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RESPONSE TO COMMENTS ON THE PUBLIC NOTICE FOR PERMIT REFERENCE NO. 96-4-02325

MASTER PLAN DEVELOPMENT ACTIONS AT SEATTLE-TACOMA INTERNATIONAL AIRPORT

PORT OF SEATTLE

INTRODUCTION AND SUMMARY

This document is the Port's response to questions raised by agencies and the public during the comment periods for the Public Notice. The document is organized into two main sections. The first addresses six general questions/concerns that were raised by several commenters. The following summarizes those concerns and the Port's responses.

1. **Has the Port followed the required process regarding wetland impacts and mitigation?**

The sequencing outlined in the EPA/COE MOA has been followed. Impacts have been avoided and minimized where possible. Compensatory mitigation is proposed for impacts that cannot be avoided.

2. **Is there justification to replace some wetland functions in another watershed?**

The majority of wetland functions are being replaced in the impacted watersheds. The Port has proposed new in-basin mitigation in its **Modified Mitigation Approach** dated May 1998. The off-site mitigation wetland in Auburn is proposed to compensate for impacts to wildlife habitat. FAA guidance and the Port's need to maintain a safe environment for aircraft operations precludes it from being able to create and maintain wetland habitat near the Airport.

3. **Is there a need for the proposed development in the area known as the South Aviation Support Area (SASA)?**

SASA is needed at Sea-Tac Airport to provide space for displaced line maintenance facilities and to accommodate an existing and growing need for cargo facilities. In response to agency concerns, the SASA preliminary design has been reevaluated and it appears that impacts to 1.04 acres of wetlands can be avoided through the use of bridges and retaining walls.

4. **Can the wetlands in the on-site borrow source areas be avoided?**

Impacts to some wetlands in the on-site borrow areas can be avoided. Impacts to Wetland 51 (0.48 acres) can be avoided by slightly modifying the design of Borrow Source 1. However, using all off-site borrow (to completely avoid impacts to the remaining 1.44 acres of low-quality wetland) would be between $20 and $60 million more than using on-site borrow sources and would result in greater traffic and air quality impacts, due to the higher number of truck trips to and from the Airport.

5. **Are there aviation technologies available now or in the near future that would make the third runway unnecessary?**

The Master Plan Update evaluated several technologies including GPS and found none presently available that could meet the Purpose and Need of the project.

6. **How will the groundwater and water supply aquifers be affected?**

Groundwater is pumped from intermediate and deep aquifers in the vicinity of the Airport. Potential adverse surficial aquifer recharge impacts would be minimal. Subsequently, recharge to the intermediate and deep aquifers would be largely unaffected. The existing aquifers would not be affected by the weight of the proposed fill.

The second section of the document is the Port's response to comment letters and comments raised during the Public Hearing.

RESPONSE TO COMMENTS ON PUBLIC NOTICE

The Corps of Engineers, Department of Ecology, and Port of Seattle have received a number of comments from agencies and the public on the Public Notice for the Section 404 permit for the Master Plan Update Development Actions at Seattle-Tacoma International Airport.

The following general concerns have been raised (the concerns are numbered to aid the reader; the numbering does not imply an importance or order):

1. Has the Port followed the required process regarding wetland impacts and mitigation?
2. Is there justification to replace some wetland functions in another watershed?
3. Is there a need for the proposed development in the area known as the South Aviation Support Area (SASA)?
4. Can the wetlands in the on-site borrow source areas be avoided?
5. Are there aviation technologies available now or in the near future that would make the third runway unnecessary?

1. HAS THE PORT FOLLOWED THE REQUIRED PROCESS REGARDING WETLAND IMPACTS AND MITIGATION?

A number of comments questioned whether mitigation for impacts to wetlands and streams has followed the sequencing identified in the EPA/Corps of Engineers Memorandum of Agreement (MOA) concerning mitigation under the Clean Water Act. The MOA identified the correct order of mitigation actions as avoidance, minimization, restoration, and finally compensatory replacement.

The Port has avoided and minimized impacts to wetlands and streams through incorporation of project and design modifications. For safety reasons discussed in detail later in this document, on-site wetland restoration or compensatory mitigation that creates attractive wildlife habitat is not an option at the Airport. However, a number of restorative actions are proposed for Miller and Des Moines creeks. Finally, for wetland impacts that cannot be avoided or mitigated in the watershed, off-site compensatory mitigation is proposed.

Avoidance Of Wetlands On Other Potential Airport Sites

The planning process that led to the proposal analyzed in the Master Plan Update EIS and SEIS began in the mid 1980s. The Flight Plan Study and the Major Supplemental Airport Study looked at alternatives to an expansion of Sea-Tac Airport. The Major Supplemental Airport Study looked at potential sites at a planning level of analysis and found that all had substantial wetland impacts (Table 1).

Table 1. Potential wetland impacts of alternative sites analyzed in Major Supplemental Airport Study

Sites	Wetland Impact (acres)
Existing Airports	
Arlington	45
McChord Air Force Base	166
Potential New Airports	
Bothell/Mill Creek	92
Duvall	104
Enumclaw	83
Frederickson	29
Lake Sawyer	39
Marysville East	185
Marysville West	75
Redmond	187
Stanwood	182
Tanwax Lake	78

Source: Appendix B of Master Plan Update Final EIS.

Avoidance And Minimization Of Impacts To Wetlands At Sea-Tac

When the Master Plan Update planning process was initiated, work began to reduce the potential wetland impact acreage. As an example, an otherwise feasible on-site borrow area was eliminated to avoid impacts to approximately 19 acres of wetlands. This work has continued

through the EIS/SEIS and permitting processes and wetland impacts have been reduced to the present number of about 8 acres. Wetland impacts associated with the North Employee Parking lot were avoided in the final design process. At the north end of the Airport, wetland impacts from runway safety area improvements, South 154th Street relocation, and new runway construction are minimized by the use of retaining walls.

The Port considers the remaining wetland impacts (Table 2) to be a result of the least environmental damaging practicable alternative.

Compensatory Mitigation For Impacts

Mitigation proposed to compensate for unavoidable impacts to wetlands and streams is consistent with the EPA/COE MOA. To the extent practicable, in-kind and on-site mitigation is proposed to compensate for impacts to streams, aquatic habitat, floodplain, and other hydrologic functions affected by the project. Off-site mitigation is proposed to compensate for impacts to wildlife habitat.

The response to the following general comment addresses the mitigation proposal in more detail.

2. IS THERE JUSTIFICATION TO REPLACE SOME WETLAND FUNCTIONS IN ANOTHER WATERSHED (IN-BASIN VS. OUT-OF-BASIN)?

In considering this question, there are a number of important pieces of information. First is the fact that the higher-functioning wetlands in the watersheds are not affected by the project. The affected wetlands are of a relatively lower functional value than those that would remain.

Also, the Port is proposing to mitigate most impacts in the affected watersheds including significant new in-basin mitigation proposals pursuant to the Port's **Modified Mitigation Approach** dated May 1998. The one function that would be replaced out-of-basin is wildlife habitat. For safety reasons, the Port and the FAA do not endorse building habitat near operating airports.

The following sections provide more detail on these basic pieces of information

Review of Wetland Functions

Functions of Wetlands Not Affected by the Project

Over 143 acres of wetland have been identified near the existing airport. While a number of small wetlands would be impacted or eliminated by the proposed Master Plan improvements, several large wetland complexes would not be affected. These wetlands contain physical and biological features that indicate they provide a variety of wetland functions at high to moderate levels. These wetlands are discussed briefly below.

A 30-acre wetland (Wetland 43, see Figure 1A) occurs between Des Moines Way and SR 509 immediately north of South 176 Street. This wetland contains a diversity of vegetation types, including forested, shrub, emergent, and open water wetland classes. Walker Creek flows through the wetland. Because of the diversity of wetland classes, the presence of permanent open water, and hydrologic connections to stream habitat, the wetland provides moderate to high biologic function for a variety of wildlife groups (resident fish, passerine birds, small mammals, amphibians, and waterfowl). Its location near the headwaters, the presence of adjacent developments, and topographic conditions in the depression the wetland occupies suggest it also provides substantial physical functions, including baseflow support, surface runoff storage, sediment trapping, and water quality benefits.

A 17-acre wetland (Wetland 33) occurs south of Sunset Park and includes Tub Lake. This wetland contains forested, shrub, emergent, and open water wetland classes and Miller Creek flows through it. The diversity of wetland classes, the presence of permanent open water, connections to other undeveloped land, and hydrologic connections to stream habitat, result in moderate to high biologic function for a variety of wildlife groups (resident fish, passerine birds, small mammals, amphibians, and waterfowl). The location near the headwaters of Miller Creek, presence of upslope development, and topography

of the basin indicate the wetland provides major physical functions, including baseflow support, surface runoff storage, sediment trapping, and water quality benefits.

Bow Lake is a 25-acre wetland (Wetland 54, see Figure 1B) located east of SR 99 and north of South 188th Street. This wetland contains open water and shrub vegetation classes, and is not hydrologically connected to any natural stream or other wetlands. The biological functions of the wetland are limited by the proximity of adjacent commercial and residential development, however, the wetland likely provides moderate biological function for passerine birds, small mammals, waterfowl, and amphibians. Physical functions likely provided by the wetland include groundwater recharge, storage of runoff, and water quality benefits.

Wetland 28 (see Figure 1B) is adjacent to the Tyee Golf Course and is about 18 acres. The wetland is composed of open water, emergent, and shrub wetland habitat. A tributary of Des Moines Creek flows through the wetland. The presence of permanent open water, shrub and adjacent forest vegetation, connections to other undeveloped land, and hydrologic connections to stream habitat, results in moderate to high biologic function for a variety of wildlife groups (resident fish, passerine birds, small mammals, amphibians, and waterfowl). Since the wetland is in the Des Moines Creek headwaters, is downslope of developed areas, and is in a favorable topographic setting, it provides physical functions, including base flow support, surface runoff storage, sediment trapping, and water quality benefits.

A series of wetlands (Wetlands 3, 4, 5, 6, 7, 8, and 9; see Figure 1A) totaling about 25 acres comprise the Reba Detention Facility. The wetlands consist of open water, emergent, shrub, and forested wetlands that are hydrologically connected to Miller Creek. Because of the diversity of wetland classes, the presence of permanent open water, and hydrologic connections to stream habitat, the wetland provides moderate to high biologic function for a variety of wildlife groups (resident fish, passerine birds, small mammals, amphibians, and waterfowl). The location near the headwaters, presence of adjacent developments, and topographic conditions suggest the wetland also provides physical functions such as base flow support, surface runoff storage, sediment trapping, and water quality benefits.

Functions of Wetlands Affected by the Project

The Port's Master Plan EIS identified the functional attributes of wetlands impacted by the proposed project. This assessment is summarized below, in Appendix P of the Master Plan Update FEIS, and in the attachments included in the JARPA application for the projects.

Hydrologic Functions

Wetlands and streams impacted by the project provide a number of hydrologic functions as described below.

Groundwater Discharge

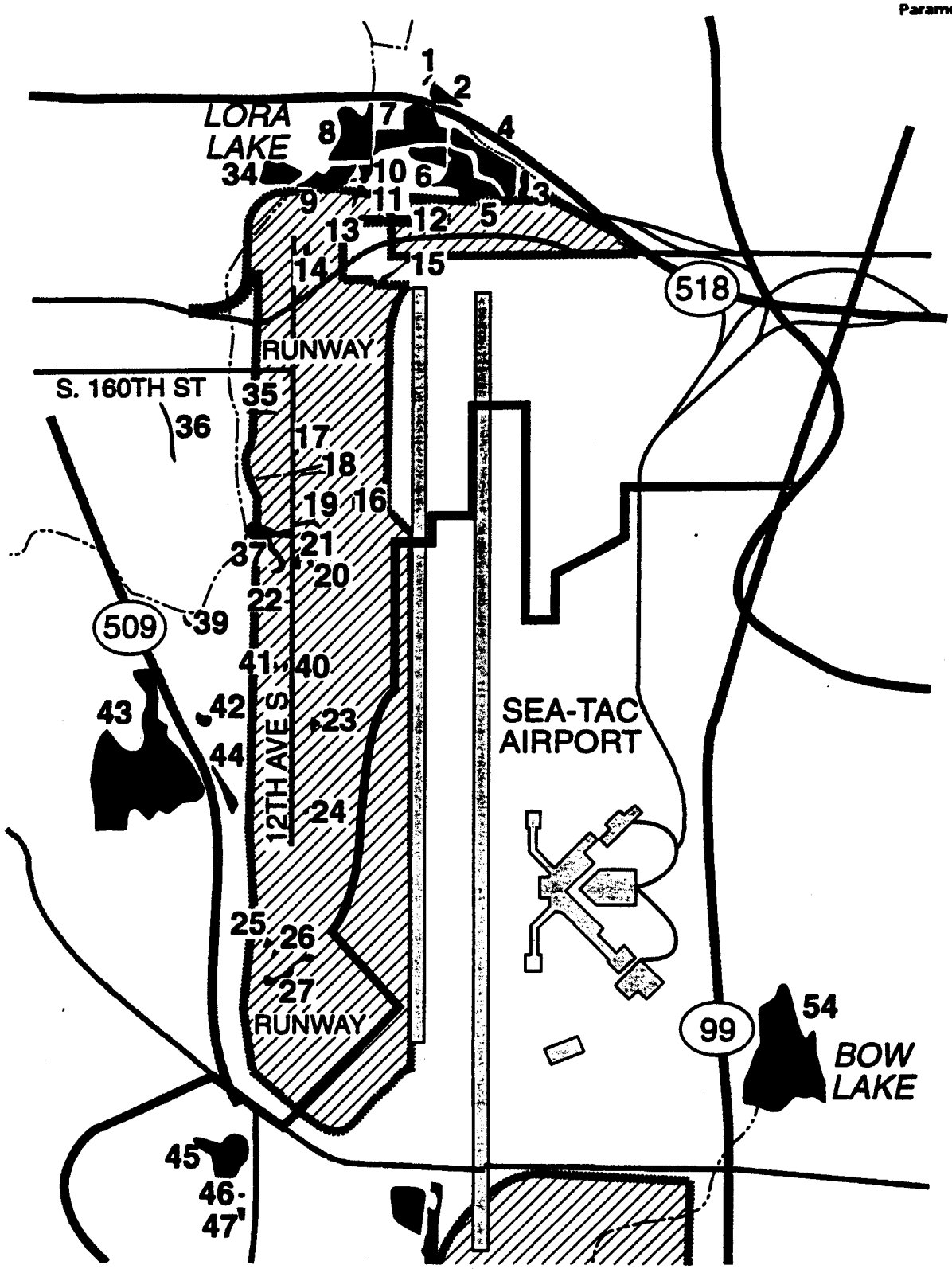
A number of wetlands (most notably Wetlands 18, 19, 35, 37, and 55) are sites of groundwater discharge; these wetlands are typically on slopes or near the base of slopes, particularly along 12th Avenue South. Subsurface drain systems and surface conveyance channels will continue to collect and distribute groundwater currently surfacing near 12th Avenue to Miller Creek and adjacent wetlands.

Conveyance of Water to Miller Creek

A number of wetlands and channels located on the west side of the airport convey groundwater and storm water drainage to Miller Creek. These wetlands include Wetlands 18, 19, 37, and 35; as well as the open ditches along 12th Avenue South.

Storm Water Detention

About 3 acres of wetlands are on level ground, in shallow depressions, with a limited ability to provide detention. If a 1 ft depth is assumed as the potential active storage available in these wetlands (field observations indicate that actual active storage is much less than this), HSPF modeling shows that the wetlands could reduce peak flows in Miller Creek by less than 0.5 percent.



Source: Shapiro 1995
Additional Data Compiled by Parametrix

Sea-Tac Airport Natural Resource Mitigation/55-2912-01(03) 3/96

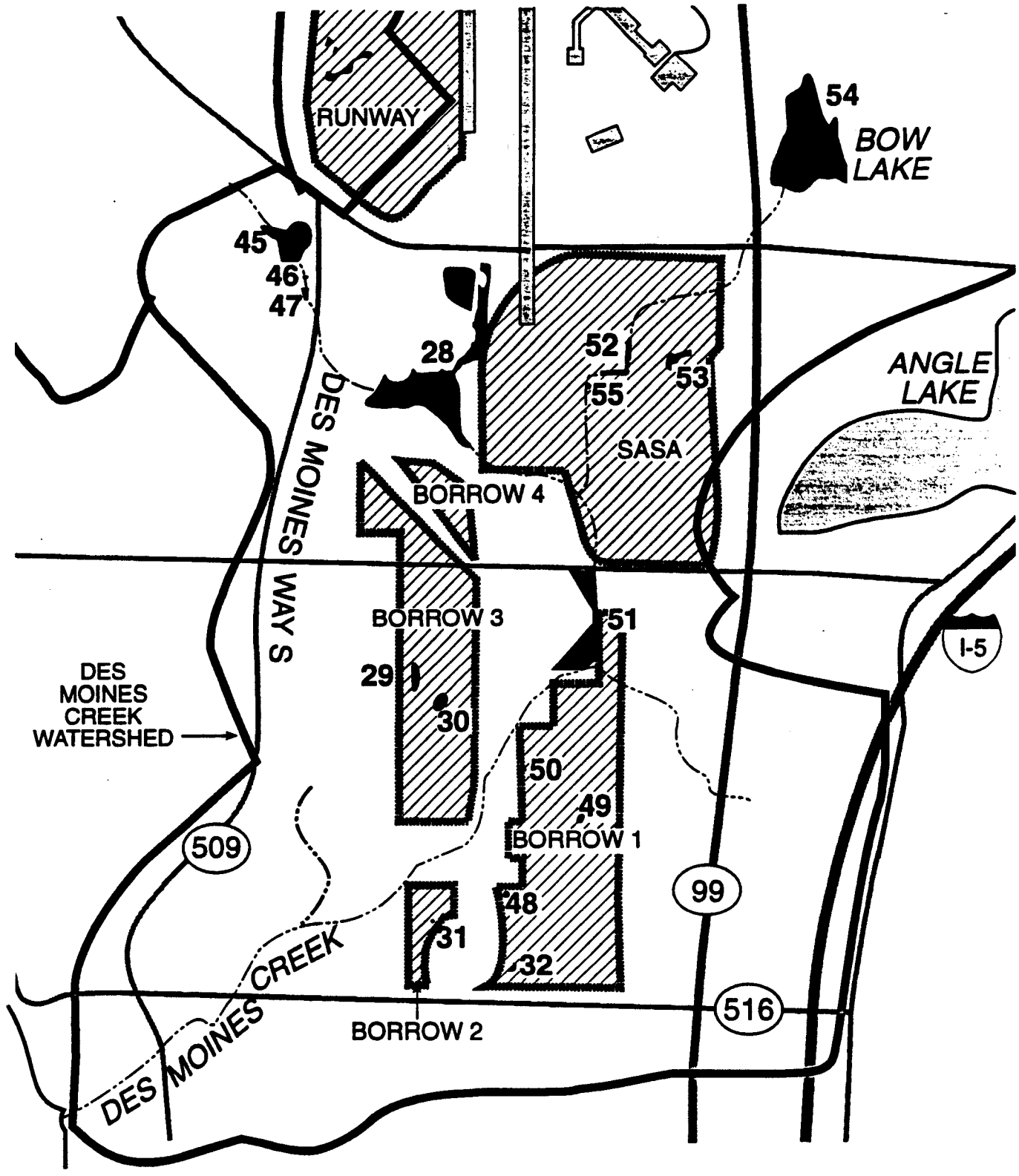
SCALE IN FEET
0 2,250

N

Palustrine Wetland
Potential Construction Impact Area

Figure 1A.
Wetlands Affected by the Construction of Master Plan Improvements

AR 035124



Source: Shapiro 1995
Additional Data Compiled by Parametrix

Sea-Tac Airport Natural Resource Mitigation/55-2912-01(03) 3/96

SCALE IN FEET
0 2,250

N

Palustrine Wetland

Potential Construction Impact Area

Figure 1B.
Wetlands Affected by the Construction of Master Plan Improvements

AR 035125

Wetlands that are situated on hillsides or slopes do not provide downstream flood attenuation benefits because significant quantities of water cannot be retained to effectively detain peak runoff events. Wetlands formed on slopes are usually created by springs or other water sources and not by ponding of surface water.

Groundwater Recharge

Depressional wetlands could play some role in ground water recharge functions. However, the fact that they are wetlands and areas of poor drainage due in part to the presence of low permeability soils suggests that these areas may not provide high rates of ground water recharge. The small size of the wetlands also suggests that this function may not be significant relative to upland areas that contain soils that are more permeable. Maps of aquifer recharge areas (Appendix Q of the FEIS) indicate a number of affected wetlands occur in areas mapped in areas of "till" or "fill". These classifications are generally defined as areas of having low groundwater recharge functions relative to other geologic units near the Airport.

Water Quality

Except for wetlands that receive runoff directly from streets (Wetlands 35, 37, and 40) or the golf course (Wetlands 52, and 55) the potential for pollutant loading to wetlands is low and these wetlands likely do not provide significant water quality functions.

Flood Storage

Lora Lake and adjacent areas (Wetland 34) within the 100-year floodplain of Miller Creek provide flood storage functions.

Habitat Functions

The wetlands impacted by the Master Plan Update improvements generally provide terrestrial habitat to small mammals, passerine birds and raptors. Their small size, proximity to urban development, and recent vegetation disturbances frequently limit the habitat functions of these wetlands. The affected wetlands lack aquatic habitat because they are not typically inundated. Those that do flood, provide ephemeral aquatic habitat during the short periods of time during the winter or early spring months when they are flooded.

Waterfowl are not likely to be impacted by the filling of wetlands for the project. Emergent wetlands affected by the project lack open water or periods of extended flooding of emergent plant communities typically needed to support waterfowl. Non-flooded emergent wetlands are not likely to be used by waterfowl because of their small size and dominance by reed canary grass. Forest and shrub wetlands do not provide vegetation structure suitable to waterfowl.

With the exception of Wetland 30, amphibians are not expected to breed in wetlands affected by the project due to the lack of surface water during December through May (the breeding season).

Other wildlife species identified by the Fish and Wildlife Service as using the impacted wetlands include passerine birds and raptors (including acceptors and northern harrier). The northern harrier is unlikely to use the affected emergent wetlands because they are too small to provide suitable habitat for the species. Raptors and passerine birds likely use the wetlands. However, the habitat requirements of these birds are terrestrial, and their presence in the area is dependent on upland habitat areas near the Airport. Cooper's hawk and sharp-shinned hawk typically nest and forage in wooded environments, which may include forested wetlands. In summary, the wetlands affected by the project provide terrestrial habitat to small mammals and a variety of birds. These species have adapted to the existing levels of disturbance and could be expected to continue to use remaining wetlands and upland habitat after project construction.

Streams and Aquatic Habitat

The reaches of Miller and Des Moines creeks that would be directly impacted provide limited habitat to resident fish. All project construction activities are located upstream of barriers to anadromous fish. However, resident cutthroat

trout and warm water fish occur in the creeks in the vicinity of the project.

Various factors limit fish habitat in the affected portions of Miller and Des Moines creeks. These factors include hydrologic impacts from upstream urban development and the proximity of development to the creek channels. In many areas, riparian vegetation has been partially removed. The lack of dense vegetation along portions of the creeks results in reduced shading of the creek channel and increases water temperatures during summer. These elevated temperatures may be stressful to resident salmonids.

Drainage channels along 12th Avenue South provide hydrologic and energy support functions to Miller Creek. However, they do not provide fish habitat themselves because of their small size and relatively steep grades. The channels enhance Miller Creek's baseflow by conveying water from groundwater seeps east of 12th Avenue South to the creek. The channels also convey nutrients and organic matter to Miller Creek, which indirectly contributes to the habitat of the creek.

Proposed In-Basin Mitigation

Because the Port is proposing to build compensatory mitigation in Auburn, Washington, a number of commenters expressed the opinion that the Port is proposing to mitigate all aquatic resource impacts outside of the watersheds in which they will occur.

On the contrary, most of the functions provided by Miller Creek, Des Moines Creek, and the affected wetlands will be replaced in the respective basin. The proposed mitigation actions address the loss of stream habitat, impacts to the floodplain of Miller Creek, groundwater conveyance, and storm water management. Table 3 is a summary of these actions.

The Port is proposing some actions in and around Miller Creek that would benefit resident fish and downstream salmonids without increasing the strike hazard at the Airport. These actions are described in more detail in the following subsections and include placing woody debris in the relocated portion of Miller Creek and planting the riparian zone of the buyout area with native vegetation.

While these actions may have some benefits to terrestrial wildlife and could be considered habitat mitigation, the Port is not asking the resource agencies to count them as mitigation against the project impacts. The Port's need to maintain habitat management control keeps it from being able to commit to protect the sites in perpetuity. The Port will continue to regularly monitor its property to ensure that wildlife attractants do not develop. However, the Port believes that these actions will have a long-term positive affect in the watershed and that recognition of this by the agencies and the public is appropriate.

Miller Creek/Des Moines Creek Aquatic and Riparian Habitat

All direct impacts to Miller and Des Moines Creek will be mitigated within the respective watersheds. Relocating the channels around the proposed projects and constructing stream habitat in the relocated channels will mitigate project impacts to streams and associated aquatic habitat. Reconstructed stream habitat will include in-water fisheries enhancement (e.g., woody debris) and buffers planted with native species.

In addition to stream relocation around the footprint of the project, the Port will establish a 50-ft buffer on either side of Miller Creek throughout the "buyout area". (When used in this context, the term "buyout area" refers to the property on the west side of the Airport that the Port will acquire but will not use for actual construction of the Master Plan improvements.) The establishment of 50-ft buffers along the 2,600 linear ft of Miller Creek that flows through the buyout area will provide about six acres of riparian habitat. There are currently 22 to 25 buildings located within this riparian buffer zone. Besides the structures, there is also lawn and landscaped yards.

Table 2. Classification, size and impacts to wetlands.

