PCHB NO. 01-133
PORT OF SEATTLE'S MEMO OPPOSING
ACC'S MOTION FOR STAY

Declaration of Steven G. Jones

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POLLUTION CONTROL HEARINGS BOARD
FOR THE STATE OF WASHINGTON

Airport Communities Coalition, Appellant, v. Department of Ecology and The Port of Seattle, Respondents.	No. PCHB 01-133 DECLARATION OF STEVEN G. JONES

STEVN G. JONES declares as follows:

1. I am one of the attorneys representing Respondent Port of Seattle (the "Port") in this case. I have personal knowledge of the facts set forth in this declaration and would be competent to testify to them if necessary.

2. I was involved in the preparation and review of the Port's responses to public comments received in response to the JARPA application filed by the Port with the U.S. Army Corps of Engineers and the Department of Ecology (reference number 1996-4-02325). Attached to this Declaration as Exhibit A is a true and correct copy of the Port's General Responses to those comments, dated April 30, 2001.

3. In addition to its General Responses to public comments, the Port prepared specific responses to many of the comment letters received by the Corps and Ecology. For reference

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purposes, copies of Port's responses to comment letters received from Amanda Azous, Dr. Peter Willing, William Rozeboom, Dr. John Strand and Tom Luster are attached to this declaration as Exhibit B. Those responses were directed to specific comments in the various comment letters. Accordingly, in order to facilitate review of the Port's responses to individual letters, the comment letters to which the responses are directed have been included along with each of the responses.

3. Attached to this Declaration as Exhibit C is a true and correct copy of a letter sent on January 21, 2001 from Tom Luster to the Honorable Julia Patterson.

4. Attached to this Declaration as Exhibit D is a true and correct copy of the Water Quality Certification issued by the Department of Ecology on September 21, 2001, for U.S. Army Corps of Engineers Public Notice 1996-4-02325 (Amended – 1), reflecting the changes agreed to by the Port and the Department of Ecology in the Stipulation and Agreed Order of Dismissal filed in the case of *The Port of Seattle v. Department of Ecology*, PCHB No. 01-150.

5. Attached to this Declaration as Exhibit E is the Motion for Voluntary Dismissal filed by the Airport Communities Coalition on June 11, 2001, in the case of *Airport Communities Coalition, et al. V. Federal Aviation Administration and Port of Seattle,* U.S. Court of Appeals for the Ninth Circuit, No. 00-708-48.

6. Attached to this Declaration as Exhibit F is a letter dated August 9, 2001, from Donna Darm, Acting Regional Administrator for the National Marine Fisheries Service to Lowell H. Johnson, Manager, Airport Division.

7. Attached to this Declaration as Exhibit G is a true and correct copy of Regulatory Guidance Letter No. 87-03, issued by the U.S. Army Corps of Engineers on April 14, 1987.

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I declare under penalty of perjury under the laws of the State of Washington that the foregoing is true and correct.

Executed at Seattle Washington, this 1st day of October, 2001.

Steven G. Jones

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A

Response to Comments

Master Plan Update Improvements at
Seattle-Tacoma International Airport

Permit: 1996-4-02325

Prepared by:

Port of Seattle
17900 International Boulevard, Suite 402
SeaTac, Washington 98188

April 2001

I. SUMMARY

Introduction

On December 27, 2000, the U.S. Army Corps of Engineers issued a second revised public notice concerning the Section 404 application under the Federal Clean Water Act for the proposed Master Plan Update improvements at Seattle-Tacoma International Airport. This document has been prepared to provide the regulatory agencies with responses to agency and public comments concerning this application from the Port of Seattle perspective. This document is organized as follows:

I. Summary (Introduction and Summary of Changes in the Port's Application Since 1999)

II. General Responses to Comments

III. Response to Agency Letters
- Response to Tom Luster's Memo to Julia Patterson
- Response to Muckleshoot Tribe
- Response to Airport Community Coalition communities and their Technical Consultants

a. Helsell Fetterman
b. Stephen Hockaday
c. Geoff Gosling
d. Thomas Lane Associates
e. GeoSyntec
f. Azous Environmental
g. BioAnalysts
h. Columbia Biological
i. Northwest Hydraulics
j. Norman Wildlife Consulting
k. Paschal Osborn
l. Sheldon & Associates
m. Water Resource Consulting
n. Smith & Lowney

IV. Responses to Citizens, Groups and Elected Officials – letters, emails, faxes, hearing cards and transcript

V. Earlier Public Notice Comments and Responses (Prior to 1999 Public Notice)
- Overview of how new material changes earlier responses
- Earlier Public Comments and Responses

Sections II through IV respond from the Port's perspective to comments received since the 1999 public notice. Section V contains the Port of Seattle's responses to all comments received prior to the 1999 notice. It is important to note that the responses to comments in Section V have not been undated based on new information. Rather, the Port has prepared an overview of how the 2000 public notice material affects these responses.

Application History

On December 18, 1996, the Port of Seattle (Port) submitted a Joint Aquatic Resources Permit Application (JARPA) to the U.S. Army Corps of Engineers (Corps) to apply for Section 404 approval under the Federal Clean Water Act for the proposed Master Plan Update improvements at Seattle-Tacoma International Airport.

On December 19, 1997, after receiving the additional information it deemed necessary for a complete application, the Corps published a Public Notice (reference number 1996-4-02325). Table 1 lists the pertinent details regarding the public notices for the project.

Table 1. Public Notice History for Master Plan Update Actions

	Original Public Notice	1st Revised Public Notice	2nd Revised Public Notice
Publication Date	December 19, 1997	September 30, 1999	December 27, 2000
Public Hearing Date and Location	April 9, 1998 Foster Performing Arts Center, Tukwila	November 3, 1999 Foster Performing Arts Center, Tukwila	January 26 and 27, 2001 Washington State Criminal Justice Training Center, Burien
End of Comment Period	April 21, 1998	November 29, 1999	February 16, 2001
Number of Letters	90[a]	256	321
Number of People Providing Oral Comments	70	59	117

[a] Number of letters listed are those received during official comment periods. The Corps also accepted letters received between comment periods.

In July 1997, the Federal Aviation Administration (FAA) issued the Record of Decision on the Port's proposed improvements under its Master Plan Update, and the Port initiated the process to acquire property necessary to construct those improvements. Up until that time, the majority of property owners potentially affected by the project had denied the Port access to their property. The *Final Environmental Impact Statement* (FEIS), *Final Supplemental Environmental Impact Statement* (FSEIS), and permit application (Joint Aquatic Resources Permit Application – JARPA) made note of this fact, consistently stating that the impact of the project could increase as the Port obtained site-specific information. Because access was denied until the property had been acquired, wetland fill acreages provided in these documents had been estimated using the best available information, including City of SeaTac critical areas mapping and National Wetland Inventory maps.

By mid 1998, the Port had gained possession of about 30 properties and had initiated a wetland delineation and survey process for these parcels. At that time, it became apparent that more or larger wetlands were present than had previously been estimated. In addition, a field survey found the Miller Creek channel to be 83 feet further east than shown in previous mapping (which was based on National Wetland Inventory maps). Because of the increased impact acreage, the Corps and the Port agreed that it was important to give the public an additional opportunity to comment, so a Revised Public Notice was issued on September 30, 1999, and a second public hearing was held on November 3, 1999.

In 1999, the state legislature mandated that Washington State Department of Ecology (Ecology) perform a study of the impacts to the underlying aquifer and adjacent water bodies from the placement of fill overlying the Highline Aquifer. Ecology contracted with Pacific Groundwater Group to conduct the study, which was completed in June 2000.

The Port worked with the Department of Ecology and Corps of Engineers in 2000 to address comments raised in the public comment period. Ecology determined that additional review of the *Comprehensive Stormwater Management Plan* (CSMP) for Master Plan Update actions was necessary, and contracted with King County to conduct a detailed review of the CSMP.

In September of 2000, Ecology determined that the state required more time to work with the Port to evaluate whether the agency had reasonable assurance for the Master Plan Update improvements. The time necessary to review and assess the remaining project issues was in excess of the deadline for Ecology to issue a §401 water quality certification on the project, one year from the Public Notice date of September 30, 1999. The additional review and assessment was required for specific remaining elements of the *Comprehensive Stormwater Management Plan*, the *Natural Resource Mitigation Plan* and Flow Augmentation proposal.

As a result, on September 28, 2000, the Port of Seattle withdrew the JARPA, with the intent of resubmitting the application at a later date.

The second Revised Public Notice was issued on December 27, 2000. In this case, the public was asked to comment on changes to the project since September 30, 1999, including:

- Project design changes
- Final verification of affected wetland boundaries
- Additional analysis of wetland impacts
- Revisions to the stormwater management plan
- Updated information concerning impacts to endangered species, and
- Revisions to the natural resources mitigation plan.

Changes Since First Revised Public Notice

Since the submittal of the Port's first §401 application in December 1996, a number of changes have occurred including:

- Project design changes (such as the mechanically stabilized earth wall, stormwater management facilities, the temporary construction interchange on SR 509, etc);
- Final verification of wetland boundaries as the Port gained access to the land acquired to build the runway embankment; and
- Listing by the National Marine Fisheries Service and the U.S. Fish and Wildlife Service of Endangered Species known to use waters in Puget Sound.

The following summarize these changes.

Project Design Changes

Mechanically Stabilized Earth (MSE) Wall

Port staff and consultants have completed geotechnical, hydrologic, and wetland studies to identify alternatives and verify that proven mechanically stabilized earth (MSE) technology can provide safe and relatively cost-effective construction of retaining walls for soil conditions at the site. A large number of embankment slope and retaining wall alternatives were considered to avoid or reduce impacts to Miller Creek and adjacent wetlands. MSE retaining walls were selected by the Port as the recommended alternative to be developed, as follows:

- At the north end of the embankment, MSE walls will be used to limit the impact to Miller Creek and the extent of filling of Wetlands A-1 and 9.
- Near the middle of the west side of the embankment, an MSE wall will be used to avoid filling a significant part of Wetland 37a, and to avoid relocating part of Miller Creek.
- Near the south end of the new runway, an MSE wall will be built to limit the extent of filling of Wetland 44a.

MSE is a method of constructing earth embankments using a combination of compacted soil and reinforcing elements. MSE technology includes a range of steel and polymer (plastic) products (mesh, strips, and grids) used to retain and reinforce soil, and provides a number of advantages over other types

of retaining walls. The MSE technology selected by the Port improves soil strength by incorporating reinforcing steel strips into the soil embankment.

Proposed Stormwater Management Facilities

Stormwater management has been the main focus of discussions between the Port and the regulatory agencies since the first Revised Public Notice. Many substantial design improvements have taken place as a result of these discussions.

As described in a later section of this report, the stormwater detention requirements at the Airport have increased from 76.6 acre-ft to 326.4 acre-ft. Table 2 lists the facilities the Port proposes to meet these detention needs.

Table 2 – Proposed Stormwater Facilities for MPU Projects

Project	Description
South Aviation Support Area (SASA) Detention Pond	Create regional stormwater detention pond for the SASA project and other sites. Pond will be 33.4 acre-ft and discharge to Des Moines Creek.
North Employee Parking Lot (NEPL) Vault	A 13.9 acre-ft vault to retrofit the NEPL; will discharge to Miller Creek via Lake Reba.
Third Runway Vaults and Ponds	Stormwater detention vaults and ponds at the north, west, and south sides of the Airport, discharging to Miller, Walker, and Des Moines creeks.
Sea-Tac International Airport Retrofit Facilities	Detention vaults or ponds to provide flow control retrofitting for existing Airport discharges to Des Moines Creek. Vaults to be constructed in combination with third runway facilities when possible.
Cargo Vault	Detention vault for North Cargo facility (4.5 acre-ft discharging to Miller Creek via Lake Reba).

In response to Ecology's preference for stormwater infiltration facilities, the Port has included two infiltration facilities in subbasins of Miller Creek.

Temporary SR 509 Interchange

The Port has refined its design for this temporary construction-only interchange in consultation with the Washington State Department of Transportation (WSDOT). The interchange will be constructed within the WSDOT right-of-way in the south and northbound locations. In the SR 509 southbound lane, a ramp accessing the interchange will exit SR 509 about 1,300 ft north of South 176th Street and rise to the elevation of the overpass. In the northbound lane, the ramp will merge empty trucks about 1,200 ft north of the overpass. As a result, the grade change will provide a natural deceleration brake for full trucks leaving SR 509 as they travel over the incline to reach the overpass, before proceeding east on the overpass. Because property acquisition will have been completed to the area west of the proposed Third Runway embankment, as defined in the *Final EIS* and *Final Supplemental EIS*, South 176th Street will be closed to through traffic at the easterly edge of the overpass (this will be done so as to not affect public access to the residential area west of SR 509). As a result, trucks exiting SR 509 will not be required to stop before turning east over the overpass.

The design of the interchange was modified slightly in 2000 to eliminate impacts to 0.011 acres of jurisdictional wetland that had been identified.

Final Verification of Wetland Boundaries

As of the dates of the original Public Notice and the first Revised Public Notice, the Port did not have access to all parcels affected by the proposed action. Accordingly, the Corps was not able to verify the boundaries of all affected wetlands in the project area. The Port has now gained access to all parcels and delineated all wetlands affected by the project and the Corps has verified these new boundaries. The Corps considers the verification of all wetland boundaries affected by the Port's proposal to be complete.

Completed Delineations of Impacted Wetlands at Airport

Wetland delineations have been completed for all wetlands that will be affected by Master Plan projects; including several parcels not delineated prior to the last public notice.

Between the first and second Revised Public Notice, a specific concern was raised regarding the potential impacts to Wetland 44 from the construction of the temporary SR 509 interchange. In response to these concerns, the Port revisited the previous delineation.

Wetland 44 is located in a steep-sided ravine between South 174th Street and SR 509. The base of the ravine is crossed by SR 509 road fill, which creates an artificial depression. Water entering the ravine is conveyed in a culvert beneath SR 509 to a ditch on the west side of the highway, and then to Wetland 43. Wetland 43 is the source of Walker Creek, a tributary to Miller Creek. The wetland was examined during several site visits between July 1998 and October 2000. In June 2000, approximately 0.01 acre of wetland occurring on the SR 509 road fill was added to Wetland 44a. In October 2000, the eastern edge of the wetland was modified when about 0.25 acre was determined to be upland.

The delineation of Wetland 28, near the Industrial Waste System (IWS) lagoon, was also modified. Originally, the wetland edge was delineated near the base of existing fill, but portions of the wetland boundary were found to extend upslope onto the fill. The wetland is now estimated to be 35.45 acres. A total of 0.07 acre of Wetland 28 will be affected by the project.

Completed Delineations at Auburn Mitigation Site

In October 2000, Parametrix conducted a jurisdictional wetland delineation on the 67-acre mitigation site located in Auburn, Washington. The wetland delineation followed required methods of the U.S. Army Corps of Engineers *Wetlands Delineation Manual* (Environmental Laboratory 1987) and the *Washington State Wetlands Identification and Delineation Manual* (Ecology 1997).

Three jurisdictional wetlands were delineated on the mitigation site. Wetland 1 occurs in the northwest and central portions of the site and extends off site to the west and north. About 20.45 acres of the wetland occur on the mitigation site. Wetland 2 is 0.60 acres and is located in the south-central part of the site. Wetland 3 is 0.01 acre and is located in the north-central part of the site.

Wetlands 1 and 2 meet the Ecology criteria of a Category III wetland. Wetland 3 meets the criteria of a Category IV wetland. The soil, hydrology, and vegetation of these wetlands are similar. The remainder of the mitigation site (about 44 acres) is non-wetland.

Additional Analysis of Affected Wetlands

Between the first and second revised Public Notice, the Port undertook an extended additional analysis of wetland impacts. This analysis included:

- Compiling more information on indirect and cumulative impacts;

- Assessing additional areas where impacts to wetlands could be avoided;
- Compiling more information on impacts associated with implementing the mitigation plan; and
- Taking a second look at certain wetlands where specific concerns had been raised.

Indirect Impacts

Section 4.3 of the *Wetland Functional Assessment and Impact Analysis* (Parametrix 2000) provides a detailed description of the anticipated indirect impacts from implementation of the Master Plan Update improvements. Potential indirect impacts include:

- Placement of fill near or adjacent to wetlands;
- Stormwater management upslope of wetlands;
- Aircraft noise;
- Human disturbance from nearby construction activities;
- Wildlife hazard management activities required for aircraft safety;
- Excavation for retaining wall footings or stormwater management ponds upslope of wetlands; and
- Potential discharges of stormwater runoff to wetlands near construction sites.

These impacts could affect the wildlife habitat, hydrology, and/or water quality functions of the wetlands.

The calculated permanent impacts to wetlands (18.37 acres) include about 2.4 acres of indirect impacts that could occur in certain locations where changes to wetland hydrology, shading, or fragmentation of wetlands occur. While these indirect impacts could result in the loss of some wetland functions from an area, they may not necessarily remove all functions. For example, where the SASA bridge is proposed to cross Wetland 52, shading will eliminate wetland vegetation and wildlife habitat, however, the corridor and hydrology functions provided by the wetland will remain. Nevertheless, to be conservative, the indirect impacts are fully mitigated at a ratio of 3:1.

Cumulative Impacts

Section 4.4 of the *Wetland Functional Assessment and Impact Analysis* provides a detailed description of the anticipated cumulative impacts associated with the implementation of the Master Plan Update improvements and other projects in the general area. These projects include:

- SR 509 Extension and South Access Roadway (Washington State Department of Transportation)
- Central Link Light Rail Transit System (Regional Transit Authority)
- Regional Detention Facility (Des Moines Creek Basin Committee)
- Land Use Planning Activities (City of SeaTac)
- Navigation Improvements (Federal Aviation Administration)
- South SeaTac Electrical Substation Upgrade (Port of Seattle)
- Upgrade and Expansion of Industrial Wastewater System Lagoon 3 (Port of Seattle)
- Upgrade of Airport Satellite Transit System (Port of Seattle)
- Air Cargo Development Plan (Port of Seattle)
- Part 150 Noise Study (Port of Seattle)
- South Terminal Expansion (Port of Seattle)
- Aircraft Hydrant Fueling System (Port of Seattle)

Impacts Avoided in Borrow Areas 1 and 3

The Port has redesigned the excavation plan for Borrow Sites 1 and 3 to avoid impacts to Wetlands 48 and B15, which are located along the southwestern edge of the borrow area of Area 1, and to avoid impacts to Wetlands B10, B29, B9b, B9a, 30, B7, B6 and B5 in Area 3. This action avoids impacts to approximately 3.63 acres of wetland in Area 1 and approximately 2.35 acres in Area 3, a portion of which is forested. The Port has also designed a seepage collection drainage swale to mitigate potential indirect impacts to wetlands in Area 3.

Wetland Modifications Resulting from Mitigation

Section 4.2.3.5 of the *Wetland Functional Assessment and Impact Analysis* identifies the anticipated impacts associated with implementation of the proposed mitigation. These impacts will occur both at the Airport and at the Auburn mitigation site. In general, these impacts will affect Category II, III, and IV wetlands that are farmed or dominated by non-native vegetation.

Since the affected areas would be incorporated into the mitigation design, no loss of wetland would occur. The exception to this is a small (0.12 acre) area of emergent wetland (dominated by pasture grasses) that would be filled by an access and maintenance road to the Auburn mitigation site. Following implementation of the mitigation projects, wetland areas would be restored to higher quality wetlands, including converting Category III and IV wetlands to Category II. These Category II wetlands will typically have extended wetland hydro-periods and greater diversity of plant community types that improve water quality and habitat functions.

Vacca Farm Wetland Restoration Site

Mitigation at the Vacca Farm Restoration site will modify existing wetland, farmed wetlands, and prior converted cropland. Relocation of the Miller Creek channel will affect 2.21 acres of wetland. Fill placement to create channel banks will affect 1.79 acres of wetland and excavation of new floodplain in currently farmed areas will modify 1.56 acres of wetland.

Miller Creek Riparian Buffer

Enhancement of 7.40 acres of wetland in the Miller Creek buffer will involve minor disturbance. Planting will redistribute soils. The clearing and grubbing that may be necessary to remove existing non-native vegetation will also redistribute soils. Finally, a temporary irrigation system will also disturb wetland soils.

Tyee Valley Golf Course Wetland Mitigation and Des Moines Creek Buffer

Enhancement of 6.07 acres of wetland on the Tyee Valley Golf Course will involve some soil disturbance during demolition of pathways and other structures located in wetlands. Planting will also redistribute soils.

Auburn Wetland Mitigation Site

Impacts from implementation of the mitigation plan at the Auburn site will be similar to those described for the other mitigation sites. Soils will be disturbed and redistributed due to planting, and clearing and grubbing. This will affect about 9.13 acres of low quality wetland. Excavation will affect about 10.39 acres of Category III wetlands. A temporary construction access road will affect about 1.55 acres of wetland temporarily. To minimize these impacts, the road will be constructed on geotextile fabric and a

quarry rock base. While the base will allow surface water to equilibrate across the road, culverts will also be placed to convey water to existing ditches.

On-site construction staging will also temporarily affect about 5.11 acres of wetlands. Geotextile fabric and gravel will be placed on portions of the site prior to their use for staging. Following excavation, the staging area will be removed and the existing wetlands enhanced.

Wetlands 43 and 44

Between the first and second revision of the Public Notice, the Airport Communities Coalition (ACC) expressed concern over what they viewed as the potential alteration to the headwaters of Walker Creek, a tributary to Miller Creek. The ACC maintained that impacts to Wetlands 43 and 44 affect "headwater seeps" that they believe are the source of flow for Walker Creek. The impacts could potentially come from the construction of the temporary SR 509 interchange or the embankment placement.

The portions of Wetland 44 where fill will occur are located upslope of one of the several perennial seeps that ultimately coalesce and form Walker Creek. The fill would affect a channelized portion of the wetland that, primarily due to stormwater runoff from streets and conveyance through culverts has concentrated to form channelized flow. During winter months, some interflow (shallow soil water) also seeps into this portion of the channel.

Two small channels are mapped as perennial on Parcel 496 in the *Wetland Delineation Report* (Parametrix 2000, Appendix D, Map 14). Upslope of Parcel 496, where fill will occur (on Parcels 494 and 493) the channels are mapped as intermittent. Permanent fill will not extend westward from Parcel 494 or 493 to Parcel 496, and thus will not be placed in channels with perennial flow.

The project will eliminate unmanaged stormwater runoff generated by 12th Avenue South from entering Wetland 44. In the future, stormwater runoff from the third runway project will be collected, treated to meet water quality requirements, and released gradually from detention facilities to reduce peak streamflows in Walker Creek. Thus, filling of 0.26 acres of Wetland 44 would not impact the water quality or the peak flow conditions in Wetland 44, Wetland 43, or in Walker Creek.

The groundwater discharge functions of Wetland 44, which are important to Walker Creek, will be will be maintained by the design of the embankment fill, as described in the several hydrologic evaluations for the project. The embankment design will allow groundwater to infiltrate into the embankment and recharge aquifers in the soils beneath it. This water would move subsurface, eventually discharging to Wetland 44 or Wetland 43. The hydrologic delay caused by water moving through the embankment fill, would improve the hydrologic condition of Wetland 44 because additional groundwater would be discharged to the wetland during the late spring and early summer months than currently occurs. Thus, fill of 0.26 acres of Wetland 44 would not negatively impact the groundwater discharge functions this wetland provides to Walker Creek.

Temporary impacts to Wetland 44 would result from stormwater management facilities needed during construction. The temporary impacts that would occur on Parcels 493 and 496 are where a small perennial seep is present and on Parcel 485 where a second intermittent channel is present. The temporary uses of these areas for stormwater management are designed to protect water quality (by removing sediments and turbidity) and to prevent hydrologic alterations (by preventing changes to groundwater gradients and by discharging treated (clean) runoff back to the wetland).

After consultation with the Corps, the Port redesigned the temporary SR 509 interchange to avoid direct and indirect impacts to wetlands. One of the most significant perennial water sources to Walker Creek

base flow is from the constructed drainage system beneath SR 509 near South 176th Street. This subsurface water is collected on the east side of SR 509 and conveyed under the highway to enter Wetland 43 on the west side of SR 509. The outlet of this drainage system provides a large amount of flow to Wetland 43 and may be construed to be the headwaters of Walker Creek. This groundwater source will not be affected by the embankment or interchange project.

Stormwater Management

Stormwater management at Sea-Tac Airport has been the subject of much study and discussion between the agencies and the Port since the first Revised Public Notice. As a result, a number of changes have occurred in the proposed *Comprehensive Stormwater Management Plan* (Parametrix 2000).

The Port re-ran the model that the stormwater planning was based on and revised some of the basic parameters. These included:

- Recalibrating the Hydrologic Simulation Program-Fortran (HSPF) model to include a separate calibration for Walker Creek;
- Using updated land use and soils information;
- Changing the location of downstream points of compliance for peak stormwater flows from instream locations to the outlets of each subbasin; and
- Changing the assumption of the pre-project condition from a 1994 base year to an assumption of only 10 percent impervious surface.

Additionally, the Port and the agencies agreed that the Port could not assume the use of an expanded Miller Creek Regional Detention Facility (RDF) or a new Des Moines Creek RDF in its planning. The outcome of these changes was to increase the stormwater detention requirements for the project from 76.6 acre-feet to 326.4 acre-feet.

The revised *Comprehensive Stormwater Management Plan* includes new or expanded facilities to meet the increased detention requirements. These include stormwater infiltration facilities in two Miller Creek subbasins. The revised plan also proposes a schedule for implementation of new stormwater facilities that is synchronized with Master Plan Update projects.

Another revision to the *Comprehensive Stormwater Management Plan* since the first Revised Public Notice concerns low flow mitigation to Miller, Walker and Des Moines creeks. The Port now proposes to enhance low stream flows by ceasing the exercise of existing surface water rights (obtained by the Port through property acquisitions) on Miller Creek, incorporating infiltration into stormwater detention facilities where feasible, and supplementing low flow with stored and released stormwater to mitigate base flow impacts. The Port's participation in the Basin Plan flow augmentation project is not proposed as mitigation for Master Plan Update impacts. Impacts to low flows in Des Moines Creek caused by Master Plan Update projects will be mitigated by stored and released stormwater, and no other impacts to low flow will be mitigated by the Port's plan to store and release stormwater. The Port will continue to participate in the Des Moines Creek Basin Plan Committee's flow augmentation project, which addresses low flow issues caused by urban development throughout the basin.

Endangered Species

Section 7 of the Endangered Species Act (ESA) requires federal agencies to ensure that their actions do not jeopardize the continued existence of endangered or threatened species, or their critical habitat. Therefore, the Federal Aviation Administration (FAA) prepared documentation (Biological Assessments)

on potential impacts and mitigation for species listed under ESA that may have the potential to be affected by actions at the Airport.

In 1995, a Biological Assessment (BA) was prepared for two bird species listed under ESA by the United State Fish and Wildlife Service: bald eagles and peregrine falcons. The BA determined that the Master Plan Update projects *"may effect, but were not likely to adversely affect"* these species. The FAA initiated consultation in 1995 with the US Fish & Wildlife Service (USFWS) on the findings of the BA, and USFWS concurred with the determination on December 6, 1995.

Since the May 1997 publication of the *Final Supplemental EIS* and the issuance of the Record of Decision on July 3, 1997, two species of fish were listed as threatened under ESA: Coastal/Puget Sound bull trout (listed by USFWS) and Puget Sound Chinook Salmon (listed by the National Marine Fisheries Service–NMFS). Both of these species and/or their critical habitat may occur in the vicinity of the Airport.

In April 2000, the FAA, because of changes to the proposed project and the new listings, re-initiated consultation with the Services (USFWS and NMFS) concerning the impacts of Master Plan Update projects over which FAA possesses discretionary involvement or control. In accordance with Section 7 of the Endangered Species Act, the FAA and Corps authorized the preparation of a second Biological Assessment (Parametrix 2000).

The 2000 BA concluded that the proposed actions: (1) "may affect" but are "not likely to adversely affect" bald eagles, Puget Sound chinook salmon, and Puget Sound bull trout; (2) "may affect" but are "not likely to destroy or adversely modify" designated critical habitat of chinook salmon; (3) are within the range of expected circumstances, will have "no effect" on marbled murrelet or its designated critical habitat; and (4) will not adversely affect designated pelagic or west coast groundfish essential fish habitat.

The BA was submitted to the Services in June 2000, and supplemented in November and December 2000 with further stormwater analysis information. The Port is currently waiting for the Biological Opinion from the Services.

Natural Resource Mitigation Plan

The *Natural Resource Mitigation Plan* has been modified since the first Revised Public Notice to include more specific details about how the mitigation will be constructed, operated, and maintained. The revisions include:

- Clearer performance standards that increase the ability to evaluate if goals are being achieved and increase the agencies' ability to require contingency actions if standards are not met.
- More detail on monitoring to determine compliance with performance standards.

Additional mitigation actions are proposed at the Airport including:

- Increasing the amount of buffer along Miller Creek by providing 100-foot buffers (or buffer averaging area) to riparian wetlands as well as Miller Creek.
- Modifications to the Miller Creek instream enhancement projects to reflect recommendations of Washington Department of Fish and Wildlife.
- Removal of a shoreline bulkhead around the west and north shorelines of Lora Lake as to improve aquatic habitat functions of the lake.
- Addition of stream buffer enhancement adjacent to the Tyee wetland mitigation site on Des Moines Creek at the golf course.

The Auburn mitigation design has been revised to:

- Increase buffers to 100 feet
- Enhance new wetlands
- Incorporate the entire site (65 acres) into the mitigation project

The quantity of mitigation provided at Auburn has increased by about 15 acres over what had been proposed earlier.

II. RESPONSES TO GENERAL COMMENTS

A series of General Responses have been prepared to questions that were asked by a number of individuals or groups. General Responses (GLR) include:

GLR1	Proposal By An Independent Third Party to Conveyor Fill From Puget Sound To Sea-Tac Airport
GLR2	Fill Acceptance And MTCA Method A Standards
GLR3	Alleged Contaminated Material Placed At The Third Runway Embankment
GLR4	Use of Fill From Maury Island
GLR5	Concerns With Windshear From The MSE Retaining Wall
GLR6	Ecology/Corps Review of the MSE Retaining Wall
GLR7	Instream Flow Mitigation
GLR8	Summary Of Endangered Species Issues
GLR9	Highline School And Noise Effects On Schools
GLR10	Noise Conditions
GLR11	Air Pollution Conditions
GLR12	Public Hearing On The Revised §404 Application In 2001
GLR13	Temporary Construction Interchange On SR509
GLR14	Industrial Waste System (IWS) Lagoon 3 Project
GLR15	Comments Concerning Incomplete Information
GLR16	Validity Of The FEIS/FSEIS – Suggestions That A New EIS Or Supplemental EIS is Needed
GLR17	Consideration Of Alternatives
GLR18	Delay Measurement
GLR19	Cumulative Impacts

The responses in this section have been prepared from the Port's perspective and knowledge.

GLR1 PROPOSAL BY AN INDEPENDENT THIRD PARTY TO CONVEYOR FILL FROM PUGET SOUND TO SEA-TAC

A private proponent has proposed a conveyor belt project consisting of an offloading pier for fill material offshore of Des Moines marina and a 4.8 mile conveyor belt transport system to move material to the Port's Third Runway site. The conveyor would be used to transport fill material brought in by barge. A conveyor could substantially reduce the number of truck trips that would be associated with construction of the project. The City of Des Moines has not issued any permits or approvals for this project, and the Port and Federal Aviation Administration (FAA) have concluded that permitting obstacles render this project infeasible at this time. The conveyor belt is not necessary to construct the Master Plan Update improvements. It has been proposed as an alternative method for delivery of fill material to the construction site to alleviate trucks on local roadways. If it is not constructed, the fill can be delivered by other means. The Master Plan Update §404 permit does not have to be revised to include the conveyor belt proposal because all of the Master Plan Update projects could be built even if the conveyor is never completed.

Construction of the conveyor would require certain discretionary approvals from the City of Des Moines. These include easements to cross City-owned land, right-of-way crossing approvals, a permit or zoning ordinance amendment to locate in a single-family residential zone, a shoreline substantial development permit, and review and approval pursuant to the State Environmental Policy Act. A *Final Supplemental Environmental Impact Statement for the Greater Des Moines Comprehensive Plan Amendment and Proposed Conveyor Project* was issued on March 5, 1999, and after deliberation by the Des Moines City Council on May 13, 1999, an amendment to the Comprehensive Plan necessary to approve the private proponents proposal, failed unanimously 6-0.

The conveyor project is being considered under a separate application for a Corps Section 10 permit (Corps File No. 2000-1-01481). A Public Notice on the project is anticipated shortly.

The conveyor belt project is proposed by a private entity (Environmental Materials Transport LLC) that intends to compete for the job of delivering fill material to the Master Plan Updateproject sites. As was noted in the *Final EIS* and *Final Supplemental EIS*, the Port would require project bidders to demonstrate that the bidder has obtained all necessary environmental permits and approvals for delivery mechanisms other than conventional haul (truck haul) and use of fill from the sites other than those evaluated. The Port continues to believe that local permitting obstacles render the conveyor project infeasible at this time.

GLR2 FILL ACCEPTANCE AND MTCA METHOD A STANDARDS.

Through its Clean Water Act §401 permitting process, the Department of Ecology (Ecology) has required the Port to develop a process for ensuring that contaminated fill material is not incorporated into the Third Runway embankment. The process agreed to by Ecology is contained in the 1999 Airfield Project Soil Fill Acceptance Criteria (Fill Acceptance Criteria). The process includes several steps necessary to evaluate fill material prior to acceptance and during placement of accepted material. Briefly, the procedures include:

1. The Port and the supplier identify the type of fill site. Sites which are potential sources of fill are classified into three general categories: (1) State-certified borrow pits; (2) Category A sites (industrial sources, locations known to have probability of environmental impact, and sites listed on Ecology databases); and (3) Category B sites (sites with low probability for environmental impact such as residential sites). The classifications are used to identify the appropriate level of evaluation and testing.

2. The supplier conducts an environmental evaluation. Using a qualified environmental professional, a supplier of proposed fill must conduct an environmental evaluation of the site. The level of review varies based on the category of site, but generally involves a review of historic site operations, a site inspection, and chemical testing of the soil. The supplier is required to certify that the soil meets MTCA Method A standards.

3. The Port reviews the supplier documentation. Based on the information provided by the supplier, the Port makes a determination of the suitability of the material. As appropriate, the Port may conduct an independent inspection of the site. After making the evaluation the Port decides if the material is suitable or not. The Port may also condition acceptance of the fill; for example, material may be accepted only from certain well-defined portions of a site, additional testing may be required during excavation, or on-site environmental supervision may be required.

4. The Port inspects incoming fill material. The Port inspects material coming into the Third Runway embankment, specifically observing for any visual or olfactory signs of contamination, as well as any other indication (e.g., soil type) that the material is different from the soil accepted for import. In addition, the Port may inspect the source excavation activity on a periodic or regular basis.
5. The Port reports quarterly to Ecology. The Port provides Ecology a quarterly summary of material brought into the Third Runway embankment along with supporting environmental documentation.

Pursuant to the Fill Acceptance Criteria, all material must meet project-specific geotechnical suitability criteria, and it must meet Model Toxics Control Act (MTCA) Method A standards.

Concern has been expressed regarding the use of MTCA Method A levels. Comments were expressed that MTCA Method A levels were developed to govern the clean-up of contaminated sites, not for the protection of clean sites from potentially contaminated soil, and therefore use of MTCA Method A levels was not appropriate in this context. MTCA Method A contaminant levels were developed by Ecology and have long been accepted as soil constituent or contaminant levels that are protective of human health and the environment. Method A standards are designed to be used as a conservative set of values to determine whether soil in any location, under any conditions, may remain in place for unrestricted use. Method A standards are protective of human exposure in residential settings and of ground water used as drinking water. The standards are concentrations at which soil contamination will not migrate to or otherwise impact ground water to be used as drinking water (adjusted for background and laboratory detection limits). These are the most stringent soil standards established by MTCA and are appropriate for evaluating the cleanliness of fill material to be placed in the Third Runway embankment.

Other alternatives to MTCA Method A levels that have been discussed are sediment standards, including the Washington State Sediment Management Standards and the Puget Sound Dredge Disposal Agency (PSDDA) criteria. However, sediment standards are intended for use in evaluating the soil to be placed directly into an aquatic environment in which the material forms the substrate in and around benthos. These are inappropriate standards for soil material to be located in an upland embankment that has erosion and sedimentation control mechanisms with a proven track record of environmental success.

The permit is conditioned to require adherence to the Fill Acceptance Criteria for Port acceptance of all fill material placed at the Third Runway embankment.

Another alternative is the National Oceanic and Atmospheric Administration's Screening Reference Tables Soil Values (SQuiRT). The SQuiRT approach is based on the geometric mean of natural soils throughout the United States. This would not be an appropriate standard, because uncontaminated, native soil could exceed a national average due to natural local conditions, and yet not be a threat to aquatic resources.

GLR3 ALLEGED CONTAMINATED MATERIAL PLACED AT THE THIRD RUNWAY EMBANKMENT.

U.S. Army Corps of Engineers Hamm Creek Restoration Project

Early in 1999, the Port received a request from the U.S. Army Corps of Engineers (Corps) to accept soil excavated as part of the development of the Hamm Creek Restoration Site. The evaluation of the suitability of the soil from the Hamm Creek Restoration Project was based on review of a 1990 site assessment by Boeing and a 1997 Corps Sediment Characterization Report (including the Site Sampling and Analysis Plan). Copies of these reports were provided to Ecology.

The evaluation of the Hamm Creek Restoration Project was based on review of information contained in both the Corps studies and the Boeing studies. Port review included consideration of site uses and operational history, as well as chemical test results. The Boeing studies included collection and analysis of 12 soil samples and three groundwater samples. Analytical test results for these samples were all below Model Toxics Control Act (MTCA) Method A Cleanup Levels. The Corps study was focused on specific portions of the source area being considered for potential open water disposal. The sampling, including the compositing of soil samples, was performed in accordance with Puget Sound Dredge Disposal Authority (PSDDA) protocol for open water disposal.

Although not collected in accordance with typical upland sampling protocol, it is the Port's belief the data collected by the Corps provides a useful supplement to the Boeing evaluations. The evaluation of the suitability of the soil was based on MTCA Method A standards. The PSDDA criteria are developed for open water disposal in a saltwater environment and are not applicable to an upland site. The material ultimately accepted from the Corps' project satisfied the fill acceptance criteria, and from both a technical and a regulatory standpoint, represented no unacceptable environmental risk as upland fill.

In 1999, approximately 80,000 cubic yards of soil was brought from the Hamm Creek Restoration Project to the Third Runway for use as fill. A Senior Port Site Inspector visited the Hamm Creek Restoration Site on two occasions during excavation activities to observe the material being brought into the Third Runway. In addition, the material was regularly inspected at the Third Runway receiving site.

WSDOT First Avenue Bridge Project

In the Fall of 1999, the Port of Seattle received a request from the Washington State Department of Transportation (WSDOT) to accept soil generated as part of WSDOT's First Avenue Bridge Project. WSDOT initially provided results for five samples collected throughout the proposed fill material. One of these samples exceeded the MTCA Method A Cleanup Level for total petroleum hydrocarbons (heavy oils). Additional sampling in the same area confirmed the presence of heavy oils. Based on these results, the Port of Seattle designated as not suitable for Third Runway fill the material located where soil sample data indicated concentrations greater than the fill criteria. The Port agreed to conditionally accept the remaining project material and, along with WSDOT, developed a program to monitor and test the material during excavation to confirm the continued compliance with the Third Runway Fill Acceptance Criteria and to confirm that material from the impacted area was not brought to Port property. Material from the First Avenue Bridge Project was brought to Port property in Spring 2000. The results of source sampling activities and confirmational testing demonstrate that soil from the impacted area was not brought to Port property. In addition, on-site supervision by a Senior Port Site Inspector was provided to monitor soil excavation, specifically observing any visual or olfactory signs of contamination. At the request of the Port Site Inspector, the previously identified impacted soil area was flagged so that it would clearly be distinguished from other site material. WSDOT also had a full-time site inspector at the excavation site. At the Port's receiving site, a full-time observer observed all loads received from the First Avenue Bridge Project. Based on these screening and precautionary measures, the Port is confident that all material accepted from this project satisfied the Fill Acceptance Criteria.

Other Sites

In addition to the Hamm Creek and First Avenue South projects, allegations have been made concerning a pile of dirt with a tire prominently exposed. A photograph of dirt pile and tire has been used as evidence of the type of material the Port has been accepting for fill. The photograph was taken on Port property, but it was of a stockpile of excavated material awaiting removal and disposal at a landfill. In fact, not only was the stockpiled material not to be used for fill, the project involved was not even related to the Master Plan Update projects.

Concerns have also been expressed regarding the level of testing for the Airborne Express Project. It should be clarified that at this site Phase I and Phase II studies (including soil sampling), were conducted. As a standard condition the Port required "That the Port Environmental Department be notified immediately if there are any unusual conditions such as visually or "smelly" soil." This condition was not a substitute for the standard testing requirements. Questions were also raised regarding the lack of documentation at the Lakeland Pit. This site was initially reported to Ecology in 1998 as a state-certified pit. However, subsequent reports to Ecology clarified that this site was not a state certified pit and provided appropriate environmental documentation for the site.

GLR4 USE OF FILL FROM MAURY ISLAND

The Port is not proposing to mine material on Maury Island. If an embankment construction contractor were to propose Glacier NW's Maury Island pit as a fill source for the Third Runway, it would have to meet all of the specification requirements, as is noted in the *Final Supplemental EIS*. This would include providing all necessary permits for the mining and transportation of the material. It would also require environmental testing of the material to ensure compliance with project soil acceptance criteria. No arsenic or lead contaminated materials will be accepted as fill material for the Third Runway. See also General Response GLR2 and GLR3.

GLR5 CONCERNS WITH WINDSHEAR FROM THE MSE WALL

The proposed mechanically stabilized earth (MSE) retaining wall, its geometry, and its proximity to the proposed Third Runway have been analyzed and meet all current criteria set forth by the Federal Aviation Administration (FAA). To further consider wind effects, the runway design contractor contacted bridge design specialists. Bridge design specialists were contacted, because no such specialists beyond that of the FAA exist concerning runway design requirements. Contacts with bridge design specialists indicated that the proposed embankment and wall design do not represent unusual wind concerns that do not already exist at Sea-Tac Airport off the immediate ends of the runway due to the terrain differences particularly on the north end of the airfield. As such, no unusual wind conditions are expected.

GLR6 ECOLOGY/CORPS REVIEW OF THE MSE WALL

Review of the mechanically stabilized earth (MSE) wall is conducted pursuant to the Corps' authority to consider the potential impacts of the proposed project on the public interest, pursuant to 33 C.F.R. §320.4(a) and related regulations. Such review is similar to that undertaken by the Corps for impoundment structures, the procedure for which is set forth at 33 C.F.R. §325.1(d)(6), which states:

> If the activity would involve the construction of an impoundment structure, the applicant may be required to demonstrate that the structure complies with established state dam safety criteria or that the structure has been designed by qualified persons and, in appropriate cases, independently reviewed (and modified as the review would indicate) by similarly qualified persons. No specific design criteria are to be prescribed nor is an independent detailed engineering review to be made by the district engineer.

It is the Port's belief that the professional team that is designing the retainingwall is highly qualified for this work. The design team for the overall Third Runway project consists primarily of three firms: HNTB (civil engineering), Hart Crowser (geotechnical engineering), and Parametrix (stormwater engineering and wetlands biology). As described in more detail below, a design team was assembled for the Third Runway retaining walls consisting of these three firms plus others who specialize in retaining

walls. Prior to starting design of the wall, the Port reviewed eight different types of retaining wall and more than 60 wall/slope combinations before selecting the proposed MSE wall configuration. Professional engineers at Shannon & Wilson Inc independently reviewed the evaluation of alternatives. Shannon & Wilson is a 47-year-old geotechnical and environmental engineering firm that has extensive experience in retaining wall design, Puget Sound soil characteristics, seismic analysis, and foundation analysis. Shannon & Wilson concluded that the proposed MSE retaining wall is most appropriate for this site.

The HNTB design team worked with MSE wall experts at the University of Washington (U.W.) and the Washington State Department of Transportation (WSDOT), and with two professional engineering associations, to identify firms worldwide that are qualified to design MSE retaining walls. A request for qualifications was sent out through two MSE associations. Based on its review of firms' qualifications, the design team selected The Reinforced Earth Company (RECo) to serve as lead designer for the wall. RECo's engineers have designed hundreds of MSE walls around the world, including twelve that are more than 90 feet high. The firm has designed two MSE walls that are as high or higher than the maximum proposed wall height at the Airport, and both of these have been successfully built and are performing well.

The proposed MSE walls at the Airport are being designed in accordance with the building code developed by the American Association of State Transportation Officials. HNTB and Hart Crowser have reviewed RECo's wall design calculations. The preliminary design plans and supporting calculations have been provided to the outside reviewers at the U.W. and WSDOT for their review and comment.

In addition to the above, the Port has retained three internationally recognized engineers to form a special Technical Review Board to review the RECo work. The Board members include:

- Dr. James K. Mitchell, P.E., Distinguished Professor at Virginia Polytechnic University and former Chair of the Civil Engineering Department at the University of California at Berkeley. Professor Mitchell is an expert in soil behavior and embankment construction.
- Dr. I.M. Idriss, P.E., Professor of Civil Engineering at the University of California at Davis. Professor Idriss is a recognized authority on earthquake engineering and on seismic performance of embankments and MSE walls.
- Dr. Barry Christopher, P.E., and independent geotechnical engineering consultant and internationally recognized expert in MSE wall design, construction, and performance.

The Technical Review Board was given all the engineering data, design reports, results of calculations, and wall plans for review and comment. The Board met with the Port's design team to discuss the investigations and design work, reviewed the preliminary design plans, and prepared a statement to the Corps and Ecology dated January 25, 2001. The Board stated:

> The Board is in general agreement with the design approaches and methodology employed by the design team on the Third Runway project. The Board further concludes that the embankment and MSE wall investigations and technical analyses being conducted on the project are at an appropriate level of detail and thoroughness deemed necessary for a project of this complexity and are in compliance with current engineering and construction industry practice.
>
> Each of the Board's suggestions has been, or is being, investigated and results to date support the original design. The Review Board will continue to review the design and construction approaches to the project and will provide further suggestions, as warranted, based on their in-depth experience.

The Port is satisfied that the MSE retaining wall is being designed by qualified persons and that the design is being reviewed (and modified as the review would indicate) by similarly qualified persons.

Detailed engineering plans and specifications for the MSE retaining wall are not required in the §404 permit process, as specified in 33 C.F.R. §325.1(d). Therefore, the Port believes that it was not necessary to extend the public comment period to allow more time for public review and comment on the engineering design drawings. Nevertheless, the Port believes that consideration has been given to all comments filed with the Corps prior to the decision on the §404 permit.

GLR7 INSTREAM FLOW MITIGATION

Several comment letters focused on the related subjects of (1) the stormwater detention and release strategy to mitigate low flow hydrologic impacts in Des Moines, Miller and Walker Creeks; (2) whether a water right was necessary for the stormwater detention and release strategy; (3) impacts on low stream flow of reduced irrigation in the Miller Creek subbasin; and (4) water rights issues associated with the Port's *Comprehensive Stormwater Management Plan* (CSMP) and Des Moines Creek stream flow mitigation using the Port's Tyee Golf Course Well. This general response addresses these related comments.

The Port's plan for mitigating stream flow impacts is based upon stormwater detention and controlled release to mitigate low flow impacts caused by construction of facilities at Sea-Tac Airport. The Port's Des Moines Creek Augmentation Plan is no longer the Port's primary mitigation proposal within the Des Moines Creek subbasin because of water right issues that will not be resolved by Ecology's Water Resources Program in a timeframe to meet the requirements of reasonable assurance for the §401 water quality certification. In order to set forth the options considered and the current Port approach to streamflow mitigation, a brief history of the Port's consultations with Ecology regarding stream mitigation and the evolution of the Port's mitigation plan is set forth below.

History of Stream Flow Mitigation Options.

The Des Moines Creek Basin Planning Committee identified low summer flows as a problem in Des Moines Creek in its 1997 Basin Plan. The low flows were attributed to development throughout the basin. To correct this problem, the basin planning committee recommended augmenting stream flows using groundwater from a Port-owned well. The Planning Committee proposed a minimum flow of one cfs in the creek. Maintaining the minimum flow with well water would lower the stream temperature by the introduction of cool groundwater, and would increase the dissolved oxygen content through passive aeration of the groundwater prior to its introduction into the creek. The Port, through its participation in the basin planning committee, agreed to allow the Tyee Golf Course well (Ground Water Certificate 2369) (Well No. 1) to be used to implement the basin plan. In that way, water from the well would be used to restore stream flow reduced over time by basin-wide development. The minimum flow supported by Well No. 1 would fully mitigate any low stream flow reduction caused by the Port's proposed construction projects.

Questions were raised about the validity of the water right associated with Well No. 1. The Port acquired Well No. 1 in 1961 from King County Water District No. 75 (now Highline Water District) through condemnation. The lack of clear information from the condemnation has led to questions of whether or not the water right associated with the well was transferred to the Port at that time. The Port and Highline Water District reached a negotiated agreement resolving those issues in March 2000. That agreement confirmed the Port's ownership of Well No. 1 and its associated water right and conveyed any remaining interest or rights the District may have had in Well No. 1 to the Port.

Water from Well No. 1 has been put to beneficial use continually from 1965 through the present. The water has been used to irrigate a golf course on Port property that is operated under a lease agreement. In

June 2000, at the suggestion of Ecology staff, the Port filed a change of use application to add to the water right flow mitigation for Des Moines Creek as a permitted use. However, Ecology has not acted on this change of use application, and is unlikely to do so prior to Ecology's §401 certification decision. Accordingly, Ecology requested that the Port identify and pursue other sources of water to mitigate the impacts of the Port's proposed construction projects.

The Port subsequently contacted Seattle Public Utilities (SPU) to discuss the possibility of using SPU water for flow mitigation. Sea-Tac Airport is an SPU customer, and water could be delivered through the existing airport/SPU connection. Water could be piped from the airfield to the creek, treated to remove chlorine, and discharged to the creek. However, Ecology determined that this would require a change to be made to SPU's water rights claims and/or permits. SPU declined to apply for a change to its water rights, and withdrew from the discussions at that time. Subsequently, the Port commissioned studies to design and evaluate stormwater detention facilities that would mitigate low flow impacts to Des Moines, Miller and Walker Creeks.

The Port's Mitigation Plan for Impacts to Streamflow

The Port's mitigation plan for impacts to streamflow is to detain stormwater in detention ponds and vaults and manage its release to mitigate the low flow impacts of Airport improvements on Des Moines, Miller and Walker Creeks, without the use of additional sources of mitigation water. See Section 6.2 (page 6-3) of the *Comprehensive Stormwater Management Plan* (Parametrix, updated December 2000). The Port is still participating in the Des Moines Creek Basin Planning Committee's effort to use Well No. 1 to mitigate basin-wide impacts. However, baseflow mitigation is not a part of the Port's mitigation plan as evaluated in the *Low Streamflow Analysis* (Earth Tech, December 2000).

The *Sea-Tac Runway Fill Hydrologic Studies Report* (Pacific Groundwater Group, June 19, 2000) and the *Low Streamflow Analysis* provide a comprehensive analysis of the hydrologic effects of the proposed Third Runway fill embankment, proposed stormwater detention ponds and vaults, and changes in water usage within the buy-out area of the basins. The *Low Streamflow Analysis* concludes that there will be no net effect on the low flows of the Des Moines, Miller and Walker Creeks given the changes in runoff conditions, delayed discharge of water percolating through the runway embankment fill, changes in water uses within the buy-out areas, and managed release of stormwater from reserved storage facilities. The analysis of no net streamflow impacts does not include any mitigation water sources for Des Moines, Miller or Walker Creeks, only changes in runoff conditions and stormwater management. The Port believes that the *Comprehensive Stormwater Management Plan* demonstrates that detention ponds and vaults and metered discharge will mitigate the effects of the Master Plan Update improvements on low flows of the three creeks, without the use of additional sources of mitigation water. The Port is still participating in the Basin Planning Committee's effort to use Well No. 1 to mitigate existing basin-wide low flow conditions, but not as part of the Section 404/401 permit applications for the Master Plan Update improvements. The Basin Planning Committee's effort to augment the baseflow of Des Moines Creek is separate and distinct from the Port's plan to mitigate for the impacts of the construction of those improvements on Des Moines, Miller and Walker Creeks.

Technical Evaluation of Streamflow Impacts and Mitigation Facilities

The *Sea-Tac Runway Fill Hydrologic Studies Report* (Pacific Groundwater Group, June 19, 2000) was prepared for Ecology in order to assess the hydrologic effects of constructing the proposed Third Runway fill embankment. The report evaluated hydrologic analyses completed up to that time. It also presented estimates of the hydrologic effects of delayed discharge to Miller Creek and Walker Creek of precipitation that would infiltrate the runway embankment fill, and summarized the effects of non-hydrologic factors, specifically discontinued irrigation withdrawals from Miller Creek and discontinued

discharges of imported water through irrigation and domestic septic systems. Based on the information available at the time of the report, it was concluded that the delayed fill discharge presented a significant beneficial factor in supporting summer low flows and that the net effect of discontinued local withdrawals and importation of water in the Miller Creek basin were approximately zero. Preparation of this study was overseen by Ecology, and the results were reviewed by and presented publicly with Ecology staff.

Hart Crowser later prepared an independent analysis for the Port of the behavior of precipitation infiltration through the proposed embankment fill (Hart Crowser, October 13, 2000). This analysis utilized model methods and parameters that differed in some respects from the Pacific Groundwater Group study. The Hart Crowser results supported the findings of the Pacific Groundwater Group report, specifically that there would be a delayed discharge of infiltrated water and that this would provide increased discharge from the fill area during low flow periods in Miller Creek.

The *Low Streamflow Analysis* (Earth Tech, December 2000) provided a more comprehensive evaluation of potential low streamflow effects in the three stream systems. The analysis considered the net effects on low streamflows from (1) changes in storm runoff characteristics; (2) delayed discharge of infiltrated water percolating through the fill embankment; (3) changes in non-hydrologic water uses within the buy-out area in the watersheds; and (4) managed release of stormwater from reserved storage facilities.

The EarthTech analysis utilized the results of updated Hydrologic Simulation Program-Fortran (HSPF) model simulations from the *Comprehensive Stormwater Management Plan* that were reviewed by King County staff working on behalf of the Department of Ecology. The estimates of historic local water withdrawals were revised downward from earlier estimates based on consultations with former property owners. The estimates of runoff volume that would percolate into the fill through biofiltration strips accounted for the reduced infiltration capacity expected to result from direct precipitation on the filter strips; the infiltration capacity of biofiltration swales atop the runway fill were conservatively neglected in the analysis. The analysis concluded that low flows can be maintained to, or improved above, pre-project conditions in all three streams with the implementation of the stormwater infrastructure proposed in the *Comprehensive Stormwater Management Plan* reflecting a refined estimate of historic water usage based on verification with property owners, as updated in Appendix G of the *Comprehensive Stormwater Management Plan*), cessation of irrigation and septic system discharges of imported water, delayed discharge of direct precipitation and pavement runoff through the proposed embankment fill, and the use of reserved stormwater releases.

The Walker Creek analysis accounts for changes in stormwater flows, the effects of stormwater management facilities, and delayed discharge of direct precipitation and pavement runoff through the proposed embankment fill.

The Des Moines Creek analysis accounts for the effects of stormwater management facilities and the use of reserved stormwater releases, and does not rely on the use of water from Well No. 1 to maintain low flows.

Miller Creek Water Rights Retirement

Some of the comment letters stated that the Port's acquisition of water rights certificates and claims in the Miller Creek basin would result in a net decrease to base flows. In fact, this impact is accounted for in the *Comprehensive Stormwater Management Plan* and the design of stormwater detention facilities to mitigate low flow impacts. The initial estimates of water rights and historic water withdrawals were revised in the December 2000 *Comprehensive Stormwater Management Plan* (Appendix G, pages G-1 through G-5) following contacts with former property owners in the buy-out area. The *Low Streamflow Analysis* concluded that the lowered estimate of water withdrawals in the basin would result in an estimated reduction in Miller Creek streamflow of 25,000 gallons per day (0.04 cfs). *Low Streamflow*

Analysis at 10. This 0.04 cfs impact is the net effect of both reduced water withdrawals and reduced importation of water from septic system and irrigation recharge. *See* Table 8, *Low Streamflow Analysis*, at 9. This net effect of 0.04 cfs is included in the *Comprehensive Stormwater Management Plan* Table 6-3.a, *Summary of Miller Creek Streamflow Effects*, as "Non-Hydrologic Changes." Thus, contrary to the positions taken in the comment letters, the lower estimates of water withdrawals prior to the Port's buy-out of properties in the Miller Creek basin have been accounted for in the Port's streamflow mitigation plan.

Water Rights for Well No. 1 (Des Moines Creek Augmentation Plan)

Based on the *Comprehensive Stormwater Management Plan* as described above, the *Des Moines Creek Augmentation Plan* is no longer necessary to mitigate the impacts of Master Plan Update improvements. However, the Port is still cooperating with the Des Moines Creek Basin Planning Committee to implement its recommendation that a well and pump system be constructed near South 200th Street to augment stream flow impacted by existing development in the basin. The flow augmentation would improve the existing water quality conditions in the stream during late summer, when low stream flow contributes to elevated temperatures and low dissolved oxygen levels. This effort will only be possible if the Department of Ecology approves the Port's application for change of Water Right Certificate No. 2369 to include stream flow mitigation. As part of Ecology's investigation and findings on that change application, it will make a tentative determination regarding the validity of the Port's water right for Well No. 1, answering questions raised in comment letters about the validity of the Well No. 1 water right and its suitability for use for stream flow mitigation. As set forth above, the delayed timing of this investigation and findings by Ecology led the Port to develop the *Comprehensive Stormwater Management Plan* as its primary means of mitigating low flow and water quality impacts to the three creeks. Ecology's future determination regarding the validity of the Well No. 1 water right is not essential to a finding of reasonable assurance of compliance with water quality standards for Master Plan Update improvements, because the Port is basing such compliance on the *Comprehensive Stormwater Management Plan*, not the *Des Moines Creek Augmentation Plan*.

If Ecology approves the Port's water right change application for Well No. 1 (Certificate 2369), the Port could provide enough streamflow mitigation from Well No. 1 to offset the impacts of both the Master Plan Update improvements and accomplish the goals of the Basin Plan, making construction of some of the stormwater detention vaults in the Des Moines Creek subbasin unnecessary. The Port anticipates that Ecology's §401 certification will provide that Well No. 1 could be used to mitigate low flow and water quality impacts to Des Moines Creek as an alternative to the construction of some of the detention vaults in the Des Moines Creek subbasin, if Ecology approves the Well No. 1 water right change application. However, the Comprehensive Stormwater Management Plan will provide necessary streamflow mitigation even in the event that approval is not received.

Storm Water Detention and Release Water Rights Questions

Some comments suggest that the use of retained stormwater in vaults and controlled discharge to the three creeks would improperly bypass water rights permitting requirements. The Port believes that there is no statute or case law specifically addressing the requirement for a water right to detain stormwater and control its discharge to a natural stream or aquifer as a means of mitigating the impacts of the Port's construction projects. The Port is not aware of any case in which Ecology, the Pollution Control Hearings Board, or the courts have required a water right to detain stormwater and control its discharge as mitigation for impacts to stream flow or water quality.

State and federal law requires dischargers of stormwater from construction projects of five acres or greater to control stormwater discharges. Such discharges may not occur in the absence of a discharge

permit, and these permits require the development of a site specific stormwater management plan and the implementation of "best management practices" to ensure that water quality requirements are met. Many times these best management practices will include collection and detention of stormwater prior to discharge. This requirement has been imposed at thousands of construction sites across the state.

The Port is not aware of any case where Ecology required a water right for such collection and discharge. This is appropriate, since the purpose of stormwater collection and detention and the purpose of collection, detention and metered release to augment stream flow is exactly the same– the protection and maintenance of water quality and streamflows.

A water right is only required if a person seeks to appropriate water for a beneficial use. RCW 90.03.250. Except for minimum instream flow water rights established by Ecology, a physical diversion from the natural channel of the surface waters is required to constitute an "appropriation." The Port intends only to control stormwaters from artificially created impervious surfaces prior to their entering the natural channels of the three creeks, not to divert these waters from the natural channels of the three creeks. The Port's plan to control the discharge of retained stormwaters to the creeks to mitigate the impact of the Master Plan Update improvements on the water quality and quantity of the creeks during their summer low flows does not involve a diversion of surface waters or the establishment of a new instream flow water right. Accordingly, there is no "appropriation" of water involved. If all mitigation of impacts to surface waters were categorized as "beneficial uses" of water and required a water right permit, the state would be discouraging the implementation of stormwater management plans in addition to expanding the backlog of water right applications.

In addition, it is unnecessary to create a water right for the use of detained stormwater to mitigate water quality and low flow impacts to Miller and Des Moines Creeks, because those creeks are already closed to further appropriations by Ecology rule. WAC 173-509-040(1). Thus, even if the Port creates additional flows for these creeks through stormwater detention and controlled discharges, the additional flows would not be subject to appropriation.

Finally, contrary to the suggestion of several commentors, Washington administrative case law suggests that water rights cannot be created for stream flow mitigation using detained stormwater. In *Auburn School District No. 408 v. Ecology*, 1996 WL 752665 (PCHB Case No. 96-91), the Pollution Control Hearings Board held that a water right applicant could not offset water captured from impervious surfaces and infiltrated to ground water against other consumptive uses. The Board held that water captured from impermeable surfaces would otherwise naturally recharge the system and benefit the base flows of streams. As a result, no credit was merited or authorized under the Water Code for "returning to nature what originally belonged to it." Under this reasoning, retaining stormwater and later discharging that stormwater for streamflow mitigation falls into the category of natural recharge, which would not require a water right.

GLR 8 SUMMARY OF ENDANGERED SPECIES ISSUES

Since the publication of the *Final Supplemental EIS* in May of 1997 and the Federal Aviation Administration's (FAA) issuance of the Record of Decision on July 3, 1997, the National Marine Fisheries Service (NMFS) and United States Fish and Wildlife Service (FWS) have listed as threatened or endangered two species of fish that are known to exist in streams and other waters in the Puget Sound that have the potential to be affected by the construction of the Master Plan Update improvements.

The Fish and Wildlife Service, a division of the Department of Interior, and the National Marine Fisheries Service in the Department of Commerce, share responsibility for administration of the Endangered

Species Act (ESA). Generally, NMFS possesses ESA jurisdiction over species that spend a majority of their lives in marine environments (e.g., anadromous salmonids), while FWS is responsible for terrestrial and freshwater species and migratory birds. NMFS also administers interpretation of the Magnuson-Stevens Fishery Conservation and Management Act, including Amendment 14 provisions for Essential Fish Habitat.

A species may be classified for protection as "endangered" when it is in danger of extinction within the foreseeable future throughout all or a significant portion of its range. A "threatened" classification is provided to those animals and plants likely to become endangered within the foreseeable future throughout all or a signification portion of their ranges. A "species" includes:

- any species or subspecies of fish, wildlife, or plant
- any variety of plant; and
- any distinct population segment of any vertebrate species that interbreeds when mature.

In applying the definition of "species" to anadromous salmonids, NMFS considers a group of salmonid populations to constitute a species for purposes of listing if such populations are (a) reproductively isolated from other conspecific populations; and (b) if such populations represent an important component of the evolutionary legacy of the biological species. NMFS defines its listing unit as an "evolutionarily significant unit" or "ESU."

Once a species or critical habitat has been proposed for inclusion on a list of endangered or threatened species, a notice is published in the Federal Register. The public is offered an opportunity to comment, and the rule is finalized or withdrawn. Species and critical habitat are listed as threatened or endangered on the basis of the "best scientific and commercial data available" considering biological status, threats to existence, and probable recovery. FWS and NMFS (collectively the Services) maintain a list of "candidate" species that are under review for potential listing.

The *Final EIS* and *Final Supplemental EIS* considered the effect of the Master Plan Update improvements at Sea-Tac Airport on the marbled murrelet (*Brachyamphus marmoratus*). In 1995, a Biological Assessment (BA) was prepared for bald eagle and peregrine falcon that determined that the Master Plan Update projects may affect, but were not likely to adversely affect these species. Consultation with the Services was initiated in 1995, and the Services concurred in the 1995 Biological Assessment's determination on December 6, 1995.

Subsequently, FWS and NMFS have listed several new species that may occur in the vicinity of Sea-Tac Airport, including the threatened Coastal/Puget Sound bull trout (*Salvelinus confluentus*) and threatened Puget Sound chinook salmon (*Oncorhynchus tshawytscha*). Section 7 of the ESA requires federal agencies to ensure that their actions do not jeopardize the continued existence of endangered or threatened species, or adversely modify their critical habitat.

In April 2000, the Federal Aviation Administration (FAA) re-initiated consultation with the Services concerning the impacts of Master Plan Update projects over which FAA possesses discretionary involvement or control. In accordance with Section 7, the FAA and Corps prepared a second BA for the proposed Master Plan Update actions. The BA determined that the Master Plan Update actions may affect, but are not likely to adversely affect bald eagles, bull trout and chinook salmon. The agencies further determined that under the range of anticipated conditions, the proposed action would have no effect on marbled murrelets; however, under unlikely circumstance, the proposed action may affect, but would not likely adversely affect this species. In accordance with Section 7, this BA was submitted to the Services in June 2000. Supplements to the BA were submitted in November and December 2000 respectively to update the BA with further stormwater analysis information.

NMFS also recently established requirements under the Magnuson-Stevens Fishery Conservation and Management Act for federal action agencies to consult over activities that may adversely effect designated Essential Fish Habitat (EFH). NMFS designated EFH for coastal pelagic fisheries and Pacific groundfish species, as well as several Pacific salmon species. In accordance with the MSA, the FAA and Corps prepared an EFH assessment in June 2000 analyzing the impacts of proposed Master Plan Update actions on designated EFH for pelagic fish species and determined that the Master Plan Update projects were not likely to adversely affect designated EFH. In September 2000, NMFS designated EFH for several species of salmon, including chinook, coho, pink, and chum salmon. In February 2000 the FAA prepared a supplemental EFH analysis and determined that the Master Plan Update projects may adversely affect coho salmon EFH in the short-term, but are not likely to adversely effect chinook, coho, and Pacific Sound pink salmon EFH in the long-term.

Chinook and pink salmon have not been documented to occur in the Miller or Des Moines Creek basins upstream of their discharge with Puget Sound; therefore, construction and operations of the project will have no adverse effect on freshwater EFH of chinook or pink salmon in the Miller Creek or Des Moines Creek basins. Coho salmon are present within central and lower reaches of Miller, Walker, and Des Moines creeks, and may be present in several areas where direct impacts could occur from construction of habitat improvements (e.g., installation of large woody debris, removal of rock weirs) and/or water quality alteration from turbidity, suspended sediment, or stormwater chemistry. When the potential effects of the proposed Master Plan Update improvements on the EFH of coho salmon in the project area were considered relative to the proposed conservation measures, the Agencies determined that the proposed action "may adversely effect" coho EFH in the short-term, but will be unlikely to adversely affect coho salmon EFH for the long-term and will actually prove beneficial to this species.

GLR9 HIGHLINE SCHOOLS AND NOISE EFFECTS ON SCHOOLS

In 1977, the Port settled a lawsuit with the Highline School District, paying $3.6 million to the District in exchange for aviation easements over thirteen schools. In the spring of 1992, the District expressed concern with the impact of aircraft noise on the learning environment in Highline schools. In response, the Port Commission passed Resolution 3125 that included the Port's commitment to insulate schools affected by significant aircraft noise. Since 1993, the Port has been insulating buildings at Highline Community College and completed the insulation of three private schools using standards adopted by the Federal Aviation Administration.

In 1996, following the Puget Sound Regional Council's resolution A96-01, the Port committed $50 million for a school sound insulation program. This cost was based on the District's 1990 Study and Survey Report on the condition of their facilities – which indicated total facility needs of $300 million, including $50 million for noise mitigation. In 1997, the Port offered to jointly ask the State to apply sales tax money from the development of the Master Plan Update improvements to help fund school improvement costs. This offer was rejected by the District.

The Port has an outstanding commitment to insulate schools affected by 65 DNL and greater sound levels. Although negotiations between the Port and Highline School District regarding this work are ongoing, issues concerning the standards to which the schools would be insulated currently remain unresolved. The Highline School District commissioned a study and selected a standard that is more conservative than the FAA's standard used across the country. The Port is unable to fund insulation to the new standard. Congressman Adam Smith has intervened in the negotiations and is attempting to resolve the remaining disputed issues. The District has recently commissioned a new study of designing

the schools to the Federal Aviation Administration's standard to understand the differences between the two standards. The Port continues to stand by its commitment to insulate the affected schools.

GLR10 NOISE CONDITIONS

Existing noise conditions are discussed in the *Final EIS* and the *Supplemental EIS*. Further, the Port has maintained a longstanding commitment to address existing and future noise conditions from aircraft operations at Sea-Tac Airport. The Port updated its Part 150 Noise Compatibility Plan in 2000 and issued a State Environmental Policy Act (SEPA) checklist and determination of non-significance for the recommendations contained in that plan. The Port expects to update its noise plan every five years.

GLR11 AIR POLLUTION CONDITIONS

Since the completion of the *Final Supplemental EIS*, Ecology has conducted air quality measurements in the vicinity of the Airport. The results of the carbon monoxide (CO) measurements showed that concentrations along International Boulevard were lower than modeled predictions completed for the *Final Supplemental EIS*. Higher actual CO concentrations were found along 1st Avenue South; however the emissions are a result of regional traffic not related to Sea-Tac Airport. Measurements of nitrogen dioxide found concentrations less than the national ambient air quality standards.

The Port continues to cooperate with Public Health – Seattle & King County, the Washington State Department of Health, and Ecology as they investigate whether pollution from SeaTac Airport affects the health of nearby residents. Thus far, two reports on that topic have been released. Although those reports documented a 1992 spike in a type of brain cancer in the area around SeaTac Airport, the reports concluded the rate is not higher now and that overall cancer risk is normal. However, there are indications that respiratory diseases are higher around the airport than elsewhere. According to David Solet, an epidemiologist from Public Health –Seattle & King County, "Smoking and both indoor and outdoor air pollution are some of the risk factors for these diseases. Unfortunately, we don't have enough information to know which of the risk factors is most important here."

See also response to Helsell Fetterman's December 22, 2000, letter concerning health studies conducted at other airports.

GLR12 PUBLIC HEARING ON THE REVISED PERMIT APPLICATION

A number of comments were made regarding the Port's revised §404 permit application, the public notice issued in connection with that application, the public hearing held regarding the revised application, and the public comment period following that application.

A Public Hearing on the Port's revised §404 permit application was held January 26 and 27, 2001, at the Washington State Criminal Justice Training Center. The January 26 hearing went from 5:30 pm to 10:20 pm, and the January 27 hearing went from 9:00 am to 5:00 pm.

The Public Notice on the revised permit application stated that the list of documents provided in the Bibliography is a non-inclusive list and that additional information on the project is available at the Corps' District office.

The public notice was issued December 27, 2000. The standard public comment period is 30 days, but the public comment period for this project was extended to February 16, 2001, in order to provide

additional time for public and agency comment. The *Comprehensive Stormwater Management Plan* was issued December 2000, and the Public Hearing was held January 26 and 27, 2001.

Revised reports available before the Public Notice was issued on December 27, 2000, include the: *Wetland Functional Assessment and Impact Analysis, Natural Resource Management Plan, Wetland Delineation Report, Comprehensive Stormwater Management Plan,* and the *Seattle-Tacoma Master Plan Update Low Streamflow Analysis.*

GLR13 TEMPORARY CONSTRUCTION INTERCHANGE ON SR 509

The Port proposes to construct a temporary construction-only interchange near the existing South 176th Street overpass to provide construction vehicles direct access from SR 509 to the west side of the Airport. The half-diamond interchange would consist of an exit ramp from southbound SR 509 to South 176th Street and an entrance ramp from South 176th Street to northbound SR 509.

The 1997 *Final Supplemental EIS* evaluated the construction and use of temporary construction-only interchanges proposed for the purpose of mitigating traffic-related impacts from hauling fill. The temporary interchange is discussed in the Federal Aviation Administration's Record of Decision (see Table 2-7 of Appendix A) on the Master Plan Update improvements, issued on July 3, 1997.

The interchange will be used as part of the fill haul route during construction of the Third Runway. It is a mitigation measure to reduce surface transportation impacts. It will be dedicated to haul vehicles for the Third Runway construction and will be removed when construction is complete. The Port will be responsible for operation and maintenance of temporary and permanent drainage features throughout construction of the Third Runway project as stated in the Temporary Interchange Design, Construction and Operation Agreement between the Port and the Washington State Department of Transportation.

The Port prepared and issued construction bid documents for the project in March 2000. The Port had re-evaluated the project and its impacts and believed that there would be no direct or indirect impacts to waters of the United States from the implementation of the project. The Port issued the bid document aware that any construction done on uplands related to the Third Runway before a permit decision were undertaken at the Port's own risk.

As the public learned of the request for bids, a number of letters were written to the Port, Corps, Ecology, City of SeaTac, and Washington State Department of Transportation demanding that the temporary interchange project be stopped until the Port received its §404 permit from the Corps. Some suggested that the temporary interchange construction would directly impact Wetlands 43 and 44, which the writers maintained were the headwaters of Walker Creek.

In response to the concerns raised in these letters, the Corps asked the Port and its consultants to provide more information. Site visits were undertaken specifically to investigate the concerns on May 25 and June 8, 2000. During these visits, it became apparent that the delineation for Wetland 44a was incorrect. A small area adjacent to the wetland had become saturated due to an un-maintained subsurface drainage system under SR 509. The Corps conducted a determination and came to the conclusion that this area was in fact a jurisdictional wetland. Therefore, as designed, the project would have placed fill in 0.011 acre of jurisdictional wetland and would have been subject to approval under the Clean Water Act.

The Port redesigned the project to avoid placing fill in the wetland. To be conservative, even though no impacts have been identified to surface waters, the Port has also applied for and received a Hydraulic Project Approval permit from Washington Department of Fish and Wildlife. Currently, the Port is

awaiting the outcome of its request to Ecology for a modification to its National Pollution Discharge Elimination System permit before proceeding.

GLR14 INDUSTRIAL WASTE SYSTEM (IWS) LAGOON 3 PROJECT

Commentors contend that the Industrial Waste System (IWS) Lagoon #3 upgrade and expansion project is being done to accommodate runoff from the Third Runway and therefore should be considered under the Port's §404 permit application and in connection with the §401 water quality certification process.

The upgrade and expansion of the IWS Lagoon #3 is independent of construction or operation of the Master Plan Update improvements, and would be undertaken regardless of the decision on the Port's §404 application. Treated effluent from the Sea-Tac Airport Industrial Wastewater System Treatment Plant (IWTP) currently discharges to the Midway Sewer outfall into Puget Sound. By June 2004, the Port plans to discharge the treated effluent from the IWTP to the King County East Division Reclamation Plant in Renton for further treatment, prior to discharge to Puget Sound. Expansion of Lagoon #3 will provide greater storage capacity prior to treatment and allow for a more controlled discharge to the King County Metro sewer system.

The proposed IWS improvements would allow additional areas that generate industrial wastewater to drain to the IWS rather than to the stormwater system. Runways, taxiways or the future Third Runway do not generate industrial wastewater. The existing runways and future runway will continue to drain to the stormwater system. The upgrade and expansion of the IWS was recommended in the *Industrial Waste System and Treatment Plan Engineering Report* (December 1995) and the *Addendum to IWS Engineering Report* (April 1998), which evaluated all known, available, and reasonable treatment (AKART) methods prior to discharge. In addition, special condition #4 of the Port's National Pollution Discharge Elimination System permit (WA-002465-1) for the IWS requires the Port to use AKART methods to improve water quality at the Airport.

The Port has completed the cleaning and lining of Lagoons #1 and #2 and will complete the cleaning, expansion and lining of Lagoon #3 in 2002.

GLR15 COMMENTS CONCERNING INCOMPLETE INFORMATION

A number of commentors expressed the opinion that "incomplete information" should keep the Corps and Ecology from being able to make a permit decision. References to "incomplete information" included (1) frustration over perceived delays regarding formal requests for information from the permitting agencies and the Port, (2) an "incomplete" Joint Aquatic Resources Permit Application and Public Notice, (3) various environmental reports prepared by the Port of Seattle that have been revised following the filing of the Port's permit application and contain "incomplete and misleading" information, and (4) a belief that the permitting agencies must wait for several pending studies and actions to be completed before they can make an informed permit decision.

Information Requests

Information requests for federal and state agency files related to the Master Plan Update actions have come under the Freedom of Information Act for federal agencies and the Public Disclosure Act for the state agencies and the Port.

Freedom of Information Act requests

The Freedom of Information Act (FOIA) requires an agency to decide within ten business days whether to comply with a FOIA request and to inform the person making the request of the agency's decision and of the person's right to appeal a refusal to provide information to the head of the agency. An agency may take an additional ten days to respond to the initial request or the appeal in "unusual circumstances." An agency has 20 days to respond to an administrative appeal. If the agency upholds the decision to refuse to provide the information, it must inform the person requesting it of the right to appeal to a federal court.

A number of comments have made reference to FOIA requests made to the Corps. The Port is unable to comment on the specifics of how FOIA requests for this project have been processed by the Corps. However, the Port presumes that all responses have been provided in accordance with the applicable regulations.

Public Disclosure Act (PDA) requests

State agencies are required to respond to a request for public records within five business days of receipt of the request. The response must either be (1) a production of the record, (2) an acknowledgment of receipt of the request and a reasonable estimate of the time necessary for a response, or (3) a denial of the request. If the agency asks for clarification, the requesting party must respond. Failure to do so excuses the agency from responding to the unclarified request. Denials of requests must be made in writing and state specifically the reasons for the denial. The written response must identify the specific exemption on which the agency relies and a brief explanation of how that exemption applies to the records requested.

A number of comments have made reference to PDA requests made to Ecology. The Port is unable to comment on the specifics of how PDA requests for this project have been processed by Ecology. However, the Port presumes that all responses have been provided in accordance with the applicable regulations.

PDA requests to the Port

The Port takes its public disclosure responsibilities seriously. To the Port's knowledge, all requests have been handled appropriately and within the guidelines set forth in the Public Records Act.

"Incomplete" Application

Some commentors have contended that the Port's §404 application is incomplete because it does not include sufficient information to "generate meaningful comments" on some Master Plan Update projects.

The Port's §404 application sets out all activities that the Port plans for the Master Plan Update projects. In addition, the Port has fully disclosed the existence of Port-sponsored non-Master Plan Update projects and non-Port projects in the vicinity of Sea-Tac Airport, and it has provided the Corps with the available environmental information for those projects. The Port agrees that the Corps' jurisdiction exceeds a review of the specific activity that triggers the need for a §404 permit and may include reviewing other aspects of the Master Plan Update projects or consideration of cumulative impacts.

It is the Port's belief that its application is complete, and includes "sufficient information to give a clear understanding of the notice and magnitude of the activity to generate meaningful comment." 33 CFR § 325.3. In addition to the material in the application, the Port believes that the Corps has considered, and made available to the public, information on other projects in the vicinity of the Airport. In some cases, the projects mentioned by the commentor are still in the planning stages and awaiting environmental review. In others, the Port is not the project sponsor. To the extent known, the Port has provided the Corps with all required environmental information on these projects and proposals. This information is available in the Master Plan Update §404 project file for interested members of the public and to assist the Corps' continuing evaluation of the Master Plan Update projects and consideration of the relationship between those projects and other Port and non-Port projects in the vicinity of the Airport.

"Incomplete" Public Notice

Some commentors have claimed that the section of the Public Notice that lists relevant documents is incomplete.

The Project Bibliography section of the 2nd Revised Public Notice was intended to be a "non-inclusive list" of the documents that have been issued since the last public notice which contain the most applicable information on impacts of the project to waters of the United States. The interested reviewer is referred to the Corps' project files for more information. The Corps' file for this project (open since 1996) is quite large. The fact that the Public Notice did not list all of the documents that have been prepared since November 1999 does not make the Public Notice incomplete.

A list of some of the documents referred to by the Corps was put in the Public Notice as an aid to the public in preparing comments. However, 33 CFR §325.3 does not require that an exhaustive list of each and every document prepared in connection with the project by either the Port or its consultants be included in the Public Notice. Detailed peer review of every engineering document on a project as complex as that proposed by the Port is not what is envisioned by the public comment process. Rather, what 33 CFR §325.3 requires is a "brief description" of the project to allow the public to make "meaningful comment" on the proposed project.

"Incomplete and Misleading" Environmental Reports

No attempt has been made by the Port or its consultants to mislead the public with the various environmental reports that have been prepared. The Port believes that it has presented all the information necessary for both the Corps and Ecology to make informed decisions in granting the subject permits.

Some commentors have suggested that the lack of change sheets accompanying the revised documents was a deliberate act of the Port to keep commentors from being able to find new information quickly. In fact, the documents are dynamic and have been revised a number of times in response to requests from agencies and the public. A list of the revisions has not been made, nor has such a list been kept from the public.

"Information Not Available" to Make Informed Permit Decisions.

Some commentors suggested that several pending studies must be completed before the agencies can make informed permitting decisions.

Section 401 Certification

The Port believes that there is no requirement that a §401 water quality certification be issued prior to the Corps accepting a §404 permit application. Regulatory evaluation of the §401 certification and §404 permit can occur simultaneously, which is the approach being undertaken in this case.

Hydrology Studies

Some comments noted that the hydrology studies funded by the state legislature and prepared under the direction of Ecology were not mentioned in the second Revised Public Notice. The results of these studies were used in the revision of the *Wetland Functional Assessment and Impact Analysis* (see Section 5-1) supporting the §404/401 application and the studies are listed in the bibliography.

Hazardous Waste Issues; Existing On-Site Aquifer Contamination

Some commentors contended that the Aircraft Hydrant Fueling System (AHFS) project will require the removal of existing contaminated soils and that this necessitates that the Corps and Ecology must include a review of on-site soil and aquifer contamination in their permit decision.

The AHFS is meant to replace the aging fueling system at Sea-Tac Airport and to significantly reduce the use of fueling trucks around the Airport. The AHFS has utility independent from the Master Plan Update projects and will be completed regardless of the other projects.

Because of its independent utility, the AFHS project is not included in the Master Plan Update projects considered under this §404/401 application. Additionally, the project does not have potential impacts to water of the United States and therefore does not require §404/401 approval.

The AFHS is included in the cumulative impact analysis that has been completed for the Master Plan Update projects. See GLR19 Cumulative Impacts below.

GLR16 VALIDITY OF THE FEIS/FSEIS – SUGGESTIONS THAT A NEW EIS OR SUPPLEMENTAL EIS IS NEEDED

In February 1996, the Federal Aviation Administration (FAA) and Port issued the *Final Environmental Impact Statement for Proposed Master Plan Update Development Actions at Seattle-Tacoma International Airport* (FEIS). On May 13, 1997, the FAA approved the *Final Supplemental Environmental Impact Statement for the Proposed Master Plan Update Development Actions at Seattle-Tacoma International Airport* (FSEIS). A Record of Decision (ROD) was subsequently approved on July 3, 1997, providing final approval for those FAA actions necessary to approve the proposed Airport Layout Plan (ALP). The ALP depicts four categories of development at the Airport: (1) a Third Runway (a new 8500-foot dependent air carrier runway); (2) a 600-foot southerly extension of existing Runway 16L/34R; (3) expanded runway safety areas for Runways 16R and 16L; and (4) certain terminal and landside improvements scheduled to be completed through the year 2010.

Some commentors have stated that another supplemental EIS is necessary due to changes, new information, and the passage of time since the FEIS and FSEIS were issued. Based on a full analysis of the changes, new information, and passage of time, the Port has concluded that the environmental documents are adequate and another supplemental EIS is not required.

Supplemental review under the National Environmental Policy Act (NEPA) is reserved for "significant" project changes. Unless the new circumstances or information present a seriously different picture of the environmental impact of the proposed project from what was previously envisioned, the information is not "significant." *Marsh v. Oregon Natural Resources Council*, 490 U.S. 360, 371 (1989). An agency need not supplement an EIS every time new information comes to light after the EIS is finalized. *Id.*

An agency's decision on whether to prepare a SEIS is subject to the "rule of reason." *Marsh*, 490 U.S. at 373 (1989). Under the "rule of reason" standard, an EIS must (1) contain a reasonably thorough discussion of significant impacts of the probable environmental consequences and (2) the form, content and preparation of the EIS must foster both informed decision-making and informed public participation. The requirement is that the agency has taken this procedural and substantive "hard look." *Stop H-3 Association v. Dole*, 740 F.2d 1442, 1461 (9th Cir. 1984). The Port's environmental review documents meet this standard.

See response to Helsell Fetterman letter of December 22, 2000, for a discussion of the changes and new information since the FEIS and FSEIS were issued. As described in that response, the Port has taken a "hard look" and concluded that the changes and new information do not present a seriously different picture of the environmental impacts from what was envisioned in the previous environmental documents. In the absence of significant changes and new information, the passage of time alone is not sufficient to warrant preparation of another supplemental EIS.

Ecology and the Port are subject to requirements of the Washington State Environmental Policy Act (SEPA) that are similar to NEPA's requirements. In January 2000, the Port issued an EIS addendum under the Washington State Environmental Policy Act (SEPA) entitled *Addendum To Final Environmental Impact Statement and Final Supplemental Environmental Impact Statement For Proposed Master Plan Update Development Actions at Seattle-Tacoma International Airport.* The Port has assessed the new information regarding affected wetlands and the temporary interchanges under the standards of SEPA governing when supplementation of an FEIS for an ongoing proposal is required. The Washington SEPA Rules require a supplemental EIS if there are: (1) substantial changes so that the proposal is likely to have significant adverse environmental impacts not considered in the previous EIS; or (2) new information indicating a proposal's probable significant adverse environmental impacts. WAC 197-11-600(3)(b) and (4)(d). The Port's review led to the conclusion that an Addendum was the appropriate mechanism to address these issues. SEPA does not have time limitations that would affect the preparation of a Supplemental EIS.

GLR17 CONSIDERATION OF ALTERNATIVES

Through the Flight Plan and Major Supplemental Airport Study and later through the Master Plan Update and the associated EIS process, the Puget Sound Regional Council (PSRC), the Port, and Federal Aviation Administration (FAA) have considered the full range of alternatives to the Master Plan Update projects, including alternatives to the third parallel runway.

The 1989-1992 Flight Plan Study and Flight Plan EIS Considered Regional Alternatives To Meet Air Transportation Demand

In 1989, the Port and the Puget Sound Regional Council of Governments (the predecessor regional planning organization to PSRC) initiated the Flight Plan Project to study alternatives and recommend solutions for meeting the region's long-term air transportation needs. See *The Flight Plan Project – Final Environmental Impact Statement* (October 1992). As part of the Flight Plan Project, the *Final Flight Plan*

Programmatic EIS (FPEIS) analyzed 34 alternative strategies for meeting the region's air transportation needs. *Flight Plan Draft and Final EIS.*

At the conclusion of the Flight Plan studies and public process in 1992, the Flight Plan Report concluded there was a pressing need in the Puget Sound region to meet increasing demand for air transportation services, and it recommended implementation of a multiple airport system, including the addition of a new air carrier runway at Sea-Tac Airport. *Flight Plan FEIS.* An extensive search was conducted of potential sites for a replacement or supplemental airport, and detailed study was conducted of the most promising sites. The sites that were studied in detail included Boeing Field, Paine Field, Arlington Airport, McChord Air Force Base, and potential new sites in central Pierce County and in the Black Lake area of Thurston County. Earlier in the study process, other airports and sites were considered and rejected, including Auburn, Bellingham, Bremerton, Moses Lake, Olympia, Port Angeles, Renton, Skagit/Bayview, and Tacoma Narrows.

In April 1993, in response to the recommendations in the Flight Plan Study, the PSRC General Assembly adopted Resolution A-93-03, amending the Regional Transportation Plan to authorize development of a Third Runway at Sea-Tac Airport (1) unless a supplemental airport site was proven to be feasible to eliminate the need for a new runway at Sea-Tac Airport, (2) after demand management and system management programs are achieved or proven not to be feasible, and (3) when noise reduction performance objectives are scheduled, pursued, and achieved based on independent evaluation and measurement of noise impacts. See *Master Plan FEIS* (EIS) Section I (Project Background).

In early 1994, the PSRC conducted the *Major Supplemental Airport Feasibility Study* (MSA) to consider the feasibility of a major supplemental airport. The PSRC concluded that "there are no feasible sites for a major supplemental airport within the four-county region" and that further studies of alternative sites would not be undertaken. *PSRC Executive Board Resolution EB 94-01* (10-27-94).

Following the MSA and other studies, the PSRC Executive Board determined that the region should continue to support a Third Runway at Sea-Tac Airport. *April 25, 1996 Minutes of PSRC Executive Board.* On July 11, 1996, the PSRC General Assembly passed Resolution A-96-02, which amended Resolution A-93-03 and included a Third Runway at Sea-Tac Airport, with additional noise reduction measures, in the region's Regional Transportation Plan. The Regional Transportation Plan is a part of Vision 2020, the region's growth policies and strategies. PSRC Resolution A-96-02.

Flight Plan Programmatic Environmental Impact Statement

The 1992 *Flight Plan Programmatic Environmental Impact Statement* (FPEIS) considered site-specific and programmatic alternatives to construction of a Third Runway at Sea-Tac Airport as possible solutions to the projected capacity. These alternatives included:

- No action
- Limited expansion of Sea-Tac Airport
- Expansion of Sea-Tac Airport, including a new air carrier runway
- Closure of Sea-Tac Airport and development of a replacement airport
- Multiple airport system involving Sea-Tac Airport and one or more smaller supplemental airports
- A single remote airport to be functionally linked to Sea-Tac Airport
- Demand management measures
- New air navigation and airplane technologies
- High-speed ground transportation

The Puget Sound Air Transportation Committee (PSATC) evaluated these system alternatives based on a series of criteria which included: (1) airspace and the presence of conflicts with other airports or terrain; (2) operational capacity; (3) accessibility to the region's residents; (4) economic impacts; and (5) implementation feasibility. The screening process resulted in a recommendation for further study of a multiple airport system including the addition of a Third Runway at Sea-Tac Airport; a replacement airport; use of Boeing Field as a close-in remote airport; and continued use of Sea-Tac Airport in conjunction with demand management, new technologies, and alternate modes of transportation. The following alternatives were considered and rejected:

No Action -- The PSATC rejected the no action alternative because it would not have aleviated the region's projected air capacity shortfall. Even the most conservative estimates indicated that Sea-Tac Airport would soon reach its efficient capacity. Delays were projected to be unacceptable, especially during times of peak travel or inclemant weather. Failure to take action would also have resulted in negative environmental impacts, including increased air pollution and noise, and could potentially impact the safety of the flying public.

Demand Management -- The PSATC considered various demand management strategies, including optimizing aircraft size and varible ticket pricing, to maximize the efficient use of the existing airspace capacity. The PSATC concluded that while such stragegies might provide some short-term relieve while capacity improvements were made, demand management techniques alone would not solve the region's air transportation problems.

New Technologies -- Likewise, the PSATC concluded that new technologies, such as super-sized or tilt-rotor aircraft can play a role in operational efficiency, but were too speculative and could not be relied upon to provide sufficient capacity relief and avert the expected shortfall.

High Speed Ground Transportation -- The PSATC assumed that high speed ground transportation could reduce flight operations to Portland, Oregon and Vancover, British Columbia by about one-half (40,000 operations/year) by the year 2020. Despite this reduction, Sea-Tac Airport would still face a capacity shortfall of 104,000 operations per year. Moreover, construction of a high speed rail line would cost approximately $3 billion, which made this alternative the most expensive alternative of those studied.

A single remote airport at Boeing Field or Moses Lake Airport to be functionally linked to Sea-Tac Airport -- The PSATC concluded that growth would not occur at a remote airport site until the air capacity delay and its associated cost at Sea-Tac Airport created an impetus for airlines to move their operations to the remote airfield, which would not occur in the foreseeable future. The PSATC rejected the Moses Lake remote field option because it would require some form of high-speed ground transportation link between Sea-Tac and the remote airport. The need for a high-speed ground link pushed the estimated cost to construct a remote airport at Moses Lake over $3 billion dollars, making it the most expensive alternative studied. The ground transportation requirement would also result in greatly increased travel times and reduce the convenient movement of goods and people. The PSATC rejected siting the remote field at Boeing Field because this option would provide only limited capacity enhancement to Sea-Tac Airport due to significant airspace conflicts with Sea-Tac Airport resulting from the proximity of the two airports and the alignments of their runways. Also, Boeing Field already relieves traffic at Sea-Tac Airport by accepting general aviation aircraft.

Closure of Sea-Tac Airport/Replacement Airport -- The PSATC rejected the closure of Sea-Tac Airport and construction of a large airport capable of handling the region's air transportation needs. It concluded that a replacement airport would come at a significant economic cost and would likely result in substantial environmental impacts, since no replacement sites exist close to urban centers. Siting the airport in a rural area would increase urban sprawl, would increase travel times and associated costs, and would negatively impact the region's air quality because of increased vehicle emissions.

1994 Major Supplemental Airport Study

The Major Supplemental Airport Study (MSA) began with an initial list of 40 potential sites and was developed from numerous sources, including the Flight Plan Project, existing commercial, general aviation and military airports in the Puget Sound region, and review of US Geological Survey maps for level areas large enough to accommodate an airport.

Potential sites for a new regional airport were required to meet a 2,140-acre footprint criterion to accommodate two parallel, independent runways, with a minimum separation of 2,400 feet. Sites were classified as unacceptable if significant physical obstructions (major hills, cliffs, and bodies of water) existed within the footprint that would prohibit development. Approximately 25 sites satisfied the initial criteria. Six of these sites were then eliminated due to their location outside of the relevant market area. The 19 remaining sites were then rated for accessibility, instrument approach capability, local airspace, site construction, site expansion potential, noise impacts, and environmental impacts. *Major Supplemental Airport Feasibility Study*, Working Paper Three, 3-9 (August 1, 1994). This secondary screening resulted in a reduction to twelve potential sites.

The wetland impacts, stream impacts, and wildlife habitat impacts reported in the MSA were as follows:

Location	**Wetlands Impacts (acres)**	**Stream Impacts (miles)**	**Wildlife Habitat Impacts (acres)**
Stanwood	182	4.5	233
Arlington	45	2.3	124
Marysville West	75	6.2	232
Marysville East	185		
Bothell/Mill Creek	92	0.0	170
Duvall	104	0.2	121
Redmond	187	1.0	335
Lake Sawyer	39	4.2	179
Enumclaw	83	0.0	92
McChord	166	4.1	196
Frederickson	29	0.0	33
Tanwax Lake	78	0.0	77

Major Supplemental Airport Feasibility Study Preliminary Site Screening (Phase I) Evaluation, p. 9 (August 1994). Since this initial evaluation of impacts was completed, the Port has undertaken additional evaluation of the wetland and stream impacts of the Arlington, Lake Sawyer and Frederickson sites. This supplemental evaluation demonstrated that development of the Arlington site would result inthe impact to 329 acres of wetlands and 3 miles of stream length, development of the Lake Sawyer site would result in impacts to 114 acres of wetlands and 5.3 miles of stream length, and development of the Frederickson site would result in impacts to 101 acres of wetlands and .03 miles of stream length.

On October 27, 1994, based on numerous public meetings and hearings and the information set forth in the FPEIS and MSA, the PSRC adopted Resolution EB 94-01, which concluded that a major supplemental airport was not feasible. The rationale for the decision included the increased cost of a new airport over the cost of constructing a Third Runway at Sea-Tac Airport, opposition from air carriers to the concept of a supplemental airport, questions regarding the long-term need for a supplemental airport in light of emerging transportation technologies, and support from a variety of labor, business and community groups for the concept of construction of a Third Runway at Sea-Tac Airport. *Id.* In addition,

as is set forth in the table above, and as verified in the supplemental analysis of the Arlington, Lake Sawyer and Frederickson site, evaluation of each of the remaining MSA sites demonstrated that development of any of those sites would result in more environmental impacts than construction of a Third Runway.

Finally, it should be noted that there has never been a sponsor or identified source of funds for construction of a supplemental airport and that no party or group intervened during the Flight Plan Study, Major Supplemental Airport Study or in any forum since. Neither the lack of a sponsor, nor the conclusion of the PSRC process appears to have been based on the level of anticipated demand for air travel in the region.

Sea-Tac Airport Master Plan Update/EIS

Also in response to the PSATC Flight Plan Study, the Port undertook a comprehensive update to the Sea-Tac Airport Master Plan to evaluate the long-term facility needs at the airport and to develop an array of possible improvements for efficiently meeting forecast regional air travel demand to the year 2020. The Master Plan Update built on planning work undertaken at the Airport during the previous several years and sought to balance the capacity of the airfield, terminal, roadways, and parking facilities and to maintain an efficient level of service for the growing passenger and operational demands.

To evaluate the potential environmental impacts and mitigation measures for proposed airport improvements –including a new runway – the FAA and the Port entered into a memorandum of understanding to serve as joint-lead agencies for preparing an environmental impact statement on the Airport Master Plan Update. The Corps of Engineers served as a cooperating agency for this EIS.

The Master Plan Update/EIS reconsidered the broad system alternatives to constructing a new runway at Sea-Tac Airport, including use of other modes of transportation, use of other existing airports, construction of a new airport, activity/demand management, use of technology, and delayed or blended alternatives. With regard to a new runway at Sea-Tac Airport, the Master Plan Update included a detailed analysis of the range of potential lengths and separations for a new runway. The Master Plan Update evaluated the operational benefits of the following eight airfield options:

- Do nothing
- 5,200' runway separated by 1,500' from the existing east runway
- 5,200' runway separated by 2,500' from the existing east runway
- 7,000' runway separated by 2,500' from the existing east runway
- 7,000' runway separated by 2,500' from the existing east runway and staggered 1,435' on the north end
- 7,500' runway separated by 2,500' from the existing east runway and staggered 935' on the north end
- 8,500' runway separated by 2,500' from the existing east runway
- 8,500' runway separated by 3,300' from the existing east runway

A new runway separated less than 2,500 feet from the existing east runway would not permit dual poor weather arrival streams and would therefore not significantly reduce delay. Options separated by 2,500 feet would permit dual staggered arrivals, with the types of aircraft able to use the runway dependent on its length. A 5,200 foot runway could only accommodate about 31 percent of the year 2020 Sea-Tac Airport fleet. A 7,000 foot, 7,500 foot, or 8,500 foot runway at 2,500 feet separation would be sufficiently long to accommodate between 91 – 99 percent (depending on its length) of aircraft using Sea-Tac Airport in 2020 and would provide substantial delay savings benefits. A new runway separated 3,300' from the east runway with the use of fast-radar (precision runway monitor) could potentially allow for independent dual simultaneous (non-staggered) arrival streams during poor weather, but would not produce substantially more

delay savings benefits through the year 2020 planning horizon than would a runway separated by 2,500 feet. In addition, a 3,300 foot separation would have greatly increased environmental impacts and construction costs. Based on these findings, the Master Plan Update and EIS evaluated new runway options separated by 2,500feet from the east runway with lengths of 7,000, 7,500, and 8,500 feet.

The EIS focused on the potential environmental impacts and mitigation measures of three Sea-Tac Airport improvement alternatives and the "Do-Nothing" option. Each of the three improvement alternatives include construction of a new parallel runway with a length up to 8,500 feet and development of a range of landside support facilities in either the central terminal area or through the addition of either a north unit terminal or south unit terminal. The Master Plan Update recommended development of a new two-concourse terminal building north of the existing terminal, including approximately 20-25 new gates and new parking facilities.

FAA Consideration of Alternatives

On July 3, 1997, the FAA's Northwest Mountain Region issued its Record of Decision (ROD) for the Master Plan Update Development Actions at Seattle-Tacoma International Airport. On pp. 8- 11 of the ROD, the FAA discussed its analysis of alternatives to the Third Runway. It noted that the FAA has participated for many years in regional attempts to find a solution to the Sea-Tac Airport delay problem through a wide variety of alternatives. The studied alternatives included: development of a replacement or supplemental airport, the expanded use of existing airports, development of other modes of transportation, demand and system management alternatives, and use of additional air traffic and flight technology. The FAA emphasized that it has in recent years made a number of procedural and technological improvements at Sea-Tac Airport that have increased the efficiency of air traffic flow. However, the FAA stated

> [W]e have now exhausted all known available and reasonable improvements of this nature. Additional technological and procedural alternatives that have been suggested are not reasonable solutions to the defined need. (FAA ROD at p. 8.)

Shorter Runway Alternatives

In the course of deliberations regarding the proposed Third Runway, an alternative was suggested that involves a shorter runway length (e.g., 6,000 feet to 6,700 feet) that is not aligned with the existing runways on the north end. Since most of the fill will occur on the north end of the runway, a 6,000 feet runway could reduce the amount of fill and avoid relocating up to 800 linear feet of Miller Creek. This alternative has been fully considered. The FAA considered and rejected a shorter-length runway and approved the proposed 8,500-foot length. FAA ROD at p. 9.

To avoid wetlands and reduce Miller Creek relocation, the shorter runway's north threshold would have to be staggered by approximately 2,500 feet (for a 6,000-foot runway) to 1,800 feet (for 6,700-foot runway). That is, the north end of the new runway would not be aligned with the north end of the two existing runways, but would be "staggered" to the south by a considerable distance. (The two existing runways do not have staggered north thresholds -- they are aligned on the north end.) Under the suggested shorter-runway alternative, the staggered north end is necessary to avoid wetland and stream impacts. If the north end were aligned with the existing runways, the suggested alternative would have no fewer wetland and stream impacts than the Port's proposed 8,500-foot runway.

A staggered north threshold would not meet the project's purpose. Staggering the north threshold would prevent certain operations under air traffic control procedures in Instrument Flight Rule (IFR) conditions. IFR conditions are common at Sea-Tac Airport, occurring approximately 25 percent of the time. Following development of the Third Runway, it is important that the airport have the ability to conduct independent arrivals and departures during IFR conditions (i.e., departures from the inboard runway at the same time as

arrivals on the new Third Runway). The ability to conduct independent arrivals and departures is important to reducing bad weather delay at Sea-Tac Airport. Moreover, this situation would be common (as often at 15 to 17 percent of the time) because the inboard runway, the longest runway at Sea-Tac Airport, is best suited for departures of all aircraft types. In addition, from an air traffic control perspective, it is preferable totaxi aircraft across a runway where departures are occurring (where it is easier to hold the departing planes) rather than to taxi aircraft across a runway where arrivals are occurring. For both reasons, the situation in which departures are occurring on the inboard runway while arrivals are taking place on the new Third Runway would be a common occurrence at Sea-Tac Airport. Moreover, in order to reduce aircraft operation delay at Sea-Tac Airport it is highly desirable for the inboard departures and outboard arrivals to be "independent" so that the air traffic controllers do not need to create a temporal separation between each separate departing and arriving aircraft.

Under FAA Rules, 2,500 feet is the minimum runway separation for independent takeoffs from the inboard runway while landings are taking place on the outboard runway. But this is *only* true when the ends of the runways are aligned. If the thresholds are staggered, additional separation between the two runways is required.

> When the thresholds are staggered and the approach is to the far threshold, the minimum 2,500-foot separation (for simultaneous IFR approach and departure) requires an increase of 100 feet for every 500 feet of threshold stagger. (FAA Advisory Circular 150/5300-13 Change 5, ¶ 208)

Moreover, this is not a requirement that can be cured by better technology, nor can it be waived, because it is a safety requirement designed to keep departing aircraft a safe distance away from the wake vortices of arriving aircraft. To maintain the ability to conduct simultaneous IFR approach and departure, which is an important airfield operating element to reduce poor weather delay at Sea-Tac Airport, the proposed "alternative" runway would have to be moved to the west by 400 to 500 feet, which would increase its wetland and stream impacts.

Although the primary function of the new runway is to serve arrivals, which require less runway length than departures, the new runway must be capable of limited departures during certain conditions. This will enable air traffic controllers to offload departures from the primary departure runway during limited peak periods and during conditions in which the existing runways are unavailable. Limited use of the new runway for departures will also provide added flexibility for air traffic controllers. Only 50 to 60 percent of the commercial aircraft typically departing from Sea-Tac Airport could use a 6,000- to 6,700-foot runway for departures.

Pilots on arriving aircraft have the authority to reject a runway assignment and select a different runway. Many pilots would refuse to land on a 6,000- to 6,700-foot runway, given the availability of a longer parallel runway. Technically, according to the aircraft flight manuals, a large percentage of aircraft can land on a 6,000- to 6,700-foot runway in good weather. However, pilots are ultimately responsible for the control of their aircraft and will frequently refuse a shorter runway length, especially during bad weather or crosswind conditions, which are frequent at Sea-Tac Airport. Any time a pilot does so, additional delays and increased air traffic controller workload will result as arriving aircraft are routed to holding patterns and wait their turn to land on the longer runway. The availability of an 8,500-foot runway that provides the flexibility to accommodate virtually all arrivals, regardless of aircraft type and weather condition, reduces delays.

The suggested shorter runway would complicate air terminal management, based on routine air traffic control procedures at Sea-Tac Airport. If the new runway were less than 8,500 feet in length, certain long-haul traffic would have to be segregated from other traffic and re-sequenced into the approach pattern of the existing longer runway. This procedure would not only increase controller work load, but it would increase aircraft

flying time and delays, since aircraft would have to fly further, thereby building delays into the airfield at Sea-Tac Airport.

For these reasons, a shorter runway would not meet the project's purpose and is not a practicable alternative to an 8,500-foot runway with a north threshold aligned with the existing two runways.

GLR18 DELAY MEASUREMENT

The purpose for the Third Runway project, as articulated in the *Final EIS* (FEIS), *Final Supplemental EIS* (FSEIS) and the Federal Aviation Administration's (FAA) Record of Decision is to "Improve the poor weather airfield operating capability in a manner that accommodates aircraft activity with an acceptable level of aircraft delay." One of the by-products of the project is an increase in airfield capacity, as is discussed extensively in Chapter 2 of the *Final Supplemental EIS*. As that chapter notes, the capacity of the two-runway system is about 480,000 annual operations. With the Third Runway and existing air traffic procedures, the Third Runway would be expected to increase that capacity to about 600,000 to 630,000 annual operations.

The delay analysis presented in the FEIS and FSEIS is the state-of-the-art method for assessing delays at a specific airport. At this time, there is no single measure of delay that fully captures all delays attributed to a particular airport. In the absence of a comprehensive delay measurement system, the most commonly used method for estimating current and future levels of delay for purposes of considering airport capital investment decisions is a simulation analysis. Simulation analysis is an industry-accepted methodology for calculating airport delays that relies on the use of a validated simulation model and actual data on the existing and future airport operating environment. The FAA's capacity enhancement study provided the basis for considering delay in the FEIS and FSEIS.

Aircraft delay is one measure of the operating efficiency or performance of an airport system or its various components. It is defined as the difference between the actual time required for aircraft to pass through the system (or a component of the system, like the enroute airspace) and the optimal time achievable without constraints such as poor weather at the destination airport, lack of adequate runway or taxiway facilities, or airspace interactions with other airports. Aircraft delay results from multiple aircraft competing for limited facilities and can be influenced by a number of factors, such as:

- Ceiling and Visibility Conditions,
- Airfield Physical Characteristics,
- Air Traffic Control Procedures, and
- Aircraft Operational Characteristics.

An additional factor in measuring aircraft delay is the fact that aircraft are often delayed at a location that is not the source of the delay. By means of FAA Central Flow Control Procedures, aircraft are routinely held at the origin airport rather than in airspace holding patterns during periods of reduced arrival acceptance rates at the destination airport. Accordingly, when weather conditions in Seattle preclude the use of dual approaches, aircraft destined for Sea-Tac are held either at the gate or on the airfield of the origin airport. Such delays often are attributed to the departure from the origin airport, rather than the arrival into Sea-Tac Airport.

The metrics used to measure delay vary widely and depend on the intended use of the data. For example, the FAA's Air Traffic Management Operations System (ATOMS) is an operational and tactical planning tool used to support decisions about real time air traffic control procedures and the deployment of air traffic control personnel and other resources. As such, ATOMS is used to collect data on the number of

flights delayed 15 minutes or more during any one of the four stages of flight: departure, air traffic management, enroute, and arrival. These four segments coincide with the air traffic control division of workload used throughout the National Airspace System (NAS). For example, a flight that incurs 14.5 minutes of delay in the departure phase, 14.5 minutes of delay due to air traffic management, 14.5 minutes enroute and 14.5 in the arrival phases (a total flight delay of 58 minutes) would not be counted as a delayed flight using the ATOMS methods. Since ATOMS was not designed to assist with decisions about airport improvements, such as the proposed new runway at Sea-Tac Airport, it does not provide useful information about the source of a particular delay, nor does it quantify the aggregate minutes of delay experienced throughout the NAS due to constraints at a particular facility.

On-time performance, as reported through Airline Service Quality Performance (ASQP), is another measure of system performance that is often confused with delay. In accordance with 14 CFR Part 234, certain U.S. airlines are required to report their on-time performance for information to consumers. On-time performance measures the historical tendency for a flight or group of flights to arrive early, on-time or late, relative to the flight's scheduled arrival time. Reviewing on-time performance data is an effective way of planning a trip or evaluating an airline's flight schedule. However, since airlines often add time into a flight schedule in anticipation of delay and to provide customers with a reasonable expectation of the arrival time at the destination, on-time performance provides little insight into airport system performance. Consequently, on-time performance data is not relevant to the determination of improvements necessary at any airport, including Sea-Tac Airport.

Another commonly used measure of delay is airline performance data, which is often referred to as block times or "out-off-on-in" times. For each flight, certain airlines record (often electronically) the actual time in which each aircraft pulls out of a gate (out time), the runway liftoff time (off time), the runway touchdown time (on time) and the gate arrival time (in time). Measures of aircraft delay for participating flights can be estimated by comparing this data to a minimum travel time.

Because of the cost of fuel, crew salaries and other direct aircraft operating expenses, airlines, airports and the FAA recognize that reductions in delay offer the potential to reduce airline operating costs. The average aircraft operation at Sea-Tac Airport costs $1,604 per hour or $26.73 per minute, according to the July 1995 Sea-Tac Airport Capacity Enhancement Plan Update. Reduction in delay due to a particular airport improvement, whether it be less than or greater than fifteen minutes, and regardless of where it is physically incurred, influences decisions about capital projects like the proposed new parallel runway at Sea-Tac Airport.

The FAA defines an airport's "practical capacity" according to the National Plan of Integrated Airport System (NPIAS), which occurs at the level of annual operations in which average delay per operation is five minutes. This is consistent with the 4-6 minute level of acceptable delay defined in the Final EIS. The FSEIS also discusses the theoretical maximum capacity at an airport, at a level of annual operations in which the average delay per operation is 15-20 minutes. However, this does not suggest that delay levels of this magnitude are acceptable. To the contrary, because of the cost to the airlines and the inconvenience to the traveling public, delay levels of this magnitude are unacceptable.

It should also be acknowledged that an annual average delay level of 15-20 minutes indicates a wide variation between the level of delay incurred between good and bad weather conditions (i.e., ceiling/visibility above and below 5,000 feet/five statute miles). While good weather delays would likely remain at acceptable levels, delays during poor weather conditions in which a single approach is used for arrivals would be well in excess of 20 minutes per operation. In fact, as demand grows, a significant number of flights either would be delayed well into the nighttime noise abatement period or would be canceled. Passengers affected by flight cancellations would be accommodated on a later flight or would

be rerouted through another city. In any event, poor weather delays would result in a severe inconvenience to the traveling public.

To further illustrate the impact of future delay, occasionally flights are canceled today during low visibility conditions. In most cases, load factors enable airlines to consolidate passengers of canceled flights onto other flights later in the day. However, this practice will become more difficult as passenger demand continues to increase. The "gap" in average delay per operation between good and poor weather conditions will continue to increase, and, as a result, on-time reliability will continue to worsen. Passenger demand would therefore continue to be served, albeit at a deteriorating level of service.

GLR19 CUMULATIVE IMPACTS

Since publication of the FEIS and SEIS, more detailed information has become available on other projects in the vicinity of the airport. This section lists the most current environmental documentation for these other projects and briefly highlights the major findings of those documents. This information is relevant to the consideration of the cumulative impacts of these other projects when combined with the impacts of the Master Plan Update projects. The following analysis briefly summarizes the significant cumulative impacts of both non-Port and Port projects with a particular emphasis on impacts to aquatic resources. The background environmental documents for these projects have been provided to the Corps for consideration during its ongoing "hard look" review of the Master Plan Update project and for review by the public.

Cumulative impacts for projects sponsored by the Port and other agencies were considered in the 1996 FEIS, the 1997 FSEIS and other supporting environmental documents. For example, cumulative impacts have been described in the FEIS III-6, Future Planned Developments and FSEIS Section 4-4-8, Cumulative Impacts. After publication of the FEIS and FSEIS, cumulative impacts on wetland functions were discussed in *Wetland Functional Assessment and Impact Analysis for the Master Plan Update Improvements*, Parametrix, December 2000, at pp. 4-72 to 4-83. Cumulative impacts are also discussed in the January 24, 2000 *SEPA Addendum re: Additional Wetland Impacts and Construction Only Interchange*, p. 43. Cumulative impacts related to ESA issues are discussed in the *Biological Assessment*, June 2000 at pp. 9-17, 9-20, 9-21, 9-23, and 9-24; see also the *Port Re-Evaluation Document*, November 1999 (discussing cumulative impacts of SR 509/South Access Freeway, Des Moines Creek Regional Detention Facility, Link Light Rail project, and potential redevelopment of Borrow Areas).

Projects Sponsored by Other Agencies

Projects in the airport vicinity sponsored by agencies other than the Port of Seattle are at various stages of design and implementation. These projects are not expected to cause significant adverse cumulative impacts that, when considered in relation to the potential impacts of the Master Plan Update projects, would necessitate preparation of another SEIS.

SR 509/South Access

The Washington State Department of Transportation (WSDOT) is the lead agency for the proposed extension of State Route 509 south of the Airport. The SR 509/South Access Road project would extend the SR 509 freeway south from its current terminus at Des Moines Memorial Dr. (near South 188th Street to a connection with Interstate 5 and improve related local traffic circulation patterns. Southern access to the Airport would be provided by construction of a new roadway, the South Access Road, which would connect the Airport's terminal drives to the SR 509 extension near S. 200th Street.

Five alternatives are currently under consideration for the location the SR 509 extension. WSDOT has proposed Alternative C2 as the preliminary preferred alternative. Alternative C2 would cross the southern one-third of the Federal Aviation Administration (FAA) extended object-free zone at the south end of Runway 16L/34R. The roadway would continue to the southeast and encroach on the northeast corner of Des Moines Creek Park and require the acquisition of approximately 8.1 acres of parkland. Continuing toward I-5, the SR 509 mainline would pass through an area of mobile homes and would join I-5 in the vicinity of South 208th-212th Streets. The length of the extension would be approximately 3.3 miles. Improvements along I-5 would continue to the south at least as far as South 272nd Street.

In 1996, WSDOT published a draft programmatic environmental impact statement examining a wide range of potential roadway alignments for the project. WSDOT subsequently initiated a more detailed, project specific environmental analysis and Supplemental EIS. The Draft of the EIS is currently expected to be issued in Fall, 2001. Between February 2000 and August 2000, WSDOT released updated information on the project in a number of *Discipline Reports* in the following areas: *Geology and Soils; Water Quality; Hazardous Waste; Historical and Archeological Preservation; Relocation; Section 4(f)—23 U.S.C. § 138 evaluation re: use of land from public park, recreation area, wildlife or waterfowl refuge, or historic site; Social; Visual Quality; Vegetation, Wildlife and Fisheries; and Wetlands.* Additional reports covering traffic, noise, and other topics are being prepared.

The potential impacts in several of these areas are summarized below. Readers are referred to the *Discipline Reports* for detailed discussion of these and other potential project-related impacts.

Wetlands. Impacts to wetlands and wetland buffers vary depending on the alternative considered, and impacts could include alteration of existing wetland hydrology and water quality. Thirty-five wetlands or buffer areas lie within the cut or fill lines of the five Build alternatives. Thirty of these wetlands are generally isolated slopes or depression systems. Two wetlands occur along the main stem of Des Moines Creek. Three wetlands have surface water connections to drainages that flow into Des Moines Creek.

Based on the data available in April 2000, the predicted impacts are between 7.7 to 9.29 acres of wetland impacts and 14.5 to 18.56 acres of buffer impacts. These area totals include both direct, physical impacts and secondary impacts such as shading. The predicted impacts are described in more detail in the April 2000, *Wetland Discipline Report ("WDR")*, pp. 57-65. Mitigation measures are discussed at *WDR*, pp. 66-70.

Alternative C2 has been proposed by WSDOT as the Preliminary Preferred Alternative. Twenty wetlands are located near the Alternative C2 alignment. Seven of these wetlands would not experience direct wetland or buffer impacts from the C2 alignment, but they are located close enough that design adjustments in the alignment could create some impacts in these areas.

Four Wetlands (designated A, D, F, and G) are associated with the Des Moines Creek corridor. Wetland A, around the main stem of Des Moines Creek, is a large (6.5 hectare) forested and scrub-shrub system. Wetland A exhibits moderate wetland functions. Wetland G, extending up Des Moines creek to both Wetlands F and D, is a disturbed riparian system with moderate to low wetland functions. At the headwaters of the east fork of Des Moines Creek, Wetland F is a large (11.6 hectare) forested, scrub-shrub, emergent, and open water system with high functions. The east fork of Des Moines Creek (Wetland D) is a disturbed riparian area. The low end of this wetland has been engineered as a stormwater detention system, while portions of the upper area have moderate function and extensive seeps that are an important hydrologic source for Des Moines Creek. Wetland B is a large (2.7 hectare) system above the headwaters of the west tributary of Des Moines Creek. Wetland B has moderate functions for stormwater control and water quality improvement and potential for base flow support. The remaining 14 wetlands in the project are depressional or slope systems that are either hydrologically

isolated or the hydrologic connections were not determined. They generally have low-to-moderate functions.

Environmental Consequences - Construction impacts are both temporary and permanent impacts that directly affect wetlands through filling or dredging. Operation impacts are impacts resulting from the ongoing use of the roadway after construction. Secondary impacts are mostly associated with potential alterations to wetlands hydrology, water quality, wildlife disturbance, and increased noise.

The primary effect from project construction on the wetland systems would be the permanent fill or dredge from cut slopes or wetlands and their buffer areas.

Some wetlands would be cleared, graded, and filled for construction of each Build alternatives. Wetland buffers would also be affected. *See WDF* Table 5, p. 58. Additionally, temporary wetland impacts would occur along vertical wall structures during construction. This narrow band of impact adjacent to the walls would be restored upon completion of construction.

Wetland functions that could be reduced as a result of construction include flood water detention and retention, flood flow desynchronization, groundwater recharge and discharge, and water quality improvement. Biological and wildlife support could be affected by reduced production and disruption of connections among habitats. *See WDF* Table 4, p. 39. Placement and sizing of culverts, bridges, berms and other structures that direct the flow of surface water could alter wetland hydrology by diverting, restricting, or increasing the flow of water in adjacent wetlands. The type and magnitude of construction impacts would depend on final designs of these structures and stormwater management systems.

Temporary impacts during construction would include clearing and grading. This would expose erodible soils, increasing the potential for erosion and sediment transport to wetlands. Sedimentation could degrade water quality by increasing turbidity, suspended solids, and pollutants. If left unmitigated, sediment deposition in wetlands could reduce floodwater storage capacity, change water depth and flow patterns, and block water inflow or outflow paths. Large volumes of sediment could damage or destroy trees by cutting off oxygen to their roots and could bury eggs of aquatic organisms.

Also, if left unmitigated, wetland water quality could be adversely affected during construction as a result of onsite storage and the use of construction equipment fuel and lubricants.

Wetlands that would not be graded or filled but that are adjacent to areas of construction impact could be affected by changes in water quantity and water quality. Increased noise and human activity during construction may cause short-term degradation to wetland wildlife habitat.

All of the Build alternatives will result in an increase in roadway surface, which could alter the hydrologic functions in the wetlands and streams. Increases for Alternative C2 include a total of 30.8 hectares (76 acres) of road surface in three stream basins: Des Moines Creek Basin, 24.5 hectares (60.5 acres) of road surface; Massey Creek Basin, 5.5 hectares (13.6 acres) of road surface and Miller Creek Basin 0.8, hectare (1.9 acres) of road surface.

Operation impacts include possible alteration of existing wetland hydrology and reductions in water quality and wildlife habitat. Vegetated wetland and adjacent upland areas that currently allow infiltration of rainwater would be replaced by impervious road surfaces. Resulting increases in volume and rate of surface water runoff could cause increased fluctuations in water levels. Alteration of the wetlands' hydrology could change their respective size, plant communities, and wildlife. The extent of these impacts will be dependent on the ability of the surface water management systems to control flow rates and preserve water quality.

Pollutants such as petroleum products, heavy metals and sediments from the highway surface may be carried into the wetlands along with stormwater and could negatively affect wetland functions. Additionally, noise and visual disturbance from vehicular traffic may impact wildlife breeding, nesting and feeding.

In addition to the impacts described above that are common to all Build alternatives.building Alternative C2 would result in additional wetland impacts as summarized in *WDR* Figure 11. The construction of Alternative C2 would not cause direct wetland impacts to any Class 1 significant wetlands. Total direct wetland impacts would equal 3.1 hectares (7.6 acres) of Class 2 wetlands and 0.5 hectare (0.9 acre) of Class 3 wetlands. Buffer impacts would be 5.9 hectares (14.5 acres).

Wetland impacts will be avoided where possible and reduced through design changes. The roadway design and use of vertical walls are two measures to avoid unnecessary wetland impacts. Other design features that may be incorporated into the project include design elements to help maintain existing water flow through wetland systems. Bridges and trestles may be used to minimize the need for filling or culverts.

Impacted wetlands will be rehabilitated or restored, and wetlands will be replaced through agreement with local governments and regulatory agencies. The cities of SeaTac and Des Moines have both enacted "no net less" wetland regulations. The project will also meet the mitigation ratios (2:1 for Class 1 and 2 wetlands, 1:1 for Class 3 wetlands) of the applicable city regulations.

In addition, the roadway construction will adhere to best management practices ("BMPs") to ensure that stormwater runoff is collected and treated and that discharge to existing waters is controlled. A stormwater pollution prevention plan, temporary erosion control plan, and temporary sedimentation control plan will be implemented to avoid or minimize construction impacts. These plans will likely include settling ponds, containment berms, silt fences, sediment traps, and seeding of exposed slopes.

In areas where direct wetland impacts are unavoidable, compensation for impacts will be accomplished through some combination of wetland enhancement, restoration and creation consistent with the POS Wildlife Hazard Management Plan. *See WDR*, p. 69. An Initial Mitigation Plan will be prepared for Alternative C2 and issued as an appendix to the Draft Supplemental EIS. The plan will comply with NEPA and SEPA and incorporate methods in the interagency *Guidelines for Developing Freshwater Wetlands Mitigation Plans and Proposals* and the applicable Sensitive Areas Ordinances.

Operational impacts will be minimized through the design and maintenance of the stormwater management systems and the use of retention/detention facilities, bioswales, oil separators and other structures that treat and control the stormwater release rate. Flow spreaders and other energy-defusing structures could be used to reduce erosion of natural drainage systems during high-flow events.

Vegetation, Wildlife and Fisheries. Several vegetation communities and a wide range of topography, including three stream basins Miller Creek, Des Moines Creek, and Massey Creek Basins are located within the project area. Vegetation communities consist of mowed and unmowed grassland areas along 1-5 and adjacent roads, commercial and residential areas containing primarily non-native species, wetlands, shrublands, and mixed deciduous/coniferous forest.

No substantial impacts to vegetation or wildlife are anticipated. The primary effects on habitat from road construction would be the removal of vegetation and increased habitat fragmentation. Wider roads and new roads could create barriers to wildlife movements. Noise could cause wildlife to seek new foraging or nesting areas. Excavated streams would be restored and wildlife habitat would be mitigated in

consultation with the FAA, federal, state, and local agencies. Impacts to vegetation, wildlife and fisheries vary between the alternatives and range from 113 acres to 170.8 acres of impacts to various categories of natural habitat. March 2000 *Vegetation, Wildlife and Fisheries Discipline Report ("VWFDR")*, pp. 39-47 (discussing impacts) and pp. 48-50 (discussing mitigation measures).

Water Quality. Potential impacts to water quality could occur from the construction and operation of the highway. Construction activities would include clearing of vegetation, demolishing existing roads and buildings, regrading the existing ground surface, installing culverts at stream crossings, handling construction materials, and operating machinery. If unmitigated, these activities have the potential to disrupt surface water flows, increase surface runoff volumes, cause erosion and sedimentation in receiving streams, and increase water temperature in streams. In addition, a variety of foreign materials could enter surface water bodies including sediment, fuel, lubricants, paving oils, construction debris, and uncured concrete.

Activities and events that could occur during operation of the highway, such as stormwater runoff, accidental spills, sanding and de-icing, and vegetation control all have the potential to affect surface water quality. Contaminant concentrations in stormwater coming from the roadway would most likely not exceed Washington State Water Quality standards due to treatment by selected Best Management Practices (BMPs).

A number of measures can be taken to reduce the potential impacts on water quality, including integration of a stormwater management system into the roadway design. Also, WSDOT's Municipal NPDES permit will require mitigation of potential adverse effects from the long-term operation of the road. This mitigation includes collection of stormwater, control of flow rate, and water quality treatment in accordance with King County's 1998 Stormwater Management Guidelines, WSDOT's 1995 Stormwater Management Guidelines and WSDOT's 1999 ESA Stormwater Guidelines. To minimize accumulation of sediments in streams and wetlands, WSDOT is currently considering the use of thirteen wet vaults, located along the roadway as necessary to allow collected stormwater to be discharged at natural locations in the highway's subbasins.

Current Process. The WSDOT planning and environmental assessment for the SR 509/South Access project is being carried out in close coordination with state and federal regulatory agencies under the terms of a "merger agreement." These agencies will be responsible for approval of the 401, 404, and associated permits for the project. Under the terms of the merger agreement, WSDOT meets periodically with these agencies and discusses project elements and modifications that may reduce or mitigate environmental impacts. Since the publication of the Discipline Reports, WSDOT has continued to work with the regulatory agencies to modify their proposal to reduce wetland and buffer impacts.

Central Link Light Rail Transit System

The cumulative impacts of the proposed light rail transit system were considered in the FSEIS, p. 5-1-8. The Central Puget Sound Regional Transit Authority ("Sound Transit") is proposing construction and operation of an approximately 25-mile electric light rail system known as the Central Link Light Rail Transit Project, which will connect to the eastside of the airport. The portion of the project near Sea-Tac Airport is referred to as "Segment F" in the *Central Link Light Rail Transit Project, Final Environmental Impact Statement*, November 1999.

The preferred alternative for Segment F is designated Alternative F2.3 Washington Memorial Park, Elevated east of 28th Avenue. This alternative includes an elevated line along Tukwila International Boulevard from 152nd Street, continuing southwest to cross traveling over SR 518, traveling west of

Washington Memorial Park, and connecting to the Airport's North Unit Terminal. The line would then continue elevated along the west side of International Boulevard, turn southwest to cross 188th Street and continue elevated along the east side of 28th Avenue S. to S. 200th Street. Three stations are proposed for Alternative F2.3 with one alternative station and another potential station.

The Alternative F2.3 stations at S. 154th Street, the North Unit Terminal, and S. 184th Street would decrease existing impervious surface. The proposed park-and-ride facility at S. 200th would add 130,600 square feet of impervious surface area if the proposed 630 stalls are constructed. Trackage associated with this alternative would add an additional 80,000 square feet of new impervious surface along International Boulevard S., and road widening would add 7,200 square feet of new impervious surface.

Water Resources. None of the Segment F alternative alignments would cause significant impacts to wetlands. Four of the Project Alternatives would require 0.60 acre of tree removal along the eastern edge of Washington Memorial Park and the loss of 0.12 acres of forested and palustrine emergent wetland and 0.21 acres of wetland buffer. One alternative would affect Bow Lake (AR-44) through the loss of less than 0.01 acre of scrub/shrub wetland and 0.06 acre of wetland buffer, loss of some riparian vegetation that provides wildlife habitat and water quality functions, and incremental degradation of fish habitat from in-water piers and clearing of littoral vegetation. *Central Link Light Rail FEIS*, pp. 4-121.

There are a number of options under consideration for construction of the South SeaTac Station (Options A-F). South SeaTac Station Option A would remove 5.0 acres, and station options B and C would remove 4.0 acres of trees and dense shrubs. South SeaTac Station options D, E, and F would remove 0.60 acres of urban songbird habitat. No long-term impacts on wetlands or fish habitat are expected under the other alternatives in Segment F. Alternative F2.3 may effect fish in Bow Lake through the loss of habitat from clearing of riparian or littoral vegetation and the placement of piers in the water. *Central Link Light Rail FEIS*, pp. 4-124 and 4-125 (Table 4.7-2).

None of these alternatives is expected to affect the bald eagle nesting territory at Angle Lake. No impacts on threatened and endangered fish species are expected to result from any of the alternatives in this segment. *Central Link Light Rail FEIS*, pp. 4-121, 4-125, 4-126.

The various Alternatives create up to 120,000 square feet of new impervious surface from trackage, 18,000 square feet from road improvements, and 130,600 square feet at the S. 200th Street park-and-ride if the 950 proposed stalls are constructed.

Alternative F2.3 would add 130,600 sq. ft. of impervious surface area if the proposed 630 stalls are constructed. Trackage associated with this alternative would add 80,000 sq. ft. of impervious surface along International Boulevard, and road widening would add an additional 7,200 sq. ft. of new impervious surface. Stations at S. 154th St., IMC or NEAT, and S. 184th St. would decrease impervious surface.

Increased impervious surface associated with the proposed S. 200th Street park-and-ride facility could impact local drainage systems and water quality by increasing runoff; however, this project is not expected to have significant impacts on the East Fork of Des Moines Creek, which lies downstream from the project. Park-and-ride facilities at S. 154th and S. 160th are proposed at existing developed sites with 100 percent impervious surface and would decrease the total amount of impervious surface area within the Des Moines Creek watershed, although the amount of pollutant-generating impervious surface would increase.

Mitigation. Mitigation for each project segment will be required to meet the applicable standards of the local jurisdictions. City of SeaTac regulations, which are based upon the *King County Surface Water*

Design Manual (1998), govern the area that would be impacted by all the alternatives in Segment F. Stormwater detention and treatment and water quality treatment wouldbe provided at the proposed park-and-ride at International Blvd. and S. 200th Street, and at 28th Ave. S. and S. 200th Street to meet KCSWM Level 2 requirements. Water quality treatment would be provided at the S. 154th Street park-and-ride facilities. *Central Link Light Rail FEIS*, pp. 4-134 to 4-138.

Regional Stormwater Detention Facility

The potential impacts of the Regional Detention Facility (RDF) were considered in the *Preliminary Comprehensive Stormwater Management Plan*, June 1998/revised November 1999 at pp. 2-5, 2-9, 2-17 (Des Moines Creek basin plan), 3-9, 4-6, 4-7, 4-19, Figures 4-4 and 4-5, and Tables 4-6 and 4-7. Construction of the RDF is recommended in the Des Moines Creek Basin Plan, which was developed by the Des Moines Creek Basin Committee, a group comprised of the Port of Seattle, King County, and local jurisdictions. The Des Moines Creek Plan is intended to improve stormwater runoff management in the Des Moines Creek basin.