Wetland Number	Classification[1]	Wetland Size (Acres)[2]	Total Impact (Acres)[2,3]	Vegetation Cover Types Impacted (Acres)		
				Forested	Shrub-Scrub	Emergent
9	Emergent/Forested (60/40)	2.85	0.13	0.05	--	0.08
11	Forested/Emergent (80/20)	0.50	0.46	0.37	--	0.09
12	Emergent/Forested (80/20)	0.21	0.20	0.04	--	0.16
13	Emergent	0.05	0.05	--	--	0.05
14	Forested	0.19	0.19	0.19	--	--
15	Emergent	0.28	0.28	--	--	0.28
16	Emergent	0.06	0.06	--	--	0.06
17	Emergent	0.03	0.03	--	--	0.03
18	Forested	0.12	0.12	0.12	--	--
19	Forested	0.57	0.57	0.57	--	--
20	Shrub-Scrub/Emergent (90/10)	0.06	0.06	--	0.05	0.01
21	Forested	0.22	0.22	0.22	--	--
22[4]	Emergent/Shrub-Scrub (90/10)	0.06	0.06	--	0.01	0.05
23	Emergent	0.78	0.78	--	--	0.78
24	Emergent	0.14	0.14	--	--	0.14
25	Forested	0.06	0.06	0.06	--	--
26	Emergent	0.02	0.02	--	--	0.02
28	Open Water/Shrub-Scrub (0/100)	18.10	0.06	--	0.06	--
29	Forested	0.74	0.74	0.74	--	--
30	Forested/Shrub-Scrub (80/20)	0.50	0.50	0.40	0.10	--
32	Emergent	0.05	0.05	--	--	0.05
35[4]	Emergent	0.21	0.18	--	--	0.18
37[4]	Forested/Shrub-Scrub (70/30)	2.41	1.67	1.17	--	0.50
40[4]	Forested	0.09	0.09	0.09	--	--
41[4]	Emergent	0.08	0.08	--	--	0.08
49	Emergent	0.03	0.03	--	--	0.03
50	Shrub-Scrub	0.12	0.12	--	0.12	--
52	Forested/Shrub-Scrub (90/10)	1.00	1.00	0.90	0.10	
53	Forested	0.60	0.60	0.60	--	--
55	Shrub-Scrub	0.04	0.04	--	0.04	--
TOTAL		**30.17**	**8.59**	**5.52**	**0.48**	**2.59**

Source: Shapiro 1995 (updated).

1 All wetlands are palustrine based on USFWS classification system (Cowardin et al. 1979). Where more than one cover type is present, the percent impact to each cover type is shown in parenthesis.

2 Values are rounded to two significant figures. Actual values differ slightly due to the effects of rounding.

3 Exact areas of wetland impact are subject to minor changes due to final engineering design and completion of wetland delineations on private property.

4 These wetlands occur on private property. The total size and impact areas are estimates based on best available information. The wetlands will be formally delineated when the Port gains the right to enter the properties.

Table 3. Summary of on- and off-site mitigation for wetland and stream impacts.

Potential Impact	Mitigation Action	Explanation And Comments
On-Site Mitigation		
Miller Creek Habitat	Relocate creek channel	Channel relocation will enhance aquatic habitat by providing stream buffers, instream habitat, and increased channel length.
Des Moines Creek Habitat	Relocate creek channel	Channel relocation will enhance aquatic habitat by providing stream buffers and instream habitat.
Miller Creek Floodplain	Create new floodplain	New floodplain equivalent storage will be excavated from the Vacca Farm site.
Riparian Function	Provide protective buffers	Vegetated riparian buffers to protect instream habitat and water quality will be established as follows: Miller Creek – 50-ft minimum along 3,900 linear ft of channel resulting in about 9 acres of buffer habitat. Des Moines Creek – 25-50 ft along 1,800 ft of channel resulting in 1.5 acres of buffer habitat. Drainage Channels – 15 ft along about 2,000 linear ft of channel resulting in about 1.5 acres of buffer habitat.
Ground Water Discharge	Design internal drainage and conveyance channels	Subsurface drain system and surface conveyance channels will continue to collect and distribute ground water currently surfacing near 12th Avenue to Miller Creek and wetlands.
Storm Water Quality	Meet current water quality standards for new development	Storm water quality facilities will be developed to meet or exceed Department of Ecology requirements. These facilities will also replace storm water management functions provided by wetlands. Areas in the buyout area that lack storm water management facilities will be retrofitted as development occurs.
Storm Water Quantity	Meet current water quantity standards for new development	Storm water detention facilities will be developed to meet or exceed Department of Ecology requirements. These facilities will also replace storm water management functions provided by wetlands. Areas in the buyout area that lack storm water management facilities will be retrofitted as development occurs.
Wildlife Habitat	Provide stream buffers; revegetate Vacca Farms	In addition to stream buffers identified above, about 3 acres of plowed farmland within the 100-year floodplain of Miller Creek would be revegetated. These actions partially mitigate for impacts to wildlife habitat.
Indirect and Cumulative	Participate in Miller Creek and Des Moines Creek Basin Plans	These planning processes will identify effective, long-term solutions to restore fish habitat to Miller and Des Moines Creeks. The Port contributes both staffing resources and funds and with other cooperating jurisdictions will continue to plan and implement appropriate watershed restoration projects.
	Monitor wetland and streams	Hydrologic conditions in Miller and Des Moines Creeks will be monitored to verify mitigation is effective. Wetlands subject to indirect impacts will be monitored to determine if unmitigated indirect impacts have occurred.
Off-Site Mitigation		
Wildlife Habitat	Replace habitat function off-site at overall ratio of 2:1	Flooded emergent and open water wetlands (out-of-kind mitigation) will be incorporated into the plan to increase overall wildlife use and diversity.

These land uses will be removed which will improve stream habitat, reduce the potential for chemical pollution (i.e., fertilizers, herbicides, pesticides, and leaks from septic tanks), and provide a continuous riparian habitat corridor.

In the SASA development area, the golf course will be removed and the Des Moines Creek riparian corridor will be planted with native vegetation. These actions will improve the creek habitat by providing increased shade and riparian function.

Because wildlife that may nest or roost in forest land near the Airport (including the riparian areas of Miller and Des Moines creeks) may become aviation hazards, the Port must maintain the right to modify vegetation in these areas. Under the subheading, "Wetland Habitat Mitigation (In-kind/Off-site)" there is a detailed discussion of this key issue.

Miller Creek Floodplain

The embankment for the northwestern end of the runway and the relocated 154th Street will fill a portion of the Miller Creek 100-year floodplain. This impact will be compensated for in the Miller Creek basin. Flood storage capacity lost by the proposed fill will be relocated on the Vacca farm site by excavating land that is currently above the 100-year floodplain elevation to appropriate elevations (Figure 2).

Planting native vegetation in fields that are currently actively farmed will also enhance the Vacca Farm portion of the Miller Creek floodplain. These fields are plowed to the creek edge and likely contribute sediment to Miller Creek. Planting this area will restore riparian functions to about 5 acres of floodplain by contributing nutrients and detrital material to Miller Creek during floods and substantially reducing erosion. Please note that the Port will reserve the right to manage vegetation in this area if wildlife hazards to aviation are observed.

Groundwater Discharge And Conveyance Channels

Some of the existing wetlands on the west side of the Airport (primarily Wetlands 18, 19, 35, and 37) are sites of groundwater discharge. Drainage channels in this area carry the seepage and runoff from 12th Avenue to Miller Creek. The embankment for the third runway will fill portions of these wetlands and channels, however their function will be maintained by constructing subsurface drains or other conveyance systems through the fill. This drainage is necessary to prevent groundwater from destabilizing the fill.

The existing drainage channels pass through a small red alder (*Alnus rubra*) and Himalayan blackberry (*Rubus discolor*) community before entering a series of roadside ditches. The ditches are vegetated by reed canary grass (*Phalaris arundinacea*) and other non-native species. The source of the majority of the water in the ditches is from groundwater discharge and urban storm runoff. These ditches either run directly into Miller Creek, or through Himalayan blackberry-dominated swales before entering the creek.

While these drainage channels do not contain fish habitat, they provide riparian and aquatic habitat functions by transporting organic matter and dissolved nutrients to Miller Creek, which then helps support aquatic life. There is likely some invertebrate production in the channels and washout or drift of these food resources to Miller Creek.

The riparian functions of these channels including biofiltration and riparian habitat will be replaced on-site, as described in the JARPA application and the Corps' Public Notice (Sheet 26). The replacement channels will be 30-ft wide swales planted with native vegetation as shown in Sheet 26 of the Public Notice. Where channels occur next to the Airport security road, a 10-ft vegetation filter strip will provide water quality protection. Where drainage channels connect to Miller Creek, instream habitat and erosion control features (log weirs) will be provided, as shown in Sheets 28 and 29.

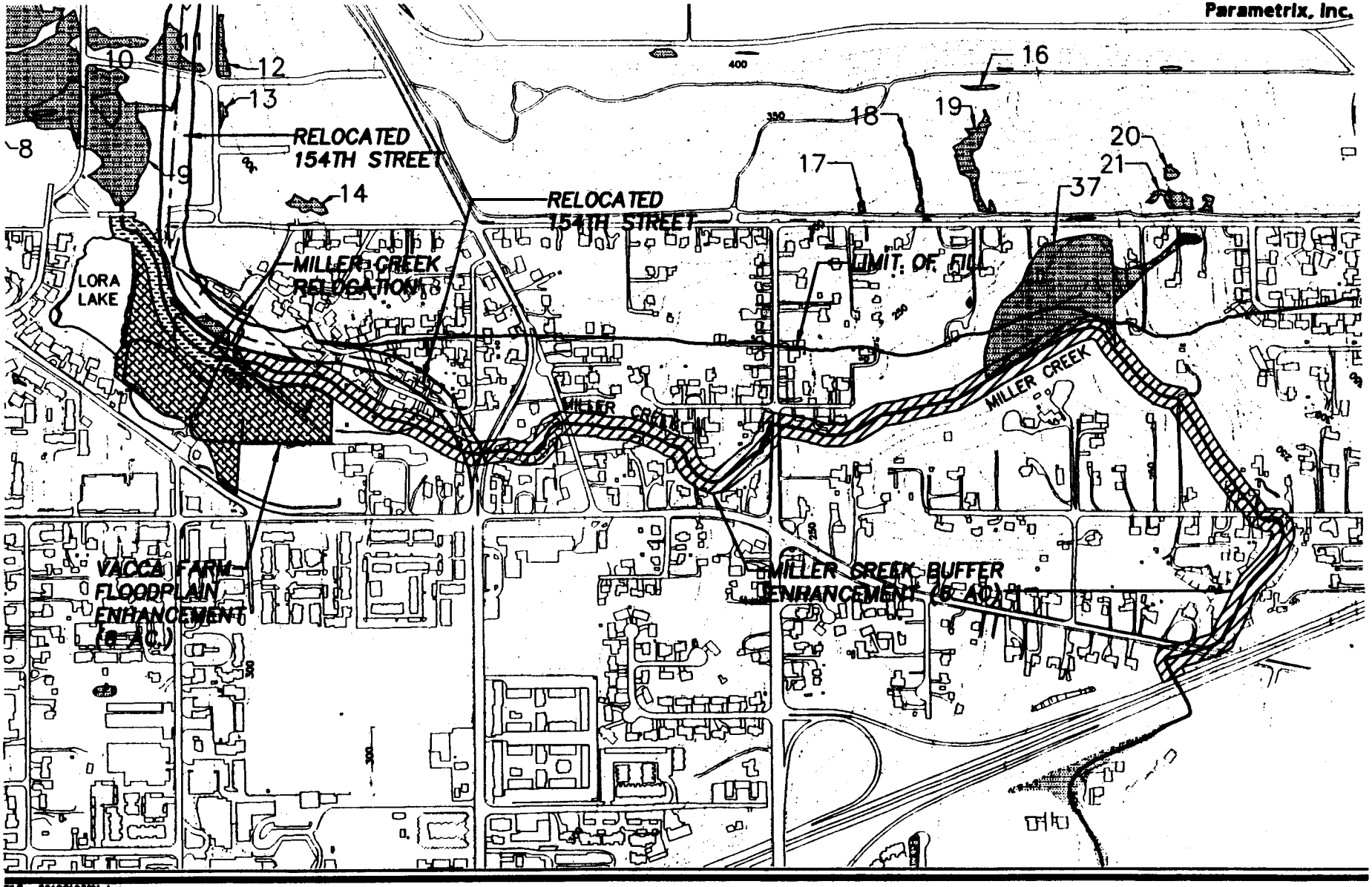


Figure 2
Location of Miller Creek Relocation, Buffer Enhancement, and Floodplain Enhancement Projects

AR 035131

Storm Water Management

On-site storm water quality and quantity management features, including possible combinations of wet vaults, biofiltration swales, three-celled ponds, and/or infiltration facilities, are included in the project design. These facilities are designed to meet all best management practices and regulatory requirements for storm water mitigation. The facilities will be designed with detention capacity sufficient to prevent increases in peak flows to Miller and Des Moines creeks. These actions will replace the storm water detention functions of the affected wetlands.

Table 4 describes the total quantity of storm water detention storage that would be required for all Master Plan projects to meet the storm water management requirements. These detention storage volumes are based on initial hydrologic modeling of the proposed projects. Detention volumes will likely change as projects are refined and revised.

The Port may eventually redevelop the buyout area with land uses that are appropriate for the location (e.g. aviation-related commercial development). For the most part, the area now lacks adequate storm water management facilities. A future benefit is that as portions of the buyout area are redeveloped, storm water quality and quantity controls will be provided. These new facilities will improve conditions in Miller Creek.

Long-term Watershed Enhancement and Restoration

The Port has actively participated in Des Moines Creek and Miller Creek Basin planning and implementation efforts and plans to continue to do so in the future. This participation includes substantial funding for fisheries and aquatic habitat restoration projects.

Table 4. New detention storage required for Master Plan projects.

Location	Storage (ac-ft)	Areas Served
Miller Creek Basin		
North Employee Parking Lot vault	4.0	Parking lot (constructed 1997)
Expanded Miller Creek Detention Facility (MCDF)	16.4	North Terminal/Air Cargo area
Upper Miller Creek (below MCDF)	11.2	3rd Runway/taxiway
Lower Miller Creek (above SR-518)	12.5	3rd Runway/taxiway
Walker Creek	6.0	3rd Runway/taxiway
Des Moines Creek Basin		
Northwest Pond area[1]	17.0	3rd Runway/taxiway
SASA Detention Facility[2]	24.0	SASA, Master Plan projects in south Terminal area

[1] Volume based on modeling of separate detention pond
[2] Includes replacement of 14.9 acre-feet in the existing Tyee Pond

Wetland Habitat Mitigation (In-kind/Off-site)

Wildlife Hazards

As explained in the Final EIS, the Final Supplemental EIS, and the Wetland Mitigation Plan, wildlife/aircraft collisions (strikes) are a major concern of the Port of Seattle, the FAA, and the aviation community in general. As part of the FAA's Part 139 Airport Certification Program, the Port is required to maintain and implement a wildlife hazard management plan designed to minimize strikes. The Port's current plan is attached as Appendix A. To maintain the Airport's FAA certification, the Port is required to (where feasible) eliminate hazards. Wildlife habitat management is typically targeted to address specific, localized problems, such as removing isolated or small groups of trees frequented by raptors foraging over the airfield, hazing (frightening away) wildlife in the approach/departure zones, and hazing of birds on the airfield. Port staff accomplish this by hazing (frightening away) birds from problem areas, or modifying habitat so it is no longer attractive to the type of wildlife creating the hazards. In extreme cases, wildlife is killed under the conditions of a permit from the U.S. Fish and Wildlife Service.

At Sea-Tac, the primary wildlife hazards are birds. Recent management activities have included hazing of waterfowl on Tyee Golf Course, removal of black cottonwood trees south of the Alaska Airlines parking lot near the southeast corner of the airfield, and frequent mowing of vegetated portions of the airfield.

The reported wildlife strikes at the Sea-Tac Airport (Table 5) average 14 per year. Since 1994, annual wildlife strikes have ranged from 13 to 35, and averaged 22.5. The strikes involve a broad range of species with various foraging and habitat requirements. The Port must maintain the ability to manage existing and new habitat near the Airport to reduce or eliminate specific identified wildlife hazards.

Advisory Circular 150/5200-33 (Appendix B) describes FAA policy regarding wildlife attractants near airports. The circular states that any activity or land use on or near an airport that threatens aircraft safety by attracting or sustaining hazardous wildlife is an incompatible land use. The Advisory Circular recommends that when siting mitigation that wildlife attractants be no closer than 10,000 ft from turbine aircraft movement areas, and 5 miles from approach or departure airspace.

The FAA and the Port of Seattle believe that wildlife habitat mitigation is a land use that should not occur near Sea-Tac Airport. Even if habitat mitigation did occur near the Airport, the Port would have to maintain the ability to control potential wildlife hazards in these areas. The use of a mitigation project by wildlife species frequenting the airfield could require management actions by the Port and FAA (such as removal of vegetation or other habitat modifications to the mitigation site to discourage wildlife use). These vegetation management and habitat modifications to a mitigation site would clearly be contrary to federal and state requirements to maintain mitigation in perpetuity.

Analysis of In-Watershed Mitigation

The Port used a GIS analysis to evaluate potential wetland mitigation sites in the Miller and Des Moines Creek watersheds (Attachment F of the JARPA application). The purpose of the analysis was to determine whether there were suitable mitigation sites within the watersheds, but outside of the 10,000-ft exclusionary zone. As demonstrated by Figure 3, wetland mitigation sites within the watersheds that meet FAA siting criteria do not exist. Nearly all the land within the watersheds is within 10,000 ft of an existing or proposed runway. The limited areas of the Miller Creek watershed that are at least 10,000 ft away from the Airport are not suitable for wetland mitigation because they consist of residential housing, parks, have unsuitable topography, or are forested.

Because of the safety concerns and the lack of suitable area in the watersheds, off-site and out-of-basin wetland habitat mitigation is proposed. The goals and methods for developing in-kind, off-site wetland habitat mitigation are extensively discussed in the JARPA application and both EISs for the project. The mitigation will provide wetland functions in excess of those impacted by the proposed project. The mitigation project consolidates the impacts to many small wetlands into a single large wetland habitat. This habitat provides in-kind replacement for impacts to forest and, shrub, and emergent wetlands. In addition, even though open water wetlands will not be affected at the Airport, habitat and wildlife diversity in the mitigation wetland will be enhanced by incorporation of an open water feature in the mitigation wetland.

Ability Of The Auburn Site To Support A Wetland

Agency reviewers have questioned whether the groundwater conditions at the Auburn site are suitable to support a large wetland.

Extensive monitoring of groundwater conditions (Figures 4A and 4B) at the mitigation site indicate that wetlands can be created as proposed. Groundwater monitoring data collected during September, 1995 demonstrate groundwater on the site following a year of near normal precipitation (August 1994 to August 1995) is nearly the same as that observed for a years with greater than normal precipitation (August 1995 to August 1997) (Table 6). Late summer water levels in September 1995, following 12 months of normal precipitation were nearly the same as water levels in September 1996 following 12 months of above normal precipitation. Finally, water levels in March 1998 following 3 months of normal precipitation were less than those of wetter periods (1996 and 1997) but were within ranges required for wetland mitigation. Overall, these data demonstrate that groundwater levels during normal and above normal precipitation years are suitable for wetland establishment. Groundwater elevations observed during these periods exceed design elevations, suggesting an adequate margin of error for years with somewhat below normal precipitation.

Opportunity To Provide Fish Habitat At Mitigation Site

Agency reviewers have asked about the possibility of providing fish habitat at the mitigation wetland. The Port's proposed wetland mitigation site in Auburn is unlikely to be able to provide direct fish habitat. While the wetland would be within a few hundred feet of the Green River, it would be separated from the river hydraulically by nearly 1.5 miles of ditches (the wetland site drains north, not east to the river). These ditches support low water flow and depth and it is unlikely that fish would travel through them to reach the mitigation site. Because the channels are important local drainage and flood conveyance features, it would be necessary to keep them cleared of vegetation and debris, which may not be compatible with providing good fish habitat. For these reasons, the mitigation site will not directly be able to provide fish habitat. The mitigation wetland will provide some indirect benefits to the Green River by enhancing the water quality of runoff from the local area.

Table 5. Wildlife species involved in strikes with aircraft at Sea-Tac Airport

Species	Year(s)
Common loon	1990
Canada Goose	1985, 1990, 1995, 1997
Northern shoveler	1994
Gadwall	1994
Mallard	1987, 1990, 1992, 1994,1996, 1997
Wigeon (species unknown)	1994
Canvasback	1987
Ruddy duck	1992
Hooded merganser	1991, 1993
Greater scaup	1997
Duck (species unknown)	1980, 1982, 1987, 1993 , 1993
Western gull	1994, 1995, 1997
Glaucous-winged gull	1990, 1995, 1996, 1997
California gull	1985
Gull (species unknown)	1980, 1983, 1984, 1985, 1990, 1991, 1993, 1994, 1996
Common tern	1985
Great blue heron	1983, 1993, 1995
Green heron	1985
Semipalmated plover	1990
Killdeer	1981, 1982, 1983, 1989, 1990, 1991, 1992, 1993, 1994, 1995
Long-billed dowitcher	1990, 1997
Dowitcher (species unknown)	1990
Western sandpiper	1979, 1989, 1991, 1992, 1996
Common snipe	1989, 1991
Horned lark	1991
Cooper's hawk	1992
Red-tailed hawk	1981, 1987, 1990, 1995, 1997
Swainson's hawk	1986
Merlin	1989
American kestrel	1989,1990, 1994, 1995, 1996, 1997
Small hawk (species unknown)	1995, 1997
Common barn owl	1981, 1985, 1987, 1989, 1990, 1991, 1993, 1996
Short-eared owl	1981, 1990, 1991
Snowy owl	1981,1996
Great horned owl	1987
Belted kingfisher	1989
Band-tailed pigeon	1979, 1983, 1991, 1993
Common nighthawk	1987, 1988
Northern flicker	1988, 1997
Black swift	1990
Barn swallow	1990, 1991, 1992, 1993, 1994
Cliff swallow	1991
Bank swallow	1986, 1987, 1988, 1990, 1991, 1994
Northern rough-winged swallow	1990
Swallow (species unknown)	1982, 1984, 1990, 1995, 1997
American robin	1983, 1990, 1996
Varied thrush	1989
European starling	1980, 1981, 1982, 1983, 1985, 1986, 1989, 1990, 1991, 1993, 1994, 1995, 1996, 1997
Cedar waxwing	1994, 1997
Western meadowlark	1983, 1986, 1990, 1991, 1992, 1995,1997
Savannah sparrow	1992
House sparrow	1992
Song sparrow	1989
Sparrow (species unknown)	1980, 1981, 1984, 1990, 1991, 1993, 1997
Spotted towhee	1997
Unknown small bird	1980, 1988, 1991, 1993, 1994, 1995, 1996, 1997
Unknown large bird	1996
Unknown bird	1979, 1981, 1986, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997
Coyote	1987, 1992
Raccoon	1988

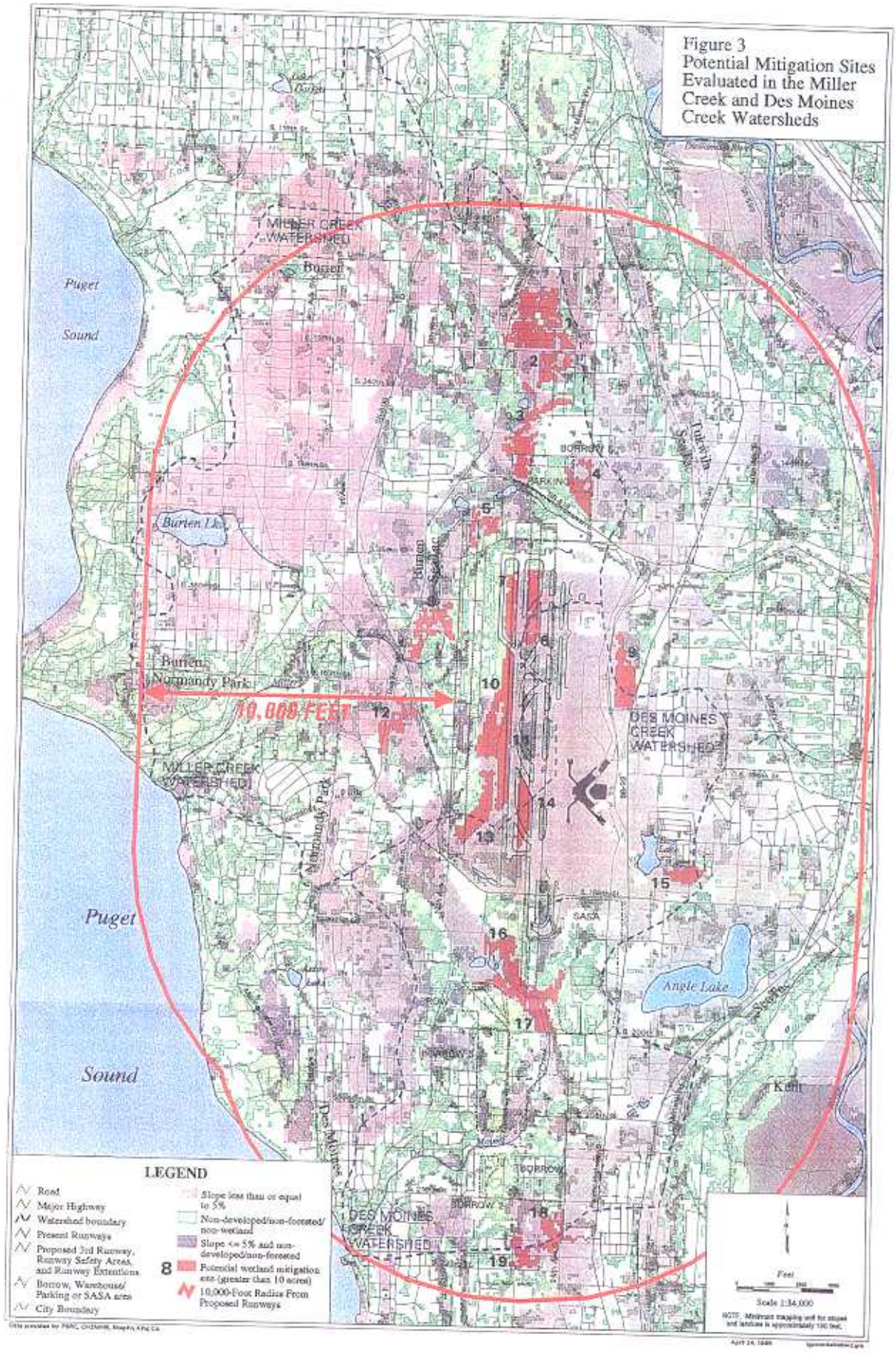


Figure 3
Potential Mitigation Sites Evaluated in the Miller Creek and Des Moines Creek Watersheds
MILLER CREEK WATERSHED
Burien
Puget
Sound
Burien Lk.
Burien Normandy Park
10,000 FEET
DES MOINES CREEK WATERSHED
Angle Lake
Kent
SASA
BORROW
PARKING
LEGEND
Road
Major Highway
Watershed boundary
Present Runways
Proposed 3rd Runway, Runway Safety Areas, and Runway Extentions
Borrow, Warehouse/ Parking or SASA area
City Boundary
Slope less than or equal to 5%
Non-developed/non-forested/ non-wetland
Slope <= 5% and non-developed/non-forested
8 Potential wetland mitigation site (greater than 10 acres)
10,000-Foot Radius From Proposed Runways
Feet
Scale 1:34,000

AR 035136

Table 6. Seattle-Tacoma International Airport monthly precipitation (in inches, by water-year)

Year	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total
94-95	1.69	3.51	5.79	8.15	4.48	4.97	4.07	2.05	0.81	1.46	1.34	1.81	40.13
95-96	0.91	3.93	10.41	6.37	7.34	8.35	2.06	5.37	2.07	0.59	0.77	1.32	49.49
96-97	1.85	5.54	5.23	10.18	7.05	1.99	8.17	4.35	1.88	1.67	1.23	1.28	50.42
97-98	3.42	6.00	3.94	2.56	6.72	3.31	3.96						
						YTD =	29.91						
LT Average	2.02	3.43	5.60	6.33	6.04	4.22	3.59	2.4	1.58	1.38	0.74	1.27	38.6
						YTD =	31.23						

3. Is there a proven need for the South Aviation Support Area (SASA)?

The South Aviation Support Area (SASA) has also raised a number of questions. Commenters questioned whether the functions that would be housed at SASA are needed at Sea-Tac Airport, whether there are other locations for those functions at Sea-Tac Airport, and whether the SASA design can be modified to reduce impacts.

The SASA development went through NEPA/SEPA environmental review in the early 1990s and the FAA issued a ROD in 1994. It is important to note that the purpose and need for SASA was modified during the Master Plan Update process. Originally, SASA was to serve primarily as a base maintenance facility for an airline tenant. Base maintenance activities are those required by an established schedule of flight hours. An analogy using an automobile would be a standard 60,000-mile check. The activities tend to take a relatively long period of time and take the airplane out of service for several days to several weeks.

The Master Plan Update changed the primary purpose of SASA from a base maintenance facility to a cargo and support facility location. To continue with the automobile analogy, line maintenance is similar to an oil change. The time frame is relatively short, the activities need to be performed fairly often, and all airports need to be able to provide an area for this type of activity.

Does Sea-Tac Airport Need SASA?

Commenters questioned whether the activities proposed at SASA could take place at another airport. The FEIS for the Master Plan Update identified several existing uses that would be moved to SASA, primarily due to the expansion of the Main Terminal. These uses include Northwest Airlines aircraft maintenance, the U.S. Post Office airmail facility, and possibly Airborne cargo. SASA will also host a Northwest Airlines hangar, and allow for the expansion of cargo and maintenance areas. These activities need to take place at the Airport.

Some have suggested that a cargo-only airport be developed or that cargo operations be diverted to another existing airport. However, nearly half of all cargo is shipped in passenger aircraft. Thus, some cargo would be required to arrive in the region at one airport and be transported to Sea-Tac or visa-versa. Because the region currently has a time advantage over other locations on the west coast, it is likely that the added time to deplane, sort, and enplane cargo would result in unnecessary inefficiencies in operation. For non-connecting cargo, the region would also experience unnecessary and thus inefficient additional aircraft operations to transport cargo and passengers separately. Air cargo tonnage at Sea-Tac Airport is expected to grow 131 percent by 2020. Obviously, providing adequate facilities to efficiently accommodate this growth is important. The following summarize the alternatives to satisfying future terminal/landside improvements that envision the development of cargo and maintenance functions in the area known as SASA that were discussed in the FSEIS (page 5-5-11):

- Use of Other Modes of Transportation Alternatives - Alternative modes of transportation were evaluated in terms of their capability to meet the needs of freight shippers and travelers who presently use Sea-Tac Airport. Based upon the characteristics of freight shipments and travelers from Sea-Tac, alternative modes of transportation, such as rail (traditional or high speed) or automobile/bus, cannot be realistically considered as providing a suitable solution to needs identified in this study at Sea-Tac Airport.
- Use of Other Airports or Development of a New Airport Alternatives - An extensive study of the development of a replacement or supplemental airport was conducted by the Puget Sound Regional Council. This study found: "The Executive Board concludes that there are no feasible sites for a major supplemental airport within the four-county region and that continued

examination of any local sites will prolong community anxiety while eroding the credibility of regional governance." Based on the analysis presented earlier and the findings of the Puget Sound Regional Council, it is unlikely that use of other airports or development of a new airport are reasonable alternatives to serving future air travel demands.

- Activity/Demand Alternatives - Another group of alternatives, which are frequently suggested when considering airport development, include traffic demand management and activity restrictions. As was described in the FEIS and FSEIS, activity alternatives would not reduce demand such as to prevent the need for improvements at Sea-Tac Airport.
- Landslide Development at Sea-Tac Airport Alternatives - The following summarizes options to addressing cargo and maintenance facilities.

Centralized Cargo Option - About 176 acres of land would be required to centralize the cargo facilities in a single complex. To centralize the facilities, it is assumed that the existing cargo facilities would be abandoned and redeveloped at another location on-airport. Two locations for centralized facilities were identified: SASA and a north site. Because of the site characteristics and size requirements and cost, the complete redevelopment of a new centralized cargo complex is not practical.

Decentralized Cargo Option - The decentralized cargo option would result in supplementing existing cargo facilities at new sites on-airport. Decentralized cargo facilities could be developed within the existing cargo development (to the north of the Main Terminal), further north on existing airport property or in the SASA. Within the existing cargo area, all of the year 2005 needs can be served, about 67 percent of the year 2010 cargo building area needs can be accommodated, and about 57 percent of the hardstand needs. The post year 2005 forecast needs can then be accommodated in SASA.

Aircraft Maintenance - The Final EIS and Record of Decision of the South Aviation Support Area addressed three sites for the development of aircraft maintenance needs: northeast, far north and southeast. The northeast was rejected, as there is insufficient land to develop the requisite 84 acres. The far north site (located north of SR 518, west of 24th Avenue South) was rejected because of the cost of developing a taxiway bridge over SR 518 (estimated to be greater than $50 million), and fill requirement costs.

Because of the need to use portions of the SASA site for supplemental cargo facilities, the extent of aircraft maintenance facility development in the SASA would be dictated by the displacement of cargo facilities caused by alternative terminal development.

- Delayed/Blended Alternative - Delaying implementation of the SASA would result in the Do-Nothing alternative for some period. This alternative is not a reasonable alternative, as it would not satisfy the need.

Do-Nothing/No-Build Alternative - The Do-Nothing alternative would result in the Airport remaining as it is today. Therefore, future operational congestion and delay would not be relieved, and would increase.

Can The SASA Design Be Modified To Reduce Impacts?

In response to this question, the Port directed its aviation planners and engineers to review the SASA preliminary design, specifically to see if there were modifications available to reduce the potential impacts to 1.64 acres of wetlands (see Figure 1B).

The Port is exploring whether it can avoid fill in Wetlands 52 and 55 (possibly with more extensive use of retaining walls). These impacts were listed as 1.04 acres in the Public Notice. The wetlands are primarily forested with some amount of shrub-scrub. The uncertainties in regards to constraints to the SASA design (e.g., the SR 509 project, the South Access Roadway project, and the bridge structure necessary to support large aircraft like 747's) make it

impossible to say definitively at this point that impacts can be avoided.

Wetland 53 cannot be avoided. As discussed above, SASA must be located adjacent to the runways in an area that permits access by commercial passenger and cargo jet aircraft. The SASA area is the only location that permits this access, and yet space in the SASA area is extremely limited. Wetland 53 is centrally located in the SASA footprint and has a size and configuration that substantially affects the SASA layout. Avoiding the 0.60-acre forested wetland and a buffer around it would significantly reduce the space available for SASA, create significant design impediments, and substantially affect the viability of the project.

4. CAN THE WETLANDS IN THE ON-SITE BORROW SOURCE AREAS BE AVOIDED?

Some wetland impacts associated with the south borrow areas have been eliminated, and the remaining small amount of wetland impacts balances several environmental impacts and benefits. Further elimination of wetland impacts in the south borrow area is not proposed because avoidance of all wetlands in these areas would eliminate the feasibility of the borrow areas for sources of fill material. If the south borrow areas are not developed, increased traffic, noise, and air quality impacts will result and there will be substantially increased project costs. These impacts are discussed below.

On-Site Borrow Areas

The FSEIS stated that up to 12.35 million CY of fill material are available from the four south borrow areas. Since publication of the FSEIS, borrow area 2 has been eliminated from further consideration due to its small size (0.65 million CY). Current engineering estimates suggest that 4.0, 1.7, and 2.4 million CY of fill is available from source areas 1, 3, and 4, respectively. Thus, a total of 8 million CY of fill are available which is about 35 percent of the total amount of fill required for the Master Plan projects.

Use of these borrow sources would impact about 1.44 acres of wetland.[1] Borrow source area 1 contains about 0.20 acres of emergent and shrub wetlands (Wetlands 32, 49, and 50, Table 2). Borrow source area 3 contains 1.24 acres of forest and shrub wetland (Wetlands 29 and 30). These wetlands generally function to provide habitat for terrestrial birds and small mammals, however, Wetland 30 also contains seasonal standing water that provides breeding habitat for amphibians. The wetlands are generally areas where perched groundwater surfaces and is temporarily stored during the wet season.

Impacts to wetlands located within source areas cannot be avoided unless fill excavation does not occur. If wetlands located within borrow areas were avoided, excavation around them would eliminate sources of groundwater hydrology and likely de-water the wetlands. Large buffers around the wetlands would also remove substantial amounts of land from the source areas and make the development of the areas for borrow not practical.

Two alternatives exist to transport on-site borrow to fill sites at the Airport. As indicated in Exhibit 5-4-2 of the FSEIS, fill material could be hauled to project sites across Port property, largely avoiding public roads. With this alternative, impacts to surface transportation would be limited to flagged crossings of South 200th Street and 18th Avenue South. A new overpass to be constructed over South 188th Street would eliminate traffic impacts to this arterial street. The second alternative for transporting on-site fill to construction areas involves the use of a temporary conveyor system. This conveyor belt system would extend from source areas across Port property to construction sites. Elevated crossings of streets (South 200th and South 188th Streets) would avoid traffic impacts.

Development of on-site borrow provides substantial benefits that help mitigate several potential impacts associated with the use of off-site fill. Assuming 22 CY of fill per truck, then 8

1 This value reflects elimination of 0.48 acres of impact to Wetland 51, located near borrow source 1.

million CY of fill excavated from the identified source areas could eliminate over 363,630 one way truck trips hauling off-site fill to the Airport. Since on-site fill would be hauled principally on Port property, traffic impacts would be minimal, and restricted to flagged crossings of South 200th Street. Use of a conveyor transfer within Port property would eliminate all traffic impacts.

Trucking on-site fill material borrow reduces travel times and distances required to haul fill to project sites at the Airport. These reduced haul distances reduces air quality impacts of the projects. If on-site fill were transported by a conveyor system, air quality impacts of fill haul would be largely eliminated.

A final benefit of developing on-site fill is cost. The cost of fill derived from on-site sources is expected to be about 50 percent less than costs for fill from off-site sources. The costs savings attributable to use of on-site borrow sources ranges from $20 million to $60 million, depending on the amount of on-site material excavated and the cost of material from off-site sources.

Barging/Conveying Fill Material from Off-Site Sources

The resource agencies have asked the Port of Seattle to provide more information regarding the need to use on-site fill sources that would impact 1.44 acres of wetlands. The Port is proposing the use of these sites in order to reduce the impacts associated with trucking fill from off-site sources to the Airport. The Port was asked about other transportation alternatives that would have presumably less impact on the built and natural environment. Specifically, the Port was asked to provide information concerning barges and conveyor belts.

The Port has closely investigated alternatives to using trucks to bring fill to the Airport. The *Fill Material Alternative Delivery Method Study for Third Runway, Phase 1* (HNTB 1996) was initiated to identify and evaluate feasible methods of transporting fill. The objective of the study was to develop information from which the Port could determine:

1. if a different delivery method or combination of methods could reduce the impacts of trucking all the material to the Airport

2. if alternate delivery methods could increase competition between potential contractors, leading to a savings in construction costs, and

3. any effect alternative delivery methods could have on the project schedule.

Two barge transfer points were considered in detail. The first, at Des Moines Beach Park, would accept material and offload it to a conveyor belt that would follow Des Moines Creek until it reached the Airport at South 200th Street. The second option would use an existing terminal on the Duwamish Waterway and construct the conveyor system to follow the SR 509/SR 518 corridor, entering the Airport site at either the north end of the runway construction site or at the South 160th Street interchange with SR 509. The following sections provide details on these options.

Des Moines Beach Park Barge Terminal

An evaluation was made of a potential barge terminal at Des Moines Beach Park to enable material to be conveyed up a path, parallel to or adjacent to Des Moines Creek, to the runway site. A review was made of the feasibility of the proposed barge terminal site and the proposed route of the conveyor. Import fill material could potentially be transported by barge on Puget Sound to a temporary transfer facility off-shore at Des Moines Beach Park. A conveyor would proceed directly to the shore over subtidal and intertidal lands, supported by fixed pile bents at approximately a 50-ft spacing. The conveyor width over aquatic lands would be about 10 ft, including a catwalk.

A tunnel or similar passageway would be necessary to allow the conveyor to pass through the Marine View Drive embankment. The

conveyor could then generally follow Des Moines Creek to Port property. On Port of Seattle property, the conveyor could continue north on abandoned paved roads. It would be necessary to construct a portion of the conveyor overhead or to tunnel under the crossing at South 200th Street. The conveyor system length from the barge transfer facility to the construction area would be about 4 miles.

Along most of the likely route, the conveyor would be located on land that currently has limited public use or access. The route does, however, travel through City of Des Moines parkland, where the City is constructing a multi-use trail. Constructing a conveyor system in close proximity to a public trail and creek could be difficult due to concerns with safety, maintenance access, security, dust, creek water quality, and aesthetics. The use of the route would likely lead to impacts to Des Moines Creek Park and could trigger a U.S. Department of Transportation 4(f) analysis.

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. The City of Des Moines has initiated, and is actively pursuing, litigation against the Port and the FAA in an effort to block construction of the third runway project. Therefore, the Port and FAA concluded in the Master Plan Update FEIS and FSEIS that there are permitting obstacles that render the Des Moines Creek conveyor project infeasible at this time.

Duwamish Waterway Barge Terminal

A specific location for a material transfer site along the Duwamish Waterway was not identified in the Phase 1 study, although there are a number of possibilities with both Port-owned and privately owned facilities. The Fill Material Alternative Delivery Method Study looked at several conveyor route options and came to the conclusion that avoiding the constraints associated with West Marginal Way (e.g., a bike trail, rail line, overhead power lines, and access driveways) would be preferable. The initial study concluded that a barge off-loading facility at Terminal 115 appeared to be an optimal location.

Once the conveyor route reached the SR 509 corridor, it would follow the west side of the highway. The route would face a number of obstacles including 7 interchanges, 14 to 18 ramps or roadways, and 2 to 3 bridges. Strengthening of existing bridges to support the conveyor could be required. At the SR 509/SR 518 interchange, the route could follow SR 518 to the north end of the runway construction site or could continue south along SR 509 and enter the site south of the South 160th Street interchange.

The SR 509 conveyor route would be located along a highway with full public use and access. Security for the system would need to be provided for the entire route. Access to maintain the conveyor would be constrained and could require use of the highway shoulder for a maintenance road. Although WSDOT has stated an intention to assist in making an option such as this possible, approval for use of portions of the highway right-of-way is uncertain.

The SR 509 conveyor route would be difficult regardless of which route is taken. The route, although possible to construct, has many power line conflicts, steep hillsides, elevated structures, horizontal and vertical transfer points, and roadway crossings, and, at 7 miles, would be the longest of all the conveyor routes reviewed.

5. ARE THERE AVIATION TECHNOLOGIES AVAILABLE NOW OR IN THE NEAR FUTURE THAT WOULD MAKE THE THIRD RUNWAY UNNECESSARY?

Through the EIS process, the Port has evaluated several technology options to the third dependent runway. The following text is from Chapter II of the FEIS (page II-14). It describes in some detail the different technology options evaluated by the Port and discusses why these

options do not meet the Port's need to reduce poor weather delay.

A number of technology opportunities exist to reduce delay during poor weather. The 1993 Aviation System Capacity Plan and 1994 Federal Research and Technology for Aviation [2/] provide detailed summaries of technology that is being evaluated to reduce delay. These include:

- Airport Surface Capacity Technology (primarily affecting the movement of aircraft while on the ground);
- Terminal Airspace Capacity Technology (primarily affecting aircraft on approach or departure from an airport); and
- Enroute Airspace Capacity Technology (primarily affecting aircraft operating between cities - outside the airspace of the origin/destination city); and
- System Planning, Integration and Control Technology and Vertical Flight Program.

The following paragraphs briefly summarize the technology and how it could be applied to Sea-Tac in the reduction of poor weather related delay.

Airport Surface Capacity Technology - During the taxi-in or taxi-out of the gate area, flights may be delayed due to taxiway blockage, separations at taxiway intersections, departure queues, etc. The FAA's airport surface traffic automation program is focused on lighting, radar, and sensors to make ground operations safer and more efficient by providing air traffic controllers with the ability to identify all aircraft and special vehicles on the ground during all-weather conditions. Because of the frequency of poor weather in the Puget Sound Region, Sea-Tac Airport has been the site of several types of low visibility technologies, including Airport Surface Detection Equipment (ASDE-3), infrared vision and heads-up cockpit displays. Such programs include the Surface Movement Guidance and Control System (SMGCS) and various elements of the airport surface automation system. While limited testing of parts of the system has occurred, the FAA anticipates that pre-production units of this technology will be tested in full during the 1997 timeframe.

Taxi delay is a minor part of overall delay at Sea-Tac Airport. While this technology will improve efficiency on the airfield in the future at Sea-Tac, it would not enable dual approaches to Sea-Tac during poor weather conditions or address aviation demand growth.

Terminal Airspace Capacity Technology - The terminal airspace is the controlled airspace normally associated with aircraft departure and arrival patterns to and from airports within a terminal system and between adjacent terminal system in which tower enroute air traffic control is provided. To permit more closely spaced arrivals and departures in poor weather conditions, improvements will be required in precision navigation, enhanced vision, and improved surveillance capabilities. Such technology includes:

Terminal Air Traffic Control Automation (such as converging runway[3/] display aid, Center TRACON Automation System and integration of terminal automation techniques with other air traffic control and cockpit automation capabilities). The purpose of these technologies is to assist air traffic controllers in enhancing the management of traffic in the terminal airspace and to facilitate the implementation of technology at airports. While Sea-Tac's airfield does not consist of converging runways, Center TRACON Automation Systems offer the potential at Sea-Tac to reduce controller workload and to increase airspace efficiency by enabling controllers to smooth out traffic flows and to coordinate traffic more efficiently. However, this technology will not enable Sea-Tac to operate with two approach streams during poor weather.

Precision Runway Monitor is an improved radar technology and controller display aid

2/ Aviation System Capacity Plan, Federal Aviation Administration, 1993; Federal Research and Technology for Aviation, Office of Technology Assessment, U.S. Congress, September 1994.

3/ A converging runway system is one where runways are not parallel to one another. Thus, CRDA is not applicable to Sea-Tac.

which enables the separation between parallel runways to be reduced and still enable two independent arrival streams. Based on tests of PRM at Raleigh and Memphis, the FAA has published dual simultaneous independent parallel approach procedures under poor weather with runways separated by 3,400 ft or more. Additional analysis is being performed by the FAA Technical Center to determine the minimum spacing below 3,400 ft that PRM approaches can be accomplished. However, without additional technology to address wake vortices associated with aircraft movement, the PRM at Sea-Tac would not be envisioned to enable parallel approaches in poor weather with runways separation less than 3,000 ft.

Microwave Landing System (MLS) - Current Instrument Landing System (ILS) final approach procedures require long straight approaches and can cause concerns for closely spaced and multiple airport environments, or airports which have tall structures near the runway approach. The MLS enables curved approaches to avoid structures and minimize dependencies between airports. Sea-Tac currently has an MLS which is used by commuter aircraft to enable the FAA to more efficiently sequence commuter aircraft between in-trail air carrier activity.

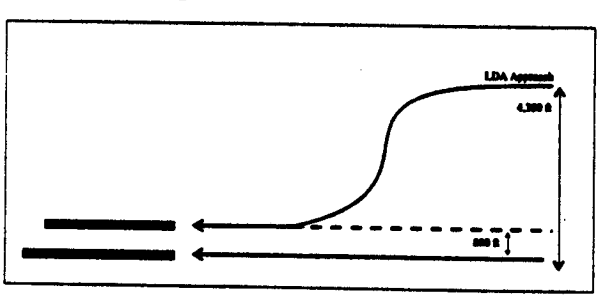
Traffic Alert and Collision Avoidance System (TCAS) Applications - TCAS is a system that provides warnings to pilots concerning nearby airborne aircraft that are equipped with transponders. However, due to pilot concerns over false warnings, programs in evaluating the value of TCAS have slowed.

Wake Vortex Avoidance/Advisory System - Vortices begin when an aircraft lifts off and continue throughout the flight, stopping when an aircraft lands. The strength of a vortex is a function of lift needed for flight, and therefore, is correlated to aircraft weight. A better understanding of wake vortex strength, duration and movement created by specific aircraft types under various wind and weather conditions could result in a reduction of aircraft separation criteria. NASA has demonstrated that wake vortices can be dissipated using various combinations of aircraft flaps and spoilers on heavy jets. However, such measures increase the need for longer runways, and increase wear on tires, fuel consumption and noise. Technology is being investigated to aid in the detection of vortices, which would reduce in-trail separation. Such revised criteria could increase airport capacity by 12-15 percent during poor weather conditions. However, current technologies are not anticipated to enable parallel approaches to runways with a separation of less than 2,500 ft. While this technology would result in slight capacity improvements at Sea-Tac, it would not enable dual independent approaches during poor weather conditions.

Localizer Directional Aid (LDA) Approaches - The LDA approaches create the appearance of the availability of widely spaced runways, where one stream is aligned with the runway and the other stream is offset by an established LDA distance. At 2-3 miles from the landing threshold, one stream sidesteps over and is then aligned with the centerline of the runway. Since an LDA approach is offset from the extended runway centerline, visual separation between aircraft on adjacent approaches and the air traffic control tower must exist at the missed approach point (typically 2-3 nautical miles from the runway threshold).

As a result, the approach minima for dual IFR approaches are typically higher than those for basic VFR minima. Due to the frequency of IFR conditions at Sea-Tac, the higher minima associated with an LDA approach would limit the use of this procedure during those conditions when the greatest delays occur. Therefore, this technology could be useful in reducing delays during VFR2, although it would not affect delays during IFR conditions.

LDA Sidestep Procedure



As is described in the FEIS, weather is categorized as:

Good Weather		Poor Weather	
VFR1	56.1%	VFR2	19.7%
		IFR1	17.0%
		IFR2	5.4%
		IFR3	1.5%
		IFR4	0.3%

The LDA would assist with addressing dual approaches during one of the five poor weather conditions, it would only be available during VFR2. Thus, the single arrival stream would not be addressed during 65 percent of the poor weather conditions, or 24.2 percent of weather conditions (all IFR conditions). Currently during VFR1, arrival delay currently averages about 1 minute. Average arrival delay increases to 11.4 minutes in VFR2 and 21.7 minutes or more in IFR conditions. While the LDA would reduce delays during VFR2, it would not reduce the most severe delays that occur during IFR conditions, which make up 60 percent of the arrival delay problem.

	Average Arrival Delay (minutes)	
	Existing Do-Nothing	Existing With LDA
VFR1	1.0	1.0
VFR2	**11.4**	**2.2**
IFR1	21.7	21.7
IFR2	21.7	21.7
IFR3	21.7	21.7
IFR4	333.2	333.2
Avg. Arr	7.7	4.4

Source: Capacity Enhancement Plan, Data Package #12, Federal Aviation Admin., June 1995.

Due to the offset centerline type approaches, this technique would require a deviation from the established noise abatement approaches. An LDA would also change the paths that aircraft would use on approach to the existing runways at Sea-Tac. In south flow, which occurs about 70% of the time, instead of arriving aircraft aligning their approach over the Duwamish industrial corridor, arrivals would either overfly the West Seattle ridge or the Beacon Hill ridge and then side step over to the runway within 2-3 miles. Due to the 300-400 ft higher elevation of properties located on these ridges, a substantial increase in arriving aircraft noise would likely be experienced on the ground.

The benefits of the LDA are overstated because:

- The LDA would not be available during 65 percent of the poor weather (it is not usable during IFR conditions); a third parallel runway would address these IFR weather conditions;
- Future departure operations would be affected to a greater degree by the LDA, resulting in greater total future delay. A third parallel runway would enable the outboard runways to be used for arrivals during peak periods, with the inboard runway available for departures;
- As 60 percent of the delays occur during IFR conditions, the LDA would not address a significant majority of the existing and future poor weather delay;

The FAA is presently operating an LDA procedure at St. Louis's Lambert Field and at San Francisco International. The LDA at Sea-Tac would be most similar to the procedure at San Francisco, where the LDA has reduced arrival delays during VFR2 but does not address IFR delay.