The Des Moines Creek RDF will be located at the head of the west branch of Des Moines Creek at the Northwest Ponds and is anticipated to provide a total of 180 acre-ft of storage. The facility would mitigate impacts of stormwater runoff from all past and future (beyond Level 1 of the King County standards) development in the Des Moines creek watershed. The goal of the project is to stabilize the flow regime, reduce the channel erosion rate, and restore the salmon habitat for Des Moines Creek.

The three alternatives for the design of the RDF facility are described in the November 1, 1999 *Des Moines Creek Regional Capital Improvement Projects Preliminary Design Report*. On November 1, 1999, the Des Moines Creek Basin Committee also published an *Addendum to the Des Moines Creek Regional Capital Improvement Project Preliminary Design Report ("Addendum")*. In the *Addendum*, the Des Moines Creek Basin Committee selected the Alternative 2 design option, which is described on page 16 of the *Preliminary Design Report*.

Wetland Impacts: The area proposed for the RDF, the Northwest Ponds, is part of a large wetland system that includes the ponds themselves, portions of an existing golf course, and extensive areas both northeast and southwest of the ponds. To accommodate additional water storage necessary for stream protection, portions of the existing wetland will need to be modified. This modification would include construction of one or two berms and regrading approximately 11 acres of wetland area. Of this area, roughly five acres lie within the golf course and are dominated by turf grasses while another two to three acres are dominated by invasive scrub-shrub species. Although the modifications will disturb some existing plant communities, the disturbed areas will remain wetlands, with the exception of the area filled for berms.

To effectively lower the water surface elevations of the ponds, the outlet channel (West Fork Des Moines Creek) must also be lowered. This will require reconstruction of approximately 2,000 linear feet of existing channel and the removal of two artificial weirs within that reach. Restoration and enhancement of the stream channel will include both in-stream and habitat features, such as placement of large, woody debris and boulders, as well as buffer revegetation. As currently proposed, there will be no permanent loss of stream function or length as a result of conveyance improvements to the stream for operation of the facility. *Preliminary Design Report*, p. 54.

There are three proposed Alternatives for this project. Alternative 2 is the Preferred Alternative.

Alternative 1 impounds the Northwest Ponds by constructing a berm at the existing outlet release control. A second berm would be constructed at the Approach Light Road with flow release of discharge in the range of 10-year to 25-year return interval flow rate. The South End Sea-Tac storm drainage (existing

concrete pipe) would be rerouted to the Northwest Ponds. The Flow Bypass System would be connected to Northwest Ponds at the existing outlet.

Alternative 2 impounds the Northwest Ponds by constructing a berm at the existing outlet. A second berm would be constructed at the Approach Light Road with a flow release control of discharge in the range of 10-year to 25-year return interval flow rate. The existing culverts at S. 200th St. would be modified to perform flow rate control for 25-year to 500-year return interval flow rates. East Fork Des Moines Creek at the Tyee Pond would be diverted to Northwest Pond. The South End Sea-Tac storm drainage (existing concrete pipe) would be rerouted to the Northwest Ponds, and the Flow Bypass System would be connected to the existing outlet. *Preliminary Design Report*, page 16.

The berm design for Alternative 2 could require filling up to 1 acre of wetland within the golf course, depending on the final berm design and location. *Preliminary Design Report*, page 53. This Alternative would also require reconstruction of approximately 2,000 linear feet of existing channel and the removal of two artificial weirs that are located within that reach. Restoration and enhancement of the stream channel would include both instream habitat features, such as large woody debris and boulders, as well as buffer revegetation. There would be no permanent loss of stream function or length as a result of the stream conveyance improvements.

Alternative 3 would not require construction of a berm at the outlet. Instead, the outlet would be excavated to provide an open conveyance from Northwest Ponds to hydraulic control at the Approach Light Road. As with the other alternatives, a berm would be constructed at the Approach Light Road with flow release control of discharge for the storm events up to the 100-year return interval. The culverts at South 200th Street would be modified to perform flow rate control for 100-year to 500-year return interval flow rates. *See Preliminary Design Report*, p. 27.

The potential cumulative impact of the RDF project was considered in the Port of Seattle's *Preliminary Comprehensive Stormwater Management Plan*, June 1998/revised December 1999 at pages. 2-5, 2-9, 2-17 (Des Moines Creek basin plan), 3-9, 4-6, 4-7, 4-19, Figures 4-4 and 4-5, and Tables 4-6 and 4-7. While the RDF project has undergone continued refinement and environmental analysis since that time, no significant new information or changes in the project proposal have been identified. Moreover, the Port believes that the RDF project, if mitigated as proposed, will likely benefit Des Moines Creek by stabilizing flow rates and is likely to cause only a minimal impact on other aquatic resources in the vicinity of the Sea-Tac Airport.

City of SeaTac Development Planning

As a condition of the 1997 Interlocal Agreement between the Port and the City of SeaTac, both agencies have agreed to coordinate development in and around the airport. The proposed Master Plan Update improvements are consistent with the City's comprehensive plan adopted pursuant to the state Growth Management Act.

City Center Plan: In November 1999, the City adopted the SeaTac City Center Plan as a Subarea plan to SeaTac's comprehensive plan. The primary objectives of the City Center Plan include support for integrated development in the City Center area, creation of a central business district, changes to land use designations, and location of a Sound Transit light rail station. See *SeaTac City Center Plan Final Supplemental Programmatic Environmental Impact Statement*, Section 1 (November 1999).

The City and the Port of Seattle have also entered into a Joint Transportation Study that will include development of multi-modal travel simulation models to test various combinations of regional Airport and City-wide development and access alternatives.

The *SeaTac City Plan FEIS* did not identify any unavoidable impacts that affect the environmental analysis provided for the Port's §404 application. For example, the *SeaTac City Plan FEIS* did not identify any additional wetland impacts, and water impacts were limited to additional stormwater runoff that will be mitigated through compliance with applicable surface water design regulations, stormwater filtration, and additional landscaping requirements. See *SeaTac City Plan FEIS*, pp. 1-7 to 1-13.

Port of Seattle Projects

The Port has a number of airport improvement projects at various stages of design and implementation. These projects are not expected to cause significant adverse cumulative impacts that, when considered in relation to the potential impacts of the Master Plan Update projects, would necessitate preparation of another SEIS.

South SeaTac Electrical Substation Upgrade

This project will expand the capacity of the existing South SeaTac Substation by constructing a new substation next to the existing one and installing approximately 1.2 miles of 115kV high transmission lines on segments of South 188th Street and 28th Avenue South. See *SEPA Determination of Non-Significance*: POS SEPA File No. 99-02 (March 1, 1999).

Wetland Impacts: Two shrub and forested wetlands are located 50 feet south and 50 feet east of the proposed substation site. The wetlands south of the site contain both forested and emergent wetland habitats. Groundwater seepage into the wetlands during the wet season maintains the area as a wetland. The wetlands lack any distinct surface water inlet or outlet features. The wetlands are considered Category IV using the WSDOE wetland rating system because of small size, recent disturbance, and limited biological diversity. The wetlands are rated Class II under the City of SeaTac's sensitive areas code. *Substation SEPA Checklist*, pp. 7-8. The proposed project will be designed and constructed in accordance with City of SeaTac requirements for projects near wetlands. No structures will be constructed within 65 feet of the wetlands, and measures to minimize erosion, and off-site sediment transport will be implemented. *Id.*

South Terminal Expansion (Concourse A and related projects)

Much of this project was analyzed under the Master Plan Update FEIS and FSEIS. Changes to the proposal were discussed in the July 19, 1999 *South Terminal Expansion SEPA Checklist*, Table 1, pp. 3-11 and considered in a Mitigated Determination of Non-Significance dated July 19, 1999. The project will be constructed on a previously developed portion of airport property and is expected to include the following elements: Concourse A Extension, Office Tower Building, Supply Distribution Center on Concourse A, South Ground Transportation Lot, Public Transit Curb, Gate B Outbound Baggage Facility, Concourse B Operations Office, relocation of Concourse A tenants and South Satellite Office, Remain Overnight Aircraft Parking, apron paving, demolition of existing Delta Airlines hanger and construction of a new Northwest Airlines hanger on the site, Northwest Airlines flight kitchen, aircraft lavatory dump station replacement, and construction staging area. The project changes do not substantially alter the Master Plan EIS analysis of potential environmental impacts. See July 19, 1999 *South Terminal Expansion SEPA Checklist*, pp. 13-31.

Upgrade of Airport Satellite Transit System

This proposal was analyzed in the May 13, 1997 Master Plan FSEIS. The upgrade entails relocation of the existing north security checkpoint, construction of a new vertical circulation core, improvements to

the satellite transit system, interior remodeling, and extension of the north end of the main terminal by approximately 75 feet. Project modifications are discussed in the August 23, 1999 SEPA Addendum. The modifications do not substantially alter the analysis of significant impacts described in the Master Plan FSEIS. August 23, 1999 SEPA Addendum, p. 3.

Upgrade and Expansion of Industrial Wastewater System Lagoon #3

This proposal is to clean, line, expand and upgrade an existing wastewater system lagoon. The expanded lagoon will provide greater industrial wastewater storage capacity prior to treatment in the Port's Industrial Wastewater System Treatment Plant and allow for controlled discharge to the King County Metro Sewer line. The proposal received a SEPA Determination of Non-Significance on December 22, 1999.

Wetland Impacts: Two wetland complexes and a stream are located in the immediate site vicinity. Wetland 28, also known as the Northwest Ponds, is a large diverse Class I wetland located mostly south of Lagoon #3. The wetland is approximately 35 acres in size and consists of open water, and emergent and scrub-shrub vegetation. Two arms of Wetland 28 extend north to border both the east and west sides of Lagoon #3. The west branch of Des Moines Creek originates in Wetland 28 and flows south and west into Puget Sound. Another wetland complex (IWSA/IWSB) is located north of Lagoon #3. This forested wetland is approximately 0.67 acres and is divided by a gravel access road.

The project will not involve work in the waters of Wetland 28 or IWSA/IWSB. Work will occur adjacent to the northern arms of Wetland 28 and IWSA/IWSB. Buffer impacts resulting from the project would be reviewed by the appropriate regulatory agencies and may require mitigation such as buffer averaging or replacement. *IWS Lagoon #3 Upgrade SEPA Checklist*, p. 10. Some groundwater dewatering is expected during construction with a maximum dry weather pumping rate of 450 gallons per minute. This groundwater is not expected to require treatment prior to discharge into the Des Moines Creek tributary east of the site. If water quality testing indicates high levels of turbidity, the water may be treated on site prior to discharge. As part of the proposed lagoon improvement, a permanent underdrain and pumping system would be installed to prevent accumulation of groundwater under the lagoon liner system. The collected water would be discharged into Des Moines Creek. *IWS Lagoon #3 Upgrade SEPA Checklist*, p. 11.

Air Cargo Development Plan (ACDP)

This is a programmatic action. The Air Cargo Development Plan (ACDP) is a 10-year development plan for facilities and actions recommended to meet the needs of existing air cargo customers at Sea-Tac Airport. Actions tentatively planned through 2004 include purchasing of airport leases to allow redevelopment in the north cargo area, constructing four aircraft hardstands in the north cargo area, constructing freight warehousing in the north cargo area, preparing a site development plan for property north of SR 518 (the "L-shaped parcel"), and redeveloping Port building 313 for air cargo. Actions tentatively planned from 2005 through 2010 include construction of five aircraft hardstands in the north cargo area, constructing mail processing and transfer facilities, constructing a non-public bridge across SR 518 (adjacent to the existing 24th Ave. S. bridge), and constructing a ground support equipment storage area. Air Cargo Development Plan SEPA Checklist, p. 3.

Redevelopment of airport property will have little effect on impervious surface area. Development of the "L-shaped parcel" north of SR 518 will increase impervious surface area because the parcel is currently undeveloped. Site development of this parcel and the bridge will include stormwater collection and detention facilities.

There are no water bodies in the immediate vicinity of the northeast corner of the Airport where the air cargo facilities recommended in the Plan would be located. The majority of the area is paved and already developed for airport uses. Preliminary information indicates that wetlands exist on the "L-shaped parcel." Portions of this property would be developed if all of the Plan recommendations are implemented. As the project is still in the project definition phase, no wetland delineation or environmental analysis has been undertaken. Air Cargo Development Plan SEPA Checklist, pp. 7-10.

Aircraft Hydrant Fueling System (AHFS)

The AHFS proposal is to install a Jet A underground fuel line concurrent with the planned improvements to Concourse A. The AHFS would provide single source fuel delivery of Jet A fuel at the airport and a common infrastructure that would be used by all airlines. The AHFS would replace the current fueling operations (primarily truck deliveries) for most commercial passenger aircraft at the Airport. The AHFS would include cathodic corrosion protection for the underground pipes and a state-of-the-art leak detection system.

A SEPA determination of non-significance was issued for the project on October 6, 2000. Previously, the Port had analyzed the need to replace the existing fueling equipment in the Master Plan FEIS. Other environmental documents that discuss the proposal are listed on page three of the SEPA environmental checklist for the proposal.

The Major goals of the AHFS project include:

- Relieve congestion and increase safety on the terminal apron by significantly reducing the need for fuel truck trips;
- Improve air quality by reducing air emissions resulting from a reduction in the number of trucks;
- Deliver fuel to aircraft in a more economical and reliable manner;
- Install new equipment and dispose of existing equipment in an environmentally safe manner; and
- Provide increased environmental protection of the aircraft fuel delivery system by installing state-of-the-art pipelines and leak detection systems.

The AHFS would require removal of some of the old hydrant system piping, fuel lines, hydrants and infrastructure; installation of new aircraft hydrant fueling system, piping, fuel lines, hydrants, hydrant pump and pits. The fuel lines will be "sleeved" (placed inside another pipe) when crossing railroad tracks or highways. The AHFS would include cathodic protection and a leak detection system. Finally, the AHFS would require construction of a new fuel farm operations building (4,586 sq. ft.), a concrete pump pad facility (187 ft. x 32 ft.) and up to two new modular operations buildings (approximately 1,320 sq. ft.).

Water Resource Impacts:
The proposed operation building and pump pad would be constructed on a portion of the existing South Employee Parking Lot, which is outside of the Des Moines Creek wetland buffer area. No fill or excavation material for this project will be placed in or removed from any surface water or wetlands. The project would not cause any surface water withdrawals or diversions. Likewise, no groundwater withdraws or discharges are contemplated for this project. Most of the project area is currently paved and connected to the Port's Industrial Wastewater System ("IWS"). It is possible, though not anticipated, that some perched groundwater may be encountered during construction. *Environmental Checklist*, pp. 15-16 (October 5, 2000).

The AHFS will be connected to the IWS, which provides stormwater treatment for areas where a fuel spill could occur. All construction activity would be conducted under a construction SWPPP as required by

the Port's NPDES permit. Construction runoff would be treated with BMPs (sedimentation basins, silt fences, mulching, netting, proper grading and water quality monitoring) to remove turbidity, sediment, or other materials and a construction Erosion and Sedimentation Control Plan will be created. This plan will draw on the following sources and include all required sedimentation and erosion control features of:

The project specifications:

- The Port of Seattle's Temporary Erosion and Sedimentation Control Plan;
- The Stormwater Management Manual for the Puget Sound Basin;
- The King County Surface Water Design Manual;
- Oversight by regulatory agencies; and
- The interlocal agreement between the Port of Seattle and the City of SeaTac.

Approximately 2,500 square feet of construction for the asphalt access road, fence and retaining wall (to minimize wetland impacts to the north of the access road, would be located 25 feet within the 50 foot. wetland buffer established by the City of SeaTac. The encroachment into the buffer would eliminate 2,500 square feet of grassland and blackberry. *Environmental Checklist*, pp. 15-16 (10/5/00).

Part 150 Noise Compatibility Plan

The Port issued a SEPA Determination of Non-Significance for the Part 150 Noise Compatibility Plan on October 20, 2000. The Part 150 plan consists of a series of actions to reduce noise from ground and flight operations at the airport. The Plan includes conducting additional studies including a siting study for the Ground Run-up Enclosure, a siting study for noise walls and recommended changes to runway use and flight tracks. The Plan also includes descriptions of existing conditions, aircraft operations forecasts, existing and future noise environment, facilities, operational and land use alternatives, technical reports, and a community involvement plan.

The Plan is part of the Port's Noise Remedy program, the goal of which is to reduce aircraft and ground noise at the Airport, reduce noise impacts on the greater Seattle area, and encourage land uses that are compatible with anticipated aircraft noise exposure.

The plan is anticipated to include the following components:

- Construction of noise barriers in the north cargo area
- Construction of a Ground Run-up Enclosure (GRE)
- Modifying existing maintenance regulations and noise fines
- Implementing a ground power and pre-conditioned air system
- Working with the FAA to develop noise-reducing aircraft arrival patterns, runway use, and glide slopes.
- Sound insulation of schools in the 65 DNL zone
- Acquisition of mobile home parks in the 70 DNL zone
- Working with local governments on airport noise compatible land use and building codes

Water Resource Impacts. The project will not place or remove fill or dredge materials from surface waters or wetlands. The project would not require surface water withdrawals or diversions and would not involve the discharge of waste materials into surface waters. The development of the Ground Run-up Enclosure (GRE) and noise walls may increase the amount of impervious surface and affect the rate of stormwater runoff. About 1-acre of additional impervious surface would be developed as the base of the GRE. Runoff from the proposed GRE would flow to the Port's IWS system for treatment and subsequent discharge.

During construction the contractor will be required to have a Stormwater Prevention Plan in place that includes temporary erosion control and sedimentation measures. This plan would include best management practices such as diverting surface runoff from erosion-prone areas, mulching, netting, and proper grading.

North End Development Project

The North End Development Project (NEDP) is in the initial planning stages and would cover primarily the area north of the existing main terminal. As currently envisioned, the project builds on and includes the Master Plan Update improvements to construct a North Unit Terminal (which is currently being called the North End Terminal). The planning conducted to date for this area would include:

- Development of the North End Terminal, with a slight change over what was evaluated by the Master Plan Update
- Construction of an Transportation Center parking garage with facility for buses and other ground transportation
- Construction of a Consolidated Rental Car Facility—garage for all rental cars
- Construction of an Automated People Mover—to connect the rental car facility with the new terminal, the Transportation Center, and the main terminal.
- Relocation of displaced facilities—post office, cargo buildings, fire station
- Potential development of Port property north of SR 518 to accommodate cargo facilities (as noted in the Master Plan Update).

Although it appears unlikely at this time that there would be significant increases in either the types or intensities of environmental impacts from these facilities, planning for these concepts is at an early stage. Construction is subject to numerous contingencies including planning decisions, potential further environmental review, Port Commission adoption of a new plan for the area, permitting, and financing. If it is determined, as planning continues, that it is necessary or advisable under NEPA or SEPA to conduct additional environmental review, the FAA and/or Port will have the opportunity to conduct additional review.

North Electrical Substation

The North Electrical Substation received a SEPA Determination of Non-Significance on June 2, 2000. This DNS was amended on March 6, 2001 to reflect minor project changes. As currently envisioned, the project involves upgrading and expanding the existing Bow Lake Substation, replacing the North SeaTac Substation with a smaller facility (the North Main Service Point) and installing an 1,800-foot, 12.5 kV underground cable system between the Bow Lake Substation and the new North Main Service Point.

The Bow Lake Substation will be rebuilt on property owned by Puget Sound Energy ("PSE"). The North Main Service Point will consist of switch-gear enclosed in a 25-foot by 60-foot building that is 15 feet tall. The building will be enclosed by a 50-foot by 100-foot fence. The North Main Service Point will be located just east of the south entrance to the Airport parking garage between the entrance booth and the northbound Airport circulation road. The proposed 12.5 kV cable system will extend along the north side of South 176th St., across International Boulevard and onto Airport property.

No wetlands or water bodies are implicated in the construction of this facility. Stormwater collected at the North Main Service Point will flow either into the Port's stormwater collection system or industrial waste system. Catch basins for both systems are located in the area.

Water System Improvements

The Port proposes to construct water system improvements, including a two-million gallon reservoir, expansion of an existing booster pump station, and other improvements to the fire and domestic water distribution systems at Airport. The reservoir will be constructed on Port-owned land on Host Road, west of the Washington Memorial Cemetery on the east side of the Airport. This location is about 350 feet south of the existing water tower. Construction of the reservoir will involve relocating utilities and the east west portion of Host Road to a point approximately 100 feet north of the new reservoir.

The project will not result in any net increase in the amount of impervious surface over the existing 34,400 square feet. Therefore, there is no expected increase in the amount of stormwater runoff flows to the Des Moines, Green or Duwamish basins.

Rainwater from the site will be collected either in the Airport's stormwater drainage system or in the Industrial Wastewater System. The project will not require work over or in surface waters, and no fill or dredge material will be placed in or removed from surface waters or wetlands.

Miscellaneous Airport Projects

The following projects are at various stages of the design and planning process. Many have not yet undergone full environmental review. To the extent that potential environmental impacts have been identified, the Port concludes that these impacts will not have significant, adverse, environmental impacts at Sea-Tac Airport (including impacts on aquatic resources), either separately or in conjunction with the impacts identified for the Master Plan Update projects.

SASA (South Aviation Support Area) – In 1994, the Port prepared an EIS on the then-preferred alternative for SASA. This preferred alternative included aircraft maintenance. During the Master Plan Update, SASA was re-defined to include aircraft maintenance, aircraft parking and cargo development.. A final design for the facility has not been completed and the Port is continuing to work on the amount of each proposed use. There are no new environmental documents for SASA and, before constructing SASA the Port will update the existing environmental information. Final evaluations of the SASA facility will take into the SR509/South Access project and the buffering of Des Moines Creek.

TRACON is a radar system used by the FAA to track planes while in flight from approximately 5 to 30 miles from the airport. The TRACON facility would consist of radars and a building to house air traffic controller radar scopes. Currently, TRACON is located in the FAA space below the tower at Sea-Tac Airport. However, the TRACON facility has outgrown available space in the tower. The FAA is currently considering relocating the TRACON to the west side of the airport below the slope of the new runway. The Master Plan Update FEIS and FSEIS evaluated this project as being located at the base of the new air traffic control tower that is under construction. Since the completion of that study, the FAA has determined that a site on-airport is not necessary and is conducting a siting evaluation, which is investigating a 19-acre potential site at 8th Ave. and 170th St.

TRACON is an FAA project, and the FAA will be responsible for construction and environmental analysis for the project. The FAA has not begun environmental analysis on the site. The target date for relocating TRACON is the end of 2004. As currently envisioned the site will house two radar antennas, a building for the air traffic controllers and a parking lot for approximately 100 vehicles.

ASDE (Airport Surface Detection Equipment) is radar that looks at runways and taxiways and provides a picture of location of vehicles and airplanes on the ground during periods of low visibility. The Master Plan Update EIS called for placing the ASDE on top of the air traffic control tower. Since that time, the

FAA has learned that there are performance issues associated with locating this type of radar close to buildings. The FAA is currently conducting a siting study for this facility, which to date has determined that the location on top of the new tower could pose visibility issues. Upon selection of a final site, it is expected that the Port will conduct an additional SEPA review, and the FAA will complete a NEPA determination.

Logging Activities – The Washington Department of Natural Resources (DNR) Forest Practices Permit issued on April 27, 2000 was a re-issuance of a DNR permit that was originally issued on February 21, 1998, well before the last public comment period on the Port's §404 permit application. The terms of 1998 and 2000 permits are virtually identical and cover the same land along the west side of the Airport. The clearing activity covered by the permit is necessary for construction of the Third Runway as disclosed in the Master Plan EISs. On August 14, 2000, the Port obtained a DNR permit to remove trees in a small area below 188th St. and 28th Avenue South, in the vicinity of the Tyee Pond. The trees to be logged under the August 2000 permit represent a 0.64% increase in the number of the total board-feet that will be removed from the site. Both the April 2000 and August 2000 permits prohibit tree removal near wetlands pending issuance of the §404 permit.

Temporary Aircraft Parking-Taxiway Stubs – On October 25, 2000, the Port issued a SEPA Determination of Non-Significance to allow use of some existing Taxiways for aircraft parking until the taxiways are needed for the Third Runway. No maintenance or de-icing activities will occur to aircraft parked on the taxiways, and no impacts to aquatic resources are expected to occur from this activity.

SR 518 – The Washington State Department of Transportation is in the process of studying SR518 and possible upgrades to the roadway and interchanges to improve traffic flow. The study should be available by late 2001.

III. RESPONSE TO AGENCY COMMUNICATIONS

The following agency communications were received:

- Muckleshoot Indian Tribe
- Tom Luster memorandum to State Senator Julia Patterson
- Airport Communities Coalition (ACC) communications, including communications from Helsell Fetterman and technical consultants;
- Citizens Against Sea-Tac Expansion (CASE) communications from Smith & Lowney

The responses in this section have been prepared from the Port's perspective and knowledge.

Muckleshoot Indian Tribe, February 15, 2001

1. The Port is aware of the Muckleshoot Indian Tribe's interest in restoration of WRIA 09.0056 and has met with the Muckleshoot Tribe Fisheries Department to ensure that the wetland mitigation planned in Auburn will complement the Tribe's efforts toward creek restoration.

It is the Port's belief that the Auburn wetland mitigation project would not alter the seasonal distribution of flow in the tributary. During the over wintering period for salmon, when water tables at the mitigation site are high and precipitation rates exceed infiltration capacity, the wetland would convey and contribute flow to the creek, as is currently the case. The quantity of runoff would be expected to be generally similar to the existing condition. Similar to the existingcondition, in mid-spring when plant growth starts and precipitation rates decrease, runoff from the site would decrease. By late spring, evapotranspiration, lowered rainfall, and low ground water tables may drop below the elevation of surface ditches, at which time the area will no longer contribute flow to the creek.

As currently designed, there are no passage barriers to fish movement between the existing drainage ditches and the planned mitigation. As is currently the case, in the uppermost drainage ditches, passage conditions are variable, and may depend on periods of heavy rain or flood stages on the Green River.

Tom Luster to Senator Julia Patterson, January 21, 2001

1. The Port's §404 application will require certification of compliance with Washington state water quality standards under §401 of the Clean Water Act. It is the Port's belief that the Department of Ecology's certification of compliance with state water quality standards may be based in large part on the Port's compliance with its National Pollution Discharge Elimination System (NPDES) permit, issued to the Port by Ecology under §402 of the Clean Water Act. The NPDES permit contains the requirements that mandate compliance over time with the Clean Water Act's standards, as well as protecting the receiving waters to which the Port is discharging. The NPDES permit states "Compliance with this permit is deemed compliance with the Federal Water Pollution Control Act, also known as the Clean Water Act (33 USC §1251, et seq.), and the Water Pollution Control Act (RCW 90.48)." (NPDES Permit No. WA0002465-1, p. 8)

The Port's NPDES permit was conditioned to comply with water quality standards. Any future NPDES permits must likewise be conditioned to comply with water quality standards and the anti-degradation requirements of the Clean Water Act. (WAC 173-201A-060, 173-201A-070, Fact Sheet to NPDES Permit No. WA-002465-1, pp. 22-23). The Fact Sheet that accompanies the Port's existing NPDES Permit states as follows:

> In order to protect existing water quality and preserve the designated beneficial uses of Washington's surface waters, WAC 173-201A-060 states that waste discharge permits shall be conditioned such that the discharge will meet established Surface Water Quality Standards... The Department has reviewed the ambient water quality monitoring results gathered by the Port... and [t]he discharges authorized by this permit should not cause further degradation which would interfere with or become injurious to existing beneficial uses. (Fact Sheet, pp. 22-23).

Consistent with this language, in instances where an applicant has an existing §402 permit (an NPDES permit), compliance with the §402 permit will provide reasonable assurance of compliance with applicable state water quality standards for all areas covered by the permit. Such compliance provides "reasonable assurance" of compliance with the state water quality standards sufficient to allow Ecology to certify compliance with those standards under §401 of the Clean Water Act.

Because the Port is required by the Clean Water Act to obtain NPDES permits for process water discharges, as well as for industrial and construction stormwater discharges, Ecology has reasonable assurance that the activity that is the subject of this §401 Certification complies with water quality standards. The NPDES permit modification is being sought only to include additional discharge points and bring additional areas of the Airport within the NPDES permit jurisdiction. This will result in more protection for receiving waters because those discharges must meet the requirements of the existing NPDES permit, which has already been conditioned to meet water quality standards.

The Port's compliance with its NPDES permit is an ongoing process under which (1) best management practices (BMPs) are identified in the *Stormwater Pollution Prevention Plan*, (2) BMPs are implemented, (3) BMPs are inspected and monitored to demonstrate BMP effectiveness, (4) BMP improvements are made when necessary, and (5) follow-up sampling is used to demonstrate that the improvements are effective. The Port submits an Annual Stormwater Monitoring Report to Ecology. Ecology reviews this report to ensure that the Port's discharges are in compliance with the Clean Water Act, and that discharge conditions actually protect receiving waters. See also *Comprehensive Stormwater Management Plan* (December 2000), Sec. 2.2 "Water Quality Management Standards" (p. 2-5 – 2.6).

In addition to this response, see response to comments #2 and #8 of Smith & Lowney's February 16, 2001 letter.

2. With respect to cumulative impacts referred to in this comment, please see General Response GLR19 on the analysis conducted with respect to cumulative impacts of projects undertaken by both the Port and other parties in and around the area of the Airport.

In response to the commentor's comments regarding the Auburn mitigation site, information responsive to this comment is contained in the *Wetland Delineation Report*, Appendix A: Wetland Delineation Report-Auburn Mitigation Site (Parametrix, December 2000); the *Wetland Functional Assessment and Impact Analysis*, §§ 4.1-4.3 (Parametrix, December 2000); and the *Natural Resource Mitigation Plan*, §§ 4.1 and (Parametrix, December 2000).

David Evans and Associates, Inc. performed the original delineation of the Auburn mitigation site in 1995. The Corps made a jurisdictional determination of wetlands based on the David Evans delineation, the 1996 delineation by Parametrix, and the 1997 field evaluation of the site. At that time, approximately 6.13 acres of emergent wetlands were delineated. In response to new finding of increased amounts of ground water and recently formed hydric soil conditions, Parametrix performed second delineation of the site in December 2000. The new findings and delineation results are consistent with the conversion of former cropland back into wetlands. The December 2000 delineation found three jurisdictional wetlands

on the site. Wetland 1 extends from the northwest corner of the site to the south-central portion of the site and covers 20.45 acres of the site. Wetland 2 is adjacent to Wetland 1, is located in the south-central portion of the site, and is about 0.60 acres in size. Wetland 3 is located in the north-central portion of the site and is about 0.01 acres in size. Wetlands 1 and 2 are Washington State Category III wetlands. Wetland 3 is a Washington State Category IV wetland. The new wetlands are emergent wetlands consisting of abandoned farmland that are dominated by invasive, non-native grasses. As explained below, the Mitigation Plan calls for replacement with native forest/shrub vegetation, high-quality native emergent and open water wetlands that will form a Class II integrated wetland system.

The December 2000 Mitigation Plan presents the new information on the wetlands at Auburn and a summary of proposed mitigation activities. The Mitigation Plan has been revised to account for the additional wetlands that were found at the site and now includes an increased amount of wetland enhancement when compared to that presented in the former version of the mitigation plan. The presence of the new wetland areas bodes well for the ultimate success of the mitigation area because the presence of existing hydric soils and wetland hydrology allows a greater percentage of the mitigation wetlands to be enhanced rather than created from upland areas.

Under the current Mitigation Plan, the Port will undertake a wetland construction and enhancement on 65 acres of the 67-acre parcel. The Auburn mitigation site will replace wetlands at minimum of a 2:1 replacement ratio. The mitigation will create a high quality, diverse wetland complex with approximately 17.2 acres of forest, 6.0 acres of shrub, 6.2 acres of emergent, 0.6 acre of open water and 19.5 acres of enhanced emergent wetland habitat. The wetland habitat functions will be further enhanced by providing approximately 11.9 acres of forested buffers around the perimeter of the site and approximately 4.0 acres of upland habitat within the interior portion of the site.

The Port has concluded that the changed conditions at the Auburn mitigation site are not significant and will not cause adverse environmental impacts. The amount and ecological functions of mitigation wetlands that will ultimately result at the site is the same. The amount of wetland creation has decreased, but the amount of wetland enhancement has increased because areas that were slated for new wetlands were determined to be existing wetland and will therefore be enhanced rather than replaced. The amount of temporary impacts has increased slightly, but most of these areas will be converted from grassland to higher quality forest/shrub wetland at the end of the project. A minor increase in permanent impacts (approximately 0.1 acre) is also reported and discussed in the revised Mitigation Plan.

For a response regarding comments on the proposed South Access Road and expansion of SR 509, please see the discussion of this project in the General Response GNLR 19, Cumulative Impacts. The SR 509/South Access project, for which the Washington State Department of Transportation is the lead agency, is independent of the Master Plan Update projects. Its potential cumulative impacts have been considered in relation to the Master Plan Update projects and other projects in the vicinity of the airport.

In response to the commentor's assertion that there may be as-yet unidentified impacts to Northwest Ponds, the Port undertook a study of dissolved oxygen (DO) in the Northwest Ponds subsequent to the commentor's departure from the Department of Ecology. Because multiple factors influence the levels of dissolved oxygen in Northwest Ponds and Lake Reba (e.g., rainfall, wind, temperature, length of dry period, natural organic carbon in runoff and pond sediments), the Cosmopolitan (1999) study was unable to show any relationship between the application of de-icers and levels of dissolved oxygen in the ponds. The Port undertook a second study the following winter that reached similar conclusions. The Port has concluded that given the infrequent and minimal use of ground de-icers at Sea-Tac Airport, further studies are not likely to change the findings reported thus far.

The commentor's assertion that the Port is using the Northwest Ponds as an unauthorized mixing zone for metals has no basis in fact. The Port has not attempted to use the Northwest Ponds as a mixing zone.

With respect to the expansion of IWS Lagoon #3, see General Response GLR14, which addresses the IWS Lagoon #3 expansion. The wetlands around IWS Lagoon #3 have been delineated and the final plans for expansion of IWS Lagoon #3 avoid any direct wetland impacts. The Corps has verified that there are no direct wetland impacts. The project has a dam safety permit. The commentor has asserted that there may be indirect impacts from the expansion of IWS Lagoon #3. The Port has undertaken an analysis of the potential for indirect impacts on Wetland #28, from this work, which is included page 4-70 of the *Wetland Functional Analysis and Impact Assessment Report*. Appendix K provides a plan sheet of the IWS expansion. The commentor is incorrect in asserting that there may be an impact on Wetland #28 arising from the IWS expansion.

3. Please see General Response GLR16 concerning National Environmental Policy Act compliance. With respect to the Governor's June 30, 1997 Certification, the Port's *Comprehensive Stormwater Management Plan* "will not cause changes in the location of the hydrologic divide between Miller and Des Moines Creeks in a manner that alters the average instream flow of either creek." Unlike the situation in Battle Mountain Gold, under the Port's plans, the amount of acreage drained by Miller and Des Moines Creeks remains the same as it currently exists.

4. Please see General Response GLR2 concerning fill criteria.

5. See response to comments #2 and #8 of Smith & Lowney's February 16, 2001, letter, and response to comments #5, #6, #8, and #9 of Water Resources Consulting's February 16, 2001, letter.

6. Please see General Response GLR7 concerning streamflow mitigation, and responses to Rachael Paschal Osborn's February 15, 2001, letter.

Helsell Fetterman, February 16, 2001 letter

The responses in this section have been prepared from the Port's perspective and knowledge.

1. The Port has not taken actions that would result in a discharge of fill material to waters of the United States and, accordingly, no permit from the Corps is required for those activities referenced in the comment. The Corps has informed the Port that any stockpiling of fill material or other development activities in advance of a decision on the Port's §404 permit application is being undertaken at the Port's risk. The Corps has also informed the Port that any development activity at Sea-Tac Airport will have no bearing on the Corps' ultimate decision on the Port's §404 permit application.

2. Comments noted.

3. The comment regarding Ecology's responsibility is noted. See below for specific responses to comments regarding incomplete or technically deficient information. The Port believes that there are significant differences between the circumstances involved in the Battle Mountain Gold decision and the circumstances in this application. For instance:

a. the Port has an existing, individual NDPES permit that regulates all industrial and construction stormwater and process water discharges as the Airport;

b. in this application, there exists extensive knowledge regarding the affected lands;

c. in this application, detailed stormwater management plans have been prepared and these plans have been independently reviewed by the King County Drainage Services Section under contract with Ecology;

d. the Port does not need and is not preparing to build a water treatment plant on a mountain top, as was done in the Battle Mountain Gold case;

e. the Battle Mountain Gold decision related to an arsenic-leaching gold mine in an undeveloped mountain environment, as opposed to this application for an additional runway for an existing airport in a developed urban setting.;

f. unlike the situation in Battle Mountain Gold, the Port is in compliance with its National Pollution Discharge Elimination System (NPDES) permit;

g. consistent with the Governor's June 30, 1997 Certification, the Port's plan "will not cause changes in the location of the hydrologic divide between Miller and Des Moines Creeks in a manner that alters the average instream flow of either creek." Unlike the situation in Battle Mountain Gold, under the Port's plans, the amount of acreage drained by Miller and Des Moines Creeks remains the same as it currently exists; and

h. the Port's plan for instream flow mitigation will maintain stream levels within Miller, Des Moines and Walker Creeks and provides for maintenance of flow levels in those streams, unlike the "speculative and uncertain" plan proposed by Battle Mountain Gold.

The Port's NPDES permit requires the Port to develop a stormwater pollution prevention plan, a sediment and erosion control plan, and site specific monitoring plans for all constructions projects. Moreover, under its NPDES permit, the Port is required to implement and monitor the best management practices (BMPs) for its stormwater discharges. The Port has complied with each of those conditions. Monitoring reports are submitted to Ecology, along with an Annual Stormwater Report, which evaluates the stormwater monitoring data. Ecology has issued no notice of violation of the Port's existing NPDES permit. Because the Port has an existing NPDES permit and will be required to have NPDES permits in

the future. Ecology has "reasonable assurance" sufficient to certify compliance with state water quality standards.

4. See response to comment 3 above as to how the Port's actions differ from those taken in the Battle Mountain Gold case.

5. The Port has supplied data and analysis that is sufficient to allow the Corps to make a determination as to the adequacy of the Port's mitigation plan. Also see the response to Azous Environmental Services letter of February 15, 2001, and Sheldon & Associates letter of February 15, 2001.

6. See response to comment letters from Rachel Paschal Osborn (February 15, 2001) and Peter Willing/Water Resources Consulting (February 16, 2001).

7. See response to comment letter from Peter Willing/Water Resources Consulting (February 16, 2001).

8. See General Response GLR6 with respect to the Corps' review of the MSE wall design and the response to the letter from GeoSyntec (February 16, 2001).

9. The existing, and any future NPDES permits must be conditioned to comply with state water quality standards and the anti-degradation requirements of the Clean Water Act. WAC 173-201A-060, 173-201A-070, Fact Sheet to NPDES Permit No. WA-002465-1, pp. 22-23. The Fact Sheet that accompanies the Airport's existing NPDES Permit states as follows: "In order to protect existing water quality and preserve the designated beneficial uses of Washington's surface waters, WAC 173-201A-060 states that waste discharge permits shall be conditioned such that the discharge will meet established Surface Water Quality Standards.... The Department has reviewed the ambient water quality monitoring results gathered by the Port ... and [t]he discharges authorized by this permit should not cause further degradation which would interfere with or become injurious to existing beneficial uses." (Fact Sheet, pp. 22-23). Because the Port is required by the Clean Water Act to obtain NPDES permits for process water discharges, as well as for industrial and construction stormwater discharges, the Department of Ecology has reasonable assurance that the activity that is the subject of the §401 Certification complies with state water quality standards. The NPDES permit modification is being sought only to include additional discharge points and bring additional areas of the Airport within the NPDES permit jurisdiction. This will result in more protection for receiving waters because those discharges must meet the requirements of the existing NPDES permit, which has been conditioned to meet state water quality standards.

10. Comment noted.

11. See responses to comment letters of Dr. John Strand/Columbia Biological Assessments; Dr. Peter Willing/Water Resources Consulting; and Dr. Tracy Hillman/BioAnalysts.

12. See responses to comment letters of GeoSyntec Consultants.

13. See responses to comment letters of Dr. Geoffrey Gosling and Dr. Stephen Hockaday.

14. See responses to comment letters of Dr. Geoffrey Gosling and Dr. Stephen Hockaday with regards to technology improvements since the FEIS is issued.

The comment's reference to alternative runway configurations are addressed in Appendix C to the Federal Aviation Administration Record Of Decision For the Master Plan Update Development Actions Sea-Tac International Airport, July 3, 1997 (ROD).

The comment's reference to the option of utilizing alternative airports is also addressed in the ROD at 3-4. In addition, the Major Supplemental Airport Study conducted by the Puget Sound Regional Council considered 40 different supplemental airport sites and concluded that construction of the Third Runway was the least environmentally intrusive of the alternatives considered.

15. The Port's §404 application sets out all activities that the Port will undertake as part of the recommended Master Plan Update improvement projects. In addition, the Port has disclosed the existence of Port-sponsored non-Master Plan Update projects and non-Port projects in the vicinity of Sea-Tac Airport, and it has provided the Corps with the available environmental information for those projects. The Port agrees that the Corps' jurisdiction is broader than simply reviewing the specific activity that triggers the need for a §404 permit and may include reviewing other aspects of the Master Plan Update projects or consideration of cumulative impacts.

The Port's application is complete, and it includes "sufficient information to give a clear understanding of the notice and magnitude of the activity to generate meaningful comment." 33 CFR §325.3. In addition to the material in the application, the Corps has considered, and made available to the public, information on other projects in the vicinity of Sea-Tac Airport. In some cases, the projects mentioned by the commentor are still in the planning stages and awaiting environmental review and adoption by the Port of Seattle Commission. In others, the projects are not sponsored by the Port. To the extent known, the Port has provided the Corps with environmental information on these projects and proposals. This information is available in the Master Plan Update §404 project file for interested members of the public and to assist the Corps' in its continuing "hard look"-evaluation of the Master Plan Update projects and consideration of their relationships with other Port and non-Port projects in the vicinity of Sea-Tac Airport.

See also General Response GLR1 and GLR19.

16. The Port estimates of the cost of building the third parallel runway is $773 million (estimated in June 1999). Throughout the planning process, the project has been the subject of extensive consideration of the project cost and benefits. A requirement of the Federal grant process is the conduct of a benefit cost evaluation that is included in support of the Port's Letter of Intent application. That benefit cost evaluation was prepared subject to federal guidelines (dated December 1999, guidelines that finalized interim guidance adopted by the FAA in 1997). This guidance, titled "FAA Benefit Cost Analysis Guidance" was issued by the FAA's Office of Aviation Policy and Plans and is used "to provide clear and thorough guidance to airport sponsors on the conduct of project-level benefit-cost analysis (BCA) for capacity-related airport projects.... Airport sponsors should conform to the general requirements of this guidance for all BCA's submitted to the FAA."

In 1997, the FAA estimated that the Project would result in delay savings, to airlines and their passengers, in excess of $2.7 billion in present value through 2015. These estimated benefits, which may now be conservative, exceed the $600 million present value of the runway's maintenance costs and updated capital costs by a ratio of 4.5 to 1.

Helsell Fetterman, January 19, 2001

Notwithstanding the closure of the formal comment period on February 16, 2001, the Corps has continued to accept and consider comments presented after the close of that comment period, up through the time of the issuance of the §404 permit.

Helsell Fetterman, January 17, 2001

Document Request from Corps and referral to Corps attorney – No comment/response from the Port required.

Helsell Fetterman, January 4, 2001

See General Response GLR6 on the mechanically stabilized earth wall. With regard to the temporary SR 509 interchange, sufficient information has been publicly available to allow for meaningful public comment. This project was discussed in the *Final Supplemental Environmental Impact Statement* (Section 5-4). The interchange will not involve any discharge of fill material into a water of the U.S. and, accordingly, will not require a §404 permit. Construction of the interchange will include the use of best management practices to detain, treat, and discharge stormwater as required by Ecology and King County stormwater manuals. The interchange will not have significant indirect impacts on wetlands, as documented in the May 3, 2000, memo from Parametrix to the Corps entitled *Analysis of Indirect Impacts to Wetlands from the Temporary SR-509 Interchange*. Any new information regarding the interchange since the issuance of the FSEIS represents only refinement of the project as considered in the FSEIS, not a wholesale new design or significant new information regarding potential impacts. Further, these issues were addressed by the Port in its January 2000 addendum under the Washington State Environmental Policy Act entitled *Addendum To Final Environmental Impact Statement and Final Supplemental Environmental Impact Statement For Proposed Master Plan Update Development Actions at Seattle-Tacoma International Airport*.

Helsell Fetterman, December 20, 2000

1. The *Comprehensive Stormwater Management Plan* (December 2000) was issued before the Public Notice was issued.

2. Fill for the Third Runway may come from a variety of sources. In a cost-competitive process, it is impossible to know who will provide the best source of material until that bidding process is completed. All material used as fill for the Third Runway will have to meet the fill quality criteria approved by the Department of Ecology.

3. See General Response GLR4 concerning Maury Island.

4. With respect to the commentor's reference to a "de-icing study", the Port undertook a study of dissolved oxygen (DO) in the Northwest Ponds in 1999 (the Cosmopolitan study). Because multiple factors influence the levels of dissolved oxygen in NW Ponds and Lake Reba (e.g., rainfall, wind, temperature, length of dry period, natural organic carbon in runoff and pond sediments), the Cosmopolitan study was unable to show any relationship between the application of de-icers and levels of dissolved oxygen in the ponds. The Port undertook a second study the following winter that reached similar conclusions. Given the infrequent and minimal use of de-icers at Sea-Tac Airport, the Port has concluded that further studies are not likely to change the findings reported thus far.

See General Response GLR6 on mechanically stabilized earth wall with respect to engineering of wall, peer review of engineering analysis, and design review by the Corps.

Helsell Fetterman, December 22, 2000

This response is broken into two parts. Initially, the Port will respond generally to ACC's assertion that supplemental environmental review is required under the National Environmental Policy Act (NEPA). Following that general response, the Port will provide a particularized response to the various issues raised by the ACC. Where multiple issued could be addressed simultaneously, responses to those issues have been grouped.

NEPA Does Not Require Preparation of Additional Environmental Documents

See General Response GLR16. An agency is obligated to prepare a supplemental environmental impact statement if: (1) The agency makes substantial changes in the proposed action that are relevant to environmental concerns; or (2) there are significant new circumstances or information relevant to environmental concerns that have a bearing on the proposed action or its impacts. 40 C.F.R. §1502.9(c)(1).

Supplemental review under NEPA is reserved for "significant" project changes. Unless the new circumstances or information present a seriously different picture of the environmental impact of the proposed project from what was previously envisioned, the information is not "significant." *Marsh v. Oregon Natural Resources Council*, 490 U.S. 360, 371 (1989). After an EIS is finalized, an agency need not supplement an EIS every time new information comes to light. *Id.*

An agency's decision on whether to prepare a SEIS is subject to the "rule of reason." *Marsh*, 490 U.S. at 373 (1989). Under the "rule of reason" standard, an EIS must (1) contain a reasonably thorough discussion of significant impacts of the probable environmental consequences of the proposed project and (2) the form, content and preparation of the EIS must foster both informed decision-making and informed public participation. The requirement is that the agency has taken both a procedural and substantive "hard look." *Stop H-3 Association v. Dole*, 740 F.2d 1442, 1461 (9th Cir. 1984). The Port's environmental review documents meet this standard.

A relevant example of this rule arose in the case of *Airport Neighbors Alliance v. U.S.*, 90 F.3d 426 (10th Cir. 1996). In that case, the Tenth Circuit Court of Appeals held that the Federal Aviation Administration had not inappropriately ignored cumulative impacts of a proposal when it chose not to analyze possible future actions postulated in a twenty-year Master Plan. The court acknowledged that the actions were far from certain and held that extended analysis would result in a "gross misallocation of resources, would trivialize NEPA and would diminish its utility in providing useful environmental analysis of major federal actions that truly affect the environment." 90 F.3d at 433. This case is consistent with a number of other decisions on this point, including many issued by the 9th Circuit Court of Appeals. *See, e.g., Price Road Neighborhood Ass'n., Inc. v. U. S. Dep't of Transp.*, 113 F.3d 1505, 1510 (9th Cir. 1997) (Court upheld the decision to issue a FONSI regarding a change in a freeway interchange from tunnels to loop roads, confirming the Federal Highway Administration's conclusion that the change in design presented no discernable difference in the level of environmental impacts between the original proposal and the redesign); *Swanson v. United States Forest Service*, 87 F.3d 339 (9th Cir. 1996) (ESA listing of Snake River Chinook Salmon did not constitute significant new circumstances or information requiring new EIS for timber sale on Forest Service land); *Environmental Coalition of Ojai v. Brown*, 72 F.3d 1411,1418 (9th Cir. 1995) (new research concerning the negative biological effects of radar emissions did not require an SEIS and the decision to issue FONSI with respect to proposal to construct new radar tower was not arbitrary and capricious where government had thoroughly evaluated recent scientific developments regarding the health impacts of radar emissions and determined that its initial conclusions remained valid); *Laguna Greenbelt, Inc. v. United States Department of Transportation*, 42 F.3d 517, 529-30 (9th Cir. 1994) (decision by the Federal Highway Administration not to prepare an SEIS on proposed new toll

road was not arbitrary and capricious, notwithstanding the fact that road was proposed for environmentally sensitive area that was home to endangered species).

Responses to Specific Issues:

The remainder of this letter provides specific responses to the issues raised by ACC in its December 22, 2000 letter.

ESA Listing of the Puget Sound Chinook Salmon and Coastal Puget Sound Bull Trout

The National Marine Fisheries Service (NMFS) issued its new listing of Chinook salmon on March 24, 1999, and the U.S. Fish & Wildlife Service (FWS) issued its new listing of Bull Trout on November 1, 1999. Both these listings occurred before the end of the last public comment period. Pursuant to the Endangered Species Act (ESA), a draft *Biological Assessment* was prepared and publicly issued in November 1999 prior to the expiration of the formal public comment period. The November 1999 draft *Biological Assessment* concluded that the Master Plan Update actions may affect, but were not likely to adversely affect the listed species. Following consultation with NMFS and FWS, a final *Biological Assessment* was issued in June 2000. In the final *Biological Assessment*, the basic facts regarding the stormwater management plan and potential impacts of stormwater on the species have not changed, nor have the essential conclusions that the actions are not likely to adversely affect the listed species. In light of the unchanged circumstances since the last public comment period, and given the *Biological Assessment*'s conclusion that the development actions are not likely to adversely affect the listed species, the final *Biological Assessment* does not constitute significant new application data that affects the public's review of the proposal to the extent of requiring additional or supplemental review under NEPA.

Potential contamination of groundwater arising from Port projects

The area of the Airport where most aircraft fueling and maintenance operations have been performed is referred to in the Model Toxics Control Act (MTCA) Ground Water Study as the Airport Operations and Maintenance Area (AOMA). Within the AOMA, contaminated ground water exists in a number of localized, discrete sites. The horizontal boundaries of each contaminated ground water site have been defined by site investigation, and include any migration that might have occurred due to the presence of utility and underground infrastructure within the AOMA.

Within the AOMA, defined areas of contaminated ground water exist in both shallow perched zones and in the shallow regional aquifer (Qva). The perched zones are isolated and discontinuous, while the Qva is continuous.

Investigation within the AOMA has demonstrated that existing perched zone contamination has remained localized, i.e., has not migrated significantly along utility pathways, and remains within the AOMA. Based on this investigation and the discontinuous nature of the perched zone, there should be no material impact from the construction of the Third Runway and other infrastructure on existing contaminated ground water within the perched zone.

No deep infrastructure is planned for the Third Runway. Some deeper infrastructure may be constructed for other master plan projects (e.g., STS upgrades, North End Development Program, or SASA), but these would be in locations far from known Qva ground water impacts. Accordingly, there will be no material impact from the construction of Third Runway and other infrastructure on existing contaminated ground water in the Qva.

In addition, construction within contaminated areas will result in the removal of contaminated soil to appropriate offsite treatment and disposal facilities. This will also be the case where contaminated soil is excavated in connection with construction of utilities and subsurface infrastructure.

Based on the analysis outlined above, the Port anticipates that construction of the Master Plan Update improvements will have no material impact on existing ground water contamination, and there is no basis to suspect that existing ground water contamination will impact area wetlands, streams, and fish life.

The MTCA Agreed Order referred to in the comment letter was signed in May 1999. As noted above, current data on contaminated sites within the AOMA demonstrates that ground water contamination has migrated to only a limited degree from known source areas. As a result, there is no significant risk that the potential receptors listed in the Agreed Order will be impacted by construction of the Third Runway or other Master Plan Update improvements.

Need for Additional NEPA Review In Light of New Municipal Air Pollution Studies

Based on the Port's review of the documents referenced and the analysis presented in the *Final EIS*, the Port believes that no significant new information has been developed in this field. The comment references the *Preliminary Study and Analysis of Toxic Air Pollutant Emissions and the Resulting Health Risks Created by These Toxic Emissions In Surrounding Residential Communities* (August 2000; City of Park Ridge, Illinois). The Park Ridge Study was a reevaluation of existing data already obtained from an earlier City of Chicago study. The earlier City of Chicago study concluded that only 1.6% of volatile organic compounds within a 10-mile radius could be attributed to O'Hare Airport.

Independent third parties have questioned the significance of the Park Ridge study. *See, e.g.*, Comments of Peter Scheff, University of Illinois Professor of Environmental and Occupational Health Sciences: "The challenge is to separate the science from the politics – and it is a challenge." *Chicago Tribune*, September 5, 2000 O'Hare Emissions Conclusion Cloudy: Scientists Unmoved by Study as Others Seek Action.

In addition, the head of the Illinois Environmental Protection Agency (Illinois EPA), Thomas Skinner, noted the lack of scientific or peer review for the Park Ridge study and questioned whether the it actually added to the reasonable debate on the issue of air quality around O'Hare. *Id.*

Preliminary results from a subsequent study conducted by Illinois EPA have confirmed that the conclusions of the Park Ridge study may have been overstated, finding that control chemicals were not found in any more significant numbers around O'Hare airport than in control communities located far away from the airport. *Chicago Tribune*, November 23, 2000 O'Hare Pollution Isn't Worse Than Areas, Illinois EPA Says.

Public health-related issued and an evaluation of air pollution health impacts is contained in the Final EIS. See *Final EIS* Chapter IV, Section 7.

FAA's construction of TRACON system

TRACON is a radar system used by the Federal Aviation Administration (FAA) to track planes while in flight from approximately 5 to 30 miles from the Airport, as well as other airports in the region. Currently, TRACON is located in the tower at Sea-Tac Airport, in space occupied by the FAA. However, the TRACON facility has outgrown available space in the tower. The FAA is currently considering alternative sites for relocating the TRACON, including a site on the west side of the Airport below the slope of the new runway. The FAA is investigating a 19-acre potential site at 8th Ave. and 170th St.

TRACON is an FAA project, with independent utility completely apart from any of the Port's Master Plan Update projects, and the FAA will be responsible for construction and environmental analysis for the project. It is appropriate to consider the TRACON system separately from the Master Plan Update projects, because TRACON is not related closely enough to the Master Plan Update projects to be, in effect, a "single course of action." *See* 40 CFR §150.24. The FAA has not begun environmental analysis on the site. The target date for relocating TRACON is the end of 2004. As currently envisioned, the site will house two radar antennas, a building for the air traffic controllers and a parking lot for approximately 100 vehicles.

Impacts from the implementation of the Port's Stormwater Management Plan; Gilliam Creek and Walker Creek; Impact of Stormwater Conveyance to IWS.

All impacts arising from both the construction of stormwater management facilities and the eventual implementation and Port's *Comprehensive Stormwater Management Plan* have been previously evaluated. As the *Comprehensive Stormwater Management Plan* makes clear, potential impacts from the construction of the Port's stormwater management facilities have been anticipated and construction and best management practices have been developed to reduce those impacts well below the level of significance. For instance, temporary erosion sediment control measures are being implemented to minimize the impact from the construction of stormwater facilities. All construction projects are required to provide a site-specific monitoring plan to Ecology for review and approval. The plan must be submitted to Ecology at least 30 days prior to the start of construction.

In addition, changes to the Port's *Comprehensive Stormwater Management Plan* since issuance of the FEIS have not been sufficiently significant to warrant additional review under the National Environmental Policy Act (NEPA). The methods of water *quality* treatment in the current plan, including bio-swales, filter strips, and other best management practices required by the applicable water quality manuals, are not significantly different from that considered in the FEIS. Furthermore, the performance standards to which the water *quantity* plans are designed also are not significantly different from that considered in the FEIS. As a result of discussions with Ecology and the Corps, the Port has revised the amount, type, and location of stormwater detention, but these revisions do not change the allowable volume or rate of water discharge. There are no new wetland impacts from these revisions, and the revisions do not have significant new environmental impacts that warrant preparation of a supplemental EIS. Most importantly, there have been no fundamental changes in the Port's proposed treatment and discharge of stormwater that require preparation of a SEIS.

During the review of the Port's §404 application conducted by NMFS and FWS in connection with the publication of the Port's *Biological Assessment*, a question arose regarding potential stormwater impacts in the Gilliam Creek basin from reconstruction of a water tower. The Port submitted information to the NMFS and FWS showing that future reconstruction of the water tower will not result in either: (1) the construction of new impervious surface or (2) a change in land use. Accordingly, there will be no changes to stormwater in the Gilliam Creek basin and no new impacts on the creek.

Similarly, with regard to Walker Creek, additional information on the temporary SR 509 interchange does not reflect a new design or significant new environmental impacts.

Finally, there is no significant new data since issuance of the FEIS regarding the Port's conveyance of stormwater to the Industrial Wastewater System (IWS) lagoons. Diversion of stormwater to the IWS will not reduce stream baseflows. IWS impacts have been taken into consideration in the overall calculation of baseflow impacts conducted as part of the Master Plan Update development actions. Similarly,

diversion of stormwater to the IWS will not have a negative impact during storm conditions because stormwater will be collected, detained, and discharged at pre-development rates.

Cumulative Impacts of other projects in the vicinity

Please see General Response GLR19 concerning the analysis conducted with respect to cumulative impacts of projects undertaken by both the Port and other parties in and around the area of Sea-Tac Airport.

Redesign of the temporary SR 509 interchange

See also General Response GLR13. This project was discussed in the *Final Supplemental Environmental Impact Statement* (Section 5-4). The interchange will not involve any discharge of fill material into a water of the U.S. and, accordingly, will not require a §404 permit. Construction of the interchange will include the use of best management practices to detain, treat, and discharge stormwater as required by the Department of Ecology and King County stormwater manuals. The interchange will not have significant indirect impacts on wetlands, as documented in the May 3, 2000, memo from Parametrix to the Corps entitled *Analysis of Indirect Impacts to Wetlands from the Temporary SR-509 Interchange*. Any new information regarding the interchange since issuance of the FSEIS represents only refinement of the project as considered in the FSEIS, not a wholesale new design or significant new information regarding potential impacts. Further, these issues were addressed by the Port in its January 2000 addendum under the Washington State Environmental Policy Act entitled *Addendum To Final Environmental Impact Statement and Final Supplemental Environmental Impact Statement For Proposed Master Plan Update Development Actions at Seattle-Tacoma International Airport.*

The Port's Fill Acceptance Criteria

See General Response GLR2 concerning fill criteria.

Unnamed tributary to Miller Creek

Neither the Port nor any other regulatory agencies with jurisdiction have overlooked the "unnamed tributary" referred to in this comment letter. The Port, the Corps, Ecology, FWS, NMFS, and WDFW are all aware of the drainage channels present on the east and west side of 12th Avenue South, near Parcel 303. Staff from these agencies have visited the low point of 12th Avenue South on numerous occasions to examine drainage channels, Wetland 37, the culvert located beneath 12th Avenue South, the groundwater discharge function occurring in the area, the location of the proposed retaining wall, and other project features.

Channels on the east site of 12th Avenue were determined to be non-wetland waters of the U.S., and are mapped and discussed as Channel A and Channel W in Figure 2.3-2 of the *Natural Resources Mitigation Plan* (Parametrix 1999). Channel A is a roadside ditch that collects groundwater, stormwater, and seepage from Wetland 19 from the east side of 12th Avenue and directs it to a culvert at the low point of 12th Avenue South. Channel W conveys stormwater and runoff from Wetland 20 to the low point on 12th Avenue South. The flows that these channels concentrate and discharge via a culvert beneath 12th Avenue South enter Wetland 37, on Parcel 303.

Within Wetland 37, the channel conveys flow to the west, about 450 feet to Miller Creek, and is included in the project analysis as a water of the U.S. because it is a part of Wetland 37. The Corps and other agencies have observed this channel. Channel conditions, including downcutting of about 12 inches through wetland soils suggest it has recently formed as a result of uncontrolled stormwater runoff from

12th Avenue South and other drainage alterations (i.e. the artificial diversion of water from Wetland 19 to Wetland 37).

Overall, drainage conditions in Wetland 37 are described in the *Wetland Delineation Report* (Parametrix 1999). The functions these channels provide to Miller Creek are recognized and reflected in the *Wetland Functional Assessment and Impact Analysis* (Parametrix 1999). In this report, the functions of Wetland 37 for export of organic carbon and groundwater exchange are rated "high" because the importance of this channel was recognized and evaluated as part of the overall function of the wetland. The channel system does not provide direct habitat to fish because of their small size, shallow water depths (1-several inches), relatively steep grade (5-10 percent), and culvert blockage. The hydrologic functions (i.e. current and future runoff conditions) of this sub-watershed have been evaluated in the *Preliminary Comprehensive Stormwater Management Plan* (Parametrix 2000). The indirect importance of the channel functions to fish habitat conditions in Miller Creek is also recognized in the evaluation of Wetland 37, hence it is rated "high" for Resident/Anadromous Fish.

WDFW has examined the channel system and has requested that the channel functions be addressed in the Port's mitigation plan. As a result of this request, Section 5.2.3 of the *Natural Resource Mitigation Plan* (NRMP) was prepared to address the hydrologic and biologic functions of these channels (Channel A, Channel W, and the channel located in Wetland 37). As explained in that document, the 1,950 linear feet of replacement drainage channels (see Figure 5.2-14 of the NRMP) proposed as mitigation will collect groundwater seepage from the embankment and convey it downslope to Wetland 37 and Miller Creek. These channels will be protected and shaded with buffers of native vegetation.

Through the major permit modification filed with Ecology on October 20, 2000, the Port has requested that named and unnamed tributaries, storm drains and other waters of Miller, Des Moines, Walker and Gilliam Creeks be specifically listed as receiving waters in the current NPDES permit for the Airport.

Impacts of waste handling facilities

Contrary to the assumption in the comment letter, the Port has not constructed and does not operate a waste treatment facility or waste disposal facility in conjunction with Sea-Tac Airport Master Plan Update improvements. Accordingly, the Port cannot respond to this comment.

Both a September 27, 2000, letter from Greg Wingard to Tom Luster and a October 18, 2000, letter from Richard Poulin to the Port assert the presence of a waste disposal facility at Sea-Tac Airport. However, no such facility exists.

The Port has constructed a facility for short-term storage of potentially contaminated fill materials excavated from on-airport construction sites. The facility allows for sampling and testing of excavated soil to determine appropriate disposal options. The facility is paved, and drains to the IWS. Appropriate engineering and related reports for this facility were provided to Ecology in May 2000, prior to construction. Use of this facility assures that potentially contaminated material excavated during construction is properly managed, thereby reducing the risk of the release of such materials to the environment. This is accomplished by virtue of segregation of these materials from the construction site while the soil is tested and appropriate disposal options are selected and implemented, and management of these materials by environmental staff using facility-specific management BMPs.

The impacts of construction in known contaminated areas of the Airport has been considered in the context of the applicable Model Toxics Control Act (MTCA) regulations. Independent MTCA site assessments and cleanups have been performed, certain contaminated materials have been allowed to

remain onsite under various MTCA cleanup protocols, and disturbance of such materials by construction is being managed consistent with MTCA protocols for handling contaminated soil.

Impacts from the expansion of IWS Lagoon #3

See General Response GLR14 concerning IWS Lagoon #3 expansion. This project is required by the Port's NPDES permit. It is not a part of the Master Plan Update development actions and is not a significant change in the §404 application requiring additional NEPA review.

The IWS project will not fill any wetlands. The project is located on existing fill, near Wetland 28. The project involves: (1) excavating and creating a berm to increase the volume of the existing IWS lagoon 3 from 29 million gallons to 76.5 million gallons, (2) cleaning the existing pond, and (3) lining the entire newly-enlarged pond.

The expansion of IWS Lagoon #3 will create a 12.3-acre, lined lagoon that is not expected to reduce discharge to Wetland 28 or to Des Moines Creek, because the lagoon is located in an area of groundwater discharge, rather than infiltration (*Kennedy/Jenks, IWS Lagoon 3 Upgrade Preliminary Design Report* 1999). Additionally, an underdrain system beneath the lined, treatment lagoon will allow groundwater beneath the lagoon to drain to Wetland 28. This system will actually allow more water to reach Wetland 28 and Des Moines Creek, because rainwater and upwelling groundwater that currently reaches unlined IWS Lagoon #3 is pumped to the Industrial Waste Treatment Plant (IWTP) and discharged outside the Des Moines Creek basin. All water contained within the IWS Lagoon #3 will be treated in the IWTP and discharged to Puget Sound or King County 's East Division Reclamation Plant at Renton, and therefore will not affect peak flows in Des Moines Creek.

Wetland hydrology for the wetlands adjacent to IWS Lagoon #3 will be maintained and surface runoff will be unchanged by the expansion of IWS lagoon 3. Therefore, the project is unlikely to adversely affect the adjacent wetlands.

Logging, clearing and grading near Miller Creek

The Port will not be logging, clearing or grading in any wetland areas or buffers prior the issuance of the §404 permit. All logging activities will be conducted consistent with the Forest Practices Management Act and under appropriate permits obtained from the Department of Natural Resources (DNR). The Port has obtained Class IV Special Forest Practices permits for recent logging that has occurred in the vicinity of Sea-Tac Airport.

The DNR Forest Practices Permit issued on April 27, 2000 was a re-issuance of a DNR permit that was originally issued on February 21, 1998, well before the last public comment period on the Port's §404 permit application. The terms of 1998 and 2000 permits are virtually identical and cover the same land along the west side of the airport. The clearing activity covered by the permit is necessary for construction of the Third Runway, as disclosed in the Master Plan EISs. On August 14, 2000, the Port obtained a DNR permit to remove trees in a small area below 188th St. and 28th Avenue South, in the vicinity of the Tyee Pond. The trees to be logged under the August 2000 permit represent a 0.64% increase in the number of the total board-feet that will be removed from the site. Both the April 2000 and August 2000 permits prohibit tree removal near wetlands pending issuance of the §404 permit.

NPDES Violations

The Port is in compliance with its National Pollution Discharge Elimination System (NPDES) permit, which requires the Port to develop a Stormwater Pollution Prevention Plan, which the Port has prepared

and submitted, to implement best management practices (BMPs) required by that Plan, and to monitor the effectiveness of those BMPs, as well as monitoring its stormwater discharges, which is ongoing. Ecology has issued no notice of violation of the Port's NPDES permit. Based on the Port's ongoing compliance with its NPDES permit, Ecology has "reasonable assurance" sufficient to certify compliance with state water quality standards.

Alleged impacts to Gilliam Creek.

There are no Master Plan Update projects being undertaken by the Port within the Gilliam Creek watershed. Accordingly, there are no projects requiring Corps of Engineers review in that watershed. Construction activity within the Gilliam Creek watershed will not result in any increase in impervious surface or change in land use. Accordingly, there will be no changes to stormwater impacts within the Gilliam Creek basin and no impact on Gilliam Creek.

Impacts to Walker Creek

The impacts to Walker Creek are the same as those that may arise in the Miller Creek and Des Moines Creek. As is outlined in detail in the Port's *Comprehensive Stormwater Management Plan*, and in the FEIS and *Final Supplemental EIS* for the Master Plan Update, those impacts have been anticipated and mitigated. These same mitigation procedures will minimize any potential impacts to Walker Creek below the level of significance.

Stream flow augmentation plans

See General Response GLR7 concerning this issue.

Auburn mitigation site

There are no new questions relating to potential flooding events. From the early planning stages for this mitigation project, the Port has planned to construct this site to become part of the 100-year floodplain. The project site is designed to provide flood storage capability during rare flooding events, and the mitigation is designed to accommodate this capability. Similarly, there are no new significant issues regarding proposed development in the area that warrant a supplemental EIS. It has been publicly known since prior to the *Final EIS* that the adjoining area was under serious consideration for development. The Port's mitigation site is designed with buffers to protect the wetlands from potentially incompatible activities on adjoining properties.

Impacts of the Aircraft Hydrant Fueling System

The Aircraft Hydrant Fueling System (AHFS) proposal is to install a Jet A underground fuel line concurrent with the planned improvements to Concourse A. The AHFS would provide single source fuel delivery of Jet A fuel at the airport and a common infrastructure that would be used by all airlines. The AHFS would replace the current fueling operations (primarily truck deliveries) for most commercial passenger aircraft at the Airport. The AHFS would include cathodic corrosion protection for the underground pipes and a state-of-the-art leak detection system.

A SEPA determination of non-significance was issued for the project on October 6, 2000. Previously, the Port had discussed the need to replace the existing fueling equipment in the Master Plan Update FEIS and FSEIS. However when the FEIS and FSEIS were prepared, the AHFS project had not been defined sufficiently to enable the consideration of the environmental effects of reconfiguring the existing system.

Other environmental documents that discuss the proposal are listed on page three of the SEPA environmental checklist for the proposal.

The AHFS would require removal of some of the old hydrant system piping, fuel lines, hydrants and infrastructure; installation of new aircraft hydrant fueling system, piping, fuel lines, hydrants, hydrant pump and pits. The fuel lines will be "sleeved" (placed inside another pipe) when crossing railroad tracks or highways. The AHFS would include cathodic protection and a leak detection system. Finally, the AHFS would require construction of a new fuel farm operations building (4,586 sq. ft.), a concrete pump pad facility (187 ft. x 32 ft.) and up to two new modular operations buildings (approximately 1320 sq. ft.).

Air quality impacts from the aircraft hydrant fueling system and associated construction activities are fully addressed in the October 5, 2000 Environmental Checklist. The checklist includes the following information regarding air quality:

- The primary emissions from the AHFS will be associated with construction and consist primarily of nitrogen oxide.
- Total air emissions attributable to construction activities are less than de-minimus levels under EPA's General Conformity Rules under the Clean Air Act.
- Air emissions associated with operation of the AHFS are expected to result in a net decrease in air emissions, since the system will eliminate the need for underground storage tanks and individual airline fueling systems and significantly reduce the number of fuel trucks and truck trips.
- During construction, contractors will be required to comply with the Puget Sound Clean Air Agency's regulations requiring reasonable precautions be taken to avoid dust emissions.

In addition, the Port has discussed potential air permitting issues for this system with the Puget Sound Clean Air Agency. The Agency does not require a Notice of Construction permit for installation of an aircraft fueling hydrant system because of the low volatility of the fuel.

Helsell Fetterman, September 6, 2000

The Port's application was withdrawn. The Public Notice issued December 27, 2000, is for the changes to the project since the last Public Hearing in November 1999.

Helsell Fetterman, August 14, 2000

A new public notice was issued December 27, 2000, and a Public Hearing was held January 26 and 27, 2001, at the Washington State Criminal Justice Training Center in Burien. The January 26 hearing went from 5:30 pm to 10:00 pm, and the January 27 hearing went from 9:00 am to 5:00 pm.

Helsell Fetterman, June 30, 2000

Gilliam Creek will not be affected by the construction or operation of the Master Plan Update projects.

Helsell Fetterman, June 22, 2000

See General Response GLR13 concerning the Temporary Construction Interchange.

Helsell Fetterman, June 6, 2000

See General Response GLR13 concerning the Temporary Construction Interchange on SR509.

Helsell Fetterman, June 2, 2000

Notice of Intent to Sue – no comment/response needed from the Port.

Helsell Fetterman, May 24, 2000

Comment noted.

Helsell Fetterman, May 15, 2000

See General Response GLR13 concerning the temporary construction interchange on SR509.

Helsell Fetterman, May 1, 2000

Notice of Intent to Sue – no comment/response needed from the Port.

Helsell Fetterman, April 28, 2000

See General Response GLR13 concerning the temporary construction interchange on SR509.

Helsell Fetterman, January 31, 2000

The Port cannot comment on or respond regarding the Corps' handling of Freedom of Information Act requests.

Stephen Hockaday --- Pacific Aviation Consulting, February 16, 2001 letter

The responses in this section have been prepared from the Port's perspective and knowledge.

1. The Master Plan Update and the *Final EIS* (FEIS) and *Final Supplemental EIS* (FSEIS) gave thorough consideration to the development of a runway with a length less than 8,500 feet as documented in Chapter 3 of the FEIS and Chapter 3 of the FSEIS. The Final EIS and FSEIS concluded that there were minimal differences between the operational performance associated with the shorter versus longer lengths. However, Appendix C of the Federal Aviation Administration's (FAA) 1997 Record of Decision (ROD) (*Assessment of Runway Length and Location for the Third Parallel Runway*) evaluated the shortening of the runway from the north end, such that the thresholds would not be co-located. As that analysis found, that operational procedures would lessen the benefit of the Third Runway unless a wider separation was used. The attachment states:

> "A staggered threshold associated with a length less than 8,500 feet on the Third Runway would reduce the operating capability of the new runway when air traffic control cannot maintain visual separation between an arriving and departing aircraft. The FAA Air Traffic Control Manual, FAA Order 7110.65J, Section 5-8-5 states that in order to conduct simultaneous operations between an aircraft departing on the near runway (existing runway 16L/34R) and an aircraft on final approach to another staggered runway (new runway), that "The runway centerlines separation exceeds 2,500 feet by at least 100 feet for each 500 feet that the landing thresholds are staggered"

As a result, the FAA's ROD found that wetland impacts would actually be greater if the north thresholds were not co-located. As the wetland impacts are focused on the north end, shortening the runway from the south does not avoid wetlands. The ROD concludes that shortening the runway to avoid specific wetlands from the north, "would create operational inefficiencies that are not practicable."

2. The Port has evaluated the design requirements for the airfield, as defined by Federal Aviation Administration (FAA) guidance. To minimize the amount of fill and embankment size, the proposed airfield has been designed at the lowest elevations allowable for FAA design requirements (grade over distance traversed). FAA establishes the grade requirements to ensure the safe operation of aircraft within the airfield. The proposed design represents the lowest elevation that enables the connecting taxiways (that connect the existing airfield to the Third Runway) to meet the FAA's airfield design grade requirements.

3. See General Response GLR17 regarding the consideration of alternatives.

4. The FEIS and FSEIS examined the full range of alternatives. As that analysis indicated, and found in the FAA's Record of Decision, no alternatives are available that obviate the need for the Third Runway. The FAA's letter dated 1-23-2001 re-affirms that no technology alternatives obviate the need for the runway as does the FAA. The FAA reviewed the letters submitted by the Airport Communities Coalition concerning the use of technology, and prepared a memorandum dated March 29, 2001. As is noted in that memorandum:

> Mr. Geoffrey Gosling discusses a number of research activities that, if successful, might have application to operations on closely space parallel runways in poor weather. Some of the technologies described do not relate to instrument approaches or to runways spaced as closely as Sea-Tac's existing runways. Other technologies he describes are expected to have some benefit at Sea-Tac and other airports. For example, the Center TRACON Automation System (CTAS) optimizes the flow of enroute arrivals and has increased flow rates at locations by approximately five percent. Although these technologies will incrementally increase capacity, they will never be great enough to obviate the need for the third runway.

The technology suggested by Mr. Gosling that could have significant benefit is Precision Runway Monitor with Simultaneous offset instrument approach (SOIA) procedures. He notes correctly that this procedure could be used in some meteorological conditions, which at Sea-Tac we estimate to be about 20 percent of the time. Because of its limitations due to closely spaced runways and higher weather minimums, SOIA procedures provide incremental improvement to hourly arrival rates. For example, at San Francisco, the proposed procedure provides 7 additional arrivals per hour and is projected to be used in weather conditions that occur about 7 percent of the time. An additional benefit of its application at San Francisco is that the additional flight tracks are over the bay rather than populated areas; this is not the case at Sea-Tac.

In addition, the concept of paired approaches has received no serious consideration for application in the national airspace system. We believe that even if it were determined to be acceptable, it would not be useful on Sea-Tac's runways spaced at 800 feet because of the negative impact on departures and wake vortex considerations.

Mr. Gosling also suggests that technology will resolve wake vortex considerations. Even with wake vortex detection systems that are currently under development, independent operations on closely spaced parallels as seen at Sea-Tac, will not be allowed. The limiting factor is that the wake vortex is a physical disturbance of air due to the dynamics of the wings, along with the shape and size of the aircraft. There is no technology that would overcome this limitation.

Increased activity at Sea-Tac, with or without a third runway, will mean additional ground operations. It will be necessary for FAA and the Port of Seattle to take all available steps to prevent runway incursions. It is not clear that the problem will be worse with an additional runway, as the operations will be handled in accordance to safe air traffic practices.

In conclusion, none of Mr. Gosling's suggestions of new technology will provide adequate capacity growth to meet the purpose and need for the runway as described in the Final Supplemental EIS. Most of his proposals are in the research and developmental stages. As he notes, even if successfully developed and implemented, they would provide only incremental improvements in capacity; all of which are significantly less than the capacity provided by constructing a third runway.

5. This comment appears to indicate a belief that if the Master Plan Update improvements are undertaken at Sea-Tac that the expenditures for those projects would preclude the development of supplemental airport resources in the Puget Sound Region. The Port believes that this is an inaccurate presumption. Regardless of whether or not an existing airline begins commercial passenger service at another airport in the region, the Master Plan Update improvements are needed at Sea-Tac Airport. As is documented in the FSEIS, the proposed projects are within the financial capability of the Port of Seattle. Pursuit of air service at airports such as Paine Field and Boeing Field can occur today, with no or limited development at those facilities. However, such service has not been shown to be financially viable from an airline perspective, and as a result has not been successfully launched. It would be incumbent on the sponsor of a new supplemental airport to secure sufficient funding to make that airport operational. Because the sponsor would not be the Port of Seattle, it is unlikely that the Port's financial strength (or weakness) would affect the financial capability of that sponsor. Rather, the financial strength of that new airport would depend on the passenger marketplace that it could attract and sustain. Based on available research, the financial success of a supplemental airport would not likely occur until the O&D demand in the Puget Sound Region reached 10 million enplanements, which is not in the planning horizon of the Master Plan. This issue of "catchment" is discussed in the Final EIS, page II-9 and II-10.

6. The FAA's 1995 *Capacity Enhancement Study Update* examined the impacts associated with interaction between Sea-Tac and Boeing Field (BFI). The interaction with Boeing Field was reflected in the analysis, as arrivals to Boeing's Runway 13 would require a gap in the arrival stream to the proposed new runway at Sea-Tac during south flow operations. During north flow operations, the impact of the interaction of BFI is expected to be negligible. The FAA also performed a sensitivity analysis, which demonstrated additional delay savings would result from eliminating the interaction between BFI and Sea-Tac Airport.

It should also be acknowledged that, like most reliever airport operations in the United States, air traffic control procedures have evolved to minimize operational impacts of the primary commercial airport, such as Sea-Tac. In many cases, procedures are established so that the reliever airport (Boeing Field) is subservient to the primary airport.

7. The FEIS and FSEIS examined safety associated with several factors: automobile traffic levels and interaction with haul fill traffic, and aircraft accident safety. The aircraft accident safety issues are analyzed in the Final EIS at IV.7-17 through IV.7-22. The Federal Aviation Administration considered the impact of the Third runway on runway crossings and determined that no unsafe conditions would exist. The FEIS states the following with regards to runway crossings:

"The Preferred Alternative would increase the number of runway crossings, as arriving aircraft land on the new parallel runway and then taxi to the terminal/ cargo facilities. This analysis showed the average number of all-weather crossings would change as follows:"

Number of All-Weather Average Runway Crossings

	Existing Airfield	With New Runway
1993	432	NA
2000	483	695
2010	564	812
2020	619	878

Source: 1995 Capacity Enhancement Plan Data Package 7, September , 1994.

"No direct correlation exists between the increase in runway crossings and safety, as the separation standards used by air traffic control will ensure adequate separation between aircraft, and aircraft and service vehicles. The effect of separation standards will be the experience of delay. The review of aircraft accidents, incidents and pilot deviations between 1984 and 1993 for Sea-Tac show evidence that the Airport will continue to operate with the same low accident/incident ratios. No direct correlations have been found to suggest that increased aircraft operations will adversely affect the ratios of accidents and incidents in the future. However, aircraft separation standards used by air traffic control will continue to ensure adequate separation and safety between aircraft and service vehicles. Further, upon construction of the new air traffic control tower, the ground control position will be supplemented with another position. Ground control may then be split for inbound and outbound traffic or may possibly be between gate hold/push back - ground, and movement control-ground."

Geoffery Gosling, February 16, 2001 letter

The responses in this section have been prepared from the Port's perspective and knowledge.

1. The *Final EIS* (FEIS) and *Final Supplemental EIS* (FSEIS) examined the full range of technological alternatives. As that analysis indicated, no alternatives are available that obviate the need for the Third Runway. This conclusion was reiterated in the Federal Aviation Administration's (FAA) Record of Decision (ROD) approving the Master Plan Update projects. The FAA's letter dated January 23, 2001, re-affirms that no alternatives obviate the need for the runway, based on its review of the recent advances in aviation technology. The FAA reviewed the letters submitted by the Airport Communities Coalition concerning the use of technology, and prepared a memorandum dated March 29, 2001. As is noted in that memorandum:

> Mr. Geoffrey Gosling discusses a number of research activities that, if successful, might have application to operations on closely space parallel runways in poor weather. Some of the technologies described do not relate to instrument approaches or to runways spaced as closely as Sea-Tac's existing runways. Other technologies he describes are expected to have some benefit at Sea-Tac and other airports. For example, the Center TRACON Automation System (CTAS) optimizes the flow of enroute arrivals and has increased flow rates at locations by approximately five percent. Although these technologies will incrementally increase capacity, they will never be great enough to obviate the need for the third runway.
>
> The technology suggested by Mr. Gosling that could have significant benefit is Precision Runway Monitor with Simultaneous offset instrument approach (SOIA) procedures. He notes correctly that this procedure could be used in some meteorological conditions, which at Sea-Tac we estimate to be about 20 percent of the time. Because of its limitations due to closely spaced runways and higher weather minimums, SOIA procedures provide incremental improvement to hourly arrival rates. For example, at San Francisco, the proposed procedure provides 7 additional arrivals per hour and is projected to be used in weather conditions that occur about 7 percent of the time. An additional benefit of its application at San Francisco is that the additional flight tracks are over the bay rather than populated areas; this is not the case at Sea-Tac.
>
> In addition, the concept of paired approaches has received no serious consideration for application in the national airspace system. We believe that even if it were determined to be acceptable, it would not be useful on Sea-Tac's runways spaced at 800 feet because of the negative impact on departures and wake vortex considerations.
>
> Mr. Gosling also suggests that technology will resolve wake vortex considerations. Even with wake vortex detection systems that are currently under development, independent operations on closely spaced parallels as seen at Sea-Tac, will not be allowed. The limiting factor is that the wake vortex is a physical disturbance of air due to the dynamics of the wings, along with the shape and size of the aircraft. There is no technology that would overcome this limitation.
>
> Increased activity at Sea-Tac, with or without a third runway, will mean additional ground operations. It will be necessary for FAA and the Port of Seattle to take all available steps to prevent runway incursions. It is not clear that the problem will be worse with an additional runway, as the operations will be handled in accordance to safe air traffic practices.
>
> In conclusion, none of Mr. Gosling's suggestions of new technology will provide adequate capacity growth to meet the purpose and need for the runway as described in the Final Supplemental EIS. Most of his proposals are in the research and developmental stages. As he notes, even if successfully developed and implemented, they would provide only incremental improvements in capacity; all of which are significantly less than the capacity provided by constructing a third runway.

2. The FEIS and Federal Aviation Administration (FAA) Record of Decision (ROD) examined aircraft accident/safety issues (*Final EIS* at IV.7-17 through IV.7-22). The evaluation of runway crossings was based on the FAA's evaluation done as part of the *Capacity Enhancement Study*. The FAA considered the impact of the Third runway on runway crossings and determined that no unsafe conditions would exist. The FEIS states the following with regards to runway crossings:

"The Preferred Alternative would increase the number of runway crossings, as arriving aircraft land on the new parallel runway and then taxi to the terminal/ cargo facilities. This analysis showed the average number of all-weather crossings would change as follows:"

	Number of All-Weather Average Runway Crossings	
	Existing Airfield	With New Runway
1993	432	NA
2000	483	695
2010	564	812
2020	619	878

Source: 1995 Capacity Enhancement Plan Data Package 7, September , 1994.

"No direct correlation exists between the increase in runway crossings and safety, as the separation standards used by air traffic control will ensure adequate separation between aircraft, and aircraft and service vehicles. The effect of separation standards will be the experience of delay. The review of aircraft accidents, incidents and pilot deviations between 1984 and 1993 for Sea-Tac show evidence that the Airport will continue to operate with the same low accident/incident ratios. No direct correlations have been found to suggest that increased aircraft operations will adversely affect the ratios of accidents and incidents in the future. However, aircraft separation standards used by air traffic control will continue to ensure adequate separation and safety between aircraft and service vehicles. Further, upon construction of the new air traffic control tower, the ground control position will be supplemented with another position. Ground control may then be split for inbound and outbound traffic or may possibly be between gate hold/push back - ground, and movement control-ground."

Thus, the FAA considered the issue of runway crossings and the potential effect on runway incursions. The FAA did not identify any safety issues that would preclude the development of the Third Runway. In addition, FAA will implement appropriate procedures to minimize the risk of runway incursions.

3. See response above regarding safety. It is the Port's belief that the commentors opinions are based on his belief that the projects purpose is to increase capacity. Rather, as is clearly documented in the *Master Plan*, *Final EIS*, *Final Supplemental EIS* and Record of Decision (and articulated in the Corps of Engineers application), the purpose of the additional runway is to address poor weather operating constraints. Based on the consideration of alternatives, the proposed Third Runway represents the only reasonable and feasible alternative to achieve that objective.

Thomas/Lane Associates, February 9, 2001 letter

The responses in this section have been prepared from the Port's perspective and knowledge.

1. A report similar to the comments submitted on this application was submitted by this consultant as part of "City of Burien Seattle-Tacoma Airport Master Plan Update Studies Environmental Issues Mitigation." The Port submitted comments on the preliminary draft report in a 3-page letter to the City of Burien dated November 25, 1996 (including a 14-page attachment). That letter (and attachment) were incorporated in the 1997 *Master Plan Update Final Supplemental EIS* by reference. See also response to comment 4J in the 1997 *Final Supplemental EIS* Appendix F. Many of the comments submitted in the Burien Mitigation Study are repeated in this commentor's comments on the 404 application.

The ACC and the City of Burien submitted the Burien Mitigation Study as comments on the *Draft Supplemental EIS*. This is the reference on Page 2 of the February 9, 2001 letter noting that the commentor "reviewed the notes, working papers and spreadsheets prepared as part of my past assignment with the City of Burien."

In general the primary conclusion of the Burien Mitigation Study is that the benefits and impacts of the Airport are disproportionately born within the region. Communities within the immediate airport environs experience the primary adverse impact; yet do not recoup an equivalent proportion of benefits. While the specifics of the degree and amount of impacts are disputed by the *Master Plan Update Final EIS* and *Final Supplemental EIS*, those documents recognize that some impacts fall more heavily on communities in the immediate airport environs. Thus, the focus of the review relative to the *Final EIS* and *Final Supplemental EIS* was:

- Did the *Final EIS* and/or *Final Supplemental EIS* fail to recognize significant adverse environmental impacts; and
- Have reasonable steps been taken to minimize the adverse effects of the proposed improvements.

The Port has reviewed these new comments, as well as Burien Mitigation Study, and determined that the *Final EIS* and the *Final Supplemental EIS* have identified all significant adverse environmental impacts from the proposed improvements in accord with Federal Aviation Administration (FAA) Orders 1050.1D and 5050.4A and applicable National Environmental Policy Act (NEPA) and State Environmental Policy Act (SEPA) requirements. In addition, the FAA and the Port have taken reasonable steps, through the identification of mitigation measures and improvements to the Master Plan Update since issuance of the *Final EIS*, to minimize the impacts of the proposed improvements.

It is the Port's belief that the majority of differences in the mitigation between the *Final EIS* and the new comments and the Burien Mitigation Study relate to noise mitigation. The *Final EIS* and *Final Supplemental EIS* recommend mitigation for significant noise impacts with the 65 DNL noise exposure contour, the standard used by the FAA for environmental impact studies and Part 150 Noise Compatibility Planning Studies. The Burien Study advocated the use of quieter noise levels, which failed to recognize ambient noise levels from other community sources. Further, while the purpose of the study was to identify mitigation associated with the Third Runway, the Burien Mitigation Study focused on addressing existing noise impacts outside the 65 DNL noise exposure contour, through easements and "calculated" real property value losses that were derived from unreported statistical formulas. The new comments continue to argue that the incorrect baseline for noise was used. See Response 4 below.

Potential impacts on real property values were considered by the *Final EIS*, and recalculated as a response to comment on the Supplemental EIS. As is shown in the response to comment, the Port's existing Noise

Remedy Program has already compensated residents if such a loss in property values has actually occurred. Changes in noise exposure area will be mitigated as part of the noise/land use mitigation identified in the *Final EIS* and *Final Supplemental EIS* (see page 5-6-5 of the *Final Supplemental EIS*).

The Burien Study and the new comments assert that all activity over 380,000 annual operations is associated with the operation of the Third Runway. In light of the annual activity accommodated at Sea-Tac since 1995 (which has been above that threshold), it is the Port's belief that this element of the Burien Study and new comments has already been shown to be in error. The comments submitted by Thomas/Lane on the §404 application disregard the fact that the *Final Supplemental EIS* addressed activity characteristics associated with the project.

2. The *Final EIS* and the *Final Supplemental EIS* document the economic impacts and social consequences associated with the proposed projects using industry-accepted methodologies. Further, these sections were prepared to address the specific requirements of the National Environmental Policy Act and State Environmental Policy Act. It is the Port's conclusion, which is supported by the Federal Aviation Administration's Record of Decision (page 36 and 37), that these consequences are appropriately documented, disclosed, and where appropriate, mitigated.

3. The socio-economic impact evaluation presented in the *Final EIS* discusses the Port's position concerning the probable consequences of the Master Plan Update projects. That analysis showed that there would be a slight difference between the "with Project" and Do-Nothing alternative (with the runway and without the runway). Extensive comments have been submitted concerning the forecasts prepared for the Master Plan Update and the *Final Supplemental EIS*. Appendix F of the *Final Supplemental EIS* provided detailed responses to public and agency comments concerning the forecast methodology employed in the *Final Supplemental EIS*. Further, comments concerning the adequacy of the forecasts were the subject of litigation by the ACC. The court upheld the forecasts and the adequacy of the *Final Supplemental EIS*.

The commentor seems to focus on the assumptions associated with the aviation demand forecasts. As is documented in the *Final Supplemental EIS* and the Record of Decision, the data used in evaluating the demand for air transportation is regional population, per capita income and the cost of airfares. The commentor implies that the evaluation should first identify the possible business/economic suppression as it relates to population and per capita income, and then assess the demand for air transportation associated a reduced population/per-capita income with this Do-Nothing scenario. This is not the industry-standard approach to performing such evaluations, and further, certain environmental methodologies (surface traffic and air quality) require the analysis to be consistent with regional planning data. Therefore, information prepared by the metropolitan planning organization (PSRC) was obtained that reflected the PSRC's estimate of how population and per-capita income are expected to change in the future. This data was then used to evaluate the unconstrained demand. As is stated in the Final EIS and *Final Supplemental EIS*, the proposed improvements will not affect the variables that define demand: population, per capita income, and airfares. The unconstrained demand includes all of the economic activity and all of the air travel demand that would exist if the Airport could handle all flights and all passengers who want to use the Airport when they want to use it, without significant delay. Then a constrained activity level (associated with the Do-Nothing Alternative) is evaluated that reflects the constraints that the existing facilities have on the ability to accommodate demand.

4. This comment appears to reflect the commentor's review of the noise analysis prepared for the 1996 *Final EIS*, but does not recognize that the noise analysis was updated in a subsequent 1997 *Final Supplemental EIS*.

The basis for the comment is that the *Final EIS* did not identify any project related noise effects, as the forecast demand at that time was less than the operating capability estimated for the existing airfield. That information was updated in the *Final Supplemental EIS*, as was the mitigation associated with the project. Further the commentor objected to the evaluation of the existing condition, which reflected Stage 2 (noisier aircraft) than are now required to operate. As the existing conditions represented conditions in 1994, when Stage 2 aircraft were legally allowed to operate, they were reflected in the noise analysis. Noise conditions for years after 2000, when the Airport Noise and Capacity Act required the phase-out of these aircraft, reflected the appropriate aircraft fleet mix.

5. It is the Port's belief that this comment fails to reflect the updated analysis prepared after the 1996 *Final EIS* as documented in the 1997 *Final Supplemental EIS*, which identified new forecasts and presented an updated evaluation of the capacity of the two runway and three runway system.

6. The Port estimates the cost of building the third parallel runway will be $773 million (estimated June 1999). Throughout the planning process, the project has been the subject of extensive consideration of the project cost and benefits. The Federal grant process requires conducting the benefit cost evaluation that is included in support of the Port's Letter of Intent application. That benefit cost evaluation was prepared subject to Federal guidelines (dated December 1999 which finalized interim guidance adopted by the Federal Aviation Administration (FAA) in 1997). This guidance, titled "FAA Benefit Cost Analysis Guidance" was issued by the FAA's Office of Aviation Policy and Plans and is used "to provide clear and thorough guidance to airport sponsors on the conduct of project-level benefit-cost analysis (BCA) for capacity-related airport projects... Airport sponsors should conform to the general requirements of this guidance for all BCA's submitted to the FAA."

In 1997, the FAA estimated that the Project would result in delay savings, to airlines and their passengers, in excess of $2.7 billion in present value through 2015. These estimated benefits, which may now be conservative, exceed the $600 million present value of the runway's maintenance costs and updated capital costs by a ratio of 4.5 to 1.

7. The Port continues to assert in general that communities closer to the airport receive benefits from the airport in greater proportion than communities further away. Those conclusions are borne out by the socio-economic analysis prepared by the Port as documented in the *Final EIS* in Chapter IV, section 4. That analysis is based on industry-accepted means of evaluation the socio-economic impact of airports.

8. Relative to the socio-economic evaluation, the commentor cites specific studies to bolster conclusions of the direct, indirect, and induced impacts. It is the commentor's hypothesis that proximity to Sea-Tac has resulted in a reduction in property values (or a slowing of appreciation) as a result of the project. However, the commentor appropriately notes that such effects were typically felt when the Airport first began jet service or as a consequence of a large changes in conditions, until such time as those changes were known and were captured by the marketplace. It is the Port's belief that the report fails to note several key considerations:

- Jets have operated at Sea-Tac since the early 1960s. By 1970, jet operations exceeded over 100,000 operations per year of the noisy 707-era aircraft. Based on the cited research, the primary adverse effects on property values would have been experienced at by this time;
- Since the 1960s, adverse environmental impacts of airport operations have declined, as is evidenced by the noise impact evaluations. Between 1991 and 1994, noise exposure impacts declined 52%. Thus, if noise exposure was found to have an adverse property value impact, the converse would have to apply; that appreciation has accelerated (or actual losses have been recovered) with reduced noise exposure.

- The commentor indicated that the direct impacts (declines in private property values and tax base) produce indirect impacts (changes in land use). Thus, if it is concluded that property value impacts have not occurred as a result of airport impacts, than changes in land use from this cause would not occur. Similarly, if changes in land use do not occur, or if local land use planning avoids such impacts, induced impacts of changes in community services and adverse impacts from changing demographics would not occur.
- The commentor provides no explanation or consideration in his analysis for other causes of property value losses, including individual variations in the quality of construction or upkeep of a home, and fails to recognize that local jurisdictions are responsible for land use planning. Thus, if it were concluded that such direct impacts occurred, one solution would be to use local land use planning to avoid these impacts. Similar comments exist concerning the disproportionate share of benefits from the Airport. Local jurisdictions, through their comprehensive planning process influence land uses. Thus, local jurisdictions are singularly responsible for not "getting their fair share" of socio-economic benefits.

The FAA and Port presented a summary of the effect of aircraft noise on property values in Chapter IV, Section 7 of the *Final EIS*. That evaluation, as well as the Appendix R document, summarizes the research that has been conducted concerning noise and property values. As the documentation notes, no specialized studies have been conducted specific to Sea-Tac other than that of the commentor. The *Final EIS* presents the estimated effects of the Master Plan Update projects on property values in Table IV.7-1 on page IV.7-6.

GeoSyntec Consultants, February 16, 2001 letter

The responses in this section have been prepared from the Port's perspective and knowledge. In summary, the Port notes the following:

- Design of the walls is being done in accordance with accepted and proven procedures that are embodied in a nationally recognized building code;
- Because of the size and importance of this project, the Port has completed extensive exploration, testing and analyses, beyond that accomplished for most projects, and the design process is still ongoing;
- Performance of properly designed and constructed mechanically stabilized earth (MSE) walls in major earthquakes has been excellent. Based on this experience and incorporation of techniques used elsewhere that have withstood actual seismic challenges, the Port anticipates that the proposed MSE wall would withstand reasonable challenges;
- The Port has incorporated independent checks at every significant step in the process, including involvement of a highly qualified Engineering Technical Review Board.

Each of GeoSyntec's comments is specifically addressed below.

1A. Structural Integrity of the MSE Wall Foundation

Support for the mechanically stabilized earth (MSE) wall foundations will be dense and unyielding. The proposed use of "stone columns" is a form of subgrade improvement that will result in construction of a structural fill *in situ*. Use of the stone column technique provides a very adequate foundation that provides an alternative to making an open excavation immediately adjacent to Miller Creek and associated wetlands. This construction method avoids any potential short-term impacts associated with temporary construction dewatering.

Stone column construction is typically used to mitigate soils subject to seismic liquefaction, and/or to improve strength and reduce compressibility of native soils. This type of subgrade improvement is a widely accepted construction practice that has been used on major projects all over the world.

Stone columns are constructed by replacing soft or weak native soils with densely compacted angular rock that has much higher shear strength and bearing capacity than the original soils. The technique is discussed in detail in Appendix L of the Port's *Comprehensive Storm Water Management Plan*.

Stone column construction is well suited to verification of quality assurance during construction, and plans for such quality control verification are included in the current Phase 4 construction documents that have been available for review during the current §404/401 public comment period. The Port notes that Ecology and the Corps did not receive any comments critical of the proposed construction quality control and verification process for stone column construction.

The Port believes that the comment also suggests that design of the MSE walls is based on "limited" site-specific data. Actually design of the proposed MSE walls is based on more than 90 subsurface borings, cone penetrometer soundings and test pits, as well as an extensive series of *in situ* and laboratory soils tests. The exploration and test program generally conforms to standards for design of MSE walls published by the Federal Highway Administration (*Mechanically Stabilized Earth Walls and Reinforced Soil Slopes Design and Construction Guidelines, SA-96-071, FHWA, 1997*) and the code developed for design of MSE walls by the American Association of State Highway and Transportation Officials

(AASHTO. 1996-2000 "Standard Specifications for Highway Bridges", 16th Edition, 1996, with current interim addenda through 2000).

1B. The Size of the MSE Wall is Accurately Reported.

Typical practice for mechanically stabilized earth (MSE) walls and all other types of structure, is to define their height above ground, i.e. the height of the MSE wall is typically measured from the toe to the top of the wall face. It is commonplace to design MSE walls that have a sloping ground surface above and behind the top of the wall face. As recommended in the design guidelines established by American Association of State Highway and Transportation Officials (AASHTO, *1996-2000 "Standard Specifications for Highway Bridges", 16th Edition, 1996, with current interim addenda through 2000*), the sloping ground behind the MSE wall is designed as a surcharge load to the wall and the slope below the toe of the MSE wall is designed as the wall embedment. The weight of the additional earth from the slope above the MSE wall has been taken into account as a surcharge load as recommended by AASHTO.

The MSE walls proposed by the Port range in maximum height from 50 to 135 feet. The firm designing these walls, RECo USA, has designed two MSE walls that were built to about the same height as the maximum proposed wall height at SeaTac: 137 feet high in South Africa and 133 feet high in Hong Kong. While neither of these two high walls had slopes above them, RECo has completed many such walls, including those listed below.

There are many tall MSE walls that have been successfully constructed with the sloping ground above the wall. Some examples are provided in the following table as a comparison to the Port's design. The first two of the examples, Le Peyronnet AB and Setouchi Country Club, are located in seismically active regions and have a total height (wall and slope on top) that is greater than the Port's design. Therefore, the Port's design is not unprecedented height for a wall with a slope on top.
Examples of MSE walls with sloping fill on top of the wall:

Country	Project	Combined Height of Exposed Wall and Slope on Top (feet)
Japan	Setouchi Country Club	240
France	Le Peyronnet AB	157
USA	**Proposed SeaTac Third Runway**	**153**
USA	US23, Tennessee	122
Mexico	Porta Del Sol	104
Japan	Highway Route 432	102

Source: RECo, March 2001.

The Port agrees with GeoSyntec that the proposed MSE walls are significant structures, and is providing the utmost level of care and attention to detail in the design.

2. The Port has Conducted Sufficient Laboratory Testing of Soils

Frequency of sampling and testing depends on variability of the soils and tests results, and with the level of experience of the engineer with the particular soils. Standard industry practice requires the design engineer to exercise professional judgment in determining the scope of exploration program and the frequency of sampling and testing based on examination of variability of ground conditions and test results. In the case of the Third Runway, the designers located the spacing of explorations to obtain samples for characterization of soil conditions and testing to generally conform to recommended FHWA practice (*Mechanically Stabilized Earth Walls and Reinforced Soil Slopes Design and Construction Guidelines, SA-96-071, FHWA, 1997*).

Results of laboratory consolidated undrained (CU) triaxial tests on samples below the proposed West MSE Wall are consistent with results of strength tests from samples on other parts of the project. The laboratory strength test results also correlate well with the results of *in-situ* (field) cone penetration tests (CPT). It is the professional opinion of the Port's design team that the level and frequency of laboratory testing is appropriate based on the consistent results observed throughout the entire project site.

The Port's design team has taken a conservative approach in selecting design strength values of soils from results of both the laboratory and field tests. The shear strength values selected for the external or global stability analysis and design of the MSE walls are typically lower than those interpreted from laboratory test results. For examples, laboratory CU triaxial tests on fine-grained soils indicated that the value of effective friction angles ranged from 32 to 35 degrees, however, an effective friction angle of 32 degrees was used for the initial design analyses, and this was further reduced to 30 degrees in the latest stability verification analyses.

3. The Port has Accurately Interpreted Laboratory Strength Test Results

All the laboratory consolidated undrained (CU) and unconsolidated undrained (UU) triaxial tests were performed in accordance with the American Society for Testing and Materials (ASTM) standard procedures. The Port's design team used the procedures ASTM D 2850 "*Standard Test Method for Unconsolidated Undrained Compressive Strength of Cohesive Soils in Triaxial Compression*" to determine UU strength; and ASTM D 4767 "*Standard Test Method for Consolidated Undrained Compressive Strength of Cohesive Soils in Triaxial Compression*" to determine CU strength properties.

The test procedures in both ASTM D 2850 and ASTM D-4767 state that "the test load shall continue to a minimum of 15% strain, except loading may be stopped when the deviator stress has dropped 20% or when 5% additional axial strain occurs after a peak in deviator stress." All laboratory triaxial tests accomplished for the Third Runway project were terminated at 15% to 20% strain, as required by the ASTM standards.

The stress path plots in the CU triaxial test results showed essentially no difference in determining the effective friction angle of soils at 10% to 20% strain, since the stress paths converged on the same envelope prior to reaching the 10% strain level.

A close examination of the stress-strain curves in both the CU and UU triaxial tests indicates that 14 of the 37 soil samples (about 38%) showed higher shear strength at 20% strain than at 10% strain. The other soil samples showed either the same or slightly lower shear strength values at 20% strain compared to 10% strain. The difference in shear strength values at 10% and 20% strain is generally less than 15% and has already been taken into account in the Port's design. Running the tests to 20% strain demonstrates there is no significant reduction in strength as strain increases. This demonstrates the soil can tolerate large deformations without failure and any increase in strength means it will further limit deformations.

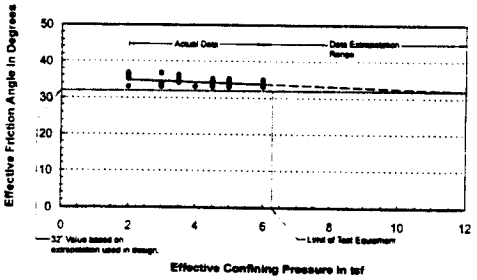
The design strength values of soils were selected based on the laboratory test results, as well as consideration of the field cone penetration test (CPT) data. The undrained shear strength of soils interpreted from UU triaxial tests correlates reasonably well with CPT results (*Kulhawy, F.H. and Mayne, P.W. (1990), Soil Property Manual, Electrical Power Research Institute, EPRI Report EL-6800).* The selected design strength values of soils for the stability analysis and design of the MSE walls were typically lower (more conservative) than those interpreted from laboratory and field test results. For example, values of undrained shear strength used in the West Wall stability analyses were 1,000 pounds per square foot (psf) for the soft to medium stiff silt and clay, and 3,500 psf for the stiff to hard silt and clay, while actual UU strength values from samples at the West Wall location ranged from over 1,300 to almost 9,300 psf.

4. The Port has Employed Conservative Strength Values in Its Stability Analyses

The Port's design team agrees that the confining pressure used in the preliminary triaxial tests (about 6 tons per square foot, tsf) is less than the condition that will be produced by the maximum embankment height (up to about 11 tsf), but notes the range of confining pressures used represents the height range for much of the embankment. Higher pressures were not used in the preliminary triaxial tests because of a limitation in the capacity of testing equipment, but will be completed as part of final design.

The Port's design team used soil strength values that are reasonable and appropriate. The Port's site-specific triaxial CU test data produced effective friction values that ranged from 32 to 35 degrees and show a slightly decreasing trend as the confining pressure increases. Design analyses are based on the extrapolation of available test data to about 12 tsf, which produced an average effective friction angle for fine-grained soils of approximately 32 degrees. See Figure 1. The Port used 32 degrees as the basis for design in its global stability analyses. Moreover, subsequent analyses demonstrated factors of safety greater than 1.0 would result from using even lower values. Thus, the current design provides an additional margin of safety due to the use of this conservative angle of friction.

Sea-Tac Third Runway CU Triaxial Data

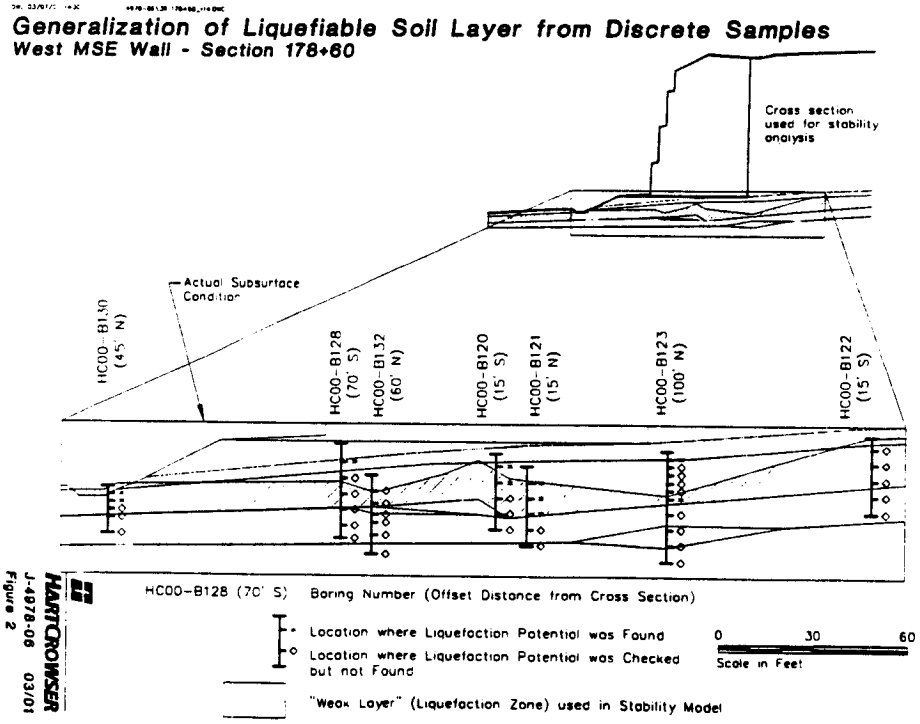


In addition to the checks described above, the Port's designers also noted that the effective friction angle of fine-grained soils interpreted from laboratory triaxial tests correlates well with field test (CPT) data *(Lunne, T., Christoffersen, H.P., and Tjelta, T.I. (1985). Engineering Use of Piezocone data in North Sea Clays. Proceedings, 11th ICSMFE, San Francisco, Vol. 2, pp. 907-912; and Senneset, K., Janbu, N., and Svano, G. (1982). Strength and Deformation Parameters from Cone Penetration Tests. Proceedings, Second European Symposium of Penetration Testing, Amsterdam, pp. 863-869).*

5. The Port's Liquefaction Analysis Methodology Is Accurate and Supported by the Scientific Literature.

A spatial analysis of potential liquefaction was completed along with a simulated spatial analysis based on a Monte Carlo type approach (*Hart Crowser, 2001. DRAFT Geotechnical Engineering Analyses and Recommendations, Third Runway Embankment, Seattle-Tacoma International Airport, SeaTac, WA. Pages 8 through 10, and A-6 through A-12, March 2001*). In some areas, the Port's consultant (Hart Crowser) did find specific seams or zones of potentially liquefiable soils; in other areas there are only discrete, isolated samples that analysis indicated are subject to liquefaction, and in these areas Hart Crowser found no geologic basis for interpolating contiguous liquefiable conditions. Analyses using the most conservative interpretation showed stability exceeded the target factor of safety.

Numerous cross sections for both MSE walls and the embankment were analyzed for stability based on conservative assumptions, using "weak seams" to represent continuous layers of liquefaction-susceptible soils. In several cases the Port's design analyses generalized liquefiable soils to be more extensive than actually exist in order to evaluate the effect on stability and to design the extent of subgrade improvement, see Figure 2 for example. Figure 2 shows how the Port conservatively modeled a few liquefiable samples as a continuous layer, for stability analysis.



In addition to stability analysis based on graphical interpolation and extrapolation of liquefiable soils, the Port's geotechnical engineer considered liquefaction in a statistical manner, to compare general trends in liquefaction potential based on four general subdivisions (North MSE Wall, 2H:1V Slope, West MSE Wall, and South MSE Wall). This comparison included considering the relative distribution of soils that would liquefy due to different size earthquakes, and what the resulting effect would be on soil strength.

It is the Port's belief that the commentor did not accurately address the screening criteria used by the Port to identify non-liquefiable soils, and the Port's analysis has not incorrectly applied screening criteria to identify liquefaction susceptible soils. The appropriateness of the Port's analyses is confirmed in the geotechnical engineering literature (*Seed, H.B., I.M. Idriss, and I. Arango, 1983. "Evaluation of liquefaction potential using field performance data," Journal of Geotechnical Engineering, ASCE, Vol. 109, No. 3, pp. 458-482; and Perlea, V.G., 2000. "Liquefaction of Cohesive Soils," Soil Dynamic and Liquefaction 2000 Geotechnical Special Publication No. 107, pp. 58-76).*

When referring to soils that do not meet all the screening criteria, Seed et al. (1983) specifically states that: "Otherwise clayey soils may be considered non-vulnerable to liquefaction." The Port's geotechnical consultant (Hart Crowser) used this method when they reported that: "if any one of these criteria was not met, the soil was deemed non-liquefiable." The commentor's assertion that "these criteria were developed for evaluation of materials that are potentially liquefiable, not identification of materials that are not liquefiable" is not supported by the literature on the subject. It is clear from the literature that the criteria can be used to exclude as well as include liquefiable soils.

The liquefaction susceptibility of soils with high fines contents were evaluated using the so-called "Chinese" criteria originally developed by Wang in 1979 (see *Wang, W., 1979. "Some Findings in Soil Liquefaction". Water Conservancy and Hydroelectric Power Scientific Research Institute, Beijing, China*); and later modified for consistency with U.S. practice by the U.S. Army Corps of Engineers (*Finn, W.D.L., Ledbetter, R.H., and Wu, G., 1994. Liquefaction in silty soils: Design and analysis. Ground Failures under Seismic Conditions, Geotechnical Special Publication 44, ASCE, New York, pp. 51-76.).* The Chinese criteria state that soils, which satisfy all of the four following soil conditions are susceptible to liquefaction:

Fraction finer than 0.005 mm ≤ 15%
Liquid limit ≤ 35%
Natural water content ≥ 0.9LL
Liquidity index ≤ 0.75

If liquefaction susceptibility requires the satisfaction of all four of these conditions, the lack of any on condition renders the soil non susceptible to liquefaction.

Additionally, the first of the four criteria above does not refer to "fines content" as assumed by the commentor. The comment uses the term "fines content" to refer to the "fraction of finer than 0.005 mm" criteria. The definition of "fines content" may be found in any soil mechanics text, or in ASTM D 653, which defines "fines" as the "portion of a soil finer than a No. 200 (0.075 mm) U.S. standard sieve." There is a tremendous difference in the dynamic behavior of soils finer than 0.075 mm and 0.005 mm.

Finally, the liquefaction analysis does predict liquefaction of soils with fines content of up to 100 percent, provided the screening criteria are met.

6. The Residual Shear Strength Values Used by the Port's Design Team Are Appropriate.

The preliminary analyses of the post-liquefaction residual strength prepared by the Port's consultant (Hart Crowser) were based on the mid-range of the empirical relationship developed by Seed and Harder (*Seed, R.B. and Harder, L.F. "SPT-based analysis of cyclic pore pressure generation and undrained residual strength," in J.M. Duncan ed., Proceedings, H. Bolton Seed Memorial Symposium, University of California, Berkeley, Vol. 2, pp. 351-376.* 1990). The empirical relationship developed by Seed and Harder represents the range of conditions where liquefaction has been observed. The mid-range of the empirical relationship was used to provide an estimate of the soil strength for analysis of stability under

liquefaction conditions. The Port's final analyses, however, is based on the relationship developed by Idriss (*Idriss, I.M. Evaluation of Liquefaction, Potential Consequences and Mitigation, An Update. Presented at Vancouver Geotechnical Society, Vancouver, B.C., February 17, 1998*). This curve typically lies between the average and lower fifth of the range developed by Seed and Harder (which is comparable to the quartile or lower third range proposed by the commenter).

Extrapolation of the Seed and Harder data beyond the range of N =16 to 20 is common practice. In stating that extrapolation of residual strength to values above 600 psf represents "a dangerous design step without any theoretical or experimental evidence supporting their interpretation," the commentor is ignoring basic principles of soil mechanics and a large body of experimental evidence on the residual strength of liquefied soil. Laboratory test data extending back to the 1930s has established that the ultimate (large-strain) shearing resistance of soils increases with increasing soil density. There is a well recognized, unique relationship between large-strain undrained strength and density, a relationship later formalized as the steady state concept (*Castro, G., 1969. Liquefaction of Sands, Harvard Soil Mechanics Series 87, Harvard University, Cambridge, Massachusetts*). Extensive laboratory testing by a variety of researchers in the U.S. and abroad has shown that the steady state, or residual, strength of laboratory test specimens increases smoothly and continuously with increasing soil density. Because the standard penetration test (SPT) resistance of a given soil is also known to increase smoothly and continuously with increasing density of that soil, residual strength must also increase smoothly and continuously with increasing SPT resistance, as inferred by the original analyses (refer to *Gibbs, H.J., and W.G. Holtz, 1957. Research on Determining the Density of Sands by Spoon Penetration Testing, Proc. 4th Inter. Conf. Soil Mech. Found. Eng. (Zurich), Vol. 1, p. 126.; and Kulhawy, Fred H., and Paul W. Mayne, 1990. Manual on Estimating Soil Properties for Foundation Design. EL-6800 Research Project 1493-6, Electric Power Research Institute, Palo Alto, California*). The commentor correctly states that the Seed-Harder database does not contain observed residual strengths greater than 600 psf; it is also true that the database does not contain residual strength data for SPT resistances greater than 15. The reason for this limitation is quite simple – there are no documented cases of liquefaction flow failure in sandy soils with SPT resistances greater than 15.

The corrected soil N-value $(N_1)_{60}$ increases because the denser sol is more likely to dilate if deformed, thus exhibiting a much higher strength. However, the maximum strength that any location would be limited to the drained shear strength of the soil. Experience has shown that $(N_1)_{60}$ values greater than about 12 to 16 are invariably dilative, *and there are no documented cases of liquefaction flow in sandy soils with SPT resistances greater than 15.*

In addition to the original design analysis, which included the extrapolation described above, the Port repeated the analysis without the extrapolation, as a check during subsequent more specific analyses. In this check, the Port's design team limited residual strength to less than or equal to that predicted forsoils with blow counts of 16 (the limit of the Seed and Harder data) using Idriss' curve (Idriss, 1998) and re-analyzed stability using the re-calculated post-liquefaction residual strength. For this check, the Port found that the factors of safety in these stability analyses were greater than 1.1 except in one portion of the 2:1 embankment (near runway Station 206+44)) where the FS was 1.01. The Port has planned for subgrade improvement in that area.+

7. The Port Utilized the Correct Methodology for Pseudo-Static Analyses

The comment asserts that the Port's pseudo-static (seismic) stability analysis is improper, and that a more "proper" analysis should be performed to search for the critical failure surface independently of the static analysis. However, it is the Port's belief that there is no theoretical justification, or code requirement that justifies the suggested approach. The pseudo-static approach used by the Port represents the standard of practice for this type of analysis. Searching for a critical surface with the pseudo-static acceleration

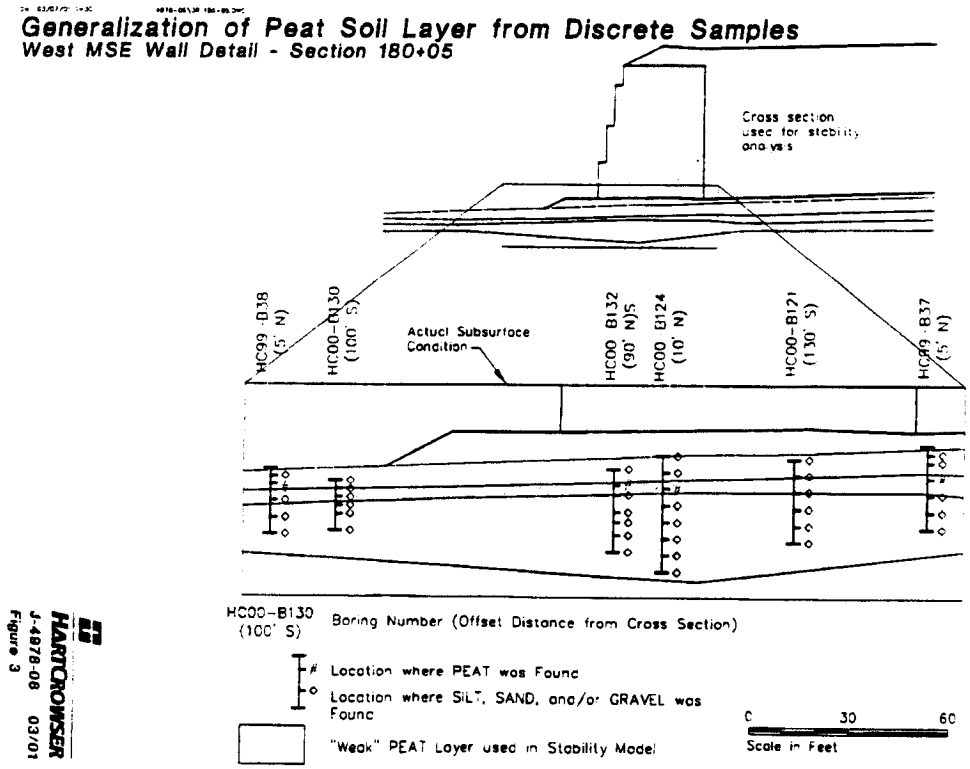
component included in the search is unreasonably overly-conservative, and for this reason is not required by design standards such as the code developed for design of MSE walls by the American Association of State Highway and Transportation Officials (*AASHTO, 1996-2000 "Standard Specifications for Highway Bridges", 16th Edition, 1996, with current interim addenda through 2000)* and the Federal Highway Administration (*FHWA, 1997, Mechanically Stabilized Earth Walls and Reinforced Soil Slopes Design and Construction Guidelines, SA-96-071).*

The Port recognizes that there are inherent limitations in the use of any pseudo-static, limit equilibrium type analysis to assess stability of slopes and MSE walls. The Port's engineers have addressed seismic stability recognizing the limitations in the pseudo-static method through the use of appropriate design parameters and factors of safety; use of post-liquefaction stability analyses, and in part by using a completely different approach (finite difference based deformation analysis) to provide an independent assessment of seismic stability.

The comment goes on to say that "sliding block" type failure surfaces should be considered in the analysis. The Port's design team did utilize sliding block or irregular surface analyses, (as described in the reports: *Hart Crowser, 2000. "Preliminary Stability and Settlement Analyses, Subgrade Improvements, MSE Wall Support, Third Runway Project", Appendix A June 2000*; and *Hart Crowser, 2000. "Stability Review of RECo 30 % Design - Third Runway Project," Hart Crowser Memorandum, November 9, 2000,* (i.e. analysis attachment pages 3, 6, 10 A & B, 11, 15, 17, 20, 28, and 40 through 42). The reported factors of safety for design include both circular and sliding block (or irregular wedge) type potential failure surfaces.

Not only did the Port's analyses include analysis of the sliding block type failure mode, many of its analyses included an artificially extended weak seam to verify that such a layer would not cause instability. This type of generalization is illustrated in enclosed Figure 2 (previously discussed) and Figure 3. Figure 3 shows an example of how intermittent isolated zones of peat were conservatively generalized into a weak layer, for purposes of the stability analysis.

The proposed subgrade improvement zone below each MSE walls was designed to provide a stable buttress assuming that there could be some zones of liquefaction or other weak soils below the embankment that are outside the zone of subgrade improvement. The enclosed Figures 2 and 3 illustrate specifically how the Port's analysis considered the potential effect of weak layers (liquefaction-susceptible soils and peat respectively) extending beyond the limits of the modeled cross-section. Since the proposed subgrade improvement zones were sized to provide a stable buttress to the embankment under both static and seismic conditions, there is no threat of weak soils below the embankment causing instability of the MSE walls.



GeoSyntec states that "computed critical failure surfaces for the seismic case tend to be longer, extending further back into the slope in order to collect more driving mass." The Port believes that this statement is correct when the soil stratigraphy allows the failure mass to increase in two dimensions, i.e. to extend to greater depths as well as farther back into the slope. However, that is not the case here, as the very strong glacial till provides a lower boundary to realistic potential failure surfaces. Indeed, the hypothetical critical surface drawn by GeoSyntec on Figure 1 of their review report shows a potential failure surface that extends only in the horizontal dimension (i.e. back into the slope but not deeper). It is relatively easy to show that the pseudo-static factor of safety *increases* when a pseudo-static failure surface of the type indicated by GeoSyntec extends further back into a given frictional soil.

As previously noted, the continuous peat layer shown in the illustration included in GeoSyntec's review comment does not actually exist, but was assumed as part of a "worst case" type analysis. Even if this surface did exist, GeoSyntec's conclusion that the critical pseudo-static failure surface would extend farther back would extend through the peat would only be accurate in the event that the pseudo-static analysis was performed incorrectly. Because the peat layer is relatively soft, upward propagating seismic waves refracted into the peat would, due to the low impedance ratio, have reduced stress amplitudes and therefore transmit lower driving forces into the potential failure mass. Use of the same pseudo-static coefficient for the entire potential failure mass would be incorrect.

8. The Probabilistic Seismic Hazard Analysis (PSHA) is Consistent with Standard Industry Practices

The comment expresses concern that the seismic environment of the project site has not been properly characterized, due to apparent inconsistencies in the PSHA. It is the Port's belief that the inconsistencies asserted to exist are not within the PSHA itself, but represent different assumptions used in the PSHA vs. the liquefaction analysis.

The commentor states "that the Hart Crowser acceleration response spectra (curves derived from the PSHA) agree remarkably well with the USGS values," and the Port believes that this is correct. The Port also believes that the earthquake magnitudes assigned to various recurrence intervals as part of the analysis of potential liquefaction are not completely consistent with the referenced USGS publication. It is the Port's belief that the magnitudes used in the Port's liquefaction analyses are more conservative than the referenced USGS publication.

For the liquefaction analysis only, the Port consultant assigned earthquake magnitude values that increased for longer recurrence intervals. This is a conservative way to account for the trend that increasingly larger magnitude earthquakes produce motions of longer duration. Hart Crowser is aware that a lower magnitude, local, shallow source, such as the Seattle Fault, could produce an equally high acceleration at the site as a higher magnitude subduction zone source further away. This assumption is limited to the analysis of potential liquefaction only, and not part of the PSHA. The Port's PSHA did not limit consideration of progressively larger events to the subduction zone.

The conservative assumptions in the liquefaction analysis are not interchangeable with the results from the PSHA (compare page 4 in *Hart Crowser, 2000, "Draft Memorandum: Revised Methods and Results of Liquefaction Analyses, Third Runway Embankment, Sea-Tac International Airport," with pages 1 through 10 and Figures 3 and 5 in Hart Crowser, 2001 "Additional Information on the Seismic Design, Sea-Tac International Airport", Memorandum to Embankment Technical Review Board, January 25, 2000.*

9. Three Time Histories are Being Used on the MSE Project

The commentor's criticism that the Port is using a single time history for this project presumably refers to a preliminary design memo (*Hart Crowser, 1999, "Sea-Tac Airport Third Runway, Probabilistic Seismic Hazard Analysis Results, Memorandum to Jim Thomson, HNTB", October 9, 1999*) and does not reflect the fact that three time histories are being used on this project, as recommended by the commentor. (For information on the two additional time histories, see *Hart Crowser, 2001 "Additional Information on the Seismic Design, Sea-Tac International Airport", Hart Crowser, January 25, 2000*).

The resonant frequency of the proposed MSE wall is not in the relatively "short frequency" (sic) range. The Port's analysis indicates the characteristic site period for the high wall (i.e., wall sections over 100-ft high) is on the order of 0.3 to 0.6 seconds, which corresponds to frequencies of 1.7 to 3.3 Hz. These are not particularly high frequencies. The design team believes the time histories used in the analyses are appropriate for the proposed construction and conditions at the site.

10. The MSE Wall Design Team Has Considered and Incorporated Seismic Performance Criteria into the Design.

The comment suggests that seismic ground motion criteria have not been developed for the project, and that the commentor could not identify established seismic performance criteria.

A number of different size earthquakes were evaluated as part of selecting the basis of design for the Third Runway MSE walls. Design is based on a level of ground motion with a return period of around 475 years. This value was developed using a probabilistic seismic hazard analysis (PSHA) that incorporates all relevant seismic sources and includes contributions from all earthquake magnitudes and distances from the site. As noted in the comment, this is the same criteria that was used by the Port for design of other major structures, including buildings that are occupied daily by thousands of air travel passengers and hundreds of Port employees. This basis of design is commonly used, and is appropriate, for structures occupied by humans or where failure could cause great harm.

The commentor disparages the 475-year criterion as the "Code requirement for ordinary buildings, e.g. for residential construction", and says this project is more important than typical residential construction. The Port disagrees, noting that the seismic standard used for the type of buildings where families reside, is an appropriate standard to use for design of these significant retaining walls.

It is important to clarify what an acceptable factor of safety for the 475-year criterion means in laymen's terms. The Port has designed the proposed MSE walls to meet various factors of safety for different conditions analyzed. Design for the 475-year event is based on satisfactory performance of the proposed walls, assuming the level of ground motion that has an average return period of 475 years. Further, the design team has sized the earth reinforcing components for the wall to allow it to handle these maximum earthquake loads after allowing for the level of corrosion that is expected for steel that has been buried in the ground for 50 years. Detailed deformation analysis for the maximum height MSE wall indicates maximum displacement for the wall is on the order of about one foot for this condition. This is anticipated to cause spalling of the concrete wall facing, but no failure of the reinforcing strips, -no catastrophic failure of the walls, and no displacement of the wall that would adversely affect Miller Creek, the integrity of the walls or functioning of the runway.

The Port's proposed design criteria for this project utilizes acceleration at this site which are much greater than the February 28, 2001 Nisqually Earthquake. While one may argue that another level of earthquake "should" be used, the simple fact is that the basis of design selected by the Port is the same as that used for many highway bridges and other major infrastructure. Seismic performance of MSE walls has been evaluated in a number of studies, both from a theoretical basis and after real earthquakes. See for instance: *Reinforced Earth Company, 1994, "Performance of the Reinforced Earth Structures Near the Epicenter of the Northridge Earthquake, January 17, 1994"; and Kobayashi, K. et al., 1996, "The Performance of Reinforced Earth Structures in the Vicinity of Kobe During the Great Hanshin Earthquake", International Symposium on Earth Reinforcement, Fukukoa, Kyushu, Japan, November 1996.* MSE technology is well established, and well-constructed walls of this type have performed well in seismic events.

Finally, the Port's MSE design is based on the methods specified by AASHTO, but the Port's design team has also included a number of provisions that go beyond AASHTO requirements. Standard approach to MSE design is based on limit equilibrium and ultimate strength type analyses. In addition to the Code requirements, the design analyses include stress-strain modeling to check and verify that deformations are within acceptable limits and that stresses in reinforcement do not exceed allowable limits.

11. Use of FLAC for Seismic Analysis is Well Documented in the Scientific Literature

This comment indicates a concern that the finite difference based computer code "FLAC" used by the Port has never been demonstrated to reliably predict seismic deformation of earth structures. Engineering literature in this area contradicts this contention and demonstrates the extensive use of FLAC for dynamic analysis of earth structures, including comparisons with real earthquakes. Examples of such literature, include:

Inel, S., W.H. Roth, and C. de Rubertis, 1993. "Nonlinear Dynamic Effective Stress Analysis of Two Case Histories," Proceedings of the Third International Conference on Case Histories in Geotechical Engineering pp 1735-1741.

Makdisi, F.I., Z-L Wang, and W.D. Edwards, 2000. "Seismic Stability of New Exchequer Dam and Gated Spillway Structure," Proceedings of the Twentieth Annual USCOLD Lecture Series: Dam O&M Issues - The Challenge of the 21st Century, pp. 437-458.

Bathurst, R.J. and K. Hatami, 1998. "Seismic Response Analysis of a Geosynthetic-Reinforced Soil Retaining Wall", Geosynthetics International, V. 5 Nos. 1-2, pp. 127-166.