While the FAA may pursue the LDA in the future at Sea-Tac Airport as an interim measure to the availability of a proposed new parallel runway, the LDA was found to not satisfy the need for the proposed Master Plan Update airside improvements.

Global Positioning System (GPS) - Over the last few decades, the FAA has pioneered the development of navigation improvements to reduce aircraft delay. Instrumental to the reduction in delay is the development of technology that enables aircraft to fly more precise flight tracks. The most significant development to date is the use of satellite technology as an aid to communication, navigation and surveillance. Developed by the U.S. Department of Defense over the last 20 years, GPS/GNSS (Global Navigation Satellite System) is expected to allow aircraft to fly flexible and highly accurate flight tracks

anywhere in the world. The FAA has responded by initiating a comprehensive satellite program involving government, industry and users to expedite research, development and field implementation of improved navigation services. The foundation of the FAA program is the GPS, a satellite-based radio-navigation and time transfer system operated and controlled by the Department of Defense. GPS has essentially replaced the MLS as the next generation precision approach system. It has applicability in reducing delay and congestion at the surface of an airport, in addition to the terminal and enroute airspace.

To date, work is on-going concerning the GPS. FAA has only approved one stand-alone non-precision approach using GPS as the primary navigation aid (Steamboat Springs, Colorado). GPS approaches however, have been approved to supplement ILS approaches and are being tested at a number of airports. While GPS is expected to have significant long-term benefits to the overall aviation system, it is not expected to address the wake vortex issues described previously. Therefore, GPS would not enable dual approaches to the existing runways during poor weather.

Flight Management Systems (FMS) - New computer technology being incorporated into the newer generation aircraft is capable of efficiently performing various navigational functions. At airports such as Sea-Tac, FMS procedures have been used to transition aircraft from an enroute phase of flight to existing charted visual procedures and instrument landing approaches. FMS procedures are expected to allow the reduction of weather minimums for charted visual approaches and offer alternative arrival paths to FMS equipped aircraft. Other benefits of FMS include a reduction in airspace conflicts, a reduction in controller workload, and possible energy reduction and improvements in the precision of noise abatement flight tracks. However, FMS would not enable dual independent approaches to the existing runways during poor weather.

- Enroute Airspace Capacity Technology - Enroute airspace is the controlled airspace above or adjacent to the terminal airspace. Because of non-uniform demand for portions of the enroute airspace, technology is being evaluated to reduce delays and match traffic flow to demand.
- System Planning, Integration and Control Technology - A number of technical tools are being developed to aid in the evaluation of air traffic control procedures and system performance.
- Vertical Flight Performance - This program is evaluating means to improve the safety and efficiency of vertical flight operations and increase the capacity of the national airspace through research, engineering and development efforts focused on vertical flight.

Of the technologies listed above, the Precision Runway Monitors (PRM) and Wake Vortex Avoidance/Advisory System have application to addressing the poor weather issues at Sea-Tac. It is expected the PRM will be used at Sea-Tac if the runway lateral separation testing shows that such technology could be applicable to runways with a separation of 2,500 ft or less. However, the primary issue that would remain is the wake-vortex condition. The FAA continues to evaluate wake vortex conditions. However, there are no plans or technological developments underway or envisioned to reduce the wake vortex standards or to reduce below 2,500 ft the separation between parallel runways.

In its August 1, 1996, approval of the Master Plan Update, the Port of Seattle Commission directed Port staff to give additional consideration to use of new technologies to satisfy poor weather operating needs. This review concluded that technologies, based on the global positioning system (GPS) and flight management system (FMS), will provide aviation system capacity relief in the future. However, no technologies were identified that would alleviate all of the poor weather constraint because no technologies exist to address the 2,500 ft spacing requirement between runways that is attributed to wake vortex conditions.

One of the findings of the technology conference is that sometime in the future, the runway spacing requirements to enable independent

parallel approaches may be reduced from 3,400 ft to 2,500 ft. As a result, with the preferred alternative location of the third parallel runway at Sea-Tac, airport users may be able to take advantage of future technology to enhance the operating capability of the airfield and extend the long-term operating capability of a third runway airfield.

6. How will the Groundwater and Water Supply Aquifers be Affected?

Background

A baseline hydrogeologic characterization of the proposed third runway area and surrounding areas (the "study area") was made in 1995 to evaluate the effects of the proposed construction activities on groundwater recharge, quality, and flow. The study, conducted by AGI Technologies, resulted in a report entitled *Baseline Groundwater Study* dated January 1996. A copy of this report is included in Appendix Q of the FEIS. A second study was performed by AGI in 1997 related to the Port's development of the North Employee Parking Lot. A copy of this study, entitled *Groundwater Quality Impact Evaluation – Proposed North Employee Parking Lot*, and dated June 13, 1997, has been submitted to the Corps of Engineers, Regulatory Branch, and was incorporated by reference in the FSEIS at page 5-7-6.

Groundwater in the study area occurs at least occasionally in each geologic deposit below the ground surface; however, the primary aquifers in the study area occur within deeper glacial deposits. Based on permeability and development as groundwater sources for water supply, three deposits are considered the principal aquifers of the study area: Shallow, Intermediate, and Deep. The Intermediate Aquifer is extensively used for water supply; the City of Seattle Highline well field is completed in this aquifer.

Groundwater in the shallow aquifer is recharged by precipitation that infiltrates through permeable surface sediments. Precipitation, evapotranspiration, and runoff govern the amount of recharge to the ground water system. Areas underlain by fine-grained, low permeability materials such as till and peat are considered low-recharge areas. Where impervious surfaces such as roadways, buildings, and airport runways exist, storm water becomes runoff and does not directly infiltrate into ground. Recharge magnitude is governed largely by the permeability of the surface sediments and topography. Water in the shallow aquifer then recharges the intermediate and deep aquifers. .

A water balance exists between the ground water and surface water system that is governed by precipitation (inflow or recharge); runoff and evapotranspiration; and discharge. Generally, inflow enters the groundwater system as precipitation minus direct runoff and evapotranspiration. Discharge from the aquifers primarily occurs as flow into streams or springs, underflow, and pumping from municipal water supply wells. Water discharges from the groundwater system is the primary source of stream baseflow.

Existing Conditions

The City of Seattle currently pumps from the Intermediate Aquifer via their Riverton Heights and Boulevard Park production wells located in the city's Highline Well Field located northeast of the airport. Water quality from this aquifer is generally considered to be excellent. The Deep Aquifer is pumped by the Highline Water District via the Angle Lake and Des Moines production wells located south of the airport. Water quality in this aquifer is also considered to be excellent. The Shallow Aquifer is not currently being used for drinking water, though there may be wells completed in this aquifer which may be used for irrigation or other commercial purposes. Water quality is generally assumed to be of good quality in this aquifer.

Effects of Proposed Runway Project on Groundwater Balance

Construction of the third runway and ancillary improvements would require the importation and

placement of substantial quantities of fill over native soil or other fill to reach design grades and foundations. The 8,500-foot runway and other proposed improvements would result in an estimated 193 acres of new impervious surfaced fill and 544 acres of pervious fill area. Direct surface water runoff would be increased in areas of new impervious surface. Where new pervious fill would be placed, direct surface water runoff could be increased. However, calibrated hydrologic modeling of the existing runway fill material indicates that it has infiltration qualities similar to glacial outwash, which is more permeable than the existing native till soil. Thus, there is higher potential for more recharge into the new fill soil and less surface runoff. In areas where fill is to be borrowed, recharge should increase since excavation would remove till and expose permeable material. These changes in recharge and discharge would affect the existing groundwater balance, and would thus affect the flow and volume in the Shallow, Intermediate, and Deep Aquifers. However, the change would not be expected to be significant.

Groundwater balance is also affected by pumping from municipal wells. The existing wells would remain in place and continue to extract water from either the Intermediate or the Deep Aquifer.

Potential Impacts

Groundwater Recharge and Discharge

The baseline study concluded that runway development would reduce recharge approximately 0.18 million gallons per day (mgd), and borrow area development (where till is removed), would increase recharge approximately 0.32 mgd. The balance of these effects indicates a net increase in recharge to the Shallow Aquifer of approximately 0.14 mgd, as long as the borrow areas are undeveloped or unsurfaced. These effects indirectly affect the Intermediate and Deep Aquifers, as water entering the Shallow Aquifer either flows downward to the Intermediate Aquifer (or discharges to streams), and Intermediate Aquifer water flows downward to the Deep Aquifer (or discharges to streams).

Discharge volumes would increase in direct proportion to the increase in net recharge. There would be greater discharge into Miller and Des Moines Creeks and greater underflow to Puget Sound and the Green River Valley, though the change in underflow would probably not be detectable for many years.

The volume, direction, and velocity of discharge to area streams would expect modest changes. Recharge could increase, primarily near the proposed nearby borrow areas, due to increased recharge. This increase could be offset by the decrease in recharge due to new impervious surfaces. It is likely that the fill in the new runway embankment will have a positive impact on water storage and discharge, although the amount has not been quantified.

Groundwater Quality

Threats to groundwater quality are largely governed by the degree to which surface water might be contaminated and then infiltrate and reach underlying groundwater. Permeability and the adsorptive capacity of soil are significant factors in assessing risk because they largely control the rate at which contaminants can infiltrate and migrate in the subsurface.

The Seattle Water Department and Highline Water District operate three and two wells, respectively in the Intermediate Aquifer and the Deep Aquifer. The presence of existing low permeability silts, clays, and glacial till between potential sources of contamination and these aquifers restricts infiltration and percolation of contaminants originating on the ground surface downward into the aquifers. For this reason, the aquifers currently have low susceptibility to contamination and are unlikely to be adversely affected by Airport operations. No reports of contamination to this aquifer from airport activities have been reported. An example of a very detailed evaluation that the Port conducted was the special study for the North Employee Parking Lot.

In general, groundwater quality in the aquifers could be impacted by runway development through either infiltration of contaminated surface water associated with construction activities or resulting airport operations. However, with proper planning and best management practices, the potential impacts can be prevented or successfully mitigated.

During construction of the runway, potential contaminants could accidentally spill and infiltrate into permeable areas. The BMPs that are part of the Port's NDPES permit are designed to minimize the potential for these types of impacts.

Operational impacts on groundwater quality in the proposed runway and ancillary improvement areas are related to new impervious surface area and associated storm water runoff. BMPs, such as a spill control plan, would be in effect to reduce the potential for adverse groundwater impacts.

Application of proper management techniques can reduce or eliminate all of the potential sources of groundwater contamination. Proper construction waste handling, spill containment areas and vehicle maintenance plans would be mandated during construction of the runway and during future operations of the area.

Proposed Fill

During the public comment process, a question was raised as to whether the weight of the fill would adversely affect the underlying aquifer. The answer is that the existing soils and aquifers would remain intact, with no threat of damage as a result of the amount of fill being placed above them. In the general area of the Airport during the last glacial period, there was a sheet of ice approximately 3,000 feet thick.[4] The weight of that glacial ice was approximately 10 times more than the weight of the proposed fill.

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[4] *Ice-Sheet Glaciation of the Puget Lowland, Washington, during the Vashon Stage (late Pleistocene).* Robert Thorson in Quarternary Research, Vol. 13. P. 303-321. 1980.

Letters to the Corps Submitted During First Comment Period (December 19, 1997 to January 20, 1998)

1F-1 NMFS

1. Comments acknowledged. The Port submitted a JARPA application in December 1996 that included an application for a Hydraulic Project Approval.

1F-2 USFWS

1. Comments noted.

2. An errata sheet was issued with the notice of the public meeting. Under current plans, the amount of wetland acreage affected would be 8.59 acres.

3. See General Response 2.

4. See General Response 4.

5. The proposed mitigation accounts for time delay in re-establishing wetland functions by providing mitigation ratios in excess of 1 to 1. Mitigation to be provided includes up to 6 acres of in-basin mitigation (in the form of buffers around Miller Creek), other in-basin mitigation activities described in the revised mitigation plan, and off-site mitigation including wetlands to be constructed in Auburn. This provides an overall ratio substantially in excess of 1 to 1.

6. Considering that mitigation will be provided in perpetuity to replace relatively young (20 to 40 year old) forest and shrub wetlands, the mitigation ratio will provide new wetland area sufficient to replace the temporal loss of habitat. Because land clearing, demolition of residential neighborhoods, etc. has disturbed many of the affected wetlands, they will be more easily replaced than undisturbed wetlands.

6. Development of wetlands on the proposed mitigation site will not require the use of artificial or experimental methods to achieve the proper wetland hydrology. Shallow groundwater hydrology has been monitored on the mitigation site for nearly 3 years. The results of this monitoring show that the desired wetland hydrology and associated plant communities can be established by grading the site to the elevations indicated in the FEIS, FSEIS, and the Public Notice.

   However, the use of liners to establish artificial ponds, wetland mitigation, or other water bodies is not experimental. For a local example, an artificially lined wetland has been successfully created at the West Point Secondary Treatment Plant in Seattle.

7. Table 3.3-2 was forwarded to USFWS.

8. In response to comments like this, the Port has proposed additional mitigation actions in the affected watersheds that will not produce wildlife attractants within 10,000 ft of the runways. See *Summary of Amended Wetland Mitigation Approach* (Parametrix 1998).

1F-3 EPA

1. An errata sheet was issued with the notice of the public meeting. Under current plans, the amount of wetland acreage affected would be 8.59 acres.

2. The numbers in the Public Notice and the errata sheet are the most accurate. The project has been refined since the mitigation plan was sent as part of the JARPA application in December 1996.

3. See General Response 2.

4. See General Response 3.

5. See General Response 4.

6. Comments noted.

7. In response to comments like this, the Port has proposed additional mitigation actions in the affected watersheds that will not produce wildlife attractants within 10,000 ft of the runways. See *Summary of Amended Wetland Mitigation Approach* (Parametrix 1998).

1T-1 Muckleshoot Indian Tribe

1. The wetland mitigation site, while adjacent to the Green River, is hydrologically and hydraulically connected to the river via a drainage channel that flows into the river approximately 1.5 miles north of the site. The mitigation site slopes away from the river, and storm water runoff flows to the north in the aforementioned channel. Connecting the site to the Green River would significantly alter the hydrology of the area and would have adverse consequences during flooding events. However, if the river were allowed to flow through the proposed wetland during a flood, a "short circuit" could be created across the site that could catastrophically divert the main river flow through the wetland site, north across the new South 277th Street, and through farms and proposed development north of the mitigation site. Also, during normal flow levels, the river is somewhat lower than the proposed site. If a connection were provided to the river, the connection could in fact drain the site and impact the success of the proposed wetland. For these reasons, the Port is not proposing to directly connect the mitigation wetland to the Green River.

1S-1 State of Washington Department of Fish and Wildlife

1. The mitigation plan will generally provide 1 piece of large woody debris (LWD) for every 2 channel widths. Because of the nearly flat profile of the stream channel, hydraulic analysis may demonstrate smaller amounts are desirable in certain locations. Wood will also be included in the floodplain and riparian buffer areas.

2. See General Response 3. As stated in the JARPA application, the Port is not seeking Corps approval for the Des Moines Creek relocation as part of this permit application and it will submit a separate permit application in the future when more is known about the proposed location of this creek. Until the Port knows more about other projects in the vicinity affecting the creek's location (e.g., extension of SR 509 and the south access to the airport), the Port cannot determine a proposed location for the creek. Meanwhile, the Port considered what it now knows about potential creek relocation, and the EIS included this information thereby satisfying the purpose of cumulative impacts consideration.

3. For construction projects identified in the Proposed Master Plan Update, the Port is required by its current NDPES permit to establish and fund an independent qualified pollution control officer to advise on and determine compliance with applicable water quality standards. See the response to Letter 1G-1, Comment 4/5.

4. The Port will work with resource agencies to ensure that an adequate baseline of habitat information is available. There are many existing sources of this information including the EIS and the Des Moines Creek Basin Plan.

5. Comments noted.

6. Comments noted.

7. As discussed in General Response 1, the Port is continuing to refine the proposal to decrease impacts to wetlands. Wetlands 3, 4, 5, and 36 will not be affected by the project. The proposed fill in Wetlands 9, 13, 19, 23, and 37 totals 3.2 acres. In the Des Moines Creek basin, Wetland 51 will not be affected by the project. The proposed fill in Wetland 52 is 1.0 acre. The total wetland fill has been reduced to 8.59 acres.

   In response to comments like this, the Port has proposed additional mitigation actions in the affected watersheds that will not produce wildlife attractants within 10,000 ft of the runways. See *Summary of Amended Wetland Mitigation Approach* (Parametrix 1998).

1C-1 King County, Water and Land Resources Division

1. See General Responses 1 and 2.

   The reviewer assumes that fill of wetlands within the Miller and Des Moines Creek basins will result in significant impacts to these creeks, including impacts to salmonid species using the lower reaches of the creeks. However, storm water management and floodplain mitigation proposed for the project will mitigate for potential adverse impacts to the creeks. Plans to relocate the creeks around areas directly impacted by the project will replace and enhance affected stream habitats.

   Hydrologic analyses of the affected wetlands indicate that they offer little ability to reduce peak flows in Miller and Des Moines Creeks. Most of these wetlands occur on slopes or in areas of groundwater discharge. Wetlands on slopes provide minimal storm water storage because of their topography. Approximately three acres of wetlands occur in shallow depressions on relatively level areas. There is little evidence that these wetlands store storm water because they lack standing water or a fluctuating water level. However, if one were to assume that the wetlands could store one foot of water during storms, HSPF modeling indicates they could reduce peak flow in Miller Creek by approximately 0.5 percent. This small amount of storm water detention that could be lost due to the project would be replaced by the proposed storm water management facilities.

   It is incorrect to assume that the few remaining wetlands in a watershed have increased functional value simply because many of the wetlands in the watershed have been filled. The function of a wetland is dependent on certain physical and ecological characteristics. For example, the ability of a wetland to store storm water depends on the drainage pattern into the wetland, the size and slope of the wetland, and its outlet configuration. These characteristics do not change simply because other wetlands in the watershed have been filled. Therefore, the wetland's function in storm water management does not change. Similarly, the ability of a wetland to provide wildlife habitat for a particular species may be dependent on the type of vegetation, size, and water regime (depth, duration, and area). Filling other wetlands in the watershed will not alter these characteristics, and thus the wetland will not become more valuable as wildlife habitat.

2. The reviewer has misinterpreted the drawings. The referenced sheet is for the design of a drainage channel, not the main relocated channel of Miller Creek. In the Public Notice, the Port proposed a stream corridor of approximately 130 ft (of which approximately 30 ft is the stream channel itself).

3. The Port of Seattle has and will continue to participate in area efforts to increase the quality of Des Moines and Miller creeks. The Port contributed a sizeable percentage of the funding for the Des Moines Creek Basin Plan. The Port has also committed to participate in the Miller Creek Basin Plan once the other jurisdictions are ready.

1L-1 City of Burien

1. One of the objectives of the Miller Creek mitigation plan is to improve the downstream fishery habitat quality of the stream. As an example, one opportunity is to plant the stream buffers with trees that will provide shade and regulate water temperatures. Currently, the section of Miller Creek that would be relocated runs through an open agricultural field with no shading on either side.

2. As a point of clarification, the project will not fill "the few remaining" wetlands in the Miller Creek basin.

   See General Response 2. Certain functions that the wetlands provide will be mitigated in the basin. The wildlife habitat function of these marginal wetlands will be mitigated for at the Auburn site.

1L-2 City of Burien

1. The public hearing was held on April 9, 1998.

2. See General Response 2.

1L-3 City of Burien

1. The public hearing was held on April 9, 1998.

2. The February 1996 Final EIS (FEIS) and the May 1997 Final Supplemental EIS (FSEIS) both discussed mitigation at the Auburn site. Both documents went through an extensive public review process, meeting and exceeding the requirements of NEPA and SEPA.

3. In this comment, the City questions whether there has been adequate consideration of the federal Coastal Zone Management Act (CZMA) which, in Washington, is administered by the state Department of Ecology (DOE). The Clean Water Act and the Corps of Engineers implementing regulations at 33 C.F.R. § 325.2(b)(2) require that 404 permit applicants certify that the applicant's project is consistent with the CZMA. The regulations also require the Corps to forward a copy of the applicant's certification to DOE and request DOE's concurrence or objection to the certification. (The Act and regulations also require that DOE grant 401 water quality certification for the project. DOE generally considers the CZMA and 401 certifications simultaneously.) In this case, when the Port submitted its 404/JARPA application to the Corps of Engineers and other resource agencies in 1997, it certified that the project would be consistent with the CZMA. The Corps forwarded this certification to DOE and requested concurrence or objection. DOE is now in the process of considering whether or not it will grant this certification.

The *Washington State Coastal Zone Management Program*, which is DOE 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 authorities. Here, the applicable management program authorities include 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 3rd runway and other airport improvements will occur, have mean annual flows that are less than the threshold of Shoreline 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 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.

The project is also consistent with the State Environmental Policy Act. There have been three environmental impact statements prepared for this project: the programmatic Flight Plan Project EIS (January 1992); the Final EIS for Proposed Master Plan Update Development Actions at Seattle-Tacoma International Airport (February 1996); and the Final Supplemental EIS for the Proposed Master Plan Update Development Actions at Seattle-Tacoma International Airport (May 1997). These EISs include extensive discussion of potential project impacts to all environmental features, including wetlands, water quality, storm water control, and other issues relating to the Miller and Des Moines Creek drainage basins.

The project is also consistent with the federal and state Clean Water Acts and the federal Clean Air Act. The potential impacts on water quality are discussed in the FEIS at Chapter IV, Section 10. The potential impacts on air quality are discussed in the FEIS at Chapter IV, Section 9 and in the FSEIS at Chapter 5, Section 2. In his letter to the Secretary of the U.S. Department of Transportation dated June 30, 1997, Governor Gary Locke certified that there is reasonable assurance that the project will comply with applicable air and water quality standards, if the Port implements certain measures. The Port has agreed to implement the specified measures.

4. In this comment, the City states its belief that there are practicable alternatives to construction of the third runway that do not require the filling of wetlands as proposed. In making its decision on the 404 permit, the Corps is required to consider whether there is a practicable alternative to the proposed discharge of fill material into waters of the U.S. that would have less adverse impact on the aquatic ecosystem. 40 C.F.R. § 230.10(a). Extensive analysis of practicable alternatives has occurred with regard to this project, as documented in the EISs and other documents in the Corps files. One of these is a 21-page document entitled "Alternatives Analysis Document for Section 404 Individual Permit Application for Seattle-Tacoma International Airport Proposed Master Plan Update Development Actions" dated 6/20/97. This document summarizes the consideration of alternatives to the Master Plan Update development actions, dating from the Flight Plan Project through the FEIS. A copy of this document is available from the Corps of Engineers, Regulatory Branch, P.O. Box 3755, Seattle, WA 98124-2255, telephone (206) 764-3495, or from the Port of Seattle, Environmental Office/Airport, Main Terminal, Seattle-Tacoma International Airport, Seattle, WA 98158, telephone (206) 439-6606. As demonstrated in the alternatives analyses

conducted by the Port, the Puget Sound Regional Council, the FAA, and others, that are discussed in the referenced documents, there is no practicable alternative to the proposed discharge of fill material in waters of the U.S. for the construction of the third runway and SASA.

1L-4 City of Des Moines

1. Comments noted.

2. Comments acknowledged. As stated in the JARPA application, the Port is not seeking Corps approval for the Des Moines Creek relocation as part of this permit application. The Port will submit a separate permit application in the future when more is known about the proposed location of this creek. Until the Port knows more about other projects in the vicinity affecting the creek's location (e.g., extension of SR 509 and the south access to the airport), the Port cannot determine a proposed location for the creek. Meanwhile, the Port considered what it now knows about potential creek relocation, and the EIS included this information thereby satisfying the purpose of cumulative impacts consideration. *See* FEIS at Chapter IV.16.

3. See General Response 2.

4. The Port has always made its participation in the Des Moines Creek basin planning effort contingent on its ability to maintain a safe and operationally efficient airport.

5. See the response to Letter 1G-3, Comment 1.

6. Comments noted.

1L-5 City of Normandy Park

1. Comments noted.

1L-6 City of Normandy Park

1. See the response to Letter 1G-3, Comment 1.

2. As of this date, the Port has not been granted permission to access all properties that may have wetlands. However, as noted, estimates of impacts to wetlands that might be affected are included in the permit application. The Port believes that they have accurately accounted for the potential impacts but cannot be absolutely certain until they have the ability to survey all the properties involved.

   The Port and the Corps have agreed to reserve the option of increasing the acreage of the mitigation wetland to account for any unanticipated impact to wetlands on the properties in question.

3. See General Response 2.

4. Related issues in the 404 and NDPES permits have been and will be coordinated to the extent necessary. Storm water plans for the project are directly related to the plans developed as part of the NPDES permit. In addition, a prerequisite to the Corps issuance of a 404 permit is 401 water quality certification by Ecology, the same agency responsible for review and approval of the

Airport's NDPES permit. Also, the Governor's Certificate requires Ecology and other state agencies to implement and enforce applicable air and water quality standards.

5. The environmental impacts of the project were evaluated in the FAA's 1996 FEIS and 1997 FSEIS.

6. The Port acknowledges and accepts responsibility for the soil erosion that occurred during construction of the North Employee Parking Lot that resulted in fines from Ecology. Best Management Practices (BMPs) at the parking lot did not function as needed for the extreme precipitation that occurred during the two storms that caused erosion and sedimentation.

A significant amount of the sediment that eroded from the parking lot during was collected at the base of the parking lot fill in sediment traps or upstream of SR 518. Finer sediment was carried by the storm water runoff to the Lake Reba detention pond, where additional settling occurred. The Lake Reba outlet was closed after the first event to prevent further sediment discharge. However, excessive rains and the slow settling time of the extremely fine sediments prevented the Port from opening the Lake Reba outlet and releasing water in preparation for the second storm. The second storm caused water flow over the lake's spillway, carrying extremely fine sediment into Miller Creek, where it washed downstream. This fine sediment in Lake Reba (a quiescent water body) took several weeks to settle. Therefore it is unlikely that there was significant sediment deposition in the flowing creek, because flowing water moves and resuspends fine sediments).

Several steps were taken by the Port to prevent further sediment discharge from the parking lot construction site:

- the contractor's superintendent was removed from the job for failure to meet contract obligations for implementing and maintaining BMPs;
- the Port's construction crew assisted the contractor to install additional BMPs prior to the next rain;
- a consultant was brought in to review existing BMPs, modify and inspect operations, and prevent further discharge;
- a sand filter system was installed at the outlet of Lake Reba to filter fine sediment from the water;
- a coagulation/settlement treatment system using alum (alum is used in water purification systems for drinking water and natural systems for surface water particulate removal) was installed to remove sediment from storm water from the parking lot;
- an independent consultant was hired to provide oversight of all third runway projects for compliance with applicable water quality standards.

The treatment systems, along with the newly implemented BMPs (i.e. plastic covering, hydroseeding, enlarged sediment traps, etc.) have effectively managed storm water from the site since their installation in November. Ecology is aware of and has concurred with the BMPs applied at the parking lot.

The Port has learned from the parking lot experience that conventional BMPs, approved and implemented at construction sites throughout the region, are inadequate to completely prevent turbid water discharge from the Port's projects. The Port is working with Ecology, WSDOT, and its consultants to develop additional BMPs that will reduce the risk of turbid water discharge from new projects.

7. Comments noted.

8. Comments noted.

1L-7 King Conservation District

1. See General Response 2.

2. The Port is proposing to construct a stream channel with natural attributes. There are no plans to "tight line" Miller Creek. See Letter 1S-1 for the WDFW's favorable opinion regarding the Miller Creek relocation plan.

1E-1 State Representative Karen Keiser

1. Comments noted.

2. Coho and chum salmon and sea-run cutthroat trout were historically in Miller Creek. However, all recent surveys have found a small run of coho, apparently supported by the hatchery-reared fingerlings released each year by Trout Unlimited. The most recent evaluation conducted in August 1996, only found resident cutthroat trout (which is not an anadromous species), pumpkinseed sunfish, and three-spine stickleback upstream of South 160th Street. The FEIS and the Miller Creek Mitigation Plan, submitted in December 1996, both include this information.

   Chum salmon and steelhead trout are not listed or proposed for listing as an endangered or threatened species in Puget Sound. On March 9, 1998 the National Marine Fisheries Service (NMFS) proposed listing the chinook salmon Puget Sound Evolutionary Significant Unit (ESU) as a threatened species under the Endangered Species Act (ESA). The NMFS' proposed rule includes its proposal to designate critical habitat for the chinook, limited to the species' current freshwater and estuarine range, which includes waterways, substrate and adjacent riparian zones below longstanding, impassible, natural barriers. 63 Federal Register 11482 (March 9, 1998).

   The Corps of Engineers is not required to commence a consultation process under Section 7 of the ESA because the Third Runway project will not jeopardize the continued existence of any listed species. Fish habitat surveys included in the EIS disclosed that there are no chinook salmon in Des Moines or Miller creeks, and impassable fish barriers exist in both creeks well below the area impacted by the airport redevelopment project. Final EIS, IV.16-5; comment letter from NMFS to Corps of Engineers dated January 15, 1998. There is no information available that chinook salmon habitat would be impacted, and therefore the proposed listing of the chinook salmon Puget Sound ESU is not "new information" on the airport redevelopment project's impacts that would require supplementation of the NEPA EIS.

3. The region has been looking at ways to meet projected air travel needs for nearly 10 years. A large number of alternatives have been addressed by the Flight Plan Study (1992), the Major Supplemental Airport Study (1994), the FEIS on the Master Plan Update Development Actions (1996) and the FSEIS (1997).

   Chapter II of the FEIS and Chapter 3 of the FSEIS address the alternative of developing a new airport or using an existing airport. As that discussion shows, after extensive consideration of all of the possible site locations, this alternative was not found feasible for each of the following reasons:

i. There is no sponsor, identified source of funds, or acceptable site for a new airport. This is evidenced by the fact that no party or group intervened during the Flight Plan Study, Major Supplemental Airport Study, or in any forum since: and

ii. Extensive study of this issue resulted in the consideration of all alternatives for addressing air transportation capacity issues in this Region. Based on this process, the PSRC adopted Resolution A-93-03 and EB –94-01 confirming that no feasible sites exist. The Port and the FAA have reviewed the regional planning studies and have independently concluded that a supplemental airport would not satisfy the needs addressed by the FEIS and the FSEIS: and

iii. Neither the lack of a sponsor, not the conclusion of the PSRC process appears to depend on the level of anticipated demand for air travel in the region; and

iv. If a supplemental airport site could be identified, market forces would not enable it to successfully compete with Sea-Tac until regional origin and destination travel exceeds 10 million enplanements annually. Using the forecasts described in the FSEIS, Sea-Tac is anticipated to accommodate 10 million origin and destination annual enplanements around the year 2005, about 5 years earlier than identified in the FEIS due to the accelerated demand. As noted in the FEIS, air carriers typically find that to initiate operations at a new facility requires demand for 20 to 30 operations per day. This would amount to about 1 million enplanements a year or 10 percent of Sea-Tac's enplaned passengers. As described on Page II-10 of the FEIS, when origin and destination enplanements are less at one competing facility, competition entices traffic to stay at the facility with greater level of service. As a result, a supplemental airport site would not off-load sufficient demand to address the current poor weather operating constraints at Sea-Tac. Therefore, the increased demand would not alter the conclusions concerning this alternative.

The Corps is holding the Port to the same standards and requirements as any other permit applicant. The Corps is preparing a 404(b)(1) analysis under the guidelines of the Clean Water Act. See the response to Letter 1L-3, Comment 4.

4. See General Response 2.

5. Comments noted.

1E-2 State Senator Julia Patterson

1. See the response to Letter 1E-1, Comment 2.

2. See the response to Letter 1E-1, Comment 3.

3. See the response to Letter 1E-1, Comment 4.

4. Comments noted.

1E-3 King County Councilmember Chris Vance

1. See the response to Letter 1C-1, Comment 3.

1G-1 ACC/Cutler & Stanfield

1. The public hearing was held April 9, 1998

2. The ACC asserts that a shorter runway (6,000- to 6,700-foot rather than the Port's proposed 8,500-foot runway) would feasibly meet the Port's stated purpose and need. This is the same argument the ACC presented to the Port of Seattle Hearing Examiner in arguing that the Master Plan Update EISs failed to adequately consider the environmental impacts of the shorter runway length. The ACC attached a copy of the Written Testimony of Dr. Stephen L.M. Hockaday that they presented in the Hearing Examiner proceeding. The Hearing Examiner considered and rejected this argument, finding that the shorter runway length was not a reasonable alternative to the proposed 8,500-foot runway. The ACC also presented this argument to the Federal Aviation Administration (FAA), but the FAA also rejected this argument when it granted approval for the Port's new runway. FAA Record of Decision, July 3, 1997

The ACC argues that a shorter runway could accommodate the vast majority of aircraft landings and therefore meet the Port's stated need of improved poor weather operating capability. ACC comments at p. 7. However, the ACC focuses solely on the percentage of aircraft that could land on a shorter runway, and it overlooks a number of critical operating characteristics of their proposed alternative that render it impracticable.

First, the ACC's proposal would have the north threshold staggered by approximately 2500 feet (for a 6000-foot runway) to 1800 feet (for 6700-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 ACC's alternative, the staggered north end is necessary to avoid wetland and stream impacts. If the north end were aligned with the existing runways, the ACC's alternative would have no fewer wetland and stream impacts than the Port's proposed 8,500-foot runway.

Attached is the testimony of Mr. Douglas F. Goldberg submitted to the Port Hearing Examiner ("Goldberg Testimony"). Mr. Goldberg is a Vice President of Landrum & Brown, Inc., and serves as the leader of the firm's Aviation Facilities and Operations Practice. He has over 14 years experience in aviation and airport planning, and has served as Project Manager on a number of airport master planning projects throughout the world. As Mr. Goldberg explained, the staggered north threshold plays an important role for air traffic control purposes under Instrument Flight Rule ("IFR") conditions. IFR conditions are common at STIA, occurring approximately 25 percent of the time.[1/]

As Mr. Goldberg's testimony shows, independent arrivals and departures during IFR conditions (departures from the inboard runway at the same time as arrivals on the new third runway) would be a common occurrence at STIA. The ability to conduct those independent arrivals and departures is important to reducing bad weather delay at STIA. Moreover, this situation would be common (as often at 15 to 17 percent of the time) because the inboard runway, the longest runway at STIA, is best suited for departures of all aircraft types. In addition, from an air traffic control perspective, it is preferable to taxi 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 STIA. Moreover, it is highly desirable, in order to reduce aircraft operational delay at STIA, for the inboard departures and outboard arrivals to be "independent" so that the air traffic controllers do not need to choreograph, and create a temporal separation between, each separate departing and arriving aircraft.

1/ Master Plan FEIS at p. I-12.

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.[2/]

Moreover, this is not a requirement that can be cured by better technology, and it is not a requirement that the FAA will waive, because it is a safety requirement designed to keep departing aircraft a safe distance away from the wake vortices of arriving aircraft. In fact, the FAA agreed that a staggered north threshold runway would not be practicable. To maintain the ability to conduct simultaneous IFR approach and departure, which is an important airfield operating element to reduce poor weather delay at STIA, the ACC's proposed "alternative" runway would have to be *moved to the west* by 400 to 500 feet, which would dramatically increase its wetland and stream impacts.

In summary, the ACC's proposed runway configuration would clearly not provide the same operational capacity as the Port's preferred alternative and is not a practicable alternative.

Second, 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. As noted above, only 50 to 60 percent of the airline fleet mix could use a 6000- to 6700-foot runway for departures.[3/] Even ACC's witness Stephen Hockaday admits that a significant percentage of the fleet mix could not use the ACC's shorter runway for departures.[4/]

Third, the ACC's predictions about the performance of its runway configuration assumes "still wind" conditions. Still wind conditions are frequently not present at STIA and certainly cannot be counted upon, especially during bad weather conditions.[5/] At the hearing before the Port Hearing Examiner, Douglas Goldberg testified that still wind conditions were not common at STIA.

Fourth, all the testimony demonstrated that many pilots would refuse a 6000- to 6700-foot runway, given the availability of a longer parallel runway. The statistics used in the EIS and by Mr. Hockaday for aircraft landing/takeoff ability on runways of various lengths are based on the technical capabilities of the aircraft, the "book value." But pilots are ultimately responsible for the control of their aircraft. In fact, pilots will frequently refuse the runway length proposed by the ACC, especially during bad weather or crosswind conditions, which are frequent at STIA. Any time a pilot does so, additional delays and increased air traffic controller workload will result. The availability of an 8500-foot runway that provides the flexibility to accommodate virtually all arrivals, regardless of aircraft type and weather condition reduces delays.[6/]

2/ FAA Advisory Circular 150/5300-13 Change 5, ¶ 208; see Written Testimony of Douglas F. Goldberg at pp. 19–20; FAA Record of Decision (July 3, 1997) at App. C.

3/ Master Plan FEIS at p. II-14.

4/ Testimony of Stephen Hockaday at p. 5.

5/ Written Testimony of Douglas F. Goldberg at pp. 21–22.

6/ Written Testimony of Douglas F. Goldberg at pp. 21–22.

Five, the ACC's proposed shorter runway would complicate air terminal management, based on routine air traffic control procedures at STIA. If the new runway were less than 8500 feet in length, certain long-haul traffic would have to be segregated from other traffic and resequenced 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 STIA.[7/]

For all the above reasons, the ACC's preferred runway configuration would not be practicable and would have nowhere near the operational capability of the Port's preferred alternative.

3. The ACC asserts that the Port failed to adequately consider on-site or same-watershed compensatory mitigation. It claims that the Port's plan provides no on-site or same-watershed mitigation. See General Responses 1 and 2 and Letter 2F-1.

The ACC also asserts that the ratio of replacement wetlands to affected wetlands is too small. It implies that the replacement wetlands may not be successful and that a larger replacement ratio should be required to compensate for this risk.

Requirements for compensatory wetland mitigation typically require that the area of new wetland provided exceed the area of wetland impacted (i.e. that the mitigation ratio of new wetland: impacted wetland exceed 1:1). For Section 404 permits, the mitigation ratio is reviewed and established on a case by case basis. The key variable that affects the mitigation ratio appropriate for a project is the overall quality of the wetlands being impacted and the time required for the replacement wetland to provide the functions lost. Generally, mitigation ratios are highest for forested wetlands and lowest for emergent wetlands, with intermediate levels for shrub wetlands. Lower mitigation ratios are justified for lower quality wetlands, where on-going or past human disturbance, low habitat diversity, or other factors result in relatively low wetland habitat functions.

An overall mitigation ratio in excess of 2:1 is not justified considering the ecological functions of the impacted wetlands the relatively short time lag required to replace their functions. The relatively low quality of wetlands impacted by the Master Plan Update projects, the degree of on-going or past human disturbance, and the relatively young age of forest and shrub vegetation affected; high mitigation ratios for replacement of wetlands are not justified. The proposed ratios are further justified in that the wetland mitigation plan will establish a large wetland area with greater habitat function than the impacted wetlands, thus, while based on area, the proposed mitigation ratio is 2:1, the ratio based on habitat function is greater than 2:1.

Hydrologic monitoring on the wetland mitigation site has been ongoing since September of 1995. The monitoring results indicate that favorable hydrology for creating wetlands on the site exist, and the probability of successful wetland mitigation is high. Further, in planning the mitigation project, contingency actions have been identified (Table 4-7.1) that will be implemented if post construction monitoring indicates the required performance standards for the wetland are not achieved. The purpose of monitoring is to assure that the mitigation plan is ultimately successful, and the mitigation plan includes annual evaluation of specific performance standards to determine if mitigation goals are achieved. The schedule for the 10-year monitoring program is presented in Table 4.5-1 of the mitigation plan. Based on the above argument, increases in the mitigation ratio due to potential failure of the mitigation project are not justified.

7/ Id.

APPENDIX B

FAA ADVISORY CIRCULAR 150/5200-33

HAZARDOUS WILDLIFE ATTRACTANTS ON OR NEAR AIRPORTS

U.S. Department
of Transportation

**Federal Aviation
Administration**

Advisory Circular

Subject: HAZARDOUS WILDLIFE ATTRACTANTS ON OR NEAR AIRPORTS

Date: 5/1/97
Initiated by:
AAS-310 and APP-600

AC No: 150/5200-33
Change:

1. **PURPOSE.** This advisory circular (AC) provides guidance on locating certain land uses having the potential to attract hazardous wildlife to or in the vicinity of public-use airports. It also provides guidance concerning the placement of new airport development projects (including airport construction, expansion, and renovation) pertaining to aircraft movement in the vicinity of hazardous wildlife attractants. Appendix 1 provides definitions of terms used in this AC.

2. **APPLICATION.** The standards, practices, and suggestions contained in this AC are recommended by the Federal Aviation Administration (FAA) for use by the operators and sponsors of all public-use airports. In addition, the standards, practices, and suggestions contained in this AC are recommended by the FAA as guidance for land use planners, operators, and developers of projects, facilities, and activities on or near airports.

3. **BACKGROUND.** Populations of many species of wildlife have increased markedly in the last few years. Some of these species are able to adapt to human-made environments, such as exist on and around airports. The increase in wildlife populations, the use of larger turbine engines, the increased use of twin-engine aircraft, and the increase in air-traffic, all combine to increase the risk, frequency, and potential severity of wildlife-aircraft collisions.

Most public-use airports have large tracts of open, unimproved land that are desirable for added margins of safety and noise mitigation. These areas can present potential hazards to aviation because they often attract hazardous wildlife. During the past century, wildlife-aircraft strikes have resulted in the loss of hundreds of lives world-wide, as well as billions of dollars worth of aircraft damage. Hazardous wildlife attractants near airports could jeopardize future airport expansion because of safety considerations.

DAVID L. BENNETT
Director, Office of Airport Safety and Standards

SECTION 1. HAZARDOUS WILDLIFE ATTRACTANTS ON OR NEAR AIRPORTS.

1-1. TYPES OF HAZARDOUS WILDLIFE ATTRACTANTS ON OR NEAR AIRPORTS. Human-made or natural areas, such as poorly-drained areas, retention ponds, roosting habitats on buildings, landscaping, putrescible-waste disposal operations, wastewater treatment plants, agricultural or aquacultural activities, surface mining, or wetlands, may be used by wildlife for escape, feeding, loafing, or reproduction. Wildlife use of areas within an airport's approach or departure airspace, aircraft movement areas, loading ramps, or aircraft parking areas may cause conditions hazardous to aircraft safety.

All species of wildlife can pose a threat to aircraft safety. However, some species are more commonly involved in aircraft strikes than others. Table 1 lists the wildlife groups commonly reported as being involved in damaging strikes to U.S. aircraft from 1993 to 1995.

Table 1. Wildlife Groups Involved in Damaging Strikes to Civilian Aircraft, USA, 1993-1995.

Wildlife Groups	Percent involvement in reported damaging strikes
Gulls	28
Waterfowl	28
Raptors	11
Doves	6
Vultures	5
Blackbirds-Starlings	5
Corvids	3
Wading birds	3
Deer	11
Canids	1

1-2. LAND USE PRACTICES. Land use practices that attract or sustain hazardous wildlife populations on or near airports can significantly increase the potential for wildlife-aircraft collisions. FAA recommends against land use practices, within the siting criteria stated in 1-3, that attract or sustain populations of hazardous wildlife within the vicinity of airports or cause movement of hazardous wildlife onto, into, or across the approach or departure airspace, aircraft movement area, loading ramps, or aircraft parking area of airports.

Airport operators, sponsors, planners, and land use developers should consider whether proposed land uses, including new airport development projects, would increase the wildlife hazard. Caution should be exercised to ensure that land use practices on or near airports do not enhance the attractiveness of the area to hazardous wildlife.

1-3. SITING CRITERIA. FAA recommends separations when siting any of the wildlife attractants mentioned in Section 2 or when planning new airport development projects to accommodate aircraft movement. The distance between an airport's aircraft movement areas, loading ramps, or aircraft parking areas and the wildlife attractant should be as follows:

a. Airports serving piston-powered aircraft. A distance of 5,000 feet is recommended.

b. Airports serving turbine-powered aircraft. A distance of 10,000 feet is recommended.

c. Approach or Departure airspace. A distance of 5 statute miles is recommended, if the wildlife attractant may cause hazardous wildlife movement into or across the approach or departure airspace.

SECTION 2. LAND USES THAT ARE INCOMPATIBLE WITH SAFE AIRPORT OPERATIONS.

2-1. GENERAL. The wildlife species and the size of the populations attracted to the airport environment are highly variable and may depend on several factors, including land-use practices on or near the airport. It is important to identify those land use practices in the airport area that attract hazardous wildlife. This section discusses land use practices known to threaten aviation safety.

2-2. PUTRESCIBLE-WASTE DISPOSAL OPERATIONS. Putrescible-waste disposal operations are known to attract large numbers of wildlife that are hazardous to aircraft. Because of this, these operations, when located within the separations identified in the sitting criteria in 1-3 are considered incompatible with safe airport operations.

FAA recommends against locating putrescible-waste disposal operations inside the separations identified in the siting criteria mentioned above. FAA also recommends against new airport development projects that would increase the number of aircraft operations or that would accommodate larger or faster aircraft, near putrescible-waste disposal operations located within the separations identified in the siting criteria in 1-3.

2-3. WASTEWATER TREATMENT FACILITIES. Wastewater treatment facilities and associated settling ponds often attract large numbers of wildlife that can pose a threat to aircraft safety when they are located on or near an airport.

a. New wastewater treatment facilities. FAA recommends against the construction of new wastewater treatment facilities or associated settling ponds within the separations identified in the siting criteria in 1-3. During the siting analysis for wastewater treatment facilities, the potential to attract hazardous wildlife should be considered if an airport is in the vicinity of a proposed site. Airport operators should voice their opposition to such sitings. In addition, they should consider the existence of wastewater treatment facilities when evaluating proposed sites for new airport development projects and avoid such sites when practicable.

b. Existing wastewater treatment facilities. FAA recommends correcting any wildlife hazards arising from existing wastewater treatment facilities located on or near airports without delay, using appropriate wildlife hazard mitigation techniques. Accordingly, measures to minimize hazardous wildlife attraction should be developed in consultation with a wildlife damage management biologist. FAA recommends that wastewater treatment facility operators incorporate appropriate wildlife hazard mitigation techniques into their operating practices. Airport operators also should encourage those operators to incorporate these mitigation techniques in their operating practices.

c. Artificial marshes. Waste-water treatment facilities may create artificial marshes and use submergent and emergent aquatic vegetation as natural filters. These artificial marshes may be used by some species of flocking birds, such as blackbirds and waterfowl, for breeding or roosting activities. FAA recommends against establishing artificial marshes within the separations identified in the siting criteria stated in 1-3.

d. Wastewater discharge and sludge disposal. FAA recommends against the discharge of wastewater or sludge on airport property. Regular spraying of wastewater or sludge disposal on unpaved areas may improve soil moisture and quality. The resultant turf growth requires more frequent mowing, which in turn may mutilate or flush insects or small animals and produce straw. The maimed or flushed organisms and the straw can attract hazardous wildlife and jeopardize aviation safety. In addition, the improved turf may attract grazing wildlife such as deer and geese.

Problems may also occur when discharges saturate unpaved airport areas. The resultant soft, muddy conditions can severely restrict or prevent emergency vehicles from reaching accident sites in a timely manner.

e. Underwater waste discharges. The underwater discharge of any food waste, e.g., fish processing offal, that could attract scavenging wildlife is not recommended within the separations identified in the siting criteria in 1-3.

2-4. WETLANDS.

a. Wetlands on or near Airports.

(1) Existing Airports. Normally, wetlands are attractive to many wildlife species. Airport operators with wetlands located on or nearby airport property should be alert to any wildlife use or habitat changes in these areas that could affect safe aircraft operations.

(2) Airport Development. When practicable, the FAA recommends siting new airports using the separations identified in the siting criteria in 1-3. Where alternative sites are not practicable or when expanding existing airports in or near wetlands, the wildlife hazards should be evaluated and minimized through a wildlife management plan prepared by a wildlife damage management biologist, in consultation with the U.S. Fish and Wildlife Service (USFWS) and the U.S. Army Corps of Engineers (COE).

NOTE: If questions exist as to whether or not an area would qualify as a wetland, contact the U.S. Army COE, the Natural Resource Conservation Service, or a wetland consultant certified to delineate wetlands.

b. Wetland mitigation. Mitigation may be necessary when unavoidable wetland disturbances result from new airport development projects. Wetland mitigation should be designed so it does not create a wildlife hazard.

(1) FAA recommends that wetland mitigation projects that may attract hazardous wildlife be sited outside of the separations identified in the siting criteria in 1-3. Wetland mitigation banks meeting these siting criteria offer an ecologically sound approach to mitigation in these situations.

(2) Exceptions to locating mitigation activities outside the separations identified in the siting criteria in 1-3 may be considered if the affected wetlands provide unique ecological functions, such as critical habitat for threatened or endangered species or ground water recharge. Such mitigation must be compatible with safe airport operations. Enhancing such mitigation areas to attract hazardous wildlife should be avoided. On-site mitigation plans may be reviewed by the FAA to determine compatibility with safe airport operations.

(3) Wetland mitigation projects that are needed to protect unique wetland functions (see 2-4.b.(2)), and that must be located in the siting criteria in 1-3 should be identified and evaluated by a wildlife damage management biologist before implementing the mitigation. A wildlife damage management plan should be developed to reduce the wildlife hazards.

NOTE: AC 150/5000-3, *Address List for Regional Airports Division and Airports District/Field Offices*, provides information on the location of these offices.

2-5. DREDGE SPOIL CONTAINMENT AREAS. FAA recommends against locating dredge spoil containment areas within the separations identified in the siting criteria in 1-3, if the spoil contains material that would attract hazardous wildlife.

SECTION 3. LAND USES THAT MAY BE COMPATIBLE WITH SAFE AIRPORT OPERATIONS.

3-1. GENERAL. Even though they may, under certain circumstances, attract hazardous wildlife, the land use practices discussed in this section have flexibility regarding their location or operation and may even be under the airport operator's or sponsor's control. In general, the FAA does not consider the activities discussed below as hazardous to aviation if there is no apparent attraction to hazardous wildlife, or wildlife hazard mitigation techniques are implemented to deal effectively with any wildlife hazard that may arise.

3-2. ENCLOSED WASTE FACILITIES. Enclosed trash transfer stations or enclosed waste handling facilities that receive garbage indoors; process it via compaction, incineration, or similar manner; and remove all residue by enclosed vehicles, generally would be compatible, from a wildlife perspective, with safe airport operations, provided they are not located on airport property or within the runway protection zone (RPZ). No putrescible-waste should be handled or stored outside at any time, for any reason, or in a partially enclosed structure accessible to hazardous wildlife.

Partially enclosed operations that accept putrescible-waste are considered to be incompatible with safe airport operations. FAA recommends these operations occur outside the separations identified in the siting criteria in 1-3.

3-3. RECYCLING CENTERS. Recycling centers that accept previously sorted, non-food items such as glass, newspaper, cardboard, or aluminum are, in most cases, not attractive to hazardous wildlife.

3-4. COMPOSTING OPERATIONS ON AIRPORTS. FAA recommends against locating composting operations on airports. However, when they are located on an airport, composting operations should not be located closer than the greater of the following distances: 1,200 feet from any aircraft movement area, loading ramp, or aircraft parking space; or the distance called for by airport design requirements. This spacing is intended to prevent material, personnel, or equipment from penetrating any Obstacle Free Area (OFA), Obstacle Free Zone (OFZ), Threshold Siting Surface (TSS), or Clearway (see AC 150/5300-13, *Airport Design*). On-airport disposal of compost by-products is not recommended for the reasons stated in 2-3.d.

a. Composition of material handled. Components of the compost should never include any municipal solid waste. Non-food waste such as leaves, lawn clippings, branches, and twigs generally are not considered a wildlife attractant. Sewage sludge, wood-chips, and similar material are not municipal solid wastes and may be used as compost bulking agents.

b. Monitoring on-airport composting operations. If composting operations are to be located on airport property, FAA recommends that the airport operator monitor composting operations to ensure that steam or thermal rise does not affect air traffic in any way. Discarded leaf disposal bags or other debris must not be allowed to blow onto any active airport area. Also, the airport operator should reserve the right to stop any operation that creates unsafe, undesirable, or incompatible conditions at the airport.