Bathurst, R. J., and K. Hatami, 1999. "Earthquake Response Analysis of Reinforced-soil Walls Using FLAC," Proceedings of the International FLAC Symposium on Numerical Modeling in Geomechanics, pp. 407-415.

Roth, W.H., et al. 1993. "Upper San Fernando Dam 1971 Revisited". Annual Conference Proceedings of the Association of State Dam Safety Officials. D.W. Darnton and S.C. Plathby eds. Lexington, KY. pp. 49-60.

FLAC was used (or is being used) for Wickiup Dam in Oregon, Seymour Falls Dam in British Columbia, Rye Patch Dam in Nevada, and Pineview Dam in Utah. FLAC or similar procedures are being used to guide design of many earth structures, including both static and seismic analyses.

The Port's design team is very familiar with research at the University of Washington that includes use of FLAC for both static and seismic analyses of MSE wall performance (see for instance *Lee, W.F., 1997. "Numerical Analysis of Instrumentation of a Geosynthetic Reinforced Wall," Industrial Fabrics Association International: Geosynthetics, Vol. 1, pp. 323-336.).* The University of Washington research has demonstrated the reasonableness of FLAC analyses for seismic analysis of MSE walls based on comparison with shaking table and centrifuge test results.

Use of FLAC is above and beyond conventional design practice for MSE walls, i.e. the AASHTO Code that is being used by the Port. Use of this tool by the Port's design team provides an increased level of understanding regarding walls performance both during construction and service. The Port's design team selected FLAC as a tool to support the design process after considering capabilities of other dynamic modeling programs such as Plaxis and FLUSH. Use of FLAC enables the Port to estimate wall movement and stresses in the reinforcing for a wide range of conditions from construction through performance in various size earthquake events, a capability that is not equally available from alternative computer models.

The comment also included a number of technical questions that are addressed below:

- Default constitutive models & elements were used, based on demonstrated performance in FLAC models of MSE walls;
- Free- field boundaries were established such that their location did not affect the model;
- ProShake was used to calculate site response from bedrock motion to get input for base of model;
- Liquefaction deformation analysis was not accomplished in the FLAC analyses to date, but is being evaluated as a further check on wall performance
- The "composite strength" approach referred to in the comment was part of an analysis of part of the 2H: 1V embankment, and does not relate to design of the MSE walls. Shear strength of sand layers underlying the MSE walls was not simply weighted by the residual strength of liquefiable soils. Use of stone columns will mitigate potential for liquefaction in the areas where ground improvement is used. Strength of the soils in the subgrade improvement areas has been estimated using performance on other projects based on the area replacement ratio approach, and will be verified by testing during construction.

It is important to understand the fact that FLAC is only one of several tools/techniques used by the Port's design team to evaluate the seismic response of the MSE walls. It is also important to emphasize that the Port is not relying solely upon FLAC for the seismic design, but rather using it as an advanced tool to confirm and supplement the conclusions given by the more conventional analyses. The biggest benefit of FLAC is to help understand the mechanisms of deformation so that the reasonableness of the limit equilibrium analyses can be confirmed.

12. No Specific Source has Been Identified for Wall Backfill Material

The comment questioned why the Port has not provided test data from its own borrow sites to verify suitability for use as MSE backfill material. However, at this time, the identified borrow areas are not anticipated by the Port to be used as a source for MSE wall backfill materials.

Regardless of the source of the fill materials, the construction specifications will include provisions to test MSE wall backfill materials that are proposed for use by the Contractor. Such specifications are likely to be similar to specifications of the current Port of Seattle Phase 4 construction documents (which were available for review but were not addressed in these comments). MSE backfill material will, at a minimum, be tested as required to conform to the AASHTO Code being used for design, and to satisfy performance requirements discussed in *Hart Crowser, 2000. DRAFT Geotechnical Input into MSE Wall and Reinforced Slope Design, pages 5 through 12, August 21, 2000.* The fines content of the wall backfill will be limited to more stringent requirements than the Code, to provide improved drainage for the wall zone.

13. The HSA Techniques Were Appropriate and Did Not Lead To Erroneous Soil Characterization

This comment expressed concern that some of the drilling and sampling techniques used by the design team may not be appropriate and could produce errors in soil characterization. The Port's design team recognizes the issue raised in the comment but notes that any potential error of the type suggested would produce conservative results, i.e. it would always tend to make soils seem more susceptible to liquefaction than they actually are. Comparison of side-by-side cone penetrometer test (CPT) and SPT blow count (N) values for parts of the Third Runway project does indicate the N values are lower than might be expected, so it is likely that there would actually be somewhat less liquefaction due to the design earthquake than previously anticipated by the Port.

14. Construction Plans Should Include Instrumentation

The Port's design team agrees with this observation. Monitoring plans were discussed during scoping design for the MSE walls, and will be developed at the time final construction plans are prepared.

Monitoring during construction is an important aspect of geotechnical engineering that is very familiar to the Port's design team. The Port anticipates that the MSE monitoring plans will be developed by the wall designer (RECo), subject to review and concurrence by other members of the design team.

In general terms, construction monitoring is anticipated to include: 1) vertical deformation of the wall subgrade soils; 2) horizontal deformation of the wall subgrade soils; 3) horizontal deformation of the reinforced wall backfill; 4) horizontal and vertical movement of the wall face. Construction observations and monitoring data will be reviewed during construction to verify that the wall is performing in the manner anticipated by the designers. This type of monitoring is in addition to construction quality control tests and quality assurance procedures that will be incorporated into the wall & reinforcing component manufacture and field construction process.

15. Use of HELP Model Is Appropriate

The Port's design team understands the comment's concern about suitability of the HELP model for analysis of infiltration into landfills.

For the Third Runway project, HELP was used as part of a detailed hydrologic analysis that included several different models to analyze different aspects of the effect of the embankment on infiltration and groundwater recharge. The Port's approach used a model called Rosetta (*Schaap, M.G. and W. Bouten, 1996. "Modeling Water Retention Curves of Sandy Soils Using Neural Networks". Water Resour. Res. 32.3033-3040.*), that uses moisture-conductivity-suction relationships based on gradation of the fill materials, to develop parameter sets that control infiltration and unsaturated percolation into the embankment. The HELP model was used to simulate flow through different parts of the embankment, including the lateral drainage layer at the base of the embankment.

An Ecology consultant, Pacific Groundwater Group, used a different type of computer model and obtained results that are very close to results produced by the Port's analysis (*Pacific Groundwater Group, 2000. "Sea-Tac Runway Fill Hydrologic Studies Report", June 19, 2000.*)

16. Ecology Review of IWS Lagoon #3 Expansion

Ecology granted the Port a Dam Construction Permit on July 21st, 2000. In a letter to the Port, Ecology stated, "The approval is based on the fact that the plans and specifications are acceptable." Ecology also stated that periodic site visits would be conducted during construction to confirm work is progressing according to plan, but gave no indication of any other review or independent analysis. See also General Response GLR14.

17. There Will Be No Material Impact On Existing Contaminated Groundwater From the Construction of the Third Runway.

In the area of the Airport where most aircraft fueling and maintenance operations have been performed (called, for the Model Toxics Control Act Ground Water Study, the Airport Operations and Maintenance Area, AOMA) contaminated ground water exists in a number of localized, discrete sites. The horizontal boundaries of each contaminated ground water site are defined by site investigation data, and include any

migration that might have occurred due to the presence of utility and underground infrastructure that crisscross the entire AOMA.

Within the AOMA, defined areas of contaminated ground water exist in both shallow perched zones and in the shallow regional aquifer (Qva). The perched zones are isolated and discontinuous, while the Qva is continuous, the uppermost aquifer of regional extent in the airport vicinity.

Underground infrastructure and utilities are typically, constructed at higher elevations than the location of the perched zones within the AOMA. Despite the numerous underground infrastructure and utilities that could influence perched ground water contamination in the AOMA, investigation data demonstrate that existing perched zone contamination has remained localized, i.e., has not migrated significantly along utility pathways, and remains well within the AOMA. Given this result, together with the discontinuous nature of the perched zone, the Port expects expect no material impact from the construction of Third Runway and other infrastructure on existing contaminated ground water in the perched zone.

Underground infrastructures are rarely constructed at depths where impact to the Qva is likely, but do exist (e.g. the satellite subway and baggage system tunnels). In one instance, AOMA Qva contamination migration has been impacted somewhat by the presence of deep infrastructure, but still remains localized and well within the AOMA. No such deep infrastructure is planned for the Third Runway. Some deeper infrastructure may be constructed for other Master Plan projects (e.g., STS upgrades or SASA), but these would be in locations far from known Qva ground water impacts. Therefore, the Port expects no material impact from the construction of Third Runway and other infrastructure on existing contaminated ground water in the Qva. In addition, construction within contaminated areas will include monitoring and remediation consistent with MTCA and other applicable environmental regulation. Such remediation may include the removal of contaminated soil to appropriate offsite treatment and disposal facilities.

Azous Environmental Sciences, February 16, 2001 letter

The responses in this section have been prepared from the Port's perspective and knowledge.

The Corps has reviewed these responses and the Port is in the process of refining their responses to incorporate suggestions made by the Corps.

1. Information regarding the area of wetland loss, functions provided by the impacted wetlands, mitigation to replace and/or restore those impacted functions, and the cumulative effects of the Port's proposed Master Plan Update improvements is available and the Port has provided this information in numerous documents, including the *Natural Resource Mitigation Plan* (Chapters 3, 4, 5, 6, and 7), *Wetland Functional Assessment and Impact Analysis* (Chapters 3 and 4), *Final Supplemental Environmental Impact Statement*, *Final Environmental Impact Statement*, and *Biological Assessment*.

2. Analyses of wetland functions being impacted as a result of the Master Plan Update improvements are presented in detail in the *Wetland Functional Assessment and Impact Analysis* report and are summarized in the *Natural Resource Mitigation Plan*. As explained in Chapters 3, 4, 5 and 7 of the *Natural Resource Mitigation Plan*, the mitigation plan has been designed to replace the wetland area and functions, which will be impacted by the project. The mitigation plan has been designed to replace the suite of functions impacted by the project, for example, organic carbon export, resident and anadromous fish habitat, nutrient/sediment trapping, flood storage, groundwater exchange, passerine birds, etc. (see Table 30-3 of the *Wetland Functional Assessment and Impact Analysis*; Chapters 3, 4, 5, and 7 of the *Natural Resource Mitigation Plan*).

3. Evaluations of permanent and temporary impacts are based on methods described in the *Wetland Functional Assessment and Impact Analysis* report. It is the Port's belief that these methods and the criteria for determining impacts are consistent with agency guidance and are based on an analysis of the specific areas impacted by project construction, the timing of construction, construction methods, pre and post-project wetland conditions, and the operation of the projects.

4. Cumulative effects are discussed in the *Wetland Functional Assessment and Impact Analysis* report at Section 4.4. In addition, the *Natural Resource Mitigation Plan* includes discussions of cumulative effects related to each of the mitigation projects (Chapters 5 and 7). See also General Response GLR19 concerning cumulative impacts.

5. The documents submitted in connection with the Public Notice issued for the Port's revised §404 permit application and supporting references provide the Corps and Ecology with extensive analysis and information on which to make informed and reasonable decisions as to whether the Master Plan Update projects meet §404 and §401 criteria. For a response to the commentor's assertion that information is missing from the *Natural Resource Mitigation Plan*, *Biological Assessment*, and *Wetland Functional Assessment and Impact Analysis* documents, see responses to other Azous Environmental Services' comment numbers 6, 9, 10, 14, 19, 23-26, 43, and 47-49 below.

6. The 2000 *Natural Resource Mitigation Plan* provides specific additions and enhancements to the mitigation plan in response to agency comments (see Table 4.1-3 on page 4-10, *Natural Resource Mitigation Plan*). These additions in the quantity and quality of mitigation are related to the functional impacts of the projects on wetlands and streams, and provide increased assurance that the mitigation will compensate for project impacts.

The mitigation proposed by the Port has been specifically targeted at replacing functions impacted by the project that are described in the *Wetland Functional Assessment and Impact Analysis* report. For each

mitigation project, the *Natural Resource Mitigation Plan* provides mitigation goals, objectives, and performance standards that define specific ecological functions required to mitigate wetland and stream impacts (Chapters 5, 6, and 7). Chapter 4, Table 4.1-1 (pages 4-2 though 4-4), and Table 4.1-2 (pages 4-7 though 4-9) of the *Natural Resource Mitigation Plan* also summarize how the project impacts are mitigated.

7. The commentor's analysis of the Port's functional assessment lumps the five rankings used by the Port into two functional rankings. The Port believes the comment fails to provide scientific justification for why rankings of "low," "low-moderate," and "moderate" should be reassigned to a single ranking of "low to moderate." Likewise, the rankings of "moderate-high" and "high" are reassigned to a single ranking of "moderate-high" in the comment. It is the Port's belief that this re-ranking is not supported by objective scientific criteria and alters the Port's actual data and the conclusions that can be drawn from that data, as well as obscuring important information that is present in the Port's analysis. For example, the commentor's Figure 1 purportedly demonstrates that for two functions, groundwater exchange and nutrient/sediment trapping, more highly ranked wetlands are being impacted than low ranking wetlands. However, most of the wetlands in the lower category for nutrient/sediment trapping actually are ranked 'moderate' for that function in the Port's analysis (Table 3-3 page 3-5, *Wetland Functional Assessment and Impact Analysis*). For groundwater exchange, most of the wetlands in the lower category rank 'low' for the function. In this example, the commentor's analysis treats low ranking and moderate ranking wetlands the same. The use of only two functional rankings in Figure 1 results in a less than accurate picture of the relative functional ranking of wetlands being impacted.

The Port's analysis provides detailed information on the relative ranking of each function for each wetland being impacted by the project (Table 3-3 page 3-5, *Wetland Functional Assessment and Impact Analysis*). This information allows for detailed analysis of the types of functions being impacted and the relative level of functional impact for each wetland. The Port has used this information, not only in the impact analysis, but also to design mitigation that replaces, restores, and enhances functions relative to existing conditions.

8. It is the Port's belief that the percentages of wetland acres lost reported by the commentor are based on assumptions that are not supported by the record, and do not reflect the actual acreage of lost wetlands. Likewise, the commentor's ranking system does not reflect actual wetland conditions. Also, see response to Comment 7 above.

9. The commentor's evaluations and conclusions regarding the targeted functions of the mitigation site do not reflect the goals and objectives stated in the *Natural Resource Mitigation Plan* (Chapters 4, 5, 6, and 7) for each mitigation project. The *Natural Resource Mitigation Plan* provides mitigation goals, objectives, and performance standards that define specific ecological functions required to mitigate wetland and stream impacts. Chapter 4, Table 4.1-1 (pages 4-2 though 4-4), and Table 4.1-2 (page 4–7) of the *Natural Resource Mitigation Plan* also summarize how the project impacts are mitigated. These tables identify mitigation in-basin and out-of basin to mitigate for the suite of wetland functions impacted by the project. Waterfowl habitat and flood storage are not the primary functions targeted for replacement in the *Natural Resource Mitigation Plan*, and they are not referenced as such in Table 1.3-1 or pages 1-1 and 1-2 of the *Natural Resource Mitigation Plan*.

The mitigation plan is designed to replace, restore, and/or enhance *all wetland functions* impacted by the project, as clearly explained in the *Natural Resource Mitigation Plan*. Furthermore, it is the Port's belief that the mitigation as designed will restore degraded wetland, stream, and stream buffer areas to higher levels of ecological function for the broad range of functions impacted. For example, the proposed mitigation will restore wetlands adjacent to Miller and Des Moines Creeks that are currently dominated by turfgrass or farmland with forested or shrub vegetation, greatly increasing organic carbon export,

nutrient and sediment trapping, and amphibian habitat functions. This action will create some habitat for passerine birds and small mammals, and will eliminate some waterfowl habitat. The wetland mitigation along Miller Creek, including the riparian buffer enhancement and the Miller Creek instream enhancements, will improve habitat for resident and anadromous fish, when compared to existing conditions.

The functions that are the focus of the mitigation plan proposed for the Miller and Des Moines Creek basins are:

- resident/anadromous fish habitat
- amphibian habitat
- export of organic matter
- sediment/nutrient trapping
- groundwater exchange
- flood storage (minor component at Vacca Farm)

The selected mitigation sites and design approaches will generally provide these functions at moderate to high levels.

The functions targeted for restoration at the off-site mitigation at Auburn include all of the above, (except resident and anadromous fish habitat) *plus:*

- waterfowl habitat
- passerine bird habitat
- small mammal habitat

Flood storage is a minor, but important function restored at the Vacca Farm site and flood storage functions will be established at the Auburn Mitigation site, but are ancillary to the greater concerns for wildlife habitat. Waterfowl (i.e. avian) habitat replacement is a component of the Auburn mitigation site, but not of the on-site mitigation. Creation or enhancement of wetlands in the Airport environs will be subject to the requirements of the August *2000 Wildlife Hazard Management Plan*, which contains procedures for minimizing hazardous wildlife-attractants. Even though avian habitat replacement is one of the goals of the Auburn mitigation site, most of the Auburn mitigation will replace, restore and enhance high quality forested and shrub wetlands. These wetlands are designed to function at high levels for passerine bird habitat, waterfowl, amphibian habitat, small mammal habitat, nutrient and sediment trapping, groundwater exchange and flood storage.

10. It is the Port's belief that the commentor's Figure 2 does not present new information on the scope of wetland impacts. The *Natural Resource Mitigation Plan* Table 3.1-2 (page 3-6) shows the relative impacts to Class II, III and IV wetlands from the Master Plan Update improvements. This *Natural Resource Mitigation Plan* table illustrates that in the Miller Creek basin, 14.37 acres of wetlands will be impacted. 8.37 acres (58 percent) of this area is Class II wetlands, 5.03 acres (35 percent) is Class III, and 0.97 acres (7 percent) is Class IV.

11. It is the Port's belief that the analysis presented in the comment does not contradict the statements made in the *Natural Resource Mitigation Plan* and *Wetland Functional Assessment and Impact Analysis* report. These documents state that the wetlands to be eliminated are degraded, and their ability to provide most of the functions analyzed is significantly reduced because of the historical wetland degradation.

The commentor's observations relating to the loss of Category II wetlands cannot be extended to determine the loss of wetland functions because Ecology's rating system is not a functional assessment system. For example, Class II wetlands can be degraded functionally, and receive a low or low to

moderate rating for one or more functional categories. This is the case for wetlands filled in the Vacca Farm area (which are degraded by farming and draining) and Wetlands 18, 37 (which have been degraded due to grazing, residential development, ditching, and logging).

The project mitigation for wetland impacts to all wetland categories (Category IV, III, and II) focuses on efforts to restore and enhance functions in degraded Category II wetlands (the Vacca Farm area, wetlands riparian to Miller Creek, and the Tyee Valley Golf Course).

12. The mitigation proposed by the Port is designed to replace and enhance the function of impacted wetland habitat.

Much of the forested and emergent habitat being impacted is degraded – forested habitats lack mature trees and native understory vegetation, while most emergent wetlands consist largely of lawns or golf course turf. The mitigation plan will replace the functions of these wetlands by replacing degraded farmland, emergent turf grass lawns, or golf course turf with forested or forested/shrub wetlands. Further mitigation, especially in buffer areas, will restore a native shrub layer and increase tree density in areas that are partially treed areas of residential landscaping.

The substantial off-site mitigation being proposed includes large areas of forested wetland and upland habitats. The Auburn wetland mitigation, approximately 36 acres of forested wetland, 6 acres of emergent wetland and 6 acres of shrub wetland will be restored/enhanced. This mitigation will convert upland and Category III wetlands to Category II wetlands.

Constraints at the Tyee and Vacca Farm mitigation sites related to wildlife hazards limit the areas that can be restored as forested or emergent wetland; therefore, the Tyee site and portions of the Vacca Farm site are dominated by shrub wetlands. However, in-basin mitigation includes approximately 15 acres of forested wetlands, and 10 acres of shrub wetlands. Overall, the mitigation design includes mostly forested wetland (about 51 acres), with smaller amounts of shrub (about 16 acres) and emergent (about 6 acres) wetland.

13. The proposed mitigation complies with Clean Water Act §404 guidelines. As described above, the mitigation is designed to replace all functions impacted by project including:

- Resident/anadromous fish habitat (on-site)
- Amphibian habitat (on-site and off-site)
- Sediment/nutrient trapping (on-site and off-site)
- Organic carbon export (primarily on-site)
- Small mammal habitat (primarily off-site)
- Passerine bird habitat (primarily off-site)
- Waterfowl habitat (off-site)

As explained above, mitigation in the Des Moines and Miller Creek basins is not limited to creating scrub-shrub wetland. Flood plain restoration is a minor component of the Vacca Farm mitigation project, and must be included in the plan due to engineering designs for the Third Runway that require placing fill in the existing floodplain. Floodplain habitat restoration at this site will also replace important sediment/nutrient trapping, amphibian, and small mammal habitat.

14. The *Wetland Functional Assessment and Impact Analysis* report and supporting documents identify how permanent, temporary, and indirect impacts to wetlands were evaluated (Chapter 2; Appendices A through K).

As is explained below, the Port believes the commentor's statements regarding the project design, potential wetland impacts, and the scientific evidence in the record does not support mitigation measures, particularly for Wetlands 18 and 37. It is also the Port's belief that the commentor has based conclusions on an incomplete review of project materials and incorrect assumptions regarding project design, potential wetland impacts, and mitigation measures. As a result, the record does not support conclusions made regarding temporary and indirect impacts to wetlands, especially Wetlands 18 and 37.

15. The Port believes that the commentor's position that the acres of wetland lost are commensurate with the proportion of functions provided by that acreage is valid in the case of Wetlands 18, 37, R1, A12 and other wetlands partially impacted by the Master Plan Update projects. However, the comment disregards the Port's impact analysis and justification for why this determination is valid,leading to the commentor's incorrect conclusion that the impacts of the project have been underestimated. The Port believes that to properly conduct the analysis, consideration of each of the habitat (fish, bird, waterfowl, amphibian, small mammals), hydrologic (groundwater exchange, flood storage, nutrient/sediment trapping), or other function (organic matter export) is required, as was done in the *Natural Resource Mitigation Plan* (Chapters 4, 5, 6, and 7).

The Port's approach of considering the impact proportional to the loss of wetland area is conservative and protective of wetland resources. Moreover, project information demonstrates that for several wetland functions, reductions in wetland size will result in little or no impact to wetland functions. For example, Wetlands 18 and 37 are rated as moderate and high, respectively, for resident and anadromous fish functions. This rating reflects the location of the wetlands adjacent to Miller Creek where wetland vegetation adjacent to the stream provides sediment/nutrient trapping, shade, and direct input of organic matter to the stream. Since project impacts will not remove overhanging vegetation or alter the stream channel in this location, fish habitat functions of the wetland will not change significantly. Because the project will not fill floodplain in this location, the floodplain functions of these wetlands will also remain unchanged.

Wetlands 18 and 37 provide high function for groundwater exchange (much of the wetlands are sites of groundwater discharge and provide baseflow functions to Miller Creek). The Port's analyses demonstrate that the project and its mitigation will not significantly alter the baseflow functions of the area. The combination of embankment design, stormwater management, and replacement drainage channels will maintain the base flow functions that Wetlands 18 and 37 provide. These analyses also indicate that the distribution of baseflow function is likely to be extended later into the summer months, and the function may thus increase.

Wetlands 18 and 37 provide high function for export of carbon to Miller Creek because of the riparian location, drainage channels, and roadside ditches associated with the wetlands that carry organic matter to the creek. Because project mitigation will replace these ditches and channels on a 1 to 1 basis, and vegetate their buffers with native tree and shrub wetland or riparian vegetation, the organic matter export functions of the wetlands would remain similar to their predevelopment condition. Over time (3-10 years), this function could increase, as all the replacement channels will contain native forest and shrub vegetation along their margins, whereas now, roadside ditches are bordered by mowed grass.

For passerine bird, waterfowl, amphibian, and small mammal habitat functions, the assumption that functional losses are proportional to the loss of wetland area is justified. These wetlands contain relatively uniform emergent, shrub, and forest habitat types that will be lost proportionallyas a result of fill. The Port believes this assumption is conservative however, because for both wetlands, the eastern portions that are subject to fill have also been subject to more recent vegetation clearing. The vegetation in the eastern area typically provides somewhat less habitat value for wildlife than the vegetation in the western portions of the wetland that are riparian to Miller Creek. Thus, pasture grasses and soft rush

typically dominate the affected emergent communities, while the wetter emergent communities that would not be filled contain small-fruited bulrush and skunk cabbage. Some shrub communities that will be filled consist primarily of blackberry, while those that will not be filled include greater amounts of willow and red osier dogwood. The forested areas to be filled are typically young alder (10-20 years of age), while those preserved include some more mature alder and tall black cottonwood trees. The analysis of habitat impacts is also conservative because, as a result of the project:

- existing detrimental impacts to habitat functions (human use, vegetation management, grazing, and domestic pets) will be removed,
- remaining wetland and buffer areas will be enhanced with native vegetation, and
- the remaining wetland will be incorporated into the Miller Creek Buffer mitigation area.

Nutrient and sediment trapping functions in the remaining portions of the wetland will remain and the replacement drainage channels will provide biofiltration functions. As a result of the construction of the Master Plan Update improvements, existing development that lacks stormwater management facilities and generates non-point pollution will be replaced by project improvements. These improvements will contain stormwater management facilities that will further assure that wetland losses do not result in water quality impacts.

16. The Port believes that the commentor's contention that a 1.4-acre wetland (the remaining size of Wetland 18 and 37) would not provide significant ecological functions is not supported by the field observations of wetland functions and discussion above. A review of the data in the *Natural Resource Mitigation Plan* Tables 1-2 (page 1-10) and 3-3 (page 3–5) shows that many wetlands much smaller than 1.4 acres have functional ratings as high or higher than Wetlands 18 and 37.

Ecology's rating system responds variously to wetland areas in classifying wetlands into one of four categories (Categories II, III, and IV for wetlands in the Master Plan Update project area). An example of how Ecology's wetland rating can be independent of wetland area[1] is the distinction between certain Category III and Category IV wetlands. Per the rating system, any wetland, regardless of how diminutive, is at least a Category III wetland if it is hydrologically connected to another stream, wetland, or pond. Alternatively, an isolated wetland as large as 2 acres can meet the criteria of a Category IV wetland. These ratings must be assigned independent of any specific evaluation of all the wetland functions that a functional assessment similar to that completed by the Port's would provide. While the rating approach helps identify a general ecological value that a wetland may provide, it cannot be used to infer what the specific functional performance of a wetland may be. Thus, the Port believes that the commentor's conclusion that "smaller wetlands are less highly rated than the larger wetlands" is not reflective of how the functional assessment was completed, or of its results. In short, wetland functional performance is not necessarily affected by wetland size.

The Port believes that the commentor's hypothesis that by reducing the size of a wetland, one removes significant value in greater proportion than the percentage of lost wetland area is not borne out by an objective evaluation of the pertinent data. Furthermore, this hypothesis cannot be predicted using the Department of Ecology rating system as an accurate predictor of wetland function.

The Port has not assumed that "wetlands have uniform conditions" and recognizes that the degree of internal diversity is often correlated to the functional performance they may provide. As discussed in reports and above, each impact area has been assessed for habitat conditions and other indicators of

[1] A careful study of the rating system will indicate that there are many other criteria used to rate wetlands that are independent of wetland area.

various wetland functions. The impact assessment is based on these site-specific determinations, and not on assumptions.

17. The impact assessment for Wetlands 18 and 37 is discussed in detail above, and similar analyses were completed for Wetland A12 and Wetland R1. Wetland A12 is a 0.11-acre Category III shrub dominated wetland. Using Department of Ecology criteria, the specific features found in this wetland indicate it does not provide significant wildlife habitat. The scrub-shrub vegetation and adjacent habitat around portions of the wetland allow it to provide "low to moderate" habitat function for passerine birds. A wetland of this size is likely unable to support all life history function of even a single pair of breeding birds, and it is simply a part of the overall upland habitat matrix available to birds and small mammals. With no unique habitat features lost and no loss of surface water, the wetland remaining after construction and mitigation (i.e., incorporation into the Miller Creek buffer) would continue to provide the same (although proportionately less) habitat functions. The analysis is conservative, because as shown on Sheet STIA-XXX-L5 of Appendix B to the *Natural Resource Mitigation Plan*, both the wetland and buffer would be enhanced with native vegetation.

Wetland A12 was rated "high" for groundwater support functions. As demonstrated by the analysis of the embankment and mitigation for impacts on baseflow, groundwater functions of this wetland will remain following construction. The wetland was rated "moderate to high" for nutrient and sediment trapping functions. Considering loss of this function proportional to loss of wetland area is justified because following construction and mitigation, existing upslope development lacking stormwater facilities will be removed and the stormwater management facilities planned for the project will retain nutrients and sediments. The Ecology rating for this wetland (Category III) would not change following construction.

As explained on page 4-62 of the *Wetland Functional Assessment and Impact Analysis* report, Wetland R1 would remain functional following construction of the Master Plan Update improvements. The "low-moderate" habitat function for passerine birds and small mammals would be maintained or enhanced by the removal of adjacent houses, wetland enhancement, and re-vegetation of buffer areas. The remaining portion of the wetland fringing the stream would continue to provide organic matter inputs to the stream, and this function would be enhanced by the buffer enhancement plantings. The fill of portions of the wetland would not alter groundwater exchange and flood storage capabilities of the remaining wetland, as the remaining wetland would continue to receive floodwaters, groundwater inputs, retain nutrients, and trap sediments. The Ecology rating of this wetland (Category III) would not change as a result of the project.

18. All temporary and permanent wetland impacts are identified and accounted for in the *Natural Resource Mitigation Plan*, including temporary disturbances from construction (Table 3.1-3 page 3-6). Where temporary construction impacts are indirect (i.e. noise disturbance of wildlife) the areas of impact are not quantified. The Port believes that given the existing noise, human, and pet disturbances in the project area, the adaptation of existing wildlife to urban environments, and the temporary nature of the impact, substantial changes in wildlife use are not anticipated.

Wetlands 18, 37, R1 and A12 have been evaluated for fill impacts, indirect impacts, and temporary construction (both direct and indirect) impacts. These impacts are accurately determined and listed in the project documents. The scientific analysis used in determining these impacts is conservative and is discussed in the reports, as well as in the responses above.

19. The timeline for construction in Wetland 18 is anticipated to be last approximately 4 to 5 years; the exact duration will depend on construction timing and the need to manage and treat stormwater during construction. However, it is important to note that the Port has considered impacts to Wetland 18 in the

Pond E footprint and drainage channels located upslope of the pond to be permanent impacts and mitigation for these impacts is part of the mitigation for permanent impacts (See Appendix D, Sheet C5).

The timeline for construction near Wetland 37 is expected to range from 1 to 2 years.

The permanent stormwater detention ponds will not be excavated in wetlands, as the resultant interception of groundwater would result in lost storage capacity. Rather, they will be bermed facilities, generally constructed above the elevation of the existing ground (cross-sections are provided in the *Comprehensive Stormwater Management Plan*, Appendix D).

The *Natural Resource Mitigation Plan* identifies a detailed restoration plan to mitigate these temporary impacts (see Section 5.2.4.12 page 5-120). The plan will involve, as necessary, "tilling or disking of the soils to loosen compacted soils and the addition of soil amendments" to ensure a suitable planting medium.

Obviously, the lifecycles of relatively sedentary or immobile animals using the wetland will be disrupted. Insects and other immobile invertebrates will be likely be killed or displaced. The wetlands are rated low as habitat for amphibians, but if amphibians are present during non-breeding periods, they will be disrupted until new habitat is provided. Birds and small mammals are expected to leave the portions of wetlands where temporary construction impacts occur. There are no unique habitat features in these areas, and the wetlands are populated by common species of wildlife that are expected to occur in both upland and wetland habitat throughout the urbanized project area. There is no evidence that these impacts are likely to result in eliminating entire populations of wildlife in the vicinity of the Airport.

The delay in providing the replacement functions of the emergent and shrub wetlands is likely to occur in several years to a decade. The delay in providing replacement habitat functions for the early succession alder forests are about 1–2 decades. Groundwater discharge functions will be replaced within 1 year. Water quality functions will largely be replaced upon stabilization of soil surfaces hydro-seeding (up to 1-year), but minor additional increases in this function would occur over a longer time frame as shrub and emergent vegetation matures. Organic matter export functions would be restored over a 2–10 year time frame as woody vegetation begins to encroach over replacement drainage channels.

20. The Port believes that the commentor's conclusion that it would take more than 50 years for temporary impacts to be restored is unsupportable because the affected wetlands have been subjected to on-going habitat and other disturbances for extended time frames. As a result of those impacts, they do not support the mature plant or animal communities that would require more than 50 years to restore. Where present, alder forest and shrub thickets range from 10 – 30 years of age. The rationale for how remaining portions of Wetlands 18, 37, A12 and R1 will remain functional is discussed above.

All wetland impacts of the project are correctly reported and fully mitigated.

21. Cumulative impacts have been addressed in the project analysis. See General Response GLR19 for a discussion of cumulative impacts. The analysis concludes that impacts of the Master Plan Update projects are mitigated through the *Comprehensive Stormwater Management Plan* and the *Natural Resource Mitigation Plan*. Because potential impacts to wetland and stream functions are mitigated, it is the Port's belief that the Master Plan Update does not contribute to cumulative wetland impacts. The analysis further concludes that other projects that may result in filling of wetlands will be required to meet standards of the Clean Water Act, State Environmental Policy Act, National Environmental Policy Act, and local wetland protection ordinances. For approval, the projects will be required to mitigate wetland impacts, so cumulative loss of wetland function is not anticipated.

The Master Plan Update projects impact 18.37 acres of existing degraded wetland.

- In-basin mitigation will provide 25.21 acres of wetland restoration/enhancement and 41.80 acres of upland buffers enhancement.
- Out-of-basin mitigation will provide 29.28 acres of wetland restoration and creation, 19.50 acres of wetland enhancement, and 15.90 acres of upland buffer enhancement.

22. In order to meet permitting requirements, impacts to wetland area, wetland functions, and beneficial uses of surface waters must be avoided or fully mitigated. Thus, there are no cumulative impacts to wetlands or surface waters. It is unreasonable to presume that future projects will be able to fill wetlands and not mitigate for this impact. Consequently, future projects that involve fill impacts to wetlands will not contribute to cumulative impacts.

23. The *Final Environmental Impact Statement* and *Final Supplemental Environmental Impact Statement* have evaluated upland and wetland wildlife habitat and vegetation. Based on the low quality of most forest, shrub, and grassland habitats that would be altered by the project, as well as the use of this habitat by common wildlife species widely adapted to suburban/urban environments, the *Final Environmental Impact Statement* and *Final Supplemental Environmental Impact Statement* determined that significant impacts to wildlife habitat or populations would not occur. It is the Port's belief that the Master Plan Update projects are not contributing to cumulative impacts on these wildlife species.

24. The Port's analysis demonstrates that watershed-dependent wetland functions will be fully mitigated in the impacted watersheds. Potential impacts to Miller, Des Moines, and Walker Creeks are evaluated and fully mitigated. Thus, no cumulative impacts are expected to result from the project. The establishment of avian habitat mitigation in Auburn provides adequate mitigation for bird species that currently use habitat near Sea-Tac Airport. Also, as recognized in the Norman Wildlife comment letter, these species are dispersed over the landscape and occur in many urban habitats. The analysis unit for highly mobile bird species adapted to urban habitats should not be small watersheds, but is a much broader region.

Project impacts on chinook salmon have been addressed in the *Biological Assessment*.

25. The localized impacts to wetlands and streams have been evaluated in the *Final Environmental Impact Statement* and *Final Supplemental Environmental Impact Statement*, and mitigation for these impacts is the subject of the *Natural Resource Mitigation Plan*. The mitigation in basin for filling 18.37 acres of existing degraded wetland includes providing in-basin, 25.21 acres of wetland restoration/enhancement and 41.80 acres of upland buffers enhancement. Additional mitigation is provided out of basin. The complete mitigation, designed to replace wetland functions potentially lost by the Master Plan Update projects, will effectively assure that localized and cumulative impacts of the project do not occur.

26. The comment fails to consider data presented in Table 1-3 (page 1-15) of the *Wetland Functional Assessment and Impact Analysis* report and the wetland functions that will be replaced through mitigation. See response to comment 24.

27. It is the Port's belief that the commentor's consideration of cumulative impacts fails to include the data provided regarding wetlands in the project area and the benefits that mitigation provides in mitigating for the impacts of the Master Plan Update projects to wetland functions.

28. As part of the planning and permitting of the Master Plan Update projects, the Port has avoided and mitigated wetland impacts per Clean Water Act requirements (see the *Natural Resource Mitigation*

Plan Table 4.1-1 and Table 4.1-2). These actions, coupled with the extensive stormwater management facilities provided to protect stream resources (see the *Comprehensive Stormwater Management Plan*) demonstrate that the Port, and the resource agencies, are taking steps to protect both Miller and Des Moines Creeks.

29. As discussed above, the mitigation proposed by the Port prevents degradation of the Miller, Walker, and Des Moines Creek watersheds.
The Port's consultants have followed requirements of the Federal Aviation Administration's Record of Decision regarding mitigation of wetland impacts, which requires that the Advisory Circular 150/5200-33, entitled *Hazardous Wildlife Attractants On Or Near Airports* (5/1/97), be followed. In implementing this requirement, the Port, its consultants, and the Federal Aviation Administration have determined the proposed in-basin mitigation is acceptable where existing wildlife hazards are reduced, and where the ability to manage the mitigation areas for wildlife hazards is retained, consistent with the procedures outlined in Section 10 of the August 2000 *Wildlife Hazard Management Plan*.

30. It is the Port's belief that the commentor has mis-stated the conclusions contained in Section 3.4 of the *Wildlife Hazard Management Plan*. The *Wildlife Hazard Management Plan* identifies a wide variety of avian and non-avian species that contribute to wildlife hazards at the Airport. Review of Section 1.2, Table 3.1, Section 3.2, and Section 3.4, Table 2 indicates that wildlife hazards at the Airport are not limited to geese and waterfowl. Table 6-2, page 6-8 of the *Biological Assessment* lists wildlife that have been struck by aircraft near Sea-Tac Airport runways. The table indicates that several avian species that use a wide variety of wetland and upland communities are of concern at the Airport. The statement that forested wetlands with closed forest canopies "do not cause safety concerns" is not supported by the experiences of wildlife management professionals at Sea-Tac Airport, or other airports around the country. This habitat type can support a wide variety of birds that forage near the Airport operations area, including large raptor species.

Wildlife management at Sea-Tac Airport is complex because of the individual requirements of particular species, interactions between predator and prey species, and the variety of micro-environments necessary to sustain populations of the variety of bird species while foraging or nesting. Thus, effective wildlife management requires more than just removing "preferred habitat," which in many cases may include jurisdictional wetlands and open water habitats that are subject to regulatory protections. Section 10 of the *Wildlife Hazard Management Plan* establishes procedures for minimizing wildlife hazards from the proposed on-site mitigation.

Much of Site 8 is already used for mitigation, as it has been incorporated into the on-site Miller Creek buffer enhancement area. Additional mitigation at Site 12 is not needed because, as discussed above, the on-site wetland, stream, and stormwater mitigation actions mitigate for the loss of wetland functions. Site 12 is located within about 1,800 feet of the proposed new runway, and creating wetlands here would not comply with the Federal Aviation Administration's Advisory Circular 150/5200-33, or with the Federal Aviation Administration's Record of Decision for the project.

The bird strike record (Table 6-2, page 6-8 of the *Biological Assessment*) indicates that a wide variety of birds, which use a wide variety of habitats (including forested wetlands) are subject to aircraft collisions at Sea-Tac Airport. The commentor concludes that bird species using wetlands at Site 12 would not "fly as high as the runway would be in relation to the wetlands;" however, this statement is not supported by the data.

31. The runway embankment affects the eastern portion of Site 8. Much of the remaining portion of Site 8 is incorporated into the on-site mitigation, in a manner acceptable to the Federal Aviation Administration's concerns regarding wildlife attractants.

32. The Port has used other sites to mitigate, in-basin, for the impacts to wetland functions potentially impacted by the Master Plan Update improvements. This mitigation protects and enhances salmon bearing streams.

33. The Port's mitigation proposal mitigates in-basin for wetland impacts. There are no requirements to mitigate for habitat impacts associated with alteration of low quality uplandvegetation. There are no substantial "remnant natural sites" that provide undisturbed high quality habitat in the project area that are not already protected by their wetland status.

34. The potential organic carbon export function was considered in the impact assessment, and mitigation is designed to specifically replace these functions in both the Miller and Des Moines Creek watersheds. In Miller Creek, converting plowed farmland to shrub wetlands will change the existing system, in which organic matter export to the creek is low (due to annual harvest of crops) to a high-export, shrub wetland linked directly to the creek through its floodplain and through overhanging woody vegetation. Also in the Miller Creek watershed, replacement drainage channels that are lined with overhanging woody vegetation will replace roadside ditches. The replacement channels will also convey organic matter to downslope areas and Miller Creek.

In Des Moines creek, mitigation will convert mowed golf course wetlands to shrub-dominated wetlands. This will convert a system where organic matter export to the creek is low (due to periodic mowing of grass and removing residues from the area) to a high export shrub wetland linked directly to the creek through its floodplain and through overhanging woody vegetation.

Further, in both the Miller Creek and Des Moines creek watersheds, enhancement of riparian buffers will increase the density and diversity of vegetation contributing organic matter to the currently sparsely vegetated creek channels.

35. There are no sedge meadows that will be filled by the project, and the emergent wetlands to be filled are typically mowed lawns, golf course areas, or pasture. Organic matter from agricultural operations, lawns and golf courses is typically removed from the site and never reaches wetlands or streams. Replacing these areas with forested and/or dense shrub wetlands will increase organic carbon export, when compared to existing conditions. Replacing existing non-native wetland vegetation with native wetland/riparian species will also result in increased organic carbon export. Establishment of sedge meadows at Vacca Farm or Tyee Golf Course mitigation sites is not proposed because these sites are not wet enough to support native wetland sedge communities in the long term.

The proposed mitigation will replace and enhance carbon matter inputs to wetlands and streams. The Vacca Farm, Miller Creek riparian wetland enhancement, Miller Creek buffer enhancement, and Tyee wetland mitigation areas will all deliver organic matter to in-basin streams.

36. Organic carbon export functions of wetlands have been considered and fully mitigated by restoration of riparian wetland and buffers. The restoration will increase the export functions of the currently degraded area and replace the functions lost through Master Plan Update project construction. Nitrogen cycling, eutrophication in the shoreline environment, and food web shifts would not occur.

In addition to mitigating for carbon export functions, the project will also remove existing land uses from both watersheds that are likely to contribute nitrogen and other chemicals to the creeks. Proposed mitigation will remove a golf course, septic systems, lawns, gardens, agricultural land, and a plant nursery, all likely sources of nutrient inputs to surface water.

The mitigation will reduce current levels of nutrient inputs to in-basin aquatic systems because of increased sediment and nutrient trapping functions associated with restoration of the Vacca Farm and Tyee Valley Golf Course.

The replacement drainage channels will enhance inputs and transport of organic matter compared to the existing roadside ditches. The drainage channels will have forested/shrub banks that will contribute litter to the channels and ultimately to the wetland and streams.

37. As is explained above in detail, it is the Port's belief that a shift in food webs will not result from the construction of the Master Plan Update improvements.

38. As is explained above in detail, organic carbon inputs will not decrease. As a result, it is the Port's belief that the commentor's concerns regarding dissolved organic carbon, metal availability, toxicity to salmon, and stormwater discharges would not occur.

39. The borrow sites are former residential neighborhoods that are covered by a variety of vegetation types, including blackberry, abandoned residential landscaping, and remnant areas of second growth forests. The borrow areas will not be completely cleared of vegetation. For example, in many cases wetlands have been preserved and buffers will be left around the perimeter and adjacent to wetlands.

Upon completion of excavation, the borrow areas will be reclaimed to a stable land surface configuration and revegetated. The base of the borrow areas will be revegetated and will have gently sloping grades, which will locally enhance infiltration. The existing, relatively impermeable glacial till surficialsoils will be removed. As a result, the post-mining condition of the borrow areas will allow for enhanced infiltration rates relative to the pre-mining conditions and are expected to remain high following excavation. The removal of forest vegetation and replacement with herbaceous and/or shrub vegetation will reduce evapotranspiration losses, potentially making more water available to infiltration due to a reduction in evapotranspiration. Without forest vegetation, soil water will be available for infiltration earlier in the fall and later during the spring months than is currently likely, losses of precipitation due to interception by a tree canopy would also decrease, and the overall precipitation contribution to groundwater would likely be increased.

Evapotranspiration from the Borrow Areas will not be "eliminated." Following excavation, the Borrow Areas will be revegetated in accordance with an approved reclamation plan. The growth of this vegetation will result in evapotranspiration.

40. Performance standards reflect that the wetlands referenced in this comment are maintained by marginal wetland hydrology that is present during the winter and early spring months. In addition to the observation of hydrologic conditions in these wetlands, the vegetation and soil conditions also indicate the wetlands are subjected to early season saturation. The performance standard is thus planned to maintain the existing hydrologic conditions in the wetland.

There are no plans to "extend and prolong the hydroperiod of wetlands that are currently fed by shallow groundwater." Appendix D of the *Wetland Functional Assessment and Impact Analysis* report describes and illustrates contingency measures to convey groundwater to wetlands in Borrow Area 3. Wetland hydrology in Borrow Area 1 is maintained by avoiding excavation in them (thus maintaining the perching soil conditions), and avoiding their upslope watersheds (for Wetlands 48 and B15). For Wetlands B4 and B12, seasonal hydrology will be preserved by avoiding excavation of their perching soil layer and the grading plan, which provides and upslope infiltration and positive drainage.

41. It is the Port's belief that the performance standard will maintain wetland functions because it maintains the existing baseline conditions in these wetlands (i.e., the performance standard reflects the typical duration that these wetlands experience wetland hydrology).

If 'uplands' experienced saturated soils into March or April, they would meet the wetland hydrology criteria, support wetland vegetation, and likely be classified as such. A large percentage of wetlands in the Northwest, and all of the wetlands of concern near the Borrow Areas, lack saturated soils during the late spring and summer months. Performance standards for these wetlands reflect observations that the wetlands lose the wetland hydrology parameter in early to mid spring, once rainfall rates decrease and increased evapotranspiration results in consumption of soil moisture.

42. This performance standard is based on maintaining the existing hydroperiod and hydrology of these wetlands. These wetlands currently begin drying in March when evapotranspiration begins, and do not support species that require water into the middle of June.

For example, for Wetland 30, which retains saturated soils longer than the other wetlands, the performance standard is standing water from December through May (i.e., the resident amphibian breeding season) in years of normal rainfall.

43. Some aquatic dependent species may require water to be present through the second week in June; however, this is not true for the species that occur in these wetlands, nor is it true of existing conditions in these wetlands.

The proposed mitigation will provide existing water to wetlands; hydroperiods will not be changed, baseflows in Des Moines Creek will be maintained.

Hydrological impacts of excavating borrow areas have been extensively evaluated and are minimal, as documented in Appendices C and D of the *Wetland Functional Assessment and Impact Analysis* and Section 5.3.3 page 5-142 through 5-145 of the *Natural Resource Mitigation Plan*.

44. No work has occurred in wetlands.

Work that is occurring in upland areas is being conducted so as to be protective of nearby wetlands. Wetland protection actions include:

- A minimum 50-foot buffer between all construction activities and wetland boundaries
- Installation of silt fences, straw bales and other best management practices to protect water quality in wetlands
- Installation of security fences around wetlands

Extensive analysis of impacts from fill to hydrology of nearby wetlands has determined that such impacts are minimal and/or beneficial.

Most of the wetlands near construction clearing activities are Class III or IV: (Class III: Wetlands 12, 13, 15, R1, W1, W2, 19; Class IV: 23, 63). These Class III/IV wetlands lack significant habitat for wildlife species, so impacts to wildlife from construction would be minimal. Significant clearing has not occurred near Class II wetlands (i.e., 18 and 52) that would result in isolation from other contiguous habitats. For example, although construction is taking place near Wetland 18, this wetland is still contiguous with habitat to the north, south and west.

45. See response to Comment 44 above.

46. There are no listed species that occur in these forested habitats in the project area. As explained above, the work has not resulted in significant impacts to biological or physical functions provided by the wetlands. There is no evidence of damage to regulated wetland areas, and the Port has not circumvented any permit processes by engaging in the pre-construction activities.

47. The *Natural Resource Mitigation Plan* (Section 5.2.3 and Appendix D) identifies how seepage flows will be collected and distributed to wetlands, as explained further below.

48. The collection and diversion of seepage flows to wetlands is shown in the drawings and explained in the *Natural Resource Mitigation Plan* (Section 5.2.3 and Appendix D) and *Wetland Functional Assessment and Impact Analysis* report (Section 4.3.2.4 page 4-41 through 4-44). See further comments below in Response #49.

49. Movement of water through the fill and mechanically stabilized earth wall has been evaluated extensively. Several studies and technical memoranda have been prepared detailing how water will flow through embankment fill and mechanically stabilized earth wall maintaining wetland hydrology downslope. Additionally, shallow groundwater will continue to support wetlands and Miller Creek west of the mechanically stabilized earth wall and embankment.

Documents that describe and substantiate that the hydrology of the wetlands located downslope of the embankment and wall are:

- *Sea-Tac Runway Fill Hydrologic Studies Report* (Pacific Groundwater Group) – This report was funded by the Washington State Department of Ecology
- *Geotechnical Report* (Hart Crowser 1999)
- *Wetland Functional Assessment and Impact* report (Parametrix, Inc. 2000)

The *Natural Resource Mitigation Plan* describes and illustrates how water will be discharged to the downslope wetlands. The replacement drainage channels are described in Section 5.2.3 of the *Natural Resource Mitigation Plan*. Design details showing the channel grades, cross sections and flow dispersal trenches are shown in Appendix D (Sheet C8) of the *Natural Resource Mitigation Plan*. Additionally, page 28 in Appendix B of the *Wetland Functional Assessment and Impact Analysis* report (Parametrix, Inc. 2000) describes facilities to maintain water supplies to wetlands located downslope of the embankment and mechanically stabilized earth wall that assure the function of the downslope wetlands and mitigation.

The replacement drainage channels will be located west of the mechanically stabilized earth wall, embankment, and security road. These channels will serve to collect seepage water diverted from the inner collection swale or seeps from the embankment underdrain. The inner collection swale will serve to collect water from the embankment, mechanically stabilized earth wall, and security road. Water from this inner collection swale will be conveyed under the security road to the replacement drainage channels, and ultimately to the wetlands located west of the project area. Water within these channels will be directed to wetlands to maintain hydrology.

The design sheets convey the required information regarding project mitigation. Segment C and Segment D of the replacement drainage channels are north flowing. Segment C conveys water to Wetland 37; Segment D conveys water to Wetland R9 and A13.

Appendices A and B of the *Wetland Functional Assessment and Impact Analysis* report identifies the design and purpose of the temporary erosion and sedimentation control swales and the inner collection swale. The Appendices make clear that, following construction, portions of the temporary erosion and

sedimentation control swale will be incorporated into the replacement drainage channels. These swales will serve to collect and direct construction runoff to sedimentation ponds. Water from these ponds will be pumped to stormwater treatment and detention ponds and discharged to Miller Creek at existing outfalls.

The swale shown in Pond D on Sheet C6 is the temporary erosion and sedimentation control swale that will be constructed prior to the construction of stormwater Pond D. This temporary erosion and sedimentation control ditch would be used only during initial construction and construction staging. Prior to completion of the project, Pond D will be constructed in the footprint shown. When this pond is constructed, the portion of the swale within the ultimate boundary of the detention pond will be removed. The finished grading plan for Pond D is shown in Appendix I of the *Wetland Functional Assessment and Impact Analysis* report.

The channel segments identified in the *Natural Resource Mitigation Plan* mitigation are the minimum channel lengths required to replace channel lengths being impacted. The remainder of the channels shown on plan sheets with buffers may also collect seepage water from the embankment or the inner collection swale. The additional lengths of channel provide flexibility in how and where the seepage water is discharged to the wetlands and Miller Creek, if during monitoring and adaptive management, contingency needs are identified.

The grading plans that are part of Appendix D (Sheet C8) of the *Natural Resource Mitigation Plan* show the temporary erosion and sedimentation control ditch to be 2-3 feet deep in upland portions adjacent to Wetland 18 and 37. This ditch is about 1 foot deep where it crosses Wetland 18 and 37. The ditch is designed to be as shallow as possible because the wetland areas it crosses are areas of ground water discharge, and there is no need or desire to collect shallow groundwater from wetlands. By constructing the ditch shallow across wetlands, the amount of groundwater collected in the stormwater ponds during the winter months when it is at the surface will be minimized, as will potential impacts to wetlands.

As described in the *Natural Resource Mitigation Plan*, the temporary ponds will be restored to their pre-construction topography by regrading and backfilling with soil similar to the soils excavated. Shallow groundwater and seeps that feed Wetland 18 and 37 will be maintained through construction of the underdrain, collection swales, and replacement drainage channels.

The 1-foot contours provided on the design drawings show that the replacement drainage channel depths are 0-3 feet in depth. The relationship of the swales to the downslope wetlands can also be determined from the grading plan. Where the swale crosses wetlands, the west side of the swale is shown to be at elevation of the wetland. Thus, water collected by the swale can disperse into the wetland.

Sheet C8 of Appendix D to the *Natural Resource Mitigation Plan* shows flow dispersal trenches. The flow dispersal trenches are not designed for infiltration. They are designed to allow water to disperse over broad areas into wetlands. They are designed to avoid concentrating water in wetlands, and represent an improvement in the existing condition where the culverts beneath 12 Avenue South concentrate water in several localized areas of Wetland 18, 37, and 44.

The potential impact of permanent stormwater detention ponds on the hydrology of downslope wetlands has been analyzed in the *Wetland Functional Assessment and Impact Analysis* report (See Section 4.3.2.12 and Appendix I). Groundwater data for this area in relation to the ground elevation is shown in Appendix I and discussed in the *Wetland Functional Assessment and Impact Analysis* report. Because of the excavation, a small indirect impact to the uppermost section of Wetland 39 could occur where the pond is excavated below the elevation of the wetland. Pond D has been designed to infiltrate water into

the soil and with an additional orifice to discharge treated stormwater to the wetland: based on this design, the indirect impact may not occur.

50. See response to the GeoSyntec Consultants' February 16, 2001, letter.
There is no reason to suspect that the mechanically stabilized earth wall will be detrimental to forest and shrub wetlands located more than 50 feet away from its base, or Miller Creek, located more than 100 feet from its base.

The plants and animals found in the project area are widely distributed across a very broad array of micro and macro-climates over their large geographical ranges. They are expected to occur from lowland areas of Puget Sound, through the Cascade foothills, and typically from northern Oregon into southern British Columbia. Many species, however, have even broader geographic ranges, extending into and over the Cascade mountains, into warmer and more arid regions of Oregon, or into wetter and cooler regions of British Columbia. Even if minor microclimatic changes were to occur near the wall, they would not be substantial enough to affect species distributions or their biology.

The wall would increase shading of the creek by up to 15 minutes daily. This would not be expected to significantly affect the wetland or creek environment, as a tree and shrub canopy already provides shade to wetlands and the creek. The wetland and riparian area of Wetland 37 may receive amphibian use due to the extended period of soil saturation and shallow (less than 2 inches deep) ponding that occurs on the site. The site conditions would not be expected to support amphibian breeding.

Even if amphibians do breed in the area, and even if the wall were to delay the phenology (i.e. egg development, metamorphosis, etc.) by "a few weeks," impacts to the species would be unlikely. The commentor argues that if eggs were to develop later in the year, they would be at greater risk to drying conditions in the wetlands, yet all hydrologic analysis of groundwater movement into wetlands adjacent to the embankment have found the period of discharge to the wetlands will be extended into the summer months. But even if temperatures were cooler and egg development delayed, the cooler temperatures themselves would promote and extended the wetland hydroperiod because evapotranspiration losses by vegetation in the wetland would be reduced.

The commentor also argues that the wall impacts of "cooler temperatures created by the wall from shading effects" at some point and for unexplained reasons will shift to "creating higher summer temperatures" that could impact stream temperatures and biota. While the wall could retain heat, the presence of a forest and shrub canopy over wetlands and streams will block transfer of radiant heat to the stream. If warming were to occur, air convection would further limit impacts by promoting warm air to rise up away from the creek and wetlands.

51. As explained in several responses above, the key in-basin mitigation for the project includes:

- Stormwater and water quality management to protect the creeks and aquatic systems;
- Design of the embankment fill to allow groundwater discharge to continue to support downslope wetlands and aquatic systems;
- Replacement of filled flood-storage volume;
- Restoration of stream buffers to enhance and restore aquatic habitat;
- Restoration and enhancement to provide physical and biological functions that replace specific functions affected by fill;
- Off-site mitigation to fully replace avian habitat function.

52. See responses above regarding mitigation for wetland wildlife habitat functions at remote locations to comply with the Federal Aviation Administration Advisory's Circular 150/5200 33 and to minimize the safety risk the traveling public.

As explained in several responses above, the mitigation as a whole will be timed, designed and located in a manner to provide equal or better biological functions than currently exist.

53. The Port is proposing a combination of ponds and vaults to detain stormwater for the project. Stormwater vaults will not attract, trap, or provide habitat to wildlife for several reasons. Where open water is present for short duration, storm water ponds will be netted to prevent use by birds. Vegetation management in stormwater ponds (frequent mowing) will further reduce use by birds and other wildlife. Since stormwater ponds are not "wet ponds" they will lack aquatic habitat that could attract amphibians. Stormwater ponds would not be accessible to fish due to the gradient flow conditions of outfall pipes and will be managed according to the *Wildlife Hazard Management Plan*, which may include the use of netting to prevent use by birds.

54. The habitat and ecological value of wetland mitigation at Vacca Farm is explained above. The peat soil at the Vacca Farm site is identified as "Rifle" peat, a fibrous, woody peat. It forms in depressions on glacial outwash soil series such as the Vashon advance outwash (a medium dense sand soil series mapped in the vicinity of the Miller Creek Valley). The characteristics of the peat include moderate permeability (for example, the Soil Conservation Service estimates the permeability of similar peat soils to be on the order of 0.63 to 2 inches per hour). An estimate of field capacity based on the Soil Conservation Service data is 0.4 inches/inch, indicating that a considerable amount of the soil moisture will be retained after gravity drainage from the peat has ceased. In comparison, the underlying dense sand in the outwash material has permeability estimated at less than 1.4 inches per hour, and an available water capacity about 0.1 inches/inch.

The quantity of peat removed that could potentially provide water storage is 10,000 cy, and represents a potential volume of 108,000 cubic feet of water if filled to capacity. Assuming the total porosity of the peat is 0.8, the peat could store 108,000 cubic feet of water [10,000 x 27 x (0.8 - 0.4) = 108,000]. If the rate of release to the creek were uniform over the dry months (May-September), the average daily flow would be on the order of 0.008 cfs [108,000 cubic feet/(160 days x 24 hours x 60 minutes x 60 seconds) = 0.008]. This estimate is high because it neglects the evapotranspiration losses of water to the atmosphere instead of the creek and the timing of release of water from the peat to the stream.

The timing of the release of water stored in the peat is not likely to be uniform throughout the summer– most release would occur during late spring and early summer, prior to minimum stream flows. In fact, the observations of irrigation on the site during the summer months indicated that due to evapotranspiration and a relatively rapid release rate, water storage in surface peats is beneath field capacity by early summer. Thus, the potential impact of peat excavation on low stream flows is likely considerably less than 0.008 cfs, which is immeasurable and insignificant compared to the 1cfs minimum flow of the creek. However, the potential minor losses in lowflow due to peat excavation are mitigated by removal of water withdrawals from Miller Creek.

55. Wetland hydrology at the Vacca Farm site is supported by high groundwater elevations, with minor contributions from overbank flows.

The wetland will not receive water only during extreme storm events (see Section 5.1.1.6 and Section 5.1.2.6, page 5-31 of the *Natural Resource Mitigation Plan*). The channel is designed to overtop its banks at flows greater than annual peak flows. In addition, the wetlands are largely maintained by a high

ground water table on the site that is present due to groundwater discharge and not flooding by the creek channel.

Micro-topographic features have always been planned as a design feature of the Vacca Farm mitigation as explained in the *Natural Resource Mitigation Plan* (Section 5.1.2.7, page 5-34). Details showing the construction of micro-topographic features were added to the plan sets of the *Natural Resource Mitigation Plan* in response to a request from the Department of Ecology (Appendix A, Sheet C7.1).

The wetland mitigation at Vacca Farm is not designed to convey water and maintenance of wetland functions is not reliant on the wetland 'conveying' water. The wetland is *not* designed to pond water for long duration.

The floodplain is designed to drain water back to the creek channel as flows in it subside and to prevent long-duration ponding on the floodplain that could attract hazard wildlife. In conjunction with the dense forested/shrub wetland vegetation to be planted, the design of the floodplain and swale will allow floodwaters to drain off the site without attracting hazard wildlife.

See the responses to the Sheldon & Associates February 15, 2001, letter for a full explanation of the channel design, peat soils, and geotextile 'liner.'

56. It is the Port's belief that the impacts alleged in this comment will be avoided through the use of temporary erosion and sedimentation control measures, fill criteria, or mitigated as described in the *Natural Resource Mitigation Plan*.

57. Indicators such as existing vegetation, soils and hydrology provide the basis for determining if wetland hydrology is sufficient to maintain existing habitat functions post-project.

See response to Sheldon & Associates February 15, 2001, letter on pre-project monitoring.

58. The Port believes the reviewer's remarks regarding fill of perennial seeps are clarified below. The portions of Wetland 44 where permanent fill will occur (0.26 acres located on Parcels 490 and 494) are located upslope of any perennial seep or streams (see Map 14, Appendix D, of the *Wetland Delineation Report)*. In this location, a portion of the wetland is conveyed as channelized flow, primarily due to stormwater runoff from streets that is concentrated by ditches and culverts. During winter months, some interflow (shallow soil water) also seeps into this portion of the channel.

The two channels referenced by the reviewer are mapped as perennial on Parcel 496 in the *Wetland Delineation* Report. Upslope of Parcel 496, where fill will occur (on Parcels 494 and 493) the channels are correctly mapped as intermittent. It is the Port's belief that permanent fill will not extend westward from Parcel 494 or 493 to Parcel 496, and thus will not be placed in channels with perennial flow.

The project will eliminate unmanaged stormwater runoff generated by 12th Avenue South from entering the wetland. In the future, stormwater runoff from the Third Runway and Master Plan Update projects will be collected, treated to meet water quality requirements, and released gradually from detention facilities to reduce peak streamflows in Walker Creek. Thus, filling of 0.26 acres of Wetland 44 would not impact the water quality or the peak flow conditions in Wetland 44, Wetland 43, or in Walker Creek.

The groundwater discharge functions of Wetland 44 will be will be maintained by the design of the embankment fill, as described in the several hydrologic evaluations of the embankment and responses above. The embankment design will allow groundwater to infiltrate into the embankment and recharge aquifers in the soils beneath it. This water would move subsurface, eventually discharging to Walker

Creek or its associated wetlands. The hydrologic delay caused by water moving through the embankment fill, would improve the hydrologic condition of Wetland 44 because additional groundwater would be discharged to the wetland during the late spring and early summer months than currently occurs. Thus, fill of 0.26 acres of Wetland 44 would not negatively impact the groundwater discharge functions this wetland provides to Walker Creek.

Temporary impacts to Wetland 44 would result from stormwater management facilities needed during construction. The temporary impacts that would occur on Parcels 493 and 496 are where a small perennial seep is present and on Parcel 485 where a second intermittent channel is present. The temporary uses of these areas for stormwater management are designed to protect water quality (by removing sediments and turbidity) and to prevent hydrologic alteration (by preventing alterations to groundwater gradients and by discharging treated (clean) runoff back to the wetland).

59. Mapping of the Walker Creek channel west of highway 509 was removed because the channel location is not known and is discontinuous (there is no channel at Des Moines Memorial Drive). The channel cannot be discerned from existing aerial photographs, and historical photographs suggest the creek was confined to an agricultural ditch.

60. See response to #58 above.

61. The Port has complied with Clean Water Act 404 guidelines to avoid, minimize and mitigate for unavoidable impacts (see Chapters 3 and 4, specifically Table 4.1-1, page 4-2, of the *Natural Resource Mitigation Plan*).

See responses to comments above.

BioAnalysts Inc., February 14, 2001 letter

The responses in this section have been prepared from the Port's perspective and knowledge.

1. The *Low Stream Flow Analysis* report provides a detailed analysis of predicted low stream flow impacts. Mitigation, proposed in the form of stored stormwater, is described in the report (see page 15 of the *Low Stream Flow Analysis* report).

2. The Des Moines Creek well is not proposed to mitigate low stream flow impacts; therefore there is no potential for drawdown of upper aquifers. The Port's well is not located in the upper aquifer; consequently, there is no anticipated impact on streamflows.

3. The potential hydrologic impacts of the borrow areas were not evaluated in the *Comprehensive Stormwater Management Plan* because the Port believes that the modifications are considered temporary and reversible, as opposed to the construction of permanent new impervious areas and airport facilities. The *Wetland Functional Assessment and Impact Analysis*, Appendices C and D, evaluate the potential impacts of the excavation of the borrow sources on wetlands, propose a plan for avoiding or mitigating those impacts, and address the post-excavation topography and drainage facilities in the areas of the borrow sources. The feasibility of stormwater control in the borrow areas is not an issue, based on the lack of limitations regarding location and feasibility of stormwater facilities in borrow areas, e.g., land areas, wetland impacts, or size requirements. Infiltration facilities are feasible in the types of soils found in the borrow areas, allowing for the mitigation of potential base flow impacts. See also, response to comment #21 of Northwest Hydraulics Consultants' February 15, 2001, letter..

The borrow area hydrology will be altered somewhat by the short-term change of landcover from residential area (with impervious area limited to old roads) and forested slopes to a reclaimed landscape with altered surface soil properties. While the complex interaction of surface runoff, interflow, groundwater discharge, and evapotranspiration will be modified, the conversion of rainfall to surface runoff (rather than infiltration) that occurs when impervious surfaces are constructed will not occur. Therefore, significant increased runoff or decreased infiltration from the site is unlikely. Interflow will be reduced in areas where the till cap is removed. This will increase groundwater recharge and may increase in areas where outwash is removed. Evapotranspiration will likely decrease due to the removal of the tree cover, and therefore would increase the amount of water available for interflow and groundwater recharge. Surface runoff will likely decrease with the removal of existing impervious roads and well-defined drainage flow paths. The area will be re-vegetated after the borrow material is removed. This will restore the evapotranspiration and infiltration functions to the site.

4. Model calibration and low stream flow mitigation design is under review by King County. Model calibration, reserve low stream flow volumes, and live storage volumes will be confirmed as part of this review.

5. The storage-discharge analysis presented in Section 4.2.2 (page 4-7) and Appendix Z of the *Comprehensive Stormwater Management Plan* demonstrates that no untreated flows would occur in the 50-year King County Runoff Time Series period of record and no overflows would occur to Miller or Des Moines Creek. The Industrial Wastewater System lagoons are in the Des Moines Creek basin; the Port believes that if there is an overflow, it would not drain to Miller Creek. In fact, modeling showed that there would be no predicted overflow with future buildout at a processing rate of just 3.1 mgd, which is 78 percent of treatment capacity and less than one-half of outfall capacity. Additional treatment capacity may be available when all known available and reasonable treatment has been implemented. In the event of an unusually large storm that exceeds any storms of the past 50 years, storm water would be very dilute and unlikely to impact the stream system. The available pollutants would not increase during a large

storm. The loading rates would be constant; as a result, more precipitation would provide more dilution. For example, the design storm required by Ecology is the two-year storm, which is considered reasonably protective of receiving waters. The 25-year design storm and the demonstrated modeling indicate that unmitigated water quality impacts are unlikely.

6. Long-term storage of water is the basic concept of wetponds and wetvaults, which are pollutant removal best management practices. Stormwater that flows to the detention facilities and reserved stormwater storage has been treated by best management practices before it flows to the vaults. "Dead" sediment storage would be provided so that water drawn from the facilities would not re-entrain remaining settled material, if any. Water would be stored in underground vaults, which would keep water sufficiently cool. Reaeration will be accomplished for the small flow from the facilities using aeration systems such as drip towers or cascades over roughened surfaces.

7. The swales proposed at the foot of the embankment will collect runoff from the slope of the embankment and the security access road. The road is considered non-pollution generating surface due to the infrequent automobile use (one vehicle per hour). Runoff from the runway does not drain to the swales. Furthermore, biofiltration swales and filter strips are standard best management practices recommended by the both King County Surface Water Design Manual (1998) and the draft Ecology Manual as treatment for stormwater. Such best management practices take advantage of the binding capacity of soil particles along with the organic and inorganic ligands in soils to render the chemicals inert. These bound chemicals will either not be able to enter the biological compartment, or if they do, they will be unavailable to exert "harmful consequences."

8. The range of buffer widths for the riparian buffer along Miller Creek are clearly shown in several figures and plan sheets in the December 2000 *Natural Resource Mitigation Plan*. Figures 4.1-3, 5.2-1, Appendix F, and Appendix B, Sheet C2 of the *Natural Resource Mitigation Plan* all clearly show where the buffer is 100 ft, where the buffer is less than 100 ft, and where the buffer has been increased to more than 100 ft to allow for buffer averaging for the areas less than 100 ft. The minimum buffer width is 50 feet. The City of Sea-Tac requires 100 ft buffers for Class 2 streams with salmonids. Buffer averaging is allowed by the City of Sea-Tac Sensitive Areas Ordinance.

9. Details showing the number, location, and general size of the large, woody debris (LWD) features in Miller Creek are provided in the plan sheets included with the *Natural Resource Mitigation Plan* (Appendix B, Sheets C3 through C6 and Sheet C10) and in Figures included in Section 5.2.2.7 in the *Natural Resource Mitigation Plan*. In addition, Section 5.2.2.7 includes a discussion of the types of wood to be used (i.e., Western red cedar, Western hemlock, Douglas fir). The Port has designed LWD features to conform to Washington Department of Fish and Wildlife guidelines that are targeted at providing large, woody debris features that create a variety of flow and habitat types for fish. In addition, the design was discussed with Washington Department of Fish and Wildlife biologists prior to submitting the Hydraulic Project Approval application, and the design will be consistent with the conditions of the Hydraulic Project Approval permit. The LWD is designed to be stable in the stream and to rely on natural anchoring, such as burying LWD, in preference to conventional anchoring methods (e.g., cables), although it will be anchored in some circumstances, as shown on the plans. Also, many of the logs will be oversized in relation to stream power (i.e., larger than the sizes that are moved by the stream now during high flows) and are unlikely to move during high flows. Finally, LWD will be maintained in the longer-term as a result of the mitigation planting of the riparian buffer with native deciduous and conifer tree species to create a forested riparian zone that will eventually provide an on-going source of new LWD to the channel.

10. Under §402 of the federal Clean Water Act and Washington State regulations, WAC 173-201A-160(3)(d), the Port believes that it is in compliance with its National Pollution Discharge Elimination

System permit which is the regulatory permit that assures "activities which generate stormwater" are in compliance with state water quality standards. The toxicity testing conducted in accordance with the permit using sensitive aquatic organisms and following Environmental Protection Agency (EPA) protocols, showed that undiluted stormwater (100 percent stormwater) from three of four tested outfalls is not toxic to aquatic life. Of particular note is the fact that stormwater from SDS3 was not toxic. Not only does this drainage basin constitute one of the largest at Sea-Tac Airport, it is also most representative of future taxiways and runways. It is important to note that water quality criteria are derived by EPA using relatively "clean" water that does not contain constituents such as particulate matter, as well as the organic and inorganic ligands in surface water and stormwater that compete and complex with the metals to reduce their toxicity. This reduced bioavailability of metals in stormwater is corroborated by the studies of Leckie and Davis (1979), Borgman and Ralph (1983), Verweij et al (1992), Welsh et al 1993, MacRae et al (1999), suggesting that for many surface waters, it is likely that numerical criteria are overprotective.

With regard to Endangered Species Act species, the *Biological Assessment* completed for the Master Plan Update projects (Parametrix, 2000) used modeling techniques to predict the transport of constituents in Sea-Tac Airport stormwater from the outfalls to the mouths of Miller and Des Moines creeks, where listed fish are expected to be. The *Biological Assessment* (see Table 7-10, page 7-21) concluded that none of the concentrations predicted to occur over a 49-year period would result in any significant adverse effects to chinook salmon or bull trout. The Port believes that there are several reasons for this: First, zinc concentrations are predicted to be below the adverse affects level for these fish at the mouth of both creeks. Second, copper concentrations are also predicted to be below the adverse affects level for bull trout at the mouth of both creeks. For chinook salmon, copper concentrations at or near the copper toxicity value are predicted to occur for such short durations (0.2 to 2 non-contiguous days over 49 years) that they will not pose adverse effects to chinook salmon. Furthermore, it is important to note that the toxicity tests used to derive adverse affects data for both copper and zinc are based on 96-hour exposure periods. It is unlikely that either salmon or bull trout will remain in the creek mouths for 96 consecutive hours.

Finally, a lack of impact from Sea-Tac Airport stormwater downstream of the outfalls is demonstrated by the results of instream toxicity screening studies reported in the Port's *Biological Assessment*, Section 7.1.3.3, page 7-24. Bioassay screening tests using instream samples from Miller Creek and Des Moines Creek downstream of Sea-Tac Airport stormwater outfalls has demonstrated no toxicity to either fathead minnows or the invertebrate, *Daphnia pulex*. For all tests, there was 100 percent survival of the test organisms in 100 percent stream sample. It should be noted that the invertebrate, *Daphnia pulex*, is more sensitive than salmonids to copper. For example, *Daphnia pulex* is five times more sensitive to copper at an adjusted hardness of 50 ppm than is chinook salmon. Accordingly, the fact that the bioassay screening showed no toxicity for *Daphnia pulex* downstream of the Sea-Tac Airport stormwater outfalls demonstrates that there is no risk of toxicity for any salmonids that might occur in these same streams.

11. The Port believes that the Master Plan Update projects will not reduce minimum stream flows and will not create increased periods of high flows (see the *Comprehensive Stormwater Management Plan*). Consequently, fish habitat conditions in the creek will not be altered. There is no need to evaluate the minimum flow requirements for fish species in the creeks because these flows will not be decreased by the projects. The fish will continue to experience the same flow regime that is currently present, and their rearing or spawning habitat will not decrease. Their ability to migrate or move within the creek will also remain the same.

In the relocated section of Miller Creek, a minimum water depth of 0.25 feet is provided to prevent stranding of fish. However, the new channel reach will also provide rearing and spawning habitat. Water depths of up to 2 feet will be present, and the presence of log weirs, large woody debris, and root wads

will create habitat diversity. More information on the habitat quality of the relocated channel reach is provided in response #11 of the Columbia Biological Assessment February 16, 2001, letter.

12. The assertion that the channel will go dry by flowing through highly permeable "spawning gravel" stream material is incorrect. The material specifications include fine sands and silts to specifically avoid the problems asserted by the comment. The actual range will consist of silt, sand, pebbles and gravel, ranging from 4" maximum, 25-50 percent less than 0.25 inches, 10-20 percent sand or smaller, and up to 5 percent silt.

13. See General Responses GLR2 and GLR3 concerning fill criteria and soil contamination.

14. The Port believes the potential impacts and benefits of relocating Miller Creek near the Vacca Farm are adequately addressed in several evaluations. The ecological condition of the creek, the fish habitat it provides, and its fisheries use has been evaluated and summarized in several documents. Therefore, additional information regarding stream habitat quality is not needed to identify potential impacts of the proposed project to Miller, Walker or Des Moines creeks.

Miller Creek is described and evaluated in the *Final and Supplemental Environmental Impact Statements*(Appendix F), a *Stream Survey for Miller Creek*, the *Biological Assessment*, the *Sea-Tac Runway Fill Hydrologic Studies* (Section 3.4.1), the *Wetland Delineation Report* (Section 3.1.1), the *Wetland Functional Assessment and Impact Analysis* report, and the *Natural Resource Mitigation Plan* (Section 2.2.1.1). These reports describe existing stream (including habitat and fish use) potential project impacts, and project mitigation. The baseline information and evaluations contained in these reports provide an adequate technical basis for evaluating impacts to fish and other aquatic life.

15. The Port is proposing to monitor a range of features and evaluate mitigation actions. These include in-stream habitat features, riparian buffer conditions, and biotic integrity using the benthic index of biotic integrity (BIBI). The BIBI score is a multivariate index that measures the response of benthic macroinvertebrates to variables in a stream's and watershed's biological and physical condition. The model is regionally based on reference data collected on streams similar to, and including, Des Moines and Miller Creek. Because the BIBI score is strongly affected by watershed and stream level processes, it may be ineffective in measuring the invertebrate response to specific actions at a specific site. It does, however, provide a powerful tool for assessing overall stream health. Additionally, the BIBI monitoring results will provide guidance for both stream-level and watershed level factors that influence stream health and a regional perspective for enhancements to urban streams in the Puget Sound.

16. Short-term effects on coho habitat are described as short-term water quality impacts (increased turbidity and sediments) that could occur during construction if temporary sedimentation and erosion control best management practices were not effective. The duration of these impacts, if they were to occur, would be episodic, and limited to the construction period for the stream enhancement work (expected to be one construction season). Limiting construction to the summer months, construction monitoring, and the turbidity standards that the Port must meet under its National Pollution Discharge Elimination System permit reduce the probability that such impacts will occur. If it were to occur, repair of and/or additional best management practices would reduce the duration of the impact. It is unlikely these short-term impacts could significantly affect the populations of fish in the creek.

17. Operation of the Industrial Wastewater System will not change from baseline conditions, so the Master Plan Update projects will not alter existing fish or benthic habitat in the vicinity of the Industrial Wastewater System outfall. As explained in the *Biological Assessment* (see Table 7-11, page 7-21) and Essential Fish Habitat analysis, fish are not exposed to toxic conditions at the outfall because of high discharge velocities that exceed their swimming speeds. In the vicinity of marine outfalls, only limited

areas of benthic habitat is exposed to wastewater discharges because the water is a lower density than salt water, which establishes a vertical plume. If benthic prey were to move outside limited areas of contaminated sediment, their small numbers relative to the total forage base utilized by fish would result in no effect.

18. Proposed mitigation that retrofits water quality best management practices, reduces flood flows, and enhances creek buffers all will serve to improve conditions and enhance survival, growth, and abundance of fish and other aquatic organisms.

19. The *Biological Assessment* (see page 7-19) assessed potential water quality impacts to the estuaries of Des Moines and Miller Creek and the nearshore environment at these locations. Water quality analysis presented in the *Biological Assessment* demonstrates that the determination of "may affect, unlikely to adversely affect" is correct.

20. The *Biological Assessment* (see Page 7-19) assessed potential water quality impacts to the estuaries of Des Moines and Miller Creek and the nearshore environment at these locations. Water quality analysis presented in the *Biological Assessment* demonstrates that the determination of "may affect, unlikely to adversely affect" is correct.

Columbia Biological Assessments, February 16, 2001 letter

The responses in this section have been prepared from the Port's perspective and knowledge.

The Port's evaluations have documented the use of Miller, Walker, and Des Moines creeks as aquatic habitat, and evaluated potential impacts of the project to fish habitat, wetland habitat, riparian areas, water quality, and stream hydrology. The findings of these studies have been used to design and plan extensive mitigation to prevent significant adverse impacts to fish and aquatic habitat and to restore or enhance ecological conditions in portions of the creeks that cross Port property.

1. The existing Miller Creek channel to be relocated is a linear ditched channel with a uniform cross section. The riparian vegetation is predominately reed canarygrass and blackberry that provides little shading of the channel. The Port believes that immediately after construction, the relocated channel will likely have no less shading than the channel in its current condition. A few years of new growth will significantly improve shading of this channel reach. In addition, new woody debris (where none is in place now) will improve re-aeration of the stream and enhance dissolved oxygen levels immediately following construction.

The stream channel will not go dry by flowing through highly permeable "spawning gravel" stream material. The material specifications include fine sands and silts to specifically avoid the potential concerns that were mentioned by the commentor. The flow depths calculated in the *Natural Resource Mitigation Plan* will be met. These flow depths are based on open channel calculations for the proposed relocated stream. In the event that design standards are not met and the stream is not providing appropriate habitat, Table 5.1-7 of the *Natural Resource Mitigation Plan* provides performance standards and contingency measures that can be implemented to remedy the situation.

Water table elevations were monitored in the Vacca Farm area as shown in Table 5.1-10 of the *Natural Resource Mitigation Plan*. The elevations indicate that minimum static water table elevations will be at approximately 261 feet. The proposed channel flow line (as defined by the log sills) varies through the reach but is at the same approximate elevation as the minimum water table elevation. In addition, drainage ditches and tile in the farmed area will be abandoned, which is likely to increase water table elevations at the site.

The proposed stream is at approximately the same elevation as the existing channel (the pools will be deeper). The new channel is therefore likely to intercept the water table in the same way as the existing channel, which means that the creek will not "drain" from its channel into the peat.

2. See the General Responses GLR2 through GLR4 as well as the detailed responses below.

3. See detailed responses below.

4. See response below.

5. The proposed modification to the Port's National Pollution Disposal Elimination System (NPDES) permit addresses modifications to the Port-owned property to which the permit applies, and clarifies the receiving waters to which the Port discharges. The provisions of the NPDES permit will apply to areas included in the boundary modifications proposed in the major modification. It is the Port's belief that the modification will not have an adverse influence on the receiving streams.

6. See General Response GLR7.

7. Only one new stormwater discharge location outfall will be constructed near Miller Creek, and it will enter the creek inside a concrete box culvert under S. 157th Street. All other stormwater discharges to Miller Creek will utilize existing outfalls. The Level 2 flow controls are specifically designed to control erosive flow durations and peaks, and will not cause an increase in scour. Construction impacts, habitat effects, and mitigation are the same as those for other elements of the Master Plan Update, described in the *Comprehensive Stormwater Management Plan* and the *Biological Assessment*. The effects of operation of the stormwater facilities on fish habitat are described in the *Biological Assessment*.

8. Flow reductions have been evaluated using well-calibrated hydrologic models that are capable of evaluating hydrologic water balance in watersheds. Evaluation of hydrologic changes that may occur and are limited by the application of the Hydrologic Simulation Program-Fortran (HSPF) model are conservatively evaluated using appropriate accepted methods. The predicted effects are very small.

All three streams in the project area drop below 1 cubic feet per second (cfs) in most summers. The additional flow reduction caused by the Master Plan Update projects, if any, will be mitigated as described in the *Low Streamflow Analysis* report (see page 15).

9. See response #49 below.

10. It is the Port's belief that the potential impacts and benefits of relocating Miller Creek near the Vacca Farm are adequately addressed in several documents that discuss the ecological condition of the creek, the fish habitat it provides, and its fisheries use. Therefore, additional information regarding stream habitat quality is not needed to identify potential impacts of the proposed project to Miller, Walker or Des Moines creeks.

Miller Creek is described and evaluated in Appendix F of the *Final and Supplemental Environmental Impact Statements*, a *Stream Survey for Miller Creek*, the *Biological Assessment*, Section 3.4.1 in the *Sea-Tac Runway Fill Hydrologic Studies*, Section 3.1.1 in the *Wetland Delineation Report*, the *Wetland Functional Assessment and Impact Analysis* report, and Section 2.2.1.1 in the *Natural Resource Mitigation Plan*. These reports describe existing stream (including habitat and fish use) potential project impacts, and project mitigation. The baseline information and evaluations contained in these reports provide an adequate technical basis for evaluating impacts to fish and other aquatic life.

Following construction of the relocated channel, the creek would be expected to be used immediately by fish. Over a short period of time, food webs including bacteria, algae, and aquatic macro- and micro-invertebrates would be expected to colonize the stream and provide forage resources to fish. The nature and complexity of the food web would increase over time, especially as the stream channel becomes shaded by riparian vegetation. The relatively dense planting, and rapid growth rates of riparian vegetation will help minimize the length of time needed for the channel to reach maturity.

The Port has addressed the magnitude of impacts to Miller Creek based on the above-referenced documents and has determined that the project, as mitigated, would not significantly impact the aquatic habitat of Miller Creek. The Miller Creek plan to relocate the creek channel considers the hydrologic, topographic, and geologic constraints of the site and is designed to improve fish and riparian habitat conditions.

11. It is the Port's belief that the habitat requirements for cutthroat trout are well documented. The Miller Creek relocation has been designed to meet these habitat requirements within the limitations of the stream hydrology, and the nearly level topography and soil conditions of the area. Habitat requirements for cutthroat trout are generally similar to those of coho salmon (Glova 1978), which may also use this reach of Miller Creek. Fisheries use of the upper portion of Miller Creek is discussed in the *Biological*

Assessment Section 4 and the *Natural Resource Mitigation Plan*. Since cutthroat are resilient and nearly ubiquitous in urban streams of the greater Seattle area (Muto and Shefler 1983; Lucchetti and Fuerstenberg 1992; Ludwa et al. 1997; Serl 1999), the relocated channel of Miller Creek, as designed, is likely to be capable of supporting the species.

Because cutthroat trout are resident in the upper reaches of Miller Creek, the relocated reach must provide adequate habitat (cover, water depths, velocity, etc.), suitable water temperatures, sufficient food resources, and spawning habitat to sustain them through their fry, juvenile and adult stages (Giger 1972; Bustard and Narver 1975; Glova 1978; Wydoski and Whitney 1979; Bisson et al. 1988).

Coastal cutthroat trout fry require low velocity, shallow water that is usually associated with backwater or dammed pools. They are also found in side channels and along the margins of pool and riffle habitats (Giger 1972; Trotter 1989). During winter months or other periods of high flows and cold-water temperatures, juvenile coastal cutthroat habitat use is shifted to low velocity, deeper pools or to the stream substrate. Under these conditions, the young fish are torpid and seek cover under rocks, tree roots, logs, debris, and in log jams (June 1981; Trotter 1989; Flosi et. al. 1994). During other seasons, preferred habitats are primary pools or backwater eddies in association with an undercut bank, submerged tree roots, or branches and logs (June 1981; Trotter 1989). Root wad, large wood accumulations, and whole trees provide escape cover and can be used to create primary pools. Treetops, branches, and other small woody debris provide especially good summer cover for coastal cutthroat (June 1981; Flosi et. al. 1994).

Juvenile cutthroat are normally found in relatively slow current or pool habitats, and prefer water temperatures within the range of 48 to 60° F (Wydoski and Whitney 1979; Trotter 1989; Heggenes et al. 1991; Flosi et. al. 1994). The channel depths (0.25 to 2 feet) and velocities (0.5 to 2.5 feet per second) reported in the *Natural Resource Mitigation Plan* are expected to meet habitat requirements for fry and juvenile trout. In addition, log weirs, large woody debris, and root wads are included in the design to promote habitat diversity for rearing.

Cutthroat trout spawn in substrates that range from coarse sand to walnut-sized gravel, but prefer substrates in the 5 to 25 mm range (Cramer 1940; Trotter 1989; Hall et al. 1997). To meet spawning requirements, a mixture of coarse sand to small gravel will be placed in the relocated channel reach. The quality of the spawning substrate may be reduced if fine sediments accumulate within it (Waters 1995). To maintain spawning substrates, channel widths have been designed to maintain water velocities that prevent fine sediment deposition. In addition, structures that develop pools for rearing habitat usually improve spawning reaches by trapping gravel, and creating hydraulic conditions that keep fine sediments in suspension (Flosi et. al. 1998). In-stream log weirs, large woody debris, and root wads are thus included in the design to promote spawning and reproduction.

A canopy of riparian vegetation should cover approximately 80 percent of the stream channel to maintain suitable water temperatures and to provide insect or other organic matter inputs (Flosi et. al. 1994). The Miller Creek project is designed to provide a multi-storied riparian vegetation area to provide shade, woody debris, and organic nutrients to the stream.

12. The existing Miller Creek channel that is slated for relocation is a linear ditched channel of uniform cross section. The riparian vegetation is predominantly reed canarygrass and blackberry that offers little shading of the channel. Immediately after construction, the relocated channel will likely have no less shading than the channel in its current condition. A few years of new growth will significantly improve shading of this channel reach. In addition, new woody debris (where none is in place now) will improve re-aeration of the stream and enhance dissolved oxygen levels immediately following construction.

13. In addition to channel configuration, slope, and roughness: channel hydraulics in the relocated reach of Miller Creek are influenced by high water table and downstream water surface elevations. The existing channel has a similar channel cross-section that meets the flow depth criteria. It is the Port's belief that the flow depths, as described in the *Natural Resource Mitigation Plan*, will be met. In the event that design standards are not met and the stream is not providing appropriate habitat, Table 5.1-7 of the *Natural Resource Mitigation Plan* provides performance standards and contingency measures that can be implemented to correct the deficiency.

14. It is the Port's belief that the channel will not go dry by flowing through highly permeable "spawning gravel" stream material. The material specifications include fine sands and silts to specifically avoid such problems. The actual range will consist of silt, sand, pebbles and gravel, ranging from 4" maximum, 25-50 percent less than 0.25 inches, 10-20 percent sand or smaller, and up to 5 percent silt. The gravel size range referenced in the comment refers to a performance goal in the mitigation plan for gravel sizes in stream riffles. Fine materials would not normally be found in riffles.

15. See response to comment #13 above.

16. The purpose for placing the geo-textile material in the streambed is to facilitate construction of the stream channel in the peat. The fabric is not waterproof or impermeable, and will freely allow water exchange between the peat and stream substrate. As described above, the water table is at or near the stream flow line even in the dry months, which means that the water will not "disappear" into the peat. If that were the case, the existing stream, which also partially constructed in peat, would not be present. The Vacca Farm area and its peat soils is an area of groundwater discharge which, when combined with its flat topography, has allowed development of wetlands and peat soils.

17. Some settlement of the stream gravel and displacement of the peat is expected. The stream banks are intended to supply gravel to the stream if settling occurs. The plans show that there will be holes cut into the fabric. This demonstrates that there was no intent (or project need) to provide an impermeable barrier under the creek.

18. The proposed stream restoration projects included removal of "hardened" banks, rip-rap, and other channel *encroachments*. These encroachments into the channel, if not hardened, are susceptible to erosion because they tend to constrict the channel, increase flow velocity, and cause channel down cutting, which further decreases bank stability. The channel enhancements, after removing the encroachments, includes restoring a more natural channel section (with increased channel width and reduced streambank slopes) that are less susceptible to erosion, and placement of biodegradable matting to hold the bank and soil in place until plant establishment. While woody debris may cause localized sediment and substrate displacement, incorporation of woody debris into the stream structure also enhances sediment deposition, and reduces channel energy. The significant improvements that can be gained from enhancing the stream channel will offset any short-term, localized sediment movement. Channel enhancements, when combined with the proposed hydrologic improvements that will reduce the magnitude and frequency of channel-forming flows, will improve the overall health of the stream.

19. Temporary erosion and sedimentation control measures for the Miller Creek enhancements are shown on Appendix B of the *Natural Resource Mitigation Plan* (2000), Sheets TE1, TE2, TE3, and TE4.

20-26. See response to General Response GLR2 and GLR3 concerning fill criteria.

27. Under §402 of the federal Clean Water Act and Washington State regulations, WAC 173-201A-160(3)(d), the Port believes that it is in compliance with its National Pollution Discharge Elimination System (NPDES) permit which is the regulatory permit that assures "activities which generate

stormwater" are in compliance with state water quality standards. The Port has conscientiously reported the quality of its stormwater in accordance with its NPDES permit. The permit does not contain effluent limits for stormwater. The statement that "metals copper and zinc are of particular concern" is not substantiated by the results of whole effluent toxicity (WET) testing conducted by the Port in accordance with its NPDES permit. These tests, conducted using sensitive aquatic organisms following Environmental Protection Agency protocols, have shown that undiluted stormwater (100% stormwater) from three of four tested outfalls is not toxic to aquatic life. (For the one outfall where toxicity has been suggested, the Port undertook additional WET testing beyond that required by its current NPDES permit and quickly initiated an investigative study to identify and remove the likely source). Of particular note is the fact that stormwater from SDS3 was not toxic. Not only does this drainage basin constitute one of the largest at Sea-Tac Airport, it is also most representative of future taxiways and runways.

28. The criteria for copper and zinc is for dissolved metals, not for total metals concentration. In addition, those criteria are hardness dependent and will therefore vary based on the hardness of the receiving waters, a fact that is not noted in the comment. Finally, as was noted in response to the previous comment, the results of whole effluent toxicity testing conducted by the Port demonstrate that the stormwater discharge from Sea-Tac Airport is not toxic.

29. See response to comment #27 above.

The results of instream toxicity screening studies reported in the Port's *Biological Assessment* (Parametrix, 2000) (see Section 7.1.3.3, page 7-24) demonstrate that stormwater from Sea-Tac Airport does not add to toxicity levels in Miller Creek and Des Moines Creek. These instream screening toxicity tests are an integral part of ongoing water quality studies being conducted by the Port in support of an adaptive management approach. Bioassay screening tests using instream samples from Miller Creek and Des Moines Creek downstream of Sea-Tac Airport stormwater outfalls has demonstrated no toxicity to fathead minnows or the invertebrate, *Daphnia pulex*. For all tests, there was 100 percent survival of the test organisms in 100 % stream sample.

30. The Port is in compliance with its National Pollution Discharge Elimination System permit. This regulatory permit assures that "activities which generate stormwater" are in compliance with state water quality standards (toxic metals criteria). Also see response to comment #27.

31. In the *Biological Assessment* (see page 7-19) completed for the Master Plan Update projects (Parametrix, 2000), modeling techniques were used to predict the transport of constituents in Sea-Tac Airport stormwater from the outfalls to the mouths of Miller and Des Moines creeks where listed fish are most likely to be found. The *Biological Assessment* (see Table 7-10, page 7-21) concluded that none of the concentrations predicted to occur at these locations over a 49-year period, would result in any significant adverse effects to chinook salmon or bull trout. There are several reasons for this conclusion. First, zinc concentrations are predicted to be below the adverse affects level for these fish at the mouth of both creeks. Second, copper concentrations are also predicted to be below the adverse affects level for bull trout at the mouth of both creeks. For chinook salmon, copper concentrations at or near the copper toxicity value are predicted to occur for such short durations (0.2 to 2 non-contiguous days over 49 years) that they will not pose adverse effects to chinook salmon. It is important to note that the toxicity tests used to derive adverse affects data for both copper and zinc are based on 96-hour exposure periods, and it is unlikely that either salmon or bull trout will remain in the creek mouths for 96 consecutive hours.

As discussed in response to comment #29, a lack of impact from Sea-Tac Airport stormwater downstream of the outfalls is demonstrated by the results of instream toxicity screening studies reported in the Port's *Biological Assessment* (see Table 7-14, page 7-24). Bioassay screening tests using instream samples from Miller Creek and Des Moines Creek downstream of Sea-Tac Airport stormwater outfalls has

demonstrated no toxicity to either fathead minnows or the invertebrate, *Daphnia pulex*. For all tests, there was 100 percent survival of the test organisms in a 100 percent stream sample. The invertebrate *Daphnia pulex* is five times more sensitive to copper at an adjusted hardness of 50 ppm than is chinook salmon.

32. See response to comment #27 for discussion of toxic metals criteria.

As discussed in the *Comprehensive Stormwater Management Plan*, Section 7, copper and zinc concentrations in stormwater from Sea-Tac Airport in the future will either be unchanged or lower than the environmental baseline as a result of increased water quality treatment and detention. The quality of stormwater from Sea-Tac Airport is anticipated to improve in the future for several reasons. First, areas where stormwater is currently not treated will be retrofitted to improve water quality. Second, for areas with new impervious surfaces, stormwater will be detained and treated. WAC 173-201A-160(3)(d) states that "the primary means to be used for requiring compliance with the [water quality] standards shall be through best management practices required in waste discharge permits, rules, orders, and directives issued by the department for activities which generate stormwater pollution." As with the Port's current National Pollution Discharge Elimination System permit, future compliance with water quality standards will be achieved through implementation of best management practices.

33. See response to comment #27 above for a discussion of stormwater data and toxics criteria. See response to comment #31 concerning the lack of impact from copper and zinc in stormwater.

34. Glycol based fluids are only used to deice aircraft, and stormwater associated with that activity drains to the Industrial Wastewater Treatment System. The Port terminated the use of glycols on the runways and taxiways in 1992 and now uses more environmentally compatible, acetate-based compounds.

Aircraft deicing and anti-icing fluids are categorized into four types: Type I, Type II, Type III, and Type IV (USEPA 2000). These fluids contain ethylene or propylene glycol, water, and additives. Type I is the most commonly used fluid and is used primarily for aircraft de-icing; Types II, III, and IV are used for aircraft anti-icing. Toxicity data presented in USEPA (2000) for these fluids supports the U.S. Fish and Wildlife Service Classification System rating of "relatively harmless" for the Type I fluids (e.g., a 96-hr LC50 for the rainbow trout of 17,000 mg/L and for the water flea, a 48-h EC50 of 44,000 mg/L). Additionally, the ethylene glycol used to deice aircraft is not considered a dangerous waste. In September 1995, the Port applied for certification of the waste aircraft deicing fluids generated at the Airport under WAC 173-303-075. The application included static acute fish and acute oral rat bioassays in accordance with the requirements of WAC 173-303-110(3)(b). On October 20, 1995, based on the results of the bioassays, Ecology certified that waste aircraft deicing fluids containing ethylene glycol generated at Sea-Tac Airport are not dangerous wastes.

35. Because multiple factors influence the levels of dissolved oxygen in NW Ponds and Lake Reba (e.g., rainfall, wind, temperature, length of dry period, natural organic carbon in runoff and pond sediments), the Cosmopolitan (1999) study was unable to show any relationship between the application of de-icers and levels of dissolved oxygen in the ponds. The Port undertook a second study the following winter that reached similar conclusions.

36. As a result of the high solubility in water of potassium acetate (2530 g/L at 20°C) and sodium acetate (365 g/L at 20°C) and low partition coefficients (e.g., sodium acetate log P(oct) of–4.22), acetate based de-icers will not adhere to the soil and sediment .

37. The utility of using conductivity as a tracer for the deicers is clearly demonstrated in a second dissolved oxygen study conducted by the Port (POS, November 2000, Volume 1 Report). This study

specifically measured the presence of potassium, sodium, and calcium ions, unique tracers of potassium acetate, sodium acetate, and calcium acetate-based deicers, respectively, that contribute to conductivity. Increased levels of these specific ions above background (i.e., sampling conducted during "non-deicing" events) traced the passage of the deicing chemical through the two systems.

38. The Port concludes that given the infrequent and minimal use of de-icers at Sea-Tac Airport (as acknowledged by the commentor in referring to the second dissolved oxygen study), further studies are not likely to change the findings reported thus far.

39. See response to comment #5 above.

40. As noted above in the response to comment #27, sampling at the outfalls has demonstrated that undiluted stormwater from Sea-Tac Airport meets all applicable toxicity limits. Dilution in receiving waters or sampling with mixing zones would only further reduce any potential toxicity.

41. See General Response GLR7 concerning instream flow mitigation.

42. See General Response GLR7 concerning instream flow mitigation.

43. See General Response GLR7 concerning instream flow mitigation.

44. See General Response GLR7 concerning instream flow mitigation.

45. See General Response GLR7 concerning instream flow mitigation

46. See General Response GLR7 concerning instream flow mitigation

47. Flow reductions have been evaluated using well-calibrated hydrologic models that are capable of evaluating hydrologic water balance in watersheds. Evaluation of hydrologic changes that may occur and are limited by the application of the Hydrologic Simulation Program-Fortran (HSPF) model are conservatively evaluated using appropriate accepted methods. The predicted effects are very small.

48. The potential flow impacts from all of the Master Plan Update projects is evaluated in the *Comprehensive Stormwater Management Plan* (see Appendix A) at points downstream of Sea-Tac Airport, which combines the cumulative impact of changes in individual subbasins. In all downstream compliance points, the Level 2 flow control standard is met or exceeded.

49. An aquatic ecological risk assessment would not provide any additional information that would be applicable in determining compliance with water quality standards. Activities currently being conducted by the Port under the National Pollution Discharge Elimination System (NPDES) permit (e.g., Best Management Practices implementation and Stormwater Pollution Prevention Plan monitoring) are sufficient to make such a determination. Furthermore, it is important to note that the toxicity tests conducted by the Port under the current NPDES permit do test for the potential effects from multiple chemicals. Since the samples tested are (undiluted) stormwater, they inherently consist of multiple constituents that will include all the conventional water quality parameters, and any chemicals that might be there.

Northwest Hydraulics Consultants, February 15, 2001 letter

The responses in this section have been prepared from the Port's perspective and knowledge.

1. It is the Port's belief that stormwater standards are described in the *Comprehensive Stormwater Management Plan*. Water quantity (flow) control standards are described in Section 2.1. Water quality management standards are described in Section 2.2. Changes to the described standards are subject to the review and approval of Ecology.

2. The Port believes the stormwater plans provided in the *Comprehensive Stormwater Management Plan* provide appropriate detail to evaluate potential stormwater impacts from the Master Plan Update projects. The protection standards are clearly detailed, and the plan shows the feasibility of providing the mitigation required to comply with the standards. In the event that modifications to the plan are necessary due to project adjustments or unanticipated field conditions, the modifications are subject to review and approval by Ecology. The standards would remain unchanged, even if the mechanism for meeting those standards were changed.

3. As part of the §401 certification process, Ecology engaged King County as a consultant to review and comment on the Port's *Comprehensive Stormwater Management Plan*. The Port has addressed all of the comments of the King County reviewers and, based on King County's review and the Port's response to the County's comments, Ecology has reasonable assurance the *Comprehensive Stormwater Management Plan* will comply with state water quality standards.

4. The Port, as a Washington municipal corporation, need not post a bond to guarantee completion of the stormwater management facilities planned as part of the Master Plan Update improvements. As a political subdivision of the State, the Port enjoys the benefits of RCW 4.92.080, which exempts the State from bond requirements.

As described in Section 7.1.5.1 of the *Comprehensive Stormwater Management Plan*, the cost estimate for the 12.6 acre-foot vault described in Appendix M is for a vault if it were to be constructed in a completely built-out area (access freeways in subbasin SDE-4). The cost estimate is presented to demonstrate that retrofitting of this specific area is not reasonably practicable. This cost estimate does not apply to areas of new construction.

5. The expansion of Industrial Wastewater System Lagoon 3 is under construction and will be completed no later than 2003, to provide at least 72.0 mg of storage, as indicated in Table 4-2 of the *Comprehensive Stormwater Management Plan*. While construction is not complete, the plans have been bid and under construction for one season. The contractor has not identified any issue about completing the construction as designed.

The Industrial Wastewater System is already treating wastewater at the rate of 4.0 mgd (the "future" rate described in the *Comprehensive Stormwater Management Plan* Table 4-2). The discharge line has capacity in excess of the treatment rate. Lagoons 1 and 2 contain 1.6 mg and 3.3 mg, indicated in *Comprehensive Stormwater Management Plan* Table 4-2. Thus, the future treatment rate and storage capacity data stated in the *Comprehensive Stormwater Management Plan* are fully supported.

As stated in *Comprehensive Stormwater Management Plan* Section 7.5, "the recommended AKART (all known available and reasonable treatment) alternative is to discharge treated effluent from the Industrial Wastewater Treatment Plant to the King County DNR East Division Reclamation Plant at Renton (EDRPR). This alternative will eliminate or reduce Industrial Wastewater System discharge to Puget Sound. Industrial wastewater system flows will continue to be treated by the Industrial Wastewater

Treatment Plant to remove oil and grease as well as total suspended solids before flowing to the EDRPR." The marine outfall will be retained and will continue to be permitted, and will be available for discharge, if necessary, to allow discharge of flows in excess of the maximum rate accepted by the EDRPR. The storage-discharge analysis presented in Section 4.2.2 and Appendix Z demonstrates that no untreated flows would occur in the 50-year King County Runoff Time Series period of record and no overflows would occur to Miller or Des Moines Creek. In fact, modeling showed that there would be no predicted overflow with future buildout at a processing rate of just 3.1 mgd, which is 78 percent of treatment capacity and less than one-half of outfall capacity. Additional treatment capacity may be available when all known available and reasonable treatment (AKART) has been implemented.

6. It is the Port's belief that the Industrial Wastewater System lagoon complies with the siting standards of the Federal Aviation Administration's Advisory Circular 150/5200-33. As required by the Circular, wildlife hazard mitigation techniques such as surface aerators, netting, and/or covers will be employed at the new Industrial Wastewater System lagoon. The site will be monitored and adaptively managed as described in the *Wildlife Hazard Management Plan* to eliminate and minimize wildlife hazards to aircraft. A key difference between constructing the Industrial Wastewater System lagoons and new wetland mitigation within 10,000 feet of runways is that wildlife and habitat management at mitigation sites is contrary to the mitigation objectives and reduces the effectiveness of the mitigation. For these reasons, even though the Port's wetland mitigation proposes on-site mitigation to fully mitigate the non-habitat wetland impacts, off-site mitigation is proposed to mitigate avian habitat at a location where there is no potential for wildlife or habitat management to reduce aviation hazards.

7. The Industrial Wastewater System is already treating at the rate of 4.0 mgd, which demonstrates feasible treatment rates. Negotiations are on-going to determine the allowable rates of Industrial Wastewater System discharge that can be routed to the King County DNR East Division Reclamation Plant at Renton (EDRPR). Routing water to EDRPR does not diminish the amount of treatment capacity that has already been proven, but instead simply provides an alternative discharge location. Under any future scenario, if operational requirements dictate a change in treatment, processing rate, outfall capacity, or other changes that could potentially increase surface water discharges to Miller or Des Moines Creeks, the Port would be obligated to evaluate potential impacts, obtain necessary permits, and provide mitigation.

8. The release rate evaluated in the *Comprehensive Stormwater Management Plan* is the proposed rate for the Industrial Wastewater System. As described above in Response #7, any changes to the treatment rate would be evaluated for impacts to the storm drainage system.

9. The Port will operate the Industrial Wastewater System in a manner consistent with the Port's NPDES permit and any conditions imposed by Ecology in its approved §401 certification. In the event that the processing rate or operations change, the Port would evaluate impacts, if any, on surface waters and seek approval from Ecology if modifications to the *Comprehensive Stormwater Management Plan* are needed.

10. The increase in storage capacity will be accomplished by expanding Industrial Wastewater System Lagoon 3, an existing facility. Runoff from small storms is stored in Lagoons 1 and 2, which are netted to prevent bird attraction. Runoff from larger storms would require the use of Lagoon 3. Bird attraction during larger storms is less of a concern, because open water will form in many other depressional areas as well, thus reducing the likelihood of bird attraction specifically to Lagoon 3. As required by Advisory Circular 150/5200-33, wildlife hazard mitigation techniques such as surface aerators will be employed at Lagoon 3. The site will be monitored and adaptively managed as described in the *Wildlife Hazard Management Plan*.

11. The tables referenced in the comment indicate live storage volume modeled and available for runoff control. Reserved storage is not included in the live storage calculations and is therefore not included in the referenced tables.

The list of low stream flow mitigation on page 6-6 of the *Comprehensive Stormwater Management Plan* describes the Port's proposed mitigation. The Tyee Golf Course well is not a "proposed" flow augmentation source to mitigate the Port's low stream flow impacts. See General Response GLR 7 on instream flow mitigation. The discussion on page 6-10 of the *Comprehensive Stormwater Management Plan* describes the Des Moines Creek Basin Committee proposal for flow mitigation. The *Low Stream Flow* analysis concluded that low flow impacts from the development of the Master Plan Update projects could be mitigated by the reserved stormwater storage. This will not conflict with King County's plans to also have a well available to mitigate existing impacts.

12. The collection and storage of surface water in underground facilities (e.g., cisterns) is not a new concept; this practice has historically been used to store water for many uses. Long-term storage of water is the basic concept of wetponds and wetvaults, which are considered pollutant removal best management practices. Stormwater that flows to the detention facilities and reserved stormwater storage has been treated by best management practices before it flows to the vaults. "Dead" sediment storage would be provided, so that water drawn from the facilities would not re-entrain remaining settled material, if any. Reaeration will be accomplished for the small flow from the facilities using passive aeration systems such as drip towers or cascades over roughened surfaces.

Exhibit C151 incorrectly labels Vault G1 with a required volume of 9.2 acre-ft. As reported in the *Comprehensive Stormwater Management Plan* Table 6-2 and Appendix A, the actual required volume is 7.4 acre-ft, which is provided in live storage in Vault G1.

The required low stream flow mitigation design is under review by King County. Reserve and live storage volumes will be confirmed as part of this review.

13. The Des Moines Creek calibration is under review by King County. The model has been calibrated and checked against the King County Gage 11F. Review of the SDS3 gage during the period in question shows that the recorded hourly low flows approach 0.06 cfs (and the corresponding calibrated flows are very close to 0.00 cfs). Thus, even if the monitoring device has been in error, the correction for that error would have been insignificant.

14. The area of noncontiguous groundwater included in the model (512 acres) is measured from interpretation of best available data. Additional interpretation of the information may yield different results by different reviewers. In addition, groundwater areas can change in area depending on seasons, variations between different climate years, and human factors such as water withdrawals. The evaluation of groundwater area used in the model was based on professional judgment and an evaluation of the significance of groundwater areas on calibration results.

15. The selection of a location to calibrate a model is subjective. Calibration of the models used for this analysis emphasized matching overall watershed conditions, and therefore utilized the lower gages.

16. Data from gage 42C is being used to improve the Walker Creek model. Preliminary results suggest that this data will enhance the calibration of the model.

17. It is difficult to quantify the size of the groundwater basin discharging to a particular point. Groundwater basins do not necessarily correspond to the surface basins defined by topography. The 630 acres used in the model resulted in an approximate match with measured low flow volumes.

18. Irrigation runoff from the golf course or leakage from the Industrial Wastewater System lagoon does not have any influence on the Walker Creek base flows, based on the fact that both are located in the Des Moines Creek surface water and groundwater basins some distance from the Walker Creek basin.

19. In preparing the plot of observed daily flows from the 1998 embankment fill for February 1999, measurements of pond volume were not made every day. On those days where no actual measurement was taken, the 'observed' daily flow was recorded as "zero." This does not mean that there were no inflows to the pond, but instead reflects days when no pond volume was measured.

20. The existing Industrial Wastewater System lagoons were shown in the calibration and future development models as water features. There is no change in the modeling input for the lagoons from pre development to post development. The expansion of Lagoon 3 and lining of the expansion area was not included in the modeling because it is not a Master Plan Update project. Moreover, the lining area (approximately 5 acres) is insignificant compared to the total impervious area and the relatively small impacts on low stream flows. Modeling of the Industrial Wastewater System lagoon areas will be modified to reflect the lining.

21. The potential hydrologic impacts of the borrow areas were not evaluated in the *Comprehensive Stormwater Management Plan* because the Port believes that modifications are considered temporary and reversible, as opposed to the construction of permanent new impervious areas and airport facilities. However, the Port believes that it is inaccurate for the commenter to assert that the hydrologic impacts of the use of the borrow sources have not been evaluated. As noted in the comment, the *Wetland Functional Assessment and Impact Analysis*, Appendices C and D, evaluate the potential impacts of the excavation of the borrow sources on wetlands, propose a plan for avoiding or mitigating those impacts, and address the post-excavation topography and drainage facilities in the areas of the borrow sources. Appendix C specifically states that "[m]itigation [of impacts from Borrow Area 1] will also include the use of a stream setback averaging 200 feet to protect Des Moines Creek from the potential impacts of borrow development activities." In addition, Appendix D makes clear that the drainage swale designed for use in Borrow Area 3 will ameliorate the changes in groundwater flow that are anticipated to occur as a result of the excavation of that Borrow Area. Finally, "reclamation of the borrow area[s] will be accomplished in accordance with Washington Department of Natural Resources criteria and the Port of Seattle landscape plans. Once final grades have been established, the drainage swale and adjacent slopes will be protected from erosion using the same techniques demonstrated to be effective by the embankment construction to date. The excavation slopes will be dressed and hydroseeded with a bonded fiber matrix. The swale will be protected with erosion control matting until grass is established as part of the post-excavation site reclamation." Appendix D at page 8.

The feasibility of stormwater control in the borrow areas is not an issue, based on the lack of limitations regarding location and feasibility of stormwater facilities in borrow areas, e.g., land areas, wetland impacts, or size requirements. Infiltration facilities are feasible in the types of soils found in the borrow areas, allowing for the mitigation of potential base flow impacts.

Field investigations and soil classification conducted in the borrow areas, along with a comparison of soil gradation tests from field samples indicate that groundwater infiltration will increase in Borrow Areas 3 and 4 because more permeable soils will be exposed, while Borrow Area 1 may show reduced infiltration. As noted above, development and reclamation plans for Borrow Area 1 will include measures to enhance on-site infiltration (e.g., terraced slopes and benches) to the extent this is necessary.

Field investigations and soil classification conducted in the borrow areas, along with a comparison of soil gradation tests from field samples indicate that groundwater infiltration will increase in Borrow Areas 3

and 4 because more permeable soils will be exposed, while Borrow Area 1 may show reduced infiltration. As noted above, development and reclamation plans for Borrow Areas 1, 3 and 4 will include measures to enhance on-site infiltration (e.g., terraced slopes and benches) to the extent this is necessary. These plans will be submitted to the appropriate permitting agencies for review.

22. Review of air photos of the borrow areas demonstrate that much of the area was formerly neighborhoods acquired by the Port in past mitigation buy-outs. Much of the soil was modified (soil or organic materials removed) when the area was residential. Nevertheless, hydrologic modifications described will occur, although to a lesser degree than described in the comment.

While it is possible in some instances that grading would reduce surface infiltration, it is more likely that the removal of less-permeable perching layers and till will in fact increase the potential for infiltration and recharge that could increase baseflows to Des Moines Creek.

23. The Port believes the "headwaters" of Des Moines Creek are misrepresented in the comment as the borrow area locations. The west branch of Des Moines Creek originates as a well-defined, dredged channel from Northwest Ponds (the drainage area of which extends about a mile north of the Northwest Ponds), which are located approximately one-half mile upstream of 200th Street. The east branch of Des Moines Creek originates in drainage channels (with a drainage basin extending approximately 0.7 miles north of the lake) flowing to Bow Lake, which is located approximately 1 mile north of 200th Street.

24. See response to Comment 21 above.

25. The Port believes there is no basis for asserting that there will be adverse impacts from the borrow areas. Mitigation, if necessary, can be provided in the borrow areas with no impacts to operations or borrow area feasibility.

26. Refer to Technical Appendix B, Volume 3, of the *Comprehensive Stormwater Management Plan*.

27. The *Low Streamflow Analysis* report did not include supplemental Hydrologic Simulation Program-Fortran (HSPF) analyses. The *Low Streamflow Analysis* report used results from the HSPF analyses contained in the *Comprehensive Stormwater Management Plan*. Refer to the *Comprehensive Stormwater Management Plan* technical appendices A and B for HSPF input sequences.

28. See response to comment #14 above regarding groundwater basins.

29. See response to comments 19, and 21 above.

30. See response to comment #20, on Industrial Wastewater System lagoon lining.

31. The Hydrologic Simulation Program-Fortran (HSPF) modeling includes the baseflow impact to all creeks due to new impervious surface constructed since 1994. The diversions to the Industrial Wastewater System area since 1994 are evaluated in the *Comprehensive Stormwater Management Plan* comparison of 1994 conditions with 2006 conditions.

32. See responses to comments 23, 24 and 25 regarding the borrow areas. The borrow areas are not forested headwaters of Des Moines Creek.

33. The models used were described in the *Low Streamflow Analysis* report (pages 2-7). The Hydrologic Simulation Program-Fortran (HSPF) modeling for the *Comprehensive Stormwater Management Plan* was used for the low streamflow analysis. As a result, there are no differences in the

modeling for the two analyses. All permanent hydrologic impacts related to the Master Plan Update were evaluated.

34. The Port believes the commentor compared the matrix conductivity used in the Pacific Groundwater Group's analysis to the INFILT parameter in the Hydrologic Simulation Program-Fortran (HSPF) model developed for the *Comprehensive Stormwater Management Plan*. However, for comparison to HSPF model parameters, it is more appropriate to compare the HSPF INFILT parameter to the hydraulic conductivity of the bulk fill (Kbulk). It should also be recognized that Kbulk is not exactly equal to INFILT. Pacific Groundwater Group's Kbulk value of 0.085 in/hr (6x10-5 cm/sec) compares to the HSPF INFILT value of 0.02 in/hr. Based on this comparison, the difference is less than implied by the commentor. However, differences do exist between the amount of infiltration allowed by the two models. The following paragraphs explain the origins of the various values and application of results of the analysis.

The hydraulic conductivity used for the secondary recharge analysis was based on a database of measurements by others, and well-established algorithms that use soil particle size distribution. In this case, the percents of sand and silt expected of the entire fill were calculated based on geotechnical engineering plans for the fill. The resulting percents of sand and silt were considered representative of the soil matrix between gravel and cobbles. No flow was assumed to occur through the gravel/cobble fraction of the fill. As a result, the bulk hydraulic conductivity was lower than the matrix conductivityby the formula:

Kbulk = Kmatrix * (1-gravel fraction)

Where:
Kbulk =bulk hydraulic conductivity
Kmatrix = matrix hydraulic conductivity

In this case Kmatrix = 1.35x10-4 cm/sec, Kbulk = 6x10-5 cm/sec, and gravel fraction = 0.55.

INFILT for the Third Runway fill was established based on calibration of the HSPF model to Phase I fill runoff data spanning a one-month period in February 2000. At that time the Phase I fill had been contoured, densified by rolling, and treated to reduce erosion. It was virtually free of vegetation except on the slope.

The difference between the HSPF calibration result and the hydraulic conductivity implied by the particle size distribution was recognized at the time the secondary recharge analysis was performed. However, it was the opinion of more than one hydrogeologist that runoff from the completed fill would likely be less than suggested by the limited Phase I runoff monitoring data. It was recognized that stormwater designs based on the HSPF model would therefore overestimate as-built runoff, underestimate infiltration, and therefore overestimate impacts to streams in low flow periods. Because of the resulting conservative stormwater component designs, the HSPF model was not altered and the secondary recharge analysis proceeded independently.

35. A sensitivity analysis was performed in the Pacific Groundwater Group's secondary recharge analysis using reasonable assumptions for the widths of the infiltration filter strips (30 and 75 feet). Reducing Kbulk causes a reduction in estimated secondary recharge and increasing the filter-strip width causes an increase in the volume of water infiltrated (and a reduction in rate due to the increased infiltration area). By reducing the modeled Kbulk to a value equal to the HSPF model parameter (0.02 in/hr), estimated secondary recharge would be reduced by about 55% for a 75-foot filter strip (from about 22 to 10 in/yr) and by about 75% for a 30-foot filter strip (from about 48 to 12 in/yr). The secondary

recharge values estimated with the HSPF INFILT values used for Kbulk (10-12 in/yr) are less than will likely occur under the eventual built condition.

36. Dam safety design procedures defined in WAC 173-175 are followed for pond designs. All ponds requiring the Dam Safety review will incorporate that review process into the design process. If Dam Safety review is required, plans will be finalized in compliance with those regulations. All ponds constructed thus far have been exempt from a dam safety review.

37. See response to comment #36 above.

38. A geotechnical report for stability and constructability of the vaults will be completed as part of final design. Significant geotechnical evaluation of the embankment will be completed, as required to conform to all applicable regulatory requirements.

39. The depth requirement to which this comment refers is listed in the King County Stormwater Design Manual under the heading "Access Requirements." The specified depth is not a structural requirement. No depth limit is stated in the requirements under the heading "Structural Stability," on page 5-37 of the King County Stormwater Design Manual.

The Port maintains its own facilities. Due to the size and scale of operations at the Sea-Tac Airport, the Port is able to provide the necessary equipment to access and maintain these vaults.

Cast-in-place vaults will be designed and stamped by a licensed structural engineer.

40. The stormwater detention facilities will be constructed and operated consistent with the Port's *Wildlife Hazard Management Plan*. Standards for stormwater facilities are included in the *Wildlife Hazard Management Plan*. If the facilities fail to meet those standards, there are viable and feasible alternatives to retrofit the facilities to reduce wildlife attraction. Since the 1980's, the Port has staffed a full time wildlife biologist at the airport to assist in reducing and managing wildlife hazards. Accordingly, in the event of a problem, mitigation will be identified and implemented.

41. The Port believes the details described in the comment are included in plans at the appropriate level of design progress. The Port has a systematic, critical construction plan review process. Plans are reviewed at multiple design milestones by more than eight qualified Port environmental staff and consultants. In addition, the Port's individual National Pollution Discharge Elimination System (NPDES) permit requires significantly more extensive planning, implementation, and monitoring than the requirements of most construction sites in the state of Washington. Most construction sites in Washington are permitted under the General NPDES Permit for Construction Stormwater. The Port's NPDES permit requires that site-specific monitoring plans be prepared for construction projects. The Port is also required, through the Governor's Certification, to provide third-party oversight of all Master Plan Update construction activities for temporary erosion and sedimentation control. This third-party oversight is a condition of the Port's NPDES permit. The Port has a full-time temporary erosion and sedimentation control expert on staff, and monitors each of the construction sites as required by site-specific monitoring plans approved by Ecology. Problems found at the North Employee Parking Lot construction site in 1997 were effectively resolved to allow completion of the site during the wet season with no further problems.

The Port's temporary erosion and sedimentation control design and implementation procedures currently have more than three years of proven performance on large earth embankment projects, including one of the wettest winters on record. Facilities such as pumps, swales, and treatment ponds have been constructed and operated with no uncontrolled discharges.

Temporary erosion and sedimentation control is most effectively implemented with a sound, detailed plan, overseen and monitored by experts, adjusted and adapted to unique conditions at each site, using new and innovative techniques. The Port's approach to temporary erosion and sedimentation control for Master Plan Update projects meets all of these requirements.

42. Detailed temporary erosion and sedimentation control plans will be developed prior to construction, as required by the Port's National Pollution Discharge Elimination System permit. Also see response to Comment #41 above.

43. See response to comment #42 above.

44. See response to comment #42 above.

45. Temporary erosion and sedimentation control facilities will be in place as long as they are needed. Depending on the location in the construction and drainage basin, some facilities will be needed for one construction season, while others may be needed for the life of the construction (approximately 6 years).

46. As described in the *Natural Resource Mitigation Plan* (Section 5.2.3 pages 5-101 through 5-106), following construction, the outer drainage channels will serve to collect and convey seepage water to wetlands located downslope of the embankment. The temporary construction use is to collectrunoff from the construction area for diversion to a sedimentation pond and treatment. Temporary and permanent impacts to wetlands resulting from these channels have been evaluated in the *Wetland Functional Assessment and Impacts Analysis* report (Section 4.2; Table 4-5, on page 4-13).

47. Pond A and the adjacent pump pit are located in wetlands because this is the lowest part of the west-side construction area and the point to which storm water will flow during construction. These ponds are part of the temporary erosion and sedimentation control system protecting Miller Creek from potential short-term construction impacts. These ponds will be removed as soon as the adjacent disturbed ground can be revegetated and sediment is no longer a risk.

The geotextile lining is not intended to keep groundwater out of the pond, and there is some potential for Temporary Pond A to intercept a portion of the shallow groundwater that in part maintains the hydrology of Wetland 37a. We conservatively estimate the potential flow from natural groundwater into the empty pond would be on the order of 2 to 10 gpm (0.005 to 0.022 cfs). The area of wetland potentially impacted by this would be limited to between 20 and 50 feet downslope of Pond A. This volume of flow is insignificant to the wetland as a whole, except possibly during the late summer months.

It is important to note that the impact to wetland hydrology would be seasonal and temporary. The pond only needs to be pumped out when it is needed for temporary storage of storm water, typically only during the period of say October to April. Impact in winter is expected to be minimal since other hydrologic inflows will likely be sufficient to maintain moisture levels within the surficial wetland soils irrespective of any drainage effects due to Pond A. Impacts would be potentially greater in the summer, if the pond was drawn down and intercepted shallow groundwater flow that is feeding downslope wetland. However, the Port has no plans (and no need) to operate the pond except during storm events.

A management solution the Port proposes is to maintain water in the pond during the summer, when little or no stormwater retention capacity is needed. This would reduce or eliminate the drainage effect on the adjacent wetland. If necessary, management of pond levels throughout the year could be tied to

anticipated weather conditions, with the water level only drawn down by pumping when storms are expected.

Based on the results of further analysis, an alternative management proposal for Pond A being considered by the Port includes placing a sheet-pile wall (or cofferdam) around the pond to isolate it from the groundwater flow that is sustaining Wetland 37a. In this alternative, sheet piles would be installed to the top of the glacial till at an anticipated average depth of 15 feet below ground surface. The sheet piles would prevent groundwater from entering Pond A, and thus prevent drawdown of groundwater levels in the adjacent wetland.

The cofferdam would divert some local shallow groundwater flow, forcing diverted water around the ends of the cofferdam, and possibly lowering water levels in the wetland area downslope of the pond as a consequence. To mitigate this, a collector/distributor trench filled with gravel (a "French drain") will be built around the outside of the cofferdam. The French drain will collect shallow groundwater that would otherwise tend to mound on the upslope side of the cofferdam, and conduct it around to the downslope side of the cofferdam. The water in this gravel-filled trench will be available to maintain water levels in the shallow wetland soils, with no volume reduction or delay to the seepage, and no introduction of channelized surface-water flow in the wetland.

48. The Port has successfully completed and implemented complex temporary erosion and sedimentation control plans for its embankment projects. The Port's National Pollution Discharge Elimination System permit already requires the detail and performance recommended in the comment, which is not typically required by applicants reviewed under the King County and Ecology Stormwater Management manuals.

49. The surface water runoff from the mechanically stabilized earth wall will be conducted laterally in the wall terraces to catch basins. The catch basins are part of the storm drainage system that includes piping and energy dissipation before delivery to the various detention facilities.

50. The Port's design includes engineering input on the embankment failure at the Telluride Airport. The factors that contributed to the failure at Telluride include:

- Failure to recognize the potential dangers of constructing embankment fill slopes atop old debris slides and other indicators of geologic instability. The natural slopes at the Third Runway site are stable by comparison;
- The Telluride construction site was in extreme topography near the top of a mountain in the Rockies, with steep slopes subject to instability, and very different from the Puget Sound lowlands;
- Failure to include in the embankment design adequate drainage to prevent the buildup of pore pressure, which was blamed as the primary cause of failure at Telluride. The Third Runway project includes a substantial drainage blanket designed expressly to prevent such dangerous build-up of pore pressures;
- The Telluride embankment materials were composed of weak shales and residual soils, which are prone to swelling. In contrast, the glacial materials that will be used at the Third Runway site are inherently stronger and more geologically stable;
- The location of the Telluride fill above a fault helped exacerbate seepage problems and contributed to the embankment failure. Such conditions are <u>not</u> present at the Third Runway site;

The relevant lessons of the Telluride Airport embankment failure have been fully incorporated in the Third Runway embankment design.

51. The Port believes the use of 1998 stormwater runoff data for the Phase 1 embankment likely skews the results toward low infiltration rates, when the bulk of the fill is in fact expected to have infiltration rates in excess of at least 0.19 inch per hour. The skew is deliberate in that it over-emphasizes stormwater runoff from the embankment, and ensures that stormwater management infrastructure is conservatively designed. However, the Hydrologic Simulation Program-Fortran (HSPF) will not yield reliable results for expected rates of infiltration and groundwater recharge through thick unsaturated zones such as created by the embankment fill, because HSPF is primarily a surface flow analysis tool, not a groundwater flow model.

The fill infiltration modeling in the Pacific Groundwater Group report is more concerned with understanding impacts to aquifers, and uses higher infiltration rates than does HSPF. These higher rates are more consistent with the expected water transmission properties of the fill, and the surface of the fill under long-term conditions (grassed, with wormholes and other macro porosity that will encourage infiltration). The Pacific Groundwater Group results support comparable modeling work on embankment infiltration performed by the Port (see Appendix C, *Embankment Infiltration and Seepage Studies, Draft Geotechnical Engineering Analyses and Recommendations, Third Runway Embankment, pages C-1 through C-12*Hart Crowser, December 4, 2000). Similar rates of infiltration used by Hart Crowser are also conservative in addressing the likelihood for perched zones of saturation to occur within the fill.

The embankment design considers observed fill drainage characteristics as well as analysis of infiltration on fill stability, and incorporates appropriate measures such as using relatively high conductivity soils for the outer part of permanent embankment slopes.

52. The bench drainage channels have been designed to conduct 200 percent of the peak flow for the 100-year, 24-hour storm event. Cloudburst rainfall and horizontal rainfall fall well within these sizing criteria.

53. The potential impact of permanent stormwater detention ponds on the hydrology of downslope wetlands has been analyzed in the *Wetland Functional Assessment and Impact Analysis* report (see Section 4.3.2.12 pages 4-64 through 4-67; and Appendix I). Groundwater data for this area, in relation to the ground elevation, is shown in Appendix I and discussed in the *Wetland Functional Assessment and Impact Analysis* report. Because of the excavation, a small indirect impact to the uppermost section of Wetland 39 could occur where the pond is excavated below the elevation of the wetland. However, Pond D has been designed to infiltrate water into the soil and with an additional orifice to discharge treated stormwater to the wetland as a means of preventing such an indirect impact.

All pond designs and temporary and permanent erosion and sediment controls include a site-specific evaluation. A primary aspect of pond siting involves test borings and test pits in the proposed locations. Standard pond design methods are followed in each case. Design of each pond proceeds from the site-specific data so that the pond is designed to be above the observed water table levels at each site.

54. The areas described as Vacca Farm and the Miller Creek relocation sites are landscapes that have been heavily altered by decades of human impacts. The changes include watershed development with houses, roads, and commercial development; channelizing Miller Creek; excavations in the Miller Creek Detention Facility, and construction of the facility; Lora Lake excavation; farming and farm drainage; and land clearing in the floodplain. It is difficult to replicate a natural system that retains existing habitat (small stream habitat) when that habitat probably did not exist prior to human alterations and other factors influencing this habitat (watershed development) are present. However, the proposed Miller Creek relocation, considering many of the limitations of the project area, will replace the limited natural functions that this highly altered portion of Miller Creek provides, and restore many functions that have been lost by previous actions.

For example, the existing stream channel is actually located on the edge of the floodplain, several feet above the existing bottom of the "valley" through which the channel flows. If the channel were constructed in the bottom of the floodplain with the low profile and flat floodplain, it would lose definition and no longer function as a section of stream channel that is present now. It is therefore necessary to construct a channel with "built-up" walls to define the flow channel.

The 5.24 acre-feet of 100-year floodplain storage will mitigate the loss of 100-year floodplain storage as described in the *Natural Resource Mitigation Plan* (Table 4.1-2 page 4-7; Section 5.1.2 pages 5-26 through 5-43). The relative floodplain storage is matched at each depth of flooding depth, thereby mitigating impacts of small floods. The relocated channel has increased conveyance capacity when compared to the existing channel. The area through which Miller Creek will be relocated is a broad, shallow backwater area that stores flood flow even during less frequent events. The proposed channel will convey flows as indicated in the *Natural Resource Mitigation Plan* (Sections 5.1.1.2 and 5.1.1.6 pages 5-5 through 5-16), and spill over to the floodplain with flows in excess 40 cfs, which is less than the mean annual flow (See page 5-12 and Table 5.4-1). The relocated channel and the floodplain "swale" are connected at the south end of the new creek, which is the point that will control the water surface level in the floodplain. The area draining to this point includes drainage from Des Moines Memorial Drive, Lora Lake, and overflow from the new channel.