3-5. ASH DISPOSAL. Fly ash from resource recovery facilities that are fired by municipal solid waste, coal, or wood, is generally considered not to be a wildlife attractant because it contains no putrescible matter. FAA generally does not consider landfills accepting only fly ash to be wildlife attractants, if those landfills: are maintained in an orderly manner; admit no putrescible-waste of any kind; and are not co-located with other disposal operations.

Since varying degrees of waste consumption are associated with general incineration, FAA classifies the ash from general incinerators as a regular waste disposal by-product and, therefore, a hazardous wildlife attractant.

3-6. CONSTRUCTION AND DEMOLITION (C&D) DEBRIS LANDFILLS. C&D debris (Class IV) landfills have visual and operational characteristics similar to putrescible-waste disposal sites. When co-located with putrescible-waste disposal operations, the probability of hazardous wildlife attraction to C&D landfills increases because of the similarities between these disposal activities.

FAA generally does not consider C&D landfills to be hazardous wildlife attractants, if those landfills: are maintained in an orderly manner; admit no putrescible-waste of any kind; and are not co-located with other disposal operations.

3-7. WATER DETENTION OR RETENTION PONDS. The movement of storm water away from runways, taxiways, and aprons is a normal function on most airports and is necessary for safe aircraft operations. Detention ponds hold storm water for short periods, while retention ponds hold water indefinitely. Both types of ponds control runoff, protect water quality, and can attract hazardous wildlife. Retention ponds are more attractive to hazardous wildlife than detention ponds because they provide a more reliable water source.

To facilitate hazardous wildlife control, FAA recommends using steep-sided, narrow, linearly-shaped, rip-rap lined, water detention basins rather than retention basins. When possible, these ponds should be placed away from aircraft movement areas to minimize aircraft-wildlife interactions. All vegetation in or around detention or retention basins that provide food or cover for hazardous wildlife should be eliminated.

If soil conditions and other requirements allow, FAA encourages the use of underground storm water infiltration systems, such as French drains or buried rock fields, because they are less attractive to wildlife.

3-8. LANDSCAPING. Wildlife attraction to landscaping may vary by geographic location. FAA recommends that airport operators approach landscaping with caution and confine it to airport areas not associated with aircraft movements. All landscaping plans should be reviewed by a wildlife damage management biologist. Landscaped areas should be monitored on a continuing basis for the presence of hazardous wildlife. If hazardous wildlife is detected, corrective actions should be implemented immediately.

3-9. GOLF COURSES. Golf courses may be beneficial to airports because they provide open space that can be used for noise mitigation or by aircraft during an emergency. On-airport golf courses may also be a concurrent use that provides income to the airport.

Because of operational and monetary benefits, golf courses are often deemed compatible land uses on or near airports. However, waterfowl (especially Canada geese) and some species of gulls are attracted to the large, grassy areas and open water found on most golf courses. Because waterfowl and gulls occur throughout the U.S., FAA recommends that airport operators exercise caution and consult with a wildlife damage management biologist when considering proposals for golf course construction or expansion on or near airports. Golf courses should be monitored on a continuing basis for the presence of hazardous wildlife. If hazardous wildlife is detected, corrective actions should be implemented immediately.

3-10. AGRICULTURAL CROPS. As noted above, airport operators often promote revenue-generating activities to supplement an airport's financial viability. A common concurrent use is agricultural crop production. Such use may create potential hazards to aircraft by attracting wildlife. Any proposed on-airport agricultural operations should be reviewed by a wildlife damage management biologist. FAA generally does not object to agricultural crop production on airports when: wildlife hazards are not predicted; the guidelines for the airport areas specified in 3-10.a-f. are observed; and the agricultural operation is closely monitored by the airport operator or sponsor to ensure that hazardous wildlife are not attracted.

NOTE: If wildlife becomes a problem due to on-airport agricultural operations, FAA recommends undertaking the remedial actions described in 3-10.f.

a. Agricultural activities adjacent to runways. To ensure safe, efficient aircraft operations, FAA recommends that no agricultural activities be conducted in the Runway Safety Area (RSA), OFA, and the OFZ (see AC 150/5300-13).

b. Agricultural activities in areas requiring minimum object clearances. Restricting agricultural operations to areas outside the RSA, OFA, OFZ, and Runway Visibility Zone (RVZ) (see AC 150/5300-13) will normally provide the minimum object clearances required by FAA's airport design standards. FAA recommends that farming operations not be permitted within areas critical to the proper operation of localizers, glide slope indicators, or other visual or electronic navigational aids. Determinations of minimal areas that must be kept free of farming operations should be made on a case-by-case basis. If navigational aids are present, farm leases for on-airport agricultural activities should be coordinated with FAA's Airway Facilities Division, in accordance with FAA Order 6750.16, *Siting Criteria for Instrument Landing Systems.*

NOTE: Crop restriction lines conforming to the dimensions set forth in Table 2 will normally provide the minimum object clearance required by

FAA airport design standards. The presence of navigational aids may require expansion of the restricted area.

c. Agricultural activities within an airport's approach areas. The RSA, OFA, and OFZ all extend beyond the runway shoulder and into the approach area by varying distances. The OFA normally extends the farthest and is usually the controlling surface. However, for some runways, the TSS (see AC 150/5300-13, Appendix 2) may be more controlling than the OFA. The TSS may not be penetrated by any object. The minimum distances shown in Table 2 are intended to prevent penetration of the OFA, OFZ, or TSS by crops or farm machinery.

NOTE: Threshold Siting standards should not be confused with the approach areas described in Title 14, Code of Federal Regulations, Part 77, (14 CFR 77), *Objects Affecting Navigable Airspace.*

d. Agricultural activities between intersecting runways. FAA recommends that no agricultural activities be permitted within the RVZ. If the terrain is sufficiently below the runway elevation, some types of crops and equipment may be acceptable. Specific determinations of what is permissible in this area requires topographical data. For example, if the terrain within the RVZ is level with the runway ends, farm machinery or crops may interfere with a pilot's line-of-sight in the RVZ.

e. Agricultural activities in areas adjacent to taxiways and aprons. Farming activities should not be permitted within a taxiway's OFA. The outer portions of aprons are frequently used as a taxilane and farming operations should not be permitted within the OFA. Farming operations should not be permitted between runways and parallel taxiways.

f. Remedial actions for problematic agricultural activities. If a problem with hazardous wildlife develops, FAA recommends that a professional wildlife damage management biologist be contacted and an on-site inspection be conducted. The biologist should be requested to determine the source of the hazardous wildlife attraction and suggest remedial action. Regardless of the source of the attraction, prompt remedial actions to protect aviation safety are recommended. The remedial actions may range from choosing another crop or farming technique to complete termination of the agricultural operation.

Whenever on-airport agricultural operations are stopped due to wildlife hazards or annual harvest, FAA recommends plowing under all crop residue and harrowing the surface area smooth. This will reduce or eliminate the area's attractiveness to foraging wildlife. FAA recommends that this requirement be written into all on-airport farm use contracts and clearly understood by the lessee.

Table 2. Minimum Distances Between Certain Airport Features And Any On-Airport Agriculture Crops.

Aircraft Approach Category And Design Group [1]	Distance In Feet From Runway Centerline To Crop		Distance In Feet From Runway End To Crop		Distance In Feet From Centerline Of Taxiway To Crop	Distance In Feet From Edge Of Apron To Crop
	Visual & ≥ ¾ mile	< ¾ mile	Visual & ≥ ¾ mile	< ¾ mile		
Category A & B Aircraft						
Group I	200 [2]	400	300 [3]	600	45	40
Group II	250	400	400 [3]	600	66	58
Group III	400	400	600	800	93	81
Group IV	400	400	1,000	1,000	130	113
Category C, D & E Aircraft						
Group I	530 [3]	575 [3]	1,000	1,000	45	40
Group II	530 [3]	575 [3]	1,000	1,000	66	58
Group III	530 [3]	575 [3]	1,000	1,000	93	81
Group IV	530 [3]	575 [3]	1,000	1,000	130	113
Group V	530 [3]	575 [3]	1,000	1,000	160	138
Group VI	530 [3]	575 [3]	1,000	1,000	193	167

1. Design Groups are based on wing span, and Category depends on approach speed of the aircraft.

Group I: Wing span up to 49 ft.	Category A:	Speed less than 91 knots
Group II Wing span 49ft. up to 78 ft.	Category B	Speed 91 knots up to 120 knots
Group III: Wing span 79 ft. up to 117 ft.	Category C	Speed 121 knots up to 140 knots
Group IV: Wing span 118 ft. up to 170 ft.	Category D	Speed 141 knots up to 165 knots
Group V: Wing span 171 ft. up to 213 ft.	Category E	Speed 166 knots or more
Group VI: Wing span 214 ft. up to 261 ft.		

2. If the runway will only serve small airplanes (12,500 lb. And under) in Design Group I, this dimension may be reduced to 125 feet; however, this dimension should be increased where necessary to accommodate visual navigational aids that may be installed. For example farming operations should not be allowed within 25 feet of a Precision Approach Path Indicator (PAPI) light box.

3. These dimensions reflect the TSS as defined in AC 150/5300-13, Appendix 2. The TSS cannot be penetrated by any object. Under these conditions, the TSS is more restrictive than the OFA, and the dimensions shown here are to prevent penetration of the TSS by crops and farm machinery.

SECTION 4. NOTIFICATION OF FAA ABOUT HAZARDOUS WILDLIFE ATTRACTANTS ON OR NEAR AN AIRPORT.

4-1. GENERAL. Airport operators, land developers, and owners should notify the FAA in writing of known or reasonably foreseeable land use practices on or near airports that either attract or may attract hazardous wildlife. This section discusses those notification procedures.

4-2. NOTIFICATION REQUIREMENTS FOR WASTE DISPOSAL SITE OPERATIONS. The Environmental Protection Agency (EPA) requires any operator proposing a new or expanded waste disposal operation within 5 statute miles of a runway end to notify the appropriate FAA Regional Airports Division Office and the airport operator of the proposal (40 CFR 258, *Criteria for Municipal Solid Waste Landfills*, section 258.10, *Airport Safety*). The EPA also requires owners or operators of new municipal solid waste landfill (MSWLF) units, or lateral expansions of existing MSWLF units that are located within 10,000 feet of any airport runway end used by turbojet aircraft or within 5,000 feet of any airport runway end used only by piston-type aircraft, to demonstrate successfully that such units are not hazards to aircraft.

a. **Timing of Notification.** When new or expanded MSWLFs are being proposed near airports, MSWLF operators should notify the airport operator and the FAA of this as early as possible pursuant to 40 CFR Part 258. Airport operators should encourage the MSWLF operators to provide notification as early as possible.

NOTE: AC 150/5000-3 provides information on these FAA offices.

b. **Putrescible-Waste Facilities.** In their effort to satisfy the EPA requirement, some putrescible-waste facility proponents may offer to undertake experimental measures to demonstrate that their proposed facility will not be a hazard to aircraft. To date, the ability to sustain a reduction in the numbers of hazardous wildlife to levels that existed before a putrescible-waste landfill began operating has not been successfully demonstrated. For this reason, demonstrations of experimental wildlife control measures should not be conducted in active aircraft operations areas.

c. **Other Waste Facilities.** To claim successfully that a waste handling facility sited within the separations identified in the siting criteria in 1-3 does not attract hazardous wildlife and does not threaten aviation, the developer must establish convincingly that the facility will not handle putrescible material other than that as outlined in 3-2. FAA requests that waste site developers provide a copy of an official permit request verifying that the facility will not handle putrescible material other than that as outlined in 3-2. FAA will use this information to determine if the facility will be a hazard to aviation.

4-3. NOTIFYING FAA ABOUT OTHER WILDLIFE ATTRACTANTS. While U. S. EPA regulations require landfill owners to provide notification, no similar regulations require notifying FAA about changes in other land use practices that can create hazardous wildlife attractants. Although it is not required by regulation, FAA requests those proposing land use changes such as those discussed in 2-3, 2-4, and 2-5 to provide similar notice to the FAA as early in the development process as possible. Airport operators that become aware of such proposed development in the vicinity of their airports should also notify the FAA. The notification process gives the FAA an opportunity to evaluate the effect of a particular land use change on aviation safety.

The land use operator or project proponent may use FAA Form 7460-1, *Notice of Proposed Construction or Alteration*, or other suitable documents to notify the appropriate FAA Regional Airports Division Office.

It is helpful if the notification includes a 15-minute quadrangle map of the area identifying the location of the proposed activity. The land use operator or project proponent should also forward specific details of the proposed land use change or operational change or expansion. In the case of solid waste landfills, the information should include the type of waste to be handled, how the waste will be processed, and final disposal methods.

4-5. FAA REVIEW OF PROPOSED LAND USE CHANGES.

a. The FAA discourages the development of facilities discussed in section 2 that will be located within the 5,000/10,000-foot criteria in 1-3.

b. For projects which are located outside the 5,000/10,000-foot criteria, but within 5 statute miles of the airport's aircraft movement areas, loading ramps, or aircraft parking areas, FAA may review development plans, proposed land use changes, operational changes, or wetland mitigation plans to determine if such changes present potential wildlife hazards to aircraft operations. Sensitive airport areas will be identified as those that lie under or next to approach or departure airspace. This brief examination should be sufficient to determine if further investigation is warranted.

c. Where further study has been conducted by a wildlife damage management biologist to evaluate a site's compatibility with airport operations, the FAA will use the study results to make its determination.

d. FAA will discourage the development of any excepted sites (see Section 3) within the criteria specified in 1-3 if a study shows that the area supports hazardous wildlife species.

4-6. AIRPORT OPERATORS. Airport operators should be aware of proposed land use changes, or modification of existing land uses, that could create hazardous wildlife attractants within the separations identified in the siting criteria in 1-3. Particular attention should be given to proposed land uses involving creation or expansion of waste water treatment facilities, development of wetland mitigation sites, or development or expansion of dredge spoil containment areas.

a. **AIP-funded airports.** FAA recommends that operators of AIP-funded airports, to the extent practicable, oppose off-airport land use changes or practices (within the separations identified in the siting criteria in 1-3) that may attract hazardous wildlife. Failure to do so could place the airport operator or sponsor in noncompliance with applicable grant assurances. FAA recommends against the placement of airport development projects pertaining to aircraft movement in the vicinity of hazardous wildlife attractants. Airport operators, sponsors, and planners should identify wildlife attractants and any associated wildlife hazards during any planning process for new airport development projects.

b. **Additional coordination.** If, after the initial review by FAA, questions remain about the existence of a wildlife hazard near an airport, the airport operator or sponsor should consult a wildlife damage management biologist. Such questions may be triggered by a history of wildlife strikes at the airport or the proximity of the airport to a wildlife refuge, body of water, or similar feature known to attract wildlife.

c. **Specialized assistance.** If the services of a wildlife damage management biologist are required, FAA recommends that land use developers or the airport operator contact the appropriate state director of the United States Department of Agriculture/Animal Damage Control (USDA/ADC), or a consultant specializing in wildlife damage management. Telephone numbers for the respective USDA/ADC state offices may be obtained by contacting USDA/ADC's Operational Support Staff, 4700 River Road, Unit 87, Riverdale, MD, 20737-1234, Telephone (301) 734-7921, Fax (301) 734-5157. The ADC biologist or consultant should be requested to identify and quantify wildlife common to the area and evaluate the potential wildlife hazards.

d. **Notifying airmen.** If an existing land use practice creates a wildlife hazard, and the land use practice or wildlife hazard cannot be immediately eliminated, the airport operator should issue a Notice to Airmen (NOTAM) and encourage the land owner or manager to take steps to control the wildlife hazard and minimize further attraction.

APPENDIX 1. DEFINITIONS OF TERMS USED IN THIS ADVISORY CIRCULAR.

1. **GENERAL.** This appendix provides definitions of terms used throughout this AC.

a. **Aircraft movement area.** The runways, taxiways, and other areas of an airport which are used for taxiing or hover taxiing, air taxiing, takeoff, and landing of aircraft exclusive of loading ramps and aircraft parking areas.

b. **Airport operator.** The operator (private or public) or sponsor of a public use airport.

c. **Approach or departure airspace.** The airspace, within 5 statute miles of an airport, through which aircraft move during landing or takeoff.

d. **Concurrent use.** Aeronautical property used for compatible non-aviation purposes while at the same time serving the primary purpose for which it was acquired; and the use is clearly beneficial to the airport. The concurrent use should generate revenue to be used for airport purposes (see Order 5190.6A, *Airport Compliance Requirements*, sect. 5h).

e. **Fly ash.** The fine, sand-like residue resulting from the complete incineration of an organic fuel source. Fly ash typically results from the combustion of coal or waste used to operate a power generating plant.

f. **Hazardous wildlife.** Wildlife species that are commonly associated with wildlife-aircraft strike problems, are capable of causing structural damage to airport facilities, or act as attractants to other wildlife that pose a wildlife-aircraft strike hazard.

g. **Piston-use airport.** Any airport that would primarily serve FIXED-WING, piston-powered aircraft. Incidental use of the airport by turbine-powered, FIXED-WING aircraft would not affect this designation. However, such aircraft should not be based at the airport.

h. **Public-use airport.** Any publicly owned airport or a privately-owned airport used or intended to be used for public purposes.

i. **Putrescible material.** Rotting organic material.

j. **Putrescible-waste disposal operation.** Landfills, garbage dumps, underwater waste discharges, or similar facilities where activities include processing, burying, storing, or otherwise disposing of putrescible material, trash, and refuse.

k. **Runway protection zone (RPZ).** An area off the runway end to enhance the protection of people and property on the ground (see AC 150/5300-13). The dimensions of this zone vary with the design aircraft, type of operation, and visibility minimum.

l. **Sewage sludge.** The de-watered effluent resulting from secondary or tertiary treatment of municipal sewage and/or industrial wastes, including sewage sludge as referenced in U.S. EPA's *Effluent Guidelines and Standards*, 40 C.F.R. Part 401.

m. **Shoulder.** An area adjacent to the edge of paved runways, taxiways, or aprons providing a transition between the pavement and the adjacent surface, support for aircraft running off the pavement, enhanced drainage, and blast protection (see AC 150/5300-13).

n. **Turbine-powered aircraft.** Aircraft powered by turbine engines including turbojets and turboprops but excluding turbo-shaft rotary-wing aircraft.

o. **Turbine-use airport.** Any airport that ROUTINELY serves FIXED-WING turbine-powered aircraft.

p. **Wastewater treatment facility.** Any devices and/or systems used to store, treat, recycle, or reclaim municipal sewage or liquid industrial wastes, including Publicly Owned Treatment Works (POTW), as defined by Section 212 of the Federal Water Pollution Control Act (P.L. 92-500) as amended by the Clean Water Act of 1977 (P.L. 95-576) and the Water Quality Act of 1987 (P.L. 100-4). This definition includes any pretreatment involving the reduction of the amount of pollutants, the elimination of pollutants, or the alteration of the nature of pollutant properties in wastewater prior to or in lieu of discharging or otherwise introducing such pollutants into a POTW. (See 40 C.F. R. Section 403.3 (o), (p), & (q)).

q. **Wildlife.** Any wild animal, including without limitation any wild mammal, bird, reptile, fish, amphibian, mollusk, crustacean, arthropod, coelenterate, or other invertebrate, including any part, product, egg, or offspring there of (50 CFR 10.12, *Taking, Possession, Transportation, Sale, Purchase, Barter, Exportation, and Importation of Wildlife and Plants*). As used in this AC, WILDLIFE includes feral animals and domestic animals while out of the control of their owners (14 CFR 139.3, *Certification and Operations: Land Airports Serving CAB-Certificated Scheduled Air Carriers Operating Large Aircraft (Other Than Helicopters)*).

r. **Wildlife attractants.** Any human-made structure, land use practice, or human-made or natural geographic feature, that can attract or sustain hazardous wildlife within the landing or departure airspace, aircraft movement area, loading ramps, or aircraft parking areas of an airport. These attractants can include but are not limited to architectural features, landscaping, waste disposal sites, wastewater treatment facilities, agricultural or aquacultural activities, surface mining, or wetlands.

s. **Wildlife hazard.** A potential for a damaging aircraft collision with wildlife on or near an airport (14 CFR 139.3).

2. **RESERVED.**

APPENDIX C

EXPERT TESTIMONY

BEFORE THE HEARING EXAMINER OF
THE PORT OF SEATTLE

CITY OF DES MOINES, et al., Petitioners, v. THE PORT OF SEATTLE, et al., Respondents.	)	NO. HE 96-04 TESTIMONY OF DOUGLAS F. GOLDBERG

1. **Identification of Douglas F. Goldberg.** My name is Douglas F. Goldberg. I am a Vice President of Landrum & Brown, Inc., and I serve as the Leader of the firm's Facilities and Operations Practice. In this role, I am responsible for administering the practice and coordinating client assignments. I also function as Officer-In-Charge and Project Manager on a number of airport master planning/development program assignments. Such assignments include but are not limited to master plans, delay and capacity studies, program implementation support, airport/airspace operational analyses, aviation demand forecasts and aviation strategic analyses. My area of expertise is the analysis of airport system demand and capacity, and the evaluation of proposed physical and procedural improvements. My role in the Sea-Tac Master Plan project was to provide airport system capacity and delay analysis support during the preparation of the Environmental Impact Statement.

2. **Education, General Experience and Industry Involvement.** I have a BBA degree from the University of Cincinnati with a specialization in operations research/quantitative analysis. I have 14 years of experience in aviation and airport planning, which includes assignments at several of the world's busiest and most complex airport systems. I have been involved in the

planning of over 30 airports in the U.S. and abroad, and I currently serve as the manager and officer-in-charge of the firm's general consulting contract for the Chicago Airport System, which includes Chicago O'Hare International Airport, the world's busiest airport, and Chicago Midway Airport. I have written and presented several papers to airport industry organizations, including the Federal Aviation Administration (FAA), American Society of Civil Engineers (ASCE) and Airport Council International--North America (ACI-NA). I am a past chairman of the ASCE Committee on Airport Capacity and Delay and a member of the Transportation Research Board Committee on Airfield and Airspace Capacity and Delay. I am also an associate member of the ACI-NA Technical Committee.

3. **Capacity/Delay/Operational Analysis Experience.** I have participated as an officer-in-charge, project manager, or task manager for capacity and delay studies, operational analyses, airport/airspace planing assignments and demand forecasts at a variety of airports, including Chicago O'Hare International Airport, Los Angeles International Airport, Chicago Midway Airport, Philadelphia International Airport, Seattle Tacoma International Airport, Laguardia Airport, Newark International Airport, JFK International Airport, Detroit Metro International Airport, Denver Stapleton International Airport, Denver International Airport, Helsinki-Vantaa International Airport, Washington National Airport, Lester B. Pearson International Airport, Sydney International Airport, and Lambert-St. Louis Airport. A copy of my resume is attached as Exhibit A.

4. **Experience at Sea-Tac Airport** - As a member of the EIS team, I was responsible for providing advice, guidance and support during the preparation of the EIS and the SEIS relating to demand/capacity analysis, alternative analysis, and airport/air traffic control operations. I also supported the evaluation of the delay reduction benefits and airline impacts of the proposed program for the Port of Seattle.

5. **Response to Dr. Clifford Winston's Testimony - Summary**. Winston challenges the forecasts used for the EIS/SEIS. My testimony will demonstrate that the forecasts (which were prepared by another airport consulting firm) were consistent with industry-accepted standards and were properly prepared. The basis of Winston's challenge is his statement in his Testimony that "*The Port's Supplemental EIS still fails to recognize that expanded airport facilities, including a third runway, would themselves cause growth in demand*". (Winston testimony 2.1) His testimony is based on the theoretical belief that the actual expansion of an airport is the cause of increased demand. While it is true that an inverse relationship exists between capacity and delay (i.e. delay will decrease as airport capacity increases, for a given level of demand), it does not follow that an increase in capacity necessarily *causes* an increase in demand. My testimony will demonstrate that the proposed airport expansion will not cause an increase in demand for the following reasons:

i) It is a well established fact that demand for air travel is influenced directly by local population, income, and airfare. Because the proposed expansion of the Airport will not materially affect any of these causal variables, it does not follow that expansion of the airport will cause increased demand;

ii) Forecast demand can in fact be served at Sea-Tac, even without the proposed expansion, albeit at a marginally higher level of cost to the airlines and a lower level of service to the traveling public. Nonetheless, the expansion of the Airport does not enable demand to be served that would otherwise remain unserved because of a lack of capacity. As a result, since demand will be served with or without the improvements, the expansion will not cause an increase in demand;

iii) The proposed expansion increases peak hour Instrument Flight Rule (IFR -- the bad weather conditions) capacity to a greater degree than peak hour Visual Flight Rule (VFR - the good weather conditions) capacity, and as a result, reduces IFR delay more so than VFR or all weather delay. Since the proposed expansion does not materially increase all weather capacity, it will not cause an increase in overall demand;

iv) Passengers generally make decisions to fly in advance of the day of travel and as a result, such decisions are rarely based on or influenced by actual weather conditions. As a result, improving poor weather reliability will not induce more passengers to travel by air;

v) As acknowledged in the hearing memorandum (*page 21, line 25*), delays caused by the lack of sufficient capacity during certain conditions and at certain times may cause demand to shift to other times of the day or to other alternatives, where available. However, since viable alternatives for the vast majority of air travel to or from Sea-Tac does not exist during poor weather conditions, the lack of airport expansion cannot cause travelers to seek alternatives. Therefore, while the proposed airport expansion will enable a reduction in delay during certain conditions, it will not cause an increase in overall demand;

vi) The empirical evidence offered by Dr. Winston that allegedly supports his conclusion is (a) invalid when applied to actual U.S. airports and (b) inconsistent with the industry accepted methodology for assessing future airport demand.

Because of these reasons, it will follow that the EIS and the SEIS did in fact appropriately assess the level of activity and the resulting impacts that will occur upon completion of the Airport expansion.

5.1 The forecasts were consistent with industry-accepted standards and were properly prepared. The forecasts for the Master Plan Update EIS and SEIS were prepared by P&D Aviation, using the methodology that is routinely used and accepted throughout the industry for assessing future airport demand. It is commonly accepted that aviation demand is influenced by three primary factors: population, income and air fare. The first two factors describe the propensity to travel to or from an airport based on the surrounding area's demographic and economic makeup. It has been proven that a direct relationship exists between a region's population and income level and its demand for air travel. As income and population increases, so does aviation demand. The third variable, air fare, takes into consideration a host of other indirect factors, such as the availability of alternative modes of travel, the availability of other airports, airline cost structure, market forces, and airline competition. An inverse relationship exists between air fare and air travel demand. In other words, the lower the air fare, the higher the demand. While other factors may have an indirect affect on demand, it is these three factors that have the greatest direct influence on demand, particularly for an origination/destination airport like Sea-Tac (as opposed to a connecting hub airport, like Denver, Atlanta or Chicago O'Hare)

I have reviewed the forecasts prepared by P&D Aviation and found them to be consistent with the industry accepted methodology and properly prepared. In essence, a mathematical regression model was developed to describe the relationship between population, income and air fare (referred to as the independent variables) and historical demand (the dependent variable). This relationship was then applied to independent projections of the three independent variables to

yield projections of future demand. This methodology has been used to provide the basis for implementing improvements at most of the major airports throughout the U.S.

My firm, Landrum & Brown, has applied this technique to develop originating passenger demand forecasts for many airport clients around the world, including the City of Chicago Department of Aviation and its two primary airports, Chicago O'Hare International Airport and Chicago Midway Airport, for over two decades. Specifically, I have been involved since 1985 in the development of forecasts for the City of Chicago using the same methodology used in the Sea-Tac EIS. This methodology is based on a regression analysis of local demographic variables (population and per capita personal income) and local air fares (commonly expressed as the average revenue per passenger mile, or yield) against historical originating enplaned passengers. The methodology has been relied upon for many years to support noise analyses, Part 150 Studies, Environmental Impact Statements, Master plans, and the sale of General Airport Revenue Bonds (GARBs) for Chicago O'Hare International Airport and Chicago Midway Airport. Most recently, in the five-year period from 1992 through 1996, the City of Chicago issued eight GARB series, two Passenger Facility Charge backed series, and a special revenue bond series for O'Hare using this forecasting methodology. This forecast methodology was challenged by opponents of proposed improvements at O'Hare but was upheld by the U.S. Circuit Court of Appeals.

5.2 The forecasts did not underestimate the number of operations with the project or overestimate the number of operations without the project. The forecast is considered to be "unconstrained" because the projections of the three independent variables were in no way influenced by a presumed lack of future airport capacity. Forecasts of population and income were based on the region's demographic and economic growth projections. Future air fare was influenced by the existing high level of competition in Seattle, as well as projections of the cost of labor and fuel, the two primary components of airline cost. Since none of these independent

variables were assumed in the methodology to be limited in the future by an inability to expand the airport, it is not logical that the expansion of the airport would result in higher demand. In fact, if these variables were influenced by demand, they would no longer be independent and the regression would be invalid.

Upon determining the "unconstrained" level of demand based on the independent projection of the three independent variables, the next step of this industry accepted methodology is to compare the forecast level of demand to the practical capacity of the Airport. If it is determined that the forecast level of passenger demand cannot be served at the airport because of physical constraints that cannot be overcome, then the forecast must be adjusted downward to reflect the physical capacity of the airport. The forecast would then be referred to as a constrained forecast.

However, in the case of Sea-Tac, the capacity of the airport remains above the level of forecast demand throughout the planning horizon. The expansion of the airport, therefore, will not cause an increase in demand. Rather, it will enable demand to be served at a much higher level of service (i.e. lower delays and higher reliability) than would occur if the airport is not expanded (see explanation below). Similarly, prevention of the expansion of the airport would not cause a reduction in forecast demand. As a result, *the forecasts did not underestimate the number of operations that would occur due to the construction of a new runway, nor did it overestimate the number of operations that would occur if the runway were not built.*

To fully understand the basis for this conclusion, it is necessary to explain the nature of airport capacity. Airport capacity is defined as the ability of the airport system (or a component of the system, such as the runways or the terminals) to process demand over a given period of time (such as an hour, a day or a year) at a particular level of service. Both capacity and demand can be defined in terms of passengers or aircraft operations, which are intricately related. While demand is influenced by the needs and desires of the traveling public, the capacity of an airport is

influenced by a variety of complex factors, including not only the physical characteristics of the airport system, but also the frequency and distribution of prevailing weather conditions, the distribution and patterns of demand, the operational characteristics of aircraft, the availability of airspace and air traffic control equipment, and adequate controller staffing levels. It is also widely accepted that the level of service, typically measured in the form of aircraft delay, worsens as the volume of activity increases. The capacity of an airport, therefore, is dependent on many complex factors and cannot be compared to the finite capacity of a vessel, for example, that can hold a finite volume of a liquid.

On the surface, it may appear counter-intuitive that Sea-Tac could serve the same number of operations and passengers with or without the proposed expansion. However, upon reflection of the nature of airport capacity and the many complex factors that influence an airport's performance, it is evident that Sea-Tac can in fact serve as many as 460,000 annual operations without expansion of the airport, albeit at a higher level of delay. In fact, based on the relationship between delay and demand at Sea-Tac under the "Do-Nothing" scenario, the average delay per operation in the year 2010 would remain lower than current delay levels at several other U.S. airports such as Newark and JFK.

As further evidence of this point, the hourly capacity of Chicago's O'Hare International Airport has been limited to 155 operations per hour between the hours of 6:45 a.m. and 9:15 p.m. by federal regulation since 1984 (FAR Part 93-High Density Rule). Despite this limit in the number of hourly operations, activity levels have consistently increased at the rate of 1-2 percent annually for the past 13 years. The majority of this growth did not occur during peak hours, but in the "shoulder" or off-peak hours, which is typical for virtually every major airport in the U.S. At the same time, continued improvements in the nation's air traffic control system have enabled this growth to occur without a commensurate increase in aircraft delays. It follows, therefore, that

Sea-Tac will also be capable of serving additional demand without the proposed improvements, although at a level of service that is not acceptable to the Port of Seattle, the FAA, and others.

It also relevant that while Dr. Winston's testimony focuses on factors that influence passenger demand, other factors influence operations demand. It is these factors that must be considered to explain why the proposed airport expansion will serve the same number of passengers as the Do-Nothing scenario with a slightly lower level of operations, as articulated in the SEIS. While there is often a direct relationship between operations demand and passenger demand, the number of operations needed to serve forecast passenger demand depends upon a host of other criteria, including airline market strategies, route structures, crew and equipment scheduling requirements and poor weather operating plans. In many cases, airlines can absorb more passengers during peak periods through larger aircraft and higher load factors, which results in a disproportionate relationship between operations demand and passenger demand.

5.3 Responses to Winston arguments. Having provided the above foundation for my testimony, the following sections specifically respond to the issues identified in the Winston testimony.

5.3.1 Reduction in travel time (or delay) in poor weather is not likely to induce significantly more air travel. (Winston Testimony 2.2.1) Dr. Winston claims that a reduction in travel time (or delay) and the associated uncertainty about travel time might induce additional people to travel. Dr. Winston correctly points out that the Airport expansion will in fact reduce poor weather delays as articulated in the project's purpose and need. The project will not, however, materially reduce delay during the majority of conditions in which visibility is good. Air passengers generally do not decide to travel based on future weather forecasts (which is why speculative weather forecasting is not considered to be one of the primary factors that influence demand). In fact, since most trips are scheduled at least several days or more in advance,

accurate information about the expected weather on the day of travel is rarely available when most trips are planned. As a result, even though passengers certainly welcome the greater reliability in service that comes with a reduction in poor weather delays, it is not likely that such a reduction in delay will induce significantly more people to travel.

Given that the proposed improvements are designed primarily to reduce poor weather delays, it is worth pointing out that poor weather has a greater effect on operations capacity than it does on passenger demand because of modern airline operation procedures. Most of the major airlines routinely employ sophisticated flight cancellation strategies and flow control procedures to minimize passenger disruptions during poor weather conditions in which hourly capacity is limited. These techniques allow airlines to optimize the utilization of crews and equipment while maximizing the flow of passengers throughout each airline's route system by canceling selected flights and consolidating others during high delay weather conditions. For an airport like Sea-Tac that experiences substantial poor weather delays, these computerized techniques enable the airlines to continue serving passenger demand even during periods of reduced operations capacity, albeit with higher levels of delay and operating costs. Accordingly, the reduction in delay that will result from the airport improvements is not likely to cause an increase in passenger demand.

It should be acknowledged that a reduction in delay will reduce airline cost, and as a result, offers the potential for a reduction in airfare. Given the inverse relationship between airfare and demand, a reduction in delay would indeed offer the potential to induce demand if it could be shown that the reduction in delay would result in a reduction in airfare. The reduction in poor weather delays, however, represents a relatively small percentage of the overall travel time of most flights to and from Sea-Tac. As a result, despite the substantial opportunity for cost savings in absolute terms, the savings on a per flight basis is marginal when averaged over all weather conditions. Further, the airlines also will incur a significant portion of the project's capital cost.

The net incremental delay savings (i.e. the savings in delay minus the capital cost of the expansion) will not enable a material reduction in air fares. Therefore, the reduction in delay that occurs as a result of the project will produce a positive savings to the airlines but will not enable a reduction in fare, and thus, will not result in additional demand.

Notwithstanding the above, the unconstrained forecast prepared for the EIS did not assume that passengers would be discouraged from traveling to Seattle because of expected weather delays. The increased delay, while costly to the airlines, does not add significantly to the overall travel time of the passengers. Therefore, any improvement designed to reduce such delays, like the construction of a new runway, is not likely to result in more passengers choosing to fly to Seattle.

5.3.2 The project will not result in a major increase in the capacity of the airport to handle aircraft operations, contrary to Winston's assertions. (Winston Testimony 2.1.2) Dr. Winston's testimony suggests that a major increase in runway capacity will result in an increase in discretionary air travel. The proposed expansion of the Airport, however, will not result in a major increase in overall airport capacity. Recall that the project's purpose and need is to reduce delays during those conditions in which the arrivals must currently be served from a single runway. These conditions, referred to as IFR and VFR2, occur 44 percent of the time. The proposed expansion of the Airport will indeed increase the Airport's capacity during these conditions, thereby achieving the project's purpose and need. However, during the remaining 56 percent of the time, the proposed project will not materially increase the airport's capacity.

The FAA Capacity Enhancement Plan (Airport Data Package #12, June 1995) shows no change in average delay per operation for VFR-1, with or without the proposed runway at the baseline and future 1 level of demand (between 2000 and 2005), whereas a significant reduction in average delay is expected to occur with the new runway under VFR-2 and each of the IFR configurations, as shown below:

		Average Delay Per Operation (Minutes)	
		Future 1 Demand - 425,000 Annual Operations	
Weather	Flow	Do-Nothing	With Project
VFR-1	South	2.21	2.21
VFR-2	South	33.10	2.33
IFR-1	South	51.26	2.61
IFR-2	South	52.55	49.53
IFR-3	South	52.55	49.53
IFR-4	South	379.94	67.98
VFR-1	North	2.21	2.21
VFR-2	North	33.10	2.21
IFR-1	North	51.26	2.19
IFR-2	North	52.55	3.70
IFR-3	North	52.55	49.53
IFR-4	North	379.94	67.98

(Source: Exhibits 24 and 30, Airport Data Package #12, FAA Capacity Enhancement Plan, June 1995)

As shown, the project is not expected to reduce delay or increase capacity during VFR-1 conditions, which occur 56.1 percent of the time. The most significant reduction in delay occurs during poor weather conditions, which are very unpredictable in nature. The project, therefore, enables the Airport to perform with the same level of efficiency during poor weather conditions as it does today without the project. It does not, however, result in a significant increase in overall

airport capacity. Since passengers generally do not decide to travel on the basis of future weather forecasts, the project cannot result in a significant increase in demand.

5.3.3 The project will not likely cause a reduction in airfares. (Winston Testimony 2.1.3) The Winston testimony alleges that the project will result in greater airline competition and lower fares, which will increase demand. As indicated in Section 5.3.1, the project will indeed reduce airline delays and the associated fuel costs. However, the reduction in poor weather delays represent a relatively small proportion of overall fuel costs. Moreover, the airline share of the project's capital cost will offset the majority (but not all) of the airline savings. The net decrease in incremental airline costs associated with a reduction in poor weather delays will be significantly eclipsed by overall fuel and labor costs, which will likely increase at a rate similar to inflation throughout the forecast horizon. Although the cost savings in delay are sufficient to justify the project, they will not enable a reduction in air fare, and thus, will not result in additional demand.

Moreover, the projection of future air fares, which is one of the three primary independent variables that influence future demand, is already influenced by today's high level of competition. Seattle today enjoys more competition than most airports in the U.S. As a major spoke to virtually every airline's hub, Sea-Tac is served by over 30 airlines, including the nation's preeminent low fare carrier, Southwest Airlines. Consequently, the projection of future air fares already reflects this high level of competition, which in turn influences the demand projections. In other words, unserved demand available to airlines that are unable to break into the Sea-Tac market does not exist. As a result, existing fares in Seattle are not likely to continue dropping throughout the forecast horizon. Since the proposed project will not cause a further increase in either capacity or competition beyond the Do-Nothing scenario, it is not logical that the project will result in additional demand.

5.3.4 The forecasts already incorporated the expected growth in the region's economy. (Winston Testimony 2.1.4) Finally, the testimony suggests that the expansion of the airport will generate additional economic activity, which in turn will result in increased demand for air travel. As indicated above, the air travel demand forecast is related to the expected growth in the region's demographic and economic base, which is independent from the growth of the airport. Since the forecasts of these variables did not assume limitations in the growth of the airport, the expansion of the airport will not result in added economic activity nor will it result in additional passenger demand.

The Winston testimony correctly points out that quality air service and an efficient international airport are among the many criteria used in the selection of corporate headquarters, distribution centers and manufacturing facilities. Independent projections of the population and personal income of the Puget Sound Region reflect the strength of the region and the expectation for continued economic growth. As such, these projections, which were not constrained by potential future airport system deficiencies, were also used as independent variables in the preparation of the unconstrained forecast. Therefore, any airport improvement designed to provide continued high quality air service, like the new runway, cannot on its own accord generate economic activity and additional passenger demand above and beyond that contained in the unconstrained demand forecast.

As evidence of this particular point, the experience of the nation's newest major airport, the Denver International Airport, is relevant. It was determined as early as 1985 that Denver Stapleton would not provide sufficient capacity to efficiently serve regional demand as we approached the 21st century. The City and County of Denver chose to replace Stapleton with a modern five runway airport capable of serving three independent arrival streams during all weather conditions. If the expansion of the airport was capable of causing an increase in demand,

then it would follow that the New Denver Airport would serve more activity than Stapleton, its predecessor. In reality, however, the New Denver Airport is serving fewer passengers and operations today than Stapleton served during its peak years. This example provides empirical evidence that the opening of the airport did not cause an increase in demand.

5.3.5 Winston's "empirical evidence" proves nothing. (Winston Testimony 2.2) The final argument of Dr. Winston's testimony is that empirical evidence exists to demonstrate that an additional runway at Sea-Tac will cause additional growth. The alleged "empirical evidence" is based on a theoretical study that compares the number of operations and passengers during a particular year to the number of runways at a given airport. As expected, this comparison confirmed that a direct relationship exists between the number of runways at an airport and the level of activity. In other words, this theoretical exercise proved that airports with more demand did indeed build more runways than airports with lower demand. It clearly did not prove, however, that the runway actually caused the increase in demand.

This theoretical study failed to prove that airport expansion causes increased demand for several reasons. First, airport capacity is clearly influenced by more factors than merely the number of runways. In addition to the number of runways, airport capacity is influenced by:

- runway orientation,
- runway intersection geometry,
- runway separation,
- runway length,
- runway instrumentation,
- airspace configuration,
- terminal layout/number of gates,
- roadway configuration,

- o proximity to other airports,
- o air traffic control procedures,
- o demand characteristics, and
- o prevailing weather conditions.

None of these factors were considered in the "study", which is why the analysis resulted in a relatively poor, albeit positive, correlation between the number of runways and demand. In fact, the statistical measure (i.e. "r-squared") that describes how well the number of runways explains the level of activity is very low compared to that of the more traditional forecasting variables (i.e. population, income and air fare). Since this approach does not fully account for the complex factors that influences actual demand and capacity, it is not generally accepted within the industry nor has it been used (to the best of my knowledge) to justify or support a major airport development project.

5.4 Summary - Demand at Sea-Tac Airport is caused by the combination of future population, personal income, and air fare and not by the expansion of the airport, which is consistent with the basic methodology routinely applied and accepted at airports throughout the U.S. Since the expansion of the airport will not cause an increase in population or income, nor will it cause a decrease in air fare, it follows that it cannot cause in increase in demand. Conversely, forecast demand in the year 2010 can indeed be served at the Airport without the proposed expansion, by tolerating a higher level of delay and related operating costs and by the natural shift of operations from peak operating periods to the shoulder hours, particularly during poor weather conditions. Since the proposed expansion is not intended to dramatically increase the VFR capacity of the airport, it is not unreasonable that forecast demand can indeed be served without the proposed expansion. Having proven these two fundamental facts, it follows that the EIS and the SEIS did

in fact appropriately assess the level of activity and the resulting impacts that will occur upon completion of the Airport expansion.

6. **Effect on Demand of Extending Runway 34R to 12,500 feet** - The Hearing Memorandum sets forth an argument that extending the length of Runway 34L to 12,500 feet will cause the Airport to serve additional traffic to markets in Asia. While it is true that the runway extension will increase the efficiency of serving Asian markets, it will not cause a substantial increase in Asian demand for the following reasons:

i) Sufficient runway length is available today at Sea-Tac to serve markets in Asia. In fact, Northwest Airlines, American Airlines, Asiana Airlines and EVA Airways each offer direct service to various cities in Asia from Sea-Tac. The runway extension will simply prevent the need for weight restrictions during certain high wind or hot temperature conditions, thereby enabling these markets to be served more efficiently.

ii) Air service rights to Tokyo, Seoul, Shanghai and other markets in Asia require bi-lateral treaties issued by the federal government of the U.S. and the destination country on the basis of demand, competition, and federal policy. The extension of a runway is not a sufficient reason to justify the granting of additional slots to new destinations in Asia.

iii) The number of operations that serve Asia today represents about one percent of total annual demand. Even if Asian activity were to double from five flights per day to ten flights per day, the total number of Asian departures would be a very small percentage of overall activity at Sea-Tac.

Thus, the extension of Runway 34R will not cause a substantial increase in annual operations at the Airport.

7. **Response to Stephen Hockaday's Testimony** - Hockaday alleges in his testimony that the EIS arbitrarily dismissed alternative runway lengths and placements, that it failed to consider the potential effect of Localizer Directional Aid (LDA) technology in combination with a shorter runway, and that it failed to consider the potential airspace conflicts between Boeing field and Sea-Tac Airport. My testimony will establish that the EIS did in fact consider each of these issues and will provide further evidence that none of these issues alter the findings of the EIS.

7.1 **Alternative Runway Length** (Hockaday Testimony 2.1) - Hockaday argues that a 6,000 to 6,700 foot runway that is shifted to the south and designed to accommodate aircraft arrivals rather than departures would meet the purpose and need while significantly reducing the project costs. Such a runway was in fact considered but found to be inadequate relative to the project's purpose and need. The construction of a shorter runway shifted to the south, as suggested by Hockaday, will not achieve the project purpose and need for the following reasons:

i) The new runway will be used to serve limited departures to enhance operating efficiency;

ii) The threshold of the new runway must be even with the northern threshold of existing Runway 16L/34R to provide the expected reduction in delay and to avoid additional delays and environmental impacts (otherwise, the new runway would have to be located as much as 500 feet farther to the West to achieve an equivalent capability as the proposed runway); and

iii) Actual conditions, including low visibility, crosswinds, wet pavement, pilot preference and air traffic control procedures, would render a "short" runway unacceptable to certain aircraft and as a result, would cause added delays as these aircraft are reassigned to another runway.

For these reasons, construction of a shorter runway was not selected as the preferred alternative.

7.1.1 Fewer departures would be possible. The primary function of the new runway is to serve arrivals, which in general, require less runway length than departures. However, it is important that the new runway have the capability to also serve 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 closed for either snow removal or maintenance. Further, the limited use of the new runway for departures will provide added flexibility for air traffic controllers, thereby facilitating the ability to reduce poor weather delays. Limited departure use is also consistent with the assumptions used in the EIS evaluation of aircraft noise impacts.

Runway length is influenced by many factors. First, departures require more runway length than arrivals in part because of heavier fuel loads. Further, additional runway length is required for both arrivals and departures during high temperature, wet and high wind conditions. Finally, runway length requirements are also influenced by pilot technique and aircraft performance. If the new runway were less than 8,500 feet, considerably fewer aircraft would be capable of departing from the "short" runway. Since controllers would no longer have the flexibility of selecting any aircraft to offload for departures, added delays and controller workload would result during certain conditions, thereby reducing the ability of the project to achieve its delay reduction objective.

7.1.2 A staggered north end of the new runway would either require the new runway to be moved further west or would eliminate a major benefit of the new runway. Dr. Hockaday suggests that a 6,000 or 6,700 foot runway could be shifted to the south such that its southern threshold is located at the site of the southern threshold of the proposed 8,500 foot runway. This alignment would result in a 2,500 to 1,800 foot stagger between the northern thresholds of the new runway and Runway 16L/34R. (This means the northern end of the new runway would not be even with -- i.e., would be "staggered" with -- the northern end of the existing runways.) A stagger of this magnitude during south flow IFR operations (the predominant IFR mode of operation) would require that the new runway be moved further west in order to retain the ability to conduct independent arrivals on the new runway in this alignment and departures on Runway 16L. This is based on FAA runway design guidelines contained in Advisory Circular 150/5300-13 Change 5, Paragraph 208. These guidelines are as follows:

> *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" (parenthetical added - see attached).*

The rationale for this guideline is in part to maintain wake vortex separations between aircraft on parallel runways. Because of the runway stagger, aircraft landing on the new runway would still be airborne when they are even with the threshold of the existing runways. As a result, the wake vortex generated behind the landing aircraft could impact a departure on an existing runway. In accordance with these guidelines, the lateral spacing for the new runway would have to be increased by 400 feet for the 6,700 foot runway (1,800-foot stagger) and by 500 feet for a 6,000 foot runway (2,500-foot stagger) from the original 2,500-foot spacing to provide the same IFR operational capability as an 8,500 foot runway with an even northern threshold. The resulting capital costs, noise impacts and other environmental impacts would be considerably greater under this scenario than with the proposed action.

If the new runway is not moved further to the west, departures on Runway 16L would have to be coordinated with arrivals on the new runway, which would result in additional delay. The proposed new runway, with its northern end aligned with the northern end of the existing runways, will allow independent arrivals on the new runway and departures on the existing Runway 34R/16L during south-flow IFR conditions. This means that flights can arrive on the new runway at the same time flights are departing on the existing long runway during the most common poor weather conditions. This is an important delay-reduction benefit of the new runway and is essential to the project's purpose and need.

7.1.3 A shorter runway will result in more delay than the proposed 8,500 foot runway. Dr. Hockaday correctly points out that certain jets are capable of landing on a 6,000-foot to 6,700-foot runway during still wind conditions. However, it is likely that many pilots would refuse a runway of this length, given the availability of a longer parallel runway, during certain conditions. Pilots are ultimately responsible for the control of their aircraft, and as a result, they have the right to refuse an assigned runway. For example, international arrivals into Chicago often ask and are granted permission to land on the 13,000 foot Runway 14R/32L during certain conditions, instead of an assigned shorter runway that meets the technical capability of the aircraft.

This situation would most frequently occur during less than ideal conditions, which is often the case in Seattle. In particular, pilots would likely refuse a short runway and ask to land on the longer runway to provide an added margin of safety during crosswind conditions, since no crosswind runway is available at Sea-Tac, and during wet pavement conditions, which is also frequent at Sea-Tac (winds over five knots occur about 65 percent of the time and winds over 10 knots occur about 17 percent of the time at Sea-Tac). Anytime a pilot were to refuse the new runway due to insufficient length, additional delays and increased controller workload would

result as controllers would then have to re-sequence the aircraft into a new approach pattern. The availability of an 8,500 foot runway provides the flexibility to accommodate virtually all arrivals, regardless of aircraft type and weather condition, thereby enhancing the opportunity to reduce delays.

Finally, the shortening of the runway will result in additional air traffic control delays under certain conditions based on routine air traffic control procedures. Air traffic controllers sequence each aircraft from its destination to a runway via one of four radial fixes or "cornerposts". In essence, each arrival is routed over one of four navigational "fixes" located to the northeast, northwest, southwest or southeast of Sea-Tac, based on the location of the flight's origin airport. International arrivals from the Pacific Rim that require additional runway length are typically routed over the northwest fix or southwest, whereas many arrivals that are capable of landing on a shorter runway are routed over the northeast or southeast fix. Aircraft are then assigned to runways based on the fix. Consequently, most arrivals from the Pacific Rim, which may require 8,500 feet, would be assigned to the new runway, while many other arrivals would be assigned to an existing runway. If the new runway were less than 8,500 feet, certain long-haul aircraft 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 workload, but it would also increase aircraft flying times and delays, since aircraft would be forced to fly further to reach the appropriate fix, thereby further reducing the ability of the runway to meet its delay reduction project and need.

Because of these reasons, a shorter runway will not provide an equivalent level of performance as the proposed expansion option. Nonetheless, the EIS did appropriately consider the potential impacts of a reduced runway length option.