The channel will overflow with flows in excess of 40 cfs. The 100-year flood elevation in the vicinity of the relocated channel represents a large shallow backwater area that could be characterized as more of a "lake" than a conventional streamside floodplain. The floodplain will receive water from other sources as well as overflow from the creek channel. Natural levees that separate the main channel from the floodplains are frequently found in nature.

55. See response to #54 above.

56. The channel design is virtually unchanged from the previous *Natural Resource Mitigation Plan* (Section 5.1.1 in Parametrix, August 1999). Changes in text were primarily a result of questions and comments from reviewers that required clarification. The assertion that the channel will go dry by flowing through highly permeable stream material is incorrect. The gravel specifications include fine sands and silts to specifically avoid the problems that were asserted by the reviewer.

Channel hydraulics in the relocated reach of Miller Creek are influenced by high water table and downstream water surface elevations, in addition to the channel configuration, slope, and roughness. The existing channel has a similar channel cross-section that meets the flow depth criteria. The flow depths, as described in the *Natural Resource Mitigation Plan* (Section 5.1.1.6 page 5-12) are expected to be met. In the event that design standards are not met and the stream is not providing appropriate habitat, Table 5.1-7 (page 5-21) of the *Natural Resource Mitigation Plan* provides performance standards and contingency measures that can be implemented.

Norman Wildlife Consulting, February 16, 2001 letter

The responses in this section have been prepared from the Port's perspective and knowledge.

1. This comment is simply a summary of the more detailed comments contained in the commentor's letter. A response to each of those specific comments is provided below.

2. It is the Port's belief that much of the analysis and data presented in this letter is irrelevant to the Master Plan Update or its environmental impacts. In other cases, the data or arguments have already been considered in the *Final Environmental Impact Statement*, *Final Supplemental Environmental Impact Statement*, *Biological Assessment*, *Wetland Functional Assessment and Impact Analysis* report, or other analyses of the Master Plan Update improvements. Finally, the Port believes that the comments fail to acknowledge the benefits the off-site mitigation project in Auburn will have on listed species (bald eagle), and a wide variety of other avian, aquatic, and terrestrial wildlife.

3. The *Final Environmental Impact Statement*, *Final Supplemental Environmental Impact Statement* and supporting documents correctly identify the types of wildlife habitat that will be impacted near Sea-Tac Airport. Common wildlife species using these habitats are also identified. The Port believes the Master Plan Update projects will not affect any habitat types that are uncommon or scarce in Puget Sound lowlands, and the habitat areas that are altered have been moderately to heavily modified by historical and on-going human development and activities. As identified in the *Final Environmental Impact Statement*, *Final Supplemental Environmental Impact Statement*, and other reports, this degradation substantially reduces the value of the habitat to a wide variety of wildlife. Based on the habitat alterations and wildlife relationships discussed in the *Final Environmental Impact Statement* and *Final Supplemental Environmental Impact Statement*, no significant impacts to wildlife populations and quality upland habitat will occur.

Substantial mitigation will be provided in connection with the Master Plan Update improvements that will benefit both migratory and non-migratory birds. This mitigation is consistent with approaches suggested by the Partners in Flight management plan.

The mitigation establishes significant habitat areas that will be restored and protected from future human disturbance. While the primary goal of these areas is to protect streams and wetlands, they will also benefit and provide habitat for migratory birds. The on-site mitigation will be managed for potential wildlife hazards consistent with the *Wildlife Hazard Management Plan* (Chapter 10) and restrictive covenants identified in the *Natural Resource Mitigation Plan* (Appendix F). In addition to on-site mitigation, the project provides significant off-site mitigation for the benefit of terrestrial wildlife, primarily avian species. This habitat will benefit a wide variety of terrestrial and aquatic wildlife by restoring abandoned farmland to native wetland and upland plant communities.

4. The *Biological Assessment* provides accurate and adequate information on which the Endangered Species Act analysis is based. For both bald eagles and marbled murrelets, the *Biological Assessment* (see Section 6) considered the fact that the listed species are in the action area. The analysis evaluated potential effects from habitat alterations, disturbances from construction, and potential strikes with aircraft.

Mitigation to protect forage habitat of listed species that forage in Puget Sound and the estuaries of Miller and Des Moines Creeks is substantial, and includes extensive stormwater management to prevent water quality degradation and hydrologic impacts (see Section 8 of the *Biological Assessment*).

5. The boundaries of the Angle Lake bald eagle nesting territory, as identified by the Washington Department of Fish and Wildlife, can be used to identify the main use areas of the Angle Lake bald eagle. This includes Angle Lake and portions of the Green River Valley to the east.

The *Biological Assessment* (see Section 6.1.1.1 and page K-A-2 in Appendix B) acknowledges that Angle Lake bald eagles will likely move across Sea-Tac Airport. These movements are presumed to occur during both breeding and non-breeding seasons. Eagles are unlikely to spend significant periods of time foraging in habitats affected by construction at Sea-Tac Airport, because these habitats would not support preferred prey and are subject to considerable human use.

6. The inactive eagle nest near Angle Lake has been fully considered in the *Biological Assessment* (see Section 6.1.1.1 and Appendix B). The Washington Department of Fish and Wildlife locates and monitors bald eagle nests annually, and information on nesting eagles from 1995 through 1999 was collected by the Department.

For protection of the species, the law requires that the Port not accurately display the nest location of threatened and endangered species in public documents.

The distance of the Angle Lake nesting territory from the project site is 1,000 ft. at its closest point. The distance of the Angle Lake nest (which has been inactive from 1995 through 1999) to the project site is approximately 1 mile, at its closest point, and 3 miles at its farthest point. The Master Plan Update projects are thus beyond bald eagle management areas required near active nest sites.

The suggestion that "large area for foraging at the open upland and associated wetlands south and west of the runways" are available to eagles is incorrect. The open area referred to is the Tyee Valley Golf Course, which receives high levels of human use during daylight hours year-round. For this reason, the area is not suitable foraging habitat. Further:

(1) The nesting territory identified by the Washington Department of Fish and Wildlife (which the agency defines as the area used by a given eagle pair for conducting their regular activities – i.e., nesting, foraging and perching) does not include Sea-Tac Airport property, including the golf course. Due to their small size, the open water wetlands at Sea-Tac Airport (i.e. Wetland 28 and Lake Reba) provide marginal bald eagle foraging habitat, and will not be altered by the Master Plan Update projects. Eagle foraging habitat is present at Angle Lake and Puget Sound, and these areas will not be altered by the Master Plan Update projects.

(2) Open uplands do not provide significant bald eagle foraging habitat for eagles within Puget Sound. Eagles in the Puget Sound forage primarily on waterfowl and fish (Knight et al. 1990 report over 96 percent of an eagles' diet was fish and birds, primarily water birds; Watson and Pierce 1998 report that about 97 percent of observed eagle foraging attempts were for fish or water birds), and consequently, the "open upland" does not provide significant foraging habitat for bald eagles.

The proposed Master Plan Update projects will not result in removal of high quality bald eagle nesting and foraging habitat, since eagles nest and forage adjacent to open water bodies, which are not affected by those improvements. The projects will thus not affect the potential for increases in eagle populations near Sea-Tac Airport. The off-site mitigation project in Auburn will provide forage and nesting habitat for over wintering and breeding eagles.

7. The Angle Lake nest is located approximately one mile from the nearest Master Plan Update project site. This nest is beyond the bald eagle management zone of 0.50 miles of nests within the line of sight disturbance and 0.25 miles when the nest is not within the line of sight (*Bald Eagle Recovery Plan*

FWS 1986). Consequently, disturbance to eagle nests would not occur from project activities. For eagles foraging at the Angle Lake, nesting territory would be over 1,000 ft from the project construction activities located outside the territory. At this distance, construction noises are not expected to affect the foraging eagles, which are already adapted to traffic noises from Highway 99, Interstate 5, and other streets close to Angle Lake, human activity on the Lake, and at the King County Park.

Since the project will not alter any habitat within the nesting territory or habitat near the territory likely to provide significant forage to eagles, there is not a reasonable expectation that eagles would alter their forage area. The mitigation at Auburn mitigation could provide additional forage for eagles.

As discussed in the *Final Environmental Impact Statement* and *Final Supplemental Environmental Impact Statement* for the project, the primary purpose of the Third Runway is to reduce delay during poor weather and not to increase the overall operations capacity of Sea-Tac Airport. However, regardless of whether the Third Runway is built, air traffic at Sea-Tac Airport will increase. Notwithstanding this fact, the project will not contribute to increased probability of eagle-aircraft strikes because it will not increase the baseline operations that occur with or without the runway, and thus will not increase any potential effects to eagles. Given this fact, the Endangered Species Act determination of "may affect, unlikely to adversely affect" is appropriate. Since studies have failed to observe behavioral responses from eagles to nearby commercial aircraft, a biological endpoint (i.e. significant reductions in survival or reproductive success) that could be measured is considered to be unreasonable.

The Port believes that the contention in the comment that eagle prey is shifting to upland and scavenged species is unsupported by the cited literature. The citation of Knight et al. (1990) provides no information to justify statements that eagle prey is shifting to upland and scavenged species. The cited data presents no trend analysis that shows eagle diets over time and provides no comparison of urban to non-urban environments. Further, for birds in Puget Sound, the data indicated only one incident of scavenging, and four of predation on mammals. For Puget Sound eagles, nearly all birds were found to be water birds, with only four terrestrial birds taken as prey. Norman et al. (1989) provides no evidence to support statements that eagle prey is shifting to upland or scavenged species. The fact that eagles prey on heron colonies has no significance, since there are no heron colonies that will be affected by the Master Plan Update projects. The Port cannot respond regarding the unpublished data cited in the letter, since these data have not been made available for review by the Port.

8. In the Puget Sound region, eagles migrate along rivers and along shorelines (Watson and Pierce 1998). Because the affected areas occur more than 1.5 miles from shorelines and rivers and because the project will not increase baseline aircraft conditions over these areas, the Master Plan Update projects will not affect eagle migration corridors.

The *Biological Assessment* (see Section 6.1.1.2) considers that over wintering eagles may use the Green River and its riparian habitat. The *Biological Assessment* proposes conservation measures (to limit construction at this site to between May 31 to October 31) to avoid over wintering period.

As noted above, the primary purpose of the Master Plan Update projects is to reduce poor weather delay. Accordingly, the Port believes the probability of a bald eagle-airplane strike will not increase as a result of Master Plan Update projects.

Off-site wetland mitigation is proposed to reduce the potential for bird-aircraft strikes, to meet Federal Aviation Administration safety requirements, and to comply with the requirements of the Federal Aviation Administration's Record Of Decision for the project. Off-site mitigation will assure that areas developed for wetland and habitat mitigation will not create aviation hazards or be subject to habitat

management requirements necessary to eliminate aviation hazards. This approach not only improves aviation safety, but also improves the safety of raptors and other wildlife in the vicinity of the airport.

The *Biological Assessment* assumes that there is a potential for collisions between bald eagles and aircraft. Because eagles occur in low numbers (compared to other raptors, waterfowl, and flocking birds), the probability that an eagle will be struck by aircraft is considered very unlikely.

9. As noted above, the primary purpose of the Master Plan Update projects is to reduce bad weather delay and consequently, it is the Port's belief that the chance of a bald eagle-airplane strike will not increase as a result of Master Plan Update projects. Accordingly, the Endangered Species Act determination of "may affect, unlikely to adversely affect" is appropriate.

10. Even if currents were present, eagles would not be expected to use them to forage over Sea-Tac Airport because the airport operation area does not provide significant forage habitat for eagles. As shown by Knight et. al (1990), only a small percentage of eagle diets consist of terrestrial birds or mammals that would be expected to occur on the airport operation area.

11. The *Biological Assessment* states that it is currently unknown whether marbled murrelet flight routes cross aircraft/departure zones at Sea-Tac Airport (see Section 6.2.1). However, it is known that no aircraft strikes for these birds have been recorded between 1979 and 1997. Combined with the observation that breeding marbled murrelet pairs have not been observed in the marine waters near the Airport since 1990, the *Biological Assessment* determined that the potential for marbled murrelet strike is extremely remote at best (see Section 6.2.1). As noted above for bald eagles, the purpose of the Master Plan Update projects is not to increase aircraft operations, and consequently, the chance of a marbled murrelet-airplane strike will not increase as a result of Master Plan Update projects. Regardless of the flight paths of murrelets relative to Sea-Tac Airport approach and departure zones, the proposed action will not result in an increased risk of an aircraft strike. The *Biological Assessment*'s determination of "may affect, unlikely to adversely affect" is thus appropriate.

The *Biological Assessment* has considered that marbled murrelets use areas of Puget Sound near Sea-Tac Airport and has considered this use in the effects determination. The *Biological Assessment* considered potential strike impacts (see Section 6.2.1) and the potential impacts to their forage habitat and their prey base that occurs in estuarine and nearshore areas at Miller and Des Moines Creek (see Sections 6.2.1, 7, and 9.4). Because of water quality and hydrologic mitigation provided and explained in the *Biological Assessment*, baseline conditions in these habitats would not be altered and the *Biological Assessment*'s determination of "may affect, unlikely to adversely affect" is appropriate.

12. The *Biological Assessment* identified marbled murrelets using marine shorelines near Vashon Island, Commencement Bay, and other areas (see Section 6.2). Accordingly, it is the Port's belief that additional surveys or further documentation would not provide significant new information that would change the Endangered Species Act determinations for the project.

13. Regardless of the number and timing of foraging murrelets in marine waters near the project, the *Biological Assessment* demonstrates that this forage habitat or the prey base of murrelets will not be altered (see Sections 6.2.1, 7, and 9.4). Thus, murrelets that forage in coastal areas near the project site will not be affected. Since construction areas related to the Master Plan Update projects are nearly 1.5 miles from foraging areas, disturbance from construction activities will have no effect on these birds. The *Biological Assessment*'s determination of "may affect, not likely to adversely affect" is therefore appropriate.

14. As stated above, the presence of foraging murrelets during summer in marine waters near the project site was considered and addressed in the *Biological Assessment* (see Section 6.2). Murrelets that forage in coastal areas near the project site will not be affected, as the site is nearly 1.5 miles from foraging areas, and hence disturbance from construction activities will have no effect on these birds.

15. Although not directly known, the *Biological Assessment* presumed that marbled murrelets could fly across Sea-Tac Airport and be subjected to potential aircraft strikes, and recognized the occurrence of critical habitat about 35 miles east of Sea-Tac Airport (see Section 6.2.1).

The *Biological Assessment* presents significant conservation measures that would protect estuary and nearshore water quality (see Section 8). These would thus protect potential marbled murrelet forage habitat and forage species.

16. The analysis of potential aircraft-murrelet strikes is probability based. While necessarily subjective, it considers that uncommon or rare species that do not occupy habitat at Sea-Tac Airport (such as murrelets) are less likely to be struck than other species. Common species (geese, ducks, starlings, hawks, etc.) that frequently occupy habitat on or near Sea-Tac Airport are more likely to be struck (see Table 6.2 in Section 6.2.1). Even though the probability that any single bird will be struck by an aircraft near Sea-Tac Airport is very low, the fact that birds are struck creates aviation hazards that the Port and the Federal Aviation Administration are mandated to control.

The Port does not survey areas beyond the airport operations area for bird strikes. The Port records bird strikes and evaluates strike hazards in a systematic manner that meets Federal Aviation Administration requirements. Runways are systematically searched three times daily for bird remains (the Federal Aviation Administration requires one search daily). Staff from the U.S. Department of Agriculture's Wildlife Services Division spends about 20 hours per week on the airfield managing wildlife hazards and evaluating wildlife use, response to management actions, etc. Wildlife remains are labeled and retained for positive identification by the Port wildlife biologist (if necessary, they are sent to the Smithsonian Institution for identification). The daily observations and control actions are recorded on reporting forms. Bird strikes are recorded on wildlife incident reports and filed on Federal Aviation Administration Form 5200-7 (and are summarized in Table 6.2 in Section 6.2.1 of the *Biological Assessment*).

For various reasons, the numbers and types of birds struck by aircraft at Sea-Tac Airport or any other airport cannot be accurately determined.

17. No wetland, stream, and upland habitats closer than 1.5 miles from Puget Sound will be altered by the Master Plan Update projects. Accordingly, the project will not result in the loss of any shoreline habitat (upland or otherwise).

18. As stated above, the project will not destroy shoreline upland habitat. The project sites are over 1.5 miles from shoreline habitat.

Consistent with statements made in the comment, the tendency for many migratory (and resident) birds to disperse widely and use urban habitat for breeding and migration demonstrates that migration corridors will not be eliminated and that large amounts of marginal urban habitat suitable for use by migrating birds will remain following Master Plan Update project development. Since urban habitats similar to those being eliminated are common in Puget Sound and the Sea-Tac Airport vicinity, significant impacts on the regional populations of birds are unlikely.

The *Final Environmental Impact Statement*, *Final Supplemental Environmental Impact Statement* and other documents evaluate habitat areas altered by Master Plan Update projects and correctly report these

areas as marginal habitat. Consequently, the proposed action will not have a significant effect on the population of these bird species in the region.

19. The impacted 700 acres does not provide high quality wildlife habitat. Approximately 300 of the roughly 700 acres are managed grasslands associated with the airport operations area and a golf course, with low habitat value. Approximately 80 acres are low quality shrub habitat typically consisting of non-native Himalayan blackberry that provides limited habitat value to a small number of bird species. The remaining areas of impact (early successional deciduous and coniferous forest) typically occur in former residential neighborhoods. In these areas, development has eliminated native understory shrub and herbaceous vegetation, snags, downed logs, or other habitat features that reduces their suitability to wildlife. The forest understory is typically colonized by non-native plants (both the shrub and herbaceous layers) and is fragmented by streets or more highly developed areas that further reduce their habitat suitability.

20. The Port believes the upland and wetland habitat that will be altered by Master Plan Update projects does not provide replacement habitat for the loss of estuarine habitat lost at Elliott Bay and Commencement Bay. Nearly all bird species present in the estuarine habitats of Commencement Bay or Elliot Bay are unable to use the upland or palustrine wetland habitat types that would be altered by Master Plan Update projects at Sea-Tac Airport. The Sea-Tac Airport habitats do not provide the nesting, foraging, and resting conditions required by these species that are adapted to marine or estuarine habitats.

21. Within the project area, the Miller Creek and Des Moines creek corridors provide relatively low quality wildlife habitat as they generally lack undisturbed buffers that are dominated by native vegetation and substantial human disturbance. The project will involve an overall improvement in the riparian habitat along these creeks, due to the enhancement of approximately 50 acres of riparian habitat in this area. The Master Plan Update projects will not alter or degrade any estuarine or nearshore habitat.

The comment letter lists over 50 species (Table 3) from marine, estuarine, open water wetlands and other habitat types. Many of those species rely on habitat that is very different from that affected by the Master Plan Update projects. Of the remaining species, habitat quality limits use of the project area, and approximately 20 percent of these remaining species are unlikely to regularly use the project area for nesting. These species likely use the project area only briefly during migration.

The *Final Environmental Impact Statement* data and text descriptions identify 56 bird species as occurring in the affected project area, not 42 species. The additional 14 species identified in the *Final Environmental Impact Statement* and that are excluded from Table 3 in the comment are: green heron, American wigeon, Barrow's goldeneye, northern harrier, American coot, long-billed dowitcher, glaucous-winged gull, olive-sided flycatcher, barn swallow, Swainson's thrush, orange-crowned warbler, yellow warbler, American goldfinch, and American crow.

The Port has provided detailed responses below regarding the 17 species of concern that the comment states will be impacted by the loss of upland habitat:

Band-tailed pigeon: Although the band-tailed pigeon is in decline, the main threat to the species appears to be habitat loss and direct human-caused mortality in Central America (Audubon 2001). In urban parks and gardens in western Washington, the species is actually becoming more common (Audubon 2001). Consequently, loss of habitat due to the proposed action is not expected to significantly affect the species.

Belted kingfisher: Belted kingfishers use wetland habitats with open water components. Wetlands that will be impacted by the Master Plan Update improvements do not provide suitable kingfisher habitat.

Pileated woodpecker: As stated in Appendix M of the *Final Environmental Impact Statement*, pileated woodpeckers have been observed in the approximately 187-acre deciduous forest in the central portion of the South Borrow Area. Under the proposed action, some of this forested area would be removed. Loss of this acreage will not have a significant effect on pileated woodpeckers regionally, as large tracts of their preferred habitat, mature coniferous forests, will be unaffected.

Barn swallow, tree swallow, cliff swallow, willow flycatcher, black-capped chickadee, bushtit, orange-crowned warbler, song sparrow, white-crowned sparrow, black-headed grosbeak, Wilson's warbler, American goldfinch: These species are all common in suburban environments. Abundant habitat outside of the project area will remain for these species following construction of Master Plan Update projects, because the birds are widely distributed in urban and non-urban areas throughout Puget Sound.

Swainson's thrush: This species occurs in coniferous and mixed forests with dense undergrowth. The majority of the acreage impacted by the proposed action does not contain adequate cover to provide habitat for the species. Habitat in the project area that will be impacted contains marginal nesting habitat for species, and these areas are most likely used for foraging habitat during migration. Remaining habitat in nearby areas outside of the project area will provide foraging habitat. Suitable Swainson's thrush nesting habitat in the low-elevation coniferous forests of western Washington will be unaffected.

Hutton's vireo: This species is a resident of mixed forests with evergreens and oaks, with moderate to dense canopy cover (Davis 1995). Most of the habitat impacted by the Master Plan Update projects does not contain adequate canopy cover to provide habitat for the species. Because only a small amount of marginal Hutton's vireo habitat will be impacted by the proposed action, the project will not have a significant affect on the species.

Concerning the comment that eight additional species of concern occur at Sea-Tac Airport:

Sharp-shinned hawk and Cooper's hawk: Loss of forest represents loss of habitat for these species. However, forest types impacted under the proposed action (i.e., young, deciduous forest) are relatively common in the Puget Sound region and adequate habitat outside the project area will remain for these species.

Northern harrier, American kestrel and western meadowlark: Harriers, kestrels, and meadowlarks prefer open habitats. Approximately two-thirds of the existing unmanaged grassland habitat will remain upon completion of the proposed action. Although some existing managed grassland will be impacted, the total acreage of managed grasslands will increase overall (due to creation of new managed grassland areas).

Common nighthawk: This species nests in open areas and forages in a wide variety of habitats (Csuti et. Al. 1997). By increasing the amount of open habitat, the project will increase the amount of nighthawk nesting habitat. Some loss of foraging habitat will occur where areas are paved and similarly developed. However, given the wide variety of foraging habitat that this species will use, foraging habitat is not expected to be a limiting factor for this species, and other habitat in surrounding areas will remain as foraging areas.

Vaux's swift: This species uses a wide variety of habitats where suitable cavities (i.e., dead trees, chimneys) are available (Smith et al. 1997). Removal of trees and abandoned houses (with chimneys) will reduce available cavities for this species, although remaining trees within and near the project site will continue to provide cavities for the species.

Streaked horned lark: This species has been extirpated from most of the Puget Trough, and no breeding records for the species are present in the project vicinity (Smith et al. 1997). Use of the project area is likely limited to occasional fly-overs and stop-overs during migration.

22. It is the Port's belief that the analysis of habitat impacts to birds provided by the *Final Environmental Impact Statement, Final Supplemental Environmental Impact Statement* and supporting documents meets National Environmental Policy Act (NEPA) and State Environmental Policy Act (SEPA) requirements. Consistent with NEPA and SEPA, all significant impacts to habitat have been analyzed and mitigated where necessary and in a manner consistent with applicable law and Federal Aviation Administration Advisory Circular 150/5200-33.

23. The bird-aircraft strike record at Sea-Tac Airport demonstrates that wildlife hazards exist at Sea-Tac Airport (see Table 6.2 in Section 6.2.1). The Port, Federal Aviation Administration, and U.S. Department of Agriculture's Wildlife Services Division have recognized wildlife hazards at Sea-Tac Airport since at least 1977. Since the 1980's, the Port has staffed a full time wildlife biologist at the airport to assist in reducing and managing wildlife hazards.

The Port routinely scares or removes wildlife from the airport operations area, and manages habitat to reduce its potential to attract wildlife. In recognition of wildlife hazards at Sea-Tac Airport, and consistent with Federal Aviation Administration Advisory Circular 150/5200-33, the Port will construct wetland mitigation for habitat functions more than 10,000 feet from all runways at Sea-Tac Airport. The Federal Aviation Administration has approved on-site mitigation involving wetland restoration where this action reduces wildlife hazards (primarily converting areas used by waterfowl and other flocking birds to shrub dominated areas that do not provide water fowl habitat). Because the Port must maintain the ability to manage wildlife hazards in these mitigation areas, they are subjected to habitat management actions as identified in the *Wildlife Hazard Management Plan*. Habitat mitigation for the Master Plan Update projects has required off-site habitat that will not be managed to reduce its habitat value for certain wildlife species.

24. The Port's *Wildlife Hazard Management Plan* and wildlife management program meet Federal Aviation Administration requirements. An ecological study of wildlife habitat near Sea-Tac Airport was initiated in 2000. The *Wildlife Hazard Management Plan* will be updated to reflect the findings of that survey.

25. It is the Port's belief that there is no need or requirement to differentiate these data. Bird strike reporting at Sea-Tac Airport follows Federal Aviation Administration guidelines, which considers dead birds found on runways to be "strikes."

The Port must manage wildlife hazards near Sea-Tac Airport regardless of whether the wildlife originates from habitat on-site or from other locations. However, since habitats close to the airport are more likely to result in wildlife hazards than more distant habitat areas, creating habitat areas within 10,000 feet of runways that cannot be managed to control hazards (because of protection as a mitigation site) is unacceptable to Federal Aviation Administration, the Port, and public safety.

26. The Federal Aviation Administration issued a Record of Decision for the Master Plan Update improvements that considered all comments received by the public and government agencies. The Federal Aviation Administration, as the federal agency responsible for aviation safety, identified in the Record of Decision the need for off-site wetland mitigation.

Creating new wetlands on-site as habitat mitigation would create aviation hazards. On-site wetland mitigation would be required to exceed the area of wetland impacts. The *Natural Resource Mitigation*

Plan proposes mitigation that exceeds a 3:1 replacement ratio, and thus would create new habitat in excess of baseline requirements. New mitigation would be required to be of higher habitat value than areas of habitat impacted and thus would support greater quantities of wildlife. In addition, new mitigation would be subject to protection by permitting agencies, so the ability to manage habitat and wildlife in the interest of aviation safety would be reduced.

27. Any wildlife-aircraft strike represents a significant risk to aircraft safety, and sufficient strikes occur at Sea-Tac Airport for wildlife management actions to be implemented. Sea-Tac Airport records bird strikes and evaluates strike hazards in a systematic manner that meets Federal Aviation Administration requirements (see the summary in Table 6.2 in Section 6.2.1 of the *Biological Assessment*). Runways are systematically searched three times daily for bird remains (the Federal Aviation Administration requires one search daily). Staff from the U.S. Department of Agriculture's Wildlife Services Division spends about 20 hours per week on the airfield managing wildlife hazards and evaluating wildlife use, response to management actions, etc. Wildlife remains are labeled and retained for positive identification by the Port wildlife biologist (if necessary, they are sent to the Smithsonian Institution for identification). The daily observations and control actions are recorded on reporting forms. Bird strikes are recorded on wildlife incident reports and filed on Federal Aviation Administration Form 5200-7.

The procedures for assessing wildlife hazards and for implementing management of wildlife hazards are identified in the *Wildlife Hazard Management Plan*. The *Wildlife Hazard Management Plan* has been reviewed by Federal Aviation Administration and approved as part of the FAA's certification of Sea-Tac Airport.

28. Because of the location of Sea-Tac Airport on a plateau east of Puget Sound, local and airfield topography may result in uplifting air currents that enhance soaring of some birds. If prey is available on the airport operations area, birds could use these uplifts and forage over the airport operations area for extended periods. As is currently the case, management of prey species on the airport operations area and other wildlife management actions are implemented to minimize soaring and foraging birds near the airport operations area, regardless of whether they are using uplifts or not.

29. The restoration and revegetation of stream buffers and riparian wetlands would increase input of organic matter to Miller and Des Moines creeks. No reductions in organic matter in the downstream estuaries would occur.

30. As stated, runoff conditions from the project site would be controlled, and stormwater management systems and other mitigation would prevent increases in peak flows and reductions in low flow. Constructing new stormwater management facilities to treat developed areas that currently lack them would further improve the hydrology of the creeks.

Coupled with improved riparian conditions that would increase organic matter inputs to the creek, hydrologic changes are unlikely to significantly reduce the delivery of organic matter to the estuaries. Therefore, the estuarine food webs will not be altered as a result of the project.

Greater production and export of organic matter to the creeks is expected because of converting farm and golf course areas (where plant production is currently removed from riparian areas and floodplains) to highly productive shrub vegetation types. Further enhancement will occur when vegetation density is increased in riparian buffers that are currently lawn.

Rachel Paschal Osborn, February 15, 2001 letter

The responses in this section have been prepared from the Port's perspective and knowledge.

1. In response to the assertion that the Port's construction of the Master Plan Update improvements will reduce late summer flows in Miller, Des Moines and Walker Creeks, please see General Response GLR7, Instream Flow Mitigation.

The *Sea-Tac Runway Fill Hydrologic Studies Report* (Pacific Groundwater Group, June 19, 2000) and the *Low Streamflow Analysis* provide a comprehensive analysis of the hydrologic effects of the proposed Third Runway fill embankment, proposed stormwater detention ponds and vaults, and changes in water usage within the buy-out area of the basins. The *Low Streamflow Analysis* (see Tables 11, 12, and 13) concludes that there will be no net effect on the low flows of the Des Moines, Miller and Walker Creeks given the changes in runoff conditions, delayed discharge of water percolating through the runway embankment fill, changes in water uses within the buy-out areas, and managed release of stormwater from reserved storage facilities. The analysis of no net streamflow impacts does not include any mitigation water sources for Des Moines, Miller or Walker Creeks, only changes in runoff conditions and stormwater management. The *Comprehensive Stormwater Management Plan* and *Low Streamflow Analysis* (see Tables 11, 12, and 13) demonstrate that detention ponds and vaults and metered discharge will mitigate the effects of the Master Plan Update improvements on low flows of the three creeks without the use of additional sources of mitigation water.

2. General Response GLR7 concerning Instream Flow Mitigation addresses the comment's assertion that there has been no analysis or credible mitigation response, as well as the fact that detention and controlled release of stormwater to mitigate low flows will not require a new water right.

3. The comment's assertion that the Port has employed only "speculative plans and concept-only designs" does not comport with the record.

As set forth in detail in General Response GLR7, the Port believes that it has provided detailed technical evaluation of streamflow impacts, see *Sea-Tac Runway Fill Hydrologic Studies Report* (Pacific Groundwater Group, June 19, 2000). This report was prepared for the Department of Ecology in order to assess the hydrologic effects of constructing the proposed Third Runway fill embankment, and evaluated the hydrologic analyses completed up to that time. Based on the information available at the time of the report, it was concluded that the delayed fill discharge presented a significant beneficial factor in supporting summer low flows and that the net effect of discontinued local withdrawals and importation of water in the Miller Creek basin were approximately zero. Preparation of this study was overseen by the Department of Ecology, and the results were reviewed by and presented publicly with Ecology staff.

Hart Crowser later prepared an independent analysis for the Port of the behavior of precipitation infiltration through the proposed embankment fill (Hart Crowser, October 13, 2000). This analysis utilized model methods and parameters that differed in some respects from the Pacific Groundwater Group study. The Hart Crowser results supported the findings of the Pacific Groundwater Group report, specifically that there would be a delayed discharge of infiltrated water and that this would provide increased discharge from the fill area during low flow periods in Miller Creek.

The *Low Streamflow Analysis* report (Earth Tech, December 2000) provided a more comprehensive evaluation of potential low streamflow effects in the three stream systems. The analysis considered the net effects on low streamflows from (1) changes in storm runoff characteristics; (2) delayed discharge of infiltrated water percolating through the fill embankment; (3) changes in non-hydrologic water uses

within the buy-out area in the watersheds; and (4) managed release of stormwater from reserved storage facilities.

The EarthTech analysis utilized the results of updated Hydrologic Simulation Program-Fortran (HSPF) model simulations from the *Comprehensive Stormwater Management Plan* that were reviewed by King County staff working on behalf of the Department of Ecology. The estimates of historic local water withdrawals were revised downward from earlier estimates based on consultations with former property owners. The estimates of runoff volume which would percolate into the fill through biofiltration strips accounted for the reduced infiltration capacity expected to result from direct precipitation on the filter strips; the infiltration capacity of biofiltration swales atop the runway fill were conservatively neglected in the analysis. The analysis concluded that low flows could be maintained to, or improved above, pre-project conditions in all three streams with the implementation of the stormwater infrastructure proposed in the *Comprehensive Stormwater Management Plan*.

- The Miller Creek analysis accounts for changes in stormwater flows, the effects of stormwater management facilities, cessation of water withdrawals under local water rights (it reflects a refined estimate of historic water usage based on verification with property owners, as updated in Appendix G of the *Comprehensive Stormwater Management Plan*), cessation of irrigation and septic system discharges of imported water, delayed discharge of direct precipitation and pavement runoff through the proposed embankment fill, and the use of reserved stormwater releases.

- The Walker Creek analysis accounts for changes in stormwater flows, the effects of stormwater management facilities, and delayed discharge of direct precipitation and pavement runoff through the proposed embankment fill.

- The Des Moines Creek analysis accounts for the effects of stormwater management facilities and the use of reserved stormwater releases, and it does not rely on the use of the Tyee Golf Course well to maintain low flows.

4. The commentor contends that the Port has failed to offer a valid water right or credible source of water for mitigation and that this prevents Ecology from having reasonable assurance of the validity and efficacy of the Port's instream flow mitigation plans. However, as is elaborated in detail in the General Response GLR7, Instream Flow Mitigation, and as described above, based on the *Comprehensive Stormwater Management Plan*, the Des Moines Creek Augmentation Plan is no longer necessary to mitigate the impacts of the proposed Airport improvements. Despite this fact, the Port continues to cooperate with the Des Moines Creek Basin Planning Committee to implement its recommendation that a well and pump system be constructed near South 200th Street to augment stream flow impacted by existing development in the basin. The flow augmentation would improve the existing water quality conditions in the stream during late summer when low stream flow contributes to elevated temperatures and low dissolved oxygen levels. The commentor is correct, however, that this effort will only be possible if Ecology approves the Port's application for change of water right certificate 2369 to include stream flow mitigation. As part of Ecology's investigation and findings on that change application, it will make a tentative determination regarding the validity of the Port's water right for Well No. 1, which would answer the questions raised in comment letters about the validity of the Well No. 1 water right and its suitability for use for stream flow mitigation.

The delayed timing of this investigation and findings by Ecology led the Port to develop the *Comprehensive Stormwater Management Plan* as its primary means of mitigating low flow and water quality impacts to the three creeks. Now that the *Comprehensive Stormwater Management Plan* has been developed, Ecology's future determination regarding the validity of the Well No. 1 water right is not essential to a finding under Clean Water Act §401 of reasonable assurance of compliance with water

quality standards for Master Plan Update improvements and mitigation, because the Port is basing such compliance on the *Comprehensive Stormwater Management Plan*, not the *Des Moines Creek Augmentation Plan*.

5. The comment contains an extended discussion of state water quality standards as they apply to Miller, Des Moines and Walker Creeks, as well as the case law supporting the use of conditions by Ecology on §401 certifications. The Port acknowledges the efficacy of the state's water quality standards, as well as Ecology's ability to enforce those standards and to employ conditions in its §401 certification to assure that state water quality standards are met. The Port intends to comply with all applicable legal requirements.

6. The commentor's assertion that the Port does not have a "credible water source" for its augmentation plans assumes that a new water right is necessary when that is not the case. There is no need for the Port to obtain a new water right for detention of stormwater to mitigate the impacts of the construction of the Master Plan Update improvements. In addition, the *Comprehensive Stormwater Management Plan* and *Low Streamflow Analysis* demonstrate that an Ecology decision on the Port's water right change application for the Tyee Golf Course well (Certificate 2369) is not necessary for the Port's instream flow mitigation plan to be successful.

7. For responses to the comments of Dr. Peter Willing, Water Resources Consulting; Bill Roseboom and Dr. Malcom Leytham, Northwest Hydraulics Consultants; Dr. John Strand of Columbia Biological Assessments; and Dr. Tracy Hillman, BioAnalysts; please see the individual responses to each of those comment letters.

8. For a response on the asserted technical deficiencies of the Port's Instream Flow Mitigation Plan, please see response to comment #3 above, as well as General Response GLR7, Instream Flow Mitigation.

9. For a response to the commentor's assertion that the Port has not selected a means for mitigating low summer flows in Des Moines, Walker and Miller Creeks, please see response to comment #3 above, as well as General Response GLR7, Instream Flow Mitigation.

10. The Port believes the commentor's repeated assertion that the Port's *Low Streamflow Analysis* report indicates that the Miller Creek water rights retirement will result in a net decrease in streamflow does not comport with the actual results of that analysis, nor with the *Comprehensive Stormwater Management Plan*, and other subsequent technical analyses of the Port's instream flow mitigation plans. See response to comment #3 above, as well as General Response GLR7, Instream Flow Mitigation.

11. For a response to the assertion of water rights issues associated with the Tyee Golf Course well, please see response to comment #4 above.

12. See response to comment #10 above.

13. The comment asserts that the Port has not identified whether the release of stormwater for instream flow mitigation will be "managed/active" or passive infiltration. The *Comprehensive Stormwater Management Plan* and *Low Streamflow Analysis* outline how the use of detention ponds and vaults and metered discharge will mitigate the effects of the Master Plan Update improvements on low flows of Miller, Walker and Des Moines Creeks without the use of additional sources of mitigation water. Also, see response to comment #3 above.

14. The Port believes that the commentor's assertion that a water right is required for stormwater detention for the sole purpose of mitigating the impacts from the construction of Master Plan Update

improvements is at odds with the applicable statutory and case law, as well as the applicable regulations. See also General Response GLR7. See also response to comments 4 and 6 above.

15. The commentor has asserted that the impacts from the retirement of Miller Creek water rights will be insufficient to mitigate base flows on that creek and claims in the Miller Creek basin would result in a net decrease to base flows. In fact, this impact is accounted for in the *Comprehensive Stormwater Management Plan* and the design of stormwater detention facilities to mitigate low flow impacts. The initial estimates of water rights and historic water withdrawals were revised in the December 2000 *Comprehensive Stormwater Management Plan* (Appendix G) following contacts with former property owners in the buy-out area. The *Low Streamflow Analysis* report concluded that the lowered estimate of water withdrawals in the basin would result in an estimated reduction in Miller Creek streamflow of 25,000 gallons per day (0.04 cfs). *Low Streamflow Analysis* at 10. This 0.04 cfs impact is the net effect of both reduced water withdrawals and reduced importation of water from septic system and irrigation recharge. See Table 8, *Low Streamflow Analysis*, at 9. This net effect of 0.04 cfs is included in the *Comprehensive Stormwater Management Plan* Table 6-3.a, *Summary of Miller Creek Streamflow Effects*, as "Non-Hydrologic Changes." Contrary to the suggestions of this comment, the Port's low streamflow mitigation plan for Miller Creek accounts for lower estimates of water withdrawals prior to the Port's buy-out of properties in the Miller Creek basin.

16. For a response on comments regarding active versus passive release of stormwater for mitigation purposes, please see response to comment #12 above, as well as General Response GLR7, Instream Flow Mitigation.

Sheldon & Associates, February 15, 2001 letter

The responses in this section have been prepared from the Port's perspective and knowledge.

The Corps has reviewed these responses and the Port is in the process of refining their responses to incorporate suggestions made by the Corps.

1. The Port believes that the movement of water through the fill and mechanically stabilized earth wall has been properly analyzed. Several studies and technical memoranda have been prepared detailing how water will flow through embankment fill to recharge groundwater or be collected and transmitted through the mechanically stabilized earth wall to maintain the hydrology of downslope wetlands. Documents that describe and substantiate that the hydrology of the wetlands located downslope of the embankment and wall will be maintained include:

- *Sea-Tac Runway Fill Hydrologic Studies Report* (Pacific Groundwater Group 2000). This report was funded by the Washington State Department of Ecology
- *Geotechnical Report* (Hart Crowser 1999)
- *Wetland Functional Assessment and Impact Analysis* report (Parametrix, Inc. 2000)
- *Seattle-Tacoma Airport Master Plan Update Low Streamflow Analysis* (Pacific Groundwater Group 2000)

Wetlands located downslope of the embankment are maintained by groundwater discharge seeps located beneath them and at their margins, seasonal periods of shallow interflow, and (in the case of Wetland 18, 37, and 44 some channelized flow).

2. The primary purpose of the drainage layer at the base of the embankment fill is to prevent the build-up of excess pore pressures in the overlying fill material by preventing the development of fully saturated conditions at the base of the fill. The drainage layer accomplishes this by providing a high-permeability pathway that allows drainage to occur to the toe of the embankment if the rate of infiltration and seepage through the embankment exceeds the permeability of the underlying native soils.

The primary hydrologic source for the wetlands (groundwater discharging through a shallow aquifer) will remain in place. Groundwater will continue to recharge the shallow aquifer located beneath and east of the embankment and pass beneath the embankment before discharging to the wetlands. The weight of the embankment on the aquifer will result in some compression of the soil structure beneath it, the resulting reductions in porosity, void ratio, and permeability are conservatively estimated to be less than 5 percent under the maximum height of the fill (Sea-Tac Third Runway-Aquifer Compaction, letter, to the Port from Hart Crowser, December 9, 1998) and so the groundwater flow will continue largely unimpeded.

Most of the wetlands that will remain downslope of the embankment are fed by groundwater flow from the shallow aquifer, which surfaces as seeps in these wetland areas. The groundwater flow in the shallow aquifer is sustained from the area to the east (primarily the areas east of the Third Runway), and currently flows through the subsurface materials that will form the foundation for the embankment. These soils will almost entirely remain undisturbed by construction. Excavation will occur only in limited areas where low-permeability, wetland soils are present. In these areas, soils will be replaced (typically 1 to 3 feet below existing ground surface) with more permeable drain material.

A secondary hydrologic source for downslope wetlands is interflow from the existing slopes above the wetlands. The interflow component supporting wetland hydrology lost due to embankment construction will be replaced by collecting seepage water from the underdrain conveying it to the outer swale and

downslope wetlands. Recharge calculations show that more water will be available from this source than is currently the case under existing conditions, and that it will occur for a longer duration than currently. Both these factors are expected to extend the hydroperiod of the wetland, and improve rather than detract from the current condition of the wetland.

Another function of the drainage layer is to prevent the build-up of excess pore pressures in the overlying fill material, by preventing the development of fully saturated conditions at the base of the fill. It does this by providing a high-permeability pathway that allows water to flow to the toe of the embankment if the rate of infiltration and seepage through the embankment exceeds the permeability of the underlying native soils. The drainage layer also allows existing channelized surface and seepage flow to be collected and directed to downslope wetlands.

3. **The System is Designed to Prevent Rock Underdrain Clogging**. The underdrain is designed and constructed in a manner that expressly avoids the build-up of particulates within the drain rock. The grain-size distribution of the Group 1A material that are specified for drain construction meets the standard civil engineering requirements for performance as a filter medium (i.e., it is designed not to clog when exposed to seepage from the proposed embankment soils). Part of the design requirement for this layer is to avoid clogging if exposed to the invasion of soil particles into the filter medium. Filters of this type have been used successfully for more than 50 years, and are specified for a wide range of civil engineering (Soil Mechanics in Engineering Practice, Terzaghi & Peck, 1948; ibid, 3rd Edition Terzaghi, Peck, & Mesri, 1996).

The material placed in the backfill zone behind the mechanically stabilized earth wall will be granular Group 1A or 1B material that will be relatively free-draining and will therefore allow water to drain from behind the engineered wall without build-up of excess pore pressures. Design requirements for the embankment address the invasion of soil particles into the filter medium, as discussed above, and groundwater movement would not move particles to the extent that the drainage layer would clog.

4. **Fill Infiltration.** See response #34 in the Northwest Hydraulic's February 15, 2001, letter.

5. **Constantly Saturated Underdrain.** There will not be a constantly saturated underdrain beneath the embankment or mechanically stabilized earth wall. The capacity of the underdrain to transmit lateral flow substantially exceeds the ability of fill to convey flow into the drain and the volume of water that would be directed to it. Therefore, the drain would not be constantly saturated, except in places where it is picking up subsurface seeps from below the embankment. This may occur in limited areas, typically where there are existing seeps and wetlands that will be buried beneath the fill. The drainage layer will be thickened in these areas to further reduce the likelihood of saturation. A key purpose of the drain is to prevent the build-up of positive pore pressures in the embankment. This could occur if the base of the fill was allowed to become saturated; the drain is designed to prevent this from happening, and thus to avoid potential instability.

6. **Shallow Groundwater Flow to Wetlands.** As explained above, it is the Port's belief that the embankment design will allow shallow groundwater flow to downslope wetlands to continue. The lateral groundwater flow regime in the existing subsurface shallow aquifer will not be affected by the wall or the underdrain since, as the commenter correctly observes, the drain will be largely constructed on the natural ground surface, well above the underlying groundwater (except where the embankment is constructed over wetlands and seeps). Subgrade improvements will rely on free-draining backfill or gravel and will not impede groundwater flow, as discussed in Appendix L of the Port's *Comprehensive Stormwater Management Plan*. The primary hydrologic source to the existing wetlands and Miller Creek – i.e., shallow groundwater flow – will therefore be maintained. Pacific Groundwater Group and Hart Crowser both predict that the hydrologic source to the existing wetlands and Miller Creek will be enhanced by the

increased time of travel for water infiltrating into and passing through the through the embankment fill prior to moving into existing soil layers.

7. **Uniform Fill Blanket.** The embankment design includes a drainage layer for its full length and width. The drawings (e.g., as shown in the Port's Phase 4 construction drawings) show that the underdrain will be placed as a continuous layer (minimum thickness: 3 feet) of Group 1A material beneath the base of the embankment. Groundwater from upland areas will continue to flow (as it does now) thorough the existing soils beneath the embankment. As a result, the presumed interruption to the hydrology of the wetlands and Miller Creek the commenter has posited will not occur.

8. **Reintroduction of Water.** While the Port plans to use infiltration facilities for the disposal of stormwater as part of the *Comprehensive Stormwater Management Plan*, it is largely groundwater seepage water from the underdrain (as observed in Phases 1 and 2 of embankment construction) that will be collected by the replacement drainage swale for dispersal to the wetlands. This relatively steady flow will in fact enhance the wetland hydrology because it will increase the length and duration of the hydroperiod, potentially improving the condition and function of downstream wetlands.

The adequacy of plans showing the distribution of water to from drainage channels to wetlands is addressed in response #13 below.

9. The Port believes the existing wetlands located west of the embankment already receive channelized flow (see descriptions of channels on pages 3-18, 3-20, 3-21, in the *Wetland Delineation Report*, in Chapter 3 of the *Wetland Functional Assessment and Impact Analysis*, pages 5-100 and 5-101 in the *Natural Resource Mitigation Plan*, and letter to Eric Stockdale (21 September 2000)). The channels, in part, convey water from Wetlands 19 and 20 to Wetlands 18 and 37. Ditches along 12th Avenue South also convey channelized flow to Wetlands 18 and 37. Channelized flow also occurs in Wetland 39, 44, R9, where runoff is concentrated by topography, streets, driveways, or culverts. The purpose of the replacement drainage channels is to maintain this existing hydrologic condition, including the channelized flow to Wetland 18, 37,and 44. The channels also provide contingency options to augment wetland hydrology if monitoring demonstrates the wetland hydrology must be supplemented elsewhere.

As demonstrated in the above responses, groundwater required to maintain seep wetlands located west of the embankment will continue and a collection system to collect interflow and channelized flow will further maintain wetland conditions. This drainage system is designed to maintain existing hydrologic conditions, and includes new channels that will convey existing surface flows and replace existing channels. The replacement channels will disperse flow over a broader area than the existing ditches and culverts that they replace, so increase in channelization would not occur. The maintenance of these varying sources of hydrology will maintain seep areas in the wetlands, and assure that reductions in the size of these wetlands do not occur.

The existing ground surface below the embankment will be left largely undisturbed prior to fill placement. Shallow interflow seeps, expressed where perching layers surface on the slope, will continue to discharge into the underdrain, or will continue to flow downslope within the subsurface soils below the underdrain. Areas of soft soils that need to be removed to provide embankment foundation support will be backfilled with free-draining sand and gravel hydraulically connected to the underdrain. In this way, existing seepage into the wetlands that are filled will continue to be available as seepage through the underdrain. This water will flow down gradient to the west, and eventually reach downslope wetlands and Miller Creek. If reduced wetland hydrology is observed during construction and/or post-construction monitoring, contingency actions including additional flow dispersion, and would be implemented adaptive management techniques would be implemented to ensure downslope wetlands maintain the

appropriate hydroperiod required to maintain existing functions. The 10-year monitoring plan and adaptive management approach will be instrumental in assuring maintenance of the wetland hydrology.

Because hydrologic conditions will be maintained in downslope wetlands (i.e. the wetlands will continue to receive groundwater seepage and channelized flow) nutrient dynamic in the wetlands following construction will be similar to current conditions. The removal of pollution generating surfaces and incorporating the wetlands located west of the embankment within the Miller Creek Wetland and Riparian Buffer Area will reduce anthropogenic sources of nutrients to the wetlands. Removing non-point pollution sources from lawns, parking areas, septic systems, fertilizers, and other sources will enhance wetlands and uplands in the Lora Lake/Vacca Farm area. Additionally, planting native trees and shrubs, removing areas of invasive non-native plant species, and monitoring the success of the enhancement will enhance the area. For example, the wetlands at the Vacca Farm site will shift from a wetland dominated by bare ground, Himalayan blackberry, and soft rush, to a native shrub-dominated wetlands with areas of cedar trees. This shift in plant communities will increase sediment trapping, and organic matter input from the wetland complex to the creek.

As described in Appendix B of the *Wetland Functional Assessment and Impact Analysis* (Parametrix, Inc. 2000), subgrade improvements will be composed of permeable soils (mostly gravels) and will act like outwash soils, not till. Subgrade improvements also include stone columns, which will be installed to strengthen the native soils beneath parts of the embankment. The stone columns that will be installed to strengthen the native soils beneath parts of the embankment will also act like outwash soils.

10. As explained above, no "complete change in the hydroperiod of the wetlands" is expected to occur. The plan does not require water to be "metered from a storm pond outfall into an infiltration trench."[1]

The embankment design and its potential impacts to wetland hydrology have been the subject of independent reviews. These evaluations, summarized in the *Wetland Functional Assessment and Impact Analysis* report, have found that the delay in water movement through the embankment would extend the period of groundwater discharge from the area and that this could benefit low flow conditions in Miller Creek and downslope wetlands.

11. Appendices A and B of the *Wetland Functional Assessment and Impact Analysis* report identifies the design and purpose of the temporary erosion and sedimentation control (TESC) swales and the inner collection swale. The Appendices show that portions of the TESC swale, following construction, are incorporated into the replacement drainage channels. These swales will serve to collect and direct construction runoff to sedimentation ponds. Water from these ponds will be pumped to stormwater treatment and detention ponds and discharged to Miller Creek at existing outfalls.

The inner collection swale will serve to collect water from the embankment, mechanically stabilized earth wall, and security road. Water from this inner collection swale will be conveyed under the security road to the replacement drainage channels, and ultimately to the wetlands located west of the project area.

The paved security road located west of the embankment will have limited use (approximately one vehicle per hour) and is thus not classified as a pollution-generating surface according to King County Stormwater Management standards. Therefore, runoff from the road that reaches either the inner collection swale or the replacement drainage channels is expected to meet water quality criteria. No anticipated impact is expected to occur as a result of mixing runoff from the embankment, the Perimeter

[1]For Wetland 39, potential impacts to the uppermost portion of the wetland (0.02 acres) are mitigated using hydrology from a stormwater detention pond.

Road, or the mechanically stabilized earth wall with ground water collected by the replacement drainage channel.

The replacement drainage channels will be located west of the mechanically stabilized earth wall, embankment, and security road. These channels will serve to collect seepage diverted from the inner collection swale or seeps from the embankment underdrain. Water within these channels will be directed to wetlands to help maintain their hydrology.

12. Wetlands not linked to the replacement drainage channels will continue to receive water via shallow groundwater that will be recharged as water infiltrates through the embankment and into the existing subsoils that will remain. Additionally, riparian wetlands not associated with the replacement drainage channels will continue to receive water through overbank flow from Miller Creek. The changes in the hydrologic conditions related to the embankment are discussed in detail above.

13. It is the Port's belief that the design sheet C6 in Appendix D illustrates the required information regarding project mitigation. As the reviewer has correctly determined, Segment C and Segment D of the replacement drainage channels are north flowing. Segment C conveys water to Wetland 37. Segment D conveys water to Wetland R9 and A13. The swale located upslope of these areas continues to Pond D, but this segment is not part of the *Natural Resource Mitigation Plan*, as identified in the documents.

The swale shown in Pond D on Sheet C6 in Appendix D is the temporary erosion and sedimentation control (TESC) swale that will be constructed prior to the construction of stormwater Pond D. This TESC swale will be used only during initial construction and construction staging. Prior to completion of the project, Pond D will be constructed in the footprint shown on this sheet. When this pond is constructed, the portion of the swale in its ultimate boundaries will be removed. The finished grading plan for Pond D is shown in Appendix I of the *Wetland Functional Assessment and Impact Analysis Report*.

The drainage channel segments identified in the *Natural Resource Mitigation Plan* mitigation are the minimum channel lengths required to replace channel lengths being impacted (pages 5-100 and 5-100). The remainder of the channels shown on plan sheets with buffers may also collect seepage water from the embankment or the inner collection swale and are also part of the mitigation. The additional lengths of channel provide flexibility in how and where the seepage water is discharged to the wetlands and Miller Creek, if redirection is deemed warranted during the monitoring program.

The 1-foot contours provided on the design drawings show that the replacement drainage channel depths are 0-3 feet in depth. The relationship of the swales to the downslope wetlands can also be determined from the grading plan. Where the swale crosses wetlands, the west side of the swale is shown to be at the elevation of the wetland. Thus, water collected by the swale can disperse into the downslope wetland. The distribution of water o the wetlands from the drainage channels will occur over a broader area than is found where culverts currently concentrate flows, and increases in channelization in the remaining wetlands are not expected.

The drainage swales located upslope of the mitigation channels are not part of the project mitigation. These channels are located in areas that generally lacked seeps and wetlands; thus they are expected to be dry much of the time.

14. As discussed above, the Port believes the project will not transform "downslope wetlands from seep driven wetland systems (groundwater discharge zones) to wetlands that are driven by surface water input."

There are no infiltration swales shown in the *Natural Resource Mitigation Plan* design drawings and no infiltration swales are planned or required to maintain wetland hydrology. Sheet C8 of Appendix D to the *Natural Resource Mitigation Plan* shows flow dispersal trenches. The flow dispersal trenches are not designed for infiltration. They are designed to allow water to disperse over broad areas into wetlands, and they are designed to avoid concentrating water in wetlands.

All wetlands impacts identified in Chapter 3 of the *Wetland Functional Assessment and Impact Analysis* (Parametrix, Inc. 2000) have been properly calculated. These calculations include all construction activities in wetlands, including the impact of the replacement drainage channels. Appendix D (Sheets C5 and C6) of the *Natural Resource Mitigation Plan* identify the impacts of these channels to wetlands.

15. The Port believes the mitigation does not depend on a constructed infiltration system to maintain proper hydrology in wetlands located west of the embankment. Saturation of the soils at the flow dispersal facilities will demonstrate that the reintroduction of water is occurring as planned and the water transmission capacity of the soil has been reached. This condition will be beneficial to downslope wetlands, and may even cause an increase in the size and improvement in condition of the affected wetlands. This saturation is expected to continue well into the dry summer months, due to the buffering effect of the thick vadose zone created by the embankment.

16. Significant technical details required to understand how mitigation will be constructed are included in the *Natural Resource Mitigation Plan*, Appendices, and associated reports.

17. The design drawings in Appendix A show that the relocated segment of Miller Creek will be lined with geotextile fabric. The use of geotextile fabric as part of the relocation project is also identified in the *Natural Resource Mitigation Plan* text (Figure 5.1-3, and page 5-14).

18. The proposed geotextile fabric is highly permeable, and is designed to permit groundwater exchange[2]. Because the geotextile fabric will be permeable, the Port believes that the stream will not be hydrologically isolated from the high groundwater table or the underlying peat soils. The geotextile will facilitate constructability of the channel in the peat soils.

There is no concern regarding the disappearance of water into organic soils, as monitoring reported in the *Natural Resource Mitigation Plan* demonstrates that a high water table is present on the site and that the elevation of the stream channel will be very close to the elevation of the groundwater.

An "open water pond" would not occur on the site (except during flood events) because existing and proposed grades allow surface water drainage of area through the south end of the Vacca Farm area.

19. The following discussion responds to the commentor's concerns regarding the function of the Vacca Farm Restoration project as a natural floodplain. During floods greater than the mean annual flood, the low channel bank that defines the west side of the stream channel (Sheet C5, Appendix A) will be overtopped by flood flows. At these times, floodwaters would move from the channel laterally across the floodplain, submerging low-lying areas of the floodplain located to the west. In addition to overbank flooding from the creek, "backwater" flooding could occur by floodwater overtopping the existing creek banks downstream of the relocated segment. Backwater flooding is a natural condition that is present along many large and small stream systems (another example is shown in Figure 7.2-4 of the *Natural Resource Mitigation Plan* that maps the backwater floodplain area near the off-site mitigation). During

[2]Geotextile liners are by definition permeable, unless identified as "impermeable geomembrane liner". The geotextile's permeability of 60 to110 gallons per minute per square foot is much greater than that of the underlying peat.

flood events smaller that the 1-year flood, much of the floodplain would flood as a result of a backwater condition. As correctly pointed out, the floodplain area is designed to drain freely to the south following flood events. Thus, floodwaters flow through the entire floodplain and wetland restoration area.

Chapter 5, Section 5.1.1.6 describes the estimated flooding frequency. The channel has been designed to overtop its banks at flows greater than 40 cfs, which occur approximately once a year during annual peak flows. This frequency of flood event is not an 'extreme event' and the design provides a direct hydrologic connection between the wetland floodplain and the stream channel.

The function of the creek channel, and whether or not it is lined, are independent from the design of the adjacent floodplain. The post-construction topography will allow floodwater to pond until the flow in the creek recedes, thereby providing a direct connection to the floodplain and channel.

Also see response #24 of the Northwest Hydraulic's February 15, 2001, letter.

20. It is the Port's belief that the Miller Creek relocation has been designed using appropriate and current standard engineering practices for topographic, geologic, hydrologic, and ecological conditions found in the Vacca Farm area. Because of the unique characteristics of the site, general conclusions about other sites, which have different site conditions, design approaches, and permit standards are not directly applicable to the Miller Creek design.

The Port recently examined the creek relocation project on North Creek in Bothell (March 15, 2001) during a rainstorm (about 0.7 inches measured in nearby Redmond). The creek was observed overtopping the channel banks in several locations within the mitigation site, flooding portions of the adjacent wetlands. Based on examination of pre-project aerial photographs and the recent site conditions, it appears that this project has successfully enhanced a previously ditched stream channel by creating floodplain wetlands and natural channel conditions. The site differs from that planned by the Port in that it the North Creek site includes flood control levees, which are not part of the Port's proposal.

21. The Miller Creek relocation site design responds to existing site specific hydrologic, geologic, ecological, and topographical conditions of the area. The project design meets requirements to maintain a creek channel with fish habitat, replace lost floodplain area, restore wetlands, and provide water quality benefits.

22. The Port believes that design and establishment of the creek channel and floodplain on the Vacca Farm site have been substantiated during the development of the mitigation plan. The bearing strength of peat, potential erodability of peat, other soil conditions, groundwater conditions, and channel hydraulics have been considered in the Miller Creek design, and the design approach with the geotextile liner is determined to be stable, without adversely affecting groundwater movement. Because the Vacca Farm floodplain already floods in a backwater condition, and the relocation project will not alter this feature, even if the relocated creek section failed to overtop its bank, the natural flood storage functions of the restored wetland would be realized.

Currently, there is no direct surface water connection between the Miller Creek stream channel or associated wetlands and floodplain. The stream is channelized and currently overflows its banks with at least a 2-year frequency. The new channel will be designed to allow the creek to overtop its banks with approximately 1-year frequency, thus improving the hydrologic connection to the floodplain. Additionally, the current design will create a forested and shrub riparian buffer, which will increase shade to the creek, decrease temperatures, and provide an increase in organic material.

The Miller Creek floodplain has a high groundwater table. Excavation in the floodplain soil will enhance groundwater saturation throughout the upper soil horizon within the floodplain, thus improving wetland hydrology. Supporting data on groundwater elevation in this area are provided in the *Natural Resource Mitigation Plan*.

23. The reviewer correctly identifies that the installation of logs will involve cutting of the geotextile fabric. However, since the geotextile fabric is permeable (see above), there are no design, operational, or reliability consequences to this approach. All geotextile fabric used during stream construction will be permeable; therefore, there will be a direct connection with the groundwater and "springing a leak" is not a concern.

24. The flood frequency of the wetland is described above, as is the ability of the permeable geotextile fabric to permit groundwater movement. The wetland and areas of high groundwater west of the stream are currently and will continue to be maintained by high groundwater conditions. Maintenance of wetlands in this area is not dependent upon floodwater, and peat soils would not be expected to form in wetlands that were maintained solely by floodwater.

The stream will flood its banks in less than an extreme 100-year flood event. The proposed channel will convey flows as indicated in the *Natural Resource Mitigation Plan*, and spill over to the floodplain with flows in excess 40 cfs, which is less than the mean annual flow (See page 5-12 and Table 5.4-1). The relocated channel and the floodplain "swale" are connected at the south end of the new creek, which is the point that will control the water surface level in the floodplain. The area draining to this point also includes drainage from Des Moines Memorial Drive, Lora Lake, as well as overflow from the new channel.

The 100-year flood elevation in the vicinity of the relocated channel currently forms a broad shallow backwater area rather than simply fringing the creek channel.

25. Geotextile fabric will be permeable; as a result, the Port believes that groundwater will be able to seep into the stream channel and supplement stream flow during low flow periods.

26. The *Natural Resource Mitigation Plan* identifies temporary impacts to wetlands in areas where wetlands can be avoided by the finished project, yet, to accommodate facilities to manage construction stormwater during the initial construction phase, they will be temporarily modified (Chapter 3, page 3-6). Because these impacts are temporary, they are not classified as permanent. Upon completion of construction, the wetland areas will be restored to pre-construction conditions. Chapter 2 of the *Wetland Functional Assessment and Impact Analysis* (Parametrix, Inc. 2000) describes how these impacts were calculated and explains them in detail (see especially Section 2 and Section 4.2). Additionally, Chapter 5 Section 5.2.4 of the *Natural Resource Mitigation Plan* describes the temporary construction related impacts of the Third Runway embankment and how those impacts were calculated. The temporary construction related impacts located outside the project footprint are identified in the Technical Memorandum *Temporary Impacts to Wetlands during Third Runway Embankment Construction* (HNTB 1999) (Appendix A of the *Wetland Functional Assessment and Impact Analysis* (Parametrix, Inc. 2000)).

Where temporary fill in wetlands results in small fragments of remaining wetlands, the remaining wetland area has been considered permanently impacted, and tabulated in Table 3.1-1 (page 3-2). This includes Wetlands A5, A6, A8, 35, A18, portions of Wetland 18, and portions of Wetland A12. Where, following construction, the impacted wetlands could be restored and integrated into adjacent wetland areas or buffer mitigation, impacts were considered temporary because, in these areas, the full suite of existing wetland functions could be restored.

27. The Port believes that the evaluation of temporary sediment control ponds as a temporary impact is appropriate. These facilities are temporary, are not a permanent feature of the project, and will not cause permanent impacts to downstream wetlands. The temporary stormwater ponds are located at critical elevations relative to project construction activities, as explained in Appendix A of the *Wetland Functional Assessment and Impact Analysis*. The stormwater pond locations are at the very lowest elevations adjacent to the embankment so construction runoff from the all upslope areas can be collected and treated. Where located in wetlands (i.e. Wetlands 18, 37, and 44) the collection ponds will collect construction runoff prior to it being pumping upslope to the treatment systems. One benefit of this approach is to reduce the area of temporary impacts. The conveyance of runoff to these systems is in part via the temporary erosion and sedimentation control swale shown on plan sheets, with additional conveyances from the embankment itself likely.

The depth for Pond A was set to limit the amount of direct wetland impact during construction and so that the combination of storage volume and pump capacity provides the ability to collect and transfer at least twice the anticipated stormwater volume to the upstream treatment ponds. A more shallow depth would require use of additional land and increase temporary impacts to Wetland 37.

The geotextile lining of the pond is permeable, and not intended to keep groundwater out of the pond. It is anticipated that Temporary Pond A would intercept a small portion of the shallow groundwater that flows to Wetland 37a. During periods of pond operation (October through March), some groundwater would be collected from the pond with stormwater, treated, and discharged to Miller Creek, upstream of the wetland.

During the October through March period, when the pond may be in operation, wetland vegetation is generally dormant and would not be affected by minor changes in soil moisture, were it to occur. However, there is unlikely to be any significant change in soil moisture or saturation downslope of the pond because pond operations would occur during the wet season when ample precipitation would maintain saturation in the downslope soils. During the summer months, when the pond is not in operation, seepage water would drain to the pond from the upslope (east) side. This water would collect in the bottom of the pond, but would also be able to flow through the permeable liner and infiltrate to the adjacent wetland soils through the downslope (west) side. Operation of the pond in this manner is not anticipated to result in any temporary or long-term impact to the vegetation or habitat conditions in Wetland 37 or to Miller Creek because hydrologic conditions in the wetland or creek would not change.

28. Two sedimentation ponds (Ponds A and E) will be installed within a portion of Wetlands 18 and 37, and the restoration of these areas is described in detail in the *Natural Resource Mitigation Plan* (See Section 5.2.4, starting on page 5-111; and Appendix D). The temporary ponds are to be constructed in areas of groundwater discharge, and not where wetlands occur on impervious perching layers. Since groundwater discharge maintains the wetlands in these areas, maintaining interflow during or after construction will not be required (in these groundwater discharge areas, soils saturated to the surface throughout the rainy season prevent interflow). For this reason, and because no significant excavation will occur during pond construction, there is no need to recreate impervious subsurface layers.

Wetlands 18 and 37 will be restored to pre-construction topography by removing fill used to create berms and backfilling the pond with native soil that is similar in texture to the soil removed during excavation. The requirements for treating soils during restoration of these areas are identified in Section 5.2.4.6 (page 5-114) of the *Natural Resource Mitigation Plan*. If the disturbed areas are treated as described, soil conditions will be suitable for the growth of wetland plants and sufficiently friable and permeable to allow groundwater discharges to continue.

29. The Port believes that the information the commenter has requested is part of the Public Notice. The potential impact of permanent stormwater detention ponds on the hydrology of downslope wetlands has been analyzed in the *Wetland Functional Assessment and Impact Analysis* report (See Section 4.3.2.12 and Appendix I). Groundwater data for this area, in relation to the ground elevation is shown in Appendix I and discussed in the *Wetland Functional Assessment and Impact Analysis* report. Because of the excavation, a small indirect impact to the uppermost section of Wetland 39 could occur where the pond is excavated below the elevation of the wetland. Because Pond D has been designed to infiltrate water into the soil, and with an additional orifice to discharge treated stormwater to the wetland, the potential indirect impact may not occur.

30. Permanent wetland impacts were assumed for the portion of Wetland A12 that is crossed by the temporary erosion and sedimentation control swale. The area where the swale runs through Wetland A12 was calculated as a permanent impact (0.08 acre). The area west of the swale (0.03 acre) will remain a wetland because of groundwater seepage and the replacement drainage channel that conveys water to the remaining portion of the wetland. Additionally, this wetland area will be enhanced through planting native trees and shrubs thus maintaining the primary functions of this wetland.

The *Natural Resource Mitigation Plan* describes and illustrates how water will be discharged to the downslope wetlands. The replacement drainage channels are described in Section 5.2.3 of the *Natural Resource Mitigation Plan* (page 5-100 through 5-111). Design details showing the channel grades, cross sections and flow dispersal trenches are shown in Appendix D (Sheet C8) of the *Natural Resource Mitigation Plan*. Additionally, page 28 in Appendix B of the *Wetland Functional Assessment and Impact Analysis* (Parametrix, Inc. 2000) describes facilities to maintain water supplies to wetlands located downslope of the embankment and mechanically stabilized earth wall that assure the function of the downslope wetlands and mitigation.

As described in the *Wetland Functional Assessment and Impact Analysis* report, temporary wetland impacts will not occur for the duration of the project. Section 4.2.3 of the *Wetland Functional Assessment and Impact Analysis* report states that "these temporary impacts will be approximately one to two construction seasons". Appendix A of this report also describes the type of temporary impacts and that, for Wetland 37, they will be during a 1-2 years timeframe (see page 4, *Temporary Construction Impacts to Wetlands)*. Similar timeframes will occur for other temporary impacts, but the exact timing depends on the time of year construction is started, weather conditions, and other factors.

31. Based on hydrogeologic findings and field observations, the remaining wetlands downslope of the embankment are located in areas where groundwater discharge is occurring and they are not fed by shallow interflow. Numerous geotechnical explorations have been conducted for this project and these explorations are sufficient to design the permanent stormwater ponds and assess downstream impacts. Appendix I of the *Wetland Functional Assessment and Impact Analysis* report (Parametrix, Inc. 2000) show cross sections of the permanent stormwater ponds in relation to groundwater and ground surface elevations. Section 4.3.2.12 of this report evaluates the potential impact of the embankment on downslope wetlands.

32. The grading plans that are part of Appendix D (Sheet C8) of the *Natural Resource Mitigation Plan* show the temporary erosion and sedimentation control swale to be 2-3 feet deep in upland portions adjacent to Wetland 18 and 37. This swale is about 1 foot deep where it crosses Wetland 18 and 37. The swale is designed to be as shallow as possible where it crosses wetlands. By using a shallow swale across the wetlands, the amount of groundwater collected in the stormwater ponds during the winter months will be minimized, as are potential impacts to downslope wetlands.

As described in the *Natural Resource Mitigation Plan*, the temporary ponds will be restored the pre-construction topography by regrading and backfilling with soil similar to those excavated (page 5-111 through 5-120; Figure 5.2-17). Shallow groundwater and seeps that feed Wetland 18 and 37 will be maintained through construction of the underdrain, collection swales, and replacement drainage channels.

33. The replacement drainage channel is considered to be a temporary impact, except where the design drawings indicate the impact is permanent (Appendix D of the *Natural Resource Mitigation Plan*). The channel is designed to be nearly flat, shallow, and broad where it enters Wetlands 18 and 37. For these reasons, and the emergent and shrub vegetation planted in and near it, the channel will replace the wetland functions that will be temporarily lost during construction.

34. The Port believes all wetland impacts are accounted for in the above-referenced documents. The calculation of permanent, temporary, and indirect wetland impacts are discussed above and in responses to the Azous Environmental's February 16, 2001, letter.

35. It is the Port's belief that post-construction groundwater monitoring data is not necessary to establish hydrology performance standards and to evaluate potential impacts to the wetlands located downslope of the project. As described in the *Natural Resource Mitigation Plan* in Section 5.2.3 the Port will monitor the hydrology in downslope wetlands on a monthly basis during years 0 through 5, year 7, year 9, and year and 10 (page 5-119). Within these wetlands, the depth from the ground surface to the static water table will be measured. The data will be used to determine if wetland areas downslope of the embankment continue to experience wetland hydrology, and if present, whether the duration of soil saturation is sufficient to maintain the existing wetland plant communities and the existing hydric soil conditions observed at various locations in the wetland.

This is a scientifically valid monitoring approach. The data collected from hydrologic observations can be related to the wetland indicator status of wetland plants, the information on vegetation tolerance of various hydrologic regimes, and the intensity of reducing soil conditions (i.e. iron reduction (creating mottled and gleyed soil colors) or organic matter accumulation). This analysis provides insight into the long-term hydrologic regime that the wetland has developed under, and will provide an objective methodology for determining whether the post-construction hydrology observed through monitoring can reasonably be expected to continue to support the wetland soils and vegetation observed.

The evaluation parameters used in this monitoring approach are superior to pre-construction groundwater monitoring because the criteria based on vegetation and soil conditions are free of short-term variation and aberrant conditions. For example, if preexisting groundwater data existed for two years, the implication is that adequate information is available to establish a performance standard for ground water elevation. However, in reality, since precipitation is different each year, there is no real way to relate a change in ground water elevation to a precipitation trend or a project impact. Relying solely upon hydrologic data to determine whether the wetland is functioning is problematic because hydrologic data is not always conclusive and can be misleading. For example, hydroperiod within a particular wetland is not the same each year and can vary statistically according to climate and antecedent conditions.[3]

Baseline wetland hydrology data have been gathered during wetland delineations, during geotechnical explorations, and during periodic site investigations. Performance standards for downslope wetlands have been developed based upon existing wetland hydrology and observations of soil types (see page 5-108 and 5-118 of the *Natural Resource Mitigation Plan* for complete performance standards). The monitoring standards proposed for the areas are as follows:

[3] Mitsch, William J. and James G. Gosselink. 1993. *Wetlands*. Van Nostrand Reinhold, New York.

- Flowing water will be present in the lower portions of the replacement drainage channels from December to June in years of normal rainfall.
- Wetland areas with predominantly organic soils (Portions of Wetland 18, 37a, R14a, A14b, and 44a) will have soils saturated in the upper part to mid-June in years of normal rainfall.
- Other wetlands with predominantly mineral soils will have soils saturated in the upper part to mid-April in years of normal rainfall.

Using these performance standards, as well as data gathered after standard groundwater monitoring wells are installed, it will be possible to identify if the drainage channel features or shallow groundwater is not supporting the downslope wetlands as anticipated.

If the results of the hydrologic monitoring reveals that wetlands located downslope of the embankment are not exhibiting wetland hydrology during the growing season (in years of normal rainfall) then the reason for the absence of anticipated wetland hydrology will be determined and contingency measures employed.

Due to the land acquisition process between the Port and the private landowners within the acquisition area, property access to the wetlands of concern has been sporadic throughout delineation process. Access to some property began in the spring of 1998, but most areas were not available until late 1998 or early 1999. Several landowners refused entry to the Port or their representatives until the property was sold (e.g. Parcel 177 sold 12/14/1999). Others allowed the Port access only for the short period of time required to delineate wetlands on the parcel (e.g. Parcel 302 and 303). Therefore, consistent and repetitive hydrological measurements within all wetlands were not possible until recently.

36. See response to comment #35.

37. The Port believes that it is following applicable regulations and procedures to assure no net loss of wetland area or function occurs. Many of the mitigation projects evaluated in the King County study failed to meet performance standards because the wetlands had inadequate hydrology; did not contain appropriate plants adapted site conditions; were planted with non-native plants; were not maintained; or because the mitigation plans were not properly implemented. In many cases there was a lack of proper weed management or there was a failure to monitor the wetland mitigation site. Some mitigation sites were never built.

To ensure that the Port's mitigation is successful, each mitigation project has been carefully planned to avoid the problems listed above. The Port's project also incorporate many of the recommendations of the King County study. For example, the Port has obtained over four years of hydrologic data at the Auburn site. This data, as well as other detailed analysis contained in the *Auburn Mitigation Site Draft Hydrologic Report* (Parametrix 1997) provides the necessary information to construct the wetland mitigation site and obtain the desired water levels. This approach is consistent with the findings by King County that adequate hydrology is one of the most important aspect of wetland creation. As a contingency, if optimal water levels are not obtained, simple modifications (i.e., adjustments of outlet control structures) may be made to adjust water levels to desired depths. These weirs provide flexibility to ensure that water levels match the ecological requirements of the proposed plantings.

Following recommendations of the King County study, a temporary irrigation system will be installed at mitigation sites (Auburn, Vacca Farm, portions of the Miller Creek buffer, and Tyee Valley Golf Course) to enhance survivability and growth during the first two years following planting.

As recommended by the King County study, plants to be installed at the mitigation sites are native and have been selected based upon their tolerance to the hydrologic regime for the mitigation site. For instance, Oregon white ash, red alder, black cottonwood and western red cedar have been chosen to be components of the mitigation areas because they can tolerate the seasonally saturated soils that occur or will be established on mitigation sites.

Following the findings of the King County study, the Port has planned a topsoil mix at the mitigation sites that is appropriate for the planned vegetation communities. For example, as described in Chapters 5 and 7 of the *Natural Resource Mitigation Plan* (Parametrix, Inc. 2000), the top layer of soil would be mixed with compost to provide rich soil to promote rapid plant establishment. In addition, soils that may be compacted during construction would be amended and/or scarified to provide a friable soil structure suitable for plant establishment.

As required by Ecology and the Corps, the Port has prepared and will implement detailed monitoring plans to determine if the mitigation is successful. Monitoring will continue for ten years (five years longer than the monitoring period recommend by King County). The Port will extend this monitoring period if, after ten years, the performance standards for the mitigation sites are not met.

Also, in accordance with the King County recommendations, the Port has made pre-project topographic surveys of the mitigation areas. Post-construction topographic surveys will be made to ensure that the planned topography was achieved.

The *Natural Resource Mitigation Plan* (Parametrix, Inc. 2000) identifies that a site-specific weed management strategy will be implemented pages 4-24 and 4-25). These strategies would be used to reduce the percentage of non-native invasive plant species colonizing the planted areas to ensure the survivability of the planted species.

The King County report identifies, that with incorporation of some of the above planning and design methods into mitigation projects, wetland mitigation success would increase. Since the Port has already implemented the significant recommendations made by King County and involved Department of Ecology, Corps of Engineers, Environmental Protection Agency, and U.S. Fish and Wildlife Service experts in the mitigation design process, a high probability of success exists for the mitigation projects.

A number of wetland and stream mitigation projects have been successfully planned, implemented, and monitored in the Puget Sound area. The following projects are similar to the mitigation the Port is proposing and demonstrate that wetland mitigation can be successful:

- Metro West Point Wastewater treatment facility (wetland creation)
- Emerald Downs wetland mitigation in Kent (wetland and stream restoration)
- U.W. Branch Campus-Bothell (wetland creation and stream restoration)
- Metro wastewater treatment facility in Kent (wetland creation)
- Paine Field (wetland creation)
- Boeing Longacres (wetland creation)

38. The Port believes plans submitted by the Port contain the requisite technical information needed by the reviewing agencies to reach a permit decision.

Comment noted.

The evaluation of permanent, temporary, and indirect impacts is described in detail in project report,

responses provided above, and in responses to the Azous Environmental's February 16, 2001, letter.

It is the Port's belief that the proposed plan and permit application sufficiently mitigates the identified impacts.

39. The Port believes the documents submitted by the Port and its consultants provide sufficient data and analysis for reviewing staff to evaluate the project impacts and the adequacy of the mitigation to offset them. Plan submittals show detailed mitigation designs and explanations and provide sufficient information to support the conclusion that the stream and wetland mitigation should function to meet the design goals. The plans also provide detailed monitoring plans that are based on evaluating enforceable contingency standards. For each mitigation element, a variety of contingency actions are provided, so that corrective action alternatives can be immediately implemented in the unlikely event that the desired wetland functions are not achieved by the initial mitigation plan a particular site.

Water Resource Consulting, February 16, 2001 letter

The responses in this section have been prepared from the Port's perspective and knowledge.

1. The Master Plan Update proposes to increase impervious area in the Des Moines, Miller, and Walker Creek basins by approximately 307 acres (see Table 4-1 in the *Comprehensive Stormwater Management Plan*) total for all three basins. This number does reflect the impervious area reduction in the Miller and Walker Creek basins that will result from the acquisition and demolition of houses in areas outside of the new Master Plan Update construction area. There is no diversion from the Storm Drain System to the Industrial Wastewater System in the Miller Creek basin (or in the Walker Creek basin) for the Master Plan Update, nor is diversion to the Industrial Wastewater System "the plan" for stormwater management at the airport. However, there was a diversion of surface runoff to the Industrial Wastewater System in the Miller Creek basin that has been implemented under the National Pollution Discharge Elimination System permit as a best management practice to reduce industrial stormwater discharge to Miller Creek. This diversion change is included in the *Comprehensive Stormwater Management Plan* because it occurred after the base year (1994). Approximately 78 percent of the new impervious areas will be directed to stormwater detention facilities or infiltration that flows to surface streams.

While the project changes the exact location of the hydrologic divide between Miller, Walker, and Des Moines creeks, the basin area of each subbasin affected does not change. See also response to Tom Luster's memorandum January 21, 2001, to State Senator Julia Patterson.

2. Biofiltration stormwater treatment best management practices (bioswales and filter strips) have been in use for at least 10 years in Washington. Biofiltration is specified in the King County and draft Ecology stormwater management manuals, both of which represent state-of-the-practice. The draft Ecology Manual specifies biofiltration for applications such as streets and highways (i.e., similar application to runways), specifically to target pollutants such as total suspended solids, oil and grease, and metals.

Biofiltration swales and filter strips are not means of "disposal" as asserted in the comment. Furthermore, biofiltration swales and filter strips are standard best management practices (BMPs) recommended by the *King County Surface Water Design Manual* (1998) and the draft Ecology Manual as treatment for stormwater. Such BMPs take advantage of the binding capacity of soil particles and the organic and inorganic ligands in soils, to render the chemicals inert. These bound chemicals will either not be able to enter the biological compartment, or if they do, they will be unavailable to exert "harmful consequences".

3. Models are the best means available to predict the potential for changes to the system. Models calibrated to include low flows, such as those described in the *Comprehensive Stormwater Management Plan* (Appendix B), are based on actual flow data. It is an acceptable and appropriate approach to evaluate the predicted changes in low stream flow and mitigate potential changes. Low flow mitigation responds to predicted changes in the system and provides mitigation; existing impacts are beyond the purview of stormwater impacts caused by the Master Plan Update.

With regard to calibration, refer to Technical Appendix B, Volume 3, of the *Comprehensive Stormwater Management Plan*.

4. The Port has successfully mitigated construction impacts at the Airport for the past three years. The *Comprehensive Stormwater Management Plan* describes the erosion and sedimentation controls that have successfully been used, and which will continue to control and contain sediment (see Section 7.7.6 and Appendix R). The Port is not aware of any evidence that Master Plan Update improvements would mobilize contaminants.

5. Washington State regulations state that "the primary means to be used for requiring compliance with the [water quality] standards shall be through *best management practices* (emphasis added) required in waste discharge permits, rules, orders, and directives issued by the department *for activities which generate stormwater pollution*" (emphasis added) (WAC 173-201A-160(3)(d).

The Port is in compliance with its National Pollution Discharge Elimination System (NPDES) permit, issued under §402 of the federal Clean Water Act and Washington State regulations. WAC 173-201A-160(3)(d). The Port's NPDES permit is the regulatory permit that assures "activities which generate stormwater" are in compliance with state water quality standards. This comment indicates a focus on "end of the pipe" measurements that have not had the benefit of dilution. However, the citation in the comment allows for dilution "after consideration of disposal site dilution and dispersion ...". The data obtained by the Port is "end of pipe" data. Such data does not demonstrate violation of water quality standards in the receiving water body. By employing best management practices prior to discharging its stormwater, the Port is using all known available and reasonable remediation treatment (AKART). Compliance with state water quality standards in such circumstances should be measured in the receiving waters using appropriate mixing zones and dilution within those waters. Moreover, the data is stormwater data, which cannot be used absent consideration of storm events to determine compliance with water quality standards.

In compliance with its NPDES permit, the Port tested the toxicity of its stormwater discharges directly using whole effluent toxicity (WET) testing. These tests, conducted using sensitive aquatic organisms following Environmental Protection Agency protocols, have shown that undiluted stormwater (100 percent stormwater) from three of four tested outfalls is not toxic to aquatic life. Of particular note is the fact that stormwater from SDS3 drainage basin was not toxic. This 149-acre drainage basin is the largest at Airport and is representative of future taxiways and runways. For the outfall that reported levels outside the WET range, the Port has identified the source of the pollutant that caused toxicity-- a metal roof. This problem can be fixed and the Port is taking steps to do so.

In addition to the WET testing, the Port has conducted a Water Effects Ratio (WER) bench screening analysis to estimate whether metals criteria should be adjusted for site-specific characteristics pursuant to WAC 173-201A-040(3), note dd, which authorizes such analysis. The result of this analysis showed that the stormwater would not exceed potential site-specific standards.

The Port's NPDES permit requires monitoring of all Port storm drains that drain areas associated with industrial activity. Five years of permit-required monitoring from Port stormwater outfalls has shown that airfield runoff has concentrations of pollutants lower than typical urban runoff in the Seattle metropolitan area. Moreover, it is anticipated that implementation of the *Comprehensive Stormwater Management Plan* (see Section 7) will improve stormwater quality.

6. The Port believes the streams being referred to are Miller Creek and Des Moines Creek. It should be noted that of the two, Des Moines is the only one listed, and it is listed only for fecal coliform, not metals.

See previous response regarding compliance with water quality standards for metals.

Furthermore, the Fact Sheet issued with the Port's NPDES permit states "The Department has reviewed the ambient water quality monitoring results gathered by the Port..." and "The discharges authorized by this permit should not cause further degradation which would interfere with or become injurious to existing beneficial uses" (Fact Sheet p.23).

7. The balance of water imported and exported from the basin has been evaluated in the *Low Streamflow Analysis* report.

The Des Moines Creek Basin Plan does not intend to mitigate future Port impacts, nor does the Port rely on the Basin Plan to mitigate its proposed project. See Response to General Comments #12 on instream flow mitigation.

8. Examples of successful pollutant identification and best management practices response are described in the Annual Stormwater Monitoring Reports submitted to Ecology.

See previous response to comment #5 regarding water quality issues raised in this comment.

The Port has embraced an adaptive management approach promoted by regulatory agencies elsewhere since it describes a workable approach to managing stormwater quality.

9. See response to comment #2 above regarding biofiltration best management practices (BMPs).

Scientific studies have demonstrated that biofiltration BMPs effectively remove other pollutants besides sediment. In 1992, King County (then Metro) published a document entitled *Biofiltration Swale Performance, Recommendations, and Design Considerations*: this guidance document was funded in part by Department of Ecology. Using design criteria reflected in the current King County and Department of Ecology manuals, this document reported removals of 83 percent total suspended solids, 75 percent oil and grease/total petroleum hydrocarbon, 67 percent total lead, 63 percent total zinc, 46 percent total copper, and 30 percent dissolved zinc (dissolved copper was not reported).

As acknowledged by the commentor, the best management practices proposed for use by the Port are from the King County Basic Water Quality menu. As designed, these BMPs take advantage of the binding capacity of soil particles and the organic and inorganic ligands in soil to render the chemicals inert. These bound chemicals will either not be able to enter the biological compartment, or if they do, they will be unavailable to exert adverse effects.

10. Table 4-6 describes Sea-Tac Airport subbasins as they will be configured for *future* conditions. *The point of the table is to identify future treatment needs.* The table reports both existing untreated pollution-generating impervious surface (PGIS) and future (new) PGIS. Thus, 91.2 acres of "PGIS Not Fully Treated" *does not yet exist:*

SDN6:	4.1 acres
SDW1, SDW2:	55.1 acres
SDS7:	32 acres

Without these 91.2 acres, the *current* untreated PGIS totals approximately **166 acres**. Also, SDN6, SDW1, and SDW2 are not in the Sea-Tac Airport land area now. Subtracting these 59.2 acres from the total future PGIS yields approximately **511.3 acres** of total current PGIS.

166 ac/511.3 ac = 0.32.

11. Rooftops are addressed in Section 7.4 of the *Comprehensive Stormwater Management Plan*. This section includes procedures for identification and treatment of rooftops that act as pollution generating impervious surfaces (PGIS). This process has identified rooftops in subbasin SDN-1 that act as PGIS; Tables 4-6 and 7-8 account for this PGIS, and treatment of this PGIS is discussed in *Comprehensive Stormwater Management Plan* Sections 7.1.4.1 and 7.4.

Whole effluent toxicity (WET) tests have been conducted for the purpose of describing the quality of stormwater from SDN1 subbasin. The test results and subsequent source tracing chelation techniques suggested that zinc from two metal roofs is the suspected source of toxicity observed in the tests. Based on this suggested source, the Port is proactively undertaking an investigation and is taking steps to address this identified problem. It should also be noted that the rooftops represent a very limited area of the storm drain system (approximately 0.5 percent) and are not representative of Master Plan Update projects that will not use zinc-treated roofing materials.

12. Ground truthing and examination of plans has showed actual existing bioswale base widths to be greater than 6 feet.

The existing bioswales were sized in accordance with the King County Manual. As stated in footnote (a) of Table 4-7, the sizing assumption of 960 square feet of bioswale area per acre of pollution generating impervious surfaces assumed undetained runoff. With the exception of those existing swales in the future South Aviation Support Area, the existing bioswales are located downgradient of detention facilities, and are thus smaller than the unit size of 960 square feet per acre.

13. Average and median data were used to demonstrate that conversion from (a) untreated runoff from developed residential areas to (b) treated runoff from runways and taxiways will not degrade water quality. The median data were the best available regional data, and Sea-Tac Airport data were reported as median data for an equivalent comparison.

Table 4-8 of the *Comprehensive Stormwater Management Plan* was updated to reflect the addition of current data. Because pollutant concentrations are on *decreasing* trends, the median values thus decreased.

14. Relevant data are reported in the Annual Stormwater Monitoring Reports submitted to Ecology.

15. See response regarding compliance with state water quality standards above; the comparisons between the concentrations of pollutants in runoff at Sea-Tac Airport and urban runoff were presented to demonstrate that land use conversions from untreated residential areas to treated runways and taxiways will not degrade water quality.

16. No conclusions were changed regarding sources of fecal contamination. The August 2000 *Comprehensive Stormwater Management Plan* described a microbial source tracing study performed in Des Moines Creek by King County (Des Moines Creek Basin Plan, 1997), which reported, "despite the number of unmatched strains, the data strongly imply a higher human proportion of fecal strains downstream of residential unsewered areas."

This section of the December 2000 *Comprehensive Stormwater Management Plan* was updated to include additional information about Port studies that had been reported after the August 2000 *Draft Comprehensive Stormwater Management Plan*. The new data was published in the 2000 Annual Stormwater Monitoring Report, which was referenced in the December 2000 *Comprehensive Stormwater Management Plan*).

17. Total suspended solids data are provided for informational purposes, as it is relevant to potential effects on fish habitat. Turbidity data are also reported.

18. Although the Industrial Wastewater System treats at variable rates, it provides full treatment up to its maximum treatment rate. The commentor's reference to "higher values that would be collected during

storm events" does not comport with the record, because nearly all water collected and treated by the Industrial Wastewater System is generated during storms; runoff is stored in the lagoons and treated for up to several days after storms. The Discharge Monitoring Reports are representative of the Industrial Wastewater System treatment performance.

The analysis shows zero overflow events in a 50-year period based on full capacity operation of the wastewater *treatment* system as opposed to "settling," as stated in the comment. In fact, the analysis demonstrated that the treatment rate could be reduced from 4.0 mgd to 3.1 mgd before a single overflow occurred in the King County Runoff Time Series period of record (see Table 4-2 in the *Comprehensive Stormwater Management Plan*).

19. See response immediately above. No overflows occurred in the 50-year King County Runoff Time Series period of record, including a margin for reduced treatment capacity.

The increase in storage capacity will be accomplished by expanding Lagoon 3, an *existing* facility. Runoff from small storms is stored in Lagoons 1 and 2, which are netted to prevent bird attraction. Runoff from larger storms would require the use of Lagoon 3. Bird attraction during larger storms is less of a concern, because open water will form in many other depressional areas as well, thus reducing the likelihood of bird attraction specifically to Lagoon 3. As required by Federal Aviation Administration Advisory Circular 150/5200-33, wildlife hazard mitigation techniques such as surface aerators will be employed at Lagoon 3. The site will be monitored and adaptively managed.

20. See previous responses to comment #5 on compliance with state water quality standards.

21. The South Aviation Support Area detention facility performance analysis (Hydrologic Simulation Program-Fortran (HSPF) and King County Runoff Time Series (KCRTS) is included with the similar analyses of other detention facilities in *Comprehensive Stormwater Management Plan* Appendix A.

22. The draft Ecology Stormwater Manual requires application of stormwater requirements to the *maximum extent practicable* for the entire site. Section 7.1.5 demonstrates that retrofitting of some existing areas is not currently practicable. The relative benefit of retrofitting these areas would not justify the expense of $188,000 per acre.

See previous responses to comment #5 with respect to compliance with the National Pollution Discharge Elimination System permit and a lack of toxicity seen in directly testing 100 percent (undiluted) stormwater.

23. The King County Manual states that uncoated metal rooftops are considered pollution-generating impervious surfaces (PGIS). The King County Manual does not state specific treatment best management practices (BMPs) for rooftop runoff, only that all PGIS be routed through a treatment BMP in the designated water quality menu. The most appropriate practicable BMP will be applied to treat these rooftops, either a coating or a treatment BMP.

24-35. See General Response GLR7, Instream Flow Mitigation.

36. The collection and storage of surface water in underground facilities (e.g., cisterns) is not a new concept; this practice has historically been used to store water for many uses, including drinking. Long-term storage of water is the basic concept of wetponds and wetvaults, which are pollutant*removal* BMPs. "Dead" sediment storage would be provided, so that water drawn from the facilities would not re-entrain settled material. If necessary, reaeration can be accomplished for the small flow from the facilities, likely using passive aeration systems such as drip towers or cascades over roughened surfaces.

37. It is the Port's belief that there is uncertainty in the application of all predictive models; however, the degree of uncertainty is reduced through the process of model calibration. The Hydrologic Simulation Program-Fortran (HSPF) model was calibrated using the recorded flow data available. The calibration of the HSPF model is presented in the *Comprehensive Stormwater Management Plan*, Volume 3, Appendices B1 (Des Moines Creek) and B2 (Miller/Walker Creek) and was not, therefore, reiterated in the *Low Streamflow Analysis* report.

The comment misrepresents how the model results were used, and this is important when characterizing the significance of model uncertainty. The analysis results were not used to establish target flows for the stream systems, but rather they were used to estimate the low streamflow impacts from the proposed project to guide the design of mitigation measures. Therefore, the degree of uncertainty in model results would apply strictly to the proposed mitigation; the uncertainty would amount to a percentage of a small percentage of the total low flow in the stream systems. To place the uncertainty of the flow estimates in context, the low flow volumes in the streams are dominated by hydrologic and geohydrologic responses to conditions that lie outside the Sea-Tac Airport area.

38. Tables were provided by Parametrix in a November 28, 2000, memorandum.

39. The *Low Streamflow Analysis* report specifically considered wetting of filter strips from direct precipitation at:

- p. 10, item 3, where total water input to the filter strip includes runoff from pavement plus direct rainfall on the filter strip.
- p. 11, 1st and 2nd paragraphs, references to consideration of direct rainfall on filter strips in assessing infiltration capacity
- Figures 1, 2 and 3, plots of "rainfall on filter strip"

Page 15 paragraph 1 refers to incident precipitation being considered in Figures 4, 5 and 6.

40. The Port has acknowledged that some environmental contamination has occurred in the fifty-plus years of operations at the Airport. The Port and its tenants continue to work with Ecology under the Model Toxics Control Act (MTCA) to monitor and remediate contamination within the Airport Operations and Maintenance Area (AOMA) and elsewhere at the Airport. In addition, the Port is complying with the MTCA Agreed Order that it entered into with Ecology on May 25, 1999. Under the Agreed Order, the Port is studying groundwater contamination at the Airport.

As described in the May 1999 Agreed Order, the AOMA is the area of the Airport where most aircraft fueling and maintenance operations have historically occurred. Within the AOMA, contaminated groundwater exists in several localized, discrete sites. The boundaries of the contaminated groundwater have been defined by site investigation data that were obtained through the placement and sampling of groundwater monitoring wells. Ground water monitoring continues where appropriate. The factual record does not support the commentor's assertions regarding existing soil contamination. Known contaminated sites at the airport are managed consistent with MTCA.

41. Construction of the Aircraft Hydrant Fueling System (AFS) should not accelerate the migration of soil or groundwater contamination. For example, contrary to the commentor's assertion, the AFS will not be constructed with porous backfill material. The estimated volume of soil excavated for construction of the AFS is 45,000 cubic yards, and the system piping backfill will mostly consist of controlled density fill (a lean concrete mix that is relatively impermeable), rather than soil or sand backfill materials. The AFS routing crosses several known contaminated areas. Each of these areas has been, or will be,

investigated, characterized, and managed consistent with MTCA. Construction activity that encounters contamination in known contaminated areas will be conducted such that contamination management and contractor activity are consistent with MTCA and other applicable environmental regulations. In the event that unanticipated contamination is encountered during construction activity, contamination management and contractor activity will be consistent with MTCA requirements, and investigation and characterization of the encountered contamination will be performed as appropriate.

42. It is the Port's belief that construction of the Master Plan Update improvements will not result in preferred pathways for contaminant migration. Within the Airport Operations and Maintenance Area (AOMA), areas of contaminated groundwater exist in both shallow perched zones and in the shallow regional aquifer (Qva). The perched zones are isolated and discontinuous, while the Qva is continuous.

Evidence collected from individual site investigations within the AOMA have demonstrated that existing perched zone contamination has remained localized within the AOMA and that it has not migrated significantly along constructed utilities or infrastructure, despite the very significant density of such underground facilities in the AOMA. The results of the previous investigations and the discontinuous nature of the perched zones, support the conclusion that construction activity should not materially impact the migration of the existing perched zone contamination.

Similarly, evidence collected from individual site investigations within the AOMA have also demonstrated that existing Qva aquifer contamination remains localized, despite the presence of several facilities that have been constructed at depth within the AOMA. There is no evidence that the Qva contamination has migrated significantly, and the available evidence demonstrates that it remains located well within the AOMA. Accordingly, construction of other infrastructure should not create a contaminant pathway that would accelerate the off-site migration of the existing contamination in the Qva aquifer.

43. As noted above, contaminated sites are managed in accordance with the Model Toxics Control Act (MTCA), using typical MTCA site management techniques. With respect to the Crawford remediation, as described clearly in the remediation documentation, contaminated soil was bioremediated; the resulting soil was determined to be clean in accordance with MTCA, and was beneficially reused by being combined with other soil for use as fill. Crawford soil that was not fully bioremediated was removed for appropriate offsite treatment.

44. To date, the Port has spent over $1,000,000 to comply with the Agreed Order and to complete the groundwater study. Project work is ongoing, currently awaiting required approvals and additional input from Ecology in anticipation of the next funding approval cycle. The Master Plan Update improvements and the MTCA groundwater study are distinct projects with separate funding sources.

Smith and Lowney, February 16, 2001 letter

The responses in this section have been prepared from the Port's perspective and knowledge.

1. The commentor is correct in the statement that the Corps must ensure that the Master Plan Update projects conform to the Washington State Implementation Plan. In accord with 40 CFR Part 91, a conformity evaluation was prepared and the Master Plan Update projects were shown to conform to the State Implementation Plan (SIP). The Federal Aviation Administration (FAA) made a conformity finding, documented in the Record of Decision (ROD) at pages 22 – 24). The FAA's finding was supported by letters from Ecology, dated June 23, 1997, by the US Environmental Protection Agency (EPA), dated July 23, 1997, and by the Puget Sound Air Pollution Control Agency, dated July 23, 1997 (copy provided in Appendix E of the ROD).

40 CFR 93.157(a) states: "The conformity status of a Federal action automatically lapses 5 years from the date a final conformity determination is reported under Sec. 93.155, unless the Federal action has been completed or a continuous program has been commenced to implement that Federal action within a reasonable time." As the conformity timeline will not lapse until July 3, 2002, this finding is still valid.

40 CFR Part 93.157(c) further states "If, after the conformity determination is made, the Federal action is changed so that there is an increase in the total of direct and indirect emissions, above the levels in Sec. 93.153(b), a new conformity determination is required." The Port has continued to assess the progress of the Master Plan Update projects and found that emissions are equal to or less then the de-minimis threshold.

The Final Conformity Analysis, presented in Appendix B of the *Final EIS*, noted the following emissions for the peak year of project-related emissions:

Peak Year Project Emissions (tons per year)

FSEIS/ROD Emissions	CO	NOx	VOC
Operating emission	(127)	(28)	(12)
Construction emission	99	118	18
Total	(28)	90	6
De-minimis threshold	100	100	100

Because the emissions were less than the de-minimis thresholds, the FAA determined that the project conformed to the SIP, as enabled by 40 CFR Part 93.

With changes that have occurred in the Master Plan Update, as noted in the Introduction to the Response to Comments, the Port has re-calculated the construction emissions. Based on those calculations, such that the total direct and indirect emissions are estimated as:

	Peak Year Project Emissions (tons per year)		
Revised Emissions	CO	NOx	VOC
Operating emission	(127)	(28)	(12)
Construction emission	116	121	24
Total	(11)	93	12
De-minimis threshold	100	100	100

The *Final Supplemental EIS* Appendix B estimated that the peak year of emissions would occur in 2000, primarily due to construction activity. As the peak year of construction emissions has been identified as

associated with the fill haul for the Third Runway, that peak year is now estimated to occur in either 2002 or 2003. Therefore, the emissions noted above reflect that the peak year of emissions would now occur 2 years later than earlier estimated. However as the emissions remain less than the de-minimis threshold, the projects continue to conform to the SIP.

It is the Port's belief that because the emissions have not increased above de-minimis as a result of changes in the project, no further analysis is required.

2. The Port is in compliance with its National Pollution Discharge Elimination System (NPDES) permit issued under Section 402 of the Federal Clean Water Act and Washington State regulations, WAC 173-201A-160(3)(d). The Port's NPDES permit is the regulatory permit that assures that "activities which generate stormwater" comply with state water quality standards. This comment indicates a focus on "end of the pipe" measurements that have not had the benefit of dilution. However, the citation in the comment allows for dilution "after consideration of disposal site dilution and dispersion ..." The data collected by the Port of Seattle is "end of pipe" data, which does not demonstrate violation of water quality standards in the receiving water body. By employing best management practices (BMPs) prior to discharging its stormwater, the Port is using all known available and reasonable treatment (AKART)and therefore entitled to dilution in determining compliance with water quality standards. Moreover, the data is stormwater data, which cannot be used absent consideration of storm events to determine compliance with water quality standards.

In compliance with its NPDES permit, the Port has tested the toxicity of its stormwater discharges directly using whole effluent toxicity (WET) testing. These tests, conducted using sensitive aquatic organisms following EPA protocols, have shown that undiluted stormwater (100 percent stormwater) from three of four tested outfalls is not toxic to aquatic life. Of particular note is the fact that stormwater from SDS3 drainage basin was not toxic. This 149-acre drainage basin is the largest at Airport and is representative of future taxiways and runways. For the outfall that produced measurements outside the acceptable WET range, the Port has identified the source of the pollutant that caused toxicity-- a metal roof. This problem can be fixed and the Port is taking steps to do so.

In addition to the WET testing, the Port has conducted a Water Effects Ratio (WER) bench screening analysis to estimate whether metals criteria should be adjusted for site-specific characteristics pursuant to WAC 173-201A-040(3), note dd, which authorizes such analysis. The result of this analysis showed that the stormwater would not exceed potential site-specific standards.

It is also important to note that water quality criteria are derived using relatively "clean" laboratory water that does not contain constituents such as particulate matter, as well as the organic and inorganic ligands in surface water and stormwater that compete and combine with the metals to reduce their toxicity. This reduced bioavailability of metals has been corroborated elsewhere and for many surface waters.

The Port's NPDES permit requires monitoring of all Port storm drains that drain areas associated with industrial activity. Five years of permit-required monitoring from Port stormwater outfalls has shown that airfield runoff has concentrations of pollutants lower than typical urban runoff in the Seattle metropolitan area. Moreover, it is anticipated that implementation of the *Comprehensive Stormwater Management Plan* will improve stormwater quality.

The Port believes the commentor has assumed that the proposed future activities will generate increased concentrations of copper, zinc, and lead in Airport stormwater. As discussed in the *Final EIS*, metal concentrations in stormwater from Airport in the future will either be unchanged or lower than the environmental baseline, as a result of increased water quality treatment and detention. Areas where stormwater is currently not treated will be retrofitted to improve water quality. In addition, for areas with

new impervious surfaces, stormwater will be detained and treated. WAC 173-201A-160(3)(d) states that "the primary means to be used for requiring compliance with the [water quality] standards shall be through best management practices required in waste discharge permits, rules, orders, and directives issued by the department for activities which generate stormwater pollution." As with the Port's current NPDES permit, future compliance with water quality standards will be achieved through implementation of best management practices (BMPs), as required by State regulations.

3. The "secondary effects" that are discussed will be addressed as described in the *Comprehensive Stormwater Management Plan*. These effects refer to stormwater runoff expected from new project areas, many of which are located where existing stormwater discharges occur (in residential areas, for example). Washington State regulations state "the primary means to be used for requiring compliance with the [water quality] standards shall be through best management practices." WAC 173-201A-160(3)(a). Consistent with this regulation, the Port's NPDES permit regulates stormwater discharges from the Airport through the use of BMPs. The *Comprehensive Stormwater Management Plan* (see Section 7.1 and Table 7-8) describes the BMPs proposed by the Port. In addition, existing Airport areas without BMPs in place will be retrofit with BMPs, thereby improving water quality in a manner intended by the NPDES permit.

4. See response to comment 2 above. The Port's NPDES permit does not require monitoring for hardness. The data reported in the Annual Stormwater Monitoring Report are total recoverable metals in Sea-Tac's Airport's stormwater discharge, while the state water quality standards are based on dissolved metals. Therefore, the reported data cannot be directly compared to the State water quality standards.

5. See response to comments 2 and 4 above.

6. See response to comments 2 and 4 above.

7. The proposed modification to the Port's NPDES permit addresses modifications to the Port-owned property to which the permit applies, and clarifies the receiving waters to which the Port discharges. All of the areas covered by the Master Plan Update, with the exception of the SR 509 Temporary Construction interchange, are already covered by the Port's NPDES permit. Construction of the 509 Interchange work has not started and will not start until the modification has been issued. The permit includes provisions more stringent than the NPDES general construction permit, and includes a monitoring requirement. Inclusion of the SR 509 Temporary Interchange area in the permit coverage area *increases* the requirements for compliance with NPDES. See also General Response GLR13 concerning SR 509.

8. See response to comment 2 above. Additionally, the data collected by the Port of Seattle is "end of pipe" data, which does not demonstrate violation of water quality standards in the receiving water body. By employing BMPs prior to discharging its stormwater, the Port is using all known available and reasonable treatment (AKART). Compliance with state water quality standards in such circumstances should be measured in the receiving waters using appropriate mixing zones and dilution within those waters. Moreover, the data is stormwater data, which cannot be used absent consideration of storm events to determine compliance with water quality standards. Ecology has reasonable assurance that state water quality standards will be met. Finally, the proposed NPDES permit modification identifies discharge points and subjects additional areas of the Port to compliance with the NPDES permit. For that reason, the modification will improve protection of water quality at the Airport.

9. See response to comments 2 and 8 above. Based on the Port's compliance with its NPDES permit, the results of testing and analysis reported above, and the water quality protections included in the

Port's *Comprehensive Stormwater Management Plan* (see Section 7). Ecology has reasonable assurance that state water quality standards will be met.

Des Moines Creek is listed on the 303(d) list for fecal coliform bacteria only.

10. Mitigation for wetland impacts is designed to mitigate for the suite of wetland functions impacted by the project. The mitigation plan is designed to replace, restore, and/or enhance *all* wetland functions impacted by the project, as clearly explained in the *Natural Resource Mitigation Plan* (Chapter 4). Furthermore, the mitigation as designed will restore degraded wetland, stream, and stream buffer areas to higher levels of ecological function for the broad range of functions impacted. For example, the proposed mitigation will restore wetlands adjacent to Miller and Des Moines Creeks that are currently dominated by turfgrass or farmland, with forested or shrub vegetation, greatly increasing organic carbon export, nutrient and sediment trapping, and amphibian habitat functions (Sections 5.1.1, 5.1.2, 5.1.3, 5.2.1, 5.3.1, and 5.3.2). This action will create some habitat for passerine birds and small mammals, and will eliminate some waterfowl habitat. The wetland mitigation along Miller Creek, including the riparian buffer enhancement and the Miller Creek instream enhancements will all improve habitat for resident and anadromous fish compared to existing conditions (Section 5.2.2).

The functions that are the focus of the mitigation plan proposed for the Miller and Des Moines Creek basins are:

- resident/anadromous fish
- amphibians
- export of organic matter
- sediment/nutrient trapping
- groundwater exchange
- flood storage (minor component at Vacca Farm)

The selected mitigation sites and design approaches will generally provide these functions at moderate to high levels.

The functions targeted for restoration at the Auburn mitigation site (Chapter 7 of the *Natural Resource Mitigation Plan*) include all of the above, (except resident and anadromous fish) plus:

- waterfowl habitat
- passerine bird habitat
- small mammal habitat

Waterfowl (i.e. avian) habitat replacement is a component of the Auburn mitigation site, but not of the on-site mitigation. Even though avian habitat replacement is one of the goals of the Auburn mitigation site, most of the Auburn mitigation will replace, restore and enhance high quality forested and shrub wetlands. These wetlands are designed to function at high levels for passerine bird habitat, waterfowl, amphibian habitat, small mammal habitat, nutrient and sediment trapping, groundwater exchange and flood storage.

Waterfowl habitat will not be replaced on-site at the airport for air travel safety reasons. The Federal Aviation Administration (FAA) has adopted policies to control wildlife hazards at or near airports and has made compliance with these policies a requirement for airport improvement funding and airport certification. 14 CFR 139.337 (*Wildlife Hazard Management*); 47 U.S.C. 47107(9) (assurance of safe airport operation a pre-requisite to FAA funding); and Advisory Circular 150/5200-33 (*Hazardous Wildlife Attractants On Or Near Airports).* These policies apply to wetland mitigation projects

constructed to replace wetlands that are lost to airport development, which will occur when the Master Plan Update improvements are constructed by the Port at the Airport.

Bird species in the Master Plan Update project area are common species typical of urban and suburban habitats of western Washington. They are dispersed widely over the landscape, and their distribution is not limited by the topography that defines the Miller, Des Moines and Walker Creek sub-watersheds. The tendency for many of these migratory (and resident) birds to disperse widely and use urban habitat for breeding and migration shows that migration corridors will not be eliminated and that large amounts of marginal urban habitat suitable for use by migrating birds will remain following Master Plan Update project development. Since urban habitats similar to those being eliminated are common in Puget Sound and the Airport vicinity, significant impacts on the regional populations of birds are unlikely. The mitigation project at Auburn will provide valuable replacement habitat for all bird species that potentially occur in habitat altered by Master Plan Update projects.

The project impacts to wildlife, habitat, and vegetation has been thoroughly assessed in the *Final EIS*, *Final Supplemental EIS*, and supporting documents. Based on the analysis presented in these studies, there are no "remnant natural areas" that have not been previously subjected to development, land clearing, or farming. Where somewhat natural vegetation remains, it is typically of early successional status or contains a high percentage of invasive and ornamental species.

11. See response to comments 2 and 8 above. The existing and any future National Pollution Discharge Elimination System (NPDES) permits must be conditioned to comply with the anti-degradation requirements of the Clean Water Act. (Fact Sheet to NPDES Permit No. WA-002465-1, p. 23; WAC 173-201A-070). The Fact Sheet issued with the Port's NPDES permit states: "The Department has reviewed ambient water quality monitoring results gathered by the Port in the Stormwater Receiving Environment Monitoring Report (June 1997) and the data included in the Des Moines Creek Basin Plan (November 1997). The Department will use the Class AA water quality criteria for Des Moines Creek and Miller Creek in the proposed permit. The discharges authorized by this proposed permit should not cause further degradation which would interfere with or become injurious to existing beneficial uses." (Fact Sheet p. 23). By issuing the current NPDES permit, the Department of Ecology has determined that the discharges from the Airport do not violate the state's anti-degradation policy. Because the Airport is mandated to obtain a NPDES permit for stormwater discharges associated with industrial activity, the Department has reasonable assurance the activity that is the subject of the §401 Certification complies with the anti-degradation requirements of the Clean Water Act.

12. The Fact Sheet issued with the Port's National Pollution Discharge Elimination System (NPDES) permit states: "The Department has reviewed ambient water quality monitoring results gathered by the Port in the Stormwater Receiving Environment Monitoring Report (June 1997) and the data included in the Des Moines Creek Basin Plan (November 1997). The Department will use the Class AA water quality criteria for Des Moines Creek and Miller Creek in the proposed permit. The discharges authorized by this proposed permit should not cause further degradation which would interfere with or become injurious to existing beneficial uses." (Fact Sheet p. 23). By issuing the current NPDES permit, Ecology has determined that the discharges from the Airport do not violate the state's anti-degradation policy.

As discussed in response to comment 2 above, the observed non-toxicity of undiluted stormwater demonstrates.that the Port's discharges do not degrade the receiving waters.

Furthermore, by modeling the transport of metals in stormwater discharge, the Port's *Biological Assessment* (Parametrix, 2000) found that the predicted concentrations of metals at the mouth of Miller and Des Moines Creeks would not result in any significant effects to chinook salmon or bull trout.

13. See response to comment 10 above.

14. With respect to the cumulative impacts noted in this comment, see General Response GLR19 on the analysis conducted with respect to cumulative impacts of projects undertaken by both the Port and other parties in and around the area of Sea-Tac Airport.

IV. RESPONSES TO ELECTED OFFICIALS, CITIZENS, AND GROUPS

The Responses to Citizens, Groups and Elected Officials has been placed in order of group or individual last name. Because of the number of comments from individuals, where repetitive communications have been submitted, the Port has attempted to identify the source (hearing testimony, hearing card, email, letter, etc.)

As stated in Section I (Application History) of this response document, the December 27, 2000, Public Notice asked the public to address specific changes to the project since the 1999 Public Notice. As such, the Port's responses to this iteration of comments focus on new issues and concerns that were not addressed in previous response documents.

When multiple comments were received on similar groups of issues, general responses were prepared and are provided in Section II, *Responses to General Comment*, and are referenced as GLR-# (where the number refers to a sequential number indexed to the issue). In addition, Section III, *Responses to Agency Letters*, provides details on specific technical issues, many of which were also raised by citizens, groups and elected officials. The narrative responses in Section IV cover issues not addressed previously, or those not addressed in either Section II or Section III of this response document.

Bruce Agnew, Hearing Transcript (2)

See General Response GLR17. The PSRC gave extensive consideration to rail alternatives, as shown in the *Final EIS* and *Final Supplemental EIS*. While rail would aid surface mobility within the Pacific Northwest, it would not obviate the need for the third runway.

Air Transportation Association (Ed Merlis), January 26, 2001

Comment of support for the project noted.

Brie Anderson, January 27, 2001 hearing card

Comment noted.

Michael L. Anderson, January 26, 2001 hearing card

Request to testify noted.

Michael L. Anderson, January 27, 2001 hearing card

Comment noted.

Mike Anderson, CASE January 26, 2001 hearing comments and letter:

See the benefit cost evaluation discussed in response to comment 4.5 from RCAA (Februuary 16, 2001 letter). As noted by the testimony and comments at the hearing from the Ed Merlis, Vice President of the Air Transport Association (dated January 26, 2001) the airline industry supports the development of the third runway at Sea-Tac. However, early in the process, airline support was not

vocal: as is typical to any situation where multiple users operate at a facility at varying activity levels, those users maneuver to minimize their share of the cost. The carriers operating at Sea-Tac have resolved the funding of the runway and have voted by majority-in-interest to approve and pay for the non-federally funded costs associated with the Third Runway and Master Plan Update projects.

See also response to General Responses GLR16 through GLR18 concerning the validity of the EIS, consideration of alternatives and measurement of delay. See also General Responses GLR9 through GLR11, concerning noise and air pollution.

Mike Anderson, Hearing Transcript (1)

See General Response GLR18 concerning delay.

The Port estimates for the cost of building the third parallel runway is $773 million (estimated in June 1999). Throughout the planning process, the project has been the subject of extensive consideration of the project cost and benefits. A requirement of the federal grant process is the conduct of a benefit cost evaluation that is included in support of the Port's Letter of Intent application. That benefit cost evaluation was prepared subject to federal guidelines (dated December 1999 which finalized interim guidance adopted by the Federal Aviation Administration (FAA) in 1997). This guidance, titled, "FAA Benefit Cost Analysis Guidance," was issued by the FAA's Office of Aviation Policy and Plans and is used "to provide clear and thorough guidance to airport sponsors on the conduct of project-level benefit-cost analysis (BCA) for capacity-related airport projects... Airport sponsors should conform to the general requirements of this guidance for all BCA's submitted to the FAA." The BCA guidance was developed in response to guidance from Congress citing the need for economic airport investment criteria. To enable the FAA to issue a Letter of Intent (a mechanism used to obtain multi-year grant commitment from the FAA for funding from the Airport and Airway Improvement Program), projects must have a present value benefit that exceeds the present value costs. As is shown by the Third Runway BCA, the project provides substantially greater value than the minimum requirement.

In 1997, the FAA estimated that the Project would result in delay savings, to airlines and their passengers, in excess of $2.7 billion in present value through 2015. These estimated benefits, which may now be conservative, exceed the $600 million present value of the runway's maintenance costs and updated capital costs by a ratio of 4.5 to 1.

See General Response GLR6 concerning the MSE wall, and General Response GLR5 concerning windshear from the wall.

Mike Anderson, December 19, 2000 email 4:47 pm

Comment noted concerning hearing requests.

Mary F Bardon, January 27, 2001 hearing card

See General Response GLR6 concerning the wall design, and response to GeoSyntec February 16, 2001 letter.

Cliff Argue, Hearing Transcript (1)

Comment noted.

Marilyn Ayres, Hearing Transcript (2)

Simultaneous parallel arrivals on three runways are not anticipated because of the close spacing between the runways. The *Final EIS* and *Final Supplemental EIS* examined runway use and presented actual assumptions, based on FAA simulation of the airfield operational performance during specific activity levels. *Final Supplemental EIS* Table C-3-14 shows the anticipated use of the third runway, noting that the runway would primarily be used for arrivals, but would be used for departures about 2.5% in south flow and 1.6% in north flow.

Michael Bailey, Hearing Transcript (1)

Comment noted.

James Barei, January 26, 2001 hearing card

Comment noted.

Karl Bargmeyer. January 27, 2001 hearing card

Comment noted. See General Response GLR17 regarding alternatives considered.

Joseph Barreca Sr. January 27, 2001 hearing card

Comments noted.

Joseph Barreca, Hearing Transcript (2)

See response to Hockaday's February 16, 2001 letter concerning runway crossings and safety. See General Response GLR2 and GLR3 concerning fill contamination.

Jim Bartlemay, memo from COE admin to Graves, Undated

Comment noted concerning hearing location.

Jim Bartlemay, February 16, 2001 email 3:00 pm with letter attached

Comments concerning the NPDES permit noted.

Jim Bartlemay, Hearing Transcript (1)

See General Response GLR17 concerning alternatives considered.

The Port has been very clear that local real property tax dollars are not being used to fund the construction or operation of Sea-Tac Airport. The Port is authorized under Washington State law to levy property taxes within King County for general Port purposes. The allowable amount of the tax levy is generally subject to two limitations: (1) the total levy rate may not exceed $0.45 per thousand dollars of assessed value; and (2) annual increases in the amount of the levy are restricted to the lesser of inflation or 6%. The annual increase in the allowable levy is based on the amount of taxes that could have been levied in the previous year, even if the Port did not levy the full amount.

The tax levy is available for general Port purposes, but may not be used to pay debt service on Revenue Bonds. By policy the Port uses the levy solely for marine-related capital expenditures and community investments such as the Port JOBS program. No tax levy dollars are used for the Airport. Since 1992, the Port Commission has held the amount of the tax levy flat at $35.6 million per year. In 1999 the budgeted levy rate is $0.24/$1,000 of assessed value. The Port's Tax Levy comprises less than 3% of total King County property taxes.

In 1989, Congress enabled airports to collect a passenger facility charge (PFC) of up to $3.00 per passenger departing from the airport, for approved purposes. Most large airports levy a PFC to offset airport development needs. Although airports have somewhat more flexibility in designating projects to be funded through PFCs, actions included in the PFC must also be approved by FAA. Recently enacted legislation (AIR-21) has increased the authorization for PFCs from $3.00 to $4.50. Port Commissioner Clare Norquist responded to Mr. Caldwell's comments about use of the PFC in his letter dated December 14, 2000.

See General Response GLR17 concerning alternatives.

Jim Bartlemay –January 26, 2001 hearing comments and letter

See General Response GLR17 regarding the consideration of alternatives.

Jim Bartlemay, December 18, 2000 email 3:30 pm

Comment noted concerning hearing requests.

Janet Bartlemay & Gregory Baker, February 15, 2001 letter

See also General Response GLR18 concerning the delay at Sea-Tac. With respect to comments on the design of the retaining wall, see General Response GLR6 on MSE Wall with respect to engineering of wall, peer review of engineering analysis, and design review by the Corps of Engineers.

Cathy Barton, January 26, 2001 hearing card

See response to Dan Caldwell's January 27, 2001 letter.

Patrick Bauson , January 27, 2001 hearing card

The Port is confident that it has the engineering resources to complete the project. See General Response GLR6 and the response to GeoSyntec's February 16, 2001 letter.

Robert Becker, November 9, 2000 letter

Comment noted concerning hearing requests.

? Bell, November 12, 2000 letter

Comment noted concerning hearing request.

Bellevue Chamber of Commerce (Connie Grant and Sarah Langton), February 13, 2001 letter

Comment of support for the project noted.

Patrick Benson, February 5, 2001 letter

Comment noted. See Introduction to these responses to comments concerning history of the project. See General Responses GLR6 (wall) and GLR10 (noise). See the Port's 2000 *Wetland Functional Assessment and Impact Analysis*. See the Port's 2000 *Biological Assessment*. See the Port's 2000 *Comprehensive Stormwater Management Plan*.

The *Final Supplemental EIS* presents a detailed examination of the effects of the project on surface traffic conditions.

Partrick Benson, Hearing Transcript (2)

The use of ten years of hourly weather observations is a generally accepted practice for purposes of estimating the relative occurrence of poor weather of various ceiling and visibility conditions. While the duration and timing of any occurrence relative to peak operating periods may affect estimated delays, the use of a ten-year average against peak month average day activity levels provides a reasonable and methodologically acceptable estimate of the expected annual delay impact (even though the database may include 11 winters and 10 summers). Table A shows the weather conditions and associated occurrence –VFR2 through IFR conditions is considered poor weather.

Table A

Operating Scenario	Ceiling/Visibility	Runway Operating Configuration	% of Occurrence
VFR 1	5,000 feet and above/ 5 miles and above	Independent Arrivals & Departures with dual approach streams	56.1%
VFR 2	2,500 to 4,999 feet/ 3 to 5 miles	Single arrival stream with additional aircraft under ceiling	19.7%
IFR 1	800 feet to 2,499 feet/ 2 miles and above	Single Approach Stream	17.0%
IFR 2	Not Applicable/ 1,800 RVR to 2 miles	One Approach Stream - Protect Glideslope	5.4%
IFR 3	Not Applicable/ 600 RVR to 1,799 RVR	Same as IFR 2 - No Arrivals to the North	1.5%
IFR 4	Not Applicable/ 600 RVR and below	Low visibility plan - one runway	0.3%

Source: Seattle-Tacoma International Airport - Capacity Enhancement Plan Update, July, 1995,
RVR - Runway Visual Range.

See General Response GLR6 concerning the mechanically stabilized earth wall. The Port believes the 2000 *Comprehensive Stormwater Management Plan* adequately addresses stormwater impacts and mitigation needs. This document was produced and available for the public comment period. See General Response GLR9 concerning the Port's efforts to sound insulate schools.

Cheryl Bentley, November 8, 2000 letter

Comment noted concerning hearing request.

Benzenar-Kerr Communication, Undated letter

Comments noted.

Bruce Berglund, November 9, 2000 letter

Comment noted.

Beatrice Bernhardsen, January 26, 2001 letter

Comment noted.

Beatrice Bernhardsen, January 25, 2001 letter

Comment noted.

Harold Bernhardsen, January 25, 2001 letter

Comment noted.

Harold Bernhardsen, January 23, 2001 letter

Comment noted.

Mark Bloome, January 23, 2001

Comment noted.

Alice Bilz, January 27, 2001 hearing card

See the Port's 2000 *Natural Resource Mitigation Plan* and the 2000 *Wetland Functional Assessment and Impact Analysis*.

Mr. & Mrs. Bocek, November 8, 2000 letter

Comment noted concerning hearing.

The Boeing Company (Alan Ralston), January 23, 2001 letter

Comment of support noted.

Robert Bolles, February 13, 2001 letter

The 1996 *Final EIS* and 1997 *Final Supplemental EIS* addressed the impact of the project on 23 environmental disciplines, as required by the National Environmental Policy Act and State Environmental Policy Act. Several specific sections of the EIS addressed impacts on wildlife: endangered species of flora and fauna, Plants and Animals (Biotic Communities), and wetlands.

Commentors appear to believe that because certain species of fish were not listed as threatened or endangered at the time the FEIS/FSEIS was prepared that there was inadequate consideration of the impact of the project on fish species. The Plants and Animals (Biotic Communities) section (Chapter IV, Section 16) discusses the impact of the project on fish. See also General Response GLR8 concerning the review of Endangered Species issues.

Further, in January 2000, the Port issued an addendum under the Washington State Environmental Policy Act (SEPA) entitled "Addendum To Final Environmental Impact Statement and Final Supplemental Environmental Impact Statement For Proposed Master Plan Update Development Actions at Seattle-Tacoma International Airport". This addendum addressed project changes and the identification of additional wetlands once the Port had obtained access to lands to build the new runway embankment.

See General Response GLR16 concerning the validity of the 1997 Record of Decision.

See also General Responses GLR17 and GLR19 concerning alternatives considered and cumulative impacts.

Ann Bonney (1/27/1999, 1/11/2000, 2/22/2000, 3/7/2000, 3/14/2000, 3/22/2000, 4/6/2000, 4/16/2000, 4/18/2000, 4/20/2000, 4/24/2000, 4/20/2000, 4/30/2000, 5/2/2000, 5/16/2000, 5/22/2000, 6/6/2000, 8/16/2000, 8/8/2000, 8/12/2000, 8/18/2000, 8/18/2000, 8/20/2000, 8/21/2000, 8/22/2000, 8/24/2000, 9/15/2000,9/19/2000, 9/19/2000, 9/20/2000, 9/27/2000, 10/11/2000, 10/30/2000, 11/6/2000, 11/9/2000, 12/6/2000, 12/13/2000, 1/2/2001, and two undated)

Citizens living adjacent to Sea-Tac Airport have representation in the State or federal government, as well as the ability to express opposition to or an opinion regarding the Port's application. In fact, both Ms. Bonney's State and federal legislative representatives have commented on the Port's application. In addition, her own individual comments have been received and noted.

The comment requests that the FAA fund legal counsel or an "arbitration board" to consider "FAR 150 funds." The FAA lacks authorization to fund the provision of counsel or arbitration for private citizens or interest groups that either support or oppose the Port's Master Plan Update project.

The Corps has jurisdiction over the Port's §404 application. The Port's Master Plan Update projects are subject to Washington state statutory law. In addition, the Port has applied for the §404 permit and the Port acknowledges the applicability of federal statutory law and regulations.

Pursuant to the law, the Corps and Ecology have jurisdiction to determine if the permits sought by the Port should be granted. In connection with that review, both the Corps and Ecology have the responsibility to decide what mitigation should be required for the impacts arising from the Port's proposed projects on the neighborhoods surrounding Sea-Tac Airport. The Port has identified funding to pay for mitigation required by the Corps and/or Ecology.

Al. H. Borer, January 27, 2001 hearing card.

Comment noted.

Margaret Boyle, February 5, 2001 letter

Comment noted.

Gary Brackett, Hearing Transcript (1)

Comment noted.

William Bracket, January 26, 2001 hearing card

Comment noted.

Boysen & Boysen LLC (Boysen-Heiberg), January 29, 2001 letter

Comment of support for the project noted.

Gary Bracket, January 26, 2001 hearing card

Request to testify noted.

John Braly, Hearing Transcript (2)

The development of the third runway embankment or MSE wall would not have a significant effect on the propagation of noise from aircraft activity. While the project entails the removal of trees and acquisition of residential properties, which will enable a slight increase in noise from aircraft operating on the airfield, noise exposure would be expected to increase less than 1 dBA, a level that is not significant.

Nancy Brant, Hearing Transcript (2)

See General Response GLR6 regarding concerns with the MSE wall.

William Brant, Hearing Transcript (2)

See response to Patrick Benson hearing comments concerning weather at Sea-Tac and the need for the third runway. See response to Hockaday's February 16, 2001 letter concerning runway crossings and safety.

Joe Brennan, Hearing Transcript (2)

Comment noted.

Arlene Brown, February 16, 2001 email and attachment

See General Response GLR17 regarding alternatives.

See response to Helsell Fetterman concerning the conduct of an additional EIS and General Response GLR16. See letters from Air Transportation Association and the Seattle Airlines Airport Affairs letter submitted comments demonstrating their support for the project.

See response to Stephen Hockaday and Geoffrey Gosling concerning safety.

See response to Dan Caldwell's January 27, 2001 letter concerning project cost and RCAA's February 16, 2001 response to comment 4.5.

See response to Debi Wagner February 16, 2001 letter concerning health issues and General Response GLR11.

See response to Smith & Lowney concerning air conformity.

See General Response GLR4 regarding Maury Island.

Comment noted concerning impact of "second" runway (16R/34L). See also General Response GLR11 concerning air pollution conditions. See response to GeoSyntec February 16, 2001 letter regarding wall stability.

The *Final EIS* (Chapter IV, Section 6, Pages IV.6-4 through IV.6-7) considered environmental justice related issues. As was shown, the Master Plan Update projects were found to not create a disproportionate impact on low-income or minority populations. The FAA's findings regarding Environmental Justice are documented in the 1997 Record of Decision on Page 29.

Attachments noted.

Arlene Brown, January 26, 2001 hearing card

See response to Brown's February 16, 2001 communication.

Arlene Brown, Hearing Transcript (2)

See General Response GLR11 concerning air pollution. See response to Hockaday's February 16, 2001 letter concerning runway crossings and safety.

Arlene Brown, September 15, 2000 email 10:13 pm

Comments on the *State Fill Hydrological Study* noted.

Arlene Brown, September 12, 2000 letter

Comments on the *State Fill Hydrological Study* noted.

Arlene Brown, September 6, 2000 email 6:21 pm

See General Response GLR6 and responses to the GeoSyntec February 16, 2001 letter.

Arlene Brown, May 7, 2000 letter

See General Response GLR13 concerning the temporary construction interchange on SR 509.

Derek Brown February 17, 2001 email 12:01 am

Comments noted. See response to RCAA's February 16, 2001 comment 4.5 and General Response GLR10 concerning noise.

Mary and Joseph Bruce, May 24, 2000 letter

Comment noted.

Mary R. Bruce January 23, 2001 letter and (hearing testimony)

The Master Plan Update recognized that the airframe manufacturers were considering the development of a new large aircraft. The existing runway system at Sea-Tac would enable that aircraft, as presently envisioned to operate. The Third Parallel runway would only enhance the operation with the new large aircraft, as that project is intended to address poor weather arrival delays.

See response to RCAA's February 16, 2001 comments.

As is documented in the *Final EIS*, the Third Runway at a length of 8,500 feet is capable of handling on arrival 99% of the aircraft types currently in operation or expected to be in operation through 2010. As shown in Table II-3 of the *Final EIS*, the 8,500-ft length also enables 90% of the aircraft in operation to use the runway. As the purpose of the project is to alleviate arrival delay during poor weather, its primary use is for arrivals (departure are expected to use the runway, but not as frequently as the other existing runways). The one aircraft type that is not capable of landing with maximum landing weight on the new runway would be expected to use an existing runway, as was assessed in the *Final EIS* and *Final Supplemental EIS*.

With respect to cumulative impacts, including extension of SR 509, see General Response GLR19on the analysis conducted with respect to cumulative impacts of projects undertaken by both the Port and other parties in and around the area of Sea-Tac Airport. The PSRC reviewed and considered 40 different sites for a supplemental airport and concluded that construction of the third runway was the least environmentally damaging alternative that would accomplish the purpose of reduction of bad weather operating delay.

Patti & Charles Burgess, January 8, 2001 letter

See General Response GLR19 on the analysis conducted with respect to cumulative impacts of projects undertaken by both the Port and other parties in and around the area of Sea-Tac Airport. The Port's *Comprehensive Stormwater Management Plan* was reviewed by the regulatory agencies, including the Corps, Ecology, and King County. The Plan complies with the King County Surface Water Manual, which is the accepted standard for stormwater design in western Washington. The impacts and mitigation measures for Miller Creek and Des Moines Creek are set forth in the Master Plan Update *Final EIS* and *Final Supplemental EIS*. The mitigation is intended to preserve the water quality in both of these streams and to preserve and enhance the streamside vegetation and riparian corridors.

City of Burien to DOE/Elardo, February 12, 2001 (2 letters)

Comments on 402 noted.

City of Burien (Sally Nelson) January 25, 2001 letter

Comments noted concerning objections to issuance of the permit. See General Response GLR19 on the analysis conducted with respect to cumulative impacts of projects undertaken by both the Port and other parties in and around the area of Sea-Tac Airport.

City of Burien, January 25, 2001 letter

Comments noted concerning the NPDES Major Modification.

The National Pollution Discharge Elimination System (NPDES) permit process is separate from the §401 Water Quality Certification and §404 permitting process. With any development project, various permitting processes are conducted simultaneously. This project will not be permitted to proceed unless and until all necessary permits are obtained from the appropriate agencies with jurisdiction.

City of Burien, December 19, 2000 letter

Revised reports available before the Public Notice was issued on December 27, 2000, include the: Wetland Functional Assessment and Impact Analysis, Natural Resource Mitigation Plan, Wetland Delineation Report, Comprehensive Stormwater Management Plan, and Seattle-Tacoma Master Plan Update Low Streamflow Analysis. The comment period on the Public Notice was extended beyond the typical 30 days to allow additional time for public and agency review and comment. See General Response GLR12.

City of Burien, December 19, 2000 (unsigned)

See response above.

City of Burien, November 13, 2000

Comment noted concerning hearing request.

City of Burien, April 27, 2000

See response to General Comment GLR13 concerning the temporary construction interchange on SR 509.

City of Burien April 10, 2000

See Response to General Comment GLR13 concerning the temporary construction interchange on SR 509.

City of Burien March 28, 2000 letter to City of SeaTac

The Port is working with the appropriate agencies in the review and approval of the temporary SR 509 interchange and believes that the impacts have been correctly identified and appropriate mitigation has been proposed. The Port cannot comment on the request by Burien to be consulted on the actions of SeaTac that occur on their common boundary.

Richard Burrows, December 19, 2000

Comment noted concerning hearing requests.

Richard Burrows, December 18, 2000 email 2:36 pm

Comment noted concerning the review by King County of the *Comprehensive Stormwater Management Plan.*

Dan Caldwell, January 27, 2001 letter

See response to RCAA's February 16. 2001 letter (comment 4.5). The Port has been very clear that local real property tax dollars are not used to fund the construction or operation of Sea-Tac Airport. The Port is authorized under Washington State law to levy property taxes within King County for general Port purposes. The allowable amount of the Tax Levy is generally subject to two limitations: 1) the total levy rate may not exceed $0.45 per thousand dollars of assessed value; and 2) annual increases in the amount of the levy are restricted to the lesser of inflation or 6%. The annual increase in the allowable levy is based on the amount of taxes that could have been levied in the previous year, even if the Port did not levy the full amount.

The Tax Levy is available for general Port purposes, but may not be used to pay debt service on Revenue Bonds. By policy the Port uses the levy solely for Marine-related capital expenditures and community investments such as the Port JOBS program. No tax levy dollars are used for the Airport. Since 1992 the Port Commission has held the amount of the Tax Levy flat at $35.6 million per year. In 1999 the budgeted levy rate is $0.24/$1,000 of assessed value. The Port's Tax Levy comprises less than 3% of total King County property taxes.

In 1989, Congress enabled airports to collect a fee, up to $3.00 per passenger departing from the Airport, for approved purposes. Most large airports levy a PFC to offset airport development needs. Although airports have somewhat more flexibility in designating projects to be funded through PFCs, actions included in the PFC must also be approved by FAA. Recently enacted legislation (AIR-21) has increased the authorization for PFCs from $3.00 to $4.50. Port Commissioner Clare Norquist responded to Mr. Caldwell's comments about use of the PFC in his letter dated December 14, 2000.

Within the financial community, the Port, its management capability and financial management is viewed very highly. Moody's Investor Services made the following comments about the Port in July 2000:

> Moody's assigns a Aa2 rating, with stable outlook, to the $400 million Port of Seattle Revenue Bonds and Revenue Refunding Bonds, Series 2000A. In addition, Moody's raised the rating on the port's $540 million outstanding parity revenue bonds to Aa2 from Aa3. The rating upgrade recognized the port's strong management that continues to capitalize on its fundamentally strong service area. The rating upgrade also reflects the port's sound financial management, diversified revenue streams, and debt service coverage levels that are expected to remain adequate while the agency continues an ambitious capital improvement program."

This rating is the highest U.S Transportation infrastructure revenue bond rating that Moody's has given to date.

See also General Response GLR18 concerning delay at Sea-Tac.

Dan Caldwell, January 26, 2001 letter and hearing testimony

In 1998, the Highline Water District approached the Port noting that the intertie valve between the Port's water line and the Highline Water District (in the vicinity of South 188th Street, East of the tunnel entrance had been identified as open, with the appearance that one or the other party had been

using water from the other. The Water District notified the Port that it estimated that the Port has used about $250,000 of water from the District's system.

The Port reviewed the condition and noted that the valve had been left open, but had no knowledge of opening the valve. After the initial investigation and subsequent consultant investigation, it was found that there was a pressure differential such that water was unlikely to leave the Highline System and enter the Port system, but rather that the District may have received water from the Port system. Despite that belief, the Port entered into a settlement with the District, whereby the Port compensated the District for $35,000 in consulting fees.

See also General Response GLR4 (salt water incursion).

Dan Caldwell, Hearing Transcript (1)

See response to Dan Caldwell's January 26th and January 27th comments.

Dan Caldwell, Hearing Transcript (2)

See response to Dan Caldwell's January 27th comments.

Dan Caldwell, January 19, 2001 letter

See responses to Dan Caldwell letters dated January 26, 2001 and January 27, 2001.

Dan Caldwell, January 8, 2001 letter

See responses to Dan Caldwell letters dated January 26, 2001 and January 27, 2001.

Dan Caldwell, January 10, 2000

Comment noted.

Dan Caldwell, December 20, 1999 letter

Comment noted.

Dan Caldwell November 9, 2000 fax

See Introduction to the response to comments concerning changes since earlier applications. See also response to Caldwell letters of January 26, 2001 and January 27, 2001.

Marjorie Caldwell, January 27, 2001 hearing card

Comment noted.

Phyllis Campbell (US Bank), January 29, 2001 letter

Comment of support noted.

Carolyn Carpenter, February 16, 2001 letter

Comment noted.

Carolyn Carpenter, Hearing Transcript (2)

Comment noted.

James Carpenter, Hearing Transcript (2)

See General Response GLR6 regarding concerns with the MSE wall.

James Carpenter, February 16, 2001 letter

See General Response GLR6 on MSE Wall with respect to engineering of wall, peer review of engineering analysis, and design review by the Corps of Engineers.

Deanna Carroll, January 27, 2001 hearing card

Comment noted. See also General Response GLR11 concerning air pollution and health.

Erin Carruth, December 22, 2000 email 12:29 PM

Comment noted concerning hearing requests.

Erin Carruth, November 21, 2000 email 7:38 pm

Comment noted concerning hearing requests.

Erin Caruth-Warns and Raymond Warns, May 1, 2000 letter

See General Response GLR13 concerning the temporary construction interchange on SR 509.

Erin Carruth letter 12-9-2000

See General Response GLR17 regarding alternatives considered.

Erin Carruth, December 9, 1999

Comment noted.

John Casseday, December 19, 2000 email 5:12 pm

Comment noted concerning hearing requests.

Jan Cassin to Erik Stockdale, September 5, 2000 email 1:49 pm

Email transmitting information from Parametrix to Ecology – no comment/response from the Port warranted.

Mary Castagna, January 27, 2001 hearing card.

Comment noted. See also response to Dan Caldwell concerning the cost and funding of the project.

CH2M Hill (Derry). February 13, 2001 letter

Comments of Port sponsored independent review of the *Comprehensive Stormwater Management Plan* noted.

Richard Chapman, Hearing Transcript (1)

Comment noted.

Angela Chaufty, January 27, 2001 hearing card

Comment noted – See General Response GLR17 regarding alternatives considered.

Martha Choe to Everett Bilingslea, April 25, 2000 email

Comment noted.

Emma Chopard, January 27, 2001 hearing card

See General Response GLR10 regarding noise. See *Final EIS*, Appendix R, concerning consideration of nighttime curfew.

David Christie, January 27, 2001 hearing card

Comment noted.

The Claremont Hotel (Roth), February 12, 2001 letter

Comment of support for the project noted.

Beth Clark, October 27, 2000 email 2:38 pm

As this represents a communication from the Port, no additional comment/response needed.

Lou Clark, Hearing comments

Comment noted.

Rose Clark, February 16, 2001 email 8:24 pm transmitting letter

See General Response GLR17 concerning alternatives considered.

See General Response GLR1 for a discussion of the proposed Des Moines Beach Park barge terminal and Des Moines Creek conveyor belt; and see also *Final Supplemental Environmental Impact Statement for the Greater Des Moines Comprehensive Plan Amendments and Proposed Conveyor Project*. The conveyor belt project is proposed by a private entity that intends to compete for the job of delivering fill material to the Master Plan Update project sites. The conveyor project is separate

from the Master Plan Update projects. The Master Plan Update projects are not dependent on the conveyor project. The conveyor project is being considered under a separate application for a Corps Section 10 permit. The Port and FAA have concluded that permitting obstacles render the conveyor project infeasible at this time.

See General Response GLR4 concerning Maury Island and seawater intrusion.

This commentor contended that movement of the Police Training Pit (referred to by the commentor as the "Bomb Disposal Unit") to an area near the former View Point Park was inappropriate because of the urban nature of the area, and because of the potential impacts of the facility on the proposed mechanically stabilized wall.

Moving the Police Training Pit from its current location to anywhere else at the Airport would only be done after appropriate environmental review of the potential impacts under the State Environmental Policy Act.

Rose Clark, January 26, 2001 hearing card and testimony

Request to testify noted. See response above.

Rose Clark, Hearing Transcript (1)

See General Response GLR6 regarding concerns with the MSE wall.

Rose Clark for Kevin James, Hearing Transcript (2)

The Port believes the *Comprehensive Stormwater Management Plan* adequately addresses stormwater needs. This document was produced and available for the public comment period.

Willie Clark, January 27, 2001 hearing card

Comment noted.

SeaTac City Clerk from City Attorney, January 19, 2001 Memorandrum

Comments noted concerning Interlocal Agreement between the Port and City of SeaTac.

Stacy & Craig Colombel, February 13, 2001 letter

Comment noted.

Stacey Colombel, January 26, 2001

The Port is fully aware of the risk it takes by starting construction on some elements of the project that do not have impacts to waters of the United States before the Corps and Ecology issue permits.

Comfort Inns & Suites (Brunetti), February 9, 2001 lettter

Comment of support for the project noted.

State Representative Dow Constantine, October 5, 2000 letter

Comment concerning hearing request noted.

State Representative Dow Constantine, Hearing Transcript (2)

See General Response GLR4 concerning the use of fill from Maury Island. See General Response GLR8 concerning Endangered Species Act issues. See General Response GLR7 concerning instream flow mitigation.

Edward Conway, January 27, 2001 hearing card

Comment noted.

Rita Conway, January 27, 2001 hearing card

Comment noted.

Sarah Cooke, Cooke Scientific Services to USCOE, April 29, 2000 letter

See General Response GLR13 concerning the temporary construction interchange on SR509.

Herbert Connelly, January 26, 2001 hearing card

See General Response GLR17 regarding alternatives considered.

Marcia Cotlove, January 26, 2001 hearing card

Comment noted.

Candice Corvari, Hearing Transcript (2)

See General Responses GLR2 and General Response GLR3 regarding fill contamination concerns.

Larry Corvari, January 26, 2001 hearing card

Request to testify noted.

Larry Corvari, Hearing Transcript (1)

The Port believes that its application is complete. See General Response GLR7 concerning instream flow mitigation. See General Response GLR17 regarding alternatives considered. See General Response GLR18 concerning the measurement of delay. See General Responses GLR2 and GLR3 regarding fill contamination concerns. See General Response GLR17 regarding alternatives considered. See General Response GLR17 concerning alternatives. During the planning process for the third runway, consideration was given to the development of a commuter runway and a commuter terminal on the Westside. Because that option would not address the identified purpose and need for the project, it was not considered further in the EIS process.

Larry Corvari, Hearing Transcript (2)

It is the Port's belief that the *Final EIS* and *Final Supplemental EIS* did not contain a commitment to prepare a Supplemental EIS or a new EIS after a specific date. An agency is obligated to prepare a supplemental environmental impact statement if: (1) The agency makes substantial changes in the proposed action that are relevant to environmental concerns; or (2) there are significant new circumstances or information relevant to environmental concerns that have a bearing on the proposed action or its impacts. 40 C.F.R. §1502.9(c)(1).

Supplemental review under NEPA is reserved for "significant" project changes. Unless the new circumstances or information present a seriously different picture of the environmental impact of the proposed project from what was previously envisioned, the information is not "significant." *Marsh v. Oregon Natural Resources Council*, 490 U.S. 360, 371 (1989). After an EIS is finalized, an agency need not supplement an EIS every time new information comes to light. *Id.* See also the response to Helsell Fetterman letter of 12/20/2000.

See General Response GLR16 concerning the adequacy of the EIS.

Lawrence Corvari (Cascade Chapter, Sierra Club), May 16, 2000 letter

Comment noted.

Marcia Cotlove, Hearing Transcript (2)

Comment noted.

JoAn Cox, February 13, 2001 letter

Comment regarding the 402 noted.

JoAn Cox, February 12, 2001 letter

Comment noted, see also response to Helsell Fetterman's February 16, 2001 letter concerning water quality.

JoAn E. Cox January 26, 2001 letter to DOE

See General Responses GLR6 concerning the MSE Wall, and GLR10 concerning noise. See also response to Stephen Hockaday's January 16, 2001 letter concerning safety.

Joan Cox, December 19, 2000 email 8:05 pm

Comment noted concerning hearing requests and document review.

Joan Cox, November 13, 2000 email 4:46

Comment noted concerning hearing request.

AR 013560

JoAn Cox, May 3, 2000

See General Response GLR13 concerning the proposed temporary construction interchange on SR 509.

Stuart Creighton, January 26, 2001 hearing card

Request to testify noted.

Stuart Creighton, Hearing Transcript (1)

See General Response GLR16 concerning the adequacy of the EIS. See General Response GLR6 regarding concerns with the MSE wall. See General Response GLR9 concerning the Port's efforts to insulate schools for the purpose of reducing noise impacts.

Stuart Creighton, Hearing Transcript (2)

See General Response GLR17 regarding alternatives considered.

Colleen Criss, January 27, 2001 hearing card

Comment noted.

Crown Plaza Hotels (Neidart), January 29, 2001 letter

Comment of support for the project noted.

Maud Daudon, Hearing Transcript (1)

Comment noted.

Aubrey Davis, February 15, 2001 letter

Comment of support noted.

John Del Viento, January 30, 2001 letter

Comment noted.

John Delvento, Hearing Transcript (1)

Comment noted.

Eric B. Denton, February 5, 2001 letters

Comments noted. The Port offers no response to the "Mud Flow" comments, are they do not pertain to issues associated with Port projects. See General Response GLR16 concerning the validity of the 1997 Record of Decision.

Eric Denton, January 26, 2001 hearing card

Request to testify noted.

Eric Denton, Hearing Transcript (1)

The Port's proposed mitigation reflects its concern for bird strikes and aircraft operating safety. The *Final Supplemental EIS* discusses bird strikes and safety issues (see Section 5-5). See also response to RCAA's February 16, 2001 letter comment 4.3.

William Derry, January 26, 2001 hearing card

Request to testify noted.

Bill Derry, Hearing Transcript (1)

Comment noted.

Elizabeth Desimone, January 7, 2001 letter

Comment noted. See also response to GeoSyntec's February 16, 2001 letter.

City of Des Moines, February 16, 2001 letter

The Port has disclosed all aspects of the Master Plan Update projects, the likely impacts of those projects on aquatic resources, and the proposed mitigation to minimize those impacts. To the extent known, the Port has provided the Corps with environmental documentation on other Port and non-Port projects in the vicinity of the Sea-Tac Airport. This information is part of the Corp's record for the §404 permit application and is available for the Corps to take its "hard look" at the projects and for review by interested members of the public.

The borrow sites are discussed in the Master Plan EISs and in December 1998 *Resource Evaluation and Conceptual Development for Borrow Areas 3 and 4* and other reports prepared by Hart Crowser (the Port's consultant) that have been provided to Ecology. If the Port proceeds with the development of the on-site borrow sources, use of the borrow sites will not require filling of jurisdictional wetlands and will be subject to evaluation and comment by the Corps, Ecology, other interested agencies, and members of the public. Fill accepted by the Port will conform to the fill standard criteria that ithas developed in consultation with Ecology.

Most of the Port-sponsored and non-Port projects identified by the commentor are discussed in General Response GLR19 on cumulative impacts and the Port's response to the December 22, 2000 letter from the ACCs' attorneys Helsell Fetterman. The Lone Star Maury Island gravel project is a separate project with independent utility that is not required for construction of the Master Plan Update improvements.

As discussed in the EISs and previous responses to comments, alternative airports and new approach technologies will not improve the poor weather operating capability of Sea-Tac Airport (or provide increased air traffic capacity in the Puget Sound region in the foreseeable future) and were considered by the PSRC and in subsequent environmental reviews.

See also General Response GLR18 concerning delay issues at Sea-Tac Airport.

City of Des Moines (Mayor Thomasson), January 26,2001 hearing card

Request to testify noted.

City of Des Moines, December 19, 2000 letter

Revised reports available before the Public Notice was issued on December 27, 2000, include the: *Wetland Functional Assessment and Impact Analysis*, *Natural Resource Mitigation Plan*, *Wetland Delineation Report*, *Comprehensive Stormwater Management Plan*, and *Seattle-Tacoma Master Plan Update Low Streamflow Analysis*. The comment period on the Public Notice was extended beyond the typical 30 days to allow additional time for public and agency review and comment.

City of Des Moines, August 31, 2000 letter

See General Response GLR7 concerning stream flow and stream mitigation.

City of Des Moines to WSDOT, May 11, 2000 letter

See General Response GLR13 concerning the temporary construction interchange on SR 509.

Richard Doane, February 8, 2001 letters (2)

Comment noted.

Peter M. Douglass, Inc. (Douglass), January 25, 2001 letter

Comments noted concerning the review panel assembled by the Port concerning the stability of the MSE wall.

Snohomish County Executive Bob Drewel, January 26, 2001 hearing card

Request to testify noted.

Snohomish County Executive Bob Drewel, Hearing Transcript (1)

Comment noted.

Gail Duff, November 13, 2000

Comment noted concerning hearing requests.

Rhonda Duncan, January 27, 2001 hearing card

Comment noted.

Rick Dunn, January 26, 2001 hearing card

See General Response GLR17 concerning alternatives considered.

Shelia Dunn, January 26, 2001 hearing card

See General Response GLR6 concerning the wall and the response to GeoSyntec's February 16, 2001 letter concerning the wall stability.

Robert Durham, January 31, 2001 letter

Comment noted.

Robert Durham, January 26, 2001 hearing card

Request to testify noted.

David Durst, January 27, 2001 hearing card

Comment noted.

Stan & Jean Durst, January 26, 2001 hearing card

See General Response GLR17 and GLR18 regarding delay and alternatives considered.

Judith Earle, January 27, 2001 hearing card

Comment noted.

Economic Development Council of Seattle & King County (Scheunemann), February 12, 2001 letter

Comment of support for the proposed project noted.

Economic Development Council of Thurston County, January 25, 2001 letter

Comment of support for the project noted.

Mr. And Mrs. Edgar, January 27, 2001 letter and hearing testimony

See response to RCAA's February 16, 2001 letter.

Bob Edwards (Port of Seattle Commission), January 26, 2001 hearing card

Request to testify noted.

Bob Edwards, Hearing Transcript (1)

Comment noted.

Iscel Edwards, Hearing Transcript (2)

Comment noted.

Iscel Edwards, February 14, 2001 letter and hearing comments

Comment noted.

The Elliott (Matteson), February 13, 2001 letter

Comment of support for the project noted.

William Elliott, January 26, 2001 hearing card

Request to testify noted.

William Elliott, Hearing Transcript (1)

Comment noted.

Patty Emerson, January 27, 2001 hearing comments

Comment noted.

Patty Emerson, Hearing Transcript (1)

Comment noted.

Patty Emerson, January 27, 2001 email 7:22 pm

Comment noted concerning hearing requests.

Phillip Emerson, January 27, 2001 hearing comments and card

Comments noted. See also response to GeoSyntec's February 16, 2001 letter.

Philip Emerson, January 26,2001 hearing card

Comment noted.

Philip Emerson, Hearing Transcript (2)

See General Response GLR6 regarding concerns with the MSE wall.

Tanya Engeset, January 16, 2001 hearing card

Comment noted.

Environmental Protection Agency (Findley) to Strand (Columbia Biological), February 1, 2001 letter

No response required from the Port concerning "the issue of fill quality at Sea-Tac is primarily a matter between Ecology and the Port ... as we do not have authority to 'audit' the Ecology program. Also, ... there are no existing federal or state standards for upland soil placement, nor requirements that fill be 'pristine' or totally free of contamination."

Karen Farnsworth, January 27, 2001 hearing card

Comment noted.

Susan Femenella, January 27, 2001 hearing card

Comment noted.

Brett Fish February 17, 2001 email 10:42 pm

Transmitted comments of Corey Fish noted below.

Brett Fish, February 17, 2001 email 3:34 pm

Comments noted.

The white rocks Mr. Fish observed were not the result of concrete washing into Miller Creek through storm drains. The storm drain for the roadway does not drain to Miller Creek in this area. The white coating on the rocks was actually dried algae. Ecology inspected the site and confirmed this finding.

February 16, 2001 comments noted concerning conditions of Miller Creek.

Brett Fish, February 16, 2001 email 3:44 pm and 3:34 pm

See earlier response February 17 emails.

Brett Fish, January 27, 2001 hearing card

Comment noted.

Brett Fish, Hearing Transcript (1)

The Port has researched information concerning the presence of salmon in Miller Creek and that information has been documented in the Biological Assessments.

Brett Fish, January 26, 2001 hearing card

Comment noted.

Brett Fish, January 14, 2001 email 1:02 pm

Comment noted.

Brett Fish, December 12, 2000 email 2:28 pm

Comment noted.

Brett Fish, December 1, 2000 email 1:53 pm

Comment noted.

Brett Fish, November 30, 2000 email 8:23 pm

Comment noted.

Brett Fish, October 9, 2000 email 9:14 am

Comment noted.

Brett Fish, September 26, 2000 email 11:25 am

Comment noted.

Brett Fish to Bob Wallace, August 17, 2000 email 12:38 am

Comment noted.

Brett Fish, April 27, 2000 letter

Comment noted.

Corey B. Fish, February 17, 2001 email from Brett Fish 10:42 pm

Comment noted.

State Representative Fisher, January 24, 2001 letter

Comment of support for the project noted.

Form Cards, May 3, 2000 (30 cards) – Mayo Albergini, James Bartlemay, Joseph Barreca, William & Margaret Boyle, Nancy Baird Brown, Evelyn Ceteznik, JoAn Cox, D.L. DesMarias, Eltz, Pat Emerson, Brett Fish, Sophie Frause, Annabel Gordon, Grace Henley, Mr & Mrs, Jobe, Janet Johnson, Doris Lee, Warren Lee, John Lund, Sally Mackey, John Matthews, Rosemarie McKeeman, Janice Murray, Genevieve Nuss, Paul Nuss, Len Oebser, Robert Oestreich, Lolita Oliver, Warren Pugli, Mr. & Mrs Russell Richter, Frank Reanier, Sandra Rick, Shirley Rund, M.C. Sansbury, Stan Scarvie, Lillian Schroeder, Peg Springer, G. Strong, Carl and Julia Torkleo, Stuart Weiss, Alma West, Walter West, name not shown.

Comments noted, see also General Response GLR13 concerning the temporary construction interchange on SR 509.

Arden Forrey, November 21, 2000 letter

Comment noted concerning hearing requests.

Thomas Frank, February 5, 2001 letters

Comments noted.

Sophie Frause, Undated letter

Comment noted concerning the hearing request. The reference to "recreation" is included in a list of issues the Corps needs to consider when making its permit decision. There is no "recreation permit" issued by the Corps.

Sophie Frause , January 27, 2001 hearing card

See General Response GLR9 concerning the Port's efforts to insulate Highline School District schools.

Sophie Frause , January 27, 2001 hearing card

See General Response GLR9 concerning the Port's efforts to insulate Highline School District schools.

Sophie Frause, January 26, 2001 letter and hearing testimony

Comment noted concerning the hearing request. The reference to "recreation" is included in a list of issues the Corps needs to consider when making its permit decision. There is no "recreation permit" issued by the Corps.

Sophie Frause, Hearing Transcript (1)

See response to Ann Bonney.

Sophie Frause and Joan Cox, November 13, 2000 email 4:46

Comment noted concerning hearing request.

Sophie & Henry Frause, September 27, 2000 letter

Comment noted. Also see response to Ann Bonney above.

Sophie & Henry Frause, January 31, 2001

Comment noted.

Sophie and Henry Frause, January 26, 2001

The reference to "recreation" is included in a list of issues the Corps needs to consider when making its permit decision. There is no "recreation permit" issued by the Corps.

The Corps is evaluating the Port's application for a Section 404 permit to fill wetlands to accommodate construction of the Master Plan Update projects at Sea-Tac Airport. The Corps is the agency with jurisdiction over issuing a Section 404 permit. Local land use regulations will also apply to the project as set forth in the City of SeaTac Zoning Code and the 1997 Interlocal Agreement between the Port and the City of SeaTac.

As part of the §404 permitting process, Ecology is evaluating the Port's proposal and planned mitigation and will determine whether to issue a Section 401 Water Quality Certification. The Corps and Ecology have solicited public comment as part of the Section 404 permitting process.

The identified cumulative impacts of the Master Plan Update projects are discussed in General Response GLR19. Along with the other items listed by the commentor, the Corps may consider impacts on recreational opportunities as part of its evaluation of the merits of the Section 404 permit application. The Port does not require a "recreation permit" to construct the Master Plan Update improvements.

The provisions of the Washington State Shoreline Management Act of 1971 are applicable to the Master Plan Update project.

Gene Fisher (SeaTac City Councilman, EMC Associates), January 26, 2001 letter

Comment of support for the project noted.

Rob Frisholz, February 13, 2001 letter

See General Response GLR9 concerning the insulation of schools. See response to Helsell Fetterman's February 16, 2001 letter.

Bob Frishholz, Hearing Transcript (1)

See General Response GLR9 concerning the Port's efforts to sound insulate schools.

Foster Wheeler Environmental Corporation (Hanson), February 15, 2001

Comments of the Port sponsored third party review noted.

Foster Wheeler Environmental Corporation (David Hanson), January 26, 2001 hearing card

Request to testify noted.

Al Furney, Hearing Transcript (1)

See General Response GLR16 concerning the adequacy of the EIS. See General Response GLR19 concerning cumulative impacts. See General Response GLR2 and GLR3 regarding contaminated fill concerns. See response to Smith & Lowney's February 16, 2001 letter concerning Clean Air Act conformity. The Port's application includes identification of all applicable creeks. The Port believes that its mitigation program is comprehensive.

Paul Gerry, January 26, 2001 hearing card

Comment noted.

Phyllis Gerry, January 26, 2001 hearing card

Comment noted.

Myrtes Gjefle, January 26, 2001 hearing card

Comment noted.

Julie Goodpaster, January 27, 2001 hearing card

Comment noted.

Charles Green, January 27, 2001 hearing card

Comment noted.

Georgina Green, January 27, 2001 hearing card

Comment noted.

Peter Green, January 27, 2001 hearing card

Comment noted. See also General Response GLR2 concerning fill criteria.

Patricia Griswold, January 27, 2001 hearing card:

See General Response GLR10 concerning noise.

Norris & Margaret Griswold, November 9, 2000 letter

Comment noted concerning hearing requests.

Anabelle Gordon, January 27, 2001 hearing card

Comment noted.

Chris Gower, November 26, 2000 email 12:44 pm

Mr. Gower transmits to the Corps and email from Al Furney, RCAA, that describes his interpretation of a document he discovered during a Public Disclosure Act review. In it, he questions the impartiality of two consulting companies– Floyd & Snider and Herrera Environmental Consultants– that were hired by the Port to assist with the project.

Floyd & Snider were asked by Ecology to facilitate meetings between Ecology and the Port. Both entities endorsed the need for this type of assistance. They also agreed on the need to keep a "master list of issues" – the feeling being that both parties needed to agree on what the issues are. This is a common tool in facilitation.

Herrera Environmental Consultants have been providing independent third party oversight review of erosion and sediment control at Port construction projects for a number of years at the request of Ecology and as required by the Governor's Certification and the Port's NPDES Permit. They inspect the Port and Port tenant projects weekly in the rainy winter months and less frequently in the summer. Their reports are sent to the Port and Ecology. The Port pays for their services.

Chris Gower, October 11, 2000 email 8:00 am

Comment noted.

Chris Gower to David Masters, October 9, 2000 email 10:17 am

Comment noted.

Chris Gower to Bob Wallace, October 9, 2000 email 3:01 pm

Comment noted.

Chris Gower, October 9, 2000 email 10:17 am

Comment noted.

Chris Gower, October 4, 2000 letter

Comment noted.

Chris Gower, October 3-2000 letter

See General Response GLR16 concerning the need for a new Environmental Impact Statement.

See the Port's submitted *Natural Resource Mitigation Plan* and December 2000 *Wetland Functional Assessment and Impact Analysis*.

Comment noted concerning new public hearing and application number.

Chris Gower, October 2, 2000 email 1:34pm

Comment noted.

Chris Gower to Governor Locke, September 27, 2000 letter

Comment noted.

Chris Gower, September 21, 2000 email 4:58 pm

The Port has not conducted any illegal discharges from Port property.

Chris Gower, September 18, 2000 email 8:10 am

See the Port's *Natural Resource Mitigation Plan* concerning wetland buffers.

Chris Gower transmits September 5-2000 New York Times Article "Crisis for Air Traffic System"

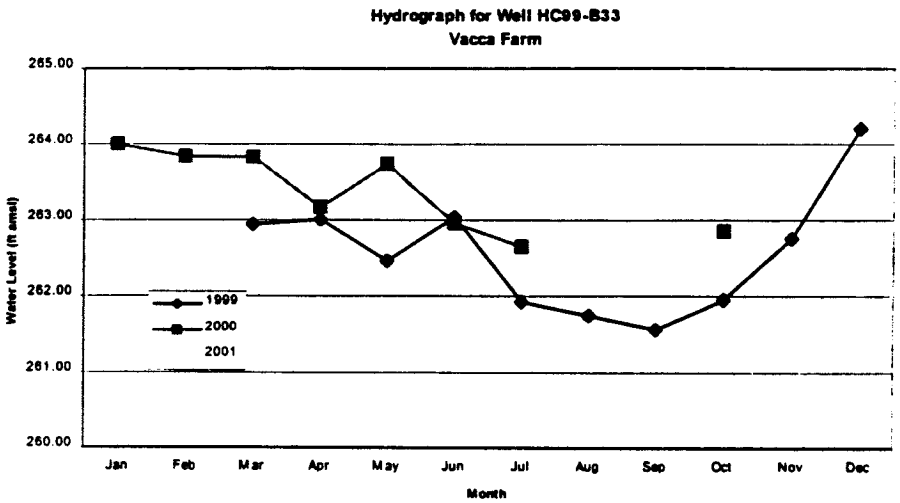
See General Responses GLR17 and GLR18 concerning the consideration of alternatives and the measurement of delay.

Chris Gower, August 28, 2000

Comment noted.

Chris Gower, August 22, 2000 email

Vacca Farm represents a discharge area for groundwater flow from the shallow aquifer that extends beyond the flanks of the Miller Creek flood plain. A large part of the area is characterized as wetland, which implies shallow groundwater levels close to or just below the ground surface. The Port does not concur with the contention that groundwater levels have risen substantially during the last two years – a period when the Port has collected water levels from monitoring wells. Examination of water level data from three of shallow wells installed in Vacca Farm does not indicate evidence for increased water levels.



Water levels were taken monthly for a period of 17 months ending July 2000, when the monitoring interval was extended to 3 months. The data for the 17-month period covers more than a full year, and establishes the typical hydrographic cycle at this location. The data shows a natural cycle of variation spanning approximately 2 feet of water-level change over the typical year. Water levels decline progressively during the summer months, and rise sharply in the fall, as is typical for the Puget Sound region. This form of variation is directly reflective of varying groundwater recharge rates that change through the year in response to variations in rainfall, and are compounded at Vacca Farm by the effects of evapotranspiration from the shallow water table.

The three-month data allows a check for consistency against the previously established seasonal trend revealed by the full cycle of monthly data. Water levels in October 2000 and January 2001 compare very closely with water levels observed at corresponding times in the previous year. There is no evidence that recent water levels have been influenced by fill placement adjacent to Vacca Farm over the last six months.

Chris Gower to EPA, August 21, 2000 letter with email transmittal

See General Response GLR2 concerning the quality of fill accepted for the third runway and the fill acceptance criteria.

Chris Gower, August 16, 2000 email 3:44 pm

Comment noted.

Chris Gower, August 14-2000 email 12:58 pm:

The Port is unaware of any requests that the FAA might make concerning the use of this model. However, the Virginia Polytechnic Institute model, as described in the material provided by the commentor would enable air traffic controllers to identify further airspace management and flight controls that would provide incremental reductions in delay. Because safety conditions associated with the close spacing of the existing runways and the occurrence of poor weather in Seattle would not obviate the need for the third parallel runway.

Chris Gower to NMFS/Stelle, August 12, 2000

Comment noted.

Chris Gower, August 11, 2000 email 7:39 pm

The FAA's 1995 Capacity Enhancement Study and the Port's subsequent Master Plan Update gave extensive consideration to the weather conditions at Sea-Tac. The *Final EIS* and *Final Supplemental EIS* clearly document the weather conditions, as categorized by Visual Flight Rule conditions and Instrument Flight Rule conditions, which define the operational procedures used by the FAA to safely control aircraft. See also General Response GLR18.

Chris Gower, August 11, 2000 7:59 pm email

In 1995, the FAA issued its record of Decision for the development of an aircraft maintenance base in the area known as the South Aviation Support Area. The Port's plans for the area changed as the Master Plan Update identified additional needs for the Airport. As a result, the Master Plan recommended that this area serve aircraft maintenance, cargo and aircraft parking. That development concept was assessed in the 1996 *Final EIS* and 1997 *Final Supplemental EIS*, for which the FAA issued its ROD on July 3, 1997. It is expected that before the Port undertakes development in the areas known as SASA that information from the SR 509 Extension/South Access project level EIS will be complete. It is important to note that the purpose of a written re-evaluation is to document the "adequacy, accuracy and validity" of the earlier environmental approval. At this time, no changes in the Master Plan Update have been identified for the SASA area. Therefore, once that SR 509 EIS has been complete, the Port and FAA would be expected to conduct a re-evaluation, if appropriate.

Chris Gower to Leavitt, POS, July 28, 2000 letter

Comments noted. The Port believes that the proposed project complies with the requirements of the Governor's certificate.

Chris Gower to COE/DOE, July 27, 2000

Comments noted on the Port's addendum to Water System Improvements noting that the project will not affect Gilliam Creek.

Chris Gower to Luster, July 17, 2000 email

See General Response GLR7 regarding the streamflow impacts generated by the proposed project, the Port's water rights and streamflow mitigation issues.

See General Response GLR6 on MSE Wall with respect to engineering of wall, peer review of engineering analysis, and design review by the Corps.

Chris Gower to Luster, June 9, 2000 email

See General Response GLR13 concerning the temporary construction interchange on SR 509.

Chris Gower to City of Tukwila, June 7, 2000

Gilliam Creek will not be affected by the construction or operation of the Master Plan Update projects.

Chris Gower to COE, June 5, 2000 letters (3)

The proposed Master Plan Update projects do not affect Gilliam Creek.

Chris Gower to Martha Choe, June 1, 2000

Comment noted.

Chris Gower to Mic Dinsmore, May 17, 2000 letter

Comment noted.

Chris Gower to John Pell, May 15, 2000 letter

The Port was not conducting work that was in violation of the Clean Water Act.

Chris Grower to Carol Browner, May 3, 2000 letter.

Comment noted.

Chris Gower to Julia Patterson, April 18, 2000

Comment noted.

Chris Gower to Congressman Smith, December 14, 1999.

See the Port's 2000 *Biological Assessment*. See General Response GLR17 concerning the use of alternative technology, and General Response GLR18 concerning the measurement of delay.

Colonel Graves to State Representative Erik Poulsen, October 12, 2000

Comments noted.

Gerald Grinstein, February 5, 2001

Comments of support of the project noted.

Comise Gupta, January 27, 2001 hearing card

Comment noted.

Alankar Gupta, January 27, 2001 hearing card

Comment noted.

George Hadley, February 16, 2001 email 7:04 pm

See General Response GLR17 concerning the consideration of alternatives.

George Hadley, February 16, 2001 8:39pm email:

See General Response GLR16 concerning the EIS process.

George Hadley, February 16, 2001 10:41 pm email:

See response to GeoSyntec's February 16, 2001 letter concerning the MSE wall.

George Hadley, February 16, 2001 email 10:03 pm

The 1996 *Final EIS* did not contain an estimate of the operating capability of Sea-Tac Airport with the third parallel runway. However, the 1997 *Final Supplemental EIS*, prepared in response to new projections in aviation activity, discussed the expected operating capability of the Airport as about 600,000 to 630,00 annual operations. The Port has not prepared any new forecasts of aviation activity, and annual passenger levels in 1999 and 2000 were generally consistent with the forecasts used in the *Final Supplemental EIS*. See also General Response GLR16 concerning the EIS.

George Hadley, February 16, 2001 6:56 pm email

See General Response GLR7 regarding the streamflow impacts generated by the proposed project, the Port's water rights and streamflow mitigation issues.

See General Response GLR6 on MSE Wall with respect to engineering of wall, peer review of engineering analysis, and design review by the Corps.

George Hadley, February 16, 2001 8:43 pm email

The proposed retaining wall, which avoids the relocation of a portion of Miller Creek, is not expected to result a measurable number of visitors. A wall gift shop or wall restaurant is not proposed by the Port. Any traffic that would occur through individuals visiting the wall would be expected to be addressed through general traffic levels considered as part of the *Final EIS* and *Final Supplemental EIS*. This is supported by a comparison made by the City of SeaTac as part of their *City Center EIS*, compared actual surface traffic levels to those evaluated by the *Final EIS* and *Final Supplemental EIS*. Their analysis found that traffic levels considered in the *Final EIS* and *Final Supplemental SEIS* were greater than comparable actual levels.

George Hadley, February 16, 2001 10:41 pm email

See General Response GLR6 concerning the review of the MSE wall.

George Hadley, December 18, 2000 email 7:06 pm

Copies of documents are found at the places listed in the Public Notice.

George Hadley, December 18, 2000 email 6:20 pm

Comment noted.

George Hadley, December 15, 2000 email 9:01 am

Comments noted.

George Hadley, December 14, 2000 letter

Comment noted.

William C. Hall, Undated letter

Comment noted.

David Hanson, Hearing Transcript (1)

Comment noted.

Guy Harper, November 13, 2000 email 2:00 pm

Comment noted.

Hart Crowser (Mike Bailey), February 8, 2001 letter and hearing comments

Comments concerning the stability of the MSE wall noted.

Hart Crowser (Mike Bailey), January 26, 2001 hearing card

Request to testify noted.

Joe and Karen Hendrickson, January 27, 2001 hearing card

Comment noted. See also General Response GLR6 regarding the wall.

Karen Hendrickson, January 26, 2001 hearing card

Comment noted.

Karl Hennum, January 23, 2001 letter

Comment noted.

Karl Hennum, January 20, 2001 letter

Comment noted.

James Henry, January 26, 2001 hearing card

Comment noted.

Marjorie Henry, January 26, 2001 hearing card

See General Response GLR17 regarding alternatives considered and General Response GLR10 regarding noise.

Mr. & Mrs. Ebert Hill, February 3, 2001 letter

Comment of support for the project noted.

Hilton Seattle Airport/Walters, January 29, 2001

Comment of support for the project noted.

Hilton Seattle (Corsini), February 9, 2001 letter

Comment of support for the project noted.

Barbara Hinkle, September 29, 2000 email 6:36 pm

The Port has not illegally filled wetlands at Sea-Tac Airport.

Barbara Hinkle (ACC) to EPA, August 4, 2000 letter

1. See General Response GLR19 regarding cumulative impacts.

2. The listing of a species as threatened or endangered may change the legal status of the species but does not alter the environmental status. As such, listing does not automatically trigger the need for additional environmental review. See also General Response GLR8 concerning the review of Endangered Species issues.

3. No willful violations of the Clean Water Act have occurred. Minor and accidental incursions into wetlands are discussed below. The Port has complied with the Corps' requirements for restoration and mitigation of these incidents. With preventive measures employed, and with no additional violations, these incidents do not represent a "pattern or practice."

- **Wetland 1**: This incident involved discharge of sediment from the North Employee Parking Lot (NEPL) embankment. New Erosion control measures at the NEPL construction site were effectively implemented to allow completion of the NEPL site during the wet season with no further problems. The Port now employs advanced erosion and sedimentation control

practices when needed at construction sites. See response to Northwest Hydraulic Consultants, February 15, 2001, comment 20, regarding the Port's erosion and sedimentation control design. With regard to the sediment discharged to Wetland 1, the sediment was removed, and the wetland and buffer restored. A recent check of this site showed that restoration was effective and complete.

- **16235 – 12th Ave. South**: A small portion of Wetland 37 was disturbed during a topographic survey of Miller Creek. Tire ruts from the vehicles used to clear Himalayan blackberry from survey lines occurred in several hundred square feet of the wetland. The Corps of Engineers was notified and required a restoration plan of the disturbed areas. Tire ruts were hand-graded and native shrubs and trees were planted in the wetland area in November 1999. Subsequent monitoring has occurred and restoration plan has determined to be been effective.

- **Parcel 306**: A septic tank was removed from a lawn adjacent to a single-family home on Parcel 306. A portion of Wetland 37 extends into the lawn, and during the removal of the septic tank, a small portion (less than 500 square feet of area) of Wetland 37 was excavated and backfilled with native soils. The Corps was notified of the action and the Port was issued the NWP 18. No permanent impacts to this portion of the wetland were identified.

4. See response to Helsell Fetterman's, February 16, 2001 letter. Both Gilliam and Walker creeks are included in the 401/404 application, which has provided opportunity for public comment.

5. See response to Water Resource Consulting, February 16, 2001, comment 1 concerning the hydrological divide.

6. Although not required under the Nationwide 6 process, the Port provided a letter of notice and a personal briefing to Corps wetlands staff to explain the purpose and scope of geotechnical borings in the wetlands, prior to the start of this work. These borings were part of routine geotechnical data collection for design of the embankment and MSE walls, including sampling of soils, *in situ* tests, and installation of observation wells to monitor groundwater conditions. All work accomplished in the wetlands was in accordance with the Nationwide 6 permit, a Hydraulic Project Approval issued by Washington Department of Fish and Wildlife, and a site-specific Storm Water Pollution Prevention Plan prepared by the Port. The information obtained from these borings is contained in numerous reports by Hart Crowser, many of which have been submitted to Ecology and the Corps, and/or made available to the public (see for instance Appendix L in the *Comprehensive Stormwater Management Plan, Parametrix, 2001*).

7. The existing and any future NPDES permits must be conditioned to comply with water quality standards and the anti-degradation requirements of the Clean Water Act. (WAC 173-201A-060, 173-201A-070, Fact Sheet to NPDES Permit No. WA-002465-1, pp. 22-23). The Fact Sheet that accompanies the Airport's existing NPDES Permit states as follows: "In order to protect existing water quality and preserve the designated beneficial uses of Washington's surface waters, WAC 173-201A-060 states that waste discharge permits shall be conditioned such that the discharge will meet established Surface Water Quality Standards ... The Department has reviewed the ambient water quality monitoring results gathered by the Port ... and [t]he discharges authorized by this permit should not cause further degradation which would interfere with or become injurious to existing beneficial uses." (Fact Sheet, pp. 22-23).

The Port is in compliance with its NPDES permit. The Port has been issued no Notice of Violations for violations of its NPDES permit. Because the Port is in compliance with its NPDES permit and because the Airport is required by the CWA to obtain NPDES permits for process water discharges,

as well as for industrial and construction stormwater discharges, the Department has reasonable assurances that the activity that is the subject of this 401 Certification complies with water quality standards. The NPDES permit modification is being sought only to include additional discharge points and bring additional areas of the Airport within the NPDES permit jurisdiction. This will result in more protection for receiving waters because those discharges must meet the requirements of the existing NPDES permit, which has been conditioned to meet water quality standards.

The Port is in compliance with its NPDES permit that requires the Port to develop a stormwater pollution prevention plan, which the Port has prepared and submitted and to do monitoring of its discharges, which is ongoing. The current NPDES permit (WA-002465-1) requires numerous studies such as an IWS Integrity Study, an IWS Hydrogeological Study, an IWS Operations and Maintenance Manual, a Sediment Baseline Study, an Operations and Maintenance Plan for Lake Reba, a Procedures Manual for Stormwater Sampling, monitoring plans for all Master Plan Update construction projects, Whole Effluent Toxicity Testing of Stormwater and a Spill Prevention, Containment and Countermeasure Plan. All of these requirements are focused in the quality and quantity of stormwater and industrial waste discharges from the Port. The NPDES permit also requires the implementation of BMPs, which the Port has undertaken. Ecology has issued no notice of violation of the Port's NPDES permit. Based on the Port's ongoing compliance with its NPDES permit, Ecology has "reasonable assurance" sufficient to certify compliance with state water quality standards.

A request for a major permit modification filed with Ecology on October 20, 2000. The Port has requested that named and unnamed tributaries, storm drains and other waters of Miller, Des Moines, Walker and Gilliam Creeks be specifically listed as receiving waters in the current NPDES permit for the Airport and that the permit cover "all areas of or surrounding the Port, Seattle International Airport in which Seattle-Tacoma International Airport has or acquires a real, property interest during the term of this permit, and all locations of construction projects conducted, managed or permitted by the Port, Seattle-International Airport, including but not limited to the area of the Third Runway and Master Plan Update projects." The current NPDES permit expires on June 30, 2002. The Port must reapply 180 days before the date that the permit expires.

8. The mitigation proposed at the Auburn Wetland Mitigation Site has been reviewed and approved by the Corps and Ecology. The §404 permit will require a several years of monitoring to ensure that the wetland plantings will take hold and that the wetlands will function properly.

9. The DNR forest practices permits that were issued to the Port do not permit the removal of trees in wetland areas without the proper permits and approvals from other regulatory agencies, including the Corps and Ecology. The Port has not removed trees from regulated wetland areas under its current Forest Practices permits.

Jennifer Holms, January 26,2001 hearing card

Request to testify noted.

Jennifer Holmes for Chris Vance, Hearing Transcript (1)

See General Response GLR9 concerning the Port's efforts to insulate schools for the purpose of reducing noise impacts. See General Response GLR17 regarding alternatives considered.

Marion Holmes, Hearing Transcript (2)

Comment noted.

State Representative Horn, January 25, 2001 letter

Comment of support for the project noted.

Robbie Howell, January 27, 2001 letter

The response to comment R-10-9 in Appendix R of the *Final EIS* (Volume 4) notes that fuel dumping is not common and is performed only in emergency situations when aircraft cannot land safely with the fuel present in the aircraft. Prior to the completion of the *Final EIS*, no fuel dumping incidents had been reported in or around Sea-Tac Airport within the last two and one half years, according to Mr. Tom Davidson, then FAA Air Traffic Manager, Seattle Tower. The Port recently requested fuel dumping information from the FAA. The FAA noted that there are no records kept concerning fuel dumping, and therefore, it is not possible for the Port to confirm the incident. .

Fuel dumping, or the purposeful jettison or leakage of aviation fuel by aircraft as they approach or depart the Airport, is not common and is performed only in emergency situations when aircraft cannot land safely with the fuel present in the aircraft. If an aircraft must make an emergency landing before it has burned enough fuel to safely land, the pilots would have to "dump fuel" in order to reduce the aircraft's weight sufficiently enough to land. According to federal directive 7110.65J paragraph 9-6-1 through 9-6-5, aircraft may dump fuel as necessary in a declared emergency state. There are no restrictions as to where the aircraft may or may not dump fuel. However, each airport has a recommended, pre-designated fuel dumping area for instances where fuel needs to be dumped if time permits. At Sea-Tac, FAA air traffic controllers have been instructed to direct aircraft in need of fuel dumpling to fly above 5,000 feet over the Puget Sound to allow time for the fuel to evaporate before reaching the ground, and to prevent non-evaporated fuel from reaching populated areas.

Residents in the immediate vicinity of the Airport may also be reporting odors from aircraft queuing - this odor typically has more of an oily smell versus an odor like one would experience when fueling an auto. The pollutants that comprise this type of smell are accounted for in the air pollutant assessment presented in the EIS for precursor pollutants -- pollutant levels where the standards exist to protect human health and welfare.

There are many different types of odorous hydrocarbon compounds in jet exhaust which may be responsible for periodic "odor episodes". Typically, the most reactive or "volatile" hydrocarbons have the most potential to cause odor (i.e., cause a detectable odor at a lower concentration). The principal odor-causing hydrocarbon species in jet exhaust are the aromatic (fuel-related) and oxygenated (partially burned) hydrocarbons. Hydrocarbon emission rates are greatest during the low-power idle and taxi modes of the LTO cycle, when the engines are not operating as efficiently. During takeoff and climbout, for example, hydrocarbon emissions are greatly reduced since the engines operate with greater efficiency.

The most recent study concerning odors from jet engine exhaust was conducted at Boston's Logan Airport ("*Identification of Odorous Compounds From Jet Engine Exhaust at Boston's Logan Airport*", December, 1992). Based on air monitoring at Boston Logan, three compounds - acetaldehyde, formaldehyde, and naphthalene - were present on a consistent basis above their respective odor recognition thresholds. Each of these compounds could be generated by the incomplete combustion of jet fuel. The odor impact depends on wind speed and direction, turbulence,

and distance between the source and nearby residents. The odor recognition characteristics of these compounds is generally characterized as follows: Acetaldehyde is described as sweet, "apple ripened" and pungent; Formaldehyde is described as odor like hay, straw-like, and pungent; Naphthalene is described as having odor like tar, creosote, and mothballs.

As noted by the Boston study, the results were based on the minimum detectable limits because overall concentrations for these compounds was generally small. Additionally, no specific source or activity was identified as the primary source of these compounds. Moreover, the Boston study notes that motor vehicle exhaust also contains many of these same compounds. No conclusion was drawn as to the source, concentration, or potential impact to human health.

See also General Responses GLR9 and GLR10 concerning noise and noise impacts on schools.

Vicki Hurley, January 27, 2001 hearing card

Comment noted.

Nola Irish, January 27, 2001 hearing card

Comment noted.

Jerry Jackson, December 19, 2000 email 6:40 PM

Comment noted concerning hearing requests and document review.

Jerry Jackson, December 19, 2000 email 6:28 PM

Comment noted concerning hearing requests and document review.

Marvin Jahnke, February 6, 2001 letter

See General Response GLR17 concerning the consideration of alternatives.

Joyce Jobe, January 26, 2001 hearing card

See General Response GLR17 concerning the consideration of alternatives.

Reuben Earl Jobe, January 18, 2001 letter

Comment noted.

Mr. And Mrs. Jobe, October 9, 2000

Comment concerning hearing noted.

Eric Johnson, Hearing Transcript (2)

Comment noted.

OH Johnson, Hearing Transcript (2)

Comment noted.

Ray Johnson, January 26, 2001 hearing card

See General Response GLR9 concerning the Port's efforts to sound insulate Highline Schools.

James Jollimore, January 26, 2001 hearing card

See General Response GLR17 regarding the consideration of alternatives.

Janet Johnson, January 27, 2001 hearing card

Comment noted.

Jean Johnson, January 26, 2001 hearing card

Comment noted.

Charles Jones, October 6, 2000 letter

Comment noted.

Kevin Jones, City of Burien councilmember, January 26, 2001 hearing statement

Comment noted.

Marnie Jones, Hearing Transcript (2)

See General Response GLR4 concerning the use of fill from Maury Island.

John Jovanovich, Hearing Transcript (1)

The *Final Supplemental EIS* contains a detailed description of the ability to mitigate certain functions that are at conflict with aircraft safety in basin (see FSEIS, Section 5-5). The 2000 *Natural Resource Mitigation Plan* contains discussions of the comprehensive mitigation that will be included in-basin. See *Natural Resource Mitigation Plan*, Chapter 5.

John Jovanovich, January 26, 2001 hearing card

Request to testify noted.

Jan Jutte, Assistant Director of Washington State Auditor to Port Commission October 4, 2000

The Port was the subject of an independent audit by the Washington State Auditor's office for the period of January 1 through December 31, 1999. The audit was performed to determine whether the Port complied with state laws and regulations, its own policies and procedures, and federal grant requirements. The State Auditors' Office also audited the financial statements and evaluated internal controls established by Port management. They focused on specific areas that have potential for abuse and misuse of public resources.

The results of the audit were that the Port substantially complied with state laws, federal regulations, and its own policies and procedures. Financial statements were accurate and complete. The one condition significant enough to report as a finding related to the underpayment of one laborer.

This letter alerts the Port Commission to weaknesses in the Port's internal control, accounting, administration, and other areas of operation. The State Auditor's office states that these comments do not affect the report and offers to review the status at the next audit.

Dave Kaplan (Des Moines City Council), January 26, 2001 hearing card

Request to testify noted.

Dave Kaplan, Hearing Transcript (1)

See General Response GLR7 concerning instream flow mitigation. See General Response GLR17 regarding alternatives considered. See General Responses GLR2 and GLR3 concerning contaminated fill concerns.

State Representative Karen Keiser, January 26,2001 hearing card

Request to testify noted.

State Representative Karen Keiser, Hearing Transcript (1)

See General Response GLR19 concerning cumulative impacts. See General Response GLR7 concerning instream flow mitigation.

State Representative Karen Keiser, September 12, 2000 letter

In September of 2000, Ecology determined that the state required more time to work with the Port to evaluate whether the agency had reasonable assurance for the Master Plan Improvements. The time necessary to review and assess the remaining project issues was in excess of the deadline for Ecology to issue a 401 water quality certification on the project, one year from the Public Notice date of September 30, 1999. The additional review and assessment was required for specific remaining elements of the *Comprehensive Stormwater Management Plan*, the *Natural Resource Mitigation Plan* and Flow Augmentation proposal.

As a result, on September 28, 2000, the Port withdrew the JARPA, with the intent of resubmitting the application at a later date.

Richard Kennedy, December 18, 2000 email 7:42 pm

Comment noted concerning document reviews and hearing request.

Port of Kennewick (Givens), February 7, 2001 letter

Comment of support for the project noted.

KIK Signatures, January 26, 2001

Comments noted.

Debra Kimmel, January 26, 2001 hearing card

Comment noted.

Debra Kimmel, Hearing Transcript (1)

Comment noted.

Harold Kitson, November 14, 2000 letter

Comment noted.

Helen D. Kludt, February 12, 2001 letter

Comments noted and responded to in prior public notice response to comments.

Helen Kludt, January 26,2001 hearing card

Comment noted.

Deborah Knutson, Hearing Transcript (2)

Comment noted.

Linda Kochmar (Federal Way Deputy Mayor), January 26, 2001 hearing card

Request to testify noted.

Linda Kochmar, Hearing Transcript (1)

See General Response GLR10 concerning noise.

Michael Kramer, January 27, 2001 hearing card

Comment noted.

Patrick Kuo, January 26, 2001 hearing card

Request to testify noted.

Joe Kuperberg, January 27, 2001 letter

Comments noted.

Joel Kuperberg, November 12, 2000 email 2:45 pm

Comment noted. See also General Response GLR4 concerning Maury Island fill.

Joel Kuperberg, Hearing Transcript (2)

Comment noted.

Barry Ladenburg, January 27, 2001 letter

Comments noted concerning hearing.

See Response to General Responses GLR17 and GLR18 concerning the evaluation of alternatives and delay.

Simultaneous parallel arrivals on three runways is not anticipated because of the close spacing between the runways. The *Final EIS* and *Final Supplemental EIS* examined runway use and presented actual assumptions, based on FAA simulation of the airfield operational performance during specific activity levels. *Final Supplemental EIS* Table C-3-14 shows the runway use, noting that the runway would primarily be used for arrivals, but would be used for departures about 2.5% in south flow and 1.6% in north flow.

The Port has not taken action resulting in a discharge of fill material to waters of the United States and, accordingly, no permit from the Corps is required for those activities referenced in the comment. The Corps has informed the Port that any stockpiling of fill material or other development activities in advance of a decision on the Port's §404 permit application is being undertaken at the Port's risk. The Corps has also informed the Port that any development activity at Sea-Tac Airport will have no bearing on the Corps' ultimate decision on the Port's §404 permit application.

Barry Ladenburg, Hearing Transcript (2)

See General Response GLR 18 concerning delay at Sea-Tac Airport. The *Final EIS* and *Final Supplemental EIS* examined runway use and presented assumptions, based on FAA simulation of the airfield operational performance during specific activity levels. *Final Supplemental EIS* Table C-3-14 shows the runway use, noting that the runway would primarily be used for arrivals, but would be used for departures about 2.5% in south flow and 1.6% in north flow. See General Response GLR17 regarding alternatives considered. See General Response GLR13 concerning the proposed temporary construction interchange on SR509. The Port believes that it is in compliance with its NPDES permit. The Port has not undertaken any construction that would require a permit without first having obtained the permit. See General Response GLR17 regarding alternatives considered.

Lakeside Advisors January 8, 2001 letter)

The Port has paid just compensation for those properties it has acquired in order to construct the Master Plan Update projects. With respect to the "taking" through increased noise that is asserted in this comment, the Port is complying with the requirement of the Part 150 process. Pursuant to this process, a determination is made as to which properties are impacted by noise to the extent of requiring purchase, insulation or other mitigation.

Ed Laster to Jonathan Smith, September 26, 2000 email 3:51 pm

This appears to be in the wrong file.

Steve Leahy, Hearing Transcript (1)

Comment noted.

Warren Lee, January 26, 2001 hearing card

Comment noted.

Warren Lee, November 12, 2000 letter

Comment noted concerning hearing requests.

Nanci Leonard, January 26,2001 hearing card

Comment noted.

Phillip & Rachel Levine, January 30 2001 letter

Comment noted

Rachel Levine, January 27, 2001 hearing card

Comment noted.

Tom Limberg, February 12, 2001

Comment noted.

Kimberly Lockard, December 19, 2000 email 12:30 pm

Comment noted concerning hearing requests and document review.

Marlil Lovell, January 27, 2001 hearing comments

The Port has not taken action resulting in a discharge of fill material to waters of the United States and, accordingly, no permit from the Corps is required for those activities referenced in the comment. The Corps has informed the Port that any stockpiling of fill material or other development activities in advance of a decision on the Port's §404 permit application is being undertaken at the Port's risk. The Corps has also informed the Port that any development activity at Sea-Tac Airport will have no bearing on the Corps' ultimate decision on the Port's §404 permit application.

Marlil Lovell, Hearing Transcript (2)

See General Response GLR9 concerning the Port's efforts to insulate schools for the purpose of reducing noise impacts. See General Response GLR8 concerning Endangered Species Act issues. See General Response GLR16 concerning the adequacy of the EIS.

League of Women Voters, February 12, 2001 letter

See General Response GLR15 and GLR19, and response to Sheldon Associates' February 15, 2001 comment letter on behalf of the Airport Communities Coalition.

Rick Lucas, January 26, 2001 hearing card

Request to testify noted.

Rick Lucas, Hearing Transcript (1)

Comment noted.

Salley Mackey, February 15, 2001 letter

Comment noted. The cost of the project is still estimated at $773 million (estimated in June 1999). The project purpose and need are clearly articulated in the *Final EIS*, *Final Supplemental EIS*, 1997 Record of Decision and the application. See also General Responses GLR2 through GLR15.

Laura Madland, February 13, 2001 letter

Comment noted.

Sandra Manning (DOE) to COE December 18, 2000 email 7:48 pm

Communication between Ecology and the Corps – no comment/response needed.

MarQueen Hotel (Kozuki), January 29, 2001

Comment of support for the project noted.

Alfonso Marsh, January 27, 2001 hearing card

Comment noted – See also General Response GLR17 concerning alternatives considered

Lester Martin, January 26, 2001 hearing card

Comment noted. The Port does not propose to acquire any further homes as a result of the Third Runway project.

Robert Martin, February 15, 2001 letter

The *Final EIS* and *Final Supplemental EIS* examined safety associated with several factors: automobile traffic levels and interaction with haul fill traffic, and aircraft accident safety. Auto safety issues are discussed in FEIS Chapter IV, Section 15 "Surface Transportation" and *Final Supplemental EIS* Section 5-1 "Surface Transportation" as well as the construction effects in Chapter IV, Section 23 and *Final Supplemental EIS* Section 5-4 "Construction Impacts"

The aircraft accident safety issues are analyzed in the *Final EIS* at IV.7-17 through IV.7-22. As noted by the ACC, the FAA considered the impact of the Third runway on runway crossings and determined that no unsafe conditions would exist. The *Final EIS* states the following with regards to runway crossings:

"The Preferred Alternative would increase the number of runway crossings, as arriving aircraft land on the new parallel runway and then taxi to the terminal/ cargo facilities. This analysis showed the average number of all-weather crossings would change as follows:"

	Number of All-Weather Average Runway Crossings	
	Existing Airfield	With New Runway
1993	432	NA
2000	483	695
2010	564	812
2020	619	878

Source: 1995 Capacity Enhancement Plan Data Package 7, September , 1994.

"No direct correlation exists between the increase in runway crossings and safety, as the separation standards used by air traffic control will ensure adequate separation between aircraft, and aircraft and service vehicles. The effect of separation standards will be the experience of delay. The review of aircraft accidents, incidents and pilot deviations between 1984 and 1993 for Sea-Tac show evidence that the Airport will continue to operate with the same low accident/incident ratios. No direct correlations have been found to suggest that increased aircraft operations will adversely affect the ratios of accidents and incidents in the future. However, aircraft separation standards used by air traffic control will continue to ensure adequate separation and safety between aircraft and service vehicles. Further, upon construction of the new air traffic control tower, the ground control position will be supplemented with another position. Ground control may then be split for inbound and outbound traffic or may possibly be between gate hold/push back - ground, and movement control-ground."

In addition to the safety analysis presented in the FEIS, it is noteworthy that the Port has acquired all residential lands within the Runway Protection Zone (RPZ) for the existing runways and the proposed Third Runway. This area, as defined by the FAA would be most prone to aircraft accidents. The RPZ's are smaller than that shown in the attachment of this commentor.

Charles Martin, November 13, 2000 email 10:54 am:

Comment noted.

Charles Martin, November 12, 2000 email 5:38 pm:

Comment noted.

Charles Martin, November 9, 2000 letter:

Comment noted.

Mike Mashock, February 8, 2001 letter

Comments in support of the project noted.

Juleen Mattern, January 27,2001 hearing card

Comment noted.

Ruth Mattern, January 27,2001 hearing card

Comment noted.

John Matthews, January 27,2001 hearing card

Comment noted.

John Mathews, January 11, 2001 letter:

See General Response GLR9 concerning impacts to schools and school insulation.

John Matthews, December 13,2000 letter:

See General Response GLR10 concerning noise.

John Matthews, November 9, 2000 letter:

Comment noted concerning hearing requests.

John Matthews, October 10, 2000 letter:

Comment noted.

Pierre Matthews, February 15, 2001 letter

See General Response GLR6 concerning the development of the MSE wall.

Pierre Matthews, Hearing Transcript (2)

See General Response GLR17 regarding alternatives considered. See response to Patrick Benson Hearing Transcript concerning the occurrence of weather at Sea-Tac Airport and the need for the runway.

Jean L. Mayer, February 10, 2001 letter

Comment noted. See General Response GLR11 (Air pollution) and General Response GLR13 regarding the temporary construction interchange.

Lenora McClellan, January 27,2001 hearing card

Comment noted.

Brette McCollum, January 27, 2001 hearing card

Comment noted.

Brette McCollum, November 9, 2000 letter

Comment noted concerning hearing requests.

Tom McCollum, (?) letter

Comment noted.

Tom McCollum, November 9, 2000 letter

Comment noted concerning hearing requests.

State Representative Joe McDermott, Hearing Transcript (2)

Comment noted.

Charles McGibbon, January 30, 2001 letter

See General Response GLR17 concerning the consideration of alternative airport sites.

Rosemarie McKeeman, February 16, 2001 email 11:45 pm

The Port has established fill acceptance criteria – see General Response GLR2. As the Port has noted since the preparation of the *Final EIS*, providers of fill for the Third Runway project will be required to comply with all Federal, State and local regulations concerning the fill provided as well as the source. Providers of fill will be required to show that the sources of their fill have been subject to the requisite environmental reviews and approvals. The *Final EIS* and *Final Supplemental EIS* evaluated and disclosed the surface traffic consequences of delivering fill to the Airport – no safety issues were identified.

See General Response GLR11 concerning air pollution and health issues.

Barbara McMichael, Hearing Transcript (2)

Comment noted.

Bruce McMichael, February 14, 2001 letter

See also Response to Helsell Fetterman's February 16, 2001 letter concerning violation of water quality standards.

See General Response GLR6 concerning the wall and response to GeoSyntec's February 16, 2001 letter.

The Port has not taken action resulting in a discharge of fill material to waters of the United States and, accordingly, no permit from the Corps is required for those activities referenced in the comment. The Corps has informed the Port that any stockpiling of fill material or other development activities in advance of a decision on the Port's §404 permit application is being undertaken at the Port's risk. The Corps has also informed the Port that any development activity at Sea-Tac Airport will have no bearing on the Corps' ultimate decision on the Port's §404 permit application.

Carl Mealy, Hearing Transcript (2)

See response to Columbia Biological Assessment's February 16, 2001, letter, and Water Resource Consulting's February 16, 2001, letter concerning water quality. See General Response GLR19 concerning cumulative impacts.

Medtronic Physio Control/Martin, January 24,2001 letter

Comment of support for the project noted.

Edward Merlis (Air Transport Association), January 26, 2001 letter and hearing card

Comment of support for the project noted.

Ed Merlis, Hearing Transcript (1)

Comment noted.

Frederica Merrell, December 26, 2000 email 9:23 am

See General Response GLR10 concerning noise. Comment noted concerning hearing requests and document review.

Martin Metz, January 27,2001 hearing card

Comment noted.

Wallace Meyers, January 26, 2001 hearing card and testimony

Request to testify noted. See response to RCAA's February 16, 2001, letter.

Wallace Meyers, Hearing Transcript (1)

The Port's proposed mitigation reflects its concern for bird strikes and aircraft operating safety. The *Final Supplemental EIS* discusses bird strikes and safety issues (see Section 5-5). See also response to RCAA's February 16, 2001 letter comment 4.3. The Port believes that the maps provided with the application are correct. The *Final Supplemental EIS* contains a detailed description concerning the ability to mitigate certain functions that are at conflict with aircraft safety in basin (see FSEIS, Section 5-5). The 2000 *Natural Resource Mitigation Plan* contains a discussion of the comprehensive mitigation that will be included in basin. See *Natural Resource Mitigation Plan*, Chapter 5.

Wally Meyers, September 26, 2000 email 1:51 pm

Comments on the State's Fill Hydrological Study noted.

Wallace Meyers, January 31, 2000 letter to Garland

The FAA and the Port take bird strikes and safety as a very serious issue. As a result, the Port has designed its wetland mitigation and stormwater management program to address these concerns and to comply with FAA guidance on wildlife attraction.

Sheet 28 shows the drainage collection swale at the base of the fill slope in relation to the replacement drainage channels. The vertical scale on this figure should start at 240 ft. The embankment slope occurs between about 250 ft and 390 ft, but the figure is not intended to show the full height of the embankment slope. The full height of the embankment relative to the creek and drainage channels is shown in Sheet 29.

See response to comment #28 in Norman Wildlife Consulting February 16, 2001 letter regarding updrafts and birds.

Mitigation at the Vacca Farm site and other areas near the airport has been designed to reduce wildlife use in areas currently used by waterfowl or flocking birds. The floodplain excavation and proposed plants are designed not to increase wildlife-attracting characteristics of the Vacca Farm area.

Wallace Meyers, December 13, 1999 letter.

Comments noted. It is unclear from the comment as to what document they are referencing. The Port's plans only identify an 8,500-foot long new parallel runway.

Lorraine Miller, January 26, 2001 hearing card and January 27, 2001 hearing comment.

Comment noted. See General Response GLR10 concerning noise. To date, there have been no discussions or plans prepared regarding the need for a fourth parallel runway at Sea-Tac. The Capacity Enhancement Study, as summarized in the *Final EIS*, show that as activity levels grow in the future, delays would continue to rise, even with the development of the third runway. The *Final Supplemental EIS* estimated that the Third Parallel Runway would accommodate about 630,000 with then current air traffic procedures. It is not reasonable to foresee at this time how demand beyond that level could be accommodated in the region.

Lorraine Miller, Hearing Transcript (2)

Comment noted.

Gregory Mills, November 7, 2000 letter

Comment noted concerning hearing requests.

Catherine Milne, November 12, 2000 letter

Comment noted concerning hearing request.

Marion Moorehead, November 9, 2000 letter

Comment noted concerning hearing request.

John Morrison, Spokane International Airport Hearing Comments, January 25, 2001 letter

Comment supporting project noted.

John Morrison, Hearing Transcript (2)

Comment noted

Chuck Mosher, Hearing Transcript (2)

Comment noted.

Anita Muffett (Kiro), January 26,2001 hearing card

Comment noted.

Sally Nelson, Hearing Transcript (2)

See General Response GLR17 regarding alternatives considered. See General Response GLR16 concerning the adequacy of the EIS. See General Response GLR17 regarding alternatives considered.

Sharon Nelson, Hearing Transcript (2)

See General Response GLR8 concerning Endangered Species Act issues.

Sharon Nelson, November 12, 2000 email 10:58

Comment noted concerning hearing requests.

Sharon Nelson, December 13, 1999 email to USCOE

See General Response GLR19 on the analysis conducted with respect to cumulative impacts of projects undertaken by both the Port and other parties in and around the area of Sea-Tac Airport.

With respect to the Lone Star Maury Island project, that project is independent from the Master Plan Update improvements. The Master Plan Update improvements and Lone Star gravel project are separate actions with independent utility and are not dependent on each other (i.e. the Master Plan Update improvements can be built without gravel from Maury Island. The agencies are reviewing the potential impacts of off-site borrow areas as deemed appropriate by the National Marine Fisheries Service and U.S. Wildlife Service. See General Response GLR4.

With respect to comments on the conveyor belt, see response to General Response GLR1 with respect to the use of the conveyor belt.

Tom Newlon, February 16, 2001 email

Comment noted.

Gordon Newton, Hearing comments and January 27, 2001 letter

Simultaneous parallel arrivals on three runways is not anticipated because of the close spacing between the runways. The *Final EIS* and *Final Supplemental EIS* examined runway use and presented actual assumptions, based on FAA simulation of the airfield operational performance during specific activity levels. *Final Supplemental EIS* Table C-3-14 shows the runway use, noting

that the runway would primarily be used for arrivals, but would be used for departures about 2.5% in south flow and 1.6% in north flow.

Gordon Newton, Hearing Transcript (2)

Chapter 2 of the *Final Supplemental EIS* discusses the operating capacity of the third runway (see Page 2-25 through 2-27).

Gordon Newton, January 8, 2001 letter

See response to Newton's January 27, 2001 letter.

Gordon Newton, October 11, 2000

Comment noted concerning hearing request.

Molly Nordhaus, February 12, 2001 letter

Comment noted on the §402 application.

Molly Nordhaus, February 14, 2001 letter

Comment noted.

Molly Nordhaus, Hearing Transcript (1)

See General Response GLR17 regarding alternatives considered. See response to Nordhaus' comments of January 26, 2001 concerning capacity. The Master Plan Update was undertaken with the understanding that a new large aircraft was in the pre-development stage, and thus the Master Plan facilities would enable the Airport to accommodate such an aircraft. See response to Hockaday's February 16, 2001 letter concerning runway crossings. See response to Dan Caldwell's January 26 2001 letter concerning the benefit/cost evaluation prepared for the project. See General Response GLR11 concerning air pollution. See General Response GLR7 concerning instream flow mitigation. See General Response GLR9 concerning the Port's efforts to insulate schools for the purpose of reducing noise impacts. See General Response GLR17 regarding alternatives considered.

Molly Nordhaus, January 26, 2001 hearing card and testimony

Request to testify noted. See also response to RCAA's February 16, 2001 letter.

Molly Nordhaus, January 26, 2001 hearing card.

The purpose for the third runway project, as articulated in the *Final EIS*, *Final Supplemental EIS* and Record of Decision is to "Improve the poor weather airfield operating capability in a manner that accommodates aircraft activity with an acceptable level of aircraft delay". One of the by-products of the project is an increase in airfield capacity, as is discussed extensively in Chapter 2 of the *Final Supplemental EIS*. As that chapter notes, the capacity of the two-runway system is about 480,000 annual operations. With the third runway and existing air traffic procedures, the third runway would be expected to increase that capacity to about 600,000 to 630,000 annual operations.

Molly Nordhaus, November 16, 2000 letter

Comment noted concerning the hearing requests. See General Response GLR16 concerning the EIS process.

City of Normandy Park, December 20, 2000 letter

Revised reports available before the Public Notice was issued on December 27, 2000, include the: *Wetland Functional Assessment and Impact Analysis, Natural Resource Mitigation Plan, Wetland Delineation Report, Comprehensive Stormwater Management Plan,* and the *Seattle-Tacoma Master Plan Update Low Streamflow Analysis.* The comment period on the Public Notice was extended beyond the typical 30 days to allow additional time for public and agency review and comment.

City of Normandy Park, December 19, 2000 letter

The public notice was issued December 27, 2000. The standard public comment period is 30 days, but the public comment period for this project was extended to February 16, 2001, to provide additional time for public and agency comment.

City of Normandy Park, May 2, 2000

See General Response GLR13 concerning the temporary construction interchange on SR 509.

Frederick Novota, January 13, 2001 letter

Since the development of the SeaTac Communities Plan in the early 1970's, the Port has provided extensive public input and involvement in the planning process for airport improvements. This public involvement continues as an essential component of the Master Plan Update permitting process.

The stockpiling of fill in upland areas of the Sea-Tac Airport does not require a §404 permit. The Port has developed fill acceptance criteria in conjunction with Ecology and is monitoring the quality of the fill that it is accepting.

There is no requirement that a §401 water quality certification be issued prior to the Corps accepting a §404 permit application. Regulatory evaluation of the §401 certification and §404 permit can occur simultaneously, which is the approach being undertaken in this case.

The environmental information in the Master Plan Update EISs has been continually updated and refined since their publication. Although some specifics of the Master Plan Updates' design and impacts have changed or new information has been collected, these project changes and new information are not likely to cause significant, additional, unmitigated cumulative environmental impacts which have not already been adequately considered in the environmental impact statements. Therefore, preparation of a Supplemental EIS is not warranted at this time.

The *Preliminary Stormwater Management Plan* disclosed the expected aquatic impacts from the proposed changes to Sea-Tac Airport's current stormwater system. The regulatory agencies are actively reviewing the proposed plan and its compliance with relevant regulations, including the 1998 King County Surface Water Manual.

The noise impacts of the Master Plan Update projects have been fully disclosed in the Master Plan Update EISs. The Port continues to work on a variety of fronts to reduce noise at the Sea-Tac

Airport. For example, the proposed Aircraft Hydrant Fueling Facility will significantly reduce the need for ground tankers to provide aviation fuel.

Comment noted. The Port proposes both in-basin and out-of-basin wetland mitigation. In basin mitigation areas include the Tyee Golf Course and former Vacca Farm properties. Off-site wetland mitigation will occur at the Auburn Wetland Mitigation property and will create over 40-acres of high quality wetlands. The Corps and Ecology will evaluate and oversee the Port's wetland mitigation measures.

See General Response GLR6 and the response to GeoSyntec's February 16, 2001, letter for a discussion of the stability of the proposed retaining wall.

Corps regulations provide for public comment by any interested member of the public. The Corps cannot discriminate against certain individuals because they are project proponents or have a contractual relationship with the Port.

Frederick Novota, November 9, 2000 letter

Comment noted concerning hearing requests.

Georgetta Nupen, Hearing Transcript (1)

See General Response GLR9 concerning the Port's efforts to insulate schools for the purpose of reducing noise impacts. The Port believes that it is in compliance with all stream/creek–related regulations. The Port does not require a permit to place the dirt that has been hauled to date. See General Response GLR18 concerning alternatives.

Paul & Genevieve Nuss, February 7, 2001 letter

Comment noted. See General Responses GLR7 (instream flow mitigation), GLR18 (measurement of delay), GLR16 (EIS), GLR6 (stability of the MSE wall) and response to Geosyntec's letter dated February 16, 2001.

Len Oebser, Hearing Transcript (2)

See General Response GLR17 regarding alternatives considered. See General Response GLR9 concerning the Port's efforts to insulate schools for the purpose of reducing noise impacts.

Robert Oestreich, January 30, 2001 letter

Comment noted. See also responses to GeoSyntec's letter dated February 16, 2001.

Robert Oestreich, September 30, 2001 (sic 2000) letters (2)

Comment noted. See also responses to GeoSyntec's letter dated February 16, 2001.

Robert Oestreich, June 13, 2000 letter

Comment noted. Also please see General Response GLR7 regarding the streamflow impacts generated by the proposed project, the Port's water rights and streamflow mitigation issues.

John Olds, Reading Room Representative, November 11, 2000 letter

Comments noted concerning hearing.

Lucille Osburn, January 26,2001 hearing card

Comment noted.

Susan Osterman, February 15, 2001 letter

Comment noted. See also General Responses GLR16 (validity of the 1997 Record of Decision), GLR19 (evaluation of cumulative impacts) and GLR9 (schools).

Raymond Overholdt, February 5, 2001 letter

The Master Plan Update recognized that the airframe manufacturers were considering the development of a new large aircraft. The existing runway system at Sea-Tac would enable that aircraft, as presently envisioned to operate. The Third Parallel runway would only enhance the operation with the new large aircraft, as that project is intended to address poor weather arrival delays.

See General Response GLR4 concerning Maury Island. See General Response GLR9 concerning the insulation of Highline School District schools. See General Response GLR11 concerning air quality.

Susan Overholdt, January 29, 2001 letters

Comments noted. See also General Response GLR6 concerning the MSE wall.

Mark Overholdt, January 26, 2001

See response to RCAA's February 16, 2001 letter.

Ray Overholt, January 27,2001 hearing card

Comment noted.

Ray Overholt, January 26,2001 hearing card

Comment noted.

Mark & Susan Overholdt, October 9, 2000

Comment concerning hearing noted.

Pacific Northwest Waterways Association, January 24, 2001 letter

Comment of support for the project noted.

The Paramount Hotel (Dooley), February 9, 2001 letter

Comment of support for the project noted.

Paramount Hotels (Rigoni), January 31, 2001 letter

Comment of support for the project noted.

Kathy Parker, Hearing Transcript (1)

See General Response GLR17 regarding alternatives considered.

John Patha, February 15, 2001 letter

See General Response GLR6 on MSE Wall with respect to engineering of wall, peer review of engineering analysis, and design review by the Corps.

State Senators Patterson, Eide, Constantine, and Representatives Schaul-Berke, Keiser, Miloscia, Poulsen, McDermott January 24, 2001 letter

Comment noted. See also response to Tom Luster's January 21, 2001 memorandrum.

State Senator Julia Patterson, January 26,2001 hearing card

Request to testify noted.

State Senator Julia Patterson, Hearing Transcript (1)

See General Response GLR6 regarding concerns with the MSE wall. See also response to GeoSyntec regarding the MSE wall. See General Response GLR2 and GLR3 concerning fill contamination issues. See General Response GLR7 concerning instream flow mitigation.

State Senator Julia Patterson, September 12, 2000 letter

In September of 2000, Ecology determined that the state required more time to work with the Port to evaluate whether the agency had reasonable assurance for the Master Plan Improvements. The time necessary to review and assess the remaining project issues was in excess of the deadline for Ecology to issue a 401 water quality certification on the project, one year from the Public Notice date of September 30, 1999. The additional review and assessment was required for specific remaining elements of the *Comprehensive Stormwater Management Plan*, *Natural Resource Mitigation Plan* and Flow Augmentation proposal.

As a result, on September 28, 2000, the Port withdrew the JARPA, with the intent of resubmitting the application at a later date.

State Senator Julia Patterson, September 11, 2000 email 3:16 pm

See response above.

State Senator Julia Patterson, September 6, 2000 email 11:56 am

Senator Patterson's agreement with the referenced editorial is noted.

State Senator Julia Patterson to WsDOT, May 11, 2000 letter

See General Response GLR13 concerning the temporary construction interchange on SR 509.

Karen Pauler, February 16, 2001 letter

Transmittal of hearing comments – see response to January 27, 2001 hearing comments and letter.

Karen Pauler, Hearing Transcript (2)

See General Response GLR6 regarding concerns with the MSE wall.

Karen Pauler, January 27, 2001 Hearing comment letter

See response to GeoSyntec's February 16, 2001 letter.

Regarding the horizontal face of the embankment tiers, none of the tiers will contain a paved service road; the surface of the tiers will be grass surface.

See General Response GLR6 concerning the MSE wall.

Karen Pauler, November 12, 2000 letter

Comment noted concerning hearing request.

Mary & Jerry Paynter, December 19, 2000 email 9:28 am

Comment noted concerning hearing requests and document review.

Mary Pennaczk, January 26,2001 hearing card

Comment noted.

Marion Valerie Perry, January 26,2001 hearing card

See response to General Comment GLR10 and GLR11 concerning noise and noise effects on schools.

Steven Peterson, January 27, 2001 card

Comment noted.

Lorane Phelps, January 26,2001 hearing card

Comment noted.

Pleasant Holidays (Long), January 24, 2001 letter

Comment of support for the project noted.

Diane Pieison, November 12, 2000 letter

Comment noted concerning hearing requests

Elizabeth Pincha, January 26, 2001 letter and hearing card

See General Response GLR6 concerning wall stability and response to the GeoSyntec's February 16, 2001 letter.

The Port believes that the mitigation program discussed in the *Natural Resource Mitigation Plan* addresses the project effect.

Elizabeth Pincha, Hearing Transcript (2)

The Port's 2000 *Natural Resource Mitigation Plan* proposes to replace removed vegetation where possible. See General Response GLR6 regarding concerns with the MSE wall.

Pat Pompeo, Hearing Transcript (1)

See General Response GLR6 regarding concerns with the MSE wall.

Pat Pompeo Comments at Public Hearing, January 27, 2001

Comment noted.

State Rep, Erik Poulsen, January 26, 2001 hearing card

Request to testify noted.

Rick Poulin, January 27, 2001 hearing card

Comment noted.

Rick Poulin, Hearing Transcript (2)

See General Response GLR17 regarding alternatives considered. See General Response GLR16 concerning the adequacy of the EIS. See General Response GLR2 and GLR3 concerning fill contamination issues. See response to Tom Luster's memorandum to Julia Patterson concerning reasonable assurance. See Response to Smith & Lowney's February 16, 2001 letter concerning Clean Air Act conformity.

State Representative Erik Poulsen, Hearing Transcript (1)

See General Response GLR8 concerning Endangered Species Act issues. See "Introduction" to these responses concerning changes in the quantity of wetlands affected by the project. See General Response GLR6 regarding concerns with the MSE wall. See response to Dan Caldwell's January 26, 2001 letter concerning the benefit/cost evaluation prepared for the project. See General Response GLR17 regarding alternatives considered.

State Sen. Prentice, January 22, 2001 letter

Comment of support for the project noted.

Patrick Pressentin, Pressentin & Associateds December 10, 1999

Comment noted. See also response to Helsell Fetterman's February 16, 2001 letter and Smith & Lowney's February 16, 2001 letter.

Patrick Pressentin, January 27, 2001 hearing card

See the Port's 2000 *Natural Resource Mitigation Plan*.

Puget Sound Regional Council (McCumber), January 26, 2001 letter

Comment noting the Region's decision to develop the runway at Sea-Tac Airport.

Imogene Pugh, Hearing Transcript (2)

See General Response GLR2 and General Response GLR3 concerning contaminated fill concerns.

Warme & Imogene Pugh, October 9, 2000 letter

Comment concerning hearing noted.

Louise Qupta, Hearing Transcript (2)

See General Response GLR17 regarding alternatives considered. See General Response GLR10 concerning noise and General Response GLR11 concerning air pollution.

Dorie Rainey, January 26, 2001 hearing card

Request to testify noted.

Ms. Rainey, Hearing Transcript (1)

The *Final Supplemental EIS* contains a detailed description concerning the ability to mitigate certain functions that conflict with aircraft safety in basin (see FSEIS, Section 5-5). The 2000 *Natural Resource Mitigation Plan* contains discussions of the comprehensive mitigation that will be included in basin. See *Natural Resource Mitigation Plan*, Chapter 5. See General Response GLR8 concerning Endangered Species Act issues.

Robert Ramboll, January 27, 2001 card

Comment noted.

Robert Ramboll, Hearing Transcript (2)

Comment noted.

Regional Commission on Airport Affairs (RCAA) by Larry Corvari email transmitting a letter on February 16, 2001

1.1 Comments noted concerning subject to their comments.

1.2 Comments noted concerning identity of the commentor.

1.3 Comments noted concerning the interest of the commentor.

1.4 Comments noted concerning the limited scope of comments.

1.5 Comments noted concerning notes, glossary, and references.

1.6 Comments noted concerning history.

2.1 RCAA disagrees with the approach in the Corps' Public Notice regarding resubmitted §404 application, and, accordingly, has reiterated all of its comments made in previous comment letters (November 29, 1999). The Port has previously supplied responses to those comments and incorporates those responses by reference. Accordingly, only new items raised by RCAA that the Port has previously not responded to will be addressed in these responses.

2.2 Comment noted concerning the notice.

2.3 RCAA has listed a large number of documents that it has reviewed that it maintains were not referenced in the Public Notice. A list of some of the documents referred to by the Corps was put in the Public Notice as an aid to the public in preparing comments. However, 33 CFR §325.3 does not require that an exhaustive list of each and every document prepared in connection with the project by either the Port or its consultants be included in the Public Notice. Detailed peer review of every engineering document on a project as complex as that proposed by the Port is not what is envisioned by the public comment process. Rather, what 33 CFR §325.3 requires is a "brief description" of the project to allow the public to make "meaningful comment" on the proposed project. In connection with this requirement, the Port notes that RCAA's reliance on the Project Bibliography enabled RCAA to review relevant documents and facilitated RCAA's detailed comments on the project.

RCAA maintains that issues exist relative to fill, potential contamination and transport of fill. Fill will come from approved, permitted sources. There are a number of potential sources of fill. The Port has been approached by numerous contractors with fill to sell, however, other than fill accepted to date in accordance with the provisions outlined in the response to General Comment 2, no decisions have been made at this time. Pursuant to the Port's Soil Fill Acceptance Criteria, all material will be analyzed to determine its quality and will be rejected if it is not appropriate.

See General Response GLR2 on the Port's Soil Fill Acceptance Criteria and the steps being taken to prevent contaminated fill.

RCAA has noted correctly that the purpose of the Master Plan Update improvements is to improve bad weather operating delays.

The Public Notice states that the list of documents provided in the Bibliography is a non-inclusive list and that additional information on the project is available at the Corps' District office.

2.4 With respect to cumulative impacts noted in this comment, see General Response GLR19 on the analysis conducted with respect to cumulative impacts of projects undertaken by both the Port and other parties in and around the area of Sea-Tac Airport.

2.5 The documents prepared for the §404 permit have been prepared in accordance with the requests of Ecology or the Corps.

2.6 Comment noted.

3.1 Comment noted.

3.2 Comment noted.

3.3 The studies sponsored by the State are included in the respective agency files. See also General Response GLR2 and GLR4.

3.4 See General Responses GLR4 and GLR5.

3.5 See General Responses GLR4 and GLR5.

3.6 No comment provided.

3.7 No comment provided.

3.8 Comment noted.

4.1.1. **Existing NPDES Permit**: The Port is in compliance with its National Pollution Discharge Elimination System (NPDES) permit, which is the regulatory permit under Section 402 of the Federal Clean Water Act and Washington State regulations, WAC 173-201A-160(3)(d) that assures that "activities which generate stormwater" comply with state water quality standards. This comment indicates a focus on "end of the pipe" measurements that have not had the benefit of dilution. However, the citation in the comment provides for dilution "after consideration of disposal site dilution and dispersion ...". The data collected by the Port is "end of pipe" data, which does not demonstrate violation of water quality standards in the receiving water body. By employing Best Management Practices (BMPs) prior to discharging its stormwater, the Port is using AKART (all known available and reasonable technology) and therefore entitled to dilution in determining compliance with water quality standards. Moreover, it is the Port's belief that the data is stormwater data, which cannot be used absent consideration of storm events to determine compliance with water quality standards.

In further compliance with its NPDES permit, the Port has tested the toxicity of its stormwater discharges directly using whole effluent toxicity (WET) testing. These tests, conducted using sensitive aquatic organisms following Environmental Protection Agency (EPA) protocols, have shown that undiluted stormwater (100 % stormwater) from three of four tested outfalls is not toxic to aquatic life. Of particular note is the fact that stormwater from SDS3 drainage basin was not toxic. This 149-acre drainage basin is the largest at Airport and is representative of future taxiways and runways. For the outfall that produced measurements outside the acceptable WET range, the Port has identified the source of the pollutant that caused toxicity and is implementing BMPs to treat the runoff.

It is also important to note that water quality criteria are derived using relatively "clean" laboratory water that does not contain constituents such as particulate matter, as well as the organic and inorganic ligands in surface water and stormwater that compete and combine with the metals to reduce their toxicity. This reduced bioavailability of metals has been corroborated elsewhere and that for many surface waters.

4.1.2 **Proposed NPDES Permit Modification**: The proposed modification to the Port's NPDES permit addresses modifications to Port-owned property to which the permit applies, and clarifies the receiving waters to which the Port discharges. All of the areas covered by the Master Plan Update, with the exception of the SR 509 Temporary Construction interchange, are already covered by the Port's NPDES permit. Construction of the 509 Interchange work have not started and will not start until the modification has been issued. The permit includes provisions more stringent than the NPDES general construction permit, and includes a monitoring requirement. Inclusion of the SR 509 Temporary Interchange area in the permit coverage area *increases* the requirements for compliance with NPDES. See also General Response GLR13 concerning SR 509.

The Port's NPDES permit requires monitoring of all Port storm drains that drain areas associated with industrial activity. Five years of permit-required monitoring from Port stormwater outfalls has shown that airfield runoff has concentrations of pollutants lower than typical urban runoff in the Seattle metropolitan area. Moreover, it is anticipated that implementation of the*Comprehensive Stormwater Management Plan* will improve stormwater quality.

The Port's NPDES permit requires the Port to develop a stormwater pollution prevention plan, a sediment and erosion control plan, and site specific monitoring plans for all constructions projects. The Port is in full compliance with all of these conditions. Moreover, under its NPDES permit, the Port is required to implement and monitor the best management practices (BMPs) for its stormwater discharges. The Port has complied with those conditions. Monitoring reports are submitted to Ecology, along with an Annual Stormwater Report, which evaluates the stormwater monitoring data. Ecology has issued no notice of violation of the Port's existing NPDES permit. Because the Port has an existing NPDES permit and will be required to have NPDES permits in the future, Ecology has "reasonable assurance" sufficient to certify compliance with state water quality standards.

The existing, and any future NPDES permits must be conditioned to comply with state water quality standards and the anti-degradation requirements of the Clean Water Act (CWA). WAC 173-201A-060, 173-201A-070, Fact Sheet to NPDES Permit No. WA-002465-1, pp. 22-23. The Fact Sheet that accompanies the Airport's existing NPDES Permit states as follows: "In order to protect existing water quality and preserve the designated beneficial uses of Washington's surface waters, WAC 173-201A-060 states that waste discharge permits shall be conditioned such that the discharge will meet established Surface Water Quality Standards.... The Department has reviewed the ambient water quality monitoring results gathered by the Port ... and [t]he discharges authorized by this permit should not cause further degradation which would interfere with or become injurious to existing beneficial uses." (Fact Sheet, pp. 22-23). Because the Port is required by the CWA to obtain NPDES permits for process water discharges, as well as for industrial and construction stormwater discharges, Ecology has reasonable assurance that the activity that is the subject of the §401 Certification complies with state water quality standards. The NPDES permit modification is being sought only to include additional discharge points and bring additional areas of the Airport within the NPDES permit jurisdiction. This will result in more protection for receiving waters because those discharges must meet the requirements of the existing NPDES permit, which has been conditioned to meet state water quality standards.

Availability of an Acceptable Stormwater Management Plan: Stormwater management at Sea-Tac Airport has been the subject of much study and discussion between the agencies and the Port since the first Revised Public Notice. As a result, a number of changes have occurred in the proposed *Comprehensive Stormwater Management Plan*.

The Port re-ran the model that the stormwater planning was based on and revised some of the basic parameters. These included:

- Recalibrating the HSPF (Hydrologic Simulation Program-Fortran) model to include a separate calibration for Walker Creek.
- Using updated land use and soils information.
- Changing the location of downstream points of compliance for peak stormwater flows from instream locations to the outlets of each subbasin.
- Changing the assumption of the pre-project condition from a 1994 base year to an assumption of only 10 percent impervious surface.

Additionally, the Port and the agencies agreed that the Port could not assume the use of an expanded Miller Creek Regional Detention Facility (RDF) or a new Des Moines Creek RDF in its planning. The outcome of these changes was to increase the stormwater detention requirements for the project from 76.6 acre-feet to 326.4 acre-feet.

The revised *Comprehensive Stormwater Management Plan* includes new or expanded facilities to meet the increased detention requirements. These include stormwater infiltration facilities in two Miller Creek sub-basins. The revised plan also proposes a schedule for implementation of new stormwater facilities that is synchronized with Master Plan Update projects.

Another revision to the *Comprehensive Stormwater Management Plan* since the first Revised Public Notice concerns low flow mitigation to Miller, Walker and Des Moines creeks. The Port now proposes to enhance low stream flows by ceasing the exercise of existing surface water rights (obtained by the Port through property acquisitions) on Miller Creek, incorporating infiltration into stormwater detention facilities where feasible, and supplementing low flow with stored and released stormwater to mitigate base flow impacts. The Port's participation in the Basin Plan flow augmentation project is not proposed as mitigation for Master Plan Update impacts. Impacts to low flows in Des Moines Creek caused by Master Plan Update projects will be mitigated by stored and released stormwater, and no other impacts to low flow will be mitigated by the Port's plan to store and release stormwater. The Port will also continue to participate in the Des Moines Creek Basin Plan Committee's flow augmentation project, which addresses low flow issues caused by urban development throughout the basin.

4.1.4 **De-icing Issues**: Glycol based fluids are only used to deice aircraft, and stormwater associated with that activity drains to the Industrial Wastewater Treatment System. The Port terminated the use of glycols on the runways and taxiways in 1992 and now uses more environmentally compatible acetate based compounds.

Aircraft deicing and anti-icing fluids are categorized into four types: Type I, Type II, Type III, and Type IV (USEPA 2000). These fluids contain ethylene or propylene glycol, water, and additives. Type I is the most commonly used fluid and is used primarily for aircraft de-icing; Types II, III, and IV are used for aircraft anti-icing. Toxicity data presented in USEPA (2000) for these fluids supports the U.S. Fish and Wildlife Service Classification System rating of "relatively harmless" for the Type I fluids (e.g., a 96-hr LC50 for the rainbow trout of 17,000 mg/L and for the water flea, a 48-h EC50 of 44,000 mg/L). Additionally, the ethylene glycol used to deice aircraft is not considered a dangerous

waste. In September 1995, the Port applied for certification of the waste aircraft deicing fluids generated at the Airport under WAC 173-303-075. The application included static acute fish and acute oral rat bioassays in accordance with the requirements of WAC 173-303-110(3)(b). On October 20, 1995, based on the results of the bioassays, Ecology certified that waste aircraft deicing fluids containing ethylene glycol generated at Sea-Tac Airport are not dangerous wastes.

Oxygen content in receiving waters during periods when deicing agents are not used. The Port has studied multiple factors that influence the levels of dissolved oxygen in NW Ponds and Lake Reba (e.g., rainfall, wind, temperature, length of dry period, natural organic carbon in runoff and pond sediments) (Cosmopolitan 1999). The results of this analysis are unable to show any relationship between the application of de-icers and levels of dissolved oxygen in the ponds. The Port undertook a second study the following winter that reached similar conclusions.

The Port concludes that given the infrequent and minimal use of de-icers at Sea-Tac Airport (as acknowledged by the commentor in referring to the second dissolved oxygen study), further studies are not likely to change the findings reported thus far.

4.1.5 **Construction Impacts are Recognized And Mitigated**: See General Response GLR6 on MSE Wall. With regard to the temporary SR 509 interchange, it is the Port's belief that sufficient information has been publicly available to allow for meaningful public comment. The proposed project was discussed in the Final Supplemental Environmental Impact Statement (Section 5-4). The interchange will not involve any discharge of fill material into a water of the U.S. and, accordingly, will not require a §404 permit. Construction of the interchange will include the use of best management practices to detain, treat, and discharge stormwater as required by Ecology and King County stormwater manuals. The interchange will not have significant indirect impacts on wetlands, as documented in the May 3, 2000, memo from Parametrix to the Corps entitled *Analysis of Indirect Impacts to Wetlands from the Temporary SR-509 Interchange*. Any new information regarding the interchange since the issuance of the *Final Supplemental EIS* (FSEIS) represents only refinement of the project as considered in the FSEIS, not a wholesale new design or significant new information regarding potential impacts. Further, these issues were addressed by the Port in its January 2000 addendum under the Washington State Environmental Policy Act (SEPA) entitled *Addendum To Final Environmental Impact Statement and Final Supplemental Environmental Impact Statement For Proposed Master Plan Update Development Actions at Seattle-Tacoma International Airport.*

4.1.6 **Stream-augmentation issues**: Flow reductions have been evaluated using well-calibrated hydrologic models that are capable of evaluating hydrologic water balance in watersheds. Evaluation of hydrologic changes that may occur and are limited by the application of the Hydrologic Simulation Program-Fortran (HSPF) model are conservatively evaluated using appropriate accepted methods. The predicted effects are very small.

All three streams in the project area drop below 1 cfs in most summers. The additional flow reduction caused by the Master Plan Update projects, if any, will be mitigated as described in the *Low Streamflow Analysis* report.

The *Sea-Tac Runway Fill Hydrologic Studies Report* (Pacific Groundwater Group, June 19, 2000) and the *Low Streamflow Analysis* provide a comprehensive analysis of the hydrologic effects of the proposed third runway fill embankment, proposed stormwater detention ponds and vaults, and changes in water usage within the buy-out area of the basins. The *Low Streamflow Analysis* concludes that there will be no net effect on the low flows of the Des Moines, Miller and Walker Creeks given the changes in runoff conditions, delayed discharge of water percolating through the runway embankment fill, changes in water uses within the buy-out areas, and managed release of

stormwater from reserved storage facilities. The analysis of no net streamflow impacts does not include any mitigation water sources for Des Moines, Miller or Walker Creeks, only changes in runoff conditions and stormwater management. The *Comprehensive Stormwater Management Plan* demonstrates that detention ponds and vaults and metered discharge will mitigate the effects of the Master Plan Update improvements on low flows of the three creeks without the use of additional sources of mitigation water.

General Response GLR7 concerning Instream Flow Mitigation addresses the comment's assertion that there has been no analysis or credible mitigation response, as well as the fact that detention and controlled release of stormwater to mitigate low flows will not require a new water right.

The Port believes the comment's assertion that the Port has employed only "speculative plans and concept-only designs" does not comport with the record.

As set forth in detail in General Response GLR7, the Port has provided detailed technical evaluation of streamflow impacts, see *Sea-Tac Runway Fill Hydrologic Studies Report* (Pacific Groundwater Group, June 19, 2000). This report was prepared for Ecology in order to assess the hydrologic effects of constructing the proposed Third Runway fill embankment, and evaluated the hydrologic analyses completed up to that time. Based on the information available at the time of the report, it was concluded that the delay in discharge of water due to fill presented a significant beneficial factor in supporting summer low flows and that the net effect of discontinued local withdrawals and importation of water in the Miller Creek basin were approximately zero. Preparation of this study was overseen by Ecology, and the results were reviewed by and presented publicly with Ecology staff.

Hart Crowser later prepared an independent analysis for the Port of the behavior of precipitation infiltration through the proposed embankment fill (Hart Crowser, October 13, 2000). This analysis utilized model methods and parameters that differed in some respects from the Pacific Groundwater Group study. The Hart Crowser results supported the findings of the Pacific Groundwater Group report, specifically that there would be a delayed discharge of infiltrated water and that this would provide increased discharge from the fill area during low flow periods in Miller Creek.

The *Low Streamflow Analysis* report provided a more comprehensive evaluation of potential low streamflow effects in the three stream systems. The analysis considered the net effects on low streamflows from (1) changes in storm runoff characteristics; (2) delayed discharge of infiltrated water percolating through the fill embankment; (3) changes in non-hydrologic water uses within the buy-out area in the watersheds; and (4) managed release of stormwater from reserved storage facilities.

The *Low Streamflow Analysis* utilized the results of updated Hydrologic Simulation Program-Fortran (HSPF) model simulations from the *Comprehensive Stormwater Management Plan* that were reviewed by King County staff working on behalf of Ecology. The estimates of historic local water withdrawals were revised downward from earlier estimates based on consultations with former property owners. The estimates of runoff volume which would percolate into the fill through biofiltration strips accounted for the reduced infiltration capacity expected to result from direct precipitation on the filter strips; the infiltration capacity of biofiltration swales atop the runway fill were conservatively neglected in the analysis. The analysis concluded that low flows could be maintained to, or improved above, pre-project conditions in all three streams with the implementation of the stormwater infrastructure proposed in the *Comprehensive Stormwater Management Plan.*

The Miller Creek analysis accounts for changes in stormwater flows, the effects of stormwater management facilities, cessation of water withdrawals under local water rights (it reflects a refined estimate of historic water usage based on verification with property owners, as updated in Appendix G of the *Comprehensive Stormwater Management Plan*), cessation of irrigation and septic system discharges of imported water, delayed discharge of direct precipitation and pavement runoff through the proposed embankment fill, and the use of reserved stormwater releases.

The Walker Creek analysis accounts for changes in stormwater flows, the effects of stormwater management facilities, and delayed discharge of direct precipitation and pavement runoff through the proposed embankment fill.

The Des Moines Creek analysis accounts for the effects of stormwater management facilities and the use of reserved stormwater releases, and it does not rely on the use of the Tyee Golf Course well to maintain low flows.

The commentor contends that the Port has failed to offer a valid water right or credible source of water for mitigation and that this prevents Ecology from having reasonable assurance of the validity and efficacy of the Port's instream flow mitigation plans. However, as is elaborated in detail in the General Response GLR7, Instream Flow Mitigation, and as described above, based on the *Comprehensive Stormwater Management Plan*, it is the Port's belief that the Des Moines Creek Augmentation Plan is no longer necessary to mitigate the impacts of the proposed Airport improvements. Despite this fact, the Port continues to cooperate with the Des Moines Creek Basin Planning Committee to implement its recommendation that a well and pump system be constructed near South 200th Street to augment stream flow impacted by existing development in the basin. The flow augmentation would improve the existing water quality conditions in the stream during late summer when low stream flow contributes to elevated temperatures and low dissolved oxygen levels. The commentor is correct, however, that this effort will only be possible if Ecology approves the Port's application for change of water right certificate 2369 to include stream flow mitigation. As part of Ecology's investigation and findings on that change application, it will make a tentative determination regarding the validity of the Port's water right for Well No. 1, which would answer the questions raised in comment letters about the validity of the Well No. 1 water right and its suitability for use for stream flow mitigation.

The delayed timing of this investigation and findings by Ecology led the Port to develop the *Comprehensive Stormwater Management Plan* as its primary means of mitigating low flow and water quality impacts to the three creeks. Now that the *Comprehensive Stormwater Management Plan* has been developed, Ecology's future determination regarding the validity of the Well No. 1 water right is not essential to a finding under Clean Water Act §401 of reasonable assurance of compliance with water quality standards for Master Plan Update improvements and mitigation, because the Port is basing such compliance on the *Comprehensive Stormwater Management Plan*, not the *Des Moines Creek Augmentation Plan*.

4.1.7 **Miller Creek**: The existing Miller Creek channel to be relocated is a linear ditched channel with a uniform cross section. The riparian vegetation is predominately reed canarygrass and blackberry that provides little shading of the channel. Immediately after construction, the relocated channel will likely have no less shading than the channel in its current condition. It is the Port's belief that a few years of new growth will significantly improve shading of this channel reach. In addition, new woody debris (where none is in place now) will improve re-aeration of the stream and enhance dissolved oxygen levels immediately following construction.

The Port believes that surface flow in the stream channel will not be lost due to the permeability of streambed material. The material specifications for streambed materials include fine sands and silts to specifically avoid the potential concerns that were mentioned by the commentor. The flow depths calculated in the *Natural Resource Mitigation Plan* will be met. These flow depths are based on open channel calculations for the proposed relocated stream. In the event that design standards are not met and the stream is not providing appropriate habitat, Table 5.1-7 of the *Natural Resource Mitigation Plan* provides performance standards and contingency measures that can be implemented to remedy the situation.

Water table elevations were monitored in the Vacca Farm area as shown in Table 5.1-10 of the *Natural Resource Mitigation Plan*. The elevations indicate that minimum static water table elevations will be at approximately 261 feet. The proposed channel flow line (as defined by the log sills) varies through the reach but is at the same approximate elevation as the minimum water table elevation. In addition, drainage ditches and tile in the farmed area will be abandoned, which is likely to increase water table elevations at the site.

The proposed stream is at approximately the same elevation as the existing channel (the pools will be deeper). The *new* channel is therefore likely to intercept the water table in the same way as the existing channel, which means that the creek will not "drain" from its channel into the peat.

4.2 Comments noted.

4.3 Bird-aircraft collisions ("bird strikes") pose a serious threat to aircraft and passenger safety. In the United States, more than 1,700 bird strikes occur each year.[1] Between 1991 and 1998, 103 bird strikes were reported at the Airport. Bird strikes are discussed in the *Biological Assessment* and in the *Natural Resource Mitigation Plan*. The Port's *Wildlife Hazard Management Plan* and wildlife management program address wildlife management actions required by the Federal Aviation Administration for all airports, like Sea-Tac, that conduct operations for aircraft with a seating capacity for more than 30 passengers. (14 CFR 139.337).

The bird-aircraft strike record at Sea-Tac Airport demonstrates that wildlife hazards exist at Sea-Tac Airport. The Port, Federal Aviation Administration, and U.S. Department of Agriculture's Wildlife Services Division have recognized wildlife hazards at Sea-Tac Airport since at least 1977. Since the 1980's the Port has staffed a full time wildlife biologist at the airport to assist in reducing and managing wildlife hazards. This management includes scaring or removing wildlife from the airport operations area, and managing habitat to reduce its potential to attract wildlife.

In recognition of wildlife hazards at Sea-Tac Airport, and consistent with Federal Aviation Administration Advisory Circular 150/5200-33, the Port will construct wetland mitigation for habitat functions more than 10,000 feet from all runways at Sea-Tac Airport. The Federal Aviation Administration has also approved on-site mitigation involving wetland restoration where this action reduces wildlife hazards (primarily by converting areas used by waterfowl and other flocking birds to shrub dominated areas that do not provide waterfowl habitat).

The wetlands filled by the Master Plan Update improvements do not provide unique ecological functions, and therefore do not meet the criteria for exception from the Advisory Circular's general prohibition against locating wetlands within 10,000 feet of the runway. See Advisory Circular 150/5200-33, § 2.4b(3). Critical habitat for endangered species is not present in any affected wetland

1 *Wildlife Strikes to Civilian Aircraft in the United States 1992-1997* (USDA/FAA August 1997).

(see the discussion of critical habitat in the *Biological Assessment*). Groundwater recharge functions are also not present in affected wetlands (geotechnical and hydrologic analysis indicates the wetlands occur in groundwater discharge areas or are perched on low permeability till where recharge rates are low). The embankment design assures that the groundwater discharge functions of wetlands are maintained on-site (see the *Wetland Functional Assessment and Impact Analysis Report).*

In July 1997, the Federal Aviation Administration issued a Record of Decision for the Master Plan Update improvements that considered all comments received by the public and government agencies. The Federal Aviation Administration, as the federal agency responsible for aviation safety, identified in the Record of Decision the need for off-site wetland mitigation, consistent with Federal Aviation Administration Advisory Circular 150/5200-33.

The off-site mitigation at the Auburn Mitigation Site is not less extensive in area than the area of wetlands filled at the airport. The off-site wetland mitigation project occupies approximately 65 acres of property (about 3.5 time the area of projected wetland impact for construction of the Master Plan Update improvements). New and restored wetlands at the Auburn Mitigation Site will total more than 48 acres, about 2.5 times the acreage of wetlands filled at the airport. The primary difference in character between the off-site wetland mitigation and the affected on-site wetlands is that the off-site wetlands will have greater levels of wildlife habitat function because of greater habitat diversity, less human disturbance, and long term protection. Only a small portion of this mitigation (0.62 acres) will be openwater.

On a cost per acre basis, it is likely that construction of on-site wetlands would be less expensive than construction of wetlands at the Auburn Mitigation Site. However, compliance with federal regulations to reduce the risks to aircraft and passenger safety posed by bird strikes justifies the additional expense to construct the mitigation at an off site location.

4.4 See General Responses GLR17 and GLR18. See also responses to Stephen Hockaday's February 16, 2001 letter and Geoffrey Gosling's February 15, 2001 letter.

4.5 The Port estimates for the cost of building the third parallel runway is $773 million (estimated in June 1999). Throughout the planning process, the project has been the subject of extensive consideration of the project cost and benefits. A requirement of the Federal grant process is the conduct of a benefit cost evaluation that is included in support of the Port's Letter of Intent application. That benefit cost evaluation was prepared subject to Federal guidelines (dated December 1999 which finalized interim guidance adopted by the FAA in 1997). This guidance, titled "FAA Benefit Cost Analysis Guidance" was issued by the FAA's Office of Aviation Policy and Plans and is used "to provide clear and thorough guidance to airport sponsors on the conduct of project-level benefit-cost analysis (BCA) for capacity-related airport projects... Airport sponsors should conform to the general requirements of this guidance for all BCA's submitted to the FAA." The BCA guidance was developed in response to guidance from Congress citing the need for economic airport investment criteria.

In 1997, the FAA estimated that the Project would result in delay savings, to airlines and their passengers, in excess of $2.7 billion in present value through 2015. These estimated benefits, which may now be conservative, exceed the $600 million present value of the runway's maintenance costs and updated capital costs by a ratio of 4.5 to 1. To enable the FAA to issue a Letter of Intent (a mechanism used to obtain multi-year grant commitment from the FAA for funding from the Airport and Airway Improvement Program), projects must have a present value benefit that exceeds the present value costs. As is shown by the Third Runway BCA, the project provides substantially greater value than the minimum requirement.

4.6 See response to comment 4.5 above. See also the letter from Ed Merlis, Air Transport Association, dated January 26, 2001.

4.7 See General Response GLR1, GLR4 and GLR9. See also response to Thomas Lane Associates' letter dated February 9, 2001.

4.8 The *Final EIS* (Chapter IV, Section 6, Pages IV.6-4 through IV.6-7) considered environmental justice related issues. As was shown, the Master Plan Update projects were found to not create a disproportionate impact on low-income or minority populations. The FAA's findings regarding Environmental Justice are documented in the 1997 Record of Decision on Page 29.

4.9 See Response to Smith & Lowney's February 16, 2001 letter comment 1.

5. Comments noted

6. Comments noted.

7. Comments noted.

RCAA (Talbot), January 24, 2001 letter

FOIA follow-up – no comment/response from the Port necessary.

RCAA, January 11, 2001 email 10:30 pm

Comments concerning hearing issues noted.

RCAA, December 19, 2000 letter

Revised reports available before the Public Notice was issued on December 27, 2000, include the: *Wetland Functional Assessment and Impact Analysis, Natural Resource Mitigation Plan, Wetland Delineation Report, Comprehensive Stormwater Management Plan, and Seattle-Tacoma Master Plan Update Low Streamflow Analysis.* The comment period on the Public Notice was extended beyond the typical 30 days to allow additional time for public and agency review and comment.

RCAA, November 15, 2000 letter

The Corps received a new application.

A new public notice was issued December 27, 2000, and a Public Hearing was held January 26 and 27, 2001, at the Washington State Criminal Justice Training Center. The January 26 hearing went from 5:30 pm to 10:00 pm, and the January 27 hearing went from 9:00 am to 5:00 pm.

1. See "Introduction" to the response to comments.
2. All documents necessary for review were submitted before the public notice.
3. The public notice issued December 27, 2000, contains information on the changes to the project since the previous public notice.
4. The public notice was issued December 27, 2000. The standard public comment period is 30 days, but the public comment period for this project was extended to February 16, 2001, to provide additional time for public and agency comment.

5. The Public Notice states that the list of documents provided in the Bibliography is a non-inclusive list and that additional information on the project is available at the Corps' District office.
6. Comment noted.
7. As stated in the Public Notice, all project documents used in evaluating this project are available at the Corps' Seattle District office.
8. Comment noted.
9. Comment noted.
10. A Public Hearing was held January 26 and 27, 2001, at the Washington State Criminal Justice Training Center in Burien. The January 26 hearing went from 5:30 pm to 10:00 pm, and the January 27 hearing went from 9:00 am to 5:00 pm.
11. See #10 above.
12. See #10 above.
13. Comment noted.
14. Comment noted.
15. Comment noted.

RCAA to Graves/USCOE, August 18, 2000 letter

A new public notice was issued December 27, 2000, and a Public Hearing was held January 26 and 27, 2001, at the Washington State Criminal Justice Training Center in Burien. The January 26 hearing went from 5:30 pm to 10:00 pm, and the January 27 hearing went from 9:00 am to 5:00 pm.

RCAA to Rigsby, June 14, 2000 letter

Gilliam Creek will not be affected by the construction or operation of the Master Plan Update projects.

RCAA (Furney) to the, January 12, 2000 (Al Furney)

Comments in the Port's SEPA determination for the IWS Lagoon 3 Upgrades and Expansion noted– see also General Response GLR14.

Mike and Jane Rees, February 16, 2001 email 11:58 am

See General Response GLR15 concerning the adequacy of the EIS, the Port's 2000 Biological Assessment, and General Response GLR2 concerning MTCA criteria. The Port disagrees with the remaining opinions/ comments regarding the NPDES, *Comprehensive Stormwater Management Plan* and responsiveness of the Port.

Mike and Jane Rees, April 28, 2000

See Response to General Comment GLR13 concerning the temporary construction interchange on SR509.

Russell Richter, December 21, 2000 email 11:46

The Mississippi River project has no relevance to the Port's Master Plan Update projects.

Russell Richter, December 20, 2000 fax letter

The Mississippi River project has no relevance to the Port's Master Plan Update projects.

Audrey Richter, February 15, 2001 letter

Comment noted. See also General Response GLR10 and GLR11.

Audrey Richter, December 20, 2000

The Mississippi River project has no relevance to the Port's Master Plan Update projects.

Bonita Reister, February 6, 2001 letter

Comment noted.

Michael & Carolyn Roedell, February 13, 2001 card

Comment noted.

Carol Rose, January 26, 2001 hearing card

See the Port's 2000 *Natural Resource Mitigation Plan*. See also General Response GLR6 concerning the wall and the response to GeoSyntec's February 16, 2000 letter concerning the stability of the MSE wall.

Steven Rosen, January 26, 2001 hearing card

Request to testify noted.

Steve Rosen, Hearing Transcript (1)

Comment noted.

Marie Rosenberg, January 27, 2001 hearing card

Comment noted.

Marie Rosenberg, Hearing Transcript (2)

Comment noted.

David Rossi, Hearing Transcript (1)

See General Response GLR16 concerning the adequacy of the EIS. See General Response GLR7 concerning instream flow mitigation.

Anita Rowe, January 31, 2001 letter

Comments noted.

Harvey Rowe January 26, 2001 letter.

See General Response GLR17 concerning alternatives evaluated.

See also response to General Response GLR9 concerning school. The commentor is referencing RCW 53.54.030, which requires the Port to obtain something from homeowners participating in sound insulation projects. In exchange for participating in the insulation program, the Port requires that homeowners provide the Port with an easement. This homeowner, like a few others, has refused to grant an easement and therefore is not participating in the insulation program.

As is stated in the 1985 Master Plan Update Executive Summary (Final Report, Page 1): "A series of policy guidelines and assumptions were developed to reflect both stated Port policy and institutional and environmental constraints. For example, it was determined at the onset that no new runways at Sea-Tac would be considered, primarily because (1) the existing runway configurations had previously been determined to provide adequate capacity for the planning period, (2) there had already been an enormous investment into the existing runways, and (3) construction of the proposed new runway would have a large environmental impact."

This statement has been construed by many neighbors of the Airport as a commitment not to expand the existing airfield. It must also be noted that when the 1985 study was initiated, the findings of the Comprehensive Planning Review and Airspace Update Study had not been completed. The Comprehensive Planning Review and Airspace Update Study found that the assumptions of the Master Plan relative to the adequacy of the existing airfield were incorrect; poor weather conditions were beginning to create significant delays, which would worsen in the future as airport activity levels grew. Thus, the 1985 Master Plan was conducted prior to the identification of a worsening poor weather constraint.

The purpose of the proposed third runway is to ensure efficient operations during poor weather conditions, since the existing runways are presently only able to accommodate a single aircraft arrival stream during poor weather. With the addition of the proposed new third runway and other proposed improvements, Sea-Tac Airport would be able to safely and efficiently accommodate aircraft operations through the planning horizon. The proposed phasing and cost estimates are discussed in Chapter II, "Alternatives".

To date, there have been no discussions or plans prepared regarding the need for a fourth parallel runway at Sea-Tac. The Capacity Enhancement Study, as summarized in the *Final EIS*, show that as activity levels grow in the future, delays would continue to rise, even with the development of the third runway. The *Final Supplemental EIS* estimated that the Third Parallel Runway would accommodate about 630,000 with then current air traffic procedures. It is not reasonable to foresee at this time how demand beyond that level could be accommodated in the region.

Harvey Rowe, Hearing Transcript (2)

Comment noted.

Melanie Rowland, May 25, 2000 email

Internal NMFS e-mail regarding ESA – No comment/response warranted by the Port.

John Rund, November 16, 2000 letter

No comment/response from the Port warranted.

John & Shirley Rund, November 9, 2000

Comment noted concerning hearing requests.

John Ryan, January 26, 2001 hearing card

Request to testify noted.

John Ryan, Hearing Transcript (1)

Comment noted.

Lee Sanders, November 11, 2000 email 4:14 pm

Comment noted concerning hearing requests.

Stan Scarvie, January 28, 2001 letter

1. Impacts to the Highline Aquifer were considered in the *Master Plan Update FEIS* and in the *Fill Hydrologic Study* specially commissioned by Ecology under instruction from the State Legislature. The FEIS concluded that any impacts to the Highline Aquifer would not be significant. The *Fill Hydrologic Study* concluded: "The small reduction in groundwater recharge to deep aquifers of the Des Moines upland would not materially affect the ability of these aquifers to supply water to wells."

The magnitude of the very localized change in recharge of 0.18 million gallons per day (FEIS: Appendix Q-A) that is predicted to occur as an impact of the Master Plan Update projects is very small when compared to the total amount of recharge (14.3 to 16.5 mgd) to the Des Moines upland (South King County Ground Water Advisory Committee, 1991). Any changes would also be distributed between the various deep aquifers beneath the Des Moines upland, with the main effect occurring in the shallowest aquifer within the Vashon Advance Outwash deposits. Most of the changes in recharge would be translated to changes in baseflow of the creeks (mainly Miller Creek and Des Moines creek) draining the central part of the Des Moines upland, with little if any measurable effect on the deeper aquifers.

2. It is the Port's belief that the commentor's assertion that saline intrusion could occur in the Highline Aquifer is not supported by the technical facts. The Highline Aquifer occurs within the Des Moines upland at typical elevations of between 227 and 108 feet or more above sea level (Final EIS; page IV.10.8). The Highline Aquifer is located entirely above sea level, with minimal or no connection to the salt waters of Puget Sound. There is therefore no credible mechanism for saltwater intrusion to occur, irrespective of any changes in recharge.

3. The occurrence of sinkholes within the glacial deposits of the Puget Sound area is extremely rare; the hydrogeologic conditions normally associated with sinkholes do not generally occur in glacial terrain. A similar phenomenon, known as kettle holes, are a feature of the local glacial terrain; these resulted from blocks of ice below the surface that melted early on in the subsequent 12,000 years which have elapsed since the last glaciation.

Sinkholes occur naturally as a result of subsurface water flow that dissolves soluble rock formations (usually limestone; especially karstic limestone) below the ground surface, leading to the development of underground voids that then collapse to form sinkholes. Declining groundwater

levels can trigger this occurrence when the buoyancy of soil and rock above water-filled voids is reduced as the water level falls. Comparable conditions do not occur locally, so the risk of forming sinkholes from a relatively minor change in groundwater recharge must be considered negligible.

Some local sinkholes did occur in upland recessional deposits as a result of the recent Nisqually earthquake (February 28, 2001). In these cases, ground shaking appears to have compacted loose sands at the surface. Changes in water table levels, which occur continuously as a result of the seasonal cycle in recharge rates, appear to have had no effect on the formation of these sinkholes. A survey of the area west of the airport conducted immediately after the February earthquake found no settlement or other effects of this earthquake in the vicinity of the proposed embankment location.

Stan Scarvie, Hearing Transcript (2)

Comment noted.

Stan Scarvie, November 11, 2000 fax letter

Comment noted concerning hearing requests.

Stan Scarvie, September 17, 2000 letter

Comments noted on the State's Fill Hydrological Study.

Richard Shapmer, January 26, 2001 hearing card

Request to testify noted.

Sandra Shea, Hearing Transcript (2)

See General Response GLR17 regarding alternatives considered.

Dorthy Sheppke, January 27,2001 hearing card

Comment noted. See General Response GLR17 concerning alternatives considered.

John Sheppke, January 27,2001 hearing card

Comment noted. See General Response GLR17 concerning alternatives considered.

Bob Scheckler, Hearing Transcript (1)

See General Response GLR6 regarding concerns with the MSE wall. See General Response GLR2 and GLR3 concerning fill contamination issues. See General Response GLR1 concerning a proposal by a private party to convey fill from Puget Sound to the project. See response to Congressman Smith's February 20, 2001 letter concerning the project cost. At this time the Port anticipates completion of the runway by end of 2006. See General Response GLR17 regarding alternatives considered.

State Representative Schindler, February 15, 2001 letter

Comment supporting project noted.

Lillian Schroeder, January 30, 2001 letter:

See General Response GLR10 and GLR11 concerning noise and air pollution.

Lilian Schroeder, October 21, 2000 letter

Comment noted concerning hearing request.

State Representative Shay Schual-Berke, MD January 27, 2001 letter

With respect to the other potential impacts noted in this comment, the Port's Master Plan Update projects are subject to Washington state statutory law. In addition, the Port acknowledges the Corps of Engineers' jurisdiction over its §404 application and the applicability of federal statutory law and regulations. The Corps is required to follow the federal law where applicable, and Ecology has certified compliance of the Port's project with Washington State water quality standards, pursuant to §401 of the Clean Water Act. The Port is committed to complying with all applicable legal requirements. With respect to the cumulative impacts noted in this comment, see General Response GLR19 on the analysis conducted with respect to cumulative impacts of projects undertaken by both the Port and other parties in and around the area of Sea-Tac Airport.

State Represenative Shay Shaul-Berke, Hearing Transcript (2)

See response to Tom Luster's memorandum to State Senator Julia Patterson concerning reasonable assurance. See General Response GLR13 concerning the temporary interchange on SR509. See General Response GLR6 regarding concerns with the MSE wall. See General Response GLR2 and GLR3 concerning fill contamination issues.

Shay Schaul-Burke, January 24, 2001 email 4:49 pm

See response to State Senator Julia Patterson January 24, 2001 letter.

State Representative Shay Schual-Berke, September 12, 2000 email 1:59 pm

In September of 2000, Ecology determined that the state required more time to work with the Port to evaluate whether the agency had reasonable assurance for the Master Plan Improvements. The time necessary to review and assess the remaining project issues was in excess of the deadline for Ecology to issue a §401 water quality certification on the project, one year from the Public Notice date of September 30, 1999. The additional review and assessment was required for specific remaining elements of the *Comprehensive Stormwater Management Plan*, *Natural Resource Mitigation Plan* and flow augmentation proposal.

As a result, on September 28, 2000, the Port withdrew the JARPA, with the intent of resubmitting the application at a later date.

City of Seattle Mayor Schell (Maud Daudon), January 26, 2001 hearing card and testimony

Comment of support noted.

Seattle Airlines Airport Affairs Committee (Argue), January 26, 2001 letter and hearing testimony

Comment of support for the project noted

Seattle Council on Airport Affairs (Talbot), February 16, 2001 letter and email transmittal

Comments noted and addressed in previous response to comment.

Seattle Community Council Federation (Talbot), February 16, 2001 letter and email transmittal

Comments noted and addressed in previous response to comment.

Seattle Hotel Association (Limberg), February 12, 2001 letter

Comment of support for the project noted.

City of SeaTac (Hanson), January 31, 2001 letter

Comment of support for the project noted.

Segale Business Park (Arthur), February 14, 2001 letter

Comment of support for the project noted.

Douglas Shade, January 27,2001 hearing card

Comment noted. See response to RCAA's February 16, 2001 comments.

Bob Sheckler, January 26, 2001 hearing card

No comment provided.

Henry Shomber, February 16, 2001 letter

Comments noted. See also General Response GLR2 and GLR3 concerning fill contamination and fill acceptance criteria. See General Response GLR6 concerning the MSE wall in addition to responses to the GeoSyntec's February 16, 2001 letter.

County Executive Ron Sims to Ann Bonney, December 3, 1999 letter

Comment noted.

Tom Slattery, January 26, 2001 hearing card

No comment provided.

Tom Slattery, Hearing Transcript (1)

The Port has not developed a memorandum of understanding concerning the insulation of Sunnydale Elementary School, as it is still negotiating with the District concerning the appropriate insulation standard.

Congressman Adam Smith to Graves, February 14, 2001 letter

The Port estimates for the cost of building the third parallel runway is $773 million (estimated in June 1999). Throughout the planning process, the project has been the subject of extensive consideration of the project cost and benefits. A requirement of the Federal grant process is the conduct of a benefit cost evaluation that is included in support of the Port's Letter of Intent application. That benefit cost evaluation was prepared subject to Federal guidelines (dated December 1999 which finalized interim guidance adopted by the Federal Aviation Administration (FAA) in 1997). This guidance, titled "FAA Benefit Cost Analysis Guidance" was issued by the FAA's Office of Aviation Policy and Plans and is used "to provide clear and thorough guidance to airport sponsors on the conduct of project-level benefit-cost analysis (BCA) for capacity-related airport projects... Airport sponsors should conform to the general requirements of this guidance for all BCA's submitted to the FAA."

In 1997, the FAA estimated that the Project would result in delay savings, to airlines and their passengers, in excess of $2.7 billion in present value through 2015. These estimated benefits, which may now be conservative, exceed the $600 million present value of the runway's maintenance costs and updated capital costs by a ratio of 4.5 to 1. The BCA guidance was developed in response to guidance from Congress citing the need for economic airport investment criteria. To enable the FAA to issue a Letter of Intent (a mechanism used to obtain multi-year grant commitment from the FAA for funding from the Airport and Airway Improvement Program), projects must have a present value benefit that exceeds the present value costs. As is shown by the Third Runway BCA, the project provides substantially greater value than the minimum requirement.

The Port has been very clear that local real property tax dollars are not used to fund the construction or operation of Sea-Tac Airport. By policy the Port uses the levy solely for Marine-related capital expenditures and community investments such as the Port JOBS program. No tax levy dollars are used for the Airport. Instead, improvements at the Airport are funded either by the tenants, through landing fees (a charge assessed per 1,000 lbs of landing weight) or through use of fees and taxes collected for aviation purposes.

In 1989, Congress enabled airports to collect a fee, up to $3.00 per passenger departing from the Airport, for approved purposes. Most large airports levy a PFC to offset airport development needs. Although airports have somewhat more flexibility in designating projects to be funded through PFCs, actions included in the PFC must also be approved by FAA. Recently enacted legislation (AIR-21) has increased the authorization for PFCs from $3.00 to $4.50.

See Introduction to response to comments, as well as General Response GLR14 concerning the IWS Lagoon 3 expansion.

See response to the Sheldon & Associates number 35 February 16, 2001 letter concerning the collection of baseline data.

Congressman Adam Smith January 26, 2001 hearing card

No comment provided.

Congressman Adam Smith, Hearing Transcript: (1)

See response to Congressman Smith's February 14, 2001, letter concerning the benefit/cost evaluation. The Port believes that it has fully addressed the effects of the project on wetlands, which are discussed in the 2000 *Natural Resource Mitigation Plan*. The *Final Supplemental EIS* contains a detailed description concerning the ability to mitigate certain functions that are at conflict with aircraft safety in basin (see FSEIS, Section 5-5). The 2000 *Natural Resource Mitigation Plan* contains an discussions of the comprehensive mitigation that will be included in basin. See *Natural Resource Mitigation Plan*, Chapter 5.

Congressman Adam Smith, December 7, 2000 letter

The Public Notice was issued December 27, 2000, and the Public Hearing was held January 26 and 27, 2001.

Congressman Adam Smith to Graves, September 20, 2000 letter

A new Public Notice was issued December 27, 2000, for the changes to the project since the last Public Hearing in November 1999. The standard public comment period is 30 days, but the public comment period for this project was extended to February 16, 2001, to provide additional time for public and agency comment. A Public Hearing was held January 26 and 27, 2001, at the Washington State Criminal Justice Training Center in Burien. The January 26 hearing went from 5:30 pm to 10:00 pm, and the January 27 hearing went from 9:00 am to 5:00 pm.

Congressman Adam Smith to Graves, August 1, 2000 letter

Comments noted.

Congressman Adam Smith to Michael David, USCOE, June 13, 2000 letter

See General Response GLR13 concerning the temporary construction interchange on SR 509.

Congressman Adam Smith, May 25, 2000 letter

See General Response GLR13 concerning the temporary construction interchange on SR 509.

Congressman Adam Smith to Gower, May 11, 2000 letter

Comment noted.

Congressman Adam Smith, April 28, 2000 letter

See General Response GLR13 concerning the temporary construction interchange on SR509.

Congressman Adam Smith, November 1, 1999 letter

Comment noted concerning the permit application.

Jim Smith, January 29, 2001 letter

Comment of support noted.

Helen Smith, January 26, 2001 hearing card

Comment noted. See General Response GLR12 concerning the availability of materials.

Michael Smith, COE to Thomas Mueller, July 20 and 25, 2000 emails

Internal Corps' email – no comment from the Port warranted.

Snohomish County Economic Development Council, February 13, 2001 letter

Comment of support for the project noted.

Snohomish County Rejects AirPort (Hoult), January 25, 2001 letter

Comment of support for the project noted.

Todd Speer, February 2 letter

Comments noted.

Todd Speer, February 1 letter

Comments noted.

Margaret Springer, October 10, 2000 letter

Comment noted concerning hearing request.

Becky Stanley, February 20, 2001 letter

1. The Port proposes to monitor all the mitigation areas for 10 years. If the mitigation areas do not meet the performance standards by the end of the 10-year monitoring period, then monitoring period would be extended. Note that the Port is not seeking mitigation credit for the trust fund. See Chapter 5 of *the Natural Resource Mitigation Plan* for details on the proposed mitigation.

   The trust funds of $150,000 each are a minor component of the mitigation proposed for the project. The trust funds supplements 67 acres of wetland, stream, and buffer mitigation in the Miller and Des Moines Creek basin, and creating a 65-acre wetland mitigation area off-site in Auburn. The trust funds for Miller Creek and Des Moines Creek are to promote additional local stream restoration efforts. Examples of projects eligible for full or partial funding could include instream fisheries habitat improvements similar to those proposed for Miller Creek in the *Natural Resource Mitigation Plan* (Parametrix, Inc. 2000), riparian buffer enhancement, removal of fish passage barriers, and removal of failed septic systems. A suite of potential projects is identified with their respective goals, general performance standards, and general monitoring requirements. Additional planning and engineering of selected projects will result in specific project designs, performance standards, monitoring requirements, and contingency

measures. Monitoring of these types of projects can be simple annual inspections that are not costly.

2. The project will not impact any "late successional" emergent wetland plant communities. Emergent wetland areas are not proposed to be created near the airport. Emergent wetlands containing both early and late successional plant species are proposed at the mitigation site in Auburn. The mitigation areas will be monitored for 10-years and if the emergent communities are not developing as planned, contingency measures will be employed. Also see response #35 in the response to the Azous February 16, 2001 letter.

3. Refer to response #50 in the response to Azous February 16, 2001 letter regarding changes in the microclimate and amount of light reaching the Miller Creek buffer area after the Mechanically Stabilized Earth (MSE) wall is constructed. Native vegetation is capable of growing, and observed growing adjacent to walls and similar structures (i.e., buildings, bridge abutments, etc.). Additionally, temporary irrigation will be installed to ensure plant survivability during the first few seasons and an invasive plant control plan has been developed and is described in the *Natural Resource Mitigation Plan* (Parametrix, Inc. 2000).

4. The wall will increase the amount of shade near creek and buffer and not increase ambient temperatures that affect Miller Creek or downstream estuarine habitat. The wetland area below the proposed retaining wall lies in a depression approximate 160 feet below the existing runway and is shaded much of the day by both the heavy tree canopy and the existing slope that lies to the east. The shade will not be removed because the proposed retaining wall will be located outside of the stream buffer and the existing vegetation and tree canopy will remain. Given the geometry and proximity of the wall, the duration of shade currently experienced in the wetland area could be expected to increase at varying levels depending on the season. Any increase in the duration of shade on the creek would provide a positive benefit by lowering water temperatures. The proposed wall is currently designed for a height of 135 feet at its highest point. Since the vegetation in the stream buffer will remain, the lower 1/3 of the wall will not be exposed to direct sunlight. The exposure of the remaining 2/3 of the wall will vary seasonally, with the greatest exposure occurring during the summer months. Given the characteristic of the proposed wall, concrete facing panels retain and are in direct contact with a large amount of fill, heat collected by the facing panels would also be absorbed by the fill material. Therefore, while the surface temperature of the concrete panels may fluctuate, radiant heat would be minimal and would be kept from reaching Miller Creek by the vegetated buffer. As to reflected sunlight, many different strategies including wall panel texture and color, as well as vegetation, can be incorporated into the wall design to reduce or eliminate reflected sunlight. The undisturbed vegetation in the stream buffer area would block reflected light from reaching the stream. Therefore, an increase in stream temperatures is not anticipated.

Becky Stanley, January 27, 2001 hearing card

Comment noted.

Becky Stanley, Hearing Transcript (2)

See General Response GLR19 concerning cumulative effects. See response to Becky Stanley's February 20, 2001 letter.

Becky Stanley, January 26, 2001 hearing card

See the 2000 *Natural Resource Mitigation Plan* regarding Miller Creek.

Cathea Stanley, January 27,2001 hearing card

Comment noted.

Cathea Stanley, January 26, 2001 hearing card

Comment noted.

Ben Stark, February 15, 2001 letter

The Port argues that the delineations and depiction of Walker Creek are correct.

Ben Stark, Hearing Transcript (1)

The Port believes that is has identified the accurate location of Walker Creek and the headwaters of the creeks. See General Response GLR13 concerning the temporary interchange on SR509.

Ben Stark, June 3, 2000 letter

Comment noted. See also General Response GLR13 concerning the temporary construction interchange on SR 509.

Soula Stefanopoulos, December 18, 2000 email 6:43 pm

Comment noted concerning hearing requests.

Danise Still, January 27,2001 hearing card

Comment noted.

Danise Still, January 26,2001 hearing comments

See response to RCAA's February 16, 2001 letter.

Frank Still, January 27,2001 hearing card

Comment noted.

Charles Sting, January 26, 2001 hearing card

See General Response GLR17 regarding the consideration of alternatives.

Gloria Sting, January 26, 2001 hearing card

Comment noted.

Due to a clerical error this number has been omitted.

Ronald Stojack, February 12, 2001 letter

Comment noted.

Geraine Strong, November 8, 2000 letter

Comment noted.

Geraine Strong, Hearing Transcript (2)

Comment noted.

Barbara Stuhring, January 25, 2001 letter

The IWS Lagoon #3 upgrade is discussed in the Cumulative Impacts General Response GLR19. Two wetland complexes are located in the immediate vicinity of the site. Wetland 28, also known as the Northwest Ponds, is a Class 1 wetland located mostly south of Lagoon #3. Two arms of Wetland 28 extend north to border on the east and west sides of Lagoon #3. Wetland IWSA/IWSB is located north of Lagoon #3. The upgrade project will not require work over or in Wetland 28 or Wetland IWSA/IWSB. Portions of the project would be located in buffer areas that are regulated by the City of SeaTac Zoning Code. Project impacts on wetland buffer areas will be reviewed by the City and subject to appropriate mitigation, such as buffer averaging or replacement. See also General Response GLR14 concerning the upgrade project.

As pointed out by the commentor, the Port is working to decrease aircraft/bird strike potential by discouraging the creation of new habitat near the Airport. The upgraded Lagoon #3 will be designed to conform to FAA requirements and the Port's Wildlife Hazard Management Plan regarding wildlife attractants near airports.

Expansion of IWS Lagoon #3 has independent utility from the Master Plan Update projects and will provide greater IWS storage capacity and will allow for controlled discharge and additional treatment prior release of the water back into the environment. The expansion of Lagoon #3 is not a Master Plan Project.

The cumulative impacts from the extension of SR 509, the Air Cargo Development Plan, and SASA are discussed in General Response GLR19, which addresses cumulative impacts. The possible future use of Airbus jumbo-jets and potential impacts on airport landside facilities, runways, and airport configuration has not been studied in detail, but is not believed to be significant.

The Master Plan Update recognized that the airframe manufacturers were considering the development of a new large aircraft. The existing runway system at Sea-Tac would enable that aircraft, as presently envisioned to operate. The Third Parallel runway would only enhance the operation with the new large aircraft, as that project is intended to address poor weather arrival delays.

Barbara Stuhring, September 4, 2000 letter

See General Response GLR2 and GLR3 concerning fill contamination and fill acceptance criteria.

Barbara Stuhring, August 25, 2000 letter

In 1995, the FAA issued its Record of Decision for the development of an aircraft maintenance base in the area known as the South Aviation Support Area. The Port's plans for the area changed as the Master Plan Update identified additional needs for the Airport. As a result, the Master Plan recommended that this area serve aircraft maintenance, cargo and aircraft parking. The South Aviation Support Area (SASA) development would be connected to the airfield system by way of a bridge. The Port's current application includes the fill of 2.78 acres of wetlands in the vicinity of SASA. As has been shown by the Port's documentation, because of the central location of the wetlands, no alternatives exist to avoid or minimize the effects to these wetlands.

The SASA development concept was assessed in the 1996 *Final EIS* and 1997 *Final Supplemental EIS*, for which the FAA issued its ROD on July 3, 1997. It is expected that before the Port undertakes development in the areas known as SASA that information from the SR 509 Extension/South Access project level EIS will be complete. It is important to note that the purpose of a written re-evaluation is to document the "adequacy, accuracy and validity" of the earlier environmental approval. At this time, no changes in the Master Plan Update have been identified for the SASA area. Therefore, once that SR 509 EIS has been complete, the Port and FAA would be expected to conduct a re-evaluation, if appropriate.

The 600-foot extension of runway 16L/34R does not affect any wetlands, as reflected in the December 2000 *Wetland Function Assessment and Impact Analysis*.

The *Final EIS* wetland mitigation program has been updated by the proposed *Natural Resource Mitigation Plan*.

Barbara Stuhring, February 27, 2000 letter to Freedman

See General Response GLR14 with regard to IWS Lagoon 3 and General Response GLR19 with respect to analysis of cumulative impacts.

Barbara Stuhring, December 29, 1999 letter

Neither of the two projects identified in this comment is an Master Plan Update project that is under review by the Corps in connection with the Port's §404 application. The Port has and will continue to work cooperatively with the Corps and Ecology and obtain all necessary permits in connection with any Port project requiring permits under the Clean Water Act. Also see response to comment letter of B. Stuhring dated 1/25/2001.

Charles and Charlotte Sullivan May 4, 2000 letter

See General Response GLR13 concerning the temporary construction interchange on SR 509..

City of Tacoma (Mike Crowley, Mayor) January 23, 2001 letter

Comment of support for the project noted.

Port of Tacoma, January 25, 2001

Comment supporting the project noted.

Chas Talbot, Hearing Transcript (2)

See response to Dan Caldwell's January 26 2001 letter concerning the benefit/cost evaluation prepared for the project. See General Response GLR11 concerning air pollution.

Paula Taylor, November 08, 2000 email 1:26 pm

Comment noted concerning hearing request

Leslie Thompson, January 18, 2001 email documented by Paula Taylor

Comment noted.

George Thornton, January 22, 2001 letter to DOE

Comment noted.

Scott Thomasson, Hearing Transcript (1)

See General Response GLR8 concerning Endangered Species Act issues. The *Final Supplemental EIS* contains a detailed description concerning the ability to mitigate certain functions that are at conflict with aircraft safety in basin (see FSEIS, Section 5-5). The 2000 *Natural Resource Mitigation Plan* contains summaries of discussions of the comprehensive mitigation that will be included in basin. See *Natural Resource Mitigation Plan*, Chapter 5. See General Response GLR17 regarding alternatives considered.

Tillicum Village (Greer), January 24, 2001 letter

Comment of support for the project noted.

Hansa Topiwala, January 22, 2001

Comments noted regarding health concerns. However, Ecology conducted measurements of pollutants in the Airport area, showing that concentrations in the area were less than the ambient air quality standards. The Port has continuously responded to these comments concerning air quality (see FEIS, Appendix R, and *Final Supplemental EIS* Appendix B and F), as well as supported the conduct of the air measurements to respond to these concerns. See also General Response GLR11.

Attachments noted.

Hansa Topiwala, November 11, 2000

Comment noted. See also General Responses GLR10 and GLR11 concerning noise and air pollution.

Hansa Topiwala, April 30, 2000

See General Response GLR13 concerning the temporary construction interchange on SR 509.

Bob and Lorna Toy, December 31, 2000 letter

Simultaneous parallel arrivals on three runways is not anticipated because of the close spacing between the runways. The *Final EIS* and *Final Supplemental EIS* examined runway use and presented actual assumptions, based on Federal Aviation Administration simulation of the airfield operational performance during specific activity levels. *Final Supplemental EIS* Table C-3-14 shows the runway use, noting that the runway would primarily be used for arrivals, but would be used for departures about 2.5% in south flow and 1.6% in north flow.

Concerning the requirement for an avigation easement in the home insulation program, the commentor is referencing RCW 53.54.030, which requires the Port to obtain something from homeowners participating in sound insulation projects. In exchange for participating in the insulation program, the Port requires that homeowners provide the Port with an easement. This homeowner, like a few others, has refused to grant an easement and therefore is not participating in the insulation program.

William Tracy, February 10, 2001 letter

Comment noted.

Tri-Cities Visitor & Convention Bureau, February 13, 2001 letter

Comment of support noted.

Tri-Cities Airport (Morasch), January 23, 2001

Comment of support for the project noted.

City of Tukwila, January 24, 2001 letter

Resolution of the City Council noted.

City of Tukwila, January 22, 2001

Comments noted. See also General Response GLR17 concerning the review of alternative airport sites and the development of a supplemental airport.

Mark Ufkes, November 13, 2000 letter

Comment noted concerning hearing requests.

Form letter from various citizens, May 3, 2000

See Response to General Comment 17 regarding alternatives considered.

Mark Ufkes, Hearing Transcript (1)

The Port is not aware of any concerns that any Indian tribes might have with its efforts to insulate schools, as no communications have been received from a tribe. See General Response GLR9 concerning the Port's efforts to insulate schools. See General Response GLR10 concerning noise.

See response to the Thomas Lane Associates February 9, 2001 letter concerning property values. See General Response GLR17 regarding alternatives considered.

Unsigned letter, about 10-10-2000

See General Response GLR17 concerning the evaluation of a "second airport".

Unsigned letter about 10-10-2000

See General Response GLR11 concerning air pollution

Unsigned/Unreadable, May 4, 2000 letter

See General Response GLR13 regarding the temporary construction interchange on SR 509.

Chris Vance, January 26, 2001 letter and testimony

Comments noted. See also General Response GLR17 concerning alternatives considered.

Georgette Valle (Burien City Council), January 26, 2001 hearing card

Request to testify noted.

Georgette Valle, Hearing Transcript (1)

See General Response GLR16 concerning the adequacy of the EIS. See General Response GLR6 regarding concerns with the MSE wall. See response to Rose Clark concerning the Police Training Facility. See General Response GLR8 concerning Endangered Species Act issues. See General Response GLR17 concerning alternatives.

Debi Wagner, February 15, 2001 letter

See General Response GLR16 concerning the need for a new EIS.

See response to Smith & Lowney's February 16, 2001 letter concerning conformity. The conformity evaluation considered the NOx emissions associated with the project. Those emissions were less than de-minimis. Therefore, no additional analysis was warranted. This analysis was supported by all three air agencies (Puget Sound Clean Air Agency, Ecology and the Environmental Protection Agency (EPA) – see ROD attachments). However, Ecology conducted measurements of NOx and NO2 in the Airport, showing that concentrations in the area were less than the ambient air quality standards. The Port has continuously responded to this commentor's comments concerning air quality (see FEIS, Appendix R, and FSEIS Appendix B and F), as well as supported the conduct of the air measurements to respond to these concerns. The issue of the demand versus activity levels accommodated by the proposed Runway, this issue has been the extensive subject of litigation, for which the premise of the FEIS/FSEIS prevailed.

The analysis from Cleveland Hopkins Airport has no bearing or relationship to conditions at Sea-Tac Airport.

The referenced Memorandum of Agreement (MOA) (the attachment 6 to the comments) is the same MOA referenced in the FSEIS acknowledging the conduct of air measurements in the airport area.

All measurements conducted by that monitoring effort showed that concentrations were lower than were predicted by the *Final EIS* and *Final Supplemental EIS*.

Similar to the response to Chris Gower concerning SASA, the Port expects that as projects that are outside the first five years of development of the Master Plan Update and they become further defined, that the Port will conduct any requisite environmental analysis. The Port anticipates conducting additional environmental analysis on the North End Development (the North Unit Terminal as referenced in the Master Plan Update). However at this time, that project has not been thoroughly defined to enable additional environmental review.

Comments noted concerning air toxics. The FEIS considered the effect of the Master Plan Update on air toxics in accord with the requests of Ecology, Puget Sound Clean Air Agency and EPA – See FEIS Chapter IV, Section 7 "Human Health". See also General Response GLR11 concerning air pollution.

The current NPDES permit expires June 30, 2002. It covers existing stormwater outfalls and temporary outfalls from construction projects. The Port is in compliance with its NPDES permit. The NPDES permit requires the Port to develop a stormwater pollution prevention plan, which the Port has prepared and submitted and to do monitoring of its discharges, which is ongoing. The NPDES permit also requires the implementation of BMP's, which the Port has undertaken. Ecology has issued no notice of violation of the Port's NPDES permit. Based on the Port's ongoing compliance with its NPDES permit, Ecology has "reasonable assurance" sufficient to certify compliance with state water quality standards.

The Port is in compliance with the Governor's Clean Air and Water Certificate.

See the Port's 2000 Biological Assessment concerning endangered species, 2000 *Comprehensive Stormwater Management Plan*, and 2000 *Natural Resource Mitigation Plan*.

See General Response GLR19 concerning cumulative impacts.

Wetland fill as a result of the Runway Safety Area (RSA) compliance is included and addressed by the permit application. See also Introduction to the Response to Comments concerning project changes and their effects on wetlands.

Attachment 1, see FSEIS response to comments (Appendix F)
Attachment 2 and 3, See FSEIS response to comments on air quality (Appendix B)
Attachment 1 "Flying off Course" by NRDC – The Port believes that much of the information in this report is inaccurate. More importantly it is not relative to the Master Plan Update.
Attachment 2 – no comment warranted
Attachment 3 – not provided
Attachment 4 – article regarding Air Traffic Tower – no comment/response required.
Attachment 5 – Letter to EPA – responded to the FEIS/FSEIS.
Attachment 6 – FAA letter (Ossenkop)– no comment/response required.
Attachment 2 – FAA letter (Dalton) – no comment/response required.
Attachment 3 - no comment/response required.
Attachment 4 – Cleveland – No comment/response required.
Attachment 5 – Clean Air Report – No comment/response required.
Attachment 6 – MOA – no comment/response required.
Attachment 7 – EPA letter – no comment/response required.
Attachment 8 – Draft ILA – please note that this is clearly marked as a DRAFT.

Attachment 9 – PSCAA letter – no comment/response required.
Attachment 10 – California air toxics – no comment/response required.
Attachment 11 – Mark Beem to Barbara Walters – no comment/response required.
Attachment 12 – AMOCO information – no comment/response required.
Attachment 13 – MAAP information – no comment/response required.
Attachment 14 – email – see also response to Helsell Fetter December 22, 2000 letter response to general comment concerning municipal air quality studies.
Attachment 15 – article – no comment/response required.
Attachment 16 – FEIS Appendix R – no comment/response required.
Attachment 17 – article – no comment/response required.
Attachment 18 – NRDC letter to Clinton, and other letters - no comment/response required.
Attachment 19 – Hydrologic Studies - no comment/response required.
Attachment 20 – Governor's Certificate - no comment/response required.
Attachment 20 – DOE newsletter - no comment/response required.
Attachment 21 – State act - no comment/response required.
Attachment 22 – article - no comment/response required.
Attachment 23 – Water District letter – see FEIS response to comments Appendix R.
Attachment 24 – DOE memo - no comment/response required.
Attachment 25 – King County letter (1995) – see FEIS response to comments Appendix R.
Attachment 26 – article - no comment/response required.
Attachment 27 – EPA comments on SASA (1994) - no comment/response required.
Attachment 28 – PortWatch (1992) letter - no comment/response required.
Attachment 29 – PSAPCA (1992) letter - no comment/response required.
Attachment 30 – Extract from SASA EIS - no comment/response required.
Attachment 31 – table - no comment/response required.
Attachment 32 – article - no comment/response required.
Other Attachments (un- numbered) – Comments submitted on SEIS – See Appendix B and F of the FSEIS.

Debi Wagner, Hearing Transcript (1)

See General Response GLR16 concerning the adequacy of the EIS. The Port believes that the project is in compliance with the requirements of the Governor's certificate. See response to Smith & Lowney's February 16, 2001 letter concerning Clean Air Act conformity. See response to GLR11 concerning air pollution that has been measured at Sea-Tac Airport, which does not exceed the applicable CO standard. . See General Response GLR14 concerning the IWS.

David Wagner, January 26,2001 hearing card

Comment noted.

LillianWalker, November 18, 2000

Comment noted.

Lillian Walker, September 19, 2000

Comments noted concerning the public notice and comment process.

Bob Wallace email to Brett Fish, August 28, 2000 11:38 am

Comment noted.

Kurt Wallin, January 26, 2001 hearing card

Comment noted.

Alex P. Walton, January 27, 2001 hearing card

Comment noted.

Lori Wardian, December 18, 2000 email 6:26

Comment noted concerning the request for a 30-day review of the stormwater management plan.

Maria Wardian, January 27, 2001 hearing card and testimony

Comment noted.

Maria Wardian, Hearing Transcript (2)

See General Response GLR10 concerning noise and General Response GLR11 concerning air pollution.

Maria Wardian, KIK, January 27, 2001 email from Brett Fish (testimony at 1-27-2001 hearing)

Comments noted.

Erin Warns, February 5, 2001 letter

Comment noted.

Mr. & Mrs. Warns, October 11, 2000

Comment noted concerning hearing request.

Washington Airport Management Association, January 25, 2001 letter

Comment of support for the project noted.

Washington Council on International Trade, February 9, 2001 letter

Comment of support for the project noted.

Washington Public Ports Association (Johnson), February 2, 2001 letter

Comment of support for the project noted.

Washington Software Alliance (Wilcox), January 24, 2001 letter

Comment of support for the project noted.

Washington State Hotel & Lodging Association, January 26, 2001 letter

Comment of support for the project noted.

Waste Action Project (Wingard), June 12, 2000 letter

Comment noted. See also General Response GLR13 concerning the temporary construction interchange on SR 509.

Water District No. 54, February 15, 2001 letters

With respect to the comment on "Borrow Area", the impacts from use of the borrow sources and the Port's plans with respect to restoration of the borrow sources are addressed in the *Port Re-Evaluation Document*, November 1999 (discussing cumulative impacts of SR 509/South Access Freeway, Des Moines Creek Regional Detention Facility, Link Light Rail project, and potential redevelopment of Borrow Areas) and *Resource Evaluation and Conceptual Development for Borrow Areas 3 and 4; Third Runway Project Seattle-Tacoma International Airport* (December 1998).

With respect to stream augmentation issues, please see General Response GLR7 regarding the streamflow impacts generated by the proposed project, the Port's water rights and streamflow mitigation issues.

Water District No. 54, September 18, 2000 letter

See General Response GLR7 regarding the streamflow impacts generated by the proposed project, the Port's water rights and streamflow mitigation issues.

Water District No. 54, September 8, 2000

Comments concerning the State's Fill Hydrologic Study noted.

Susan Watkins, December 19, 2000 email 12:06 pm

Comment noted concerning hearing request.

Frances Weidlich, January 27,2001 hearing card

Comment noted. See General Response GLR17 concerning alternatives considered.

Leslie Weiner, January 26, 2001 hearing card

Comment noted.

Stuart Weiss, January 27, 2001 hearing card;

See General Response GLR10 concerning noise, General Response GLR11 concerning air pollution, and General Response GLR17 regarding the consideration of alternative.

Stuart Weiss, Hearing Transcript (1)

See response to Stuart Weiss's January 23rd letter. See General Response GLR16 concerning the adequacy of the EIS. See General Response GLR10 concerning noise. See General Response GLR17 regarding alternatives considered.

Stuart Weiss, Hearing Transcript (2)

See General Response GLR10 concerning noise

Stuart Weiss, January 23, 2001 letter and hearing testimony:

See General Response GLR16 concerning the validity of the EIS.

See General Response GLR15 concerning air pollution. The response to comment R-10-9 in Appendix R of the *Final EIS* (Volume 4) notes that fuel dumping is not common and is performed only in emergency situations when aircraft cannot land safely with the fuel present in the aircraft. Prior to the completion of the *Final EIS*, no fuel dumping incidents had been reported in or around Sea-Tac Airport within the last two and one half years, according to Mr. Tom Davidson, then Federal Aviation Administration Air Traffic Manager, Seattle Tower. The Port recently requested fuel dumping information from the FAA. The FAA noted that there are no records kept concerning fuel dumping, and therefore, it is not possible for the Port to confirm the incident. .

Fuel dumping, or the purposeful jettison or leakage of aviation fuel by aircraft as they approach or depart the Airport, is not common and is performed only in emergency situations when aircraft cannot land safely with the fuel present in the aircraft. If an aircraft must make an emergency landing before it has burned enough fuel to safely land, the pilots would have to "dump fuel" in order to reduce the aircraft's weight sufficiently enough to land. According to federal directive 7110.65J paragraph 9-6-1 through 9-6-5, aircraft may dump fuel as necessary in a declared emergency state. There are no restrictions as to where the aircraft may or may not dump fuel. However, each airport has a recommended, pre-designated fuel dumping area for instances where fuel needs to be dumped if time permits. At Sea-Tac, FAA air traffic controllers have been instructed to direct aircraft in need of fuel dumpling to fly above 5,000 feet over the Puget Sound to allow time for the fuel to evaporate before reaching the ground, and to prevent non-evaporated fuel from reaching populated areas.

Residents in the immediate vicinity of the Airport may also be reporting odors from aircraft queuing - this odor typically has more of an oily smell versus an odor like one would experience when fueling an auto. The pollutants that comprise this type of smell are accounted for in the air pollutant assessment presented in the EIS for precursor pollutants -- pollutant levels where the standards exist to protect human health and welfare.

There are many different types of odorous hydrocarbon compounds in jet exhaust which may be responsible for periodic "odor episodes". Typically, the most reactive or "volatile" hydrocarbons have the most potential to cause odor (i.e., cause a detectable odor at a lower concentration). The principal odor-causing hydrocarbon species in jet exhaust are the aromatic (fuel-related) and oxygenated (partially burned) hydrocarbons. Hydrocarbon emission rates are greatest during the low-power idle and taxi modes of the LTO cycle, when the engines are not operating as efficiently. During takeoff and climbout, for example, hydrocarbon emissions are greatly reduced since the engines operate with greater efficiency.

The most recent study concerning odors from jet engine exhaust was conducted at Boston's Logan Airport ("*Identification of Odorous Compounds From Jet Engine Exhaust at Boston's Logan Airport*", December, 1992). Based on air monitoring at Boston Logan, three compounds - acetaldehyde, formaldehyde, and naphthalene - were present on a consistent basis above their respective odor recognition thresholds. Each of these compounds could be generated by the incomplete combustion of jet fuel. The odor impact depends on wind speed and direction, turbulence, and distance between the source and nearby residents. The odor recognition characteristics of these compounds is generally characterized as follows: Acetaldehyde is described as sweet, "apple ripened" and pungent; Formaldehyde is described as odor like hay, straw-like, and pungent; Naphthalene is described as having odor like tar, creosote, and mothballs.

As noted by the Boston study, the results were based on the minimum detectable limits because overall concentrations for these compounds was generally small. Additionally, no specific source or activity was identified as the primary source of these compounds. Moreover, the Boston study notes that motor vehicle exhaust also contains many of these same compounds. No conclusion was drawn as to the source, concentration, or potential impact to human health.

John Welch, Hearing Transcript (2)

Comment noted.

Robert Welland, December 19, 2000 email 12:20 pm

Comment noted concerning hearing requests and document review.

Daniel Wend, February 14, 2001 letter

Comment noted. See also General Response GLR17 regarding the consideration of alternatives.

Dan Wend, Hearing Transcript (2)

See General Response GLR10 concerning noise. See General Response GLR8 concerning bird species. See response to Thomas Lane Associates February 9, 2001, letter concerning property values. See General Response GLR11 concerning air pollution.

WestCoast Gateway Hotel (Hanson), February 12, 2001 letter

Comment of support for the project noted.

Weyerhaeuser (Agnew), February 14, 2001 letter

Comment of support for the project noted.

Rich White, Hearing Transcript (2)

Comment noted.

Wilton M. Whisler, February 12, 2001 letter

Comment noted. See also General Response GLR6 concerning the MSE wall and General Response GLR10 concerning noise.

Charles Gardner White, January 20, 2001 letter:

Comments noted. See also General Response GLR2 and GLR3 concerning fill contamination and acceptance criteria and General Response GLR9 concerning the insulation of schools.

R. E. Wilbert, October 10, 2000

Comment noted concerning hearing request and document review.

Virginia Wilhelmi, January 27, 2001 hearing card

See General Response GLR2 and GLR3 concerning fill materials and General Response GLR17 regarding alternatives considered.

Mrs. Andrew Williams, January 4, 2001 fax letter

Comment noted.

Lorraine Williams, January 26, 2001 hearing card

Comment noted.

Jonathan Williams, February 16, 2001 letter

The Port has always been very clear in articulating the need for the project, as shown in the *Final EIS*, Chapter 1; *Final Supplemental EIS* Chapters 1 and 2, and the Port's application to the Corps of Engineers. Please also see General Response GLR17 concerning the alternatives considered.

See response to Dan Caldwell concerning the cost of the project and use of tax dollars.

See General Response GLR9 concerning the Port's efforts to insulation Highline School District schools.

The Port disagrees with the remaining opinions of the commentor.

Jonathan Williams, Hearing Transcript (2)

See General Response GLR17 regarding alternatives considered.

Brian Williamson, January 27,2001 hearing card

Comment noted.

Steve Williamson, Hearing Transcript (2)

Comment noted.

Carolyn Wilson, January 27, 2001 hearing card

Comment noted.

Orn Richard Wilson February 16, 2001 email 11:40 pm

See General Response GLR17 concerning alternatives evaluated.

See General Response GLR19 on the analysis conducted with respect to cumulative impacts of projects undertaken by both the Port and other parties in and around the area of Sea-Tac Airport.

The 1996 Master Plan Update FEIS, 1997 Master Plan Update Supplemental EIS and subsequent documents on file with the Corps identify existing wetlands, construction impacts and mitigation measures. Alternatives to construction of a third runway at the Sea-Tac Airport were considered in the 1992 Flight Plan EIS and during the deliberations of the Puget Sound Regional Council. Construction of an airport at Moses Lake and a trans-Cascade high-speed rail system is not a feasible alternative to construction of the Master Plan Update improvements at Sea-Tac Airport. See also General Response GLR17 concerning alternatives.

Jeanne Wilson-Eager, February 16, 2001 email 4:36 pm

Comment noted.

Jeanne Wilson-Eager, January 27, 2001 hearing card

Comment noted. See also General Response GLR10 concerning noise and General Response GLR11 concerning air pollution.

John Wiltse (Normandy Park Council), January 26, 2001 hearing card

Request to testify noted.

John Wiltse, Hearing Transcript (1)

Comment noted.

Lowell Wines, February 20, 2001 letter

Comment noted. The Port has assembled a nationally recognized team of experts concerning wall design as noted in the response to the February 16, 2001 GeoSyntec letter.

Lowell & Renate Wines, February 14, 2001 letter

Comment noted.

Greg Wingard, February 16, 2001 email 11:25 pm and transmitted letter

See also response to Smith & Lowney's letter dated 2-16-2001 and Helsell Fetterman's letter dated 2-16-2001.

The current NPDES permit expires June 30, 2002. It covers existing stormwater outfalls and temporary outfalls from construction projects. The Port is in compliance with its NPDES permit. The NPDES permit requires the Port to develop a stormwater pollution prevention plan, which the Port has prepared and submitted and to do monitoring of its discharges, which is ongoing. The

NPDES permit also requires the implementation of BMP's, which the Port has undertaken. Ecology has issued no notice of violation of the Port's NPDES permit. Based on the Port's ongoing compliance with its NPDES permit, Ecology has "reasonable assurance" sufficient to certify compliance with state water quality standards.

Greg Wingard, Hearing Transcript (1)

See response to Tom Luster's memorandum to State Senator Julia Patterson concerning reasonable assurance and compliance with the Governor's certificate. See response to Smith & Lowney's February 16, 2001 letter concerning Clean Air Act conformity.

Greg Wingard, September 27, 2000 letter

See General Responses GLR2 and GLR3 concerning fill acceptance criteria.

Greg Wingard, Waste Action Project, June 12, 2000 email

See General Response GLR13 concerning the temporary construction interchange on SR 509.

The *Washington State Coastal Zone Management Program*, which is Ecology Publication 94-63 (April 1995), specifies the procedural steps and substantive criteria for CZMA consistency certification. The *Program* requires that applicants provide required data and information and show how they comply with the applicable management program. Here, the applicable management program relies on and incorporates the requirements of the state Shoreline Management Act (Ch. 90.58 RCW), the State Environmental Policy Act (Ch. 43.21C RCW), the federal and state Clean Water Acts, and the federal Clean Air Act.
The project is consistent with the Shoreline Management Act. As documented in the FEIS at p. IV.13-1, none of the activities at the Airport involve lands subject to the jurisdiction of the Act. Miller and Des Moines Creeks, in the area where the third runway and other airport improvements will be constructed, have mean annual flows that are less than the threshold of Shoreline Management Act jurisdiction. (The threshold is a mean annual flow of twenty cubic feet per second or less. RCW 90.58.030(2)(d)). Therefore, none of the proposed activity at the Airport is subject to Shoreline Management Act jurisdiction or requires a shoreline permit. Certain activity related to construction of the mitigation site in Auburn (e.g., temporary construction dewatering outfall) may be located in an area subject to Shoreline Act jurisdiction. This activity is consistent with the Auburn Shoreline Management Program.

Greg Wingard March 30, 2000 email to USCOE

See General Response GLR7 regarding the streamflow impacts generated by the proposed project, the Port's water rights and streamflow mitigation issues.

Greg Wingard to Luster, May 3, 2000 email

Comment noted. See also General Response GLR14 concerning IWS Lagoon 3 expansion.

Bill Wippel, February 12, 2001 letter

Comment noted.

Washington Department of Transportation (Craig Stone) to Sen Julia Patterson May 5, 2000 letter

See General Response GLR13 concerning the temporary construction interchange on SR 509.

The Port agrees with Mr. Stone's assessment of the responsibilities of the involved parties.

Calvert Witte, Hearing Transcript (1)

See General Response GLR10 concerning noise at Sea-Tac Airport. See General Response GLR17 regarding alternatives considered.

Wing Woo, Burien City Council member, January 26, 2001 hearing comments

With respect to comments on the conveyor belt, see General Response GLR1 with respect to the use of the conveyor belt. With respect to comments regarding the Port's water rights, please see General Response GLR7 regarding the streamflow impacts generated by the proposed project, the Port's water rights and streamflow mitigation issues.

Wing Woo, Hearing Transcript (2)

See General Response GLR16 concerning the validity of the EIS. See General Response GLR8 concerning Endangered Species Act issues. See General Response GLR7 concerning instream flows.

Everett Woods, November 5, 2000

Comment noted.

Michael Wray, February 16, 2001

Comment noted. See also response to Dan Caldwell concerning project cost and benefit.

Michael Wray, November 15, 2000 letter

Comment noted.

Yakima Air Terminal (Clem), January 25, 2001 letter

Comment of support for the project noted.

V. EARLIER PUBLIC NOTICE COMMENTS AND RESPONSES

As is noted in the Section I, *"Summary,"* the first public notice concerning the Port's proposed application to fill wetlands at Sea-Tac Airport was issued in December 1997. A revised public notice was issued in September 1999. Subsequent to these public notices, a public and agency review and comment period was conducted and the Port prepared initial draft responses to the comments received.

It is important to note that the Port has not updated its response to the comments or questions raised in 1997 through 1999, unless noted in Sections I through IV of this document. Instead, the Port prepared a summary of changes to the original responses that are necessary based on the information in the December 27, 2000 Public Notice. Accordingly, Section V contains two components:

- Part 1: A summary of notable changes to earlier or past responses
- Part 2: The Port's original responses to comments on the 1997 and 1999 public notices

The Port and Corps have agreed that this approach enables the record to remain intact, as drafted at the time (Part 2), supplemented by a summary of the changes to update the material (Part 1).

PART 1. NOTABLE CHANGES TO PAST RESPONSES

Introduction

This section identifies the areas in the previous response documents that have changed substantially since the first Revised Public Notice. The changes are described here and are intended to amend the original document. The changes are organized by topic, as follows:

- Wetland Impacts
- Natural Resource Mitigation Plan
- Indirect Impacts
- Cumulative Impacts
- Biological Assessment Update
- State-Sponsored Hydrologic Studies
- Borrow Area Hydrology

Wetland Impacts

The following table replaces Table 2 and amends General Response 1.

Table 2. Summary of permanent fill impacts to wetlands in the proposed Seattle-Tacoma International Airport Master Plan Update improvement area (in acres).

Wetland	Ecology Rating	HGM Class	Classification	Fill Impact	Vegetation Types Impacted		
					Forested	Shrub	Emergent
Runway Safety Area							
5	III	Slope	Shrub	0.14	0.07	0.07	0.00
			Subtotal	0.14	0.07	0.07	0.00
New Third Runway							
9	III	Slope	Forested/Emergent	0.03	0.01	0.00	0.02
11	III	Slope	Forested/Emergent	0.50	0.40	0.00	0.10
12	III	Slope	Forested/Emergent	0.21	0.04	0.00	0.17
13	III	Slope	Emergent	0.05	0.00	0.00	0.05
14	III	Slope	Forested	0.19	0.19	0.00	0.00
15	III	Slope	Emergent	0.28	0.00	0.00	0.28
16	III	Depression	Emergent	0.05	0.00	0.00	0.05
17	III	Depression	Emergent	0.02	0.00	0.00	0.02
18	II	Slope	Forested/Shrub/Emergent	2.84	1.28	0.75	0.81
19	III	Slope	Forested	0.56	0.56	0.00	0.00
20	II	Slope	Shrub/Emergent	0.57	0.00	0.51	0.06
21	III	Slope	Forested	0.22	0.22	0.00	0.00
22	III	Slope	Emergent/Shrub	0.06	0.00	0.01	0.05
23	IV	Depression	Emergent	0.77	0.00	0.00	0.77
24	III	Depression	Emergent	0.14	0.00	0.00	0.14
25	III	Depression	Forested	0.06	0.06	0.00	0.00
26	IV	Depression	Emergent	0.02	0.00	0.00	0.02
W1	III	Depression	Forested/Emergent	0.10	0.00	0.00	0.10
W2	III	Depression	Forested/Emergent	0.22	0.04	0.00	0.18
35a-d	III	Slope	Forested/Emergent	0.67	0.27	0.00	0.40
37a-f	II	Slope	Forested/Emergent	4.09	2.84	0.00	1.25
39	II	Slope	Forested	0.02	0.00	0.00	0.00
40	III	Depression	Forested	0.03	0.00	0.03	0.00
41a & b	III	Depression	Emergent [a]	0.44	0.00	0.00	0.44
44a & b	II	Slope	Forested	0.26	0.18	0.08	0.00
A1	II	Depression, Riparian	Forested/Shrub/Emergent	0.59	0.09	0.09	0.41
A5	IV	Depression	Emergent	0.03	0.00	0.00	0.03
A6	III	Slope	Forested	0.16	0.16	0.00	0.00
A7	III	Slope	Forested	0.30	0.30	0.00	0.00

Wetland	Ecology Rating	HGM Class	Classification	Fill Impact	Vegetation Types Impacted		
					Forested	Shrub	Emergent
A8	III	Slope	Forested/Shrub	0.38	0.07	0.31	0.00
A12	III	Slope	Shrub	0.08	0.00	0.08	0.00
A18	III	Slope	Shrub	0.01	0.00	0.01	0.00
FW5-6	IV	Depression, Riparian	Farmed Wetland	0.15	0.00	0.00	0.15
R1	III	Riparian	Emergent	0.13	0.00	0.00	0.13
			Subtotal	**14.23**	**6.73**	**1.87**	**5.63**
South Aviation Support Area (SASA)							
52	II	Slope	Forest/Shrub/Emergent	0.54	0.54	0.00	0.00
53	III	Depression	Forested	0.60	0.60	0.00	0.00
E2	III	Slope	Shrub	0.04	0.04	0.00	0.00
E3	III	Slope	Shrub	0.06	0.06	0.00	0.00
G1	IV	Slope	Shrub (Slope)	0.05	0.00	0.05	0.00
G2	IV	Slope	Emergent	0.02	0.00	0.00	0.02
G3	IV	Slope	Emergent	0.06	0.00	0.00	0.06
G4	IV	Slope	Emergent	0.04	0.00	0.00	0.04
G5	IV	Slope	Emergent	0.87	0.00	0.00	0.87
G7	III	Slope	Forest/Shrub	0.50	0.13	0.37	0.00
			Subtotal	**2.78**	**1.37**	**0.42**	**0.99**
Borrow Area and Haul Road							
28	II	Depression, Riparian	Emergent	0.07	0.00	0.00	0.07
B11	III	Depression	Emergent	0.18	0.00	0.00	0.18
B12 [b]	II	Depression	Emergent	0.07	0.00	0.07	0.00
B14	III	Depression	Shrub	0.78	0.00	0.55	0.23
			Subtotal	**1.10**	**0.00**	**0.62**	**0.48**
Mitigation							
Auburn Area 7	III	Depression	Emergent	0.02	0.00	0.00	0.02
Auburn Area 9	III	Depression	Emergent	0.03	0.00	0.00	0.03
Auburn Area 10	III	Depression	Emergent	0.07	0.00	0.00	0.07
			Subtotal	**0.12**	**0.00**	**0.00**	**0.12**
TOTAL				**18.37**	**8.17**	**2.98**	**7.22**

[a] Includes 0.18 acre of open water habitat.
[b] These wetlands extend off-site.

Natural Resource Mitigation Plan

Updated Description of Mitigation Actions

The following description of the mitigation proposal amends General Response 2. Commonly Asked Question K, and Letters 3F-1, 4F-1, 4F-2, 4L-2, 4L-3, 4E-5, 4G-10, 4P-77, 4P-86, and 4P-119.

In-Basin Mitigation Actions

Vacca Farm

Mitigation actions at the Vacca Farm site are designed to enhance approximately 17 acres of aquatic and riparian habitats by restoring natural channel morphology to Miller Creek, integrating the channel with its floodplain, removing bulkheads along the Lora Lake shoreline, and restoring functions to wetlands, farmed wetlands, prior converted croplands, and riparian and upland buffers on the site. These actions will enhance fish habitat in Miller Creek, improve water quality (provide shade, ameliorate elevated water temperatures, increase dissolved oxygen, provide inputs of organic matter, improve sediment retention, and remove potential sources of fertilizer or pesticide inputs), provide no net loss of floodplain storage, and enhance the diversity and complexity of wetland habitats. Mitigation projects on the Vacca Farm site have also been designed to reduce the potential wildlife hazards that currently exist on the site, consistent with FAA Advisory Circular 150/5200-33.

Miller Creek Relocation and Channel Restoration Plan

To accommodate the embankment for the third runway, the Runway Safety Areas (RSAs), and the relocation of South 154th Street, approximately 980 ft of Miller Creek will be realigned and relocated. The new stream channel will be constructed approximately 200 ft west of the existing channel, through the Vacca Farm site. The channel reach to be relocated has been dredged and straightened, lacks complexity (e.g., straight, uniform channel bed, no undercut banks, no side channels, no pool/riffle morphology, uniform silty substrate), there are few instream habitat features (e.g., no large woody debris, no pools or backwater areas), and the riparian vegetation provides little shade or organic matter to the channel.

Relocating the stream will increase the channel length to approximately 1,080 ft. A low-flow channel will meander within a larger high-flow channel, and the new channel will include instream habitat features (e.g., large woody debris). The channel will be designed to be connected to the floodplain by overbank flooding with approximately a 1-year interval. Channel banks will be planted with native shrub plant communities and the new channel will have a native forested riparian zone to ameliorate water quality, and provide shade and large woody debris.

Vacca Farm Floodplain and Wetland Restoration Plan

To mitigate for the loss of floodplain storage (approximately 5.24 acre-ft) and wetland impacts in the Miller Creek basin, the floodplain and wetlands in the Vacca Farm area will be restored. Restoration of the historic floodplain and wetlands will include providing approximately 5.94 acre-ft of flood storage, restoring wetland hydrology, and re-establishing native vegetation in approximately 12 acres of existing cultivated farmland and aquatic habitat of Lora Lake. Replacing non-native vegetation with native plant communities will enhance existing degraded wetlands on the Vacca Farm site. Planting forested upland buffers around the perimeter of the Vacca Farm site will further enhance functions in the restored wetlands. Approximately 5 acres of upland buffers will enhance and protect the floodplain wetlands by increasing infiltration and supporting wetland hydrology and stream base flows, removing sediments and nutrients, and providing physical protection and visual screening from adjacent properties. The Vacca

Farm mitigation allows significant wetland function restoration to occur in proximity to, and in the same basin as, project impacts.

Vacca Farm contains areas that historically were wetland but that have altered hydrology due to prior agricultural activities. The floodplain and wetland restoration would restore wetland hydrology to the site by removing existing drainage features and excavating part of the floodplain to bring seasonal groundwater levels closer to the surface. Native wetland plant communities will be restored to the floodplain wetlands and existing degraded emergent wetlands will be enhanced to forested or shrub wetlands. These actions will enhance hydrologic (i.e., surface water storage) and water quality functions at the Vacca Farm site, as well as reduce the volume of eroded soil, pesticide and fertilizer runoff reaching Miller Creek.

To protect aquatic habitat in Miller Creek and to protect and enhance functions of floodplain wetlands, forested buffers will be established and enhanced. An upland buffer area will be established along the east side of the relocated Miller Creek between the riparian zone of the stream and the relocated roadway for South 154th Street. The buffer will reduce human intrusion into the riparian zone, screen riparian habitats from human activity, and protect water quality and aquatic habitat. A second upland buffer will be established between the floodplain enhancement area and Des Moines Memorial Drive on the west side of the Vacca Farm site. The forested buffer in this area will provide a physical buffer between the road the enhanced shrub floodplain wetlands and restored stream.

Lora Lake Shoreline Enhancement

Mitigation at Lora Lake includes removing a concrete bulkhead from the west and north shore of the lake, removing residential structures from the area adjacent to the shoreline, and planting a 25-ft forested buffer around the lake. Replacing concrete bulkheads with a vegetated shoreline, and establishing forested buffers around Lora Lake provide the opportunity to enhance water quality in Lora Lake and Miller Creek. Buffers around the lake will also enhance the functions and viability of the restored wetlands in the Vacca Farm floodplain. Removal of existing residences, lawns, and structures will eliminate future sources of nutrients and pollutants to the lake and stream. Mitigation at this site also provides an opportunity to reduce existing wildlife attractants near the Airport by reducing habitat for waterfowl that graze on the existing lawn around the lake.

Miller Creek Riparian and Instream Enhancement Projects

Miller Creek Riparian Corridor Wetland and Buffer Enhancement Plan

The physical and biological functions provided by riparian vegetation will be enhanced along approximately 6,500 ft of Miller Creek. Protection and enhancement of the buffer will enhance the physical functions forested buffers provide, including reducing stream water temperatures, reducing erosion and suspended sediment releases to streams, influencing channel morphology by contributing large woody debris to the channel, and stabilizing banks. Riparian restoration will also enhance biological functions of stream buffers, such as increasing nutrient cycling and retention, increasing organic carbon export to the stream, and providing habitat and food resources to aquatic organisms.

As a consequence of past development in the Miller Creek watershed, buffers have been removed or degraded along much of the stream. Native forested vegetation has been replaced by impervious surfaces, ornamental turf grasses, and landscaping. These alterations reduce the ability of the existing buffer to support the biological and physical functions necessary to maintain quality habitat in adjacent streams.

To restore functions to aquatic resources, riparian wetlands, and buffer along Miller Creek, a buffer area that averages 100-ft wide on both banks of the stream (approximately 40 acres) will be enhanced. Approximately 7.4 acres of riparian wetland habitat and approximately 32 acres of buffer will be

enhanced. Buffer and wetland enhancement activities along Miller Creek include removal of all residential structures and associated impervious surfaces, underground oil storage tanks, and septic systems. Non-native, invasive species will be removed from wetlands and riparian areas where they would prevent the establishment of native vegetation, and where removal will not destabilize stream banks or result in increased sedimentation. The wetlands and riparian buffer will be enhanced by planting areas of existing lawn, predominantly non-native vegetation, or disturbed areas (i.e., from which structures or impervious surfaces have been removed) with native, predominantly forested vegetation. Wetland or riparian buffer areas that currently have predominantly native forested or shrub vegetation will be enhanced with in-fill planting of native trees or shrubs.

Design of the Miller Creek wetland and riparian buffer enhancements has been coordinated with the design and location of stormwater detention ponds, the South 156th Way bridge replacement, location of airport security roads and utility easements, as well as design of replacement drainage channels. Appropriate BMPs will be implemented and construction activities sequenced to ensure that there are no impacts to buffer enhancement projects from other mitigation or Master Plan Update construction activities.

Miller Creek Instream Habitat Enhancement Plan

There are four major instream enhancement projects, as well as general instream habitat enhancements proposed to restore and improve the quality of fish habitat in Miller Creek. Instream habitat quality is currently degraded as a result of historic residential land uses and overall urbanization in the basin.

The section of Miller Creek between the Vacca Farm site and Des Moines Memorial Drive was surveyed in February and March 1999 to identify areas within the stream channel that would benefit from habitat enhancement. As a result of this survey, four enhancement projects were identified. Habitat enhancement in these four projects includes removal of channel armoring, weirs, concrete walls, and footbridges, and installing instream features such as root wads, gravel, and large woody debris. In addition to these four projects, large woody debris will be added at selected locations along the 6,500-ft section of Miller Creek to enhance overall channel function and habitat. Instream enhancement projects will be coordinated with the wetland and riparian buffer enhancement projects. The streambed and bank of Miller Creek adjacent to the South 156th Street Bridge will also be restored after the existing bridge is removed and reconstructed as part of relocating South 154th Street.

Drainage Channel Replacement Plan

Three small intermittent drainage channels (Waters or Drainage Channels A, B, and W) are located in the acquisition area on the west side of the existing runway. These drainage channels currently convey water (groundwater and surface water) from the hillside on the western edge of the Airport to Miller Creek and the wetlands adjacent to Miller Creek. Channel A is located immediately east of 12th Avenue South in a roadside drainage ditch. Channel B originates in Wetland 37f and is located west of 12th Avenue South. Channel B provides a surface water connection between Wetland 37f and Wetland R9. Channel W is located east of the existing perimeter road within the current Airport Operations Area (AOA). This channel originates in Wetland 20b and flows through a culvert under the perimeter road; it ultimately empties into Channel A.

Approximately 1,290 linear ft of existing drainage channels will be filled as a result of the third runway construction. The Port proposes to mitigate for filling these channels by replacing and restoring their functions onsite. A subsurface drainage system in the fill embankment will collect infiltrating water and direct it to surface water channels at the base of the embankment. Water from the replacement drainage channels will be directed to riparian wetlands along Miller Creek. The surface water channels will be designed to replace the 100-year flow conveyance capacity of the channel lengths being filled. Replacement drainage channels will be permanent features and their construction will be coordinated with

the Miller Creek buffer enhancement projects, embankment construction activities, and stormwater facility construction.

Wetland Restoration Plan for Temporary Construction Impacts

Construction of the third runway embankment will result in some temporary wetland impacts. Temporary impacts to wetlands are those that do not involve permanent filling or excavation, and include clearing of wetland vegetation; use of a wetland for temporary construction access roads, staging areas, or temporary stormwater management ponds; or minor disturbances associated with placement of barrier or sediment fencing. Temporary impacts last from 1 to 5 years. A maximum of 2.05 acres of wetlands (including 1.15 acres of forest, 0.46 acres of shrub, and 0.44 acres of emergent wetland) may be impacted temporarily by construction activities. However, not all of these wetlands will necessarily be impacted by construction activities. During construction, all practicable means will be used to minimize and avoid temporary impacts, for example, by reducing staging area or access road footprints, minimizing pond sizes, or re-routing access roads. Therefore, temporary wetland impacts may be less than 2.05 acres. All wetlands temporarily impacted by construction activities will be restored and monitored to ensure performance standards are met.

Following construction, wetlands temporarily impacted by clearing or filling will be restored by removing all temporary fill material, re-establishing pre-disturbance conditions, and planting with native forested or shrub vegetation. Wetlands with only minor disturbances that do not involve clearing of vegetation or filling (e.g., sediment fencing placed along the edge of a wetland) will be restored by removing the fencing along with any construction debris, and replacing any disturbed wetland vegetation.

Miller Creek Basin Trust Fund for Watershed Rehabilitation

To provide opportunities for additional restoration projects in the Miller Creek basin, the Port will establish a trust fund of $150,000 to support watershed rehabilitation projects. The trust fund will focus on portions of Miller Creek not owned by the Port, and where the Port is unable to independently implement stream enhancement projects. The Port will make these funds available and defer to other governmental agencies or interested groups in the selection of appropriate projects. Projects supported by the trust fund are independent of the environmental review and permit process for Master Plan Update projects and would not be covered by any permit conditions on Port Master Plan Update construction or mitigation projects.

Des Moines Creek Basin Restoration Projects

Master Plan Update improvements will result in approximately 3.88 acres of permanent wetland impacts in the Des Moines Creek basin. These unavoidable impacts will result from the development of the South Aviation Support Area (SASA) and excavation activities in the borrow areas. To mitigate for these impacts, the Port proposes restoration and enhancement projects designed to increase wetland function, enhance aquatic habitat, and improve stream conditions within Des Moines Creek. These mitigation projects are designed to ensure that new wildlife hazards are not created near the Airport. This integrated set of projects is designed to meet the following overall objectives:

- Restore wetland functions to a portion of the Tyee Valley Golf Course by restoring a native wetland shrub community.
- Enhance aquatic habitat and improve stream functions by restoring a forested riparian buffer along 870 feet of the west branch of Des Moines Creek (also located on the golf course).
- Establish a $150,000 trust fund for restoration projects in the Des Moines Creek basin to help provide for additional stream enhancement projects and local restoration efforts.

Tyee Valley Wetland Mitigation

A minimum of 4.5 acres of the golf course will be planted with native shrub species. Non-native turf grasses currently dominate the area. Also, approximately 1.6 acres of upland area adjacent to the wetland will be planted with native shrub species

Des Moines Creek Buffers

The reach of the west bank of Des Moines Creek south of the Tyee Valley Golf Course wetland mitigation site will be enhanced by planting native riparian trees and shrubs along both banks of the stream. The riparian buffers will extend 100 ft from the Ordinary High Water Mark of the stream. Buffer plants will include black cottonwood, red alder, western red cedar, vine maple, and Nootka rose.

A temporary irrigation system will be installed in the stream buffer to provide flexibility in planting schedules and to optimize growth during the initial phase of plant establishment. The irrigation system will use municipal water purchased by the Port.

Des Moines Creek Basin Trust Fund for Watershed Rehibilitation

To provide opportunities for additional restoration projects in the Des Moines Creek basin, the Port will establish a trust fund of $150,000 to support watershed rehabilitation projects. The trust fund will focus on portions of Des Moines Creek not owned by the Port and where the Port is unable to independently implement stream enhancement projects. The Port will make these funds available and defer to other governmental agencies or interested groups in the selection of appropriate projects. Projects supported by the trust fund are independent of the environmental review and permit process for Master Plan Update projects and would not be covered by any permit conditions on Port Master Plan Update construction or mitigation projects.

Out-of-Basin Mitigation

The Auburn Wetland Mitigation site is a 67-acre parcel of land located within the City of Auburn immediately west of the Green River. This mitigation project is designed to provide restoration and enhancement of forested, shrub, emergent, and open-water wetland habitats on over 65 acres of the site to compensate for wetlands unavoidably impacted by Master Plan Update improvements. The overall goal is to replace wetland habitat functions (especially for birds) in an off-site location, in compliance with FAA Advisory Circular 150/5200-33. The Port proposes to restore or enhance existing emergent wetland with diverse forest, shrub, emergent, and open-water wetland habitat and restore buffer areas at the Auburn site as mitigation for habitat impacts at the Airport.

The wetland mitigation design consists of (1) excavating two new wetland basins; (2) establishing native forested, shrub, emergent, and open-water wetland habitats in these basins; (3) enhancing the existing emergent wetlands by replacing the non-native plant communities with native forest and shrub communities; (4) establishing a forested buffer around the perimeter of the site; and (5) post-construction monitoring and maintenance.

Mitigation Credit

The following table replaces Tables 4 and 5 in the previous Response to Comments document and revises the response to Commonly Asked Question C and Letters 4G-10E, and 4G-29.

Table 4. Summary of wetland mitigation credit for Seattle-Tacoma International Airport Master Plan Update improvements

Mitigation	Mitigation Area (acres)	Mitigation Credit
In-Basin		
Wetland Restoration – Credit ratio 1:1		
Vacca Farm (prior converted cropland and other upland)	6.60	6.60
Wetland Enhancement – Credit ratio 1:2		
Vacca Farm (Farmed Wetland, Other Wetlands, Lora Lake)	5.70	2.85
Wetlands in Miller Creek Wetland and Riparian Buffer	7.40	3.70
Tyee Valley Golf Course	4.50	2.25
Wetland in Des Moines Creek Buffer	1.01	0.51
Subtotal	25.21	12.61
Buffer Enhancement- Credit ratio 1:5		
Miller Creek Buffer, South of Vacca Farm	32.00	6.40
Vacca Farm	4.58	0.92
Lora Lake	0.27	0.05
Tyee Valley Golf Course Mitigation Area Buffer	1.57	0.31
West Branch Des Moines Creek Buffer	3.38	0.68
Subtotal	41.80	8.36
Total In-Basin Mitigation[1, 2]	**67.01**	**20.97**
Out-of-Basin		
Wetland Creation[3] - Credit ratio 1:1		
Forested (17.20 ac), shrub (6.0 ac), emergent (6.20 ac), and open water (0.60ac)	29.98	29.98
Wetland Enhancement - Credit ratio 1:2	19.50	9.75
Buffer Enhancement - Credit ratio 1:5	15.90	3.18
Total Out-of-Basin Mitigation	**65.38**	**42.93**
Total Mitigation[4]	**134.39**	**63.90**

1 Mitigation credit has not been assigned for relocating a portion of Miller Creek channel, instream enhancement projects, drainage channel replacement, Des Moines Creek buffer enhancement, or the $300,000 trust fund for watershed restoration.

2 Mitigation areas in the Des Moines and Miller Creek watersheds are 10.46 acres and 56.55 acres respectively; in- basin mitigation area divided by wetland impact (18.37 acres) provides 3:1 aerial replacement ratio.

3 Based on maps of hydric soils, mitigation can be also characterized as restoration.

4 Total mitigation area divided by wetland impact (18.37 acres) provides a 7.3:1 aerial replacement ratio; total mitigation credit divided by wetland impact (18.37) provides a 3.5:1 replacement ratio.

Inclusion of Sewer Line in Mitigation Design

The following text amends the response to Commonly Asked Question H.

Relocation of Miller Creek (design and construction) will be coordinated with the realignment of the sewer line required by the relocation of South 154th Street. The sewer line will parallel the new road alignment (outside of the mitigation site boundary) and will cross under the new channel. Thesewer line will be approximately 4 ft below the invert of the new channel. The trench in which the sewer line lies will be backfilled with compacted material that will provide a stable surface over the sewer line. The Port

has analyzed the need for additional stabilization below the new channel to protect the sewer line and the channel. This analysis indicates that because of the depth of the sewer line, the flat topography of the site, and the small size of the channel, no extra measures will be required to stabilize the channel over the sewer line. The new channel will be located in a portion of the Miller Creek floodplain that is more or less flat; stream velocities are low in this portion of the stream, and there is no potential for significant downcutting within the new channel reach. During periods of high flows, the channel is designed to overtop its banks and flow onto the floodplain, which further reduces any potential for downcutting.

The 20-ft easement for the relocated sewer will be located outside of the mitigation site boundaries, except where the line crosses under the stream. A maintenance access road will be located within the easement along the east side of the mitigation site; however, the access road will not go through the mitigation site.

Existing Wetlands at Auburn Mitigation Site

The following text amends the response to Letter 4P-24.

In October 2000, Parametrix conducted a wetland delineation on the 67-acre mitigation site located in Auburn, Washington. The wetland delineation followed required methods of Corps' *Wetlands Delineation Manual* (Environmental Laboratory 1987) and the *Washington State Wetlands Identification and Delineation Manual* (Ecology 1997). In November and December 2000 the Corps confirmed the wetland areas as jurisdictional.

Three jurisdictional wetlands were delineated on the mitigation site, which total about 19.49 acres. About 18.88 acres of Wetland 1 occurs in the northwest and central portions of the site and the wetland extends off site to the west and north. Wetland 2 is 0.60 acres and is located in the south-central part of the site. Wetland 3 is 0.01 acre and is located in the north-central part of the site.

Wetlands 1 and 2 meet the Ecology criteria of a Category III wetland. Wetland 3 meets the criteria of a Category IV wetland. The soil, hydrology, and vegetation of these wetlands are similar. The remainder of the mitigation site (about 44 acres) is non-wetland.

Walker Creek

The following text amends the response to Commonly Asked Question L, Letter 4F-1, 4P-9, 4P-77, and 4P-150.

Fill to construct the embankment will be placed in about 0.26 acres of Wetland 44, eliminating degraded forest and shrub wetland habitat. There are no perennial "headwater seeps" or perennial headwater channels that provide significant base flow to Walker Creek in the area where the embankment fill affects Wetland 44.

One of the most significant perennial sources of water to the Walker Creek base flow is from the constructed drainage system beneath SR 509 near S. 176th Street, which enters Wetland 43 on the west side of SR 509. The perennial flow from this outlet will not be affected by this project.

Use of Auburn Site for Stormwater Detention

The wetland mitigation site in Auburn will not be used for stormwater detention, and use of the site for these purposes is not permitted by the restrictive covenants (see Appendix F of the *Natural Resources Mitigation Plan*) developed to provide long term protection for the site.

Indirect Impacts

On-Site Borrow Sources

The following text amends the response to General Response 4.

Borrow Area 1

Under the Port's proposed development alternative to avoid impacts to wetland and enhance site infiltration and off-site drainage to Des Moines Creek within or adjacent to the western margins of Borrow Area 1, approximately 4.2 million BCY of borrow material would be available. The resource reduction from 4.8 million BCY to 4.2 million BCY was done specifically to avoid impacts to off-site wetlands.

Five wetlands in Borrow Area 1 (32, 48, B1, B4, and B15) will be avoided; all remaining wetlands will be permanently impacted by excavation. The upslope watersheds of Wetlands B1 and 32 will not be affected by borrow site development, and setbacks around the wetlands will maintain the seasonal perched water regime. No long-term impacts are expected for Wetlands B1 and 32. The excavation boundaries for Borrow Area 1 are designed to avoid hydrologic impacts to Wetlands B15 and 48. To preserve the surface watershed-supplied runoff and interflow to these wetlands, no excavation will occur west of 20th Avenue South.

Wetland hydrology in Wetland B15 appears to be maintained primarily by direct precipitation. Its location above a relatively thick (>20 ft) layer of dense, low-permeability till soils likely encourages the shallow ponding and storage of water within the wetland. The water supply to the wetland appears to be supplemented by overland flow and shallow interflow from a small watershed area to the southeast. The eastern extent of this watershed is limited by 20th Avenue South, which is slightly elevated relative to the surrounding land, and which currently includes a drainage ditch and storm drains with catch basins along its eastern side. These features prevent surface runoff from the east from crossing the street and flowing to the wetland. Preservation of the small watershed for these wetlands (west to and including 20th Avenue South) will therefore maintain these hydrologic sources.

Wetland 48 occurs above a similar thick section of till soils in a shallow surface depression. Wetland hydrology is likely maintained by direct precipitation onto the wetland, and supplemented by overland flow and shallow near-surface interflow. The watershed for this wetland also extends eastward toward 20th Avenue South, where the elevation and drainage features of the street form its eastern edge.

Portions of Wetland 48 and B15a that are not excavated as part of Borrow Area 1 will be maintained by surface water directed to them by the finished grades established at the end of the project. Wetland hydrology in these areas appears to be maintained by seasonal groundwater that perches on till soils. The existing stormwater drainage system in the streets in the borrow area collects surface runoff and directs it away from these wetlands. Demolition of this drainage system may establish a more natural flow pattern to the site and extend the hydroperiod of the wetlands.

Wetland B4 is an incised channel and slope wetland that has eroded as a result of a constructed stormwater drainage system. Removal of the drainage system will reduce peak flows to the wetland, while precipitation and groundwater will continue to support the wetland. For this reason, detrimental indirect impacts are unlikely. Habitat functions are not affected due to the wetland's location in the Des Moines Creek buffer.

Wetland B12 could experience some change in hydrology in the east end of the wetland as a result of excavation. Downslope portions would continue to receive precipitation and groundwater to maintain wetland conditions. The presence of forested riparian habitat as part of buffer to Des Moines Creek would maintain habitat functions in the remaining wetland.

Mitigation

The excavation in Borrow Area 1 has been designed to avoid direct impacts to Wetland B1, B4, B15a, B15b, 32, and 48. Indirect impacts to wetlands which are downslope of the borrow area will be minimized by not excavating portions of the borrow area that lie within the watershed of these wetlands. Hydrology in these wetlands appears to be maintained by seasonal groundwater that perches on the till soils following periods of high rainfall. The existing stormwater drainage system on 20th Avenue South collects surface runoff and directs it away from these wetlands. This stormwater drainage system forms the eastern edge of the watershed for Wetlands 48, B15a, and B15b. Since excavation will not occur west of 20th Avenue South, the watersheds of these wetlands will not be altered and indirect hydrologic impacts are not expected to occur.

Wetland hydrology will be monitored in Wetlands 48, B15a, and B15b to verify that wetland hydrology continues to be present in these wetlands.

Borrow Area 3

Full utilization of the available resource in Borrow Area 3 would produce approximately 1.5 million BCY of borrow material for the third runway embankment. Under the Port's proposed development alternative to avoid impacts to all wetlands in Borrow Area 3, approximately 1.0 million BCY of the borrow resource would be available. The reduction of 0.5 million BCY would be done specifically to avoid impacts to on-site wetlands. Material extraction would be conducted in a manner that would preserve local hydrologic seepage thought to support Borrow Area 3 wetlands.

All wetlands in Borrow Area 3 will be avoided and a 50-ft buffer maintained. Preserving conditions in the watershed basin upgradient and immediately surrounding each wetland will maintain wetland hydrology. Groundwater analyses indicate that groundwater movement is from northwest to southeast; the areas west and northwest of the wetlands will remain undisturbed.

Potential losses in hydrology to wetlands avoided in Borrow Area 3 are minimal (0 to 20 percent). However, collecting and directing water that drains to the borrow area to the adjacent wetlands could mitigate any such impacts. This contingency would prevent indirect impacts to the hydrology supporting Wetlands B5, B6, B7, B9a and b, B10, and 29.

As explained in the *Natural Resource Mitigation Plan*, the hydrology of downslope wetlands will be monitored by the Port to verify that these contingency measures prevent indirect hydrological impacts to downslope wetlands. Wetlands adjacent to Borrow Area 3 will meet a performance standard of having saturated soils present during December through April. For Wetland 30, the performance standard shall be standing water present during the resident amphibian-breeding season (December through May during years of average rainfall).

Mitigation

A drainage swale will be installed following excavation of Borrow Area 3 to convey groundwater to Wetland 29 and replace the potential loss of seepage from the perched groundwater zone. This swale will collect groundwater seepage from the excavated slope face on the north and west sides of Borrow Area 3. Flow in this swale will be collected and conveyed south in a swale that drains into Wetland 29.

Since the swale will extend for the full length of the seepage face in the borrow area, it may convey flows in excess of those needed to support hydrology in Wetland 29 and downslope wetlands (i.e., Wetland 30 which receives overland flow and shallow interflow from Wetland 29). To manage excess flows and to optimize the distribution of water to Wetland 29, two measures will be used. A flow control structure (weir and diversion structure) will be constructed in the swale just before it flows into Wetland 29. This control structure will allow a controlled flow rate to be directed into Wetland 29 and enable diversion of

other flows away from the wetland and into the base of Borrow Area 3. Diverted flows will either be allowed to infiltrate at the base of Borrow Area 3 or be diverted to stormwater management facilities that will be constructed to manage runoff from the remainder of the borrow area. Consistent with an adaptive management approach, the length of the collector swale can also be modified based on post-construction monitoring to control the amount of seepage and runoff that is collected in the swale and diverted to Wetland 29.

Studies of borrow area hydrology indicate that impacts to the hydrology of the remaining wetlands in Borrow Area 3 (B5, B6, B7, B9a, B9b, B10, and 30) are not anticipated (Hart Crowser 2000a and b). Wetlands in Borrow Area 3 will be monitored before, during, and after excavation to verify that wetland hydrology remains. If wetlands 29 and 30 do not meet the hydrologic performance standards developed for them, contingency measures will be implemented. The collector swale system also can be used to divert additional water to Wetland 29 if necessary.

Borrow Area 4

Borrow Area 4 is located about 400 ft south of Wetland 28. Wetland 28 is maintained by several water sources, including groundwater that emanates from beneath the existing airfield, runoff from wetlands located east of it, and runoff from the surrounding impervious area. Some water infiltrating Borrow Area 4 may also reach the south and southeastern portion of the wetland.

Unlike Borrow Area 3, excavation in Borrow Area 4 will not reach the groundwater table, and thus would not be expected to alter groundwater flow or availability for Wetland 28, as a result no indirect impacts are likely.

Portions of Wetland 28 will be enhanced by mitigation planned at the Tyee Valley Golf Course, where existing golf course green will be converted to shrub-dominated wetland. Master Plan Update improvements occurring near Wetland 28 are limited to portions of the third runway, which could, without mitigation, generate hydrologic and water quality impacts. The *Comprehensive Stormwater Management Plan* addresses detention facilities and water quality BMPs that will minimize these impacts to the wetland and downstream Des Moines Creek. Excavation of Borrow Area 4, located south of Wetland 28, will not intercept groundwater flowing to the wetland or Des Moines Creek, and is thus unlikely to impact wetland hydrology.

Indirect Hydrology Impacts

The following text amends the response to General Response 6, General Response 7, Commonly Asked Questions U and Z, and Letters 4G-10A, 4G-12.

The wetlands adjacent to the proposed third runway embankment include forested and shrub-dominated wetlands on seepage slopes or shallow depressions. Seasonal (fall-spring) precipitation and groundwater seepage are the dominant sources of water to these wetlands. For several wetlands (especially Wetlands 18 and 37), groundwater seepage extends the period of soil saturation within the wetland to the mid-summer period, and sustains the groundwater discharge functions of the wetlands.

The third runway embankment has been designed with retaining walls to reduce the volume of runway fill and impervious surfaces, which significantly alter the hydrology of downslope wetlands and streams. Design features incorporated into the project that help maintain wetlands and reduce base flow impacts include:

- A permeable rock drainage layer will be constructed atop existing soils, beneath the embankment footprint. This drainage layer will allow groundwater that currently surfaces in the wetlands to be conveyed downslope to wetland at the edge of the embankment.

- Drainage channel constructed along the west base of the embankment that will collect water emanating from the embankment and convey and distribute it to downslope wetlands.
- Engineered fill materials of sufficient permeability to infiltrate rainwater falling on non-paved portions of the embankment (this feature reduces the amount of surface runoff generated from the embankment and maintains shallow groundwater sources for downslope wetlands).
- Use of permeable stone columns as retaining wall footings that will avoid altering the patterns of groundwater movement in the vicinity of retaining walls.
- Use of retaining walls to reduce the size of the fill footprint and reduce the filling of wetlands. Retaining wall designs allow water to move vertically and laterally to prevent interruption of water flow to downslope wetlands.

Several hydrologic modeling analyses have been conducted (Hart Crowser 2000, Earth Tech 2000) to evaluate the effect of the runway embankment on base flow conditions in Miller Creek and downslope wetlands. These studies indicate that overall annual groundwater base flow to the wetlands will be reduced slightly. However, due to a hydraulic lag, base flows to the wetlands will be reduced during winter and early spring months, and increased base flow will be available to downslope wetlands and Miller Creek during summer months.

The *SeaTac Runway Fill Hydrologic Studies Report* (Pacific Groundwater Group 2000) prepared for Ecology identifies 1.68 acres of wetland that could be indirectly impacted due to hydrologic changes associated with the embankment (especially the Wetland 18 and Wetland 36 complex). The analysis concludes that seepage into the embankment and delay in water movement through the embankment would not result in the loss of these downslope wetlands. Water will infiltrate into the embankment and eventually discharge to the downslope wetlands. Although the report identifies potential secondary impacts, it also identifies a potential net benefit to wetland hydrology during the summer months based on the delay between the time water infiltrates into the embankment and when it discharges from its base.

This analysis of potential benefit to wetland hydrology for downslope wetlands is applicable to the indirect impact analysis for the following wetlands: 3, 4, 5, 7, 8, 11, A1, A11, A13, 18, 37, Channel B, and all riparian wetlands located in the west side acquisition area.

The hydrology of riparian wetland areas located on the east and west side of Miller Creek will not be altered from a loss of seepage water. In addition, the extensive stormwater management system will prevent increases in peak flow rates and duration of peak flows that may otherwise result in significant downcutting and bank erosion.

The Hart Crowser analysis also concludes that groundwater flow rates will be similar to existing conditions. However, existing conditions are predicted to be slightly higher or lower depending on annual precipitation. Hart Crowser's study concludes:

- Groundwater flow rates beneath the proposed embankment will generally be similar to or slightly lower than existing conditions during wet years.
- Groundwater flow rates beneath the embankment will show a small increase over existing conditions during dry years.
- Although the runway project will produce slightly more surface runoff volume (especially in wet years) compared to existing conditions, the overall long-term average flows are very similar in all years.
- The longer seepage path through the embankment results in a seasonal lag, which produces a net increase in base flow to Miller Creek and adjacent wetlands in the summer and early fall.

Hart Crowser's findings are consistent with the Ecology (Pacific Groundwater Group 2000) report that concluded: "Flows would be lower in the winter than under current conditions, and greater in summer

compared to the current condition." Ecology also noted "flows to local wetlands and the streams will be reduced only in winter when abundant water is typically present."

Finally, a comprehensive evaluation of the potential low streamflow impacts in Miller, Walker and Des Moines creeks from the planned Airport improvements has been completed (Earth Tech 2000). This evaluation used an HSPF model to evaluate the expected low flow conditions during August and September in the three creeks based on 1994 land use conditions and land use conditions following all Master Plan Update improvements in 2006. This evaluation specifically addressed the following conditions:

- Late summer discharge of infiltrated water stored in the embankment.
- Changes in non-hydrologic flows within the acquisition area in the watersheds. (discontinued irrigation withdrawals from the watershed and discontinued discharge of imported water through septic system drainfields).
- Secondary recharge of runoff from pavement atop the embankment.
- Extended duration discharge from the stormwater detention facilities through infiltration galleries that would provide input to the shallow groundwater regime adjacent to Miller Creek.
- Managed release of stormwater from reserved storage to ensure that low flow discharges in streams do not fall below pre-project levels.

The results of this analysis show that for Miller, Walker, and Des Moines creeks, average August and September flows are predicted to increase above existing conditions, and the 7-day low flows are expected to match pre-project conditions. A net increase of 0.04 cfs in August/September average flows is predicted in Miller Creek at SR 509. In the upper reach of Walker Creek, average August and September flows are predicted to increase by 0.009 cfs. Des Moines Creek average August and September discharges at South 200th Street would increase by 0.12 cfs.

While analysis indicates that this is unnecessary, the groundwater hydrology of riparian and isolated wetlands adjacent to the Master Plan Update improvements will be monitored for a minimum of 10 years. The purpose of this monitoring will be to collect data that can be used to determine if hydrologic conditions in the wetlands are sufficient to maintain the existing wetland vegetation types. If necessary, the groundwater collected in drainage channels or stormwater management systems can be redistributed to specific wetlands in amounts sufficient to maintain the desired conditions.

Cumulative Impacts

The following text amends the response to Letter 4P-9.

The Washington Department of Transportation is the lead agency for the proposed extension of SR 509 south of the Airport. The SR 509/South Access Road project would extend the SR 509 freeway south from South 188th Street to a connection with Interstate 5 and improve related local traffic circulation patterns. Southern access to the Airport would be provided by construction of a new roadway, the South Access Road.

Five alternatives are currently under consideration for the location of the SR 509 extension. The preliminary preferred alternative is Alternative C2. Alternative C2 would cross the southern one-third of the FAA extended object-free zone at the south end of Runway 16L/34R. The roadway would continue to the southeast and encroach on the northeast corner of Des Moines Creek Park and would require the acquisition of approximately 8.1 acres of parkland. Continuing toward I-5, the SR 509 mainline would pass through an area of mobile homes and would join I-5 near the intersection of SR 99/South 208th Street. The length of the extension would be approximately 3.3 miles.

The SR 509 extension and South Access Freeway project will not constrain implementation of the Port's mitigation plan in the Des Moines Creek basin. All wetland mitigation has been designed to avoid conflicts with the preferred alternative for these projects.

The Port's proposed mitigation at the Tyee Valley Golf Course and along Des Moines Creek avoids the preferred alternative for SR 509 and the South Access Freeway. Surface water runoff from these roadways can be collected, treated, and diverted to prevent runoff impacts to the mitigation sites. Therefore, these projects would not affect the hydrologic or riparian functions desired for the mitigation site.

Biological Assessment Update

The following text amends the response to Commonly Asked Questions B and F.

Since the publication of the *Final Supplemental EIS* in May of 1997, and the issuance of the Record of Decision on July 3, 1997, the National Marine Fisheries Service (NMFS) and United States Fish and Wildlife Service (FWS) have listed as threatened or endangered, two species of fish that are known to exist in streams and other waters in the Puget Sound that have the potential to be affected by actions at Seattle-Tacoma International Airport.

The FWS, a division of the Department of Interior, and the NMFS in the Department of Commerce, share responsibility for administration of the Endangered Species Act (ESA). Generally, NMFS possesses ESA jurisdiction over species that spend a majority of their lives in marine environments (e.g., anadromous salmonids), while FWS is responsible for terrestrial and freshwater species and migratory birds. NMFS also administers interpretation of the Magnuson-Stevens Fishery Conservation and Management Act, including Amendment 14 provisions for Essential Fish Habitat.

A species may be classified for protection as "endangered" when it is in danger of extinction within the foreseeable future throughout all or a significant portion of its range. A "threatened" classification is provided to those animals and plants likely to become endangered within the foreseeable future throughout all or a signification portion of their ranges. A "species" includes:

- any species or subspecies of fish, wildlife, or plant
- any variety of plant; and
- any distinct population segment of any vertebrate species that interbreeds when mature.

Excluded is any species of the Class Insecta determined by the Secretary to constitute a pest whose protection under the provisions of the act would present an overwhelming and overriding risk to humans. In applying the definition of "species" to anadromous salmonids, NMFS considers a group of salmonid populations to constitute a species for purposes of listing if such populations are (a) reproductively isolated from other conspecific populations; and (b) if such populations represent an important component of the evolutionary legacy of the biological species. NMFS defines its listing unit as an "evolutionarily significant unit" or "ESU."

Once a species or critical habitat has been proposed for inclusion on a list of endangered or threatened species, a notice is published in the Federal Register. The public is offered an opportunity to comment, and the rule is finalized or withdrawn. Species and critical habitat are listed as threatened or endangered on the basis of the "best scientific and commercial data available" considering biological status, threats to existence, and probable recovery. FWS and NMFS (the Services) maintain a list of "candidate" species that are under review for potential listing.

The *Final EIS* and *Final Supplemental EIS* considered the effect of the Master Plan Update projects at Sea-Tac on the marbled murrelet (*Brachyamphus marmoratus*). In 1995, a Biological Assessment was prepared for bald eagle and peregrine falcon that determined that the Master Plan Update projects may affect, but were not likely to adversely affect these species. Consultation was initiated in 1995 and the Services concurred with the determination on December 6, 1995. FWS and NMFS have listed several new species that may occur in the vicinity of Sea-Tac Airport, including the threatened Coastal/Puget Sound bull trout (*Salvelinus confluentus*), and threatened Puget Sound chinook salmon (*Oncorhynchus tshawytscha*). Section 7 of the ESA requires federal agencies to ensure that their actions do not jeopardize the continued existence of endangered or threatened species, or adversely modify their critical habitat.

In April 2000, the Federal Aviation Administration (FAA) re-initiated consultation with the Services concerning the impacts of Master Plan Update projects over which FAA possesses discretionary involvement or control. In accordance with Section 7, the FAA and Corps prepared a Biological Assessment (BA) for the proposed Master Plan Update actions. The BA for the Master Plan Update projects determined that the Master Plan Update actions may affect, but were not likely to adversely affect bald eagles, bull trout and chinook salmon. The FAA and the Corps further determined that under the range of anticipated conditions, the proposed action would have no effect on marbled murrelets; however, under unlikely circumstance, the proposed action may affect, but would not likely adversely affect this species. In accordance with Section 7, the BA was submitted to the Services in June 2000. Supplements to the BA were submitted in November and December 2000 respectively to update the BA with further stormwater analysis information.

The *Final EIS* and the *Final Supplemental EIS* disclosed the presence of these species in area streams. Those documents further disclosed the general consequences of the project on these species. The biological opinion and concurrence issued by the Services does not contradict these earlier findings.

In addition to the recent listings of various species under the ESA, NMFS recently established requirements under the Magnuson-Stevens Fishery Conservation and Management Act for federal action agencies to consult over activities that may adversely effect designated Essential Fish Habitat (EFH). NMFS designated EFH for coastal pelagic fisheries and Pacific groundfish species, as well as several Pacific salmon species. The FAA and Corps prepared an EFH assessment in June 2000 analyzing the impacts of proposed Master Plan Update actions on designated EFH for pelagic fish species and determined that the Master Plan Update projects were not likely to adversely affect designated EFH. In September 2000, NMFS designated EFH for several species of salmon, including chinook, coho, pink, and chum salmon. In February 2000 the FAA prepared a supplemental EFH analysis and determined that the Master Plan Update projects may adversely affect coho salmon EFH in the short-term, but are not likely to adversely effect chinook, coho, and Pacific Sound pink salmon EFH in the long-term.

Chinook and pink salmon have not been documented to occur in the Miller or Des Moines Creek basins upstream of their discharge with Puget Sound; therefore, construction and operations of the project will have no adverse effect on freshwater EFH of chinook or pink salmon in the Miller Creek or Des Moines Creek basins. Coho salmon are present within central and lower reaches of Miller, Walker, and Des Moines creeks and may be present in several areas where direct impacts could occur from construction of habitat improvements (e.g., installation of large woody debris, removal of rock weirs), and/or water quality alteration from turbidity, suspended sediment, or stormwater chemistry. When the potential effects of the proposed Master Plan Update improvements on the EFH of coho salmon in the project area were considered relative to the proposed conservation measures, the FAA and the Corps agencies determined that the proposed action "may adversely effect" coho EFH in the short-term, but will be unlikely to adversely affect coho salmon EFH for the long-term and will actually prove beneficial to this species.

The following text amends the response to Letter 4L-4.

Effects Determination for Chinook Salmon

When the potential direct, indirect, and cumulative effects of the proposed Sea-Tac Airport Master Plan Update improvements are considered, relative to all life stages of chinook salmon or their habitats in both freshwater and nearshore marine environments, in the Miller Creek, Des Moines Creek, and Green River basins, the BA concludes that the projects "may affect", but are "not likely to adversely affect" chinook salmon.

Effects Determination for Bull Trout

Based on the consideration of the various life histories and associated habitat requirements of bull trout in both freshwater and marine environments, the potential direct, indirect, interdependent/inter-related, and cumulative effects of the construction and operation of the Sea-Tac Airport Master Plan Update projects "may affect" but are "not likely to adversely affect" bull trout.

Determination of Effects On Essential Fish Habitat

Based on consideration of the essential fish habitat requirements of coastal pelagic species fishery and West Coast groundfish, the potential direct, indirect, and cumulative effects of the construction and operation of the Sea-Tac Airport Master Plan Update projects are "not likely to adversely affect" any identified EFH.

Effects Determination for Marbled Murrelet

Based on the rarity of marbled murrelets in marine waters near Sea-Tac Airport, the lack of breeding pairs in the action area, the distance between the Airport and Puget Sound, the water quality benefits to be derived from the Master Plan Update project improvements, and the remote possibility of an aircraft striking a murrelet, the BA concludes that under the range of normally expected circumstances, the project will have "no effect" on the marbled murrelet or its critical habitat. In certain unlikely circumstances, the project "may affect" the species, but will not adversely affect this species or its critical habitat.

Effects Determination for Bald Eagle

The implementation of the Master Plan Update projects is not expected to adversely impact local bald eagles (Shapiro 1995). This report agrees with previous assessments, that the project "may affect, not likely to adversely affect" bald eagles in the vicinity of Miller and Des Moines creeks. The overall determination for the Master Plan Update improvements project is "may affect" but is "not likely to adversely affect" bald eagles.

Miscellaneous

Sea-Tac Runway Fill Hydrologic Studies

The following text amends the response to Commonly Asked Question CC.

The *Sea-Tac Runway Fill Hydrologic Studies* (Pacific Groundwater Group 2000), funded by the state legislature in 1999, was completed in June 2000. The study was conducted under Ecology's oversight by a team of consultants: Pacific Groundwater Group, Earth Tech, Inc., and Ecology and Environment, Inc.

The study focused on a number of issues related to fill placement and its effects on local hydrology. These included (1) fill chemistry effects, (2) groundwater recharge effects, (3) fisheries effects, and (4)

effects on the hydroperiod in local wetlands. The following paragraphs are direct quotes from the Executive Summary (p. 5-7).

Fill Chemistry Effects

Gravel from a mine on Maury Island is being considered as fill for the proposed runway expansion. The top eighteen inches of gravel at Maury Island contains high levels of arsenic, cadmium, and lead originating from the former ASARCO smelter in Tacoma. The top 18 inches of soil at Maury Island are proposed to be contained at the island mine prior to aggregate extraction. Ecology must have assurance that the fill used for the airport project will not result in exceedances of state water quality criteria. The Port and Ecology are working to determine what screening methods and contingencies are necessary to ensure that water quality criteria are met.

This project analyzed the potential effects to ecological receptors, such as the benthic community and wildlife-consuming benthic organisms, if contaminants in the Maury Island fill were to migrate from soils to nearby sediments. Surface and subsurface soil data of the potential Maury Island fill were compared to ecological benchmarks to assess whether unacceptable ecological risks may occur. Based on the above analysis, use of subsurface soils as fill should not pose an unacceptable risk to ecological receptors.

Groundwater Recharge Effects

The Project Team assessed groundwater recharge in the project area and found that recharge could change because of the following actions:

- Changing infiltration of precipitation by changing land cover, soil type, and slope
- Conveying runoff from impervious surfaces away from local recharge areas
- Eliminating the discharge of imported water through leaks and septic systems throughout the year
- Eliminating irrigation with local and imported water sources in summer

The net effect of the changes to irrigation and imported domestic water appear to be about zero in the irrigation season (summer). In winter, recharge will be reduced by eliminating the septic discharge and leaks.

The change to *precipitation-derived* recharge was evaluated in a cross section of the proposed fill. This calculation considered the conversion of wetlands and forest to grass on the embankment fill. It also considered the widths of the only two impervious surfaces on the cross section (12th Avenue South and the third runway). The calculation suggests about an 11 percent decrease in groundwater recharge along the cross section, largely as a result of the large increase in impervious area. However, this estimated magnitude of change is probably high because no secondary infiltration of runoff from the third runway was assumed, and modeled water use by grass on the new embankment was possibly higher than expected for the fill soils.

The quantity of water seeping downward through the glacial till was also simulated with the cross-section model. The *volume* of seepage would likely change only slightly under the built condition; however, because total recharge would be reduced, the *percentage* of recharge seeping through the till would increase substantially.

The 11 percent reduction in local recharge is large, but dependent flows to local wetlands and creeks will be reduced only in winter when abundant water is typically present anyway. A similar reduction in recharge basin-wide would cause a major impact to baseflows. To assess basin-wide impacts, the Port's recharge calculations that considered all Master Plan Improvements were reviewed. The HSPF model parameters used in the Port's recharge analysis do not appear to correspond to those used in actual basin modeling also conducted by the Port. Therefore, a confident assessment of basin-wide recharge and

baseflow impacts is currently lacking. A confident assessment of basin-wide recharge and baseflow effects should be possible by analyzing a properly implemented and documented HSPF model.

A small reduction in recharge to deeper aquifers of the Des Moines Creek upland may occur; however, the small reduction would not affect these aquifers' ability to supply water to wells. This conclusion is based on the relatively large recharge areas of these aquifers compared to the airport, the fact that the effects will be apportioned between shallow and deep aquifers, and the reported estimates of shallow recharge.

Fisheries Effects

No direct effects on fish habitat are expected in Walker or Des Moines Creek because of construction. Miller Creek would be relocated in the Vacca Farm area but this reach currently provides poor habitat for salmonids because it features sparse riparian vegetation, a substrate dominated by sand and silt, little complexity, and no instream structure. The proposed Miller Creek channel construction will provide a net gain in habitat since it will feature a mixture of pools and riffles, gravel and cobble substrate, riparian vegetation, and replacement of woody debris. Proper construction and long-term monitoring are vital to successful Miller Creek relocation including control of turbidity during initial wetting. Some sediment transport during initial wetting is likely, and has the potential to damage habitat downstream.

An uncontrolled release of stormwater is likely at some time during construction given the size of the project and human error; however, the size and quality of a release cannot be predicted, nor can its impacts on fish be quantified. If habitat quality is further degraded because of indirect construction effects such as an uncontrolled release of turbid water, resident populations of cutthroat trout and anadromous Coho salmon would likely decline.

The enhancements to the riparian buffer corridor and instream habitat of Miller Creek will undoubtedly benefit local stream habitat for resident cutthroat trout if they are implement and maintained properly. However, the proposed mitigation is limited in that it will only affect localized Miller Creek habitat and resident cutthroat trout. Indirect construction and port-construction effects such as alterations to base flow, peak flow, and sediment input could affect the entire stream systems, not just the airport project area. The Port predicts reduction in summer base flow in Des Moines Creek as a result of reduced groundwater recharge and supports augmenting low summer stream flows by pumping from a Port-owned well and discharging the water into the creek.

The watershed trust funds for the Miller and Des Moines Creek watersheds can be beneficial. However, significant habitat restoration in Miller, Walker, and Des Moines Creeks will require substantially more funding than what is currently offered through the basin trust funds.

Effects on the Hydroperiod of Local Wetlands

A hydroperiod is a seasonal change in the timing of groundwater discharge to wetlands and streams. For this project, effects to the hydroperiod were evaluated using a cross section of the proposed embankment fill near Miller Creek. The following effects are predicted if the embankment is built:

- Recharge would be 11 percent less along the cross section, and would spread-out within the fill, causing a significant timing lag in discharge to the wetlands and creek west of the embankment compared to the current condition.
- Discharge to remaining wetlands and the creek under the built condition would vary less throughout the year and the period of minimum discharge would be shorter. Flows would be lower in winter than under the current condition, and greater in summer compared to the current conditions. The total quantity of water flowing to the wetlands would decrease because total recharge would decrease.

The timing changes would generally benefit the local wetlands that remain after filling and would slightly moderate seasonal low base flows and temperatures in Miller Creek. However, all water quantities are reduced on an average annual basis because total recharge is smaller under the built condition. Also, since the embankment is a small part of the Miller Creek watershed, the overall effect on streamflow is small. If the constructed fill has a lower silt content than was assumed for this analysis, the lag may be overestimated and the recharge volume may be underestimated.

Borrow Area Hydrology

The following amends the response to Letter 4P-22.

The series of wetlands mapped in Borrow Area 3 follow a line of shallow depressions in the southcentral part of the site, extending to the southeast from Wetland 29 through Wetlands B9, 30, B7, B6, and B5. These wetlands exist in an area of relatively permeable subsoils where the main groundwater table is at a depth of 10 to 15 ft below the wetlands. The depth of the water table indicates that the wetlands are supported by other sources of water. The sources of water appear to include surficial runoff and shallow interflow, as well as groundwater seepage occurring from a perched zone above the main water table that discharges in the area of Wetland 29. Observation wells in the area indicate that the perched zone does not contribute flow directly to the other wetlands but, by extension, flow from Wetland 29 appears to pass along the line of wetlands, to each wetland in turn.

The key factors for sustaining wetland hydrology in Borrow Area 3 are (1) ensuring the continued supply of water and (2) preventing undue loss of water from the wetlands. Wetland hydrology is typically sustained by a combination of hydrologic processes. The processes supporting wetland hydrology include precipitation, groundwater flow and spring seepage, runoff, and interflow. Other processes such as evapotranspiration and deep percolation lead to the potential loss of water from wetlands. Where wetlands exist, it can be assumed that the sources of water exceed the losses, for at least a large part of the year. Maintenance of the water sources, without increasing the losses, should ensure preservation of the wetlands in perpetuity.

One of the main constraints on wetland development in the area is the relatively high permeability of the surficial soils. In agricultural terms, the surficial soils are identified to be part of the Indianola series and are characterized as being "excessively drained with "rapid permeability". This is consistent with the predominant soil material in Borrow Area 3 being stratified glacial drift, which is primarily sand and gravel outwash with varying amounts of silt in a predominantly granular mix.

The overall approach for maintaining wetlands in Borrow Area 3 focuses on preserving or enhancing the existing sources of water, and ensuring that no additional loss pathways are created.

B

February 16, 2001

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Reference: Seattle, Port of, 1996-4-02325 Comments on impacts to wetlands, streams and fisheries resources resulting from proposed 3rd runway and related development actions at Seattle-Tacoma International Airport.

Dear Mr. Freedman and Ms. Kenny,

Azous Environmental Sciences (AES) has been retained on behalf of the Airport Communities Coalition to review the impact of the Port of Seattle's proposed development at SeaTac airport on wetlands, streams and fisheries resources. Comments were submitted on the 1999 Wetlands Delineation and Wetland Functional Assessment documents as well as the June 2000 Natural Resources Mitigation Plan and related documents in letters dated August 16th and September 1st of 2000 to the Department of Ecology and the U.S. Army Corps of Engineers. The purpose of this letter is to provide comments and analyses of the December 2000 updates of these documents. A complete list of materials examined in preparing this critique is provided below.

List of Documents Reviewed:

- *Natural Resource Mitigation Plan (NRMP)*; Seattle-Tacoma International Airport; Master Plan Update Improvements dated December 2000, Parametrix, Inc.
- *Natural Resource Mitigation Plan (NRMP) Appendices A-E Design Drawings* dated December 2000, Parametrix, Inc.
- *Natural Resource Mitigation Plan (NRMP) Revised Implementation Addendum* dated August 2000 Parametrix, Inc., Number 556-2912-001 (03).
- *Wetland Functional Assessment and Impact Analysis; Master Plan Update Improvements*; Seattle-Tacoma International Airport, December 2000 by Parametrix, Inc.
- *Wetland Delineation Report; Master Plan Update Improvements*; Seattle-Tacoma International Airport, December 2000 by Parametrix, Inc.

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- *Pacific Coast Salmon Essential Fish Habitat Assessment; Master Plan Update Improvements*; Prepared for FAA and Port of Seattle by Parametrix, Inc., December 2000. Number 556-2912-001 (01) (48).
- *Biological Assessment, Master Plan Update Improvements*; Prepared for FAA and Port of Seattle by Parametrix, Inc., June 2000.
- *Supplement to Biological Assessment, Master Plan Update Improvements*; Prepared for FAA and Port of Seattle by Parametrix, Inc., December 2000.
- *Seattle Tacoma International Airport (SEA) Wildlife Hazard Management Plan*, developed by Seattle-Tacoma International Airport in cooperation with US Department of Agriculture, Animal and Plant Health Inspection Service Wildlife Services, August 2000.
- *Comprehensive Stormwater Management Plan, Master Plan Update Improvements*; Technical Appendices J, Q and R, by Parametrix, Inc., December 2000.
- *Feasibility of Stormwater Infiltration, Third Runway Project Sea-Tac International Airport, Sea-Tac, Washington*, prepared for Port of Seattle by HartCrouser, December 6, 2000. J-4978-06

I am an environmental scientist, founder of Azous Environmental Sciences and a professional wetland scientist (SWS 001067). I am co-editor and co-author of *Wetlands and Urbanization* (CRC/Lewis Press 2000), a professional reference book on how best to protect and manage wetlands in an urbanizing environment. I hold a Masters degree in environmental engineering and science and a Bachelor of Arts in landscape architecture, both from the University of Washington. I have worked as a scientific analyst for over 20 years and have specialized in natural resource science since 1991. A package describing my background and experience is attached to this report.

Activities that degrade or destroy special aquatic sites, such as filling wetlands, are among the most severe environmental impacts the Clean Water Act and Section 404 Guidelines are intended to prevent.[1] The stated principle guiding decision-making for Section 404 permits is that degradation or destruction of special sites may represent an irreversible loss of valuable aquatic resources. Under the Act, dredged or fill material may not be discharged into the aquatic ecosystem unless it can be demonstrated that the discharge will not have an unacceptable adverse impact, either individually or in combination with known and/or probable impacts of other activities affecting the ecosystem. Accurate determination of the adversity of an impact and identification of commensurate acceptable mitigation to offset adverse impacts depends on careful analysis of the following factors:

- The physical area of the wetland loss.
- The functions provided by the wetland loss.
- The cumulative effect of all identified losses including area and functions.

Without this information, it is simply not possible to determine the effectiveness of mitigation. Without this information, the acceptability of adverse impacts cannot be decided. Although these requirements were clearly pointed out in comments made in my September 1, 2000 letter, essential data and analysis remain missing:

- The keystone of the mitigation proposal, the analysis of wetland functions being eliminated, is still unaccountably absent, and the wetland assessment is unsupported as a result. This omission has apparently led the Port to propose a mitigation package that offers to replace the wrong functions.

[1] Section 404 (b)(1) Part 230.1(d) Purpose and policy.

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- Calculations of the extent of permanent and temporary wetland area losses remain unscientific and are contrary to common sense.
- Astoundingly, there continues to be no analysis of cumulative effects. Simply listing other projects and identifying project level adverse impacts does not constitute an analysis of the cumulative effects of all the projects.

These serious voids leave USACE and the Department of Ecology with insufficient information to make a reasonable judgment as to whether the proposed discharge will comply with the intent and purpose of the Clean Water Act. To illustrate better what is missing from the NRMP, the Biological Assessment, and the Wetland Functional Assessment documentation, I have prepared a series of analyses that address these voids using the data provided by the Port's documents. The following new analysis of data will illustrate why the agencies must find either that there is insufficient information to have reasonable assurance of no significant adverse impacts, or that there is inadequate mitigation to offset the significant adverse impacts of this project.

Wetland Functional Assessment of Losses in the Miller Creek and Des Moines Creek Watersheds

Although the December 2000 NRMP appears at first to have increased proposed mitigation of losses from constructing the Third Runway over previous plans, the appearance is false because the mitigation actually proposed remains largely unrelated to the environmental functions that will be eliminated by loss of watershed systems. To illustrate the kinds of information missing from the assessment of functions performed by Parametrix for the Port of Seattle, I assembled data provided in Table 1-2 of the December 2000 Wetland Functional Assessment, and Tables 3-1 and 3-3 of the December 2000 NRMP into a spreadsheet and produced Figures 1, 2 and 3 showing the wetland functions affected by the project.

Table 3-3 gives one of five rankings (low, low-to-moderate, moderate, moderate-to-high, or high) to each function of the wetlands to be eliminated. All rankings of low, low-to-moderate, and moderate were placed in one category ("Low-Moderate"), and all rankings of moderate-to-high and high were placed in a second category ("Moderate-High"). Figure 1 is a bar chart illustrating the functional rankings of the acres of wetlands to be eliminated from both Miller and Des Moines Creek watersheds, using the two categories.

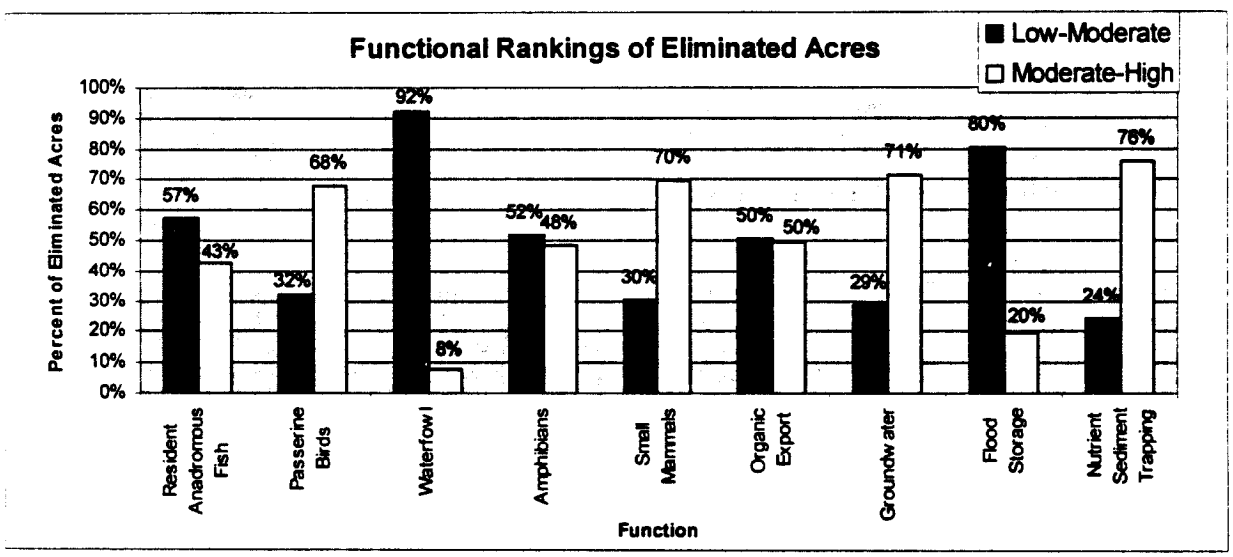

Figure 1. Functional rankings assigned to wetlands being eliminated for the Third Runway Project.

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Figure 1 shows that the highest-ranking functions being eliminated from the watershed in the greatest proportion are habitat for passerine birds (68%), small mammals (70%), groundwater discharge/recharge (71%), and nutrient sediment trapping (76%). Forty-three percent of the wetland acres being eliminated are ranked moderate-to-high for anadromous fish habitat, forty-eight percent are ranked moderate-to-high for providing amphibian habitat, and fifty percent are highly valued for export of organic material.

Significantly, *92 percent* of the eliminated wetlands are low-to-moderate for waterfowl habitat, and 80 percent are low-to-moderate for flood storage. These are proportionally the *lowest*-ranking functions among all the wetlands being eliminated, yet waterfowl habitat and flood storage are the primary functions targeted for replacement in the NRMP.[2] The grossly misplaced emphasis makes no environmental sense at all and serves to create the impression of mitigation where no effective mitigation in fact exists. The mitigation proposal appears to be tailored to the needs of the project rather than the requirements of the Clean Water Act.

Figure 2 shows the ratings of wetlands in the Miller and Des Moines Creek watersheds, using Department of Ecology's (DOE) Wetland Rating System. Starting at the left of each chart in Figure 2, the first bar shows the proportion of wetlands being eliminated for each of the three pertinent DOE ratings. The second bar shows the percent of wetland acres in the Port's entire project area that have that rating and are being eliminated. For example, the Miller Creek Basin chart in Figure 2 shows that 58 percent of the wetlands eliminated by the Third Runway in the Miller Creek watershed are rated Class II. It also shows that 45 percent of all the Class II wetlands identified within the Miller Creek Basin project area will be eliminated.[3]

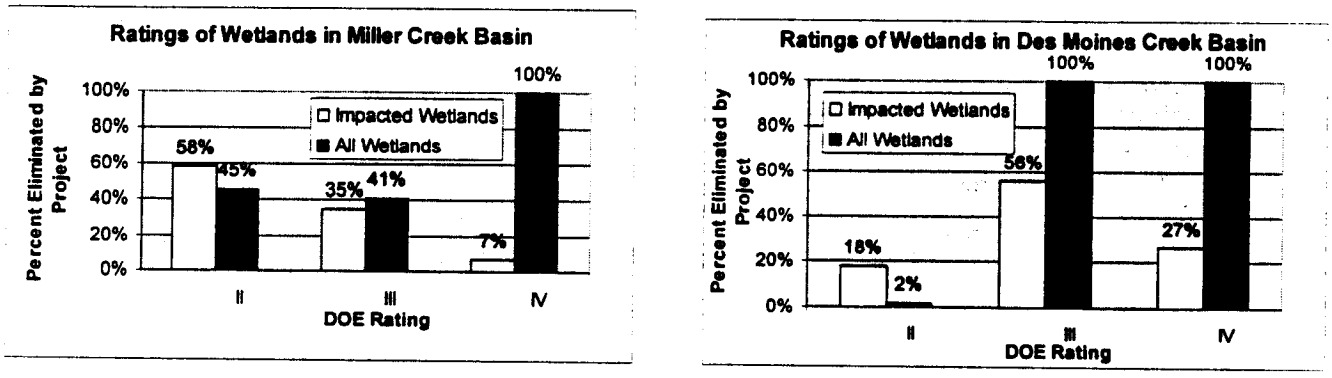

Figure 2. Department of Ecology (DOE) ratings for wetland acres eliminated.[4]

The bar charts in Figure 2 illustrate that the majority of wetland acres being eliminated for the Third Runway project in the Miller Creek watershed are more highly rated Class II wetlands, rather than lower quality Class III and IV wetlands. This evidence directly contradicts the repeated statements

[2] NRMP Table 1.3-1 and pages 1-1 and 1-2.

[3] Ideally the second bar would show the percent of wetlands being eliminated *in the watershed* by DOE rating but that data was not available.

[4] NRMP Table 2-1.1 is source of data for charts.

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made in the NRMP and Wetland Functional Assessment that the wetlands to be eliminated are degraded to the extent that they provide few valuable functions.[5]

Another important measure of wetland function is proportion of habitat types, such as emergent, scrub-shrub, or forested wetlands. Figure 3, below, identifies the types of habitat that will be eliminated in the Miller Creek and Des Moines watersheds. The charts show that the majority of wetland acres to be eliminated in Miller Creek are forested wetlands, followed by emergent habitats. Shrub wetlands constitute the smallest component of habitat types being eliminated.

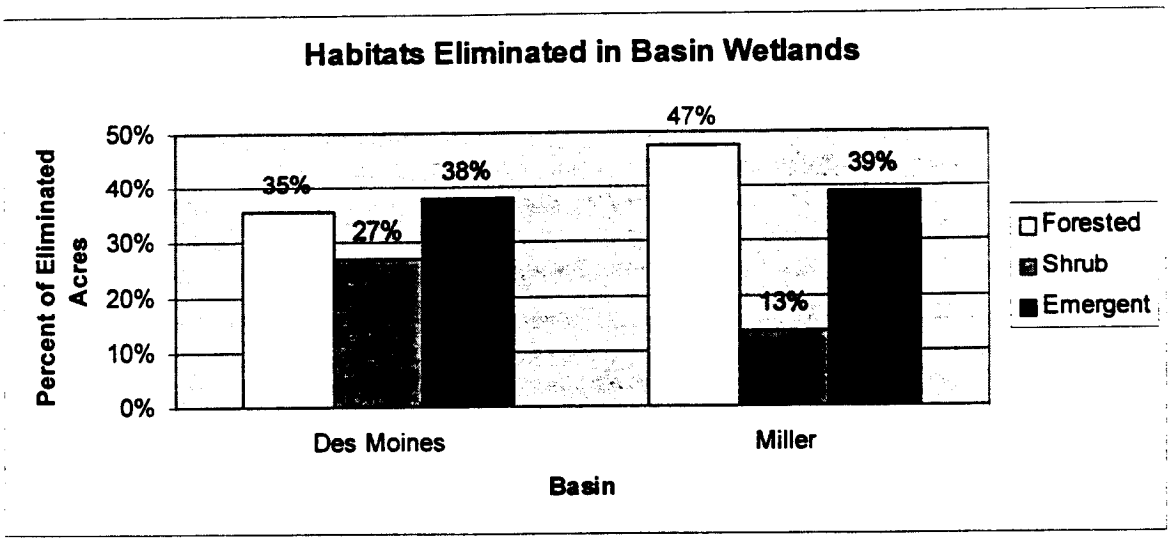

Figure 3. Proportion of wetland habitats eliminated.

Based on the results revealed in Figures 1, 2 and 3, commensurate mitigation for these lost functions would require replacement of habitat for passerine birds, small mammals, and amphibians. It would require assurances that the sediment and nutrient trapping functions be compensated for, as well as groundwater exchange functions. To comply with Section 404 Guidelines, a plan would have to ensure that sources of organic export within the affected watersheds be maintained and that there be no net loss of fisheries habitat (resident or otherwise), particularly in light of recent and proposed Environmental Species Act (ESA) listings. An acceptable plan would include creation of wetlands rated Class II or greater and would provide habitat dominated by forested and emergent wetland systems.

In contrast, the in-basin mitigation being offered within Miller Creek watershed ignores these key requirements. Instead, the Port proposes to replace the existing wetland functions, identified clearly in the data gathered by its own consultants, with a questionable restoration of a scrub-shrub wetland, the least common habitat type found in the watershed. Further, the restoration is designed to replace "lost" flood plain, which is not identified anywhere in the wetland functional assessment as a significant function provided by the impacted wetlands.

[5] NRMP Section 2 and Wetland Functional Assessment Section 4.

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Determining the Extent of Permanent and Temporary Wetland Losses

I pointed out the Port's unrealistic approach to determining what constitutes permanent versus temporary wetland impacts in my August 16th and September 1st comment letters. The December 2000 Wetland Functional Assessment may reflect an attempt to clarify permanent impacts from temporary impacts, but is still founded on unsupportable optimism regarding how much wetland can be eliminated from a system and still leave a wetland viable. The assumptions regarding what constitutes a temporary versus permanent impact remain ill-defined. Moreover, the Port significantly underestimates the extent of indirect impacts.

How Much Wetland Area Can Be Eliminated From a Wetland and Still Leave it Viable?

The NRMP makes the argument that the acres of wetland lost is commensurate with the proportion of functions provided by that acreage.[6] In other words, according to the Port's reasoning, if half a wetland is eliminated, the remaining half will necessarily provide half the previous functions. Within some ranges of values, there may be a one-for-one relationship between function and size of a wetland. Nevertheless, there is ample evidence that as wetland size diminishes the value of the wetland decreases in greater proportion because the remaining functions are qualitatively less significant.

Interestingly, this increased degradation ratio phenomenon is demonstrated in the data gathered by Parametrix for the wetland functional assessment. When one compares the average size of wetland within the DOE Rating Classes (see Table 1), it is apparent that smaller wetlands were less highly rated than the larger wetlands. By reducing the size of a wetland, one removes significant value in greater proportion than the percentage of lost area, to the extent that the wetland is rated lower when assessed at the reduced size. Moreover, the Port's argument is based on the erroneous assumption that wetlands have uniform conditions, whereas they often have a high degree of internal diversity. Large area reductions can eliminate entire populations of small mammal or amphibian species using the wetland by reducing or eliminating key features of their required habitat such as needed emergent areas or a forested buffer.

Table 1. Existing conditions: DOE Rating and average wetland size.

	DOE Rating		
	II	III	IV
Smallest Wetland in Category (acres)	0.57	0.01	0.02
Largest Wetland in Category (acres)	35.45	4.63	0.87
Average Sized Wetland in Category (acres)	**6.60**	**0.47**	**0.20**

Table 2, below, shows the total wetland acres and total acres impacted for each of the wetlands identified by the NRMP. Most of the wetlands are 100% impacted and are properly accounted for in terms of permanent impacts. A few have between zero and 13 percent of their areas permanently impacted, an effect whose significance may not be readily predictable. However, wetlands 18, 37, A12, and R1 all have *more than 70 percent* of their areas permanently impacted.

[6] NRMP Section 3.

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It is highly improbable that wetlands 18, 37, A12, and R1 could retain their DOE ratings or value if the physical basis of their functions were reduced over more than 70 percent of their area. Such a high degree of loss is likely to eliminate whole habitats within these wetlands, affecting their suitability for wildlife, nutrient sediment trapping, and organic export functions.

Table 2. Total wetland acres and total acres impacted for each of the wetlands identified by the NRMP.[7]

Wetland ID	Total Wetland Acres	Wetland Acres Impacted	Percent of Wetland Eliminated	Revised Acres for Permanently Impacted Wetlands
5	4.63	0.14	3%	0.14
9	2.83	0.03	1%	0.03
11	0.5	0.5	100%	0.5
12	0.21	0.21	100%	0.21
13	0.05	0.05	100%	0.05
14	0.19	0.19	100%	0.19
15	0.28	0.28	100%	0.28
16	0.05	0.05	100%	0.05
17	0.02	0.02	100%	0.02
18	**3.56**	**2.84**	**80%**	**3.56**
19	0.56	0.56	100%	0.56
20	0.57	0.57	100%	0.57
21	0.22	0.22	100%	0.22
22	0.06	0.06	100%	0.06
23	0.77	0.77	100%	0.77
24	0.14	0.14	100%	0.14
25	0.06	0.06	100%	0.06
26	0.02	0.02	100%	0.02
28	35.45	0.07	0.2%	0.07
35	0.67	0.67	100%	0.67
37	**5.73**	**4.11**	**72%**	**5.73**
40	0.03	0.03	100%	0.03
41	0.44	0.44	100%	0.44
44	3.08	0.26	8%	0.26
52	4.7	0.54	11%	0.54
53	0.6	0.6	100%	0.6
A1	4.66	0.59	13%	0.59
A12	**0.11**	**0.08**	**73%**	**0.11**
A5	0.03	0.03	100%	0.03
A6	0.16	0.16	100%	0.16
A7	0.3	0.3	100%	0.3
A8	0.38	0.38	100%	0.38
B11	0.18	0.18	100%	0.18
B12	0.78	0.07	9%	0.78
B14	0.78	0.78	100%	0.78
E2	0.04	0.04	100%	0.04
E3	0.06	0.06	100%	0.06
FW5	0.08	0.08	100%	0.08
FW6	0.07	0.07	100%	0.07
G2	0.02	0.02	100%	0.02
G3	0.06	0.06	100%	0.06
G4	0.04	0.04	100%	0.04
G5	0.87	0.87	100%	0.87
G7	0.5	0.5	100%	0.5
R1	**0.17**	**0.13**	**76%**	**0.17**

[7] Data taken from NRMP Table 2.1-1 and Table 3.1-1. Bold values exceed 70% loss of original acres.

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W1	0.1	0.1	100%	0.1
W2	0.24	0.24	100%	0.24
TOTAL	**75.05**	**18.25**	**24%**	**21.33**

Furthermore, the NRMP does not even attempt to account for the temporary impacts to these wetlands in addition to the permanent ones. The Wetland Functional Assessment lists each of these wetlands as sustaining temporary impacts as well as permanent ones.[8] Wetlands 18 and 37 are subjected to 0.93 acres of temporary impacts, including a temporary storm water pond located in Wetland 37. Temporary disturbance from construction activities are virtually inevitable in Wetlands R1 and A12, but the amount of area is not specified. The plain result is that of the 2.35 acres remaining between wetlands 18 and 37 after permanent impacts, 0.95 acres will be "temporarily" impacted by construction activities and the construction of a storm water management pond, leaving 1.4 acres of what was originally a 9.3-acre wetland complex. Arguing that the same functions present in a 9.3-acre wetland will proportionately scale down on a one to one ratio within a grossly reduced 1.4-acre wetland defies logic, ignores well-known objective features of wetlands, and significantly undermines the scientific credibility of the Port's analysis.

Classifying the construction zone around the embankment and wall and the construction of temporary storm water ponds within wetlands as only "temporary" impacts is misleading. While the Port has not revealed its timeline for use of these "temporary" ponds, it is probably at least several years judging from their function in the construction scheme. Furthermore, excavation and compaction activities that occur in constructing the temporary ponds will detrimentally affect soil characteristics and microorganisms that are fundamental to establishing wetland plants and a healthy and diverse wetland ecology. The life cycles of amphibians, mammals, and insects that historically used the wetland system will be disrupted, with the likely consequence of eliminating entire populations. The extensive delay encompassing initial impact, use during construction, and final restoration effectively eliminates habitat use of the area for a decade or more. Such cumulative disruptions to the system will likely be significant enough that new recruitment of species cannot occur. Impacts of this significance effect wetland ecosystem processes for decades.

It is my professional opinion that wetlands with greater than 70 percent of their area eliminated and subject to significant "temporary" construction related impacts are altered in ways that will affect their functionality for time scales on the order of 50 years. These wetlands should therefore be considered permanently impacted. If such wetland remnants are included in the calculations of permanent wetland impacts, it brings the total permanently impacted wetland acres from 18.25 (18.33 minus the 0.12 acres for off-site mitigation also included in Table 3-1.1 of the NRMP) to 21.33 acres, a significant and unmitigated increase.

Cumulative Effects Analysis

Part 230.11 (g) of the Section 404 Guidelines for implementing the Clean Water Act requires that cumulative effects attributable to the discharge of dredged or fill material in waters of the United States be predicted to the extent reasonable and practical. Cumulative impacts are the changes in an aquatic ecosystem attributable to the collective effect of a number of individual discharges of fill material. Although, on its own, the impact of a particular discharge may constitute a minor change, the cumulative effect of numerous such piecemeal changes can result in major impairment of water resources and interfere with the productivity and water quality of existing aquatic ecosystems. Thus, by definition, analysis of cumulative effects must consider impacts to wetlands on a larger scale than that of individual projects.

[8] Wetland Functional Assessment, December 2000, Table 4-5, p. 4-13.

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A list of impacts confined to individual activities, even if comprehensive, is not a substitute for analysis of their cumulative effects. Instead, cumulative impacts must be measured in an appropriate manner, depending on the resource management issues of concern. Typically, a planning area such as a watershed would be selected. A proper analysis identifies measurements of function, such as acres of wetlands, acres of uplands, and acres of contiguous habitat, for the pre-project and post-project conditions. Only such broad-scale metrics can give the required comprehensive picture of the outcome, a task for which descriptive lists necessarily fall short. These are generally recognized standard analytical methods for evaluating cumulative impacts.

For example, under existing conditions in Miller Creek basin, there remain approximately 300 acres of habitat (uplands and wetlands, not including lakes) in parcels either large enough by themselves, or sufficiently contiguous with Miller creek or other habitat areas, to provide measurable habitat functions. These lands constitute approximately six percent of the eight-square mile watershed.[9, 10] The Third Runway Project will *eliminate approximately 75 acres* of the existing wetland and upland habitat and proposes to replace it with 36.85 acres of upland habitat restored from land that is currently used as residential housing. The loss in uplands and wetlands resulting from the Third Runway Project will reduce the remaining functioning habitat area by approximately 13% and reduce the percentage of habitat within the entire basin to *five percent.*

An evaluation of the proportion of only wetlands eliminated within the watersheds (not including uplands) would be extremely important information in assessing adverse impacts particularly the loss of wetlands associated with or hydrologically connected to the creek systems. However, the Port has not provided the data required for such an evaluation, and I was unable to adequately estimate wetlands remaining in the basin from aerial photographs alone. Until these data can be presented and evaluated, it is impossible to assess fully the impact of wetland losses on primary productivity and its consequent effect on in-stream and downstream fisheries resources, including the estuarine habitat located at the outlet of Miller Creek that is frequented by Chinook salmon.

Similar metrics were prepared for the SeaTac International Airport (STIA) project area in order to assess localized impacts. The STIA project area located within the Miller and Walker Creek watersheds encompasses the central third of sub-basins appertaining to Miller Creek, and also includes the headwater and upper 25 percent of sub-basins belonging to Walker Creek. Within the area encompassed by these sub-basins, existing functioning habitat areas constitute about 242 acres in approximately 1650 acres of the Miller Creek drainage basin located within the STIA boundary.[11] Functioning habitat represents about 15 percent of the STIA project area under existing conditions. When completed, the area of functioning upland habitat in the STIA project area (assuming the enhancement activities are successful) will be limited to 10 percent. A five percent decrease in functioning habitat is a significant reduction, but in this instance is particularly egregious, as it is *fully a third* of the already reduced habitat that remains.

Table 2-1 of the Wetland Functional Assessment provides the number of acres of wetlands found within the SITA project area for the Miller and Des Moines Creek watersheds. Combining these data with data from Table 3.1-1 of the NRMP reveals that that 23 percent of the wetland acres found in the project area within the Miller Creek watershed and seven percent of those within Des Moines Creek watershed will be eliminated.

This analysis of cumulative affects is limited to the raw data provided in the mitigation plan documents and what I was able to estimate from aerial photos, but serves to illustrate the kind of

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[9] NRMP 2000 p. 2-7, Section 2.2.1.1

[10] These estimates of habitat area were calculated using 1997 aerial photographs of the watershed.

[11] See Figure 1 of the Supplement to the Biological Assessment etc. December 2000.

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metrics that are needed in order to fully evaluate the significant adverse impacts that are cumulative. Without such metrics, it is likely that the adversity of the impacts on the resource will be underestimated leaving no reasonable assurance of protecting public resources.

Even with limited data, this analysis reveals a net loss of habitat within the Miller Creek watershed. The Port's addition of upland buffer to the mitigation plan is not sufficient to offset the acres of habitat lost from development activities. The loss of wetlands in addition to the loss of uplands will permanently and significantly degrade a watershed that has limited remaining habitat areas. The enhancement proposals may be well meaning and might help improve some habitat remnants, but will not offset significantly the substantial area loss, particularly of wetlands. Permitting the proposal as it now stands would allow the "dead is dead" philosophy referred to in my August 16th comment letter to prevail.[12] This philosophy states that since certain natural resources have been degraded by human activities over time (in this case by urbanization and the construction of the existing airport), it makes sense to sacrifice those degraded systems to create other sites that are (theoretically) better protected. However, this philosophy is not consistent with the state of the existing habitat and wetlands at the STIA site or with the requirements of the Clean Water Act. The area in question is not dead: it is home to three creeks and attendant wetland systems which have, despite pressure from STIA, managed to maintain their viability and water quality sufficient to support resident and migrating salmon species. USACE and DOE are required to protect them under the Clean Water Act.

Are There Opportunities for In-Basin Mitigation?

It is fair to ask whether there are reasonable alternatives that would allow in-basin mitigation to prevent further degradation of the Miller Creek watershed. Port consultants have repeatedly argued that the threat of bird strikes renders in-basin mitigation unacceptable. However, a close reading of the Position Paper regarding Off-Airport Mitigation of Wetland Habitat Function and the analysis of mitigation site alternatives provided by Table 7.2-2 in the December 2000 NRMP, reveals significant confusion between bird species that pose a threat to aircraft and the species of birds that would actively use wetlands associated with Miller and Walker Creeks.

Avian species that threaten aircraft are primarily Canada geese and other waterfowl that use open landscapes adjacent to open water.[13] Managing the threat is largely a matter of removing their preferred habitat from the safety area. Wetlands can be constructed that discourage use by problematic species, as exemplified by the restoration goals of Vacca Farm. Forested and emergent habitat under a relatively closed canopy provide numerous critical wetland functions, including habitat for birds of species that do not cause safety concerns. In general, the bird strike hazards produced by locating created wetlands in sites 8 and 12 would not be significant if the wetlands were designed to avoid open landscapes with open water. It is unreasonable to eliminate in-basin wetland mitigation for bird-strike reasons, because there is sufficient knowledge of bird species requirements to manage the threat by appropriate wetland design. In addition, the elevation of the runway in relation to the mitigation sites would effectively eliminate as hazards many species that might use the wetlands but typically do not fly as high as the runway would be in relation to the wetlands.

Potential mitigation Sites 8 and 12, listed in Table 7.2-2 and shown on the map in Figure 7.2-3, of the NRMP comprise a total of 39 acres in the Miller Creek watershed. These sites are in-basin and adjacent to Miller creek. The table states that Site 8 is within the runway footprint, but the map in Figure 7.2-3 shows Site 8 to be located outside the runway footprint.

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[12] *Dead is Dead. -An Alternative Strategy for Urban Water Management*, Brian W. Mar, Urban Ecology, 5 (1980/1981), pp 103-112.
[13] *Wildlife Hazard Management Plan*, Section 3.4, Vegetation Management.

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In Table 7.2-2, the Port contends that both sites 8 and 12 are surrounded by roads on two sides and are therefore not suitable for a mitigation site. That assertion must be examined in context. In effect, the Port argues that it is more suitable to create "compensatory" wetlands completely outside the watershed with no hope of countering local environmental degradation than to create in-basin wetlands that may be more isolated, but provide locally key functions that prevent degradation within the watershed. This issue is particularly critical because at stake in the permitting process are many wetlands associated with salmon-bearing streams and located in watersheds where few wetlands remain.

Furthermore, the map in Figure 7.2-3 shows there are additional opportunities to provide upland habitat to buffer wetlands created within sites 8 and 12, using undeveloped land with greater than five percent slope, forested and unforested. By using sites 8 and 12 for creation of new wetlands, and adding upland buffers commensurate with the area of undeveloped upland being eliminated by the Third Runway Project, there is a far greater chance the project could be constructed without the significant adverse effects within the Miller Creek watershed that are inevitable under the current proposal. In addition, the project would help prevent the destruction of remnant natural sites within an area already significantly affected by development.[14]

Other Significant Concerns

1. Failure to Take Well-Established Wetlands Functions into Account

One particularly disconcerting void in the Port's evaluation of potentially significant alterations is the lack of discussion on the contribution of wetlands in the Miller and Des Moines creek watershed to primary productivity in the creek systems. Although approximately half of the wetland acres to be eliminated are ranked moderate-to-high for the function of organic export (see Figure 1), there is no discussion of the effect of that loss on the food webs of Miller and Des Moines creeks.

It is now universally accepted that wetlands are among the most productive ecosystems on the planet. The boundary zones (ecotones) between land and inland wetlands and streams are the principal routes for the transport of organic matter and nutrients within a watershed.[15] A *Carex* sedge meadow typically will produce three or more times the organic carbon than is produced by a woodland shrub land complex (1000 g C/m^3 versus 270).[16] The condition of plants growing in water or saturated soil provides a steady supply of water and nutrients that have the potential to support high productivity. The typically anoxic soil makes a suitable environment for nitrogen-fixing bacteria associated with the plant roots. As a result of these processes, wetland communities have a profound influence on the nutrient supply to natural waters.

The wetlands within the Miller and Des Moines Creek watersheds are extremely important because of their value for production of organic carbon and for their role in moderating nitrogen export. Reducing remaining wetlands within this watershed will alter the interception of nitrogen and increase the supply of nitrogen to the estuary at the mouth of the creeks. Since nitrogen is a limiting nutrient for phytoplankton production in coastal waters, the reduction of wetlands within the watershed could result in increased eutrophication in the shoreline environment. The reduction of wetland plants in the watershed would also reduce the volume of organic particulate matter that results from the death and partial decomposition of wetland plants. The extent of this effect will determine the degree to which the food web would shift from detritus consuming filter feeders to phytoplankton production.

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[14] 404 guidance Part 230.75.

[15] Hillbricht-Ilkowska, Phosphorus and Nitrogen Retention in Ecotones of Lowland Temperate Lakes and Rivers, HYDROBIOLOGIA, 1993, Vol. 251, No. 1-3.

[16] Barnes and Mann, Fundamentals of Aquatic Ecosystems. Tables 4.1 and 11.1.

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This shift could have enormous consequences for both resident fisheries as well as for species that use the lower reaches but are not resident, such as Chinook. This is because detrital food sources are essential to the development of invertebrate communities on which salmonid fish species feed. Reductions in the productive capacity of the riparian wetland systems are certain to affect fish production. [17]

Evaluation of loss of wetlands is also important because the Port claims the high levels of dissolved organic carbon (DOC) found in both Des Moines and Miller creeks will limit the biological availability of zinc and copper found in their storm water runoff, effectively reducing the toxicity of their stormwater to salmon.[18] DOC derives from the breakdown of detrital material by bacteria and fungi. The comparatively high levels of DOC found in Des Moines Creek and particularly the levels found in Miller Creek are very likely high because of the contribution of organic material from existing wetlands. It is noteworthy that although the Port's conclusion of no adverse effects to fish and other aquatic organisms from discharges of zinc and copper relies on the presence of high concentrations of dissolved carbon, there is no discussion about what constitutes the source of that carbon and how it will be maintained after the project is built. This is a truly a fundamental and revealing oversight because the DOC concentrations on which the Port depends to reduce the toxicity of zinc and copper in their stormwater discharges originates in the wetland systems they propose to degrade and eliminate.

The loss of wetlands will negatively affect fisheries resources. The loss of DOC in the system will affect the food web and will likely increase the bioavailability of toxic metals, especially in the Miller Creek system. Both of these alterations could have serious adverse impacts to resident and migratory Coho salmon and could affect the essential fish habitats for ESA listed Chinook salmon populations located at the mouths of Des Moines and Miller Creeks.

2. Ignoring Hydrologic Effects of Clearing

Borrow Sites 1, 3 and 4, located in the Des Moines Creek Basin at the south end of the STIA, are currently mostly undeveloped and covered by upland coniferous forest and wetland second-growth deciduous forest. These lands contribute to the headwater area of Des Moines Creek and constitute much of the forestland remaining in the basin. The proposed clearing and excavation of the borrow areas will significantly alter land cover, affecting infiltration, eliminating evapotranspiration and generally reducing the contribution of precipitation to groundwater. This will have a long-term effect of reducing seepage flows and diminishing base flows in Des Moines Creek. In addition the lining of the IWS system, although beneficial for preventing pollutant releases to groundwater, is likely to alter low flow conditions significantly in Des Moines Creek.[19]

Several wetlands are situated down gradient from Borrow Site 1, including 48, 32, B15, B12, and B4. The December 2000 NRMP Table 5.3-6 of performance standards for these wetlands states that water will be redirected to the wetlands in order to keep soils saturated to the surface from December to March or April in normal rainfall years. On what basis was this performance standard developed? Has the Port measured the existing hydroperiods of these wetlands? Is the performance standard proposing to match the existing conditions or is it intended to create new and improved hydroperiod conditions? No information is provided to answer these fundamental questions, and no detail is provided on the engineering methods to be used to extend and prolong the hydroperiod of wetlands that are currently fed by shallow groundwater.

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[17] *Dissolved Organic Material and Trophic Dynamics, R. S. Wotton, BioScience, Vol. 38, No. 3.*

[18] *Pacific Coast Salmon Essential Fish Habitat Assessment, P.4-8.*

[19] See Item 10 for additional information in comments made by Northwest Hydraulic Consultants dated February 15th, 2001.

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Moreover, even if water flow can be maintained to meet the performance standard, the standard is unlikely to have sufficient duration to preserve wetland functions. Uplands commonly retain saturated soils until March or April. Such a short water season is little guarantee that wetland functions will be preserved.

A similar situation is present near Borrow Site 3. The highest elevations of the site will be cleared and excavated leaving a 50-foot buffer around wetlands B10, 29, B9, 30, B7, B6, and B5. The performance standard requires that soils be saturated in Wetland 30 until May and that there be standing water in Wetland 30 from December until April. That is too narrow a window for successful amphibian breeding in many years, especially if temperatures are cooler than normal. Water must be provided until the middle of June to insure habitat is available for the entire breeding season.

The effective season for supporting aquatic dependant species requires water to be present through the second week in June. Without a more wetland-friendly performance standard, the activities within the Borrow Sites will adversely alter existing wetland functions, in addition to reducing base flows in Des Moines Creek.

3. Effects of Non-permitted Degradation

Impacts to wetlands have *already* occurred, in particular hydrologic and habitat isolation, in advance of the permit. In October 2000, I examined September 2000 aerial photographs of the Third Runway Project area to determine the extent of pre-permit construction activities. Several wetlands were at least partially surrounded by fill and construction activities. The resolution of the aerial photography was insufficient in many instances to determine whether a 50-foot buffer was left intact, but it was clear that several wetlands were completely or very nearly isolated by clearing and fill deposits.

These activities affected wetlands 12, 13 and 14, and R1, R2, and R4, which are associated wetlands to Miller Creek. Also affected by fill activities were wetlands 23, G3, 52, and 53. In addition, grading and fill activities were apparent within as little as 50 feet of the eastern lobes of wetlands W1, W2, 18, and 19.

Although in these instances a buffer of sorts exists, what remains does not constitute protection to a wetland when adjacent fill and clearing effectively isolate the wetland biologically and in all likelihood hydrologically. Moreover, it is likely that fill activities have continued since September, when the aerial photos were taken, resulting in further damage and isolation to the project area wetlands. These activities have reduced and continue to reduce the value of the wetlands, possibly eliminating normal functioning within these wetlands for decades. They appear to be activities that would require a permitting process, with prior review of the adverse environmental effects.

Even more flagrant is that forested habitats are being permanently removed that may affect listed endangered species prior to the completion of the ESA consultation for the project. At the very least, the Port's activities should be stopped before they do additional damage to Miller Creek's few remaining wetlands. Further, evaluation of the proposal should begin with the proposition that as a first step current damage from circumventing the permitting process must be reversed before approvals under the Clean Water Act are decided. Otherwise the baseline, which underlies the Port's application, will have been rendered false at the outset.

4. Contradictory Treatment of Seepage Flow Issues

In previous communications with Mr. Erik Stockdale, Wetland Specialist for the Department of Ecology, I discussed the issue of how seepage flows will continue to hydrate the wetlands located at the base of the MSE wall and embankment and expressed concerns regarding how the system will actually work. I pointed out several discrepancies between illustrations in the Appendices to the August 2000

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NRMP and the grading and drainage plans shown in the Stormwater Management Plan (SMP). He indicated that the inconsistencies would be discussed with Port consultants, and my understanding was that these inconsistencies would be remedied in the final documents.

Unfortunately, how seepage flows are to be captured and returned to the wetlands remains vague and inconsistent even in the December 2000 documents. *This is a significant issue.* The hydroperiod of a wetland affects its functions because it controls the input and output of nutrients and their availability for habitat.[20] Maintaining seepage flow hydrology to the wetlands located at the base of the wall and embankment is essential to their continued viability and highly challenging to engineer. If the Port cannot demonstrate how seepage flows can be successfully maintained, then the mitigation requirements must be substantially higher than proposed.

The Port had failed to provide sufficient information to ascertain what is being proposed, let alone whether the proposed discharge will comply with Section 404 guidelines. As an example, it is unclear how wetland hydrology will be maintained to Wetland 39 because Pond D is located such that it would intercept ground and surface water flows to Wetland 37. It is also unclear why a ditch will be located adjacent to the embankment wall within Wetland 37. As currently shown, it appears the ditch will capture seepage flows and carry them *away* from Wetland 37, rather than allow seepage flows to infiltrate to Wetland 37. This impression is not clarified in the NRMP or SMP discussions, which offer insufficient information to assess the outcome in conjunction with inconsistent information provided between the NRMP and the SMP. Additional detailed examples of similar inconsistencies are provided in comments submitted to you by Dyanne Sheldon.[21]

5. *Effect of MSE wall on microclimate variables in Miller Creek and adjacent remaining wetlands.*

There is no discussion in the documentation provided about the impact the MSE wall itself will have on remaining wetlands and Miller Creek. Due to the unprecedented size and mass, the wall could significantly alter temperatures in the remaining wetlands by producing an increase in shade effects during the morning, effectively shortening the growing day for many species. In contrast, late afternoon temperatures may rise significantly during sunny periods, should the wall capture heat and radiate it to adjacent aquatic habitats. This could result in significant alterations to the phenological development of plants, amphibians and insects using Miller Creek and associated wetlands. The cooler temperatures created by the wall from shading effects are likely to shift the emerging and breeding season later by a few weeks, which could put water dependent species that use the seasonal wetland habitats at greater risk. Higher summer temperatures could increase water temperatures in Miller Creek and adversely affect fish habitat and food web resources.

Review Comments Made in Previous Letters that Remain Unresolved

I commented on previous versions of the Port's documents on August 16th and September 1st of 2000. The majority of concerns expressed in those comment letters remain unresolved. The comment letters are important to understanding the background and context for this report and are included as attachments. The following are summaries of continuing issues:

1. The mitigation ratios for in-basin mitigation are exceedingly low, unrelated to the predicted losses, and are not even close to meeting Washington State Department of Ecology Guidelines. The mitigation package as proposed will inevitably produce a net loss of wetland functions within the Miller Creek watershed.

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[20] Wetland Ecosystems Studies From a Hydrologic Perspective, James W. La Baugh, Water Resources Bulletin, American Water Resources Association, Vol. 34, No. 6 1986.

[21] Dyanne Sheldon February 16th comments on Port of Seattle Reference No. 1996-4-02325.

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2. Use of a water resource inventory area (WRIA) as a pretext for allowing out-of-basin mitigation is scientifically indefensible from a resource management standpoint and inconsistent with the Clean Water Act and Section 404 guidelines. Further, the mitigation package proposed by the Port is not consistent with the intent and requirements of RCW 90.74.005 to 94.74.020, which specifies that mitigation outside the impacted area be completed in advance of impact and intends that it be timed, designed and located in a manner to provide equal or better biological functions and values when compared to traditional on-site, in-kind mitigation.[22]

3. The Port proposes to create open stormwater ponds that will likely attract undesired wildlife even while the Port refuses to create in-basin mitigation wetlands. In addition, the proposed remedial action of installing netting over the ponds creates a hazard to all wildlife. Stormwater ponds also tend to operate as ecological sinks, attracting animals, and depending on their management in relationship to water depths and temperature, are often death traps. There is no indication that these inconsistencies have been adequately addressed.

4. The wetland restoration planned for Vacca Farm continues to have significant problems, including the lack of habitat values, questionable removal of peat soils, and lack of adequate hydrology to maintain the system as a wetland. The excavation of the existing peat will provide little additional storage while removing highly valued wetland soils capable of storing water and releasing it at the end of the rainy season, one of the primary functions of a wetland. The peat soils provide important hydrologic support during the late spring and early summer for a period of several weeks.

Vacca Farm is designed such that the majority of the wetland will receive water only during extreme storm events such as a 100-year flood, effectively reducing the wetland's value for biological support. The wetland plan shows the wetland will be graded so that any water is quickly discharged via an approximately 200 foot wide shallow swale to Miller Creek. Therefore, although hummocks have been added to the December 2000 NRMP to provide more topographic relief in response to comments previously made, in the absence of adequate hydrology, such habitat measures are largely ineffective. The "restored" wetland will not convey water sufficient to maintain wetland functions. Moreover the redesigned Miller Creek Channel is unlikely to convey water from the Vacca Farm storage facility because the Port's plans reflect that the creek channel will be hydrologically disconnected from the peat soils by a geotextile liner, needed to hold the water in place.[23] This condition is described in additional detail in comments on the project made by Dyanne Sheldon.[24]

5. Secondary effects on the wetlands that are anticipated as a result of the construction include altered hydroperiods, altered substrate conditions due to construction activities, and possible water quality issues that may have significant adverse effects on life stages of aquatic life forms.

6. The plan provides no pre-project monitoring of wetland hydrology to provide data for measuring post project success. There are therefore no baseline data to compare against when determining whether hydrologic impacts to wetlands have occurred. Without these data, there is no basis for enforcing further mitigation or adapting management because there is no clear target defined for the post-construction condition. The Port has had years to collect the data. Their absence precludes approval of the application at this time.

7. The headwater of Walker Creek continues to be incorrectly and inconsistently reported. Map 14 and Image #14 of the December 2000 Wetland Delineation Report show correctly that there are three tributaries to the start of Walker Creek within Wetland 44. These constitute the headwater of Walker

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[22] Revised Code of Washington, RCW 90.74.005 to 90.74.020 is located in Title 90 Water Rights-Environment.
[23] NRMP Appendices A-E, Sheet STIA-9805-C5.
[24] Dyanne Sheldon, February 16th comments on Seattle, Port of, 1996-4-02325

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Creek, which begins east of SR509 in Wetland 44. The tributaries are seasonal seeps in the upslope areas, one of which is located east of 12th Avenue South. From there, Walker Creek travels west through a culvert crossing under SR509 to Wetland 43.

Although the correct information is available in the wetland delineation report, maps of the area in the NRMP shows the headwater of Walker Creek as the outlet of Wetland 43, and the text contained in Section 4.3.2.11 of the Wetland Functional Assessment and Impact Analysis (December 2000) repeats this misrepresentation. The report incorrectly states, "There are no perennial 'headwater seeps' that provide significant base flow to Walker Creek in the area where the embankment fill impacts Wetland 44." In fact, both Map 14 and Image #14 clearly show three tributaries to Walker Creek. Two of them become one perennial stream within the location of the embankment fill. Figure 5a shows the delineated boundary of Wetland 44 presented in Map 14 of the NRMP. Next to it, Figure 5b shows a map of the runway embankment footprint, as shown in Figure 3.1-1 of the NRMP, overlaid on Figure 5a. It shows that the southern-most tributaries are scheduled to be under the embankment fill.

In a previous version of the NRMP (August 1999), Map 10 of the Wetlands Atlas shows Walker Creek originating from the culvert under SR509 and flowing west and northwest until it disappears in under the wetland vegetation (provided in Figure 6a). Curiously, this creek channel, which actually exists, is not shown in the December 2000 Wetland Delineation Report map of Wetland 43 (provided in Figure 6b). This conceals the facts that the embankment construction will fill a portion of the headwaters of Walker Creek and that significant disturbance will occur within the remainder of the headwater wetland from construction activities. This serious harm to the headwater of Des Moines Creek hidden in contradictory reports subverts the permit review process.

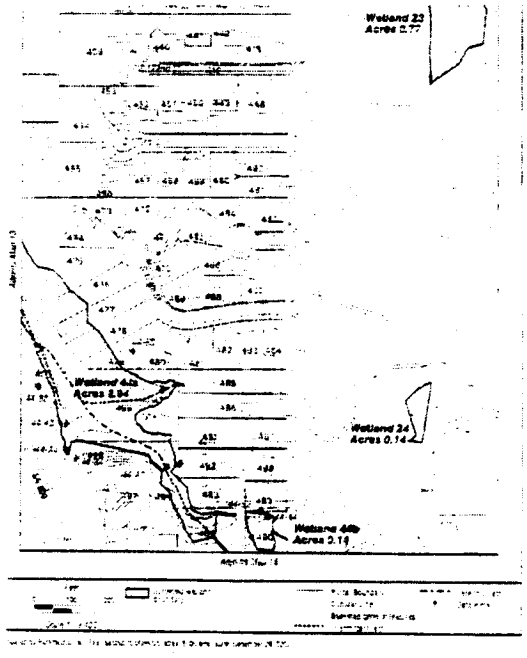

Figure 5a. Wetland 44 boundaries.

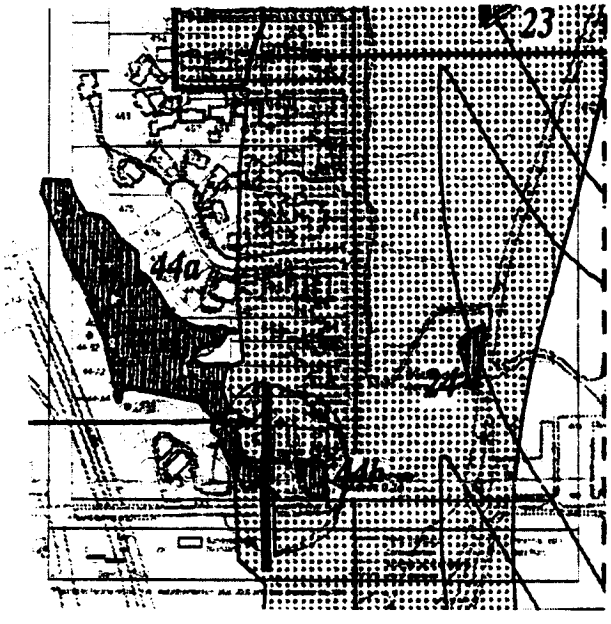

Figure 5b. Embankment footprint in relation to Wetland 44 boundaries.

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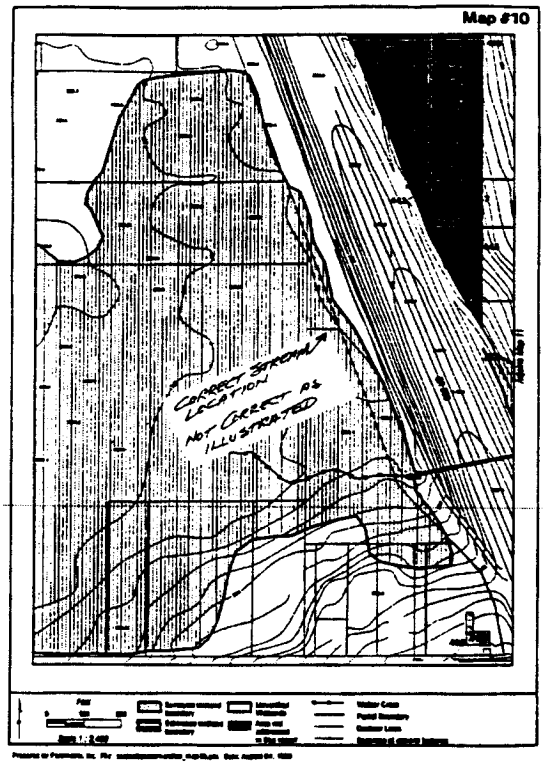

Figure 6a. Map 10 from August 1999 NRMP shows Walker creek channel.

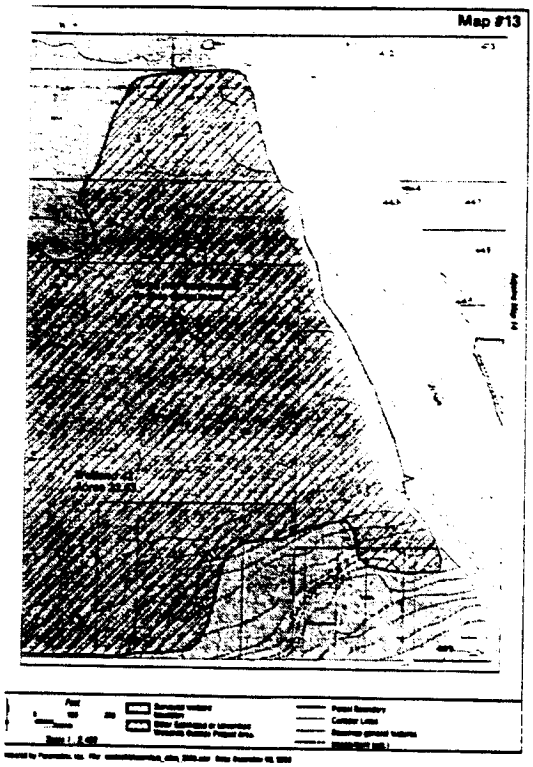

Figure 6b. Map 13 from December 2000 NRMP shows no creek channel.

The NRMP states that the stormwater system of SR509 is the headwater to Walker Creek because of its contribution to Walker Creek flows.[25] Although stormwater flows from SR509 may substantially increase Walker Creek, they cannot accurately be construed as the creek headwaters. The landscape position of Wetland 44 in relationship to 43, the presence of a clearly defined channel, and the perennial stream flows cited in the descriptions of Wetland 44 are clear evidence that Walker Creek's headwater is located in Wetland 44 and not in Wetland 43.

Tributary flow volume is an unusual definition of a headwater. Although there are different ways to define a headwater, the generally accepted definition is that a headwater is defined by the furthest upstream tributary (from the mouth) that has a perennial flow. Using this more appropriate definition, Wetland 44 and its tributaries comprise the Walker Creek's headwater. Headwater wetlands and tributary seeps have an important ecologic and hydrologic role in maintaining function in a creek system and are protected for that reason. Filling a headwater wetland will alter a stream's condition profoundly. The runway embankment fill will negatively affect the Walker Creek system by filling the upland seeps and portions of the wetland that comprise Walker Creek's true headwater.

Summary

The proposed fill activities in wetlands simply do not comply with Part 230 of the Section 404 Guidelines, nor do they preserve water quality in the Miller and Des Moines Creek systems. They are likely to result in significant degradation of the aquatic ecosystem under Part 230.10(b). The proposed

[25] Wetlands Functional Assessment, p. 4-64.

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project does not include all appropriate and practicable measures to minimize potential harm to the aquatic ecosystem. Moreover, in several key areas, there is insufficient information to support the claim that the proposed discharges will comply with Section 404 approval requirements. These shortcomings include no analysis of cumulative effects, no clear proposal of how to maintain hydrology to remaining wetlands, and no analysis of the impact the loss of the critical remaining wetlands in the Miller and Des Moines Creek watersheds will have on water quality and fisheries resources. Finally, the proposal ignores practicable in-basin mitigation alternatives that would likely have much less adverse impact on the affected aquatic ecosystems.

Thank you for your time spent in reviewing this material. Please call me or email me if you have any questions or comments.

Sincerely,

Amanda Azous

Attachments:

Azous Environmental Sciences Comment Letters Dated:
A. August 16, 2000
B. September 1, 2000
C. Vita: Amanda Azous

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February 15, 2001

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Regulatory Branch
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Seattle, Washington 98124-2255
ATTN: Jonathan Freedman, Project Manager

Washington State Department of Ecology
Shorelands and Environmental Assistance Program
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ATTN: Ann Kenny, Environmental Specialist

Subject: Comments on stormwater, hydrology, and hydraulics aspects of proposed 3rd runway and related development actions at Seattle-Tacoma International Airport, Corps Reference No. 1996-4-02325.

Northwest Hydraulic Consultants has been retained on behalf of the Airport Communities Coalition to provide technical reviews of stormwater, hydrology, and hydraulics elements of proposed development actions at SeaTac airport. Our comments on the November 1999 version of the project stormwater management plan and related environmental documents were submitted to Ecology and the Corps in a series of three letters dated 11/24/99, 5/3/2000, and 7/31/2000. Our comments on the August 2000 version of the stormwater management plan were submitted to Ecology (but not the Corps) in a series of four letters dated 9/7/2000, 9/21/2000, 9/25/2000, and 9/27/2000. The purpose of this letter is to record our review comments on the December 2000 version of the documents listed below.

- "Comprehensive Stormwater Management Plan; Seattle-Tacoma International Airport Master Plan Update Improvements" dated December 2000 by Parametrix, Inc. Also reviewed were the separately-bound (as Volumes 2 through 4) Comprehensive Stormwater Management Plan Appendices A through Z dated December 2000. (SMP)

- "Natural Resource Mitigation Plan; Seattle-Tacoma International Airport; Master Plan Update Improvements" dated December 2000 by Parametrix, Inc. Also reviewed were the separately-bound Natural Resource Mitigation Plan Appendices A-E Design Drawings dated December 2000. (NRMP)

- "Wetland Functional Assessment and Impact Analysis: Master Plan Update Improvements; Seattle-Tacoma International Airport" dated December 2000 by Parametrix, Inc. (WFA)

Our qualifications to perform this review were described in our letter of November 24, 1999, and are repeated here. Mr. Rozeboom has over 20 years of specialized experience in surface water hydrology and hydraulics, including over 6 years as principal reviewer of all Master Drainage Plan, Stormwater Management Plan, and Storm Drainage Technical Information Report documents for the 1,300-acre Snoqualmie Ridge project currently under construction in the city of Snoqualmie. The Snoqualmie Ridge project is similar to the 3rd runway project in that it is a large site development which is subject to the requirements of the Washington State Department of Ecology Stormwater Management Manual and the King County Surface Water Design Manual (KCSWDM). Dr. Leytham has over 20 years of specialized experience in surface water hydrology and hydraulics, including serving as technical advisor to King County on flow control aspects of the 1990 and 1998 versions of the KCSWDM. Dr. Leytham was also responsible in 1990 for the original development of the Miller Creek basin HSPF simulation model which has since been modified by others for purposes of 3rd runway impact assessments and facility designs. Vitae for Mr. Rozeboom and Dr. Leytham are attached for reference.

Our review of the current Stormwater Management Plan and related documents has identified numerous technical deficiencies in the analyses and preliminary designs which present a risk of significant adverse impacts to the natural stream and wetland systems if the current documents are approved as a basis for mitigation of project impacts. The risk of adverse impacts is heightened by uncertainty over what performance standards will be eventually negotiated and applied for the final design of stormwater facilities, and the absence of a process for regulatory review of final drainage design plans for this large and complex project.

Our comments follow.

1. There is no clear and consistent definition of stormwater control standards to which the Port has committed to adhere. Although the SMP describes storm water control standards and target flow regimes at some length in Chapter 2 of the SMP, the standards discussed appear to still be under negotiation with Ecology. Ecology's current proposal to modify the NPDES permit[1] for SeaTac International Airport would extend permit coverage to stormwater discharges associated with the Third Runway and Master Plan Update projects. However, in the draft of the modified permit, project stormwater detention requirements are specified in Special Condition S14 as, "*All construction actions taken by the Permittee shall provide sufficient detention and/or shall use existing available detention capacity, in accordance with the Stormwater Management Manual for the Puget Sound Basin or its approved equivalent, to prevent an increase in the peak flow rate or flooding frequency of Miller Creek and Des Moines Creek.*" The problem with this language in the draft permit is that it specifies (requires?) a stormwater standard for the Third Runway and Master Plan Update

[1]Ecology held a February 12, 2001 public hearing on the proposed modification to NPDES Permit No. WA-002465-1. The deadline for written comments on the proposed modification is February 26, 2001, which is 10 days after the deadline for public comments on the Section 404 Permit application for the same project.

projects which is less stringent than the SMP "updated" detention standards (SMP section 2.1.4) sought by others at Ecology as a condition of Section 401 Certification for those same projects. The December 2000 SMP (page 6-3) indicates that "*the hydraulic design of the facilities will be reevaluated and detention volumes adjusted as appropriate to ensure that the Port's stormwater management standards are met.*" However, the "Port's stormwater standards" appear to be defined by the SMP (page 2-1) as being "in the King County and Ecology Manuals" and those manuals do not describe or require the "updated" detention requirements found in SMP Section 2.1.4. These inconsistencies in proposed standards are of concern and lead us to question whether the Port will implement designs per the updated standards cited in the current SMP or is anticipating future negotiations which will allow the facilities to be reevaluated and detention volumes to be reduced per the less stringent standards in the King County Manual or as required by the NPDES permit.

2. The lack of detailed stormwater plans, plus the lack of a clearly-defined review process for this very complex project, makes it likely that post-SMP detailed engineering and revisions to stormwater facility designs will fail to meet Ecology and King County performance expectations. The recent history for this project, particularly the major flaws in both the November 1999 and August 2000 versions of the project SMP, highlights the need for an independent design review to supplement the Port's quality assurance and review processes. Lack of an established review process is a very major concern given that the current SMP does not establish exactly what facilities and hydraulic controls will be constructed.

   Stormwater drainage regulations for the project site are defined by the King County Surface Water Design Manual (KCSWDM) as adopted by the city of SeaTac. The KCSWDM begins (Chapter 1) by describing the drainage review procedures necessary to implement the King County surface water policies and to ensure compliance with the manual's technical requirements. However, the Port has consistently claimed to be exempt from the KCSWDM drainage review requirements as well as all other KCSWDM "procedural" requirements[2]. The proposed project will have a long timeline and there will likely be a need for design adjustments to address unanticipated conditions which arise in the future. Without explicit descriptions in the SMP of the facilities and hydraulic controls to be constructed, plus certainty of ongoing, independent, competent review, there can be no reasonable assurance of project compliance with either King County surface water policies or Ecology conditions of approval for Section 401 Certification.

3. KCSWDM Core Requirement 7: Financial Guarantees and Liability. (Similar to Ecology's Minimum Requirement #11.) The objective of this "procedural" core requirement is to ensure that development projects have adequate financial resources to fully implement the stormwater management plan and that liability is not unduly incurred by local governments. The present SMP does not address the costs of the proposed improvements or offer any financial guarantees. Using costs presented in SMP Appendix M, a single 12.6 acre-foot

[2]Procedural issues were previously raised in our comment letter dated November 24, 1999. The Port's response to those comments, in a "Response to 401/404 comments" document dated March 10, 2000, stated that the Port's Interlocal Agreement with the City of SeaTac includes an exemption from "specific County permitting procedures." In the same document, the Port response to our comment on drainage review requirements begins with the statement, "This comment refers to a procedural process that the Port is not obligated to follow."

vault for water quality treatment would cost $7,258,675 or about $13 per cubic foot. SMP page 6-5 shows that a total of 207.2 acre-feet of stormwater vaults are proposed. At $13/cubic foot, the proposed stormwater vaults alone would cost over $117,000,000. The SMP does not address or satisfy the applicable King County and Ecology requirements for financial guarantees, and provides no assurance of sufficient funding to construct the facilities being proposed.

The importance of costs and financing is also cited in a letter report dated November 10, 1999 to the US Army Corps of Engineers by Keith Macdonald, Ph.D., of CH2M Hill, who was hired by the Port to "prepare an objective, independent, peer review of the natural resources mitigation program" for the proposed Master Plan Update Improvements. Dr. Macdonald states that "Obviously, the success of the mitigation depends on the effectiveness of implementation and monitoring. . .It is critical that sufficient guaranteed funding be available. . ."

4. Sizing of stormwater facilities has relied on unsupported assumptions regarding future Industrial Wastewater System (IWS) capacity for processing airport runoff without overflows to the natural creek systems. If these assumptions are not achieved, the stormwater facilities proposed in the SMP may be undersized. The core questions are whether the IWS storage lagoons can be significantly expanded as has been proposed[3], and what future processing rate can be achieved. SMP page 7-15 indicates a requirement for AKART (all known available and reasonable methods of treatment) recommendations for handling of IWS flows to be fully implemented by June 2004, and that the recommended alternative is for IWS treated effluent to be discharged to a King County DNR facility at Renton. An important implication of this AKART requirement is that the current IWS configuration and capacity discussed in the SMP (Section 4.2.2.2) may be largely irrelevant to the future IWS configuration and capacity. According to the SMP, negotiations are ongoing for determining (future) IWS pre-treatment standards, flow limits and timing and other issues. The Storm Drain System (SDS) is being sized to accommodate year 2006 conditions and therefore needs to be compatible with the year 2006 IWS system which meets AKART requirements.

Proposed lagoon expansion is incompatible with safe airport operations. The FAA has published guidelines in Advisory Circular 150/5200-33 dated 5/1/97, titled "Hazardous Wildlife Attractants on or Near Airports." The proposed expansion of IWS Lagoon 3 falls under the Advisory Circular's definition of a wastewater treatment facility (definitions are given by SMP page 4-7). Section 2 of the Advisory Circular, "Land Uses that are Incompatible with Safe Airport Operations" recommends that any new wastewater treatment facilities or associated settling ponds be sited no closer than 10,000 feet from turbine aircraft movement areas. The existing third lagoon is located within 2,000 feet of the runway, and the proposed new expansion area is within 3,000 feet of the runway. The proposed expansion of the lagoon facilities, as assumed for purposes of SMP facility design, appears

[3]SMP Table 4-5 shows that the proposed expansion of IWS Lagoon 3 will add about 145 acre-feet of total storage. This significant volume is equal to about 45% of all other new stormwater storage volume proposed per SMP Table 6-2.

to be in direct conflict with these FAA guidelines which have been applied elsewhere in the project to preclude on-site mitigation for loss of wetlands.

Feasibility of proposed IWS discharge rate is not established. The future processing rate to be achieved by the IWS system is a variable which has yet to be designed and/or negotiated. Based on system performance predictions in the latest IWS design report[4], it is clear that consideration is being given to a processing rate which is substantially less than the 2.4 to 4 MGD treatment rates examined in the SMP (Table 4-2).

The IWS storage volumes which are assumed in the SMP presume that Lagoon 3 will be expanded from its current volume of 26 MG to a future volume of 72 MG. That future volume is not proposed or described in the IWS design report. Instead, the design report (page D-1) indicates that the required lagoon size is dependent on the available release rate--a 47 MG lagoon would be required for a release rate of 4 MGD while a larger 67 MG lagoon would be required for a release rate of 2 MGD. The report does not indicate what release rate would be associated with a 72 MG lagoon. The proposed expansion to 72 MG is understood to have been established as simply "the maximum possible capacity within the available area[5]."

The IWS design report provides information to suggest that there are benefits to having a lower processing rate. The report (page 4-4, Alternative A3) cites a major cost incentive for having a reduced IWS processing rate of 1 MGD in that effluent "can be metered to KCDNR at a controlled rate during off-peak hours, which is an operating benefit to KCDNR and a cost savings to the Port. . . the annual operating costs are approximately half of Alternative A1[6]: $2.9 million versus $5.8 million." The IWS design report however does not identify what size of lagoon would be required, for a 1 MGD processing rate, to prevent overflows into the SDS or directly into Des Moines Creek.

Due to an apparent conflict with FAA guidelines, it is uncertain whether the IWS lagoon capacity can be significantly expanded as has been assumed. Because of the unknown outcome of future negotiations between the Port and King County DNR, it is uncertain what future IWS release rates will be permitted, and whether any emergency/flood-event restrictions might be imposed on IWS releases[7]. These uncertainties are problematic for

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[4]" Addendum to IWS Engineering Report" dated April 1998 by Kennedy/Jenks Consultants.

[5]Information provided by email from Ecology (Chung Yee), with reference to a letter dated November 10, 1999, from Michael D. Feldman of the Port to Kevin Fitzpatrick of Ecology.

[6]Alternative A1 involves enlarging Lagoon 3 to 47 MG and discharging 4 MGD to King County. Disadvantages to Alternative A1 include :" Very high annual operating costs for the first 20 years. . ." and " A new pretreatment permit with KCDNR must be obtained and complied with."

[7]Other documents obtained for review purposes (not part of the SMP) included sizing calculations for Lagoon #3 dated February 2000 by Kennedy/Jenks Consultants. That document discussed several "additional considerations" to support construction of a lagoon with more storage volume, including: "Downstream system owners may prohibit IWS flows from being released during high-flow events."

ensuring the adequacy of the proposed stormwater system because IWS capacity has a direct impact on the size of required stormwater facilities, yet the IWS system is being designed and permitted through processes which appear to be largely independent of the design and review processes for stormwater system planning. In the presence of these uncertainties, there can be no reasonable assurance that water quality standards will be met.

5. Problems similar to those resulting from SDS-IWS interdependence above are also found in a need for coordination between SDS facilities and low flow augmentation facilities. Specifically, a new proposal for reserve storage to augment low streamflows appears to have been added at the SMP at the last minute. SMP page 6-6 references "managed release of stormwater from reserved storage" but the summaries of stormwater facility volumes (SMP Table 6-2 and equivalent tables in other documents) do not contain any allowance for "reserved storage." The SMP is internally inconsistent in that the SMP page 6-6 list of factors which would mitigate low flow impacts fails to include the proposal from SMP page 6-10 that water for low flow augmentation will come from a well within the Tyee Valley Golf Course. Significant problems with SMP underestimation of low flow impacts and overestimation of mitigating factors are identified in other comments later in this letter. This comment focuses mostly on the unaddressed practical challenges of adding reserve storage capabilities to already-large stormwater facilities.

Under the current proposal for streamflow augmentation (from the Low Streamflow Analysis, pg 15), the Port will construct "additional storage volume in the base of selected detention facilities" to store winter season runoff until needed to support low flows during the dry season. The Low Streamflow Analysis (pg 20) further indicates that about 16.0 acre-feet of reserve storage would be required to mitigate for estimated low flow impacts. (In other comments we describe why low flow impacts have been underestimated.) Several of the proposed detention facility exhibits presented in SMP Appendix D do have some "dead storage" capacity for reserve storm water release, but the total storage (based on spot checks) appears to fall short of the target amounts. There is no tabulation on the exhibits or elsewhere of how much stormwater reserve is to be provided in total or at each facility: our spot checks required estimation of volumes from facility dimensions. A check of Vault G1 (Exhibit C151) found that the design detention volume (9.2 acre-feet) would not be available given the facility dimensions and the depth of water being allocated to dead storage. Operation of these facilities may be impractical as now configured. For example, a valve box to control reserve releases from Vault G1 would need to be either buried at about 35 feet depth (hard to operate) for runway-grade access or, for a more reasonable shallow depth, the valve box would need to be accessed and operated from a difficult-access ledge on the embankment terrace. The deepening of the vaults to provide reserve storage has caused some vaults to exceed King County maximum cover requirements and will necessitate special designs to ensure structural integrity. The reserve (dead) storage layer at the base of the detention facilities function will accumulate and concentrate settleable solids and particulate-based pollutants from the airport stormwater runoff; that "dead storage" water would later be released under very low-flow conditions with little or no opportunity for dilution of any concentrated pollutants. There is also a potential for development of anaerobic conditions in the dead storage zone which would further worsen the quality of the

"reserved" water. Our point is that the "reserve stormwater" plans are new to the SMP design/review process. They are at a highly preliminary stage of development and require significant further work prior to a detailed design review which could offer any assurance that the plans are feasible or capable of providing useful low-flow mitigation.

6. While it appears that many of the gross inconsistencies in previous HSPF models have been resolved, we remain surprised by the lack of checks on the hydrologic simulation results and lack of effort to explore apparent data irregularities. This comment focuses on calibration deficiencies for Des Moines Creek.

The hydrologic model calibration report for Des Moines Creek indicates (SMP pages B1-13 and B1-14) that model results under-simulate recorded base flows at both of the upper-basin gages used for model calibration. The justification offered for under-simulation of inflows at Tyee Pond is a speculative "*it seems unlikely that enough rainfall can get into groundwater to support 0.35 base flow*" and a presumption that the stream should be gaining water in its lower reaches. The explanation offered for under-simulation of flows at the SDS3 outfall is that "*it is unknown what phenomenon could produce this base flow. One explanation is that the flow monitoring device will not register zero flow.*" In our opinion, further efforts should be made to evaluate the reliability of the available data. In the case of the SDS3 gage, we are unaware of any flow monitoring devices which, properly installed and maintained, would fail to register zero flow. Failure to register zero flow, if true, could reflect a problem with the gage and should be explored to determine if there are also problems with the high-flow data being reported from the gage. Given the questions over low flow calibration for both the East Branch (Tyee Pond) and West Branch (SDS3) tributaries to Des Moines Creek, the model results should be checked against the low flow data which are available for King County Gage 11F, Tyee Weir, below the confluence of these headwater streams. The calibration report does include one plot of peak daily flows at a "Golf Weir" but we could not locate any discussion of those results.

There are inconsistencies and problems with the Des Moines Creek model treatment of area groundwater conditions represented by Figure B1-3. The calibration report text (pg B1-10) indicates inflow of groundwater from 1,240 acres of area which is noncontiguous with the surface watershed; this is inconsistent with the model input sequence which has only 512 acres. Also, our independent measurement of the Des Moines Creek noncontiguous area (per Figure B1-3) yielded about 850 acres of total area. Another groundwater-related problem with calibration is that it has overlooked possible stream losses to groundwater in the lower part of the basin. Figure B1-3 groundwater mapping shows that the Des Moines Creek below about elevation 200 feet does not intersect the regional groundwater table. This transition area corresponds roughly to the location of a knickpoint described in SMP page P-2 where the Des Moines Creek channel gradient increases and where bed sediments change from fine grained materials to relatively coarse materials with boulders, cobbles, gravel, and fine sand. Considering the evidence of the streamflow data, it seems likely that the lower part of Des Moines Creek includes a "losing reach" which has cut through the perching layer which supports the regional shallow groundwater table. The physical condition of a losing reach would be consistent with streamflow data at the mouth which show unexpectedly low

flow peaks and volumes relative to streamflow data for the headwater areas. It is possible that the "poor calibration" problems described by SMP page B1-13, and the difficulty in reconciling measured flows at the upper and lower gages, could be rectified if the presence of a losing reach were confirmed.

We recognize that model calibration is a challenging process and that data reliability is often an issue. However, because the purpose of this work is to address and mitigate conditions in the upper basin (airport) areas of the watershed, calibration efforts should place more emphasis on matching upper basin flows unless those data are confirmed to be unreliable. The current calibration effort is deficient because it has placed too much emphasis on matching conditions at the lower gage, and has prematurely discounted the more-important upper basin data.

7. In our letter of Sept 21, 2000, we pointed out that the modeling had not made any use of King County stream gage 42C which measures flows in Tributary 0371A (a.k.a. Walker Creek) near 281 S 171st Place, a short distance downstream from the Walker Creek wetland. That gage provides direct information on flows in the headwater reach of this stream below the area of the proposed 3rd runway, and is more meaningful than the lower gage near the mouth for calibrating a streamflow model which is intended to examine streamflow effects of the 3rd runway. However, in the December 2000 SMP, there is again no mention or use of the available stream gage data for upper Walker Creek. The calibration is deficient for its failure to use this readily available streamflow data.

8. The Walker Creek calibration for low flows was achieved with a model adjustment which appears to be inconsistent with actual basin characteristics. In order to simulate flow volumes (and low flows), the Walker Creek model (SMP page B2-51) has included groundwater flows from 630 acres of till grass lands located in the (surface topography) Des Moines Creek basin, based on groundwater mapping shown by SMP Figure B2-23. However, our review of the same groundwater mapping does not show support for this acreage. We have measured the identified "Noncontiguous Walker Creek groundwater area" to be only about 690 acres in total, before adjustment for impervious surfaces. From Figure 2-1 and aerial photos, probably about one half of that total area consists of impervious surfaces which should be collected in either the IWS or other piped storm drain system and should not be available for groundwater recharge. These data checks indicate that the groundwater recharge area required (630 acres) to balance the measured Walker Creek flows is much greater than the available groundwater recharge area (about 350 acres) indicated by the available mapping. We do not know if the difficulty in simulating sufficient flow volume in Walker Creek is related to apparently similar problems in reproducing recorded flow volumes in the upper Des Moines Creek basin.

It is possible that base flows in the model calibration period have been supported in part by leakage from the IWS conveyance system and by seepage from unlined IWS lagoons. It is also possible, although more speculative, that irrigation runoff from the golf course may be influencing the base flows. It is difficult to provide any reasonable assurance of appropriate

mitigation for airport impacts on stream base flows, or seepage flows to wetlands, when the source of those flows is so poorly understood.

9. The SMP model calibration of airport fill parameters appears to be biased towards parameters which understate the hydrologic flashiness of the fill which is being placed. Airport fill calibration is described in SMP (Appendix) page A-16; calibration results are plotted on page 4 of Attachment B to that appendix. The calibration data show that the model does a good job of representing average flows, but does not cover the full range of flows which were measured during the calibration period.[8]. Peak flows are consistently (in 5 out of 6 events) underestimated, and low flows are consistently overestimated (by about 0.03 cfs from the 20-acre fill site being assessed). One consequence of these calibration results is that stormwater detention facilities might be slightly undersized. A second consequence of these calibration results is that any assessment of runway fill impacts on base flows, using HSPF modeling with these calibration parameters, might underestimate actual base flow impacts.

10. The SMP and related documents fail to consider the impacts to low flows in Des Moines Creek and Walker Creek which will result from recent lagoon lining improvements to the IWS system. The IWS has a direct significant impact on seepage and base flows in the Walker and Des Moines Creek systems by its removal of large areas of basin which would naturally form the headwater recharge areas for those streams. Until recently, the effects of these diversions have been partially offset by infiltration recharge to groundwater from the three IWS storage lagoons which are located near the groundwater divide between Walker and Des Moines Creeks.

    Our source of information on the history and status of the IWS system is a recent hydrogeologic study by Associated Earth Sciences, Inc., "Hydrogeologic Study, Industrial Waste System (IWS) Plant and Lagoons, Seattle Tacoma International Airport," prepared for Port of Seattle, June 21, 2000. Lagoon 1 has been used to store wastewater since 1965. Lagoon 2 was built in 1972 and "is utilized during times of heavy rainfall events." Lagoon 3 was constructed in 1979 and "is used to provide excess storage capacity for industrial wastewater in the event that Lagoons 1 and 2 reach capacity." The bottoms of the lagoons most regularly in service - Lagoons 1 and 2 - were reportedly "composed of compacted gravelly sand" which should have a relatively high infiltration capacity. A program to install leak prevention liner systems in the lagoons has been underway since 1996: Lagoon 1 was lined in 1996, Lagoon 2 was lined in 1997, and construction documents have been prepared for Lagoon 3 to be lined in the near future. The flow augmentation recommendations in the 1997 Des Moines Creek Basin Plan were likely based on data which did not reflect impacts of the lagoon linings. Our point is that airport impacts to stream base flows, as well as mitigation needs, have likely been underestimated because they have not considered the effect of lining these lagoons.

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[8]Calibration period was for 25 days in February 1999. According to NOAA-published rainfall data, SeaTac airport recorded approximately 5.6 inches during this period.

11. The SMP and related documents fail to consider the additional adverse impacts to streamflows in Des Moines Creek which will result from the proposed development of Borrow Areas 1, 3, and 4 as a source of 6.7 million cubic yards of fill for the 3rd runway. Information on the proposed borrow area development is found in the Appendices C and D of the Port's December 2000 Wetland Functional Assessment and Impact Analysis,[9] and in Ecology's June 2000 Sea-Tac Runway Hydrologic Studies Report by Pacific Groundwater Group (PGG). The three borrow area sites have a combined area of approximately 217 acres and are proposed to be mined to depths as great as 100 feet below existing grade. The material to be excavated is described as glacially-deposited, slightly silty to silty sands and gravels (outwash soils).

Airphotos of the airport vicinity show that the existing land use at the borrow areas is primarily forest. Land use for these areas (a.k.a. South Borrow Area, Onsite Borrow Source Areas 1-4) is further described in the project 1996 FEIS Appendix M, pages M-2 and M-3 as "Both upland and wetland second-growth deciduous forest are prevalent components of the South Borrow Area" and "Upland coniferous forest is found in the northwest corner of the South Borrow Area."

[9] Appendix C is a Hart Crowser memorandum dated December 8, 2000 regarding "Third Runway Project; Borrow Areas 1, 3, and 4; Projected Impacts to Wetlands." Appendix D is a Hart Crowser memorandum dated October 20, 2000 regarding "Sea-Tac Third Runway - Borrow Area 3 Preservation of Wetlands."

Development (excavation) of the borrow areas will eliminate most of the remaining forest[10] in the headwater areas of Des Moines Creek. There will be several impacts to streamflows in Des Moines Creek as a result of physical impacts of the excavation work. First, the cutting of the forest and stripping the land of forest duff and organic soils will produced increased runoff volumes as well as increased peak flows. Second, depending on the eventual site grading and soils, infiltration and groundwater recharge may be reduced relative to the current forested condition. Third, summer base flows in Des Moines Creek can be expected to be impaired due to lost flow attenuation capacity, just as summer base flows impacts in Miller Creek are expected to be moderated somewhat by flow attenuation effects in the embankment fill. Finally, base flow contributions to Des Moines Creek from the borrow areas could be significantly affected if the excavations should strip away outwash materials to leave a surface exposure of till soils or if excavations should penetrate any groundwater perching horizons.

PGG Figure 4-2 shows a cross section for Borrow Area 1. Surface geology consists of a 5- to 25-foot depth of (permeable) recessional soils overlying a (relatively impermeable) till layer which is typically about 30 feet thick. Under current conditions, very little surface runoff would be expected. Precipitation in excess of the amount consumed by forest evaporation and transpiration would infiltrate through the recessional soils, encounter the till perching layer, and gradually seep laterally to provide seepage/base flow to Des Moines Creek. Grading and excavation will cause both the forest and the recessional soils to be removed from this area. The remaining (newly-exposed) surface geology will instead consist of till which will generate relatively large surface discharges (high peak flows) and relatively little seepage or base flow. Long term impacts will also be influenced by undetermined site restoration activities or conversion to non-forest land use.

PGG Figure 4-3 shows a cross section for Borrow Areas 3&4. Surface geology is variable. In the area of Borrow Area 3, which is closest to Des Moines Creek, the surface geology consists of a typically 10-foot depth of (permeable) recessional soils overlying a quite thin (less than 10 feet) lens of relatively impermeable perching layer. The current hydrologic response for the area of Borrow Area 3 would be similar to that described above for Borrow Area 1. In the area of Borrow Area 4, the surface geology consists of a thick (up to 100 feet) depth of advance outwash soils overlying a perching horizon. The perching horizon beneath Borrow Area 4 connects with the perching layer beneath Borrow Area 3, such that the seepage flows from both areas eventually merge and flow (seep) together en route to Des Moines Creek. The current hydrologic response for the area of Borrow Area 4 would be generally similar to that for Borrow Areas 1 and 3 except that there would be even greater flow attenuation due to the thickness of the outwash deposit and the greater distance from Borrow Area 4 to Des Moines Creek.

The proposed excavation of Borrow Areas 3 and 4, as proposed, may leave a surface exposure of deep advance outwash soils. This soil exposure (assuming no conversion to land use with impervious surfaces) should not cause any increase in surface flows and the elimination of the forest cover will promote increased groundwater recharge. However, the

[10]Additional forested basin will be lost by development of the SASA element of the Master Plan Update Improvements.

proposed grading will penetrate and remove a perching layer which may currently be conveying borrow area seepage flow to the headwaters of Des Moines Creek. As a result, the base flow from these borrow areas to the upper reaches of Des Moines Creek may be significantly diminished.

In summary, the proposed development of the borrow areas is likely to result in adverse permanent impacts to Des Moines Creek, including increased peak flows and reduced base flows, which have not been assessed and for which no mitigation has been proposed.

12. There are numerous shortcomings in the evaluation of the potential low stream flow impacts described by SMP pages 6-5 and 6-6. Our comments below reference the source of that analyses which is the December 2000 Earth Tech report, "Seattle-Tacoma Airport Master Plan Update Low Streamflow Analysis."

a) The low flow analysis does not provide information to indicate the accuracy of the HSPF model in simulating low flows. Data provided in Table 1 for recorded average flows in August and September are for relatively-short periods of available record. Data provided for simulated average flows in August and September are for a much longer (1949-1996) period of simulation. These data sets are not directly comparable due to different periods of record. The report needs to provide a summary of simulated and observed monthly flows for periods of recorded data.

b) The report does not include HSPF input sequences to confirm what land uses and basin boundaries were assumed for any of the Des Moines or Walker Creek analyses. For Miller Creek, HSPF input sequences were provided only for year 2006 post-development conditions. In light of the major modeling discrepancies found in the previous SMP, and the fact that the present work is being conducted by three separate firms, it is important to confirm what models were used for each of the analyses.

c) As indicated in our above comments, model calibration appears to have relied on faulty measurements of groundwater tributary areas which are noncontiguous with the surface water basins (Figures B1-3 and B2-2). Walker Creek calibration relied on groundwater inputs from about 630 acres of noncontiguous pervious basin; however only about 350 acres of noncontiguous pervious basin appears to be actually available. There is also an apparent inconsistency in the modeling of noncontiguous groundwater inputs to Des Moines Creek: the text (SMP pg B1-10) indicates 1,240 acres but the model input file uses 512 acres. These inconsistencies need to be resolved if there is to be any confidence in model predictions regarding project effects on low flows.

d) Project impacts to low flows in areas of runway fill (Miller and Walker Creeks) may be underestimated because the HSPF model parameters used to simulate the fill materials produce larger low flows than indicated by the available calibration data. (See calibration plot, SMP Appendix A, Attachment B, Page 4. Wet season low flows are consistently overestimated by about 0.03 cfs from the 20-acre fill site being assessed.)

e) Project impacts to low flows in Des Moines Creek and Walker Creek have been underestimated because the assessment has ignored the post-1994 effects of lining the IWS storage lagoons.

f) Project impacts to low flows in Des Moines Creek have been underestimated because the assessment has ignored the post-1994 expansion of the IWS system by about 111 acres (per SMP page 5-4) and corresponding reduction in the Des Moines Creek tributary basin. The IWS basin expansion (Des Moines Creek basin reduction) is not reflected by the available supporting data for the low flow study. Instead, the area summaries presented with the Low Flow Study, Appendix D, Figure 3 indicate that the tributary basin to Des Moines Creek will increase by about 16 acres from 1994 to 2006.

g) Project impacts to low flows in Des Moines Creek have been underestimated because the assessment has ignored the effects of the loss of forest and excavation of 6.7 million cubic yards of outwash material from proposed borrow area sites at what are now **the forested headwater areas of the basin.**

In summary, insufficient information has been provided to confirm what models were used for the low flow analysis, or to establish whether the models are reasonably well calibrated for assessing low flows conditions. Furthermore, the analysis methods have overlooked several airport activities which will likely have an adverse impact on low streamflows, particularly in the Des Moines Creek basin. Individually and cumulatively, these problems result in a failure to adequately address airport impacts on low streamflows and associated water quality concerns in the affected streams, and a corresponding failure to provide reasonable assurance of adequate mitigation.

13. Estimates in the Low Streamflow Analysis (pages 5 through 9) of the mitigating effects of "Fill Infiltration Discharge" are inconsistent with the measured hydrologic response of the 1998 fill embankment as shown in SMP Appendix A. The measured runoff from the embankment indicates a relatively rapid flashy response to rainfall with rapid recession rates which are inconsistent with the statement (Low Streamflow Analysis page 6) that fill " would provide increased discharge from the fill area during the critical low flow periods in area wetlands and streams". One of the principal problems appears to be that the PGG study[11] used as the basis for this assessment assumed a theoretical hydraulic conductivity for the fill which is far greater than the infiltration capacity which can be inferred from either the measured data or the HSPF model calibration. The PGG study (page C-4) assumed a hydraulic conductivity for the fill of 1.35×10^{-4} cm/sec (equivalent to 0.19 inches/hour) based on theoretical values for fill gradation specifications. That theoretical value is significantly greater than short term rainfall intensities associated with production of runoff during the monitoring period, and is nearly 10 times greater than the nominal infiltration rate of 0.02

[11] Pacific Groundwater Group, "Sea-Tac Runway Fill Hydrologic Studies Report," for Washington State Department of Ecology, June 19, 2000.

inches per hour determined through HSPF model calibration (SMP page A-17). We recognize that the HSPF model infiltration parameter is not a direct measure of hydraulic conductivity. Nevertheless the difference in values shows a significant discrepancy between the fill response predicted in the Low Flow Analysis and the measured data from the 1998 fill embankment. We do not know why the observed runoff response of the fill is so different from the values predicted by PGG. However, a major discrepancy clearly exists and has caused the PGG analysis to significantly overestimate the seepage and baseflows which can realistically be expected from areas of embankment fill. There was a recommendation during recent permit negotiations for additional work which would have reconciled this discrepancy[12], but there is no record of that work ever being performed. Without further analysis such as recommended but never performed, which considers the observed data, there is no basis for claims that the fill will have a net beneficial effect on low flows.

14. Estimates in the Low Streamflow Study (pages 10 and 11) of the mitigating effects of "secondary recharge" are greatly overestimated. The secondary recharge calculation assumes a theoretical value for infiltration capacity based on the groundwater modeling (PGG study page C-4). As described in our above comment, this rate is significantly greater than the infiltration rate inferred from field measurements and HSPF model calibration. The results of the "secondary recharge" calculation are meaningless because of differences between the hydrologic response predicted in Low Streamflow Analysis and the observed runoff data.

15. Dam safety requirements established by Washington Administrative Code Chapter 173-175 and King County Surface Water Design Manual Section 5.3.1 have been overlooked in the current SMP. From the available drawings, it is apparent that Pond G, and possibly Pond D, exceed the size (and danger) thresholds which necessitate dam safety reviews. We note also that the Port has issued "Third Runway - Embankment Construction Phase 4" construction drawings and specifications dated January 29, 2001 for work which includes construction of berm embankments for Pond G, apparently without the required dam safety review.

16. Based on project drawings obtained for other (non-SMP) reviews, there appears to be a dam safety issue at the proposed SASA facility. The current SMP is deficient because it fails to include any plans or design drawings for the SASA stormwater facility, and because dam safety requirements for this facility are not addressed.

17. In addition to dam safety reviews for the open water detention facilities identified above, dam safety or equivalent safety reviews are needed for proposed vaults SDS7 and G1 (Basin SDW1A) as shown in SMP Appendix D, Exhibits C140 and C151. Vault SDS7 proposes above-grade storage of 21.4 acre-feet of water volume in a rectangular structure with an above-ground water depth of 19.8 feet. Vault G1 proposes storage of about 13.8 acre-feet

[12]Floyd & Snider Inc, undated Final Draft, "Sea-Tac Airport Third Runway 401 Permit Negotiations, Meeting Notes Summary, October 2nd through December 8th, 2000." Resolution Pending Review dated 10/13 for Project Effect on Low Stream Flows reads in part, "...Results of the consultation recommend that the Hydrous model used by PGG be rerun using HSPF output for initial infiltration as input to the Hydrous model in order to analyze all components effecting base flows."

of water volume (detention storage plus reserve storage) with a water depth of 30 feet. There is an obvious need for a safety review to assure the structural stability of Vault SDS7. Our concerns over Vault G1 result from its close (about 20 feet) proximity to the top edge of a 140-foot high fill embankment. Furthermore, because of its proposed placement in fill, Vault G1 (and perhaps others) fails to satisfy the KCSWDM technical requirement (pg 5-37) that "Vaults shall not be allowed in fill slopes, unless analyzed in a geotechnical report for stability and constructability."

18. Many of the proposed vaults are in violation of KCSWDM pg 5-38 which specifies, "The maximum depth from finished grade to the vault invert shall be 20 feet." This requirement appears to relate to the maximum loading which a conventional vault structure can withstand without risk of structural failure. If so, then special structural designs will need to be developed for Vaults SDS3 and G1 (cover depth to about 40 feet), Vaults SDN3 and C1 (cover depth to about 30 feet), and Vaults M6 and C2 (cover depth to about 25 feet). Due to the currently-proposed depths, none of these six vault facilities are in compliance with the King County technical requirements for stormwater facilities. In some cases, this compliance problem has been caused or worsened because the facilities have been enlarged (deepened) to accommodate reserve stormwater storage for purposes of low flow augmentation. Further analysis is necessary to determine whether these facilities are viable.

19. SMP section 3.1.2.3 discusses concerns with standing open water. A drain time calculation proposed in the SMP for addressing open water concerns is inappropriate and will underestimate actual open water durations. The drain time method is inconsistent with actual prolonged-duration precipitation conditions in the Puget Sound. Continuous simulation methods need to be used. (Also see Comments 10 and 11 of our letter of November 24, 1999.) The current SMP proposes an inappropriate methodology to assess open water durations and furthermore fails to provide any analysis, by any method, of expected open water durations in any of the stormwater facilities being proposed. The consequence of using an inappropriate analysis methodology in this instance is that the duration of standing open water is likely to be significantly underestimated and that mitigation designs (for example netting over lower cells within detention ponds) could fail to prevent the creation of open water waterfowl attractants which are incompatible with safe airport operations.

20. Insufficient information has been provided regarding proposed Erosion and Sediment Control (ESC) facilities to offer any assurance that facilities are adequately sized and will perform as intended. There is no cogent explanation of how this ESC system is supposed to function and there are numerous potential problems inherent in the current SMP plans.. Our concerns are heightened because the Port has already issued "Third Runway- Embankment Construction Phase 4" construction plans[13] and specifications for erosion control facilities and some permanent drainage facilities, without any known independent review or approval

[13]Port of Seattle major contract construction plans titled "Third Runway - Embankment Construction - Phase 4", Work Order #101346, Project STIA-0104-T-01, were approved on 1/25/01 by Raymond P. Rawe, Director of Engineering Services. The accompanying two-volume Project Manual, including Specifications, prepared under the direction of Raymond P. Rawe, is dated January 29, 2001.

of those plans by any regulatory agency. Further review, prior to project approval, is needed to resolve the following questions:

a) Where are the clearing limits for the proposed work? King County core requirement 1.2.5.1 requires that prior to any site clearing or grading, areas to remain undisturbed during project construction shall be delineated. For example, SMP Appendix R, Exhibit C24 suggests that there will be an undisturbed strip, which includes some wetlands, between a line marked "limits of embankment" and a proposed TESC ditch some distance downhill. Is this strip supposed to remain undisturbed? On the corresponding grading and drainage plan for the same area (SMP Appendix O, Exhibit C115) there are again no work limits shown and the plans are deficient for not identifying the grading necessary to restore the wetlands which were altered by construction of TESC facilities.

b) What is the tributary area for each of the proposed ESC facilities? What are the design flows? Have the design calculations been reviewed? Who was responsible for this review?

c) How big are the pumps being proposed for this work? (Pumps need to be of sufficient capacity and compatible with ESC processing rates and storage volume.) What is the power supply for these pumps? If gas/diesel pumps (or power generators) are proposed, how will refueling be accomplished and what safeguards will be in place to contain spills?

d) How long will these "temporary" facilities be in place. One year? Six years?

e) How are the "outer swale" ditches supposed to work? According to the geotechnical engineering report (SMP Appendix L, Figure 8) these ditches are supposed to intercept the seepage flow from the base of the embankment and convey the water to wetlands. Collection of the (clean water) seepage flow is in conflict with the use of these same ditches for conveyance of (turbid water) construction site runoff as proposed in the SMP Appendix R exhibits. Capture and routing of clean water seepage flows to erosion control facilities might overload sediment pond processing capacity, causing releases of untreated turbid water during storm events. Capture and routing of clean water seepage in interceptor swales would furthermore cause downslope wetlands to be significantly de-watered during the (multi-year?) period of construction.

f) Why is temporary Pond A being excavated to a depth of approximately 10 feet in the middle of a wetland? The pond location is shown by SMP Appendix R Exhibit C24; greater detail is shown on Phase 4 construction drawings. The construction drawings include a note warning the contractor to anticipate seasonal groundwater at about 1 to 1.5 feet below ground surface. It is unrealistic to expect that a simple geotextile membrane as proposed will succeed in keeping the surrounding groundwater out of this pond. It is probable that the pond will be constantly recharged by the wetland

water supply and that pumping from this pond will be functionally equivalent to pumping from the wetland. In addition to adverse impacts on the wetland, it is likely that ESC facilities have not been sized to accommodate this water.

The above questions result in part from a failure to recognize or satisfy the procedural, design review provisions of the King County and Ecology requirements. In this instance, the lesser requirement is defined by Ecology's Stormwater Program Guidance Manual, which specifies that a development site of this size must prepare a Large Parcel Erosion and Sediment Control Plan[14], comprising both a narrative report plus site plans, to demonstrate compliance with minimum requirements. The current erosion control site plans do not demonstrate compliance with minimum erosion control requirements, and give rise to numerous concerns which, individually and cumulatively, create a significant risk of recurring uncontrolled releases of construction site runoff.

21. The plans do not show how runoff from the face of the MSE wall, or from the face of the embankment, will be conveyed to the stormwater detention facilities. There are two issues. First, drainage must be provided from terraces on the face of the wall and the face of the embankment drainage in order to prevent erosion damage and to minimize the possibility of surface saturation which might result in localized slope failures. Second, this water must be conveyed to the stormwater detention facilities which will provide the required Level 2 flow control. Plans in SMP Appendix O, Exhibit C115 show that undetained surface runoff collecting at the bottom of the embankment, and also from the airport security road, would be discharged directly into adjacent wetlands without any peak flow detention as required by King County and Ecology regulations.

22. SMP Page 3-7 states, "*Several examples of water-induced slope failures have occurred recently, including one airport embankment project in Telluride, Colorado, that resulted in airport closure for one year. The slope failure was primarily attributed to stormwater build-up within the embankment.*" Because of the height of the proposed 3rd runway embankment, and the potentially catastrophic consequences of a slope or wall failure, the design documentation for the SeaTac project should identify the specific design and environmental factors which were associated with those failures. For example, were previous failures associated with poorly-draining fill materials, inadequate construction methods, or insufficient drainage systems? Were previous failures associated with specific climatic conditions such as unusually intense cloudburst events or an unusually prolonged rainfall event or closely-spaced series of intense events? Careful examination of the causes of known recent water-induced slope failures is a necessary, but missing, first step to ensure that the 3rd runway project does not repeat whatever errors or oversights may have been responsible for past slope failures.

[14] See " Stormwater Erosion and Sediment Control for Large Parcel Construction", Department of Ecology Report WQ-R-93-012 1 #4 of 5. Also available at http://www.ecy.wa.gov/pubs/wqr93013.pdf

Based on our review of the Stormwater Management Plan documents, there are at least two drainage issues affecting the fill embankment which should be addressed and resolved prior to project approval.

a) There appears to be a significant discrepancy between the embankment theoretical infiltration properties assumed by geotechnical specialists responsible for the design of the embankment and the embankment infiltration properties inferred through stormwater runoff model calibration to data from the 1998 embankment by other specialists responsible for the design of stormwater management facilities. The geotechnical analysis of the embankment and wall, and design of internal drainage systems, should account for a range of worse-case scenarios which might result from variable (or uncertain) infiltration properties. For instance, if the unexpectedly-low observed infiltration capacity was suspected to be a result of periodic applications of tackifiers or emulsions or other surface treatments for erosion control during construction, then the embankment geotechnical analysis should anticipate perching horizons and saturated zones within the embankment. Review of past slope failures should consider whether discrepancies between theoretical and actual infiltration rates may have been a contributing factor.

b) Drainage from the steps in the wall and embankment should be designed to handle cloudburst rainfall quantities computed against the surface area of these features, rather than the plan view. It is not apparent that the SMP has given any consideration to either the specific scenario of wind-driven (non-vertical) precipitation or the more general surface runoff drainage needs for the face of the wall and embankment. Review of past slope failures should assess the role and significance of surface drainage from the face of the embankment (or wall) as a contributing factor.

23. The proposed construction excavation for Pond D, as shown by SMP Appendix D, Exhibits C133 through C134.1, is very likely to intercept the local shallow regional groundwater table and to significantly disrupt the water supply to Wetland 39. We question the accuracy of groundwater levels shown by Exhibit C134.1 which suggests the maximum seasonal water level in the vicinity of the pond would be slightly below the proposed pond bottom at elevation 336.0. There is strong evidence to suggest that the excavation proposed for Pond D, to depths as great as 25 feet below grade, will intercept the local groundwater table. First, the Hart Crowser study of local groundwater conditions (SMP Appendix L) found that the shallow groundwater table is typically 10 feet below existing ground level. Second, there is an existing surface expression of groundwater at Wetland 41a which is in the footprint of Pond D. Finally, it can be seen from Exhibit C133.1 that Wetland 39 (shown but not labeled on the exhibit) begins at about elevation 348 feet, 12 feet above the proposed bottom of pond.

24. The NRMP (page 3-10) asserts that compensatory storage will be provided to mitigate for approximately 5.24 acre-ft of floodplain storage which will be lost due to embankment fill. However, our review of the proposed design has found that the compensatory storage will fail to provide any mitigation for loss of storage during frequently-occurring flood events.

Loss of compensatory storage for frequently-occurring events (such as floods with return periods in the range of 2 to 10 years) might result in increased peak flows and erosion during those events.

Grading plans for the proposed compensatory floodplain area are shown by NRMP Appendix A, Sheet STIA-9805-C2. A hydraulic analysis for the associated reach of Miller Creek is presented in SMP Appendix J. The main problem with the proposed design is that the compensatory floodplain will be separated from the (relocated) stream channel by a ridge typically 2 to 4 feet higher than the floodplain. Also, the relocated channel will include a constructed 32-foot wide high flow section, independent of the floodplain, which will provide significant flow conveyance within the main channel. The ridge separating the main channel from the floodplain is apparent from the grading plans and also from NRMP Figure 5.1-6, titled "Typical Cross-Section of Miller Creek Floodplain Enhancement." The SMP hydraulic analysis shows that under major 100-year flood conditions this ridge (which has a top elevation of about 265 feet) is expected to be overtopped by depth of only about 0.5 feet. During less extreme events, the ridge will prevent floodwaters from entering the compensatory floodplain. There is no explanation for why a ridge is proposed which would prevent floodwater access to the floodplain mitigation area for all but extreme events. The compensatory floodplain design, as currently proposed, is insufficient to fully mitigate for the hydraulic effects of the embankment fill. The consequence, as stated above, is for increased peak flows and erosion during frequently-occurring flood events.

25. The proposed mitigation objectives for the Miller Creek relocation project are described by NRMP Table 5.1-2 (NRMP page 5-4). However, there are no calculations or other design information to demonstrate that the goals and design criteria will be accomplished with the design now proposed. From comparison of the December 2000 and August 1999 versions of the NRMP, we infer that some of the problems with the initial design have been recognized, but a revised design has yet to be developed which would accomplish the past or current performance objectives. The main problems are that the relocated channel is likely to go dry during low flow periods if it is constructed, as proposed, over a two-foot thick bed of highly-permeable spawning gravels. We notice that the design criteria in the December 2000 NRMP is to "Construct low flow channel 8 feet wide with 1:1 slopes and 0.5 ft deep to convey summer base flows" and does not identify a minimum flow depth which would prevent fish stranding. By contrast, the performance standard in the August 1999 NRMP (Table 5-1.1) was clearly established as a minimum flow depth of 0.25 ft at 0.5 cfs. We have commented previously that the proposed 8-feet wide channel will almost certainly not support a minimum flow depth of 0.25 cfs, especially if it is constructed over top of highly permeable gravels which will convey significant sub-surface flow. Another change between the August 1999 and December 2000 NRMP document is that the earlier (1999) design criteria was that "100 year flood flows will overtop the channel into the floodplain" whereas the current (2000) criteria is that "flows greater than the annual peak flow will overtop the channel and inundate the adjacent floodplain restoration." However, the hydraulic properties (width, slope, depth) for the relocated channel as shown in current design drawings (Appendix A to December 2000 NRMP) are essentially unchanged from the hydraulic properties as shown in previous versions of the design drawings. Our point is the NRMP

fails to provide any calculations to indicate that the proposed relocated reach of Miller Creek channel will accomplish its changing design objectives. Our independent review suggests that the channel design as now proposed will fail to accomplish performance goals for minimum depth of flow and for floodplain inundation.

In summary, there continue to be numerous deficiencies in the analyses and preliminary designs which present a risk of significant adverse impacts to the natural stream and wetland systems if the December 2000 versions of the Comprehensive Stormwater Management Plan and Natural Resource Mitigation Plan are approved as a basis for mitigation of project impacts. We request on behalf of the Airport Communities Coalition that, prior to regulatory certification or approval of the proposed 3rd runway project, the applicant be required to respond to the issues we have raised in this letter, and that we be granted the opportunity to provide follow-up review and comment on that response.

Sincerely,

NORTHWEST HYDRAULIC CONSULTANTS, INC.

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Subj: Determining Whether the U.S. Army Corps of Engineers (USACOE) Has a Scientifically Adequate Basis to Issue a Permit, Under the Clean Water Act (CWA) Section 404, for the Port of Seattle's (Ports) Project Proposed in the Second Revised Public Notice No. 1996-4-02325.

Dear Mr. Freedman and Ms. Kenny:

On behalf of the Airport Communities Coalition (ACC), I have undertaken a review and evaluation of pertinent and readily available literature in an effort to answer the subject question. It is the USACOE's responsibility under the CWA to assure the public that the Port's proposed project will not harm the wetlands, surface waters, and fishery resources inhabiting the project site. The latter includes concern for chinook salmon, a federally threatened species in Puget Sound, known to frequent the estuarine reaches of streams that are affected by the Port's project. In undertaking this effort, I have relied on my relevant education, specialized training, and professional skills acquired over a 25-year career (post Ph.D.) as a fisheries biologist (see attached Curriculum Vitae).

I am concerned that the Port's declared future construction and operation will harm area fish and fish habitat in the proposed project area. There also is evidence that the Port's current operations already impact the fishery resources in project streams. Although disturbed, the project streams (Miller Creek, Walker Creek, Des Moines Creek) still support a diverse and abundant fish fauna and are worthy of protection. Both coho and chum salmon are known to spawn and rear in the Miller Creek, Walker Creek, and Des Moines Creek Watersheds (Hillman et al. 1999). Chinook salmon frequent the outfalls of

Miller and Des Moines Creeks in Puget Sound during their outmigration (Parametrix 2000a). Both watersheds are also exploited by resident cutthroat trout (Parametrix 2000a); Miller Creek may include an anadromous race of cutthroat trout. Warm water fish species including yellow perch, black crappie, large mouth bass, and pumpkinseed sunfish have been found in the upper reaches of both watersheds (Parametrix 2000a). Prickly sculpin, three-spined stickleback, and crayfish also occur throughout each watershed (Parametrix 2000a).

I approached this evaluation by first assessing the effects on fish and fish habitat of the proposed relocation of Miller Creek and associated instream enhancements. I next addressed the concern that fill already stockpiled at Seattle-Tacoma International Airport (STIA) to build a third runway is chemically contaminated and poses a risk for area streams, wetlands, and aquifers. Additionally, I determined whether water quality in surface waters near STIA is being degraded by stormwater runoff from the Port's ongoing operations at STIA. I addressed both historical and present conditions. I also looked at the Port's preferred alternative to augment flow in Des Moines Creek using Seattle Public Utility (SPU) water. I next looked at whether or not conditions in the receiving waters might improve following the subsequent installation and operation of proposed stormwater detention facilities downstream of the STIA. In a related assessment, I addressed possible low stream flows in summer and their associated impacts. Finally, I determined if the Port has addressed the potential cumulative impacts of the proposed construction projects.

My opinions in this matter are based primarily on reviewing the many assessments of impact prepared by the Port in support of their Section 404 Clean Water Act Permit Application. I evaluated each assessment by answering three questions: 1) did the Port or their consultant present the most appropriate information, 2) was the information complete and credible, and 3) was the information properly analyzed and interpreted? I also reviewed and included applicable citations from the scientific literature when the need arose. My conclusions and the detailed evaluations on which they are based can be found in the succeeding sections:

Conclusions

In my opinion, for the following reasons, the Port has not provided sufficient information to enable the USACOE to conclude, on a scientifically defensible basis, that current operation and declared future construction and operation will not harm area wetlands, streams, and fisheries resources in the project area.

- All impacts on fish and fish habitat from the proposed relocation of Miller Creek have not been addressed. Notable omissions include the likely impacts of elevated temperatures and lowered dissolved oxygen (DO) concentrations that will occur following construction because of insufficient shading and the failure to achieve design minimum flow depths in the stream channel during summer low

flow conditions. This would likely displace fish to other reaches of Miller Creek and lead to fish stranding and mortality. The addition of spawning gravels without providing interstitial fine materials (sand and silt) could intermittently eliminate surface flow during summer low flow conditions, also increasing the likelihood of fish stranding and mortality. The rerouted Miller Creek could be vulnerable to additional dewatering due to its location over peat on the former Vacca Farm.

- The Port's Soil Acceptance Criteria remain seriously flawed and do not preclude the acceptance of chemically contaminated fill. There is evidence that fill, e.g., Hamm Creek Restoration Project sediments, already stockpiled at STIA, contains residual chemicals (PCBs, and DDT) that have the potential to percolate through the fill pile to groundwater, ultimately contaminating area wetlands and streams. Model Toxics Control Act (MTCA) Soil Cleanup Levels are not appropriately used as the criteria to screen soil for use in building the third runway.

- Violations of toxic substances (water quality) criteria in Miller Creek and Des Moines Creek, particularly for copper and zinc, occur as a result of stormwater discharged at STIA, and will continue, and potentially worsen as a result of the Port's proposed project. These violations occurred historically and occur currently. While the distances downstream in each stream where impacts still occur are not known, protection of resident and anadromous fish species, including federally threatened Chinook, known to occur at the mouths of project streams, require that the Port conduct transport, fate, and effects modeling of metals and other chemicals in their stormwater. This should be required before a decision on the Port's proposed project is made. The Port must also address the need for additional waste treatment beyond what has been proposed.

- The potential effects of de-icers in stormwater discharged to area surface waters cannot reasonably be quantified and assessed without collecting additional information and conducting toxicity tests during de-icing events. The data available to date and the scope of the proposed third runway project suggest that such effects will be harmful and have not been adequately addressed by the Port

- The proposed modification for the Port's *National Pollution Discharge Elimination System Waste Discharge Permit* does little to safeguard fish and other aquatic life in Miller Creek and Des Moines Creek, as each receives significant volumes of stormwater from the STIA. There is no requirement to sample stormwater above and below each outfall, nor is there a requirement to model the transport and fate of key chemicals contained in stormwater. By continuing to report the concentrations of chemicals and conventionals at each outfall prior to their discharge, the Port can maintain their claim that stormwater from STIA is no worst than what occurs in other urban areas, and has no effect on the aquatic life in Miller and Des Moines Creeks. The Port persists in this view without regard to

whether or not their discharges, including those from the proposed third runway project, are degrading and will continue to degrade the water quality of project streams.

- The Port has offered several different flow augmentation plans for Des Moines Creek but has indicated that use of Seattle Public Utility (SPU) water is the preferred alternative. While the Port has decided to dechlorinate SPU water using sodium sulfate, the Port has neither assessed the efficacy of this treatment method nor the fate of chlorinated by-products that will surely form in Des Moines Creek if SPU water is used for augmentation. The Port's assertion that removal of chlorine is the only treatment required has not changed and remains inaccurate. Fluoride residual also found in SPU water can have both lethal and sublethal effects on fish and other aquatic life and may not be easily reduced to harmless levels employing current waste treatment technology. The Port should be required to model the transport, fate, and potential effects of chlorine residuals and fluoride over the greater length of Des Moines Creek including its outfall to Puget Sound. Only then can the Port provide reasonable assurance that the use of SPU water will not harm fish and other aquatic life inhabiting Des Moines Creek, including chinook salmon, a federally listed species, that occurs at the creek mouth during outmigration.

- New stormwater discharges on Miller Creek are not evaluated for their potential to cause increased local scouring that would diminish the quality of habitat for fish and other aquatic species. There also is no specific assessment of potential impacts on fish or fish habitat from either the construction or the operation of the proposed stormwater retention facilities.

- Flow reductions in project streams as a result of proposed airport construction and operation have not been established with any degree of certainty. Simulations conducted by the Port may underestimate summer low flow impacts and overestimate the contributions of proposed mitigation and natural mitigating factors. If flow in either project stream falls below 1.0 cfs, depth and wetted area will be reduced, resulting in increased temperatures and lowered DO tensions. Fish movement could be limited and conceivably lead to fish stranding and mortality of larger fish. While we don't know if these impacts will occur, neither does the Port because of flawed simulation modeling. The Port must review and revise their analyses as necessary, decreasing the uncertainty with which their results are presently viewed.

- Each of the proposed construction projects, as presently described and assessed, stand alone and are not evaluated for their overall (cumulative impact) on the aquatic resources of Miller Creek and Des Moines Creek. Aquatic ecological risk assessment could be used to characterize the cumulative risks from exposure of fish and other aquatic life to multiple chemicals and altered water quality factors.

The detailed evaluations on which the above conclusions are based are found in the following sections.

Miller Creek Relocation and Associated Instream Enhancements Do Not Protect Fishery Resources

The impacts on fish habitat of relocating Miller Creek are not even addressed by the Port. Clearly, relocation of Miller Creek will result in nearly total elimination of the fish and invertebrate communities presently found in the 980-feet of Miller Creek to be filled accommodating the embankment of the runway. The Port is remiss for not addressing the magnitude of this impact and instead, would rather dazzle us with their suggestion that the relocated Miller Creek, complete with new riffles, pools, and replacement of woody debris, will provide a net gain in fish habitat. It could be years before the relocated creek will attain the level of production achieved presently, assuming that the Port knows what level of fish production presently occurs. Unfortunately, neither the Port nor its consultants have recently undertaken a quantitative fishery survey in Miller Creek.

As described in the Natural Resource Mitigation Plan (NRMP) (Parametrix 1999) and the Joint Aquatic Resources Permit Application (JARPA) (Parametrix 2000b), the physical design (stream gradient, channel depth, size of gravel, placement of large woody debris, etc.) of the 980-foot Miller Creek Relocation Project is based on habitat requirements for cutthroat trout. The planned features include: shading with native plants to minimize temperature increases during the summer; higher velocity riffles to maintain oxygen levels and reduce sedimentation; and the placement of logs, rocks, and other structures to provide refuge.

While the proposed design appears to incorporate habitat requirements of cutthroat trout, the descriptions of the project found in both the NRMP (Parametrix 1999) and the JARPA (Parametrix 2000b) do not include scientific citations (references) in support of the proposed design standards. Also, no scientific data or calculations are provided to assure the scientific reviewer that the proposed design does, in fact, meet requirements for cutthroat trout, yet the scientific literature is replete with this information (Moore and Gregory 1988; Heggenes et al. 1991; Hall et al. 1997; Rosenfeld et al. 2000). In evaluating the proposed project design, I am left with the impression that I should simply "trust them to do the right thing." I must ask whose (which scientist's) fish habitat design standards are we using? This design was based on someone's studies, done where? Has this particular design been used elsewhere? Did it work? What were the shortcomings? How was this design changed to accommodate local features?

Clearly, there are elements of the proposed design that are suspect. For example, if Parametrix implements the design for relocating Miller Creek as presently conceived, summer water temperatures in the relocated reach will likely exceed the preferred summer maximums for cutthroat (Hall et al. 1997) and other species for several years following construction, and perhaps longer. Oxygen concentrations also will likely be

depressed. In my opinion, it will take at least three to five years, perhaps longer, for riparian vegetation to grow tall enough to provide any meaningful shading (canopy) in this reach of Miller Creek, even if the introduced native shrubs and trees all survive and achieve average growth each season. As a result, cutthroat and other aquatic life will likely be displaced to other reaches of the stream where temperature and oxygen meet their preferences or tolerances. This condition could exist each summer for a few years or for a longer period of time, until the riparian vegetation grows tall enough to establish a functional stream canopy.

There also will likely be a problem achieving the performance standard of a minimum flow depth of 0.25 feet for the stream channel during 0.5-cfs summer low flow conditions (see page 5-4 of the NRMP [Parametrix 1999]). Mr. William Rozeboom of Northwest Hydraulic Consultants, Seattle, Washington (personal communication, November 2000), indicates that the NRMP documents do not include hydraulic calculations to determine whether or not the proposed low-flow channel would maintain the stated goal of a minimum 0.25 feet in depth at a 0.5-cfs flow rate. In the absence of such data, Mr. Rozeboom performed his own analyses of hydraulic characteristics presented on pages 5-7 and 5-9 of the NRMP (Parametrix 1999) for the proposed 6-inch deep low-flow channel, assuming a Manning "n" roughness value of 0.035, an average bed slope of 0.22%, and bed and top widths of 6 feet and 8 feet, respectively. Mr. Rozeboom determined that these hydraulic data presented in the NRMP would indicate a normal flow of about 0.15 feet for a flow of 0.5 cfs. He also determined that if pool and riffle conditions developed in the proposed channel geometry, the critical-flow depth of flow in 6-foot wide riffle sections (such as over the 6-foot wide notches in the weir logs) would be about 0.06 feet.

Mr. Rozeboom identified another feature of the proposed construction that could cause even lower depths of summer-period flow and a risk of the stream going dry through portions of the reconstructed reach. This risk comes from the proposal to shape a 6-inch deep low-flow channel on a 32-foot wide, two-foot thick "bed" of spawning gravels, which is to overlay a geotextile fabric that isolates the gravel from the underlying native soils. The spawning gravels are to consist of pebbles ranging from about 0.2 inches in diameter to 1.5 inches in diameter (see page 42 of Revised Implementation Addendum, NRMP [Parametrix, 2000c]). In Mr. Rozeboom's opinion, without interstitial fine materials (sand and silt), these gravels will have a high porosity and a correspondingly high capacity to convey (allow) subsurface flow. It was Mr. Rozeboom's opinion that this high subsurface flow capacity is likely to reduce, and might intermittently eliminate, surface flow through the relocated and reconstructed reach.

Mr. Rozeboom's findings indicate that the 0.5-foot minimum flow depth will not be maintained under summer low-flow conditions. Failure to achieve the design minimum flow depth supports my opinion that summer water temperatures in the stream could exceed preferred summer maximums for cutthroat trout (Hall et al. 1997) and other aquatic species. A reduction in depth to 0.15 feet in the relocated main channel and 0.06 feet in riffles could also limit movement of all but the smallest fish throughout the

relocated reach and conceivably lead to stranding and mortality of larger fish. Use of spawning gravels without interstitial fine materials (sand and silt) to prevent subsurface flow could increase the potential for thermal stress and stranding.

Dyanne Sheldon of Sheldon & Associates, Inc., Seattle Washington (also working on behalf of ACC and submitting comments) suggests that the rerouted Miller Creek will be vulnerable to additional dewatering because the relocated stream bed will be located over peat on the former Vacca Farm. Ms. Sheldon indicates that this is the reason Parametrix proposed a geotextile liner. Peat does not allow for the creation of a stream channel with gravel substrates. If a liner wasn't used, the water would simply disappear into the peat until the peat became saturated, at which time, a pond would be formed.

Ms. Sheldon goes on to say that where this design was used previously (North Creek) to create a stream channel and floodplain wetlands, again over peat, "the weight of gravel, rocks, woody debris, plus the water on a fabric liner caused the peats in the floodplain wetland to rebound to approximately 18 inches higher in elevation than it was designed." She also says that the geotextile fabric will leak where cables attached to large woody debris pierce the fabric and are anchored to the substrate. If Ms. Sheldon is right, there is no reason to think that the proposed mitigation project will be successful.

The proposed instream enhancement projects, of which there are four, are located south of the former Vacca Farm on Miller Creek and include removing man-made structures (weirs, footbridges, driveways, riprap, and old tires), restoring the natural flow of the stream, and introducing large woody debris to the new stream channel.

For the most part, the Port's proposal to remove man-made structures (weirs, footbridges, driveways, riprap, and old tires) is appropriate for improving fish habitat in Miller Creek. At issue, however, is whether or not the overall project and, in particular, what is installed in lieu of man-made structures to stabilize the bank will be a net enhancement and, will remain during storm events. According to the 1999 NRMP (page 5-63), the existing condition of the mitigation site is characterized by riparian vegetation that consists primarily of lawns and some trees, which "does not provide shade, bank stabilization, or habitat complexity." Under existing conditions, the banks are stabilized by introduced measures including tire riprap that is proposed for removal as an instream enhancement project. Since the existing riparian vegetation is incapable of providing bank stabilization, it follows that removal of the existing bank protection works will cause an increase in bank erosion and stream sediment for whatever period it takes for stabilizing riparian vegetation to develop. The local turbulence caused by the proposed introduction of large woody debris to the channel will likely cause additional bank erosion and stream sediment loading during the period it takes for the stream channel to reach a new equilibrium.

The NRMP (Parametrix 1999) recognizes the need to implement erosion control measures to stabilize eroding banks but does not identify which specific measures would be employed, nor examine whether or not the measures would be effective. Table 5.2-6

(pg 5-64) referenced by the plan on page 5-71 does not provide proposed mitigation projects and appears to be cited in error.

In my opinion, what this means is that fish will try to make a living in a less fish-friendly environment, at least in the short-term. Miller Creek, as a result of storm-induced changes, will not likely meet cutthroat requirements (Hall et al. 1997). This could go on for years until the stream stabilizes and establishes a more or less permanent meander. As a consequence, it is likely that follow-up restoration will be required and that the stream will have to be monitored routinely.

Third Runway Fill Stockpile Contains Potentially Harmful Chemicals that Could Impact Wetlands, Surface Waters, and Fishery Resources at the Project Site

I have found nothing in my reading of the new Section 404 application materials that suggests the Port has adopted new and improved *Soil Fill Acceptance Criteria*. My concern is that chemical contaminants associated with fill materials at the fill placement site have the potential (if not the probability) to percolate through the fill pile to groundwater, ultimately contaminating wetlands and surface water that may be connected to the groundwater stream (see letters to Tom Luster, Washington Department of Ecology (WDOE), on August 31, 2000, and to Charles Findley, U.S. Environmental Protection Agency (USEPA), on December 19, 2000). Chemicals in the fill would also have the potential to directly contaminate wetlands and surface waters through runoff following seasonal rains.

At issue is the appropriateness of the Port's Soil Fill Acceptance Criteria, with particular interest in the process employed to certify that fill accepted by the Port is free of chemical contamination. Also at issue is whether or not fill already stockpiled is contaminated, constituting a risk for area streams, wetlands, and aquifers.

The fundamental purpose of MTCA and the MTCA Method A Soil Cleanup Levels is to clean up existing contaminated or hazardous waste sites. The law sets reasonable standards for the amount of toxic material that can be left in a contaminated site. This standard also recognizes that there is a certain level below which it is not practical or feasible to clean. These standards do not, nor have they ever, allowed the contamination of clean property up to some predetermined level. Further, the absence of a particular standard to screen soils for uplands placement does not excuse adopting one that is very likely to cause environmental harm. To the best of my knowledge, the STIA property where the fill is being placed was free of contamination prior to any fill placement. MTCA does not apply and should not be used for the purpose of screening soils or sediments for use on the STIA Third Runway Fill Project.

Among a number of requirements, the Port's Soil Fill Acceptance Criteria are supposed to preclude chemical contamination. However, they are fundamentally flawed in their lack of a consistent and statistically meaningful approach to determine the location and extent of any contamination contained in candidate fill materials. Statistically rigorous

sampling approaches exist, e.g., systematic grid system (Gilbert 1982), over sampling and compositing (Skalski and Thomas 1984) and are used routinely to survey sites for buried waste, yet no such approach is adopted in the Port's Soil Fill Acceptance Criteria. While such an approach need not be undertaken at State-certified barrow pits, they should be required at all sites like the First Avenue Bridge and Hamm Creek where contamination is known to occur.

Reviewing the various sediment characterization reports or phase I or II environmental assessments for lands from which soils were already accepted by the Port indicates the significance of this problem. As an example, let's look at the 85,000 CY of soil from the First Avenue Bridge accepted by the Port from the Washington Department of Transportation (WDOT) in the Second Quarter 2000 (see letter from Paul Agid, Port, to Chung Yee, WDOE, dated July 27, 2000). It turns out that initially only five samples were analyzed for petroleum contamination and potentially toxic metals (see letter from Tom Madden, WDOT, to Beth Clark, Port, dated Nov.29, 1999). Significantly, one of those samples revealed total petroleum hydrocarbons (TPH) exceeding the Method A Soil Cleanup Level of 200 mg/Kg (actual value was 870 mg/Kg). The consultant then collected only three additional samples to delineate the apparent hotspot. These samples also contained TPH in excess of the Method A Standard but no other samples were collected. Even though the hot spot was not fully delineated, the vast majority of the soil was accepted and transferred to the Port. Some (an unspecified amount) was set aside for future testing. Eighty-five thousand cubic yards (85,000 CY), then, were accepted on the basis of only four samples. In this case, the Port is remiss for not fully delineating the hotspot found in the initial round of sampling. Because they did not follow a systematic sampling approach and collected so few samples, they also could not guarantee that other hotspots didn't exist and go undetected.

The Port also accepted 80,000 CY of sediments removed from Hamm Creek on the basis of only two samples (see letter from Elizabeth Clark, Port, to Roger Nye, WDOE, dated Feb. 4, 2000). Four samples were actually collected but composited down to two samples prior to chemical analyses. In a Memorandum to Paul Agid, Port, from Beth Doan, USACOE, dated March 24, 1999, a caveat is included that "indicates the samples were composited over large areas and depths, and that there is a potential for hotspots to go undetected." Although the Port's Mr. Agid has since written to the WDOE downplaying contamination concerns, this communication from USACOE, "purveyor" of the Hamm Creek fill warning of "hotspots", raises the question of how quality control (environmental safety) of the soil delivered on site can be assured if scientifically representative samples were not tested? In the case of the Hamm Creek dredge spoils from a known contaminated site, how can anyone assure the quality of 80,000 CY deposited on the airport site on the basis of only two composited, four total, samples?

In fact, it is likely that fill materials already stockpiled by Port are contaminated. The results of analyses of Hamm Creek sediments summarized in the Memorandum from Beth Doan to Paul Agid dated March 24,1999, show that the two composited samples analyzed were found to contain PCBs and DDT at 160 and 14 ug/Kg, respectively.

Sediments from the Hamm Creek site also failed follow-up bioassays indicating they were toxic to aquatic life, and could be toxic to aquatic life again, if they entered streams on the project site with runoff. Because so very little of the candidate dredged material for placement at STIA was analyzed (only four samples were analyzed by the USACOE from 80,000 CY dredged from Hamm Creek), there is considerable uncertainty as to the actual quantities of PCBs and DDT, and other chemicals contained in Hamm Creek sediments. Efforts to better understand the mobility, bioavailability, and toxicity of the PCBs and DDT known to contaminate these materials should have been undertaken. An additional 10,000 CY of candidate fill material from Hamm Creek were not even analyzed by the USACOE. Presumably, these sediments were included in the 80,000 CY transferred to the Port from the USACOE in 1999.

While the Port states that they used the results of both USACOE (1997) and later Boeing studies (1990) to certify the Hamm Creek sediments (see letter from Paul Agid, Port of Seattle, to Ray Hellwig, WDOE, dated Sept. 15, 2000), the Port appears to have relied more on the decade-old Boeing data. The Boeing study was completed in 1990 and was undertaken for a purpose other than screening candidate fill materials for the Third Runway at STIA. The Boeing study was designed and conducted as a Phase II Environmental Assessment in anticipation of a property transfer. In my opinion, the Boeing study is significantly out of date and only increases the uncertainty with which the chemical content of the Hamm Creek fill materials can be viewed. Concentrations of chemicals in wetland sediments at the Hamm Creek Restoration Project site could have increased appreciably in 10 years, attributable to transport and deposition by both tidal currents and annual flooding of the Duwamish River. Concentrations of chemicals in upland deposited (dredged) sediments at the Hamm Creek Restoration Project site also could have increased over this time period due to unauthorized dumping and runoff from West Marginal Way.

There are other problems in using the results of the Boeing study to certify the Hamm Creek sediments. The locations sampled by Boeing in their 1990 survey are not the same as the locations sampled by the USACOE in 1997. The detection limits for most chemicals analyzed by Boeing's chemists in 1990 were also higher than the detection limits for the chemicals analyzed by the USACOE chemists in 1997 (see letter from Paul Agid to Ray Hellwig, WDOE, dated Sept. 15, 2000). As well, the method of compositing sediment samples employed in the Boeing study could have diluted contaminated sediments with clean sediment, so that concentrations of chemicals in composited samples, those chemically analyzed, fell below applicable chemical detection limits. Any one, two, or all three explanations, might account for Boeing's failure to detect PCBs and DDT in Hamm Creek sediments, which is the key difference between the older Boeing and more recent USACOE studies, and which increases the uncertainty associated with the Boeing results.

For the above reasons, if we were to rely on only one study, it would not be the Boeing study. Further, in my opinion, the two studies do not complement each other, and beg the question, why wasn't a third, independent, sediment survey undertaken. Neither existing

study was undertaken for the expressed purpose of screening sediments for the Third Runway. Clearly, such a study should have been undertaken.

There is evidence that fill, e.g., Hamm Creek Restoration Project sediments, already stockpiled at STIA, contains residual chemicals (PCBs, and DDT). This suggests that other fill materials stockpiled by the Port could also be contaminated. The MTCA Soil Cleanup Levels are not appropriately used as the criteria to screen soil for use in building the third runway. As a consequence, the Port's Soil Acceptance Criteria are seriously flawed and do not afford natural resources much protection from chemicals up to the MTCA Soil Cleanup Levels.

Metals Exceedences of State of Washington Toxic Substances Criteria Will Continue and Potentially Worsen if the Port's Proposed Project Is Approved

While there are several constituents (metals, fecal coliforms, turbidity) associated with STIA stormwater in Miller and Des Moines Creeks that have historically violated State of Washington Water Quality (Toxic Substances) Criteria (Chapter 173-201A WAC), the metals copper and zinc are of particular concern given their designation as toxic substances. In both creeks, the Port has presented metals data for stations at the STIA stormwater outfalls, upstream of the outfalls, and downstream of the outfalls.

Data presented by the Port (1997) indicated that concentrations of both copper and zinc in STIA stormwater discharges greatly exceeded applicable State/U.S. Environmental Protection Agency (EPA) Toxic Substances Criteria, in some instances by more than an order of magnitude. For example at the stormwater outfall to Miller Creek (see 1997 report page 35), total copper concentrations ranged from 4.2-82.9 ug/L. The EPA criterion is 4.4 ug/L. The Port's 1997 data also indicated that concentrations (4.7-14.8 ug/L) of total copper upstream of STIA were at or slightly exceeded the EPA metals criteria. That Miller Creek was unable to assimilate the STIA discharges, however, is confirmed by downstream sampling data showing total copper concentrations of 0.72-44 ug/L. For zinc in Miller Creek, the values at the outfall, upstream, and downstream were 15-525 ug/L, 37-69 ug/L, and 2.3-295 ug/L., respectively, again showing that the influence of zinc additions at the outfall persisted downstream. The EPA criterion for zinc is 33.7 ug/L.

The concentrations of copper and zinc downstream exceeded the applicable Toxic Substances Criteria. The Port's 1997 Report does not provide evidence that would support a scientifically valid conclusion that STIA does not impact Miller and Des Moines Creeks downstream of their respective stormwater outfalls. Persistence of an influence of stormwater downstream, and at the magnitudes illustrated above, also suggests the need for treatment of the waste streams before discharge to project streams.

Data presented by the Port in 1999 confirm that exceedences of toxic metals criteria continue to occur at the Port's stormwater outfalls to the creeks. In addition, the downstream stations, where sampled, show that the influences of STIA stormwater

discharges persist in the receiving waters. What appears missing in the 1999 report, however, is any indication that the Port sampled upstream of STIA. The Port's failure to maintain the original sampling protocol in this regard greatly diminishes the value of their stormwater-monitoring program.

Unknown is how far downstream the impacts of copper and zinc occur in Miller Creek and Des Moines Creek. Unfortunately, the Port makes no effort to model the fate of their stormwater. Although much dependent upon the volumes of stormwater discharged, it is my opinion that potentially harmful concentrations of copper and zinc in stormwater could persist over the entire length of each creek, to their outfalls. Both resident and anadromous fish inhabiting Des Moines Creek and Miller Creek are vulnerable, including juvenile chinook, a federally threatened species, that occurs at the mouths of both creeks during outmigration.

The Port has failed to demonstrate that STIA stormwater does not adversely impact the water quality of Miller and Des Moines Creeks. The Port's own sampling data confirms that STIA stormwater greatly contributes to exceedences of toxic metals criteria in the receiving waters. The Port also cannot say that conditions in the project streams will not worsen if the project is approved. The addition of new impervious area will increase the volume of stormwater discharged to project streams and also increase the quantities of metals and other chemicals contained in stormwater that is discharged to project streams. While flow mitigation as proposed by the Port will decrease the effects of sediments and sediment bound metals and other chemicals, flow mitigation will do less to decrease the concentrations of metals and other chemicals that are already in solution; that have already partitioned to the aqueous phase. The Port's reminder on page 22 of their 1999 report that the Water Quality Standards (Toxic Substances Criteria) apply to receiving waters and not the discharges from their outfalls also is of little consequence if the Port fails to present data from both above and below their outfalls, over the greater length of each stream.

More recently (1999), Cosmopolitan Engineering Group (Cosmopolitan) reported the results of metals analyses at the Port's STIA outfalls (see Table 15, page 6-2). They indicated that the only metal to exceed historical highs was lead at 0.010 ug/L but this concentration did not exceed the receiving Water Quality (Toxic Substances) Criteria for lead of 0.032 mg/L (calculated at 56 mg/L total hardness). While the information on lead is not particularly important, to not include a parallel interpretation of the copper and zinc levels also reported in Table 15; that is, comparisons of copper and zinc levels to applicable water quality (toxic substances) criteria, is a serious breech of scientific ethics. If the authors did, they would have had to agree that many of the copper and zinc values did exceed their applicable water quality (toxic substances) criteria, e.g. the copper and zinc values for outfall SDN3 adjusted for 33.5 mg/L hardness (Feb-99); the copper and zinc values for outfall SDN4 adjusted for 34.2 mg/L hardness (Dec-98). The point is however, despite the Port's caveat that they should not be held to the applicable Water Quality (Toxic Substances) Criteria in their pipes (at their outfalls), it is intuitive that as the water runs off to the creeks from STIA's outfalls, that for some unspecified but

substantial distance downstream of these outfalls, the concentrations of metals will exceed applicable Toxic Substances Criteria.

There is Still Insufficient Information to Say That De-Icers Pose No Risk to Surface Waters as a Result of Their Use at STIA

Activities associated with implementing the Master Plan Update Improvements, if approved, will include adding new impervious surfaces including a third runway, new taxiways and new aircraft parking area. This action to enlarge the airport, in my opinion, will result in greater use of de-icers with the potential for increased runoff of de-icer and anti-icer residues to project streams. De-icers (glycols, acetates) and their additives (sodium nitrite, sodium benzoate, borax, high molecular weight polymers, polyamines, triazoles) (Lokke 1984; MacDonald et al. 1992; Hartwell et al. 1995) are toxic to aquatic life at relatively low concentrations (1.8-8.7 mg/L) (Hartwell et al. 1995). De-icers, as they degrade, also increase biological oxygen demand (BOD) decreasing DO tensions.

Cosmopolitan (1999), during the winter of 1998-1999, studied the potential effects of de-icers (sodium or potassium acetate) on DO in downstream detention ponds (Lake Reba and Northwest Ponds) on Miller Creek and Des Moines Creek, respectively, after two runway deicer events (Dec 19-24, 1998; Feb 8-9, 1999) at STIA. Cosmopolitan's work was stimulated by earlier Port results (1999) that found high BOD in water samples from five stormwater outfalls (SDE4, SDS3, SDN1, SDN3, and SDN4 at STIA), which was attributed to acetate-based runway deicing chemical.

Cosmopolitan determined that trends in DO fluctuated widely over the course of the study but generally followed trends in rainfall. During dry periods, DO decreased to below saturation. Conversely, DO increased during periods of rainfall. De-icing chemicals were also found to pass rapidly through both Miller Creek and Des Moines Creek after rainfall and runoff began following deicing events. Cosmopolitan concluded that DO was not reduced in either Miller Creek or Des Moines Creek as a result of de-icing events.

In my opinion, Cosmopolitan (1999) cannot say unequivocally that the sag in DO, which follows each de-icing event by two weeks, is not due at least in part to the breakdown of de-icer in Northwest Ponds and Lake Reba. What the data in Figures 4 and 5 (pages 4-19, 4-20) indicate is that during dry periods, the BOD increases in response to bacterial decay of organic materials that have accumulated in the sediments of these water bodies during past runoff events. This we should expect. Then when it rains, DO in these water bodies increases due to aeration during runoff. One cannot separate the effects of the de-icer from other organic materials that enter the ponds as runoff, that also will eventually degrade and decay, increasing BOD, and decreasing DO concentrations. Despite Cosmopolitan's conclusion to the contrary, there is evidence of an impact (depression) on DO in Des Moines Creek at the Golf Course Weir following the Feb 8-9, 1999 deicing event (see Figure 4, page 4-19).

Further, de-icer does not pass through the system as quickly as Cosmopolitan suggests. The de-icer material as acetate will become associated (adhere to) soil and sediment particles as it runs off. As it enters the Northwest Ponds and Lake Reba, some or most of it will settle out to the bottom where the organic fraction will degrade and decay. Because it is winter and temperatures are relatively low, bacterial decay will be slow, which suggests that the two-week time lag before the oxygen sag was observed may not be unrealistic.

That sodium or potassium acetate entering the system as runoff is not the only material that can increase conductivity is also not convincing. Cosmopolitan's assertion that conductivity is a good tracer for de-icer chemicals requires further support. The metals Cu, Pb, and Zn, all common to stormwater, also could contribute to higher conductivity. Clearly, metals dynamics as well as the dynamics of de-icers are one and the same with the dynamics that stormwater exhibits.

I agree that rainfall does affect DO concentrations in the Northwest Ponds and in Lake Reba but this does not explain all the variation that is observed in the 1998-1999 data. To determine whether or not de-icing chemicals impact the system (depress DO) would require a better understanding of all the factors affecting DO in the system. Additional events will need to be followed and more data will need to be collected preceding deicing events. Cosmopolitan followed only two deicing events in the Winter 1998-1999. While Cosmopolitan (2000) also studied the potential effects of de-icers on DO concentrations during the Winter 1999-2000, too little deicer entered Northwest Ponds and Lake Reba to contribute much to our understanding of the problem.

Technically speaking, the Port has only begun to address the issues of de-icers. They have not addressed toxicity in any meaningful way, particularly with regard to the additives found in commercially available deicing chemicals. In the absence of toxicity testing during de-icing events, they have not provided information sufficient to eliminate the likelihood de-icers are a substantial detriment to surface water quality as a result of their use at STIA, and would be greater detriment if the third runway were built.

The Port's Proposed Modification to the National Pollution Discharge Elimination System (NPDES) Waste Discharge Permit Still Does Not Safeguard Fish and Other Aquatic Life in Project Area

The proposed NPDES Permit modification still does little to safeguard fish and other aquatic life in Miller Creek or Des Moines Creek, as each receives significant volumes of stormwater from the STIA. Any CWA Section 404 and 401 approvals, which assume that this permit will protect the waters and aquatic resources of project streams, would be flawed. The proposed permit modification changes very little when compared with the existing permit, yet the volume of stormwater will increase, as will the quantities of metals and other chemicals entering the project streams increase, if the Port's project is built.

There is no requirement in the permit to sample stormwater above and below each outfall, nor is there a requirement to model the transport and fate of key chemicals contained in stormwater in each watershed. By continuing to report the concentrations of chemicals and conventionals at each outfall prior to their discharge, the Port can maintain their claim that stormwater from STIA is no worst than what occurs in other urban areas, and that it has no effect on the aquatic life in Miller and Des Moines Creeks.

Des Moines Creek Flow Augmentation Preliminary Design Using SPU Water Still Leaves Too Many Unanswered Questions

While the Port has decided to employ sodium sulfite tablets to dechlorinate SPU water (Kennedy/Jenks 2000); that is, if they implement their preferred alternative, the Port has not presented any data on the efficacy of this treatment approach. With most dechlorination alternatives, there is residual free chlorine that can react with natural humic materials in the receiving waters to form a variety of chlorination by-products. In other words, most dechlorination systems are not 100 percent effective. As I stated in my initial reviews of the Port's plans forwarded to Tom Luster, WDOE, on August 21, 2000, and September 5, 2000, even with dechlorination, there is still a need to access (model) the fate, transport, and potential bioeffects of chlorine and chlorinated by-products with each treatment alternative the Port considers, because chlorine and chlorinated by-products are toxic to fish and other aquatic life at very low levels, i.e., 3-6 ug/L. Only in this way will the public be assured that the trout and salmon in Des Moines Creek will be protected.

The Port's assertion that removal of chlorine is the only treatment required has not changed and remains inaccurate. As I said in my earlier letters to Tom Luster at WDOE, fluoride is also found in SPU water at 1.0 mg/L, which is above the lethal or sublethal toxicity limits for many aquatic species. For example, using data from Angelovic et al. (1961) and Pimental and Bulkley (1983), the LC_{50} for rainbow trout exposed to sodium fluoride at a hardness of 12 mg/L (typical hardness of Des Moines Creek in wet season) was estimated to be 0.2 mg/L (Foulkes and Anderson 1994). Fluoride was also found to mask olfaction and adversely affect migration in salmonids (chinook and coho salmon) at concentrations < 1.0 mg/L (Damkaer and Dey 1989).

Fluoride also may not be reduced to harmless levels employing current waste treatment technology. Principal fluoride removal methods are precipitation by lime, absorption on activated alumina, or removal by an ion exchange process, all of which are expensive, and may not remove fluoride below 1-2 mg/L level (Liu et al. 1997). This level of efficacy, as determined in my previous assessment, will not be fully protective of fish and other aquatic life.

While the Port has acknowledged that there could be differences in temperature between SPU water and Des Moines Creek water, it only proposes to address the potential effects of different temperatures after flow augmentation begins. The Port's plan "includes monitoring and testing during the first year of operation to determine the effects of

various temperature settings on downstream temperatures, and determining optimal augmentation rates to achieve desired results." Clearly, if it proceeds as it says, there could be serious impact (thermal shock to fish and other aquatic life) in Des Moines Creek during the first year of augmentation. The alkalinity and pH will be lower in drinking water when compared with Des Moines Creek and also may have to be adjusted upward to avoid osmotic shock.

The unknown is the extent to which changes in ambient water quality will occur over the length of Des Moines Creek if SPU water is used for augmentation. To address this unknown, the Port will need to complete its application and prior to agency approval, carefully model the transport and fate of chlorine residuals, fluoride, and other water quality parameters, taking into consideration differences in treatment efficacy, flow regime, and rate of augmentation. Only in this way, can the Port provide the agencies with sufficient scientific information to determine whether or not there is reasonable assurance that treated SPU water will not harm fish and other aquatic life, including federally threatened chinook, that occur in Puget Sound at the mouth of Des Moines Creek.

Discharge Velocities of Proposed Stormwater Detention Facilities Not Established

Additional temporary and permanent stormwater detention facilities and outfalls are to be constructed to allegedly mitigate impacts from the proposed third runway construction activities and new, impervious surfaces. Seven temporary ponds, four permanent ponds, and two treatment facilities are to be constructed and operated.

In my opinion, additional point-source discharges to Miller Creek will occur with the possibility of increased local impacts if all the proposed stormwater detention ponds and treatment facilities are built. Below each outfall on the creek, there will be an area of scoured substrate, which will likely increase or decrease in size as a function of discharge velocity. Scoured stream substrate is poor habitat for fish and other aquatic species.

While the Comprehensive Stormwater Management Plan prepared by Parametrix (2000d) includes the volumes and discharge velocities for existing detention facilities on Miller Creek, the discharge velocities for the proposed outfalls are not presented. It is suggested in the Preliminary Comprehensive Stormwater Management Plan (Parametrix 2000d) that flows and water quality from the proposed stormwater detention facilities will meet requirements of King County's Surface Water Design Manual (KCC 9.04) but there is no specific assessment of potential impacts associated with the construction of these facilities. Again I am left with the impression that I should simply "trust them" to build facilities that have little or no adverse impact but without the design data and analysis on which to base that trust.

Low Stream Flow Impacts are Underestimated

There are likely significant problems with the Port's Low Stream Flow Analyses (see Comprehensive Stormwater Management Plan [Parametrix 2000d]) in that the predictions may underestimate summer low flow impacts and overestimate the contributions of proposed mitigation and natural mitigating factors. For example, one option that the Port proposed in mitigation of predicted low stream flows is the use of "additional storage volume in the base of selected detention facilities, that can be used to store winter (wet) season runoff until needed to support low flows in the summer (dry) season." According to Mr. William Rozeboom of Northwest Hydraulic Consultants, Seattle, Washington (also working on behalf of ACC and submitting comments), some of the proposed detention facilities that are to be used in this way do not have "dead storage" capacity for reserve storm water release, with the result the total proposed storage falls short of the target volumes. Mr. Rozeboom also points out that the potential mitigating effect of the "fill infiltration discharge" from the proposed runway embankment to Miller Creek is overestimated, and that the "IWS lagoon lining improvements" would specifically reduce recharge for Walker and Des Moines Creeks. For these reasons and others (see the full text of Mr. Rozeboom's comments), the Port's conclusion indicating that base lows will not be diminished beyond the values presented in Table 5 (page 18) of the Biological Assessment – Supplement (Parametrix 2000) is in serious doubt. Clearly, flow reductions have not been established with any degree of certainty.

Again, we are left with the impression that we should simply "trust" the Port; that their analyses are accurate, and that declared future STIA development will not further diminish flows during the summer (dry) season. From a fish or fish habitat perspective, it is my opinion, that if flows fall below 1.0 cfs, impacts to anadromous as well as resident fish species will likely occur, and over the entire length of the streams on the project site. If flows diminish, depths will surely decrease resulting in elevated temperatures and lower DO tensions. Fish and other mobile aquatic life could be displaced to other reaches of the stream where preferred conditions persist. Diminished flow and depth could also limit movement of fish throughout the stream length and conceivable lead to stranding and mortality of larger fish.

There is increased likelihood that low stream flow impacts on fish and other aquatic life in project streams will occur. Because of flawed simulation modeling, the Port does not possess scientifically credible information to indicate that impacts will not occur. It is incumbent upon the Port to complete its application and prior to agency evaluation revise its analyses as necessary, addressing the issue raised above.

Cumulative Impacts Are Not Assessed

Unfortunately, there is no attempt to link any of the proposed construction projects on either the Miller Creek or Des Moines Creek Watersheds, yet there is potential for cumulative impacts. Each of the proposed construction projects or discharges in their respective watersheds, as presently described and assessed, stand alone and are not

evaluated in the context of the overall change that Miller Creek, Walker Creek, or Des Moines Creek will undergo if the Port is permitted to build the third runway. Even if the Port does not believe there will be cumulative impacts, they are remiss for not considering this possibility and providing a rational assessment. Their work must be viewed as incomplete if they do not carry out this assessment.

One approach that could be taken to address the cumulative impacts of chemical additions and altered water quality is to conduct an aquatic ecological risk assessment. New risk characterization procedures are available that are quantitative, probabilistic, and provide community-level estimates for risks, and generate measures of uncertainty in the risk estimates. Estimates of risk for individual chemicals, as well as estimates of the total (cumulative) risk from multiple chemicals or conventional water quality factors can be calculated. What is required for this analysis is knowledge of the different organisms that inhabit the project streams, their toxic response to different chemicals (e.g., lethal dose to 50% of the test population [LD_{50}]), and their exposure (dose) to the same chemicals. One such risk assessment method, *Aquatic Ecological Risk Assessment, A multi-Tiered Approach* (Parkhurst et al. 1996) has recently undergone extensive validation and has been reviewed and accepted by the USEPA. The method performs well with metals, pesticides, other organic chemicals, where the exposure is in water, sediments, or from internally deposited chemical residues.

Thank you for the opportunity to comment on these issues. I am available by phone, email, or in person, to discuss any of my comments in greater detail.

Yours very truly,

John A. Strand, Ph.D.
Principal Biologist

Cc: Kimberly Lockhard
Peter Eglick

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Attachment

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Water Resources Consulting L.L.C.
Peter Willing, Ph.D.

February 16, 2001

U.S. Army Corps of Engineers
Regulatory Branch
P.O. Box 3755
Seattle, Washington 98124-2255
ATTENTION: Jonathan Freedman

Washington State Department of Ecology
3190 160th Ave. S.E.
Bellevue, Washington 98008-5452
ATTENTION: Ann Kenny

RE: Department of the Army Section 404 Permit Application, SeaTac Airport
Reference: 1996-4-02325

Dear Mr. Freedman and Ms. Kenny,

The following review of water quality and water management aspects of the plan for SeaTac Airport comes to you at the request of the Airport Communities Coalition. I base my statements on 30 years of experience in reviewing major projects for water quality and water quantity impacts. My resume summarizes this experience and is attached.

I have referred to the following documents in the course of this review:

- Comprehensive Stormwater Management Plan, Master Plan Update Improvements, Seattle Tacoma International Airport. Prepared for the Port of Seattle by Parametrix, Inc. December 2000; previous versions of August 2000 and November 1999.
- Annual Stormwater Monitoring Report for Seattle Tacoma International Airport, July 1, 1999 - June 30, 2000. September 28, 2000.
- Seattle Tacoma Airport Master Plan Update Low Streamflow Analysis. Earth Tech, Inc., December 2000.
- NPDES Permit No. WA-002465-1, dated January 25, 1999, and its appurtenant Fact Sheet.
- National Pollutant Discharge Elimination System Discharge Monitoring Reports for SeaTac Airport, Port of Seattle, Permit no. WA-002465-1. 1998-2000.
- Des Moines Creek Basin Plan, November 1997
- King County Surface Water Design Manual, September 1998

The following section is a summary of my analysis:

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Peter Willing, Ph.D.

Since the August 2000 version of the Stormwater Plan, there has been a disturbing lack of improvement in the features of the airport plan that bear on water quality. These features will greatly diminish water quality in the streams and aquifers surrounding the SeaTac area. There is no basis for Clean Water Act Section 401 certification or Section 404 approval. I will summarize the broad issues before proceeding to detailed comments.

- The Port of Seattle's plan for stormwater management is to divert flow from the stormwater system to the industrial waste system. This in effect diverts it from the Des Moines and Miller Creek basins, through the Renton treatment plant discharge, to Puget Sound. This hydrologic re-definition of the SeaTac area watersheds has the effect of concentrating a modestly reduced pollutant load into a greatly reduced annual runoff volume. By intercepting recharge, it has the potential to aggravate water quality problems in streams that are already heavily degraded. It also violates Governor Locke's certification of June 30, 1997 to the Secretary of Transportation, that "The Port of Seattle will design and construct the third runway such that the project will not cause changes in the location of the hydrologic divide between Miller and Des Moines Creeks in a manner that alters the average instream flow of either creek."

- A consistent direction in the Plan is the disposal of water-borne pollutants to biofiltration swales and filter strips. This approach anticipates permanent shallow soil disposal for long-lived pollutants. The harmful consequences of this decision have not been addressed in the Plan.

- The Low Streamflow Analysis reports a variety of modeling simulations. Estimates of low flow behavior were based on statistical analysis of the results of a model simulation. They were not based on actual flows, and thus they are an abstraction from reality. There are doubts about the applicability of the model calibration to actual low flow conditions. These results are used to develop low flow targets for stream systems that have been degraded by generations of man-made interference.

- The fate and transport of contaminants in SeaTac soils is an inescapable complication of any new construction at the airport. There is an acknowledged 50-year accumulation of contaminants, and proposed airport expansion activities will disturb and mobilize them. Instead of making systematic provisions for dealing with them, the Port appears to be counting on an ad hoc response when it can no longer be avoided.

- Existing Best Management Practices for stormwater at the airport have not been working, based on measured water quality parameters, partly because they were not designed for the water treatment problem at hand. Yet the Port of Seattle plans to install more facilities that,

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like the existing ones, come from the King County Basic Water Quality Menu. The plans will result in perpetuation of water quality violations. The Port offers no assurance that water quality violations will not continue and increase as a result of the proposed project.

Existing stormwater discharges from SeaTac Airport continue to exceed the Washington State Water Quality Standards on a regular basis. These discharges are routed to Class AA streams that are on the 303(d) list of impaired waters. The streams themselves do not meet the state water quality standards, and many of the beneficial uses they should support have been compromised. There is no doubt that the state water quality standards are being violated. The stormwater plan relies on measures that will result in continuing future violations. Therefore the December 2000 version of the Stormwater Management Plan fails to constitute reasonable assurance that water quality standards will be met.

The above points are further explained below in comments on specific sections of the Stormwater Management Plan and accompanying documents.

Stormwater Management Plan

Volume I, page 1-2 describes a "specific objective" as follows:

> Enhance stream low flows by ceasing the exercise of existing surface water rights (obtained by the Port through property acquisitions) on Miller Creek, supporting and participating in the Des Moines Creek Basin Committee's flow augmentation project on Des Moines Creek, incorporating infiltration into stormwater detention facilities where feasible, and if necessary, supplementing low flow with stored stormwater.

The promises in this section deserve to be examined one at a time. Three out of four of the promises appear to be uncertain or exaggerated. Relinquishment of water rights in Miller Creek turns out to be a net loss of water if it is balanced against termination of water imports into the basin. The Des Moines Creek Basin Plan was developed to deal with past ills, and does not pretend to have the resources or intent to mitigate Port watershed damage in the future. Further, no source of water has been obtained for this project. All of the conceptual sources that the Port has proposed have fatal flaws, which will be discussed in a later section.

Page 2-7 section 2.2.1 (in language unchanged from the August version) reports in narrative form an optimistic and idealized view of stormwater quality at the Port:

> Source controls and treatment facilities are implemented throughout STIA for all activities. This infrastructure is continually updated via an adaptive management process by which (1) BMP's are implemented, (2) monitoring and inspections demonstrate BMP effectiveness, (3) BMP improvements are made when necessary, and (4) follow-up sampling demonstrates that the improvements are effective. . . .

This description greatly exceeds the actual experience, which is a record of permit violations, unmet water quality criteria, and 303(d) listings for SeaTac area streams. In the face of this situation, section 2.2.2 (p. 2-6) says "ongoing water quality monitoring may indicate the need for future water quality BMP's."

Page 2-7, Section 2.2.2.2 recites a variety of facilities from the King County Basic Water Quality menu that will be used to manage the quality of water running off airport properties. The Plan does not mention the loading rates, ultimate fates, and mass balance relationships for major pollutants. They are all treated as if they just go away. The filter strip section on page 2-8 talks about "removal of metals and organic compounds is also significant, as these pollutants typically bind to trapped particles and/or the organic material in the soil and vegetation." In fact, filter strips are not very effective at removing anything but sediment. King County pointed this out in its review of the last (September 2000) version of the plan, but it remains unchanged. King County made it clear that if the SeaTac plans had been processed under the Large Site Drainage Review, the Port would be expected to produce BMP's with performance standards specific to the proposed conditions and contaminants. The consequence of the Port's stormwater management strategy is a high level of contamination in the surface soils. At anticipated rates of input, many pollutants such as metals, organics, and petroleum products will build up to substantial amounts. The dissolved air floatation sludge resulting from the industrial wastewater treatment process is classified as a hazardous waste, but the same materials in the stormwater system are simply disposed to land. Re-mobilization in relatively large slugs by heavy rains has not been assessed.

Page 4-13 says that 68% of the existing airport area that generates pollution is treated by facilities that are up to modern design standards. This leaves 32% that is not so treated, under existing conditions. These percentages do not agree with the accompanying table (4-6), which does not total treated and untreated acreages. If it did, it would show 55% treated and 45% not fully treated.

Page 4-15, Section 4.5.1.2, Subbasin PGIS Areas, informs us that "for the purposes of this initial assessment, roof tops were assumed to be non-PGIS [non-pollution-generating impervious surface]." Other documents make it plain that these surfaces do produce pollutants. Appendix T shows building roof surfaces that add up to approximately 5.2 acres of bare metal roof (an increase of one acre since the August estimate), plus a substantial area that has not been inventoried. These areas are mostly in subbasin SDN1, which has shown numerous permit violations for zinc, copper, and lead. The Annual Stormwater Monitoring Report that was completed in September 2000 says that Whole Effluent Testing (WET) led to zinc from two metal roofs as a suspected toxicant.

Page 4-15, Section 4.5.1.3, BMP Inventory, says that "Bioswales were conservatively assumed to be trapezoidal, 6-ft-wide at the base, 2-inch-deep flow (regularly mowed), with 3:1 side slopes." One would expect a Stormwater Management Plan to have more than assumptions about the geometry of existing bioswales, especially as there are only four of them shown. They total 0.53 acres, which are supposed to serve 99 acres of future PGIS. This ratio is hardly plausible, particularly if the characteristics of the swales are all assumed. The Plan lacks a specific inventory of dimensions, treatment capacity, and performance levels for the anticipated waste stream. Without it, we have no assurance that the waste stream is being treated at all.

Page 4-15, Section 4.5.2, SDS Water Quality, claims that

> overall, the data show that the concentration of various constituents in STIA stormwater are generally less than those in runoff from other residential, urban, and industrial areas in the region. For example, the median concentrations for STIA constituents are lower than those in urban stormwater , with the exception of total

> recoverable copper. These data provide evidence for the efficacy of BMP's that have been implemented by the Port . . .

This set of claims is misleading on three counts: 1) it deflects attention from the fact that there has been a consistent history of permit violations and an unsatisfactory track record for existing BMP's; 2) it is of no relevance in assessing water quality impacts how the airport compares itself to the region; 3) a median of reported values is a meaningless indicator of water quality performance.

Table 4-8 (page 4-17) has been changed from the August version only by showing lower "median" values for SeaTac. It purports to back up the claim that SeaTac runoff is better than other developed areas in the region. However the metal values do not show any accompanying hardness values, in the absence of which they cannot be compared. Furthermore, they are "median" values for subbasin SDS3, which has contributed part of a long history of violating state water quality criteria for metals. The Port's Annual Stormwater Monitoring Reports have showed these violations in the past, but the most recent one for July 1999 through June 2000 attempts to hide the fact more securely than the previous ones. Instead of showing hardness data that corresponds with the metal sampling sources, it substitutes an across-the-board hardness value of 56 mg/l which purportedly is the median of seven samples collected in 1999 – data for which are not shown. Using a median value is a deception anyway, because it hides the violations in a pool of lower values. Besides, 56 mg/l is higher than any hardness values the Port has reported before: the median of 12 values reported in the last Monitoring Report is 14 mg/l. Under the State Water Quality Standards, even if one accepted the invalid notion of the 14 mg/l median, all of the five values shown in Appendix B are in violation, by up to 9 times the chronic toxicity standard for copper, and 7 times for lead. The effect of this distorted and selective use of the data is to make it look as though the metals analyses comply with the water quality standards, when in fact they do not.

On p. 4-18 (unchanged since August), the Port mentions only one specific discharge point, SDS1, for which "copper and zinc concentrations have dropped significantly," but shows no data to back up the claim. The Port does not mention the other outfalls in the stormwater system, which have not had a clean record. A far more useful way to portray the relevant information would be a tabulation of outfalls, with a water quality summary of each, and the state water quality standards for comparison. This would let the reviewer see what the situation is, where the problems are, and what needs to be done about them.

Page 4-18, Section 4.5.2.1, Metals and Hydrocarbons, offers a summary of water quality results based on relative statistics:

> Concentrations of these pollutants in STIA runoff are typically lower . . . more than 95% . . . were below levels found in urban runoff from other sources . . . 36% of the samples collected since March 1998 have had TPH concentrations less than the detectable limit . . . 75% of the lead, copper, and zinc . . . were below the median from comparable regional urban data.

There is little information in this summary. Average and median values are meaningless, because they say nothing about total mass loading or extreme concentrations: the argument is like the driver of an automobile claiming to drive the speed limit more often than other drivers.

Page 4-18, Section 4.5.2.2, Fecal Coliforms: the last two versions of the stormwater plan reported bacterial identification studies, but changed the conclusion. This section has been re-written to say that sanitary sewage is not the source of fecal contamination. The new evidence is not presented, nor are its contradictory conclusions explained, nor is a new candidate fecal source identified. If the Port has developed scientific data with sound methods, it should report the results so they can be evaluated. The substantial methodological limitations of bacterial source tracking techniques are reviewed in Sargeant (1999). The reviewer is forced to assess this section as an indefensible exercise calculated to shift responsibility for bacterial contamination away from the Port.

Page 4-18, Section 4.5.2.3, Suspended Solids: The median values of Total Suspended Solids tell us nothing. The important number to notice is the water quality criterion, which for AA waters is 5 NTU or 10% over background. Without the background levels, the suspended solids information is no more than empty statistics.

Page 4-20, Section 4.5.3, IWS [industrial waste system] Treatment Performance, announces that according to data from Port Discharge Monitoring Reports, effluent water quality limitations have been met since November 1996. The DMR's bias the picture however, because they show results from composite samples taken on a routine schedule, and do not show higher values that would be collected during storm events – when IWS overflows would be likely to happen. The analysis purporting to show zero overflow events in a 50 year period depends on continuous full capacity operation of the wastewater pumping system during winter (King County comments on September Stormwater Plan, 2000, p. 2). Nor does the plan say anything about the violation record shown in the Discharge Monitoring Reports for the stormwater outfalls that drain to local streams.

Frequency of IWS overflow to the stormwater system is a major determinant of water quality in receiving streams. Runoff from a large land area has been diverted to the IWS. Overflow frequency is a function of treatment capacity and storage. The storage capacity has apparently been increased from 47 to 72 million gallons, but at the expense of 11.5 acres of open water within 2,500' of both runways 34L and 34R, and mostly within the runway protection zone of 34L (Kennedy/Jenks, Industrial Wastewater Lagoon 3 Expansion Project, drawing STIA 0009-G-2; approved for construction by Ecology, 7/24/2000). (Because the Port has furnished few design details, the 11.5 acre number has to be derived from a stage-storage relationship based on the plans.) This feature cannot be reconciled with FAA Advisory Circular 150/5200-33, which has a siting criterion that no waste water settling ponds will be created within 10,000' of a jet aircraft runway.

The Stormwater Management Plan has several sections that refer to flow augmentation. Comments on these sections will be found in a separate part of these comments that is reserved for that subject.

Page 7-3 announces that "water quality for the third runway drainage is expected to be similar to that measured in subbasin SDS3 in recent years." This news is not reassuring, in light of the fact that the Port's Discharge Monitoring Reports for 1998-2000 show that this discharge has a sustained record of violation of the copper and zinc water quality standards.

Page 7-4 describes proposed expansion of the south aviation support area (SASA). Of 93 acres of new impervious surface, 58 will be diverted out of the basin to the industrial wastewater system; 35 acres will be routed to Des Moines Creek either directly or through biofiltration swales. Although there are numerous references to a new detention pond, including a size of 33.4 acre-feet on page

6-5 and Figure 6.1, there are no detailed plans in any of the Appendices (such as D or H) where one would expect to find them. A footnote on p. 7-4 discloses only the cryptic information that "SASA stormwater runoff may be discharged directly to Des Moines Creek after treatment. The SASA pond will then be designed . . ." in the future. For the present, there appears to be no detention pond at all for 98 acres of new impervious surface in this basin. With over half of this acreage draining to the IWS, these changes will bring about a massive hydrological redirection of the basin, in violation of Governor Locke's certification. Essentially 8 bioswales are expected to replace the varied wetland functional values of the existing land cover, which consists largely of mature vegetation (NHC, 2001).

Page 7-10 reports that retrofitting over 80 acres in subbasins SDS3 and SDE4 with conventional treatment BMP's will be impracticable. These are two of the subbasins that have reported discharge permit violations for metals in the last two years. It appears that the Port plan is to continue to discharge flows that violate the water quality criteria into the stormwater system as before, and passively hope for new BMP ideas to emerge. The same approach is anticipated for the Terminal drives. These proposals are not an adequate basis for section 401 certification.

The retrofitting section lists as treatment BMP's "routing of rooftop runoff through a Basic Water Quality Menu treatment BMP." Sedimentation will do nothing whatsoever to treat the runoff, which has dissolved metals but few suspended solids. This deficiency was carefully explained by King County (2000, p. 16) after the last version of the stormwater plan. No change has resulted. Without proper provision for the pollutant load of stormwater runoff, 401 approval must be denied.

Flow Augmentation for Des Moines Creek

The Port of Seattle's inability to propose a reliable and convincing water source for flow augmentation in Des Moines Creek was one of four reasons why the Port was forced to withdraw its application for a 401 permit in 1998 (see letter from T. Luster to E. Leavitz [sic] , September 25, 1998). The Port has not yet made up its mind how it plans to meet this obligation, much less "resolved" the issue beyond the narrow semantic terms of the facilitated negotiations in late 2000. The complete lack of certainty of outcomes for Des Moines Creek is underscored by the following chronology:

- Implementation Plan for the Des Moines Creek Flow Augmentation Facility, July 25, 2000. The "preferred option" in this version of the plan was to use water from a port-owned well.

- Revised Implementation Plan for the Des Moines Creek Flow Augmentation Facility, August 18, 2000. This version of the plan maintained the preference for the well source, but also discussed Seattle water.

- Flow Augmentation Update, email from Keith Smith to Tom Luster, September 6, 2000. This revision stated that "the primary source is water from Seattle Public Utilities."

- Des Moines Creek Flow Augmentation Preliminary Design," written by Kennedy/Jenks Consultants for the Port of Seattle, dated September 2000. This version says that water from SPU is "currently the preferred source" of flow augmentation water.

- The Port's Stormwater Management Plan of December 2000 says the water will come from the existing Port-owned well on the Tyee Golf Course.

- The Low Streamflow Analysis of December 2000 says that the Port proposes to construct additional stormwater storage facilities that would hold stormwater for later use in augmenting dry season low stream flows.

- The Port and Ecology appear to have agreed that there will be "no Separate Flow Augmentation Plan" for Des Moines Creek or any other creek; but that other documents produced for public comment will describe the facilities, monitoring, and operation (SeaTac Airport Third Runway 401 Permit Negotiations, Meeting Notes Summary; January 3, 2001). No such documents or description has emerged, however.

- The port is still "investigating other sources of water in the basin" (Dennis Ossenkop memorandum dated January 10, 2001 to Nancy Brennan-Dubbs; Response to USFWS Questions)

The existing documents are all incomplete, conflicting, inconsistent, and make it clear that no reliance can be placed on the Port of Seattle's handling of this important problem.

In the December 2000 Stormwater plan, p. 6-10, the "preferred plan" has reverted to the old Highline Water District well #1. The plan to use the well conflicts with information on p. 1-2, and in the Low Streamflow Analysis, which says (p. 15-20) that seasonal carry-over stormwater storage will be used for flow augmentation in Des Moines Creek. The Port of Seattle appears to be using whichever source suits the argument of the moment, hoping that several partial inconsistent plans will add up to one acceptable plan.

Page 6-11 of the Stormwater plan offers some details about how Des Moines Creek flows will be augmented according to monitoring instrumentation at the gauge at 200th St. This gauge is King County 11F, which has no rating curve. The weir is wide, so that a large variation in flows is represented by a very small increment of gauge height, leading to an insensitive control on the pump. The Port is proposing a delicately balanced feedback system to protect the flow in Des Moines Creek. As described, it will not work: it will fail to turn off and on at the right times. The proposed 19°C set point for temperature control is 3° above the water quality criterion. Reasonable assurance has to be based on a workable plan.

The December 2000 Stormwater plan, Page 7-21, Section 7.7.5, promises that the Port will "work with" the Des Moines Creek Basin Committee to implement the flow augmentation project. Mitigation for the third runway construction is a sole responsibility of the Port, and should not be confused with the purpose of the Committee's Basin Plan. The Committee Plan was developed to identify and remediate long-standing existing water quality problems, not to take on the new burdens on the Creek that the Port proposes.

All of the three major flow augmentation schemes that have been floated by the Port have serious defects that disqualify them as a contribution to the "reasonable assurance" the Port is required to provide. I will treat them one at a time.

Existing well on the Tyee Golf Course:

The Port came to an agreement with the Highline Water District about the former Highline well #1, on the golf course. This well was not used at all for a period of years, and then was used without benefit of a water right for many more years. It is highly unlikely there is a valid water right for the well. The administrative process to determine whether there is or not has not proceeded beyond the preliminary stages.

This well was not legally constructed under state law, the water right for it has probably expired, and it is not capable of making any contribution to reasonable assurance that the flow augmentation plan will work. The well exploits three different aquifers in a common casing, in contravention of state guidance on protecting upper aquifer zones. The revised flow augmentation proposal of August 18, 2000 contains several pages from an unidentified document with pages numbered 34 and 37, and some King County drawings. Page 34, 2nd para under "Assessment of Existing Well" has a description of well #1. There are several errors in this paragraph. It equates perforations with screens. They are not the same. "The second [set of perforations], between 190 and 243 feet, has an aquitard that makes it a confined aquifer." While there may be a large degree of confinement in this horizon, it is hardly an absolute – there is unquestionably some degree of vertical leakage. The discussion neglects to discuss the third set of perforations that are described on the well log, between 511' and 541', and it does not show on Figure 13.

The Port would have us believe that 35' of screen on an 8" casing at a depth of 511' to 541' is out-producing a total of 141' of perforated 12" casing at much shallower depths. This is very difficult to believe: the longer, larger diameter, shallower open interval would produce most of the water . "The well is configured so that the lower aquifer contributes the most flow." This statement is patent wishful thinking. Well #2 is screened in the upper aquifer, above 130' depth. The Port thinks this is different from Well #1, which is perforated from 72' to 160'. The same logic should apply to both: "Withdrawal from this aquifer would probably have an impact on Des Moines Creek recharge."

The Port's Figure 13 has further discrepancies that do not agree with the well log. It shows a "lower aquitard" consisting of "clay" of indeterminate thickness below 245' depth. The well log shows "Sand, clay, gravel;" "Fine sand and clay;" for this part of the well. To interpret these descriptors, one must acknowledge the well driller's convention of listing the most abundant materials first in the lithologic characterization. The materials described do not constitute an "aquitard." The effect of this discrepancy is to understate the degree of hydraulic continuity between Des Moines Creek and the producing horizon proposed for an augmentation water source. In all likelihood, the aquifer discharges naturally to the creek, and if the Port pumps it into the creek it will not be augmenting anything. In January 2001 the Port suggested "packing off" the upper cased intervals of the well. Clearance for this concept would have to follow a laborious showing that it will work. Before any reliance can be made of this well, it must be subjected to a detailed hydrogeologic analysis, inspection, and testing; in the end it still may not work.

Water from Seattle Public Utilities:

Temperature improvements claimed for the Implementation Plan cannot be realized with water from the Seattle distribution system. The first iteration of an Implementation Plan (under cover letter from

Keith R. Smith to Tom Luster, July 25, 2000) proposed a temperature target of 16°C for Des Moines Creek flows. In fact 16°C is the water quality standard for Class AA streams. The revised plan does not mention the temperature criterion. Even with cool water, attaining a target temperature of 16°C could require more than 1 cfs of augmentation water. Seattle Public Utilities staff data show that Lake Youngs water sometimes reaches 20°C in September. When it does so, during the time when supplemental water is most needed, it will not be acceptable for flow augmentation.

The SPU scheme relies on technological inputs whose continuity cannot be assured. There is a fundamental weakness in a mitigation plan that depends on technological inputs, such as chemicals, electronic sensors, programmable controllers, and large horsepower pumps. This point has been raised by the Corps, in its comments: "We discourage the use of structures in a mitigation site that might need direct human interaction over long periods of time to operate." (Terzi and Freeman to J. Kelly, Parametrix, August 11, 2000). The point was made emphatically in the Battle Mountain Gold decision also (Pollution Control Hearings Board, 2000). The Port has assumed that an SPU augmentation water supply would be non-interruptible (p. 2, top paragraph), but negotiations for a water purchase agreement with the City of Seattle have been suspended.

Delivery of water from the Seattle Public Utilities distribution system would entail 4,500' of 6" or 8" diameter pipeline from the present end of the distribution system to Des Moines Creek. This is a major construction project, that will require at least a 10' construction path, probably more; a pipe buried as much as 4 feet, bedded in pea gravel, the trench to be backfilled with pit run gravel. Yet "No wetlands will be affected" is the Port's summary of effects of this project. The pipeline would have to be routed around wetland 28, which is 35 acres, is discontinuous, and surrounded by other non-jurisdictional wetlands.

The SPU water would have to be purged of drinking water conditioning chemicals. The Port of Seattle has clearly not done its homework on this score. Obviously chlorine has a high toxicity to fish and cannot be tolerated in an augmentation flow. WAC 173-201A-040, the Washington State water quality criteria, specifies a maximum of 19 µg/l maximum 1-hour concentration of chlorine in a 3-year period. Fluoride is also a problem: the City of Seattle follows standard practice in applying fluoride to its water supply system, at concentrations designed to achieve a concentration of 1 mg/l at the point of service (APHA-AWWA-WPCF, 1989). To achieve the target concentration at the customer's tap means that it has to be slightly higher in the distribution system. Fluoride is applied to Seattle's Highline wells at the wellhead. Fluoride at 1 mg/l has been shown to cause mortality and morbidity in salmonids and other aquatic organisms (Strand, 2000). Fluoride will have to be removed from the water used for flow enhancement, and the Port implementation plan is totally silent on the matter.

Carry-over storage of stormwater:

The Port's Low Streamflow Analysis of December 2000 proposes a heretofore unmentioned scheme to use carry-over stormwater storage to augment streamflows in Des Moines and Miller Creeks. The scheme is to capture and store 8.9 acre feet in the Miller Creek Basin and 7.1 acre-feet in the Des Moines Creek basin. The storage facilities will presumably have to consist of additional depth in underground vaults, because open ponds would attract birds. The December plans (Appendix D, figures C139, C150, C151) show 7.2 acre feet of carry over storage in two vaults in the Miller Creek basin, but there is no indication of where the remaining 1.7 acre-feet will be stored. The plans show 1.8 acre-feet in the SDS4 vault on Des Moines Creek, but do not account for the remaining 5.3 acre

feet of required storage in that basin. The drawings show a dead storage discharge line in the bottom of the vault. If built as shown, the first discharge to the receiving Class AA streams which would already be under stressed low flow conditions, would be an anoxic slug of accumulated silt and sediment carrying a year's worth of adsorbed pollutant load. Contrary to the facilitated arrangement with Ecology in December, there is not a word about operational procedures to make this approach to flow augmentation effective. Because this idea has never come up before, and because it has no design or operational details, one is forced to assume that the concept is an afterthought. It by no means has the strength to carry the burden of reasonable assurance.

The Stormwater Management Plan, p. 6-3, section 6.1.4, "Water quality of stormwater stored in vaults" is optimistic that stormwater stored for as much as six months will be of adequate quality to discharge to streams during low flow periods. No examples of successful installation or operation of such a scheme are offered. The scheme has not been developed to the point of design or operational specificity.

The Port has careened from one concept to another, encountering difficulties, and responding by thinking up another augmentation water source. None of them has been proven up, and none of them offers a reasonable assurance that water quality standards will be met in Des Moines Creek.

Low Streamflow Study

The Low Streamflow Analysis reports a variety of modeling simulations, and non-modeling tweaks to improve these simulations where the models are known to be inadequate. Estimates of low flow behavior were based on statistical analysis of the results of a model simulation; not based on actual flows; thus they are an abstraction from reality, and as such are speculative and uncertain. There are no estimated error bands or confidence limits on the analysis, that would show how far off it could be. There is a very short record of actual flows, and no indication of if, or how, they were used as a reasonableness check on the model-based results. These results are used to develop low flow targets for stream systems that have been degraded by generations of man-made interference.

The flow diagram that illustrates the HSPF model structure (Appendix D, Figure 3) shows an increase in Des Moines Creek effective impervious area between 1994 and 2006 of 198 acres. It also shows the basin increasing by 16 acres. These figures do not agree with the Stormwater Plan, which says that the Des Moines Creek basin will experience 128 acres of new impervious surface. Des Moines Creek's share of the 111 acres of new IWS tributary area is not specified. For Miller Creek, these two sources of information show a discrepancy of 27 acres of impervious surface and the Miller Creek basin loses 44 acres of overall tributary area. These discrepancies are sufficient to undermine any confidence in the predictions of effects on low flow behavior that will result from airport expansion.

The Low Streamflow Analysis claims that most of the runway runoff will infiltrate into neighboring grassed filter strips as "secondary recharge." No specific analysis of these filter strips or their infiltration capacity has been carried out since the last version of the Stormwater Plan. There is a danger that the infiltration capacity of the filter strips could be occupied by direct precipitation on the strips themselves, so the soil reaches saturation, and will accept no further infiltration from offsite; then the runoff from the runways will be forced to continue on the surface.

Fate and transport of contaminants in SeaTac soils

There is a 50-year history of spills and intentional land disposal of jet fuel, aviation gasoline, other petroleum wastes, and of a variety of other contaminants around the SeaTac Airport Operations and Maintenance Area (Agreed Order of May 25, 1999 pursuant to the Model Toxics Control Act ("MTCA," RCW 70.105D). Specific contaminants found on the airport site include numerous known sites with multiple dozens of compounds such as benzene-ethylene-toluene-xylene, heavy metals, volatile organics, and total petroleum hydrocarbon (TPH) species. Some of these materials have found their way into the local groundwater. Some are lying in wait below the surface, for the next subsurface construction job to expose them. Port contractors have identified the City of Seattle Highline wellfield; the Highline Water District; King County Water District 54; private drinking water wells; Des Moines Creek; and Miller Creek as "potential local receptors" of exposure to these materials (AESI, 2000b).

Numerous major construction projects are both underway and proposed at the airport in areas that are known to contain contaminated soils above MTCA cleanup levels. One example is the Aircraft Hydrant Fueling System. Environmental review of this project consisted of a Declaration of Non-Significance and accompanying Environmental Checklist dated respectively October 6 and 5, 2000. This one project entails construction of approximately 7,000 lineal feet of pipeline, with as much as 350,000 cubic yards of excavation and corresponding backfill. The route transits an area of known soil contamination left over from the old Continental Airlines hydrant system (AESI, 2000b, figure 2). Other areas of contamination are not precisely known, and the first specific knowledge of them will come from a backhoe operator.

Trench backfill for the hydrant piping will most likely consist of coarse-grained gravelly material. Shallow infiltrated stormwater, and any contaminants in the shallow soils, will readily follow the outside of the pipe in the permeable backfill material. The backfill can also act as a french drain, enhancing recharge into the shallow groundwater. Current and future construction activities will create preferential pathways for contaminant transport around the SeaTac site. The groundwater flow directions in the shallow (Qva) aquifer in the AOMA vicinity are to the west and northwest, which would lead the contaminant pathways toward the headwaters of Miller and Walker Creeks (AESI 2000b, Figure 7; Stormwater Management Plan, Appendix Figure B1-3).

The Port has adopted two approaches to dealing with contaminated sediments. One is to abandon the materials in place and assume that if they don't go away on their own, at least they will not go anywhere else. The other is to spread them out and dilute them below clean-up action levels, as was done with petroleum contaminated soil from the Crawford Fuel Tank Parking Area Remediation Project. The material from that site was "landfarmed," i.e. mixed with clean surface soils, at the IWS Lagoon 3 site (letter from Kathy Bahnick, Port of Seattle, to Chung Yee, Department of Ecology, August 29, 2000).

Environmental evaluation of the fuel hydrant system was dismissed with a Declaration of Non-Significance. The major groundwater modeling study that was required under the Agreed Order, and which was intended to evaluate potential groundwater pollution from the operations area, is in suspension because the Port has not allocated the funding to complete it. For an airport expansion plan whose cost is now estimated at $6 billion, the lack of $60,000 for a groundwater study is hardly believable. Until the Port completes a comprehensive evaluation of contaminant fate and transport,

as it promised to do under the Agreed Order, there can be no assurance that transport of existing contaminants will not violate water quality standards or pose a threat of environmental harm to local receptors.

Conclusions

In order to approve the expansion plans at Sea Tac Airport, the State of Washington must certify that there is a reasonable assurance that the project will not result in violations of state water quality standards. In order to allow the project to proceed with the filling of jurisdictional wetlands, the Corps of Engineers must receive the State's certification, and it must establish independently that the project is in the public interest based on, among other considerations, the project's environmental impact. My intensive review of the Port of Seattle's case, which I have conducted over the last fifteen months, leads me to the conclusion that the project does not meet its burden of proof in either case.

Thank you for taking into account these thoughts on the adequacy of the Port of Seattle's application for Section 401 and 404 approvals for its proposed SeaTac developments.

Sincerely,

Peter Willing, Ph. D.
Enclosure

References:

AESI, 2000a. Hydrogeologic Study, Industrial Waste System Plant and Lagoons, Seattle-Tacoma International Airport. Project BV98112. June 21, 2000.

AESI, 2000b. Seattle-Tacoma International Airport Groundwater Study. Project Overview/Conceptual Fate & Transport Model Presentation, October 4, 2000.

APHA-AWWA-WPCF. 1989. Standard Methods for the Examination of Water and Waste Water. 17th ed.

King County Department of Natural Resources. Enclosure 2. Final Review Comments on SeaTac Stormwater Management Plan.

Northwest Hydraulic Consultants, 2001. Comments on stormwater, hydrology, and hydraulics aspects of proposed 3rd runway and related development actions at Seattle-Tacoma International Airport. Comment letter provided to Washington Department of Ecology and Corps of Engineers.

Sargeant, D. 1999. Fecal Contamination Source Identification Methods in Surface Water. Department of Ecology Report #99-345. 19 p.

Pollution Control Hearings Board. 2000. Okanogan Highlands Alliance et al. v. Ecology and Battle Mountain Gold Company. PCHB No. 99-019.

C

STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

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January 21, 2001

Honorable Julia Patterson
Washington State Senate
422 John A. Cherberg Building
P.O. Box 40433
Olympia, WA 98504-0433

Dear Senator Patterson:

Thank you for your letter of congratulations last week. I am looking forward to the challenges of my new position in California, though I know I will miss serving the state of Washington. It has been a privilege to work on such challenging issues over the years, and I've appreciated the opportunity to help make a difference in protecting the state's waterbodies.

I am also providing this letter in response to your request for information on Ecology's review of the proposed SeaTac expansion under Section 401 of the federal Clean Water Act. Please excuse the lateness of my response, as I have been busy completing all my other work at Ecology. I've included with this letter a brief assessment of my view of the issues – due to several time constraints, it is not complete, but it does focus on what I believe are some of the primary issues to be resolved in the project review.

In all fairness, I must include two caveats with this letter. First, this assessment reflects my own views of the issues based on my work over the past several years to develop a defensible 401 decision. It may not fully reflect the views of others at Ecology. Second, some of the information I've used in my assessment may not be up to date, since I am not aware of all the changes that have occurred with the Port's proposal or Ecology's review since I was taken off the project in October. I recommend you contact Ann Kenny at Ecology's Northwest Regional Office (425-649-4310) for the most up-to-date information on Ecology's review.

Also, as you point out in your letter, with my new position in California, I will not be as available to Ann as had been anticipated when she was assigned to the 401 review; however, I will make myself available by phone or e-mail if necessary and as various questions arise.

Again, thank you for your kind wishes, and thank you for your interest in Ecology's work.

Sincerely,

Tom Luster

Tom Luster

Cc: Ecology: Tom Fitzsimmons
Bill Alkire
Gordon White
Ray Hellwig
Paula Ehlers
Ann Kenny

ISSUES RELATED TO ECOLOGY'S SECTION 401 WATER QUALITY CERTIFICATION REVIEW OF THE PROPOSED SEATAC AIRPORT EXPANSION

General Issues: background on the review process –

- Requirements for 401 certification:
  - "Reasonable assurance"
  - Interaction of Sections 401 and 402 of the federal Clean Water Act

Specific Issues Related to Aquatic resource Protection: to be resolved as part of Ecology's 401 review –

- Determine direct, indirect, and cumulative impacts and identify necessary mitigation
- Determine compliance with other associated aquatic resource-related regulations
- Determine standards for "clean fill" material
- Develop an acceptable stormwater plan
- Develop an acceptable streamflow augmentation plan
- Develop an acceptable wetland impacts and mitigation

GENERAL ISSUES:

My primary job duty has been to ensure that our 401 decisions result in clean water. For most proposed projects, this means looking at the full range of known or anticipated impacts associated with the construction and operation of a project, reviewing those impacts against the water quality standards, and determining if the standards will be met and what permit conditions are needed to ensure they are met.

With regards to the proposed SeaTac expansion, the intent of my review throughout the process was to develop a fully defensible 401 decision to ensure that applicable water quality regulations would be met.

Requirements for 401 certification:

The basic requirement of Ecology's review has remained the same throughout the history of this proposed project – to determine whether the proposal will meet the state's water quality standards. The three main questions to be answered with regards to meeting the standards are:

- Will the proposed discharges (construction and operational) meet antidegradation requirements (i.e., no further degradation in the waterbody, and no degradation below a certain level)?
- Will these discharges allow beneficial uses (such as fishing, recreation, water supply, etc.) to be met in the affected waterbodies?
- Will they meet the applicable numeric and narrative water quality criteria?

The federal Clean Water Act and the state water quality standards are structured to apply both to discharges and to the waterbodies being discharged to. Ecology's obligation under the regulations is to review proposed projects to ensure both that the contaminant levels in a proposed discharge meet the water quality standards and that the receiving waterbody is meeting the standards. Essentially, the mechanisms of the Clean Water Act (i.e., permit review under Sections 401 and 402) are intended to result in meeting the goals of the Act (i.e., fishable and swimmable waters, the elimination of toxic discharges, etc.).

"Reasonable Assurance": Review under Section 401 requires Ecology to have "reasonable assurance" that the water quality standards will be met. "Reasonable assurance" is a term of law meaning we must have a "preponderance of evidence" showing that the proposed actions will meet the standards. In addition, "reasonable assurance" recognizes that there is some uncertainty with the decision, given that the proposed actions will occur sometime in the future and cannot be fully predicted. Therefore, once we have the necessary "preponderance of evidence" showing that standards will be met, we can then include conditions that address the remaining areas of uncertainty – for example, conditions can be added to the 401 permit that require monitoring, compliance inspections, review and approval of any design changes, etc.

Interaction of 401 and 402: Another key point in Ecology's review on this particular project is the interaction of two different sections of the Clean Water Act. The proposed SeaTac expansion requires approvals under both Section 401 of the Act (water quality certification) and Section 402 of the Act (NPDES discharge permits). While these sections of the Act are both meant to ensure compliance with water quality standards, they take a different approach that must be rectified when a proposal requires approvals under each.

The Clean Water Act includes different requirements for permit review under Sections 401 and 402. The essential difference is that Section 401(d) establishes that a certification must include all necessary effluent limitations to ensure standards are met, and Section 402(a) allows a permit to either include those limitations or other appropriate measures that will eventually lead to the standards being met.

Ecology has recognized this difference by drafting a policy between its Water Quality Program, which implements Section 402, and its Shorelands and Environmental Assistance Program, which implements Section 401. This policy establishes a review process for proposed projects requiring both permits. Key language of this policy includes the following:

> "When a project's discharges are covered by an Individual 402 Permit, and the project is in compliance with that permit as determined by the Water Quality Program, the 401 Certification will require compliance with the Individual 402 Permit as adequate for compliance with the water quality standards, however additional 401 Certification conditions may be necessary to address compliance for stormwater and other water quality impacts or project areas not covered by the 402 Permit."

...and:

> "For projects that have not yet obtained a required 402 Permit, the 401 Certification will be held in abeyance for a maximum period of one year, or denied without prejudice until the 402 Permit is received. A 401 Certification can not be approved if a required 402 Permit has not yet been received because reasonable assurance that the standards will be met can not be determined on a proposed future permit."

This difference is also recognized in Ecology's draft Stormwater Management Manual (from Section 1.9.8):

> "For projects that require a fill or dredge permit under Section 404 of the Clean Water Act, Ecology must certify to the permitting agency, the U.S. Army Corps of Engineers, that the proposed project will not violate water quality standards. In order to make such a determination, Ecology may do a more specific review of the potential impacts of a stormwater discharge from the construction phase of the project and from the completed project. As a result of that review, Ecology may condition its certification to require:
>
> - Application of the minimum requirements and BMPs in this manual; or
> - Application of more stringent requirements."

In essence, when a proposed project requires approval under both Section 401 and Section 402, Ecology must base its 401 decision on whether it has "reasonable assurance" that the 402-regulated activities are meeting the 401 requirement that all applicable effluent limitations be met.

SPECIFIC ISSUES RELATED TO AQUATIC RESOURCE PROTECTION:

As of last October, when I was moved to other duties, none of the following aquatic resource-related issues had been fully resolved for purposes of 401 certification. We were awaiting further information from the Port on many of these issues and were anticipating receipt of public comments during the public comment period that started several weeks ago.

Determine the direct, indirect, and cumulative impacts of the proposal, and identify necessary mitigation:

Ecology's review of this proposed project changed a number of times over the past several years as new information became available about various aspects of the projects. One of the largest areas of change was in determining the extent of the direct, indirect and cumulative impacts associated with the proposed SeaTac expansion.

As of last October, Ecology had not yet determined the full or final extent of project-related impacts. Some examples include:

- Auburn wetland mitigation site: the Port had recently informed us that new information about the proposed Auburn wetland site showed existing wetlands at the site were more extensive than originally determined. This had the potential to change the amount and type of wetland mitigation that would be required for the anticipated wetland impacts.

- Proposed South Access Road and expansion of State Route 509: we had not yet fully determined the relationship between these proposed projects and the airport expansion, and had not determined the full extent of wetland impacts due to the proposed road projects.

- Proposed expansion of Industrial Waste System Lagoon #3. the proposed expansion of IWS Lagoon #3 will result in about 10 acres of additional impervious surface being added just north of Wetland 28. This indirect hydrologic impact had not yet been evaluated. In addition, Appendix D of the 1998 Lagoon #3 Expansion Hydrologic Report identifies several deficiencies in the current lagoon that must be corrected as part of the expansion, including reconstructing the eastern containment dike and relocating stormwater piping in the ravine to the east of the lagoon. The area immediately east of the lagoon consists largely of wetlands that have so far been described elsewhere in Port documents as not being impacted by the Port expansion project. This may result in additional direct impacts that have not yet been addressed, and may require additional approvals from Ecology in the form of dam safety permits.

- Ongoing impacts to Northwest Ponds (the "De-icing Study"): the Port's report on de-icing submitted to Ecology last year identified several impacts to waters of the state that have not yet been addressed through either the 401 review or the 402 permitting process. These include the apparent use of the Northwest Ponds as a de facto but unapproved mixing zone for several contaminants (i.e., low dissolved oxygen levels, high metals concentrations) at levels beyond the water quality criteria.

Ecology provided comments to the Port on this initial report, and is expecting a supplemental report sometime in the near future that addresses these comments. These impacts should be evaluated and mitigated through the 401 review process if they are not first addressed through a modification to the NPDES permit. Options include improved source control or stormwater treatment BMPs, or additional mitigation to make up for any loss of wetland functions in the Northwest Ponds due to this ongoing, unapproved impact.

Determine compliance with other associated aquatic resource-related regulations:

Ecology had received comments this past fall regarding the Federal Aviation Administration's (FAA) and Port's compliance with requirements of the National Environmental Policy Act (NEPA). Ecology does not implement this federal law, but the outcome of the FAA's determination could affect the Port's compliance with the State Environmental Policy Act (SEPA), which is a required part of Ecology's review. If there are required changes to NEPA that result in necessary changes to existing SEPA documents, then Ecology must wait until those SEPA changes are completed before making its 401 decision.

In addition, Ecology was expecting comments on whether the Port's current proposal as described in the Corps/Ecology Public Notice for 401 review was in compliance with the requirements of the Governor's certification letter to the FAA several years ago. We were awaiting the final project description to determine whether it met requirements of the Clean Air Act and the Agreed Order for cleanup activities, as described in the Governor's letter.

Determine standards for "clean fill" material:

Ecology had not yet completed its evaluation of what types of material were and were not acceptable to use as clean fill in the airport expansion project. Our evaluation was based on ensuring that fill material would allow groundwater to move through the material to emerge as surface water and not exceed surface water quality standards

Development of an acceptable stormwater plan:

Adequacy of stormwater treatment: at the time of my review, I did not yet have reasonable assurance that the Port's proposed stormwater discharges would meet the applicable water quality criteria; in fact, the documentation I was aware of showed that several criteria would be exceeded. The literature available on the subject of stormwater Best Management Practices (BMPs) showed that the BMPs being proposed by the Port were not adequate to treat stormwater discharges to levels below the criteria for several metals and for fecal coliform. In addition, the Port's annual monitoring reports and recent Discharge Monitoring Reports (DMRs) showed that stormwater discharges to Des Moines and Miller Creeks often had concentrations of several contaminants above the water quality criteria.

The first proposed stormwater management plan submitted by the Port as part of Ecology's 401 review in 1998 included essentially the same BMPs that were being used at the airport at that time and were resulting in the above-noted exceedances. Ecology did a "reasonable potential analysis" based on the known discharges and the modeled effectiveness of those BMPs and determined that they were not effective enough to adequately treat the Port's stormwater discharges to meet several acute water quality criteria. As a result, Ecology's original 401 issued in 1998 required the Port to "double-up" on its BMPs in order to provide more treatment. That original stormwater plan and 401 certification were withdrawn shortly after the 401 was issued, based on new information about wetland impacts. Ecology, however, did consider the stormwater requirements of that 401 as the "baseline" for any future 401s that might be issued.

When the Port submitted its next proposed stormwater plan, Ecology contracted with King County to provide additional expertise to review the Port's proposal. Over the past year or so, Ecology and the County have been working with the Port to ensure first that their proposed stormwater management plan met the minimum requirements of the Ecology and King County stormwater manuals, and then to determine what additional measures might be needed to ensure the stormwater discharges would meet water quality standards.

As of October of this year, the proposed stormwater plan under review included only the minimum BMPs required under the King County stormwater manual (which are similar to what is in place at the airport now) and did not include all the BMPs required under Ecology's previous certification. I had anticipated that any additional source control or treatment requirements would be evaluated after the County had determined the proposed plan met the minimum technical requirements of the two manuals. This delay in the additional evaluation was due to the likelihood that the County's review would result in additional stormwater detention above what is currently in place at the airport. This additional detention was likely to provide some additional treatment before stormwater flows were discharged to the local creeks.

This anticipated evaluation for additional treatment requirements was important for reaching a defensible 401 decision for several reasons:

- the new and expanded stormwater discharges anticipated from the proposed project are similar to those currently being discharged from the Port; therefore, the effectiveness of the existing BMPs and the resulting water quality exceedances are likely to be similar.
- the state's water quality standards do not allow a compliance schedule for new discharges. Because Ecology must at the time of its 401 decision have "reasonable assurance" that the standards would be met, there must be some measures taken to improve the performance of the existing BMPs.
- a recent Ninth Circuit Court decision (Defenders of Wildlife v. Browner) suggested that stormwater discharges associated with industrial NPDES permits (such as the one held by the Port) were subject to water quality based standards (i.e., numeric water quality criteria). The Court's decision included the following:

> "As is apparent, Congress expressly required industrial storm-water discharges to comply with the requirements of 33 U.S.C. S 1311. See 33 U.S.C. S 1342(p)(3)(A) ("Permits for discharges associated with industrial activity shall meet all applicable provisions of this section and section 1311 of this title.") (emphasis added). By incorporation, then, industrial storm-water discharges "shall . . . achiev[e] . . . any more stringent limitation, including those necessary to meet water quality standards, treatment standards or schedules of compliance, established pursuant to any State law or regulation (under authority preserved by section 1370 of this title)." 33 U.S.C. S 1311(b)(1)(C) (emphasis added); see also Sally A. Longroy, The Regulation of Storm Water Runoff and its Impact on Aviation, 58 J. Air. L. & Com. 555, 565-66 (1993) ("Congress further singled out industrial storm water dischargers, all of which are on the

> high-priority schedule, and requires them to satisfy all provisions of section 301 of the CWA [33 U.S.C. S 1311]. . . . Section 301 further mandates that NPDES permits include requirements that receiving waters meet water quality based standards.") (emphasis added). In other words, industrial discharges must comply strictly with state water-quality standards."

Without fully incorporating the above factors into the review, I was concerned that we would not have a fully defensible 401 decision.

Development of an acceptable streamflow augmentation plan:

During Ecology's 401 review, the Port provided documentation showing that the fill placed for the South Aviation Support Area (SASA) and the impervious surface associated with that development would diminish stream flows in Des Moines Creek to some degree. Ecology had also reviewed the Des Moines Creek Basin Plan, which had been prepared by King County, the Port, and several local jurisdictions, which showed that the creek experienced a number of problems due to existing development in the watershed and would likely experience increased problems due to proposed or expected future development. Among the problems were some violations of water quality standards caused in part by low summer streamflows.

Given this documentation, we informed the Port that part of their proposed mitigation package had to include an acceptable form of streamflow augmentation to prevent and minimize existing and anticipated impacts to the creek. As part of Ecology's 401 approval, the Port had to provide a confirmed source of flow augmentation water and a confirmed treatment system, if necessary, to ensure that the augmentation water met water quality standards.

At the time of my review, the Port had proposed several possible sources of water and a conceptual treatment system, but they had not yet been developed to the level of certainty that provided me with reasonable assurance that the standards would be met.

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DEPARTMENT OF ECOLOGY
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September 21, 2001

REGISTERED MAIL

Port of Seattle
Attn: Ms. Elizabeth Leavitt
17900 International Blvd., Suite 402
Seattle-Tacoma International Airport
SeaTac, WA 98188-4236

Dear Ms. Leavitt:

Re: Water Quality Certification for U.S. Army Corps of Engineers Public Notice 1996-4-02325 (Amended-1); Construction of a Third Runway and related projects at the Seattle-Tacoma International Airport (STIA) in the Miller, Walker, and Des Moines Creek watersheds and in wetlands at the Seattle-Tacoma International Airport, located within the vicinity of the city of SeaTac, King County, Washington; and in wetlands at the mitigation site in Auburn, King County, Washington.

The public notice from the U.S. Army Corps of Engineers (Corps) for proposed work has been reviewed. On behalf of the state of Washington, we certify that the work proposed in the Port of Seattle's (the Port's) revised Joint Aquatic Resource Permit Application (JARPA) dated October 25, 2000, the Corps' public notice and the Department of Ecology's (Ecology's) public notice complies with applicable provisions of Sections 301, 302, 303, 306 and 307 of the Clean Water Act, as amended, and other appropriate requirements of state law. This letter also serves as the state response to the Corps. This letter also serves as notification that Ecology has rescinded Order Number 1996-4-02325 issued on August 10, 2001 and replaced it with Order Number 1996-4-02325 (Amended-1) issued on September 21, 2001.

Pursuant to Section 307(c)(3) of the Coastal Zone Management Act of 1972 as amended, Ecology concurs with the Port's certification that this work is consistent with the approved Washington State Coastal Zone Management Program. This concurrence is based upon the Port's compliance with all applicable enforceable policies of the Coastal Zone Management Program, including Section 401 of the Federal Water Pollution Control Act.

Work authorized by this certification is limited to the work described in the October 25, 2000, JARPA, the Corp's Public Notice, and the plans submitted by the Port to Ecology for review and written approval.

This certification shall be withdrawn if the Corps does not issue a Section 404 permit. It shall also be withdrawn if the project is revised in such a manner or purpose that the Corps or Ecology determines the revised project must obtain new authorization and public notice. The Port will

then be required to reapply for state certification under Section 401 of the Federal Clean Water Act.
This certification is subject to the conditions contained in the enclosed Order and to the water quality and aquatic resource related conditions of the following permits and approvals:

- The Hydraulic Project Approval (HPA) be issued by the Washington State Department of Fish & Wildlife (WDFW).
- NPDES permit #WA-002465-1, issued by the Department of Ecology on February 20, 1998 and modified on May 29, 2001.
- NPDES General Stormwater Permit for Construction Activity #SO3-00491 issued by the Department of Ecology on April 4, 2001.

If you have any questions, please contact Ann Kenny at (425) 649-4310. Written comments can be sent to her at the Department of Ecology, Northwest Regional Office, 3190 160th Avenue SE, Bellevue, Washington, 98008-5452. The enclosed Order may be appealed by following the procedures described in the Order.

Sincerely,

Gordon White

Gordon White
Program Manager
Shorelands and Environmental Assistance Program

GW:AK
Enclosure
cc: Michelle Walker, Corps of Engineers
Gail Terzi, Corps of Engineers
Tony Opperman, WDFW
Tom Sibley, NMFS
Nancy Brennan-Dubbs, USFWS
Joan Cabreza, EPA
Kimberly Lockard, Airport Communities Coalition

IN THE MATTER OF GRANTING A WATER QUALITY CERTIFICATION TO: the Port of Seattle, in accordance with 33 U.S.C. 1341 FWPCA § 401, RCW 90.48.260 and WAC 173-201A.	**ORDER #1996-4-02325 (Amended -1)** Construction of a Third Runway and related projects. Components of the project include construction of a 8,500-foot-long third parallel runway with associated taxiway and navigational aids, establishment of standard runway safety areas for existing runways, relocating S. 154th Street north of the extended runway safety areas and the new third runway, development of the South Aviation Support Area and the use of on-site borrow sources for the third runway embankment.

TO: Port of Seattle
Seattle-Tacoma International Airport
Attn: Elizabeth Leavitt
17900 International Blvd., Suite 402
SeaTac, WA 98188-4236

The Port of Seattle (Port) requested a water quality certification from the state of Washington for the above-referenced project pursuant to the provisions of 33 U.S.C. 1341 (FWPCA§ 401). The request for certification was made available for public review and comment through the U.S. Army Corps of Engineer's Second Revised Public Notice No. 1996-4-02325 dated December 27, 2000, as amended by the Corps' Amendment and Erratum to the Second Revised Public Notice dated January 17, 2001. Ecology issued a 401 certification for this project on August 10, 2001. Ecology has decided to amend that certification. Accordingly, Ecology hereby rescinds Order Number 1996-4-02325 and replaces it in its entirety with Order Number 1996-4-02325 (Amended-1).

The Third Runway site and related Master Plan Update projects and on-site mitigation are located in Sections 4, 5, and 9, Township 22N, Range 4E and Sections 20, 21, 28, 29, 32, 33, Township 23 N, Range 4E in King County. Offsite mitigation will be located in Section 31, Township 22N, Range 5E in King County. The project areas, on-site mitigation and the proposed offsite mitigation are located within Water Resource Inventory Area 9. The projects covered by this Order are described in detail in the December 27, 2000 Public Notice issued by the U.S. Army Corps of Engineers, the October 25, 2000 Joint Aquatic Resource Permit Application (JARPA) and in the plans approved by Ecology as a part of this Order.

For purposes of this Order, the term "Port" shall mean Port of Seattle and its agents or contractors.

Work authorized by this Order is limited to the work described in the October 25, 2000, JARPA, as amended, unless modified by this Order or by conditions contained in other permits sought for the Master Plan Update Improvement projects.

AUTHORITIES:

In exercising authority under 33 U.S.C. 1341 and RCW 90.48.260, Ecology has investigated this application pursuant to the following:

A. Conformance with applicable water quality-based, technology-based, and toxic or pretreatment effluent limitations as provided under 33 U.S.C. Sections 1311, 1312, 1313, 1316, and 1317 (FWPCA Sections 301, 302, 303, 306, and 307);

B. Conformance with the state water quality standards as provided for in Chapter 173-201A WAC, and authorized by 33 U.S.C. 1313 and Chapter 90.48 RCW, and with other appropriate requirements of state law; and,

C. Conformance with the requirement to use all known, available and reasonable methods to prevent and control pollution of state waters as provided by RCW 90.48.010.

WATER QUALITY CERTIFICATION CONDITIONS:

In view of the foregoing and in accordance with 33 U.S.C. 1341, RCW 90.48.260 and Chapter 173-201A WAC, by this Order water quality certification is granted to the Port, subject to the following conditions:

A. Water Quality Standard Conditions:

1. Water Quality Criteria

Des Moines Creek (WA-09-2000), Miller Creek (WA-09-2005) and Walker Creek (1223370474523) are Class AA waters of the state. Certification of this proposal does not authorize the Port to exceed applicable state water quality standards (173-201A WAC) or sediment quality standards (173-204 WAC). Water quality criteria contained in WACs 173-201A-030(1) and 173-201A-040 shall apply to this project, unless otherwise authorized by Ecology. This Order does not authorize temporary exceedances of water quality standards beyond the limits established in WAC 173-201A-110(3). Furthermore, nothing in this Order shall absolve the Port from liability for contamination and any subsequent cleanup of surface waters or sediments occurring as a result of project construction or operations.

Des Moines Creek has been identified on the current FWCPA Section 303(d) list as exceeding state water quality standards for fecal coliform. This project shall not result in further exceedances of this standard.

2. Instream/Shoreline Work Monitoring Plan

a) The Port shall submit a monitoring plan for each in-water or shoreline construction project. The monitoring plan shall be submitted to Ecology for review and approval at

least thirty (30) days prior to the start of construction. No construction shall begin until the Port receives written approval of the monitoring plan from Ecology.

b) All monitoring will be reviewed for compliance with WAC 173-201A.

c) Port staff or contractors qualified to monitor for water quality compliance shall be on-site during project construction to carry out monitoring and inspect erosion and sedimentation control measures in order to ensure that water quality standards are not exceeded.

d) In the monitoring plan, the Port shall demonstrate to Ecology that any mixing zone is minimized in conformance with WAC 173-201A-100(6).

e) At a minimum, the monitoring plan shall include the measurement of turbidity and pH at an agreed point upstream of the point of in-water work or shoreline work and an agreed downstream point not to exceed 100 feet. The monitoring method shall be by a portable turbidimeter and a pH meter following the prescribed maintenance, operating, and calibration procedures in the instrument's instruction manuals. Alternatively, a grab sample can be analyzed by a laboratory accredited under the provisions of Accreditation of Environmental Laboratories, Chapter 173-50 WAC.

f) If a visual sheen is observed the Port shall sample for oil and grease.

The Minimum Detection Level (MDL) for oil and grease is 0.2 mg/L using trichlorotrifluoroethane extraction and gravimetric analysis using EPA Method 413.1. The quantitation level (QL) for oil and grease is 1.0 mg/L (5 x MDL). An equivalent method is Method 1664 using normal hexane (n-hexane) as the extraction solvent in place of 1,1,2-trichloro-1,2,2-trifluoroethane (CFC-113; Freon-113). An equivalent method is total petroleum hydrocarbons with a MDL of 0.1 mg/L using Gas Chromatography and Flame Ionization Detector (FID) and Method WTPH-Dx Diesel (WTPH-D) from the Washington State Department of Ecology Method WTPH-D. The quantitation level (QL) for TPH-Dx is 0.5 mg/L (5 x MDL).

g) If monitoring indicates turbidity standards are not being met at the boundary of the mixing zone, measures shall immediately be taken to reduce turbidity rates, such as slowing the rate of work, placement of additional sediment curtains, etc. A field log in which the results from the turbidity sampling have been recorded shall be maintained at the project site. The field log shall be made available to Ecology staff upon request.

h) Monitoring results shall be submitted every other month to Ecology's Federal Permit Manager, SeaTac Third Runway.

B. Permit Duration:

1. This Order shall be valid during construction of the project. The following provisions of this Order shall be valid during long-term operation and maintenance of the project:
a) In Condition D, Wetland, Stream and Riparian Mitigation, as follows: The mitigation areas to be protected by restrictive covenants, and the Final Natural Resource Mitigation Plan as amended, shall remain in effect in perpetuity.

   b) In Condition D(7), provisions regarding wetland, stream, and riparian mitigation monitoring and reporting shall remain in effect as specified therein.

   c) In Condition E (3), the Surface Water and Ground Water Monitoring plan shall remain in effect as specified in that plan but in no event for a duration less than eight (8) years.

   d) In Condition F (1), the plan to monitor potential contaminant transport to soil and groundwater via subsurface utility lines shall remain in effect as specified in that plan but in no event for a duration less than eight (8) years.

   e) In Condition I, Conditions for Mitigation of Low Flow Impacts, as follows: The low streamflow facilities, and the revised low streamflow plan as amended, shall remain in effect in perpetuity.

   f) In Condition J, Operational Stormwater Requirements, as follows: Those provisions of this condition, including the Comprehensive Stormwater Management Plan, that are incorporated into and superceded by any future Ecology-approved NPDES permit for the Seattle-Tacoma International Airport (STIA), shall be superceded as determined in that permit. Any conditions not incorporated into a future Ecology-approved NPDES permit for STIA shall remain in effect as provided in this condition.

2. The Port shall reapply with an updated JARPA if seven years elapse between the date of the issuance of this Order and completion of the project construction and/or discharge for which the federal license or permit is being sought.

3. The Port shall submit an updated application to Ecology if the information contained in the October 25, 2000 JARPA is altered by subsequent submittals to the federal agency and/or state agencies. Within 30 days of receipt of an updated application Ecology will determine if a modification to this Order is required.

4. Any future construction-related activities that could impact waters of the state at this project location, emergency or otherwise, that are not defined in the October 25, 2000 JARPA, this Order, or have not been approved in writing by Ecology, are not authorized by this Order. Such proposed actions shall be reviewed with Ecology for its written approval prior to implementation if the activity requires §401 certification or is otherwise within Ecology's statutory authorization.

C. **Notification and Reporting Requirements:**

1. Notification shall be made to Ecology's Federal Permit Manager, SeaTac Third Runway at 425-649-4310, 425-649-7098 (Fax), mail: 3190 160th Avenue SE, Bellevue, WA 98008 or by e-mail at aken461@ecy.wa.gov for the following activities:

   a) at least thirty (30) days prior to the pre-construction meeting to review environmental permits and conditions,

   b) at least ten (10) days prior to starting construction of each of the projects identified in Table A-3 (Comprehensive Stormwater Management Plan, Volume 2) and each of the mitigation sites identified in the Natural Resource Mitigation Plan, and

   c) within seven (7) days after the completion of construction of each of the projects identified in Table A-3 (Comprehensive Stormwater Management Plan, Volume 2) and each of the mitigation sites identified in the Natural Resource Mitigation Plan.

NOTE: The required notifications shall include the Port's name, project name, project location, the number of this Order, the name of contractor and any subcontractor, contact and contact's phone number.

2. The Port shall ensure that all appropriate Project Engineer(s) and the Lead Contractor(s) at the project site and/or mitigation sites have read and understand relevant conditions of this Order and all permits, approvals, and documents referenced in this Order.

   a) The Port shall provide to Ecology a signed statement, **Attachment A**, from each Project Engineer(s) and Lead Contractor(s) that they have read and understand the conditions of this Order and the above-referenced permits, plans, documents and approvals.

   b) These statements shall be provided to Ecology no less than seven (7) days before each Project Engineer or Lead contractor begins work at the project or mitigation sites.

3. All reports, plans, or other information required to be submitted by this Order shall be submitted in triplicate to Ecology's Federal Permit Manager, SeaTac Third Runway, at 3190 160th Avenue SE, Bellevue, WA 98008-5452.

4. Documents required to be submitted to Ecology for review and/or approval by this Order shall be submitted to Ecology by the time specified in this order. Failure to submit documents by the required time may result in the revocation of this Order. The Port may, on a case-by-case basis, submit a written request for an extension of the specified submittal deadline for a document. Ecology will consider the reasonableness of the

request for an extension and may grant an extension for a period of time it deems appropriate. **Ecology will provide any such extension to the Port in writing only.**

No document, report or plan required by this Order shall be deemed approved until the Port receives written verification of approval from Ecology.

D. **Wetland, Stream and Riparian Mitigation:**

1. Required Mitigation: Mitigation for this project shall be completed as described in the following documents with the following additions and clarifications:

   - the Final Natural Resource Mitigation Plan (NRMP), Master Plan Update Improvements, STIA, dated December 2000 (Parametrix, Inc.).
   - Appendixes A-E, Design Drawings, Natural Resource Mitigation Plan, STIA, dated December 2000 (Parametrix, Inc.).
   - the Revised Grading and Planting Plan for the Auburn Wetland Mitigation site dated June 28, 2001 (Parametrix, Inc.).
   - the revised NRMP performance standards found in Tables 4.2-1, 4.2-2, 5.1-7, 5.2-3, 5.2-8, 5.2-12, 5.2-16, 5.3-2, 5.3-6, and 7.7-1 received July 31, 2001 (Parametrix, Inc.).
   - the revised Borrow Site Three plan sheets and drawings dated June 2001 and received by Ecology on June 18, 2001 (Hart Crowser).

   The Port shall amend and/or clarify the documents identified in Condition D.1 as follows:

   a) The Port shall increase the duration of monitoring from ten (10) to fifteen (15) years.

   b) Table 4.2-1 of the NRMP (July 31, 2001) outlines the performance standards for vegetation cover by vegetation zone and monitoring year. A note shall be added to the table that states: "Invasive plant species cover will be monitored during all monitoring years."

   c) In addition to the non-native invasive species listed in Table 4.2-2 of the NRMP (July 31, 2001), hedge bindweed (*Convolvulus sepium*), giant knotweed (*Polygonum sachalinense*) and evergreen blackberry (*Rubus laciniatus*) shall be monitored and controlled in the mitigation sites.

   d) All performance standards addressing cover of non-native plants shall read: "Cover of non-native invasive species will be no greater than 10% in any year in newly planted or enhanced areas."

   e) Table 5.1-7 of the NRMP (July 31, 2001) states that shade cloth will be placed over the new channel. The Port shall provide a map of the location for the shade

cloth, details on how it will be installed, and a schedule of installation and removal.

f) The Port shall provide Ecology with written documentation of the implementation of any of the contingency measures and adaptive management measures set forth in the NRMP. Temporary erosion and sedimentation measures approved by Ecology shall remain in effect for all adaptive management measures or contingency measures implemented. Any problems identified throughout the mitigation sites shall be immediately corrected. Implementation of corrective actions shall be done within the confines of the contingency measures identified in the NRMP. All contingency measures shall be implemented in a manner such that they do not exceed state water quality standards.

g) The Port shall monitor hydrologic conditions of all wetlands downslope of the Third Runway embankment in the Miller, Walker and Des Moines Creek sub-basins. Hydrologic monitoring using piezometers and shallow hand dug soil pits in undisturbed wetlands downslope of the Third Runway embankment shall be conducted with sufficient frequency to determine wet season trends. The Port shall immediately begin conducting twice-monthly hydrologic monitoring during the wet season, November through May, and shall continue such monitoring for at least three (3) years after completion. Maps of sample locations and vegetation in the surrounding areas, observation of stressed vegetation, any adaptive management implemented in the surrounding areas, comparison to baseline data, and conclusions shall be documented and submitted to Ecology on a monthly basis during that period. At the end of each water year, the Port shall complete a trends analysis with proposed contingency measures identified and a schedule for completion of proposed contingency measures.

h) Existing wetland and mitigated wetland boundaries (including all areas down slope of the Third Runway embankment, Vacca farm, the borrow sites, and the Auburn mitigation site) shall be delineated at years five (5), ten (10), and fifteen (15). A licensed survey crew shall survey the wetland points established. The delineation map and comparisons to previous delineation maps shall be furnished to Ecology by December 31st for each of the years in which a delineation is conducted. If the delineation shows the wetland boundaries have decreased then additional in-basin mitigation may be required by Ecology.

i) Final performance standards for the replacement drainage channel shall read: "Construct the replacement channel to convey all storm events equal to or less than the 100-year, 24-hour design storm and seepage water collected by the embankment drains layer and adjacent areas." (Revised Performance Standards, Table 5.2-12 NRMP)

j) Revised Table 5.2-12 of the NRMP (July 31, 2001) proposes a performance standard that monitors the change in plant species in undisturbed wetlands, where the hydrology is being replaced through inputs from the replacement drainage channel. Emergent non-invasive plants provide a better indicator for general plant species trends over time than trees and shrubs because typically their root structures are shallower, and subsequently respond to hydrologic changes more quickly. The Port shall amend the monitoring condition in Table 5.2-12 to read: "Wetland indicator status (WIS) of the dominant noninvasive plant species shall not differ from pre-project conditions during or at the end of the monitoring period. Each vegetative strata (trees, shrubs and emergents) shall be assessed separately, and have separate conclusions. Statistically valid sampling procedures will be employed to monitor theses potential changes, in all areas where there is a potential to change the post construction hydrology (down slope of the embankment, and the borrow sites). WIS status of the vegetation will be calculated as described in the 1987 USACE or Washington State Department of Ecology delineation manuals."

k) In all areas where soil saturation is being monitored the performance standards shall include the following conditions: "Other wetlands with predominantly mineral soils shall have groundwater within the upper 10 inches from at least March to mid-April in years of normal rainfall."

l) Soils stockpiled for mitigation purposes for over one year require the reintroduction of naturally occurring microbes, prior to use in mitigation sites. This shall be accomplished through introduction of soils microbial inoculants, or through introduction of well decomposed organic matter.

m) The Port shall redevelop the sample data sheets to meet all the monitoring requirements set forth this order.

n) Auburn Mitigation Site- Emergent marsh plants shall be planted with rhizomes 12" on center (o.c.) instead of the 18" o.c. currently specified. Areas that are designated for hydroseeding that have visible surface water at the time of planting those areas shall be planted with plugs. Routine maintenance, such as, weeding, removal of non-native species, and watering, shall occur at least twice a year in all areas and more often in areas if needed. The maintenance crew shall be overseen by a wetland biologist to assist with identifying invasive species and identifying problem areas.

o) Vacca Farm Mitigation Site- Revised Table 5.1-7 of the NRMP (July 31, 2001) Final performance standards shall have a note added that reads: "Observable surface flow must be present in the created channel at all times."

p) Contingency measures and additional monitoring of the mitigation areas shall be required by Ecology if wetland monitoring reveals that vegetation establishment or wildlife use of the wetland is not sufficient to meet the success standards. Additional monitoring may be required beyond the fifteen (15) year period if mitigation success is not achieved within the fifteen (15) year monitoring period.

q) The wetland mitigation planting plan shall be field inspected by Parametrix, Inc. or another qualified wetland consulting firm during construction and planting to ensure proper installation.

r) The boundaries of the mitigation area and buffers shall be permanently marked with stakes at least every 100 feet or with construction fencing. The marking shall include signage that clearly indicates that mowing and fertilizer/pesticide applications are prohibited within mitigation areas.

s) Ecology and the U.S. Army Corps of Engineers shall be notified a minimum of three days in advance of field monitoring work by the Port. Ecology or its designee shall be allowed access to all mitigation sites for the entire monitoring period.

2. Restrictive Covenants:

The Port shall place restrictive covenants on the deeds for the following mitigation sites: Miller Creek Mitigation Area; Miller Creek/Lora Lake/Vacca Farm Wetland and Floodplain Mitigation Area; Tyee Valley Golf Course Mitigation Area; Auburn Wetland Mitigation Area; and Des Moines Creek Mitigation Area (June 28, 2001, Foster, Pepper and Shefelman). The Port shall record the restrictive covenants with King County no later than sixty (60) days after the issuance by the U.S. Army Corps of Engineers of the Section 404 required for construction of the Master Plan Update projects.

Any changes to the restrictive covenants shall require written approval by Ecology.

Violation of any term of the restrictive covenants shall be considered a violation of this Order.

3. Submittal of a Revised Mitigation Plan

The Port shall submit to Ecology for its review and written approval a revised NRMP which includes the changes or additions required by this Order for review and written approval no later than December 31, 2001. The revised NRMP shall include revised plan sheets that address the corrections required in Attachment B.

If, after revision of the NRMP required by this Order, the Port submits a further revised NRMP to the U.S. Army Corps of Engineers for review, the Port shall simultaneously

submit the same revised NRMP to Ecology for its review and written approval. No fill shall be placed in waters of the state until the revised NRMP submitted to the U.S. Army Corps of Engineers has been approved by Ecology.

A Final NRMP shall be prepared and submitted to Ecology within three months after a Section 404 permit has been issued by the U.S. Army Corps of Engineers.

4. Mitigation for Temporary Impacts

The December 2000 NRMP indicates that up to 2.05 acres of wetlands will be affected by the construction of temporary stormwater management ponds and other construction impacts (p. 4-8 and other). Approximately 1.25 acres will result from the construction of the stormwater ponds in the Miller Creek basin. Ecology has determined that the impacts characterized as "temporary" in the NRMP are not temporal in nature because they will last for longer than a one-year period. The agency considers these impacts to be permanent and has determined that additional in-basin mitigation is necessary in the Miller Creek basin. Additional mitigation is necessary in order to mitigate for hydrologic, water quality and general habitat impacts that will result from the "temporary" impacts. In-basin mitigation is necessary to provide a "temporal lift" of wetland water quality and general habitat functions.

In order to compensate for these unmitigated impacts in the Miller Creek basin, the Port shall prepare a mitigation plan for submittal to Ecology for its review and written approval. A conceptual plan shall be submitted to Ecology for review and written approval by November 9, 2001. Upon receipt of Ecology's written approval of the mitigation plan, the Port shall amend the NRMP to incorporate the approved mitigation plan. The plan must contain the following elements:

a) The wetland/riparian zone comprised of Wetlands A17b/c/d (Wetland A17 Complex) and "Water D" shall be added to the wetland and buffer restoration/enhancement on Miller Creek. This area is depicted in Attachment C titled "Wetland A17 Complex". A 100-foot buffer shall be placed to envelop this system. Wetlands A17b/c/d comprise a total of 2.64 acres and "Water D" totals 0.16 acres for a combined total of 2.80 acres (not including the buffer). The buffer shall be averaged, similar to the buffer on Miller Creek. The buffer area may include location of the airport detection system (ADS) to the extent that its footprint has been minimized to the extent practicable.

b) The plan shall use the same goals and performance standards as the NRMP approved by this Order.

c) The plan shall evaluate the feasibility of improving the hydrologic connection of the Wetland A17 Complex to Miller Creek via "Water D", including but not

limited to removing the underground pipe. If it is feasible to improve the hydrologic connection of the Wetland A17 Complex to Miller Creek via "Water D", the Port shall include a plan for improving the connection in its submittal.

d) Homes, driveways, concrete, fill, septic systems and other unsuitable material with be removed from Wetlands A17b/c/d, in a manner that meets the treatment protocol established for the Miller Creek restoration in the NRMP.

e) The plan shall develop a buffer restoration and re-vegetation plan for this area that meets the treatment protocol for the Miller Creek restoration in the NRMP. This shall include the removal of invasive species, and replanting of appropriate native species.

f) The plan shall evaluate the potential for wetland restoration, creation and enhancement within this new mitigation zone. This shall include evaluation of the reconnection of Wetlands A17b and A17c by removal of the road between them and removal of the road that separates Wetlands A17a and A17b. Ecology recognizes the need for an access road to the TRACON facility between Wetlands A17c and A17d.

g) The buffer shall be joined with the buffer on Miller Creek to the south.

h) A restrictive covenant shall be drafted for this additional mitigation area. The restrictive covenant shall be consistent with other restrictive covenants established for this project. The Port shall record the restrictive covenants with King County no later than sixty (60) days after the issuance by the U.S. Army Corps of Engineers of the Section 404 required for construction of the Master Plan Update projects.

5. Borrow Site One –

The performance standards for Borrow Site One in Table 5.3-6 of the NRMP (July 31, 2001) allow for monitoring of the wetland hydrology. The evaluation approach shall compare the shallow groundwater data collected to data collected pre-construction. Wetlands 48, B15, 32, B12, B4, and B1 shall be evaluated using this approach. The Port shall provide to Ecology bi-monthly hydrologic monitoring during the wet seasons, November through May, for at least three (3) years after completion. Maps of sample locations and vegetation in the surrounding areas, observation of stressed vegetation, any adaptive management implemented in the surrounding areas, comparison to baseline data, and conclusions shall be documented and submitted to Ecology on a monthly basis during that period. At the end of each water year the Port shall complete and submit to Ecology

a trends analysis with proposed contingency measures identified and a schedule for completion of the proposed contingency measures.

6. Borrow Site Three- The following conditions apply to Borrow Site 3:

   a) The site plan from Hart Crowser titled Post Reclamation Topographic detail Borrow Area 3 Wetland Protection Swale HNTB revision (June 15, 2001 Draft) shows a flow dispersal trench overlapping with a small portion of Wetland 29. The flow dispersal trench shall not be constructed so that it is in the wetland.

   b) The wetland protection swale shall be lined (with HDPE or other similar liner material) where necessary to minimize infiltration of captured seepage water through the bottom of the swale (as described in Hart Crowser 2000b Sea-Tac Airport Third Runway – Borrow Area 3 Preservation of Wetlands; memorandum from Michael Kenrick and Michael Bailey (Hart Crowser) to Jim Thomson (HNTB) on wetland hydrology and proposed drainage swale design (October 20, 2000)).

   c) Excess water from the stormwater overflow structure shall be diverted away from the wetland protection swale to a stormwater detention pond (as described in Hart Crowser 2000b Sea-Tac Airport Third Runway – Borrow Area 3 Preservation of Wetlands; memorandum from Michael Kenrick and Michael Bailey (Hart Crowser) to Jim Thomson (HNTB) on wetland hydrology and proposed drainage swale design (October 20, 2000)).

   d) The Port shall monitor hydrologic conditions of wetlands remaining in and adjacent to the borrow sites. Hydrologic monitoring using piezometers and shallow hand dug soil pits in undisturbed wetlands associated with Borrow Site Three shall be conducted with sufficient frequency to determine wet season trends. Special emphasis shall be given to the area near where the drainage swale discharges into Wetland 29, to provide an early indication of hydrologic duress to plants in the wetland. The Port shall provide to Ecology bi-monthly hydrologic during the wet seasons, November through May, before construction and for at least three (3) years after completion. Maps of sample locations and vegetation in the surrounding areas, observation of stressed vegetation, any adaptive management implemented in the surrounding areas, comparison to baseline data, and conclusions shall be documented and submitted to Ecology on a monthly basis during that period. At the end of each water year the Port shall complete and submit to Ecology a trends analysis with proposed contingency measures identified and a schedule for completion of the proposed contingency measures.

   e) The wetland protection swale shall be inspected and maintained at a minimum frequency of two (2) times per year. Swale maintenance shall include adjustment of flow control weir boards to provide appropriate flows to Wetland 29, and

removal of vegetation or fill in the swale which may interfere with the seepage collection and diversion functions of the swale. The weir shall be calibrated so that flow rates can be observed at any time.

f) **Increased Buffer Area:** In order to protect the hydrologic functions, and hydrology supporting Wetlands 29, 30, B5, B6, B7, and B9, all areas up slope of the wetlands within the property shall be included in the wetland buffer. Additionally, the Port shall ensure protection of hydrology to Wetlands 29, 30, B5, B6, B7, and B9 from future development. The wetland protection swale shall also be included in a restrictive covenant, with 25 foot buffers on either side of the swale. Those areas are depicted in **Attachment D (Revised)**, Borrow Area 3 Wetland Buffer. A restrictive covenant shall be drafted for this additional buffer area. The restrictive covenant shall be consistent with other restrictive covenants established for this project. The Port shall record the restrictive covenants with King County no later than sixty (60) days after the issuance by the U.S. Army Corps of Engineers of the Section 404 required for construction of the Master Plan Update projects. This condition applies only to property currently owned by the Port.

g) The performance standards in Table 5.3-6 of the NRMP (July 31, 2001) allow for monitoring of the surface water in Wetland 30. The evaluation approach states that shallow groundwater monitoring wells will be used. The evaluation approach shall be changed to provide that surface water depths are measured monthly during the period from December through April, and the monitoring results compared to pre-construction data.

7. Wetland, Stream and Riparian Mitigation Monitoring and Reporting:

a) Monitoring of all wetland mitigation sites identified in the December 2000 NRMP and the June 2001 Auburn Grading and Planting Plan, as revised below, shall be incorporated into the Final NRMP submitted to Ecology.

i) Monitoring shall be completed at least yearly for a fifteen (15) year period with initial monitoring starting after the first growing season after installation of plants. If at any point during the monitoring period the results of monitoring show that the success criteria established in the plan are not being met, Ecology may require corrective action, additional monitoring, and additional mitigation.

ii) The Port shall prepare and submit annual monitoring reports to Ecology's Federal Permit Manager, SeaTac Third Runway, Northwest Regional Office, 3190 160th Avenue SE, Bellevue, WA 98008-5452 no later than December 31st of each year following the first year of the mitigation site work. Each year's monitoring report shall include photographic documentation of the

project taken from permanent reference points. The Port shall identify and incorporate permanent reference points into the Final NRMP.

iii) As-Built Report: An as-built report documenting the final design of all wetland mitigation sites shall be prepared when the initial planting is completed. The report shall include the following:

- final site topography;
- photographs of the area taken from established permanent reference points;
- a planting plan showing species, densities, sizes, and approximate locations of plants, as well as plant sources and the time of planting;
- habitat features (snags, large woody debris, etc) and their locations;
- drawings in the report shall clearly identify the boundaries of the project;
- locations of sampling and monitoring sites; and
- any changes to the plan that occurred during construction.

The As-Built Report shall include detailed plans showing locations of all monitoring transects and locations. All vegetation sampling and analysis shall employ statistically valid sampling and analysis procedures during each of the monitoring events. Monitoring reports shall show all sampling locations, discuss trends and changes, discuss success in achieving performance standards or other implementation difficulties, provide remedies to address implementation problems, and set forth a timeline for their resolution. Supporting data and calculations shall be maintained by the contractor and made available to Ecology upon request.

iv) The As Built Report shall be sent to Ecology's Federal Permit Manager, SeaTac Third Runway within sixty (60) days of completing the mitigation site.

v) Any proposed changes to the wetland mitigation and monitoring protocol established in the NRMP and as revised by this Order, must be approved in writing by Ecology prior to implementation of any changes.

E. Conditions for Acceptance of Fill to be used in Construction of the Third Runway and Associated Master Plan Update Improvements:

The use of imported fill for projects for which the §404 permit was sought, e.g., Third Runway, Runway Safety Areas, South Aviation Support Area, and other appropriate Master Plan Update Improvements as determined by Ecology (Port 404 Projects) may result in impacts to wetlands or other waters of the state. To ensure compliance with measures designed to minimize potential impacts, the Port shall submit borrow site clean fill certification documentation described in the following sections to Ecology for review and

written approval prior to fill placement.

1. Fill Documentation/Fill Criteria/Fill Source

The Port shall adhere to the following conditions to ensure that the fill placed for Port 404 Projects does not contain toxic materials in toxic amounts, thereby preventing the introduction of toxic materials in toxic amounts into waters of the state which includes wetlands.

a) Documentation

No later than five (5) business days prior to accepting any fill materials for use on Port 404 Projects, the Port shall submit to Ecology's Federal Permit Manager, SeaTac Third Runway, documentation certifying that the proposed fill source meets the criteria of this Order. The documentation shall contain an environmental assessment of the fill source and shall verify that excavated soil from the proposed fill source complies with the fill criteria set forth below. Findings of the environmental assessment are subject to the review of Ecology. Ecology reserves the right to disapprove fill materials following review of the Port's supporting documentation and a determination that the fill criteria were not met. In the event of such disapproval, Ecology reserves its rights to enforce the terms of the Order and require appropriate remedial measures.

The environmental assessment shall be conducted by an environmental professional in general conformance with the American Society for Testing and Materials Standard (ASTM) E 1527-00 Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process, and E 1903-97 Standard Guide for Environmental Site Assessments: Phase II Environmental Site Assessment Process. At minimum, the document shall contain the following information:

i) Fill Source Description: Provide a description/location of the fill source, general characteristics of the fill source and vicinity, current use, and a site plan identifying the extent of the excavation, project schedule and the estimated quantity of fill to be transported to Port 404 Projects.

ii) Records Review: Obtain and review environmental records of the proposed fill source site and adjoining properties. In addition to the standard federal and local environmental record sources, the following Ecology environmental databases shall be reviewed:

- Confirmed & Suspected Contaminated Site Report
- No Further Action Site List
- Underground Storage Tank List
- Leaking Underground Storage Tank List
- Site Register.

Records review shall also contain historical use information of the fill source and the surrounding area to help identify the likelihood of environmental contamination.

iii) Site Reconnaissance: Documentation of visits to each site that identifies current site use and site conditions to assist in identifying the likelihood of environmental contamination and/or the potential migration of hazardous substances onto the site from adjoining properties.

iv) Fill Source Sampling: Collect and analyze fill materials for the potential contaminant(s) identified in the Phase I Environmental Site Assessment. At a minimum, fill materials from each fill source shall be analyzed for the following hazardous substances

- Total Antimony
- Total Arsenic
- Total Beryllium
- Total Cadmium
- Total Chromium[1]
- Total Copper
- Total Lead
- Total Mercury
- Total Nickel
- Total Selenium
- Total Silver
- Total Thallium
- Total Zinc
- NWTPH-HCID

[1] Chromium (VI) shall be analyzed if the results of the Phase I Environmental Site Assessment show a likelihood of Chromium (VI) contamination.

For fill source characterization, the following table presents the minimum sampling schedule for fill sources with no likelihood of environmental contamination.

Cubic Yards of Soil	Minimum Number of Samples
<1,000	2
1,000 – 10,000	3
10,000 – 50,000	4
50,000 – 100,000	5
>100,000	6

Samples shall be collected at locations that are representative of the fill destined for Port 404 Projects.

For fill sources with suspected contamination identified by the Phase I Environmental Site Assessment or with complex site conditions, please consult with Ecology's Federal Permit Manager, SeaTac Third Runway for the appropriate sampling requirements.

b) Fill Criteria

The results of the Phase II Environmental Site Assessment sampling and testing shall be compared to the fill criteria to determine the suitability of the fill source for Port 404 Projects.

The following table establishes the fill criteria limitations for the hazardous substances identified in Section E1(a)(iv) of this Order.

Hazardous Substances	Fill Criteria mg/kg[2]
Antimony	16
Arsenic	20
Beryllium	0.6
Cadmium	2
Chromium[3]	42/2000
Copper	36
Lead[4]	220/250
Mercury	2
Nickel[5]	100/110
Selenium	5
Silver	5
Thallium	2
Zinc	85
Gasoline	30
Diesel[6]	460/2000
Heavy Oils	2000

2 mg/kg = milligrams per kilogram

3 Fill with total chromium concentrations greater than 42 mg/kg and less than 2000 mg/kg may be placed to within six feet of the ground surface. No fill with total chromium concentrations greater than 42 mg/kg may be placed within the first six feet of the embankment. No fill with chromium (VI) concentrations greater than 19 mg/kg may be placed within the embankment.

- Fill with total lead concentrations greater than 220 mg/kg and less than 250 mg/kg may be placed to within six feet of the ground surface. No fill with total lead concentrations greater than 220 mg/kg may be placed within the first six feet of the embankment.

- Fill with total nickel concentrations greater than 100 mg/kg and less than 110 mg/kg may be placed to within six feet of the ground surface. No fill with total nickel concentrations greater than 100 mg/kg may be placed within the first six feet of the embankment.

- Fill with diesel range organics concentrations greater than 460 mg/kg and less than 2000 mg/kg may be placed to within six feet of the ground surface. No fill with diesel range organics concentrations greater than 460 mg/kg may be placed within the first six feet of the embankment

For hazardous substances other than those identified in the above fill criteria table that have been identified in the Phase II Environmental Site Assessment, the Port shall consult with Ecology's Federal Permit Manager, SeaTac Third Runway for the applicable fill criteria.

As an alternative to applying the limitations listed above for the material within the top six feet of the existing ground surface and/or within the first six feet of the embankment (as noted in footnotes two through six above), the Port may construct a "drainage layer cover" (that layer immediately above the drainage layer of the embankment) that will measure at least forty (40) feet thick at the face of the embankment and will reduce in height to the east at a rate of two (2) percent. The fill criteria listed above for the first six feet of the embankment will apply to the drainage layer cover. If proposed fill (for either the drainage layer cover or the rest of the embankment or other Port 404 Projects) does not meet the fill criteria in Condition E.1.(b), the Port can demonstrate the suitability of that fill by employing a Synthetic Precipitation Leaching Procedure (SPLP), SW-846 Method 1312. SPLP testing shall conducted in accordance with the SPLP work plan, **Attachment E**, or as amended in the future. Where the Port utilizes the SPLP method to demonstrate the suitability of fill, SPLP test results shall be provided to Ecology at least ten (10) business days prior to fill placement. As per Condition E.1.(a), Ecology reserves the right to disapprove the use of fill analyzed under the SPLP method.

c) Fill Sources
Fill materials for Port 404 Projects shall be limited to the following three sources:

i) State-certified borrow pits
ii) Contractor-certified construction sites
iii) Port of Seattle-owned properties.

d) Prohibited Fill Sources
The following fill sources are prohibited for use on Port 404 Projects:

- Fill which consists in whole or in part of soils or materials that are determined to be contaminated following a Phase I or Phase II site assessment.

- Fill which consists in whole or in part of soils or materials that were previously determined to be contaminated by a Phase I or Phase II site assessment and have been treated in some manner so to be considered re-mediated soils or fill material.

2. As-Built Documentation

The Port shall provide to Ecology for review monthly summaries of:

- Names and locations of fill sources placed for the previous month
- Quantities of fill materials from these fill sources
- Locations and elevations of fill source materials placed within the Port 404 Projects.

Ecology may require additional compliance conditions and/or corrective actions upon Ecology's review of the as-built documents. The monthly summaries shall be provided to Ecology no later than fifteen (15) days following the last day of the month.

3. Post Construction Monitoring

The Port shall monitor runoff and seepage from Port 404 Projects where fill is placed for compliance with applicable Washington State surface water criteria. Ground water down-gradient from the fill area shall be monitored for compliance with applicable ground water criteria.

Within 60 days after the issuance of the 401 Water Quality Certification for the Master Plan Update Improvements, the Port shall submit to Ecology for review and written approval a Surface Water and Ground Water Monitoring Plan. The monitoring plan shall be designed to detect impacts of the fill embankment to the receiving water and to the ground water during fill placement and post fill placement. In the event monitoring detects exceedances of the water quality criteria in either surface or ground water; Ecology may revise the fill criteria and/or require corrective action.

F. **Conditions to Prevent Transport of Contaminants:**

1. All Master Plan Update Improvements and all associated utility corridors shall be constructed in a manner that will prevent the possible interception of contaminated groundwater originating from the Airport Maintenance and Operations Area or other potentially contaminated Seattle-Tacoma International Airport (STIA) areas. The Port shall submit to Ecology proposed construction BMPs to prevent interception of contaminated groundwater by utility corridors and a plan to monitor potential contaminant transport to soil and groundwater via subsurface utility lines at the STIA and submit it to Ecology for review and written approval no later than November 9,

2001. The plan shall be submitted to Ecology's Federal Permit Manager, SeaTac Third Runway.

2. The Port shall have staff trained in the detection of hazardous materials and contaminated soils or water inspect on a regular basis all areas where there is clearing and grading, or construction under way by Port contractors or employees. If hazardous materials or contaminated soils or other indications of contamination are discovered the Port shall immediately cease construction in the suspect area, secure the site and clean up the area in accordance with the Model Toxics Control Act (MTCA), Chapter 70.105d RCW, the Hazardous Waste Management Act, Chapter 70.105 RCW, and with generally accepted best management practices.

3. The Port shall administer and periodically update the contaminant database and contaminant maps and figures for the STIA. The database shall be updated as new information is received. The maps and figures shall be updated annually and delivered to Ecology's Federal Permit Manager, SeaTac Third Runway in a report of findings for review. Maps and figures shall be similar to the maps and figures shown in the Port's "Analysis of Preferential Ground Water Flow Paths Relative to Proposed Third Runway," dated June 21, 2001.

4. The Port shall collect all new environmental data generated by construction activities, cleanup actions, or any other environmental investigations of soil and groundwater throughout the STIA. The information shall be used to update the contaminant database. The Port, airport tenants, and other entities conducting environmental investigations shall continue to provide reports of ongoing cleanup actions and any new contamination discovered to Ecology as required by the MTCA.

G. Dam Safety Requirements:

1. All facilities identified in Table 3-1 of the Comprehensive Stormwater Management Plan (CSMP) that meet the requirements of Chapter 173-175 WAC (Dam Safety Regulations) shall obtain a Dam Safety Permit from Ecology prior to commencement of construction. If any stormwater facilities identified in the CSMP change during final design such that they meet the requirements of Chapter 173-175 WAC, those facilities shall obtain a Dam Safety Permit from Ecology prior to commencement of construction.

H. Conditions for Upland Construction Activities:

1. During construction the Port shall comply with all stormwater requirements within the National Pollutant Discharge Elimination System (NPDES) Permit No. WA-002465-1 as modified on May 29, 2001 for this project.

2. The project shall be clearly marked/staked prior to construction. Clearing limits, travel corridors and stockpile sites shall be clearly marked. Sensitive areas to be protected from disturbance shall be delineated and marked with brightly colored construction fence, so as to be clearly visible to equipment operators. All project staff shall be trained to recognize construction fencing that identifies sensitive areas boundaries (wetlands, streams, riparian corridors, buffers, etc.). Equipment shall enter and operate only within the delineated clearing limits, corridors and stockpile areas.

3. The Port shall follow and implement all specifications for erosion and sediment control specified in the Stormwater Pollution Prevention Plan (SWPPP) and/or Erosion and Sediment Control (ESC) plan as required in the NPDES permit. The erosion control devices shall be in place before starting construction and shall be maintained, so as to be effective throughout construction.

4. Stormwater Detention for New Outfalls: Any new diversion ditch or channel, pond, trap, impoundment or other detention or retention BMP constructed at the site for treatment of stormwater shall be designed, constructed, and maintained to contain and provide treatment for the peak flow for the ten (10)-year 24 hour precipitation event estimated from data published by the National Oceanic and Atmospheric Administration.

5. The Port shall periodically inspect and maintain all erosion control structures. Inspections shall be conducted no less than every seven (7) days from the start of the project to final site stabilization. Daily inspections of sedimentation ponds shall occur during wet seasons. Additional inspections shall be conducted after rainfall events greater than 0.5 inches per 24-hour period, to ensure erosion control measures are in working condition. These inspections shall be conducted within 24 hours after the event. Any damaged structures shall be repaired immediately. If it is determined during the inspection that additional measures are needed to control stormwater and erosion, such measures shall be implemented immediately. Inspections shall be documented in writing and shall be available for Ecology's review upon request.

6. Wash water containing oils, grease, or other hazardous materials resulting from wash down of equipment or working areas shall not be discharged into state waters except as authorized by an NPDES permit or state waste discharge permit.

7. Machinery and equipment used during construction shall be serviced, fueled, and maintained on uplands in order to prevent contamination to surface waters.

8. Grading/Construction in Borrow Areas: The depth of the excavation at the borrow areas shall be limited to a depth ten (10) feet above the maximum seasonal groundwater table. The maximum seasonal ground water table shall be determined by

the monitoring wells on Port property. Depth of excavation and maximum seasonal ground water elevations shall be submitted annually to Ecology's Federal Permit Manager, SeaTac Third Runway.

I. Conditions for Mitigation of Low Flow Impacts:

1. Ecology has reviewed and approved the December 2000 Low Streamflow Analysis and the Summer Low Flow Impact Offset Facility Proposal dated July 23, 2001. In order to ensure clarity, within 45 days of receipt of this Order the Port shall submit a revised plan integrating the Low Streamflow Analysis and Summer Low Flow Impact Offset Facility Proposal into a single document that addresses the following issues:

   a) General:

      i) The revised plan shall be stamped by a licensed professional civil engineer.
      ii) All supporting documents shall be clearly labeled and included in a technical appendix and/or on one clearly labeled CDROM. Only those files which directly correspond to results presented in the report should be included.
      iii) The plan shall include a specific section discussing the accuracy of the calibration in predicting low flows at upper stream gauges, and a statement of adequacy of the calibrations for the purpose of low flow simulation.
      iv) Revised conceptual drawings for reserve storage vaults shall be submitted that include any changes required by this Order and that include details on how constant discharge will be maintained in reservoirs with variable hydraulic head pressures. Reserve vault inlets and outlets shall be configured so that water is added/discharged from the middle of the reserve storage depth in order to avoid disturbing sediments and/or floatables that could be present in the reserve vault. In order to ensure that reserve water is well aerated, reserve storage vaults shall include open ventilation consistent with King County Surface Water Design Manual wetvaults. Mechanical aeration shall be provided if grating is not feasible. Conceptual drawings shall include detail on reserve water outfalls. Where feasible, outfalls shall discharge directly to wetlands that are adjacent (in hydrologic continuity) to streams rather than directly to streams.
      v) A final Operations and Maintenance Plan shall be included in the revised plan. The Operations and Maintenance plan section of the report shall require the release of any water remaining in the reserve vaults during the month of November or until substantial rains occur. The Operations and Maintenance Plan shall address management of accumulated sediments in reserve storage vaults. All accumulated sediments shall be disposed of in

an appropriate upland disposal site.

vi) The revised plan shall include a monitoring protocol to determine whether placement of the Third Runway embankment fill and other fill used for Master Plan Update Improvements meets fill specifications for type of material, meets specifications for compaction rates, and meets assumption for infiltration rates.

vii) The revised plan shall include contingency measures to offset reduced recharge in the event the Third Runway embankment fill and other fill used for Master Plan Update Improvements does not meet performance standards for infiltration rates.

viii) The revised plan shall include information demonstrating that low flow mitigation (vault releases) can be conveyed to streams without being lost to soil.

ix) The Port shall develop a pilot program to test one reserve stormwater vault for performance. The Port shall include a proposal for a pilot in the revised plan. The pilot shall be completed within three years after receipt of the Section 404 permit from the U.S. Army Corps of Engineers.

x) The revised plan shall identify and analyze all direct or indirect impacts to wetlands as a result of low flow impacts and the proposed low flow mitigation. The revised plan shall contain contingencies to mitigate for impacts to wetlands if wetland impacts are identified as a result of monitoring.

b) Des Moines Creek-

i) The revised plan shall provide data comparing the existing simulation of low flows against the Tyee Golf Course weir gauge data. The Port shall provide representative hydrographs, associated discussion and statement of adequacy of the calibration for simulating low flows.

ii) SDS3 vault design (sheet C141) indicates that not all inlet pipes are tributary to the reserve storage vault. The revised plan shall factor into the vault filling calculations the effects of having a reduced tributary area.

iii) SDS4 vault design (sheet 139) shall be reconfigured to show the vault inlet pipe at a lower elevation. A note similar to the one found on exhibit C131 should be included here. The Port shall evaluate the feasibility of providing reserve storage only in the SDS3 vault.

c) Walker Creek-

i) In place of the Port's proposal to line 3.5 acres of filter strip within the SDW2 subbasin, the Port's revised plan shall provide that low flow mitigation water for Walker Creek will be obtained from the collection of winter runoff from the 69 acres of impervious surface being added in the

Walker Creek non-contiguous groundwater basin. Reserve stormwater collected from this area may be stored in either the proposed 15-acre foot vault in Walker Creek or in the SDS3 vault. If, within thirty (30) days of receiving this order, the Port submits to Ecology information demonstrating that another feasible and implementable alternative exists, Ecology will review the alternative and consider amending this Order to allow implementation of the alternative.

ii) The current proposal for Walker Creek assumes no contribution from the Third Runway embankment fill. If the revised plan includes a reinstatement of the Third Runway embankment model, the area of the fill embankment tributary to Walker Creek shall be verified and modeled accordingly.

d) Miller Creek-

i) The revised plan shall verify whether the 1991 impact number is 0.11cfs or 0.12cfs. Unless shown otherwise, Ecology shall presume that 0.12cfs is the correct number.

ii) The revised plan shall include the correct "Low Flow Miller 91-94.xls" file and back-up data that produce a future 1991 7-day low flow of 0.67cfs shall be included on CDROM.

iii) The revised plan shall include documentation that clarifies whether the existing (1994) condition 1991 low flow is 0.784cfs as was used in electronic files or 0.79cfs as was presented in the July 23, 2001 memorandum.

iv) The revised plan shall correct the impervious acreage figures provided for the new North Employees Parking Lot (NEPL) vault to reflect 26.29 acres of impervious (Miller 2006 HSPF model), rather than 32.31 acres.

v) The Port shall evaluate orifice sizing and determine whether a change in orifice size and/or a reduction in the number of reserve stormwater vaults is warranted. The revised plan shall evaluate vault locations for feasibility and special design considerations (e.g., upstream spill control, oil controls, downstream compost filters, etc.) to ensure that reserve stormwater from the NEPL and cargo vaults will receive adequate treatment to ensure water quality.

vi) The revised plan shall include BMPs developed to ensure infiltration into the Third Runway embankment rather than into the Third Runway embankment conveyance system.

vii) The revised plan shall include revised Grading and Drainage sheets 129 and 130. The revised sheets shall clarify the flow in the collection swales.

viii) Revised conceptual drawings, and supporting analysis, shall be submitted with the revised plan that address water quality concerns for the NEPL and Cargo reserve storage areas.

e) Monitoring and Reporting Requirements: The revised plan shall develop a comprehensive monitoring protocol that, at a minimum, addresses the following elements:

i) Collection of stream gage data and an evaluation/correlation to expected flow rates established by the model.
ii) Water quality sampling and reporting. Water quality shall be tested at vault outflow and instream at a point 100 feet downstream of the outflow.
iii) Metering of water from vaults.
iv) Infiltration rate sampling and monitoring to evaluate performance of the fill.
v) Contingency if water quality in vaults does not meet water quality criteria (e.g., additional treatment, other source, flocculation, coalescing oil water separator, etc.).
vi) Instream biologic monitoring shall occur in Des Moines, Miller and Walker Creeks to assess the impacts of the Port's low flow offset proposal. The Port shall develop an instream monitoring protocol that shall at a minimum include the following elements:

- Existing low-flow conditions of Des Moines, Miller and Walker Creek will be evaluated by conducting Benthic Index of Biotic Integrity (BIBI) monitoring (Karr and Chu 1999). Monitoring shall occur four times per year and shall continue through year five (5) after construction and then yearly until completion of the fifteen (15)-year monitoring period. In addition to the BIBI monitoring required above, the Port shall develop a that monitors at a minimum temperature, turbidity, channel morphology, substrate quality, type and amount of large woody debris and other habitat features, riparian habitat cover and fish use. Representative stream channel cross-sections shall be utilized. Information must be synthesized to determine how these elements may be impacting overall stream health.

- Mitigation during the proposed period appears to effect low flow frequencies during June and July. Monitoring shall specifically address potential adverse impacts to fish or aquatic biota during June and July. If monitoring shows an adverse effect during this time period the Port shall implement contingencies to address the impact (such as providing additional mitigation water during June and July).

J. **Operational Stormwater Requirements:**

1. Approved Stormwater Plan: The Comprehensive Stormwater Management Plan (CSMP), Volumes 1 through 4, December 2000 as revised by the July 2001 Replacement pages is the approved stormwater management plan for this project. It shall be implemented in its entirety. No changes to the CSMP

shall be made without prior review and written approval from Ecology.

a) The Port shall provide Ecology with draft proposed changes to the Plan no later than 60 days prior to the date it seeks to implement a change to the .

b) The Port shall implement the project in accordance with the schedule provided in Table A-3 (July 2001). Any changes to the schedule must be reviewed and approved in advance by Ecology. The Port shall provide Ecology with a draft revised schedule no later than 60 days prior to the date it seeks to implement the change to the schedule. The following facilities/projects listed in Table A-3 (July 2001) do not yet have approved stormwater treatment facilities, proposed: expansion of NEPL to 6000 stalls, additional taxiway exits on 16L/34R, additional expansion of main parking garage, additional expansion of NEPL, expansion of North Unit parking structure, SR 509 extension/South Access, ASDE, and NAVAIDS. If the Port decides to build any of these facilities/projects the Port must submit conceptual drawings that meet the performance standards of the CSMP to Ecology no later than sixty (60) days prior to the date it seeks to commence construction.

c) Retrofitting of stormwater management facilities at the STIA shall occur at a rate commensurate with the construction of new impervious surface at the STIA. For every ten (10) percent of new impervious surface added at the project site, the Port must demonstrate that twenty (20) percent of retrofitting has occurred unless demonstrated that a twenty (20) percent rate isn't feasible. The Port shall document the implementation of retrofitting in quarterly progress reports. The Port shall develop and submit for review and written approval a schedule of construction of stormwater management facilities within 60 days after receipt of the Section 404 permit from the U.S. Army Corps of Engineers. Where the project schedule in the Stormwater Management Plan (including Table A-3) conflicts with this condition, the Port and Ecology shall discuss an appropriate retrofit schedule.

d) Nothing in this Order shall be deemed to prohibit continued participation by the Port in planning efforts to establish regional detention facilities for Des Moines or Miller Creek. The Port may request to amend this Order and the Comprehensive Stormwater Management Plan if it decides to route stormwater to future regional detention facilities and it is demonstrated that under future build-out conditions the combination of on-site and regional flow controls will achieve the performance goals of the CSMP and the corresponding basin plan. If the Port decides to participate in future regional detention facilities, the Port shall submit documentation to Ecology that substantiates that Regional Detention Facilities will be constructed and that

the Port may legally route stormwater to a RDF before Ecology will allow a change to the CSMP.

2. Discharge of operational stormwater to state receiving waters:

a) No stormwater generated by operation of new pollution generating impervious surfaces of projects for which the §404 permit was sought (excluding surfaces not to be included in the airport NPDES permit, e.g., South 154th Street which is a City of SeaTac facility) shall be discharged to state receiving waters until a site specific study, e.g., a Water Effects Ratio Study (WERS), has been completed and approved by Ecology and appropriate limitations and monitoring requirements have been established in the Port's NPDES permit. The study may use existing impervious surfaces as a surrogate for future new impervious surfaces, and it shall be submitted to Ecology for review and written approval. The Port shall consult with Ecology's Northwest Regional Office Water Quality Program's SeaTac NPDES Manager to determine an appropriate time for submittal of the study.

b) All stormwater discharges from the project shall be in compliance with state of Washington surface water quality standards (Chapter 173-201A WAC), sediment management standards (Chapter 173-204 WAC) and ground water quality standards (Chapter 173-200 WAC).

c) The Port shall design, construct, operate, and maintain stormwater treatment facilities to ensure that discharges shall not result in exceedances of state water quality criteria in receiving waters. Ecology may require changes to the approved CSMP as a part of future NDPES permits.

d) If monitoring indicates a need for additional BMPs, the Port may propose other BMPs for stormwater treatment if it can be demonstrated that they will result in stormwater discharges that meet the state water quality standards. Any proposed changes are subject to review and written approval by Ecology.

e) The Port shall submit the final stormwater treatment and flow control facility designs to Ecology for review and written approval 60 days prior to the start of construction of the facilities. During final design the Port shall evaluate the likelihood that stormwater facilities will intercept groundwater and make modifications to the designs so as to either prevent the interception of groundwater or increase facility sizing to accommodate the groundwater. If facility sizes increase the Port shall evaluate potential impacts to wetlands and other waters of the state and whether the increase facility size triggers Dam Safety requirements under Chapter 173-175 WAC.

f) Within 180 days of issuance of this Order the Port shall submit to Ecology for review and written approval a Stormwater Facilities Operation and Maintenance Plan which addresses maintenance and operation of all STIA stormwater facilities approved by this Order. For the purpose of meeting this condition the Port may submit other existing documents or updates of other existing documents that meet this requirement. The Port shall identify methods to prevent overtopping of stormwater facilities and the Industrial Wastewater Treatment System to streams during design storm events.

K. Construction Stormwater Limitations and Monitoring Requirements:

1. Stormwater Pollution Prevention Plans shall be prepared in conformity with the Construction Stormwater/Dewatering requirements the NPDES permit.

2. Limitations

Stormwater discharges shall not cause a visible change in turbidity, color, or cause a visible oil sheen in the receiving water from any stormwater detention or retention pond.

3. Stormwater Monitoring Schedule for Construction Stormwater Discharges

The Port shall monitor each stormwater outfall discharge according to the following schedule:

a) Turbidity and pH:

i) The Port shall monitor turbidity and pH in any surface water discharge from construction sites within 24 hours after any storm event of greater than 0.5 inches of rain per 24-hour period. The storm events shall be measured by an on-site rain gauge. The monitoring method shall be by a portable turbidimeter and a pH meter following the maintenance, operating and calibration procedures in the instrument's instruction manual. Alternatively, a grab sample shall be analyzed by a laboratory accredited under the provisions of Accreditation of Environmental Laboratories, Chapter 173-50 WAC.

ii) During each rain event the turbidimeter and pH meter shall also be used for the measurement of turbidity and pH upstream of the point of discharge to the receiving water and downstream of the thorough mixing of the discharge and the receiving water.

b) Oil, Grease and Temperature:

i) The Port shall sample for oil, grease and temperature as follows:

Parameter	Units	Sample Point[1]	Minimum Sampling Frequency	Sample Type
Oil and Grease	Mg/l	Point of Discharge	When visible sheen observed	grab
Temperature	^{0}C	Upstream[2] and downstream at the edge of the mixing zone (no greater than 100 feet)	Weekly[3]	grab

[1]Samples shall be collected from the outfall or an on-line stormwater drain access point nearest the outfall terminus.

[2] Background temperature measured at a point or points unaffected by the discharge and representative of the highest ambient water temperature in the vicinity of the discharge.

[3] During the months of July, August, and September

ii) Sampling method for Oil and Grease: The MDL for oil and grease is 0.2 mg/L using trichlorotrifluoroethane extraction and gravimetric analysis using EPA Method 413.1. The quantitation level (QL) for oil and grease is 1.0 mg/L (5 x MDL). An equivalent method is Method 1664 using normal hexane (n-hexane) as the extraction solvent in place of 1,1,2-trichloro-1,2,2-trifluoroethane (CFC-113; Freon-113). An equivalent method is total petroleum hydrocarbons with a MDL of 0.1 mg/L using Gas Chromatography and Flame Ionization Detector (FID) and Method WTPH-Dx Diesel (WTPH-D) from the Washington State Department of Ecology Method WTPH-D. The quantitation level (QL) for TPH-Dx is 0.5 mg/L (5 x MDL).

c. If monitoring indicates a need for additional BMPs, the Port may propose other BMPs for stormwater treatment if it can be demonstrated that they will result in stormwater discharges that meet the state water quality standards. Any proposed changes are subject to review and written approval by Ecology.

4. Stormwater Detention for New Outfalls
Any new diversion ditch or channel, pond, trap, impoundment or other detention or retention BMP constructed at the site for treatment of stormwater shall be designed, constructed, and maintained to contain and provide treatment for the peak flow for the ten (10) year 24 hour precipitation event estimated from data published by the National Oceanic and Atmospheric Administration.

5. Vehicle Trackout
Vehicles shall be cleaned of mud, rock, and other material before entering a paved public highway so that tracking of sediment onto the highway does not occur.

6. Reporting - Construction stormwater
Monitoring results for construction stormwater discharges shall be submitted every other month to Ecology's Federal Permit Manager, SeaTac Third Runway. Monitoring shall be reviewed for compliance with WAC 173-201A.

7. The Port shall document the use of any additives in the treatment of discharge water. Documentation shall identify the additives used, their commercial source, the material safety data sheet, and the appropriate application rate. The Port shall retain this information on-site or within reasonable access to the site and make it immediately available, upon request, to Ecology.

Additives to enhance solids settling before discharge to surface water must be applied according to the manufacturer's recommended dose. In addition, only additives of low toxicity to aquatic organisms, an LC_{50} equal to or greater than 100 mg/l, shall be used. The use of additives to enhance settling before discharge to surface water will not be allowed if the toxicity to aquatic organisms is not known.

8. In addition to the above, the Port shall submit a monitoring plan for stormwater and construction dewatering discharges from all construction projects including grading and construction of the Auburn mitigation site. The monitoring plan shall be submitted to Ecology for review and written approval at least thirty (30) days prior to the start of construction.

L. **Emergency/Contingency Requirements:**

1. The Port shall develop a spill prevention and containment plan for all aspects of this project, and shall have spill cleanup materials available on site.

2. Any work that is out of compliance with the provisions of this Order, causes distress death of fish, or any discharge of oil, fuel, or chemicals into state waters, or onto land with a potential for entry into state waters, is prohibited. If these occur, the Port shall immediately take the following actions:

a) Cease operations at the location of the violation.

b) Assess the cause of the water quality problem and take appropriate measures to correct the problem and/or prevent further environmental damage.

c) Notify Ecology of the failure to comply. Spill events shall be reported immediately to Ecology's 24-Hour Spill Response Team at 425-649-7000, and

within 24 hours of other events contact Ecology's Federal Permit Manager, SeaTac Third Runway at 425-649-4310.

d) Submit a detailed written report to Ecology within five days that describes the nature of the event, corrective action taken and/or planned, steps to be taken to prevent a recurrence, results of any samples taken, and any other pertinent information.

Compliance with these requirements does not relieve the Port from responsibility to maintain continuous compliance with the terms and conditions of this Order or the resulting liability from failure to comply.

3. In the event of finding distressed, dying or dead fish, the Port shall collect fish specimens and water samples in the affected area, within the first hour of the event. These samples shall be held in refrigeration or on ice until the Port is instructed by Ecology on their disposition. Ecology may require analyses of these samples before allowing the work to resume.

4. In the event of a discharge of oil, fuel, or chemicals into state waters, or onto land with a potential for entry into state waters, containment and cleanup efforts shall begin immediately and be completed as soon as possible, taking precedence over normal work. Cleanup shall include proper disposal of any spilled material and used cleanup materials.

5. Fuel hoses, oil drums, oil or fuel transfer valves and fittings, etc., shall be checked regularly for drips or leaks, and shall be maintained and stored properly to prevent spills into state waters.

6. If at any time during work the Port finds buried chemical containers, such as drums, or any unusual conditions indicating disposal of chemicals, the Port shall immediately notify the Ecology's NWRO Regional Spill Response Office at 425-649-7000.

M. **General Conditions:**

1. This Order does not authorize direct, indirect, permanent, or temporary impacts to waters of the state or related aquatic resources, except as specifically provided for in conditions of this Order.

2. This Order does not exempt and is conditional upon compliance with other statutes and codes administered by federal, state, and local agencies.

3. Ecology retains continuing jurisdiction to make modifications hereto through supplemental Order, if it appears necessary to further protect the public interest.

4. The Port shall have a designee on-site, or on-call and readily accessible to the site, at all times while construction activities are occurring that may affect the quality of ground and surface waters of the state, including all periods of construction activities.

5. The Port's designee shall have adequate authority to ensure proper implementation of the Erosion and Sediment Control (ESC) Plan, as well as immediate corrective actions necessary because of changing field conditions. If the Port's designee issues a directive necessary to implement a portion of the ESC Plan or to prevent pollution to waters of the state, all personnel on site, including the construction contractor and the contractor's employees, shall immediately comply with this directive.

6. The Port shall provide access to the project site and all mitigation sites by Ecology or WDFW personnel for site inspections, monitoring, necessary data collection, or to ensure that conditions of this Order are being met.

7. Copies of this Order and all related permits, approvals, and documents shall be kept on the project site and readily available for reference by the project managers, construction managers and foremen, other employees and contractors of the Port, and state agency personnel.

8. The Port shall comply with all provisions of any Hydraulic Project Approval issued by the Washington Department of Fish and Wildlife. Work in or near the water that may affect fish migration, spawning, or rearing shall cease immediately upon a determination by WDFW that fisheries resources may be adversely affected.

N. **Violations of the Order:**

Any person who fails to comply with any provision of this Order shall be liable for a penalty of up to ten thousand dollars ($10,000) per violation for each day of continuing noncompliance. Violations of this Order shall be addressed in accordance with the requirements of RCW 90.42 and RCW 43.21B. Upon Ecology's determination that the Port is violating any condition of this Order, it shall serve notice of the violation to the Port by registered mail.

O. **Appeal process:**

Any person aggrieved by this Order may obtain review thereof by appeal. The Port can appeal up to 30 days after receipt of the permit, and all others can appeal up to 30 days from the postmarked date of the permit. The appeal must be sent to the Washington Pollution Control Hearings Board, PO Box 40903, Olympia, WA 98504-0903. Concurrently, a copy of the appeal must be sent to the Department of Ecology, Northwest Regional Office, Shorelands and Environmental Assistance Program, Attn: Ann Kenny,

3190 160th Avenue SE, Bellevue, WA 98008-5452. These procedures are consistent with the provisions of Chapter 43.21B RCW and the rules and regulations adopted thereunder.

Dated September 21, 2001 at Olympia, Washington.

Gordon White

Gordon White, Program Manager
Shorelands and Environmental Assistance Program

Water Quality Certification # 1996-4-02325 (Amended-1)
September 21, 2001

Attachment A: Contractor Statement

PROJECT: Port of Seattle Third Runway & Master Plan Update Projects

I have read the Water Quality Certification/Coastal Zone Consistency Determination/Section 401 Permit (Order #1996-4-02325) and the National Pollutant Discharge Elimination System (NPDES) Permit for the above referenced project and, to the best of my ability, understand the requirements of those permits as they relate to those portions of the work that are being conducted under my supervision.

_____
Name (Signature)

_____
Name (Printed)

_____
Title

_____
Company or Organization

Water Quality Certification # 1996-4-02325 (Amended-1)
September 21, 2001

Attachment B: NRMP Plan Set Revisions

Appendix A – Miller Creek Relocation and Floodplain Enhancement

Sheet C3: Note 13. Provide revised sheet showing design of irrigation system and discuss irrigation plan in NRMP (timing, amounts of water, etc.).

Sheet C4: Provide revised sheet C4 showing no work in streams. Provide revised Grading plan C-129 showing no work in streams.

Sheet C7: Provide revised sheet with note detailing how woody debris will be anchored using cable or hemp.

On the swale section provide revised sheet showing that swale area will be seeded.

Sheet C-8: Provide revised sheet that shows steel anchors for all the logs in the stream channel with note that hemp rope anchors are expected to remain in place for 3-5 years.

Sheet TE1: Provide revised sheet with note on how the ditches will be blocked to prevent sediment migration.

Provide schedule or table that shows the sequence in which the different elements of the mitigation will be installed. (This applies to the Auburn site as well.)

Sheet L2: Revise sheet to show how young plants will be protected from sun exposure until they are well enough established to withstand exposure to the sun.

Revise Note 6 to state that except where needed to protect roots of conifers, care must be taken not to seed mulch collars.

Revise sheet to remove staking notes and details from sheet.

Appendix B – Miller Creek In-stream and Buffer Enhancements

Sheet C3: Revise sheet to show construction access points and add a note to the plans to minimize wetland and stream impacts. Provide note detailing how access points will be restored.

Sheet C4: Note 5. Add note to see sheet TE2 and add more details detailing how the channel will be de-watered during re-grading.

Sheet C5: Provide revised sheet if log orientation at 42+00 changes.

Note 2. Provide revised sheet with note. Discuss disposal of solid wastes in text of NRMP or in an Appendix. Provide information on how hazardous materials will be managed if discovered during the course of constructing the mitigation site.

Sheet C7: Provide revised sheet with note that details how project areas will be accessed. Also provide details on how access locations will be restored after the work has been completed.

Sheet C8: On Section 2, the coir lift is shown on the section but is not present on the plan. Provide revised sheet.

On Section 3, the logs on the plan view are not present on the section. Provide revised sheet.

On Section 5, the log shown on the plan view is not present on the section. The coir lift shown on the section is not shown on the plan. Provide revised sheet.

On Section 6, the log shown on the plan view is not present on the section. Provide revised sheet.

Sheet C9: In typical detail of coir fabric lifts, develop a specification for the quantity of willow cuning. Provide revised sheet.

Sheet C10: Provide revised sheet and include note on sheet that indicates that the geotextile fabric will be biodegradable. If this is discussed in text, then next must become part of final plan set.

Sheets TE1-TE4: Provide revised sheets adding note in notes section that states that equipment should not be driven in the streambed except where necessary to complete construction.

Sheet TE2: Provide revised sheet showing details for stream diversion structure and flow dispersion structure.

Provide revised sheet showing detail for the flexible by-pass pipe. Note that pipe should not be trenched in.

Indicate on plan sheet direction of sump discharge water with note that it is pumped to a treatment pond. Provide specific pond. Provide revised sheet.

Sheet TE5: On the live stake detail, specify the density of staking (inches on center). Provide revised sheet.

Sheet L1.1: Provide revised sheet with note that says that if S. 157th Place is determined not to be needed for access purposes it will be revegetated.

Sheet L2: Provide revised sheet with note that says that if S. 160th Street is not needed for access it will be revegetated.

Sheet L3: It is unclear how much of this area will be cleared. Provide revised sheet with correct cross-hatching in wetland.

Sheet L5: Clarify why some of Wetland R11 shown as revegetated and others are not. Provide revised sheet with note indicating that the Corps of Engineers is requiring that the sewer easement will not be revegetated.

Provide revised sheet correcting hatching error for the replacement drainage channels buffer areas that will be graded. This area should be in darker (cleared and revegetated areas) hatch.

Sheet L5.1: Provide revised sheet with note that says that if 8th Avenue South is not needed for access it will be revegetated.

Sheet L5.2: Provide revised sheet with note indicating that any irrigation installed in the field shall be shown on the As-Built Report.

Sheet L6: Areas that are cleared and revegetated should be planted at a higher density than enhancement areas. Densities or quantities should be stated on the plan.
A performance standard of 280 trees per acre is proposed for the buffer. In cases where some forest vegetation is present, the Port shall supplement the existing trees with enhancement plantings to achieve this density. Clarify in NRMP how survival monitoring will be performed in these areas to differentiate these two types of areas.

Provide revised plan detail/notes to allow for use of phased planting in areas that lack suitable shade or soil moisture. Discuss in text of NRMP.

On tree planting and staking detail, the plan needs to state when the stakes will be removed. If it is determined that staking is not necessary then remove the stake details. Provide revised sheet.

Sheet P2: Provide revised sheet showing approximate locations of the sandbags and the abutments to be removed. Provide note on TESC controls that will be in place for the timber removal in order to minimize sediment mobilization.

Appendix D – Replacement Drainage Channels and Restoration of Temporarily Impacted Wetlands

Sheet C3: Clarify how hydrologic support will be provided to Wetland 11 and Wetland 9 after construction.

Sheet C5: Provide revised plan sheet with details regarding flow spreaders and spalls.

Sheet C6: Provide revised sheet clarifying whether the dark hatched area in the vicinity of Wetlands R9a, R10, R11, A10, and A11 will be graded and revegetated.

Sheet C7: Show how will water get to Wetland 44a if the TESC channel is removed.

Show flow monitoring locations on the stormwater management plan.

Sheet C8: Clarify how the drainage channel discharge structure controls flow to the wetland. Address how often these structures will be monitored and how modifications be made if a problem is identified. Provide information in note on revised sheet.

Sheet L1: Provide revised sheet to allow for phased planting to provide shading for western red cedar and the western hemlock.

Appendix E – Auburn Wetland Mitigation

Sheet C5: Provide revised sheet with note saying that if hummocks remain in place options for removing reed canary grass will be evaluated.

The Sheet C6 grading plan shows proposed contours for re-grading the SW portion of the mitigation site. These contours do not continue onto Sheet C5. Provide revise sheet.

Sheet C8: Provide revised sheet with a note added to the plans to include culverts at the low spots if needed to eliminate ponding.

On Section 3, design to ensure the perforated pipes do not sink into the subsurate and become blocked.

Sheet TE1: There is no discussion on dewatering except in the NRMP text on page 7-50. Sheet C2 (Appendix E) shows the discharge point located along a ditch, which is slated to be recontoured. Provide revised sheet with additional details to manage potential erosion and amend text in NRMP if necessary.

If it is determined that Area 1 should have a sedimentation pond submit revised sheet showing the pond.

Page 7-47 of the text discusses major construction activities limited to a period from October 31 to March 31 to avoid winter bald eagles. Provide revised sheet correcting error regarding construction window to avoid winter bald eagles.

Sheets L7 and L8: Provide revised sheets to show plant pattern layout areas for each phase.

Sheet L9: Provide revised sheet with a note added to the plans so that ponded areas or areas that are anticipated to be ponded shortly after planting will be planted with plugs representative of the seed mix specified. Add Hydro seeding specifications.

Revised Auburn Grading Plan (June 28, 2001):

1. The revised grading plan (June 28, 2001) shows a culvert in the northwest corner of the site in the proposed new drainage swale. The culvert will pass flows under the site access path. The drawing shows this culvert approximately 60 feet long, passing under a path that is only approximately 15 feet wide. This culvert should be no longer than is necessary to pass the water under this pathway.

2. The revised grading plan (June 28, 2001) shows a culvert in the south central portion of the mitigation site. This culvert appears to be mis-located. It appears that the culvert should be shown in the wetland directly east of the shown location, where the wetland passes under the

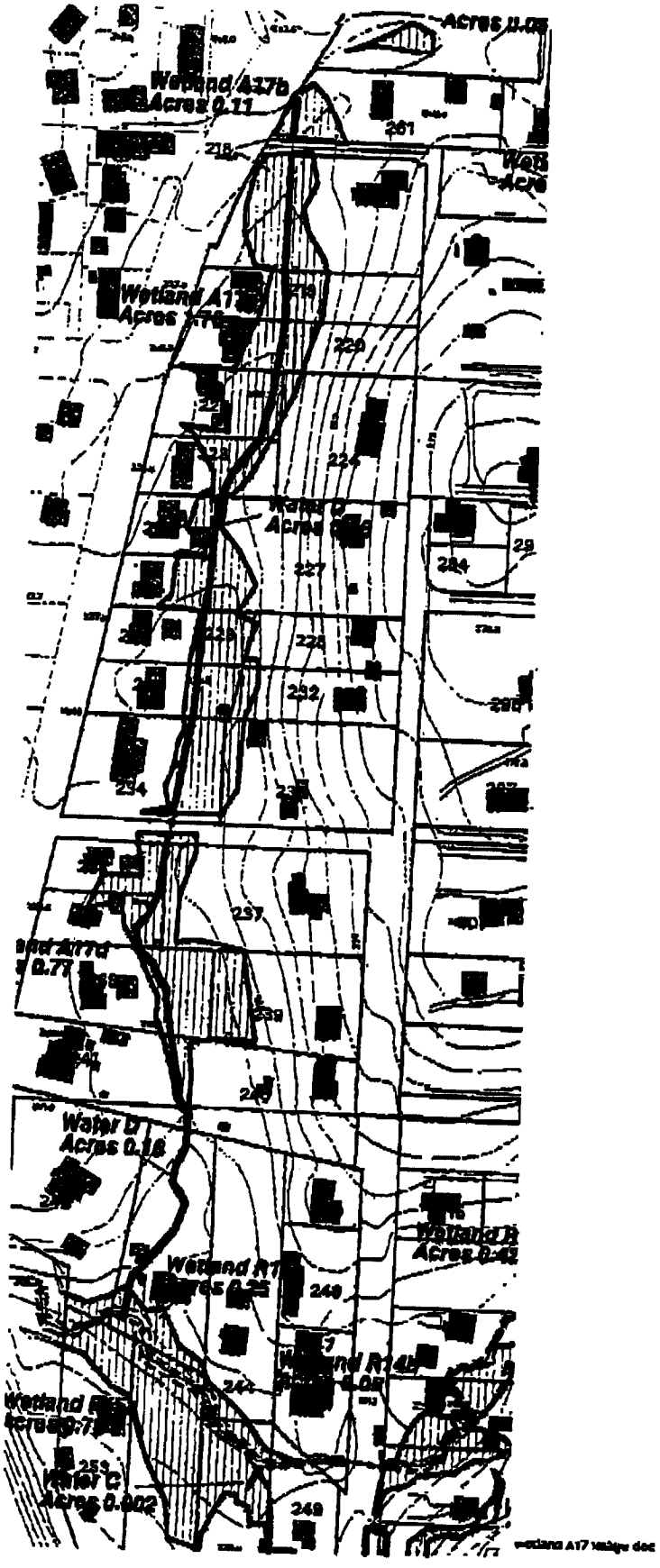
proposed maintenance path. This culvert should be no longer than is necessary to pass the water under this pathway.

3. Two additional culverts need to be shown along the new drainage swale where the water outlets the southwestern basin, under the maintenance pathway.

4. Culverts should be placed during construction under the paths/roads in all areas where there is a potential for impounding water. A note should be added on the construction documents.

5. Provide revised grading plan that addresses items 1 through 4 above.

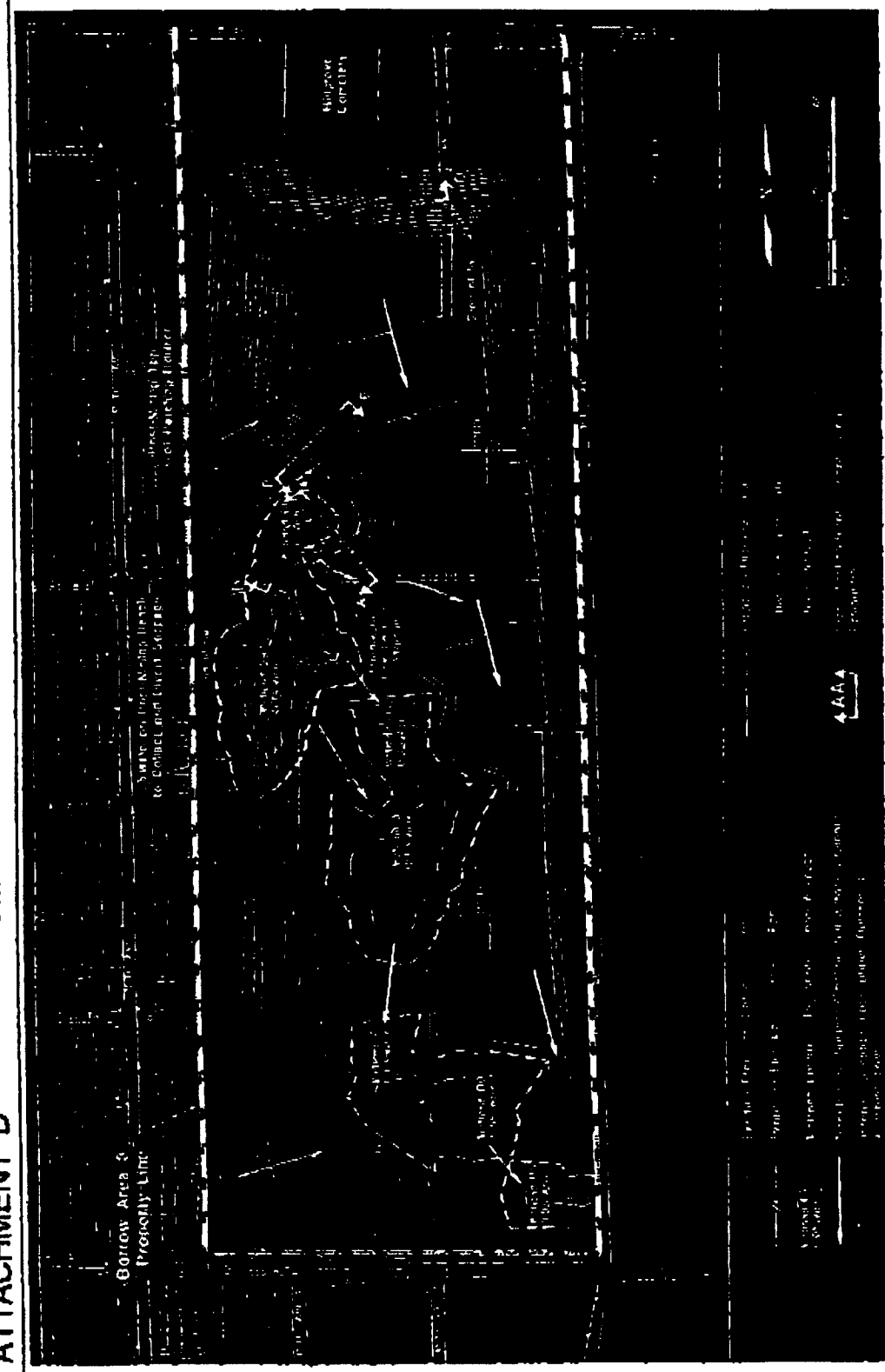
Attachment C
1996-4-02325
(Amended-1)
September 21, 2001
Wetland A17 Complex



Water Quality Certification #1996-4-02325 (Amended - 1)
September 21, 2001

ATTACHMENT D

Borrow Area 3 Wetland and Swale Buffer



Attachment E

SECTION 401 CERTIFICATION SYNTHETIC PRECIPTTATION LEACHING PROCEDURE WORK PLAN

This Work Plan provides an alternative methodology for meeting the fill suitability criteria found in Section E.1(b) of the Department of Ecology's Water Quality Certification #1996-4-02325 (the "Certification")issued to the Port of Seattle ("Port"). This Work Plan describes procedures for use of the Synthetic Precipitation Leaching Procedure ("SPLP") to determine the suitability of fill for the Port's third runway embankment and other Port projects for which the fill criteria of the Certification are applicable (defined in the Certification as "Port 404 Projects").

1. Summary of Requirements

Requirements applicable to the Port include those of the Certification and also those contained in the U.S. Fish and Wildlife Service's ("FWS") May 22, 2001 biological opinion ("BO") (FWS Reference Number 1-3-00-F-1420). The Ecology Certification and the FWS BO both have screening level criteria for Port 404 Projects, including the third runway embankment (the "Embankment"), as well as special screening criteria that apply to a zone of material above the drainage layer at the bottom of the embankment. Special criteria for this zone (referred to as the "drainage layer cover" in the BO and in this document) are applicable to a zone that is 40 ft thick at the face of the embankment and reduces in height to the east at a rate of 2 percent until it meets the drainage layer at the existing ground surface to the east.

Table 1 shows the soil criteria that have been developed for the third runway embankment by FWS and Port 404 Projects by Ecology. Ecology's Certification specifies soil criteria for 14 metals and TPH (column 5 – the last column on the right). In addition, the Certification soil criteria for chromium, lead, nickel, and diesel in the drainage layer cover of the Embankment are more stringent than for the rest of the Embankment and other Port 404 Projects (column 2). The FWS BO specifies soil criteria for the drainage layer cover as shown in column 3 for the RCRA 8 metals. Because the FWS and Ecology soil criteria differ, the Port will use the most stringent criteria of the two for the drainage layer cover (shown in column 4) and for the remainder of the Embankment (shown in column 5).

Because metals are naturally occurring, they have widespread concentration variability throughout the Pacific Northwest. Many of the soil criteria in Table 1 are at Puget Sound background concentrations calculated at the 90th percentile. Thus, by definition a constituent, even at a naturally-occurring, unaltered concentration will fail these criteria10% of the time. When testing is done for multiple constituents, the probability that naturally-occurring concentrations will disqualify a fill source rises. For fill constituents that do not meet the screening criteria of the Certification and BO, fill acceptability can be demonstrated using the SPLP test procedure.

In accordance with the BO, upper bounds are established for constituent concentrations that cannot be accepted even following a successful SPLP test (referred to in this document as "upper bound limits"). For the drainage layer cover, the upper bound limits are set in the BO at applicable MTCA Method A standards. However, Method A values were not available for barium, selenium and silver. As a result, the upper bound limit for barium was backcalculated using the MTCA three phase partitioning approach (WAC 173-340-747) and selenium and silver soil criteria were set at the PQL. Upper bound limits for the drainage layer cover and the remainder of the Embankment are incorporated into this Work Plan to avoid any potential inconsistency with the BO. As such, any material that is unacceptable for the Embankment under the BO is also unacceptable for the Embankment under this Work Plan and the Certification.

At proposed fill sources for which sampling is required in accordance with the Certification, the appropriate number of samples of proposed fill material (per Certification requirements) will be collected and analyzed for the constituents listed in Condition B.1(b). Constituent concentrations will be compared to the lower screening criteria in Condition B.1(b) and in the BO for the drainage layer cover (Table, 1, column 4) or for the rest of the embankment (Table 1, column 5). If the screening criteria are not exceeded, fill from that source will be considered suitable for placement in the appropriate portion of the embankment, or on other Port 404 Projects. If the screening criteria are exceeded, but the upper bound limits are not exceeded, the Port must demonstrate fill suitability by employing the SPLP testing protocol discussed below prior to accepting fill from that source.

II. SPLP Testing Protocol

The purpose of the SPLP is to evaluate the potential for metals and organic constituents to mobilize and move through soils in fluid form. The SPLP is an accepted laboratory leaching test, as discussed in WAC 173-340-747(7). The SPLP will be conducted in

accordance with the procedures contained in SW-846 Method 1312. In the SPLP, fluid representing acid rain is passed through a soil sample and the liquid is collected and analyzed.

SPLP testing will be conducted and the results will be evaluated relative to the applicable ambient water quality criteria of WAC 173-201A as discussed below. In the event that SPLP results consistently show that criteria for specific metals are not exceeded across a range of sites and soil conditions, the Port may elect to submit such information to Ecology for its review as evidence that the Port may discontinue the requirement to implement SPLP for specific metals. Upon approval by Ecology, the Port may then adopt the applicable upper bound limit, or some intermediate figure as determined by Ecology, as its new soil screening criterion for that constituent.

Use of SPLP to demonstrate fill acceptability will require sampling of the material proposed as imported fill. At a minimum, one SPLP sample will be collected for each original sample that exceeds the screening criteria. This sample will be representative of the area where the original sample indicating an exceedence of the screening criteria was collected. The SPLP will only be conducted for the specific chemical constituent that exceeds the criteria.

III. Screening Procedure

Results from the SPLP will be compared to freshwater ambient water quality criteria according to guidelines outlined in WAC 173-201A-040 (adjusted for PQLs). As an initial screening tool, the constituent concentrations as determined from the SPLP will be divided by a dilution factor of 20. The default dilution factor of 20 was established by Ecology for use in the Three Phase Partitioning Model (WAC 173-747). This dilution factor represents a very conservative estimate because it accounts only for the dilution that occurs between the pore water at the spot in the embankment where the constituent exceeded water quality criteria, and ground water in the saturated zone directly below, without accounting for attenuation processes. The actual dilution factor, first from a specific point in the embankment through the underlying drainage layer and then transport to Miller Creek, is much greater. If the adjusted SPLP results are equal to or below the freshwater ambient water quality criteria, the material will be considered suitable for placement in the embankment (including the drainage layer cover, provided applicable upper bound limits were not exceeded for any constituents in the initial soil test prior to SPLP use). If adjusted SPLP results are above freshwater ambient water quality criteria, the material will be rejected and will not be considered suitable for placement at any location within the embankment.

Table 1
Criteria for Drainage layer cover and other Port 404 Projects.

Constituent	Ecology special criteria for drainage layer cover (mg/kg)	FWS drainage layer cover criteria (mg/kg)	Final drainage layer cover criteria (most conservative of FWS and Ecology values) (mg/kg)	Ecology criteria for remainder of embankment and other Port 404 Projects (mg/kg)
Antimony		NA	18	18
Arsenic		7	7	20
Barium		12,000	12,000	NA
Beryllium		NA	0.8	0.6
Cadmium		1	1	2
Chromium	42	48	42	2000
Copper		NA	36	36
Lead	220	24	24	250
Mercury		0.07	0.07	2
Nickel	100	NA	48	110
Selenium		5	5	5
Silver		5	5	5
Thallium		NA	2	2
Zinc		NA	85	85
Gasoline		NA	30	30
Diesel	460	NA	460	2000
Heavy Oils		NA	2000	2000

E

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Mark C. Rutzick
Admitted to practice in
Oregon, Washington and New York

June 11, 2001

RE-
JUN 12 2001
Stoel Rives LLP

Ms. Cathy Catterson
Clerk, U.S. Court of Appeals
for the Ninth Circuit
95 Seventh Street
San Francisco, California 94103-1526

Re: *Airport Communities Coalition, et al. v. Federal Aviation Administration and Port of Seattle*, No. 00-70848

Dear Ms. Catterson:

Enclosed for filing are the original and four copies of Petitioners' Motion for Voluntary Dismissal. Counsel for the Federal Aviation Administration and the Port of Seattle have been served.

Very truly yours,

Mark C. Rutzick

Enclosures
cc: Counsel

No. 00-70848

UNITED STATES COURT OF APPEALS
FOR THE NINTH CIRCUIT

AIRPORT COMMUNITIES COALITION, et al.,

Petitioners,

vs.

FEDERAL AVIATION ADMINISTRATION and PORT OF SEATTLE,

Respondents.

PETITION FOR REVIEW OF FEDERAL AVIATION ADMINISTRATION ORDER

PETITIONERS' MOTION FOR VOLUNTARY DISMISSAL

Petitioners Airport Communities Coalition (ACC), City of Des Moines, City of Normandy Park, City of Burien, City of Federal Way, City of Tukwila, and Highline School District No. 401 move for voluntary dismissal pursuant to Fed. R. App. P. 42(b) on the ground that petitioners have achieved substantially all the relief they sought in this case through issuance of a biological opinion by the U.S. Fish and Wildlife Service (FWS) in May 2001 addressing the effects of the ongoing implementation of the Master Plan Update Development Actions (MPU) for Seattle-Tacoma International Airport on threatened Coastal/Puget Sound bull trout and endangered marbled murrelets; and by the issuance of a letter of concurrence by the National Marine Fisheries Service (NMFS) on May 31, 2001 addressing the effects of the MPU on Puget Sound chinook salmon.

Before ACC filed this case and the related pending action in the Western District of Washington, respondents Federal Aviation Administration (FAA) and Port of Seattle, Washington

(Port of Seattle) had completely ignored their duties under the Endangered Species Act (ESA), 16 U.S.C. §§1531 et seq. They had never conducted any biological review on the bull trout and chinook salmon, and had never performed any consultation with FWS or NMFS on the bull trout, chinook salmon or marbled murrelet. They had completely disregarded the interests of endangered species as they relentlessly pushed ahead with their Third Runway project.

By filing this case and the related district court case, ACC compelled the FAA and the Port of Seattle to comply with the Endangered Species Act. The FAA prepared a biological assessment on the effect of the entire Master Plan Update actions, including the Third Runway, on all the protected species, which was then substantially revised and expanded at the request of the wildlife agencies – exactly as ACC had demanded. The FAA enlarged the "action area" it studied in the biological assessment to encompass the terrestrial, estuarine and near-shore marine environments in the watersheds near the airfield – exactly as ACC had demanded. On June 15, 2000, in response to ACC's motion for a preliminary injunction in the district court case, the FAA initiated formal consultation with FWS and NMFS on the protected species – exactly as ACC had demanded. The FAA extracted from the Port of Seattle a promise to obey §7(d) of the ESA during those consultations – exactly as ACC had demanded.

The FWS biological opinion and NMFS concurrence letter contain a list of commitments by the FAA and Port to modify the Third Runway project to protect the affected species, which are incorporated as conditions of the opinion and letter. The failure of the FAA or Port to honor these commitments could trigger a reinitiation of consultation. The commitments include strict toxicity and monitoring standards in the fill dirt for the runway embankment, erosion control, sediment retention and cover practices during and after construction, compliance with the turbidity standard for Class AA waters, and improved treatment and handling of stormwater runoff at the airfield. The

biological opinion also includes a set of 13 conservation recommendations to additionally enhance the level of protection for the species, and the concurrence letter has eight further recommendations.

The effect of the biological opinion and concurrence letter is exactly what ACC had sought to achieve in this case and the related district court case – to provide substantial additional protections for bull trout, chinook salmon and marbled murrelets. These administrative actions have rendered this case largely moot. ACC therefore seeks voluntary dismissal of this petition under Fed. R. App. P. 42(b).

Conclusion

The motion for voluntary dismissal should be granted, with each party to bear its own attorney fees and costs.

Dated this 11th day of June, 2001.

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Attorneys for Petitioners

Certificate of Service

I certify that on June 11, 2001 I served one copy of PETITIONERS' MOTION FOR VOLUNTARY DISMISSAL, by FedEx, to the following counsel of record:

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Mark C. Rutzick

F

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Region
7600 Sand Point Way N.E., Bldg. 1
Seattle, WA 98115

August 9, 2001

Lowell H. Johnson
Manager, Airport Division
Federal Aviation Administration
1601 Lind Avenue
Renton, Washington 98055-4056

Re: Consultation on Salmon Essential Fish Habitat Consultation for Master Plan Update Improvements at Seattle-Tacoma International Airport (NMFS No. WSB-00-318).

Dear Mr. Johnson:

This correspondence is in response to your request for consultation under the Magnuson Stevens Fishery Conservation and Management Act (MSA). Consultations were completed previously for Endangered Species Act and for Essential Fish Habitat for coastal pelagic and West Coast Groundfish. Consequently this consultation is only for Essential Fish Habitat for Pacific salmon.

Federal agencies are obligated, under Section 305(b)(2) of the MSA and its implementing regulations (50 CFR 600), to consult with NMFS regarding actions that are authorized, funded, or undertaken by that agency, that may adversely affect Essential Fish Habitat (EFH). The MSA (§3) defines EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." Furthermore, NMFS is required to provide the Federal agency with conservation recommendations which minimize the adverse effects of the project and conserve EFH (MSA §305(b)(4)(A)). This consultation is based, in part, on information provided by the Federal agency and descriptions of EFH for Pacific salmon contained in the Fishery Management Plan produced by the Pacific Fisheries Management Council.

The proposed action and action area are described in the BA submitted to NMFS in June 2000 and the Essential Fish Habitat Consultation submitted in March 2001. The action area includes habitats which have been designated as EFH for various life stages of chinook, coho, and Puget Sound pink salmon. Information submitted by the Federal Aviation Administration (FAA) and the U.S. Army Corps of Engineers (ACOE) in the BA, supplemental correspondence, and the EFH consultation is sufficient for NMFS to conclude that the effects of the proposed actions are transient, local, and of low intensity and are not likely to adversely affect EFH in the long-term. NMFS also believes that the conservation measures proposed as an integral part of the actions would avert, minimize, or otherwise offset potential adverse impacts to designated EFH.

EFH Conservation Recommendations: The conservation measures that FAA and ACOE included as part of the proposed actions are adequate to minimize the adverse impacts from this project to designated EFH for salmon. NMFS understands that FAA and ACOE intend to implement the proposed activity with these built-in conservation measures that minimize potential adverse effect to the maximum extent practicable. Consequently, NMFS has no additional conservation recommendations to make at this time.

Please note that the MSA (§305(b)(4)(B)) and 50 CFR 600.920(j) require the Federal agency to provide a written response to NMFS' EFH conservation recommendations within 30 days of its receipt of this letter. However, since NMFS did not provide conservation recommendations for this action, a written response to this consultation is not necessary.

This concludes EFH consultation in accordance with the MSA and 50 CFR 600. The FAA or ACOE, as appropriate, must reinitiate EFH consultation with NMFS if the proposed action is substantially revised in a manner that may adversely affect EFH, or if new information becomes available that affects the basis for NMFS' EFH conservation recommendations (50 CFR 600.920(k)).

If you have any questions regarding NMFS consultation on conservation measures for EFH, please contact Tom Sibley at the Washington State Habitat Office (206) 526-4446.

Sincerely,

Donna Darm
Acting Regional Administrator

cc: Colonel Ralph H. Graves, ACOE
Muffy Walker, ACOE

bc: F/NWR - Cunningham
F/PR3 - Chief of Endangered Species
F/NWR4 - Berwick
WSHB - File Copy
WSHB - Chron File
WSHB - Sibley
WSHB - Stadler
GCNW

cc: address:

Colonel Ralph H. Graves
U.S. Army Corps of Engineers
P.O. Box 3755
Seattle, WA 98124-3755

Muffy Walker, Project Manager
U.S. Army Corps of Engineers
P.O. Box 3755
Seattle, WA 98124-3755

AR 013802

G

Regulatory Guidance Letter 87-03

SUBJECT: Section 401 Water Quality Certification

DATE: April 14, 1987 EXPIRES: December 31, 1989

1. The purpose of this guidance is to clarify when a Section 401 water quality certification is required, when a waiver occurs, and what is required if a state changes its position on the certification.

2. **Applicability:**

a. Section 401(a)(1) of the Clean Water Act requires a water quality certification or waiver before any Federal permit can be issued "to conduct any activity including, but not limited to, the construction or operation of facilities, which may result in any discharge...." The Clean Water Act further defines a "discharge" (Section 502(16)) to be a "discharge of a pollutant" (Section 502(12)).

b. **Before permit decision:** Once a Section 401 water quality certification has been issued or a waiver has occurred, the district engineer is not required to deny or condition the Corps permit should a state subsequently deny or add written conditions to the Section 401 quality certification, unless the district engineer determines there has been a sufficient change in the project such that a new application for a Section 401 water quality certification should be required. However, the district engineer will consider such denial or conditions as part of the public interest review and may deny the permit or add those conditions to a permit. On the other hand, if a state issues a 401 water quality certification, and a state or Federal court voids or sets aside that certification before the Corps issues the permit and within the statutory 1-year period from the date of application, then the Corps cannot issue the permit unless and until the 401 certification is legally revived (e.g., by an appeals court or by re-issuance or waiver of the certification by the state). Furthermore, if a state issues a certification which was previously denied, the district engineer is no longer required to deny the permit.

c. **After permit issuance:** Should a state deny or further condition a Section 401 water quality certification after a permit has been issued, the district engineer is not required to revoke or modify the permit, but may consider if modification, suspension, or revocation might be appropriate in accordance with 33 CFR 325.7 In addition, if a state or Federal court voids a 401 certification after the Corps has already issued its permit in reliance on the 401 certification, or after the passing of the statutory 1-year period, that court action does not affect the validity of the Corps permit. In such cases the district engineer may consider if modification, suspension, or revocation might be appropriate in accordance with 33 CFR 325.7.

3. **Reasonable period of time:**

a. **Individual Permits:** Section 401(a)(1) of the Clean Water Act provides that Section 401 water quality certification is waived if a state fails or refuses to act on a request for certification within a reasonable period of time (which shall not exceed one year) after receipt of such

request. Corps regulations at 33 CFR 325.2(b)(1)(ii) defines this period to be 60 days unless the district engineer determines a shorter or longer (not to exceed one year) period is reasonable for the state to act. The district engineer may establish such a shorter or longer period on an individual or generic basis. Furthermore, the district engineer is encouraged to establish procedures with the state so that waiver verification is presumed upon certain actions or non-actions. For example, a state may agree to a presumed waiver if they do not respond to a Corps public notice.

b. **Nationwide Permits:** Where a state has denied certification for a nationwide permit, 33 CFR 330.9 provides a "reasonable period of time" after an applicant seeks an individual 401 certification for his proposed activity for a waiver to occur. This "reasonable period of time" should be the same as for individual permits which is 60 days unless the district engineer establishes a shorter or longer period. See 33 CFR 330.9 and 325.2(b)(1)(ii), and paragraph 3 (a) above.

4. This guidance expires 31 December 1989 unless sooner revised or rescinded.

FOR THE CHIEF OF ENGINEERS:

Back to RGL Index

RETURN HOME