7.2 LDA Technology (Hockaday Testimony 2.2) - Mr. Hockaday suggests that use of a Localizer Directional Aid (LDA), in conjunction with a shorter runway, would provide an equivalent benefit to a new 8,500-foot runway without use of the LDA.

An LDA, which stands for Localizer Directional Aid, is an air traffic control procedure used to conduct approaches to closely spaced runways under certain marginally low visibility conditions. It typically can be applied at airports like San Francisco or St. Louis that have runways with insufficient lateral spacing for either dependent approaches (i.e. 2,500 feet) or simultaneous approaches (i.e. 3,000 feet). The basic principle of an LDA approach is to establish an approach course that is offset from the physical runway centerline such that aircraft on approach to parallel runways are separated by at least 2,500 feet for dependent approaches, or 3,000 feet for simultaneous approaches. Since the LDA approach is not aligned with the runway, the pilot must perform a "sidestep" maneuver at a point about one to two nautical miles from the runway threshold. This point is referred to as the missed approach point, beyond which the pilot must conduct a visual approach. As a result, this procedure is not applicable for the most severe IFR weather conditions (i.e., IFR 2,3 or 4). Further, because of the sidestep maneuver and the need for a visual final approach, this procedure is not favored by the FAA or pilot associations.

7.2.1 **LDA will not allow a shorter runway to be used for independent arrivals and departures in south flow poor weather conditions.** The FAA guidelines require even thresholds and at least 2,500 feet of lateral spacing between runway threshold to conduct simultaneous arrivals and departures. The 2,500 foot lateral separation between the new runway and Runway 16L/34R, and the even northern thresholds, as proposed in the EIS, comply with these guidelines and therefore enable aircraft to simultaneously land on the new runway and depart on Runway 16L during IFR conditions in south flow operations. This procedure, which would be used as often as 17 percent of the time, enhances air traffic control flexibility and

therefore contributes to the ability of the project to achieve its delay reduction objective. This procedure is influenced by the lateral separation and the stagger of the runway thresholds, rather than by the location of the approach course. The runway stagger that results from shortening the runway, as proposed by Hockaday, does not comply with FAA guidelines unless the runway were to be relocated further to the west. As a result, Hockaday's proposed layout will preclude the ability to conduct simultaneous approaches and departures, even with an LDA, and therefore, would result in higher delays.

7.2.2 LDA is not necessary for, and will have no effect on, dependent arrivals on the new runway in poor weather conditions. The 2,500 foot lateral separation between the new runway and Runway 16L/34R as proposed in the EIS, also enables dependent approaches to these runways during VFR-2 and IFR conditions, based on FAA guidelines. Use of this procedure, which is a fundamental element of the proposal and does not require an LDA, also contributes to the ability of the proposed runway to achieve its delay reduction objective. This procedure reduces the amount of time in which the Airport would otherwise be limited to a single approach from 44 percent of the time to less than one percent of the time, *without use of the LDA.*

It is possible that an LDA could be used in conjunction with the new runway -- regardless of its length -- to further reduce delays during VFR-2 and IFR conditions to a greater extent than identified in the EIS. Specifically, it might be possible to site the LDA such that the approach courses to the new runway and Runways 16L were separated by at least 3,000 feet, which could enable simultaneous approaches rather than dependent approaches. This would result in a greater delay savings than envisioned in the EIS, but would also likely result in additional noise impacts due to the offset in the Runway 16 approach course.

7.2.3 LDA Conclusion. LDA will not lessen the need for a longer runway nor will it reduce the delays that would result from a pilot refusing to land on the shorter runway. It also

does not mitigate the impact of the runway stagger, which is affected not by the location of the approach course but by the physical location of the threshold. As a result, even with the LDA as proposed, additional lateral spacing would be required to enable independent arrivals and departures on the new runway and Runway 16L. In conclusion, therefore, the LDA does not make feasible a shorter runway and it is not necessary to achieve the project's purpose and need.

7.3 **Boeing Field Interactions** (Hockaday Testimony 2.3) - Hockaday alleges that the EIS ignored the impact of Boeing Field (BFI) on the operation of the new runway at SEA-TAC. To the contrary, the EIS defined airfield capability based on the work of the FAA in its Capacity Enhancement Plan Update, which did indeed consider the interactions between Boeing Field and SEA-TAC (Seattle-Tacoma International Airport Capacity Enhancement Plan Update, July 1995, Page 10). While the EIS and the SEIS did in fact account for the airspace interactions between BFI and SEA-TAC, an analysis performed for the FAA in 1992 (Impact Of Boeing Field Interactions Of A Proposed New Runway At Seattle-Tacoma International Airport, July 1992, Aviation Simulations International, Inc.) provided further evidence that the proposed runway will achieve its delay reduction objective even with these interactions.

It should be noted that the majority of flights using Boeing Field operate under Visual Flight Rues (VFR) and as such operate independently from activity at Sea-Tac. This will continue to occur even with the new runway. The only flights that that offer the potential to impact performance at Sea-Tac are those that operate under Instrument Flight Rules (IFR). These flights are coordinated with Sea-Tac today and it is envisioned that such coordination of IFR flights will continue after construction of the proposed runway. Nonetheless, while operation of the new runway will not alleviate the airspace interactions, it will still provide the opportunity to reduce delay as defined in the purpose and need of the EIS and SEIS.

7.3.1 **Hockaday alleges that according to the above cited FAA Study, Sea-Tac would not accommodate traffic during north flow IFR conditions, even with a new runway.** While the

FAA analysis did acknowledge the impact of airspace interactions between SEA and BFI during north flow IFR conditions, it indicated that this impact would only limit 2015 demand during north flow IFR conditions. (The FAA study assumed 2015 demand to be 1,507 daily departures, where the updated forecast in the SEIS expects only 1,299 daily departures in the year 2010). Further, such north flow IFR conditions occur less than 6 percent of the time. As a result, the airspace interactions that occur during these fairly rare conditions will not significantly affect overall all-weather performance, with or without a new runway.

7.3.2 **Hockaday incorrectly alleges that south flow IFR and VFR capacity gains would be small because of airspace interactions.** The FAA analysis examined the benefit of the new runway with and without airspace interactions. In both cases, the new runway resulted in substantial delay savings, albeit the savings would be less if the airspace interactions are not mitigated. The analysis also identified technological advances and other operating strategies that may be used to mitigate the impact of the airspace interactions. However, even if these interactions remain, the analysis indicates that the new runway is still expected to produce substantial delay reduction benefits.

7.3.3 **The FAA report includes a sensitivity analysis which demonstrated additional delay savings, beyond those identified in the EIS, would result from eliminating the interaction between BFI and SEA-TAC.** It is likely that future technological improvements, such as FMS and GPS, will enable the realization of such benefits. In fact, airspace studies conducted for other major multi-airport regions like Chicago, Los Angeles and New York demonstrate that improvements in air traffic control procedures, aircraft avionics and ATC technology offer

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substantial opportunities to reduce the operational impacts of airport interactions. Nonetheless, the EIS did in fact consider the effect of the airspace interactions, and the resulting level of expected delay reduction reflects these impacts.

7.4 Summary - My testimony provides evidence that the EIS did in fact consider alternative runway lengths and placements, the potential effect of Localizer Directional Aid (LDA), and the potential airspace conflicts between Boeing field and Sea-Tac Airport. None of these issues alter the findings of the EIS or the SEIS.

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 6th day of November, 1997.

DOUGLAS F. GOLDBERG

[redacted]

Landrum & Brown

Douglas F. Goldberg

Vice President

Education

Bachelor of Business Administration, Quantitative Analysis and Marketing - University of Cincinnati
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Experience

Since joining Landrum & Brown in 1983, Mr. Goldberg's experience has been concentrated in the areas of operations research, aircraft operations analysis and facilities planning. As the leader of Landrum's Facilities and Operations Practice, he is responsible for all facets of facility and operations planning, from project inception through the implementation and operation of airport facilities. He is particularly experienced in providing the analysis and support necessary to achieve project approval and to assure an efficient operation during construction and after implementation of cost-effective airport facility development projects.

Mr. Goldberg is currently overseeing the technical planning associated with Landrum & Brown's general consulting contract with the City of Chicago, Department of Aviation. As officer-in-charge of the Chicago client work program, Mr. Goldberg is responsible for coordinating the day-to-day facility, operational, financial and environmental planning for O'Hare, Midway and Meigs Field. In this capacity, Mr. Goldberg is also responsible for assessing the strategic implications of various airport system planning issues.

Mr. Goldberg served as project manager for the Chicago Delay Task Force Study, the first airport sponsored study of its kind. In this role, Mr. Goldberg was responsible for conducting technical analyses, coordinating study efforts, preparing documentation and presenting study results. After publication of the Chicago Delay Task Force Final Report, Mr. Goldberg organized the Chicago/FAA Delay Task Force Implementation Team which includes airline, City of Chicago and FAA representatives. He serves as Technical Coordinator of the Chicago Delay Task Force Technical Support Office (TSO), which was established to provide operations analysis and facility planning services to the Implementation Team.

Mr. Goldberg has significant experience in utilizing computer simulation, analytical and qualitative techniques to evaluate the cost and benefits of proposed airfield improvements, facility closures, schedule variations and alternative air traffic control procedures. Mr. Goldberg specializes in the application of operations research techniques to determine the level of facilities needed to efficiently and cost-effectively serve aviation demand.

Mr. Goldberg has written and presented several papers to airport industry organizations, including the FAA, ASCE and ACI. He is a past chairman of the ASCE Committee on Airport Capacity and Delay and is a member of the Transportation Research Board Committee on Airfield and Airspace Capacity and Delay. Mr. Goldberg is also an associate member of the ACI-NA Technical Committee.

Representative Projects

Chicago-O'Hare International Airport, IL
- O'Hare ALP Update
- Chicago Delay Task Force
- Gate Requirements
- Bus Fleet Requirements
- Terminal One Flow Channel Operating Procedures
- Vehicle Parking Lot Utilization
- Wind/Weather Analysis
- Construction/Operations Planning
- Passenger Flow Analysis
- Facility and Operations Planning

Chicago Midway Airport, IL
- Chicago Delay Task Force
- Gate Requirements
- Airspace/Airfield Capacity and Delay
- Runway Length Analysis
- Wind and Weather Analysis
- FAR Part 77 Analysis

Chicago Lake Calumet Airport
- Feasibility Study
- Demand Allocation Analysis
- Airspace/Airfield Capacity Analysis

Boston Logan International Airport, ME
- Gate/FIS Requirements

Philadelphia International Airport, PA
- Airspace/Airfield Capacity and Delay
- Apron Area Simulation Analysis

Niagara Falls International Airport, NY
- Runway Length Analysis

Sydney (Kingsford Smith) International Airport, Australia
- Wind and Weather Analysis
- Airspace/Airfield Capacity and Delay

Helsinki Vantaa Airport, Finland
- Runway Capacity Study

Port Authority of New York and New Jersey
- Low Visability Operations Planning

Seattle-Tacoma International Airport, WA
- Airfield Delay Analysis
- Cost-Benefit Analysis

Lambert-St. Louis International Airport, MO
- Wind and Weather Analysis
- Market Service Analysis
- Airspace/Airfield Capacity and Delay
- Gate Requirements

New Denver Airport, CO
- Wind/Weather Analysis
- Airspace/Airfield Capacity and Delay
- Airfield Layout Geometry
- Air Traffic Control Line-of-Sight
- Terminal Layout Geometry
- FAR Part 77 Analysis

Denver Stapleton, CO
- Airspace/Airfield Capacity and Delay
- Wind and Weather Analysis
- Aircraft Operation/Passenger Forecast
- Runway Exit Utilization

Spruce Creek Airport Community, FL
- Airport Capacity Analysis

Wayne County Detroit Metropolitan Airport, MI
- Airfield/Airspace Capacity and Delay
- Gate Requirements
- Airfield Geometry
- Wind and Weather Analysis
- Support Facility Requirements

Detroit City Airport, MI
- Runway Length Analysis

United Airlines
- Boeing B-777 Operational Assessment

Cleveland Hopkins International Airport, OH
- FAR Part 77 Analysis
- Demand/Capacity Analysis

Washington National Airport, D.C.
- Apron Area Simulation Study

Toronto Lester B. Pearson International Airport
- Gate/Terminal Capacity Analysis
- Airfield Capacity Analysis
- Airfield/Apron Operations

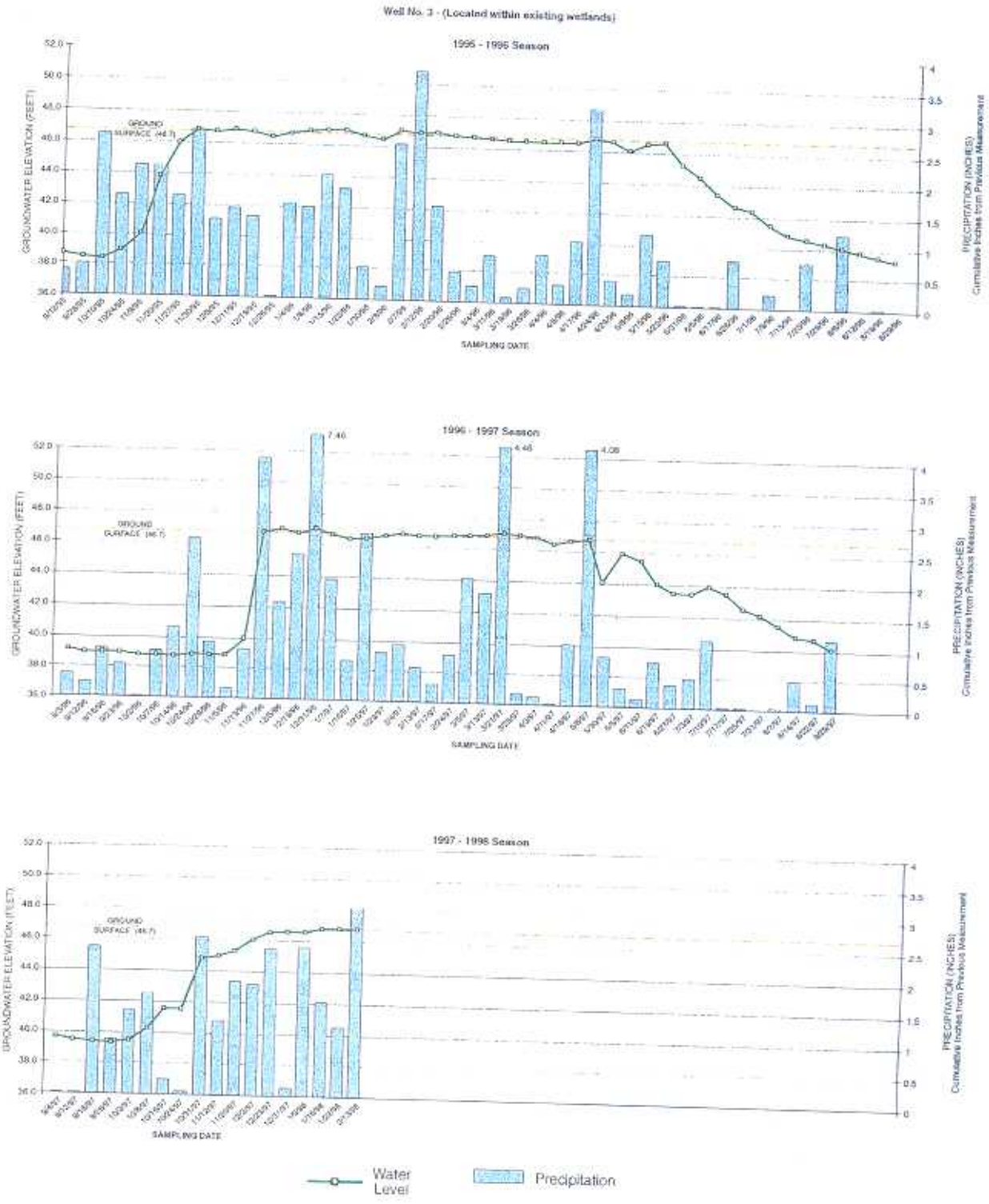


Figure 4A.
Groundwater Monitoring Results at the Auburn Wetland Mitigation Site

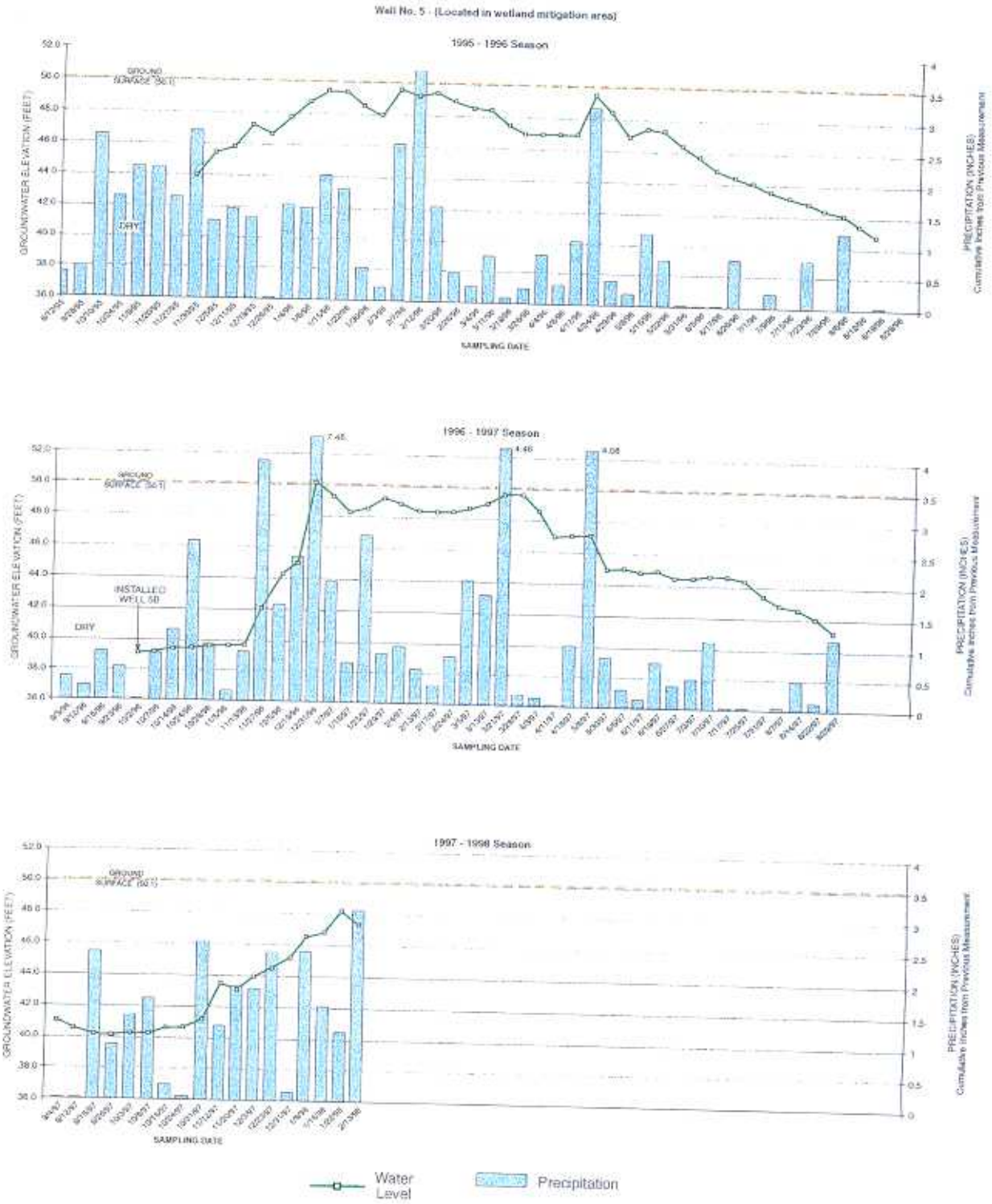


Figure 4B.
Groundwater Monitoring Results at the Auburn Wetland Mitigation Site

Finally, while a mitigation ratio (2:1) has been identified for off-site mitigation, considerable on-site mitigation is proposed to protect and enhance the aquatic habitat associated with Miller and Des Moines Creeks. While ratios for this mitigation have not been proposed, the mitigation actions substantially supplement the off-site mitigation.

4/5. The ACC asserts that construction of the new runway and other Master Plan Update projects will result in significant degradation of the waters of Miller and Des Moines Creeks, and that the Port's activity will violate state water quality standards.

Contrary to the ACC's allegation, the fill of wetlands authorized by the permit will not cause or contribute to significant degradation of waters of the United States or violations of water quality standards. The Port's NPDES permit contains numerous conditions to protect water quality during airport construction projects and during airport operations. Moreover, significant operational improvements have taken place since the FEIS was issued, which have improved the quality of storm water at the airport.

The Port's NPDES permit was reissued February 20, 1998, after an informational public meeting, a public hearing, and a public comment period. The permit regulates water quality for construction projects and industrial activities within the airport property boundary and the third runway acquisition boundary. The permit was effective on March 1, 1998, and will expire on June 30, 2002. The Port must apply for renewal of its NPDES permit at least 180 days prior to the expiration of the permit. During permit renewal, Ecology will reevaluate the airport's activities and will impose whatever conditions are necessary to protect water quality. The renewal process will involve public notice and comment.

The NPDES permit is issued pursuant to the Federal Clean Water Act and the Washington Water Pollution Control Act, which are the primary statutes enacted to preserve and protect water quality. Consisting of over 50 pages, the permit contains numerous conditions that are specifically focused on protecting water quality during third runway construction projects and during airport operations.

In particular, the permit requires that a Storm Water Pollution Prevention Plan ("SWPPP") be implemented for construction projects and airport activities. (Special Conditions S12 and S13). The key objectives of the SWPPPs are to prevent violations of surface water quality, ground water quality, or sediment management standards and to prevent adverse water quality impacts. To accomplish these objectives, the permit requires the Port to take the following actions:

1. Fully implement a Storm Water Pollution Prevention Plan ("SWPPP") for all airport activities and all construction activity, including construction dewatering prior to the commencement of any construction activity that disturbs five (5) acres or more of total land. Construction activities are specifically defined to include fill activities.

2. For construction activities, the SWPPP must include the following:

   A. An Erosion and Sediment Control Plan, which describes stabilization and structural practices, both of which must be implemented to minimize erosion and the transport of sediments. All Best Management Practices ("BMPs") must be frequently inspected and maintained. Records regarding the inspections must be kept.

   B. The Erosion and Sediment Control Plan must be attached to bid packages when seeking contractors to allow the contractor sufficient time to plan implementation. The Port

must implement procedures for reviewing the SWPPP with contractors and subcontractors prior to initiating construction activities.

C. A monitoring plan for storm water and construction dewatering discharges must be submitted to Ecology for review and approval at least 30 days prior to the start of construction.

D. The Port must designate a contact person who is available 24-hours a day to respond to emergencies and to inquiries or directives from Ecology.

E. For construction projects identified in the Proposed Master Plan Update, the Port must establish and fund an independent qualified pollution control officer to advise on and determine compliance with applicable water quality standards.

Thus, not only must the Port fully implement all soil and erosion control measure before beginning construction, it must also monitor during the course of the projects to make sure that the BMPs are effective. An independent pollution control officer determines compliance with applicable water quality standards. These measures will ensure that the Sea-Tac Expansion will not cause any degradation of waters of the U.S or cause violations of water quality standards.

3. For airport operations, the SWPPP must be prepared in accordance with the guidance provided in the Stormwater Pollution Prevention Planning for Industrial Facilities. The plan must contain the following elements:

A. Assessment and description of existing and potential pollutant sources;

B. Description of selected operational BMPs

C. Description of selected source-control BMPs

D. Description of selected erosion and sediment control BMPs

E. Description of selected treatment BMPs

F. Implementation Schedule

The permit also requires the Port to monitor 14 storm water outfalls for various parameters, including TPH, TSS, turbidity, fecal coliform, BOD5, ethylene glycol, propylene glycol, copper, lead, and zinc. This monitoring characterizes storm water discharges from industrial activities at the airport, including runways and taxiways.

Storm water drainage detention is also regulated in the NPDES permit. In this regard, all construction actions taken by the Port "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 Miler Creek and Des Moines Creek. All detention facilities owned and/or operated by the Port shall be inspected, maintained, and repaired as needed to assure continued performance of their intended function." (NPDES Permit, Special Condition S14).

The Port has made many operational improvements since the FEIS was issued, which have improved the quality of storm water at the airport. For example, the use of glycols on the runways and taxiways was terminated in 1992. The use of urea was terminated in 1996. (Fact Sheet to NPDES Permit, page 11). Thus, impacts from the runways and taxiways associated with urea have been eliminated. Ethylene glycol is only used to deice aircraft, and storm water associated with that activity drains to the Industrial Waste Treatment System. Additionally, the ethylene glycol used to deice aircraft is not 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 the Airport are not dangerous wastes.

Comments based on the assumption that there would be uncontrolled runoff from construction sites are misplaced because the NPDES permit prohibits "uncontrolled" construction site sediment loads from construction projects at the airport. Instead, as mentioned above, SWPPPs must be prepared and implemented and monitoring plans must be approved prior to construction activity occurring.

Comments regarding metals and fecal coliform are also inaccurate. The only metals detected in the Port's storm water are the same metals detected in all urban storm water runoff. In fact, NPDES monitoring over the past three years demonstrates that storm water from the Airport is cleaner than regional storm water. The Fact Sheet to the NPDES Permit illustrates this with the following table:

Parameter	ACWA, 1997[a]	Highway Runoff[b]	Sea-Tac Airport[c]
Copper (µg/L)	9	43	30
Lead (µg/L)	10	466	5
Zinc (µg/L)	480	638	72

[a]Oregon NPDES Stormwater Monitoring Data Compiled by ACWA for Mixed Land Use.
[b]Port of Seattle, 1996c. Highway runoff in 15 locations in Seattle with 57,000 ADT, 43 to 64 storm samples in 1980 - 1981.
[c]Median of all stormwater outfall monitoring data between 6/94 and 5/97.

These results demonstrate that the BMPs implemented at the airport during the last NPDES permit cycle were very effective. As the FEIS at IV.10-4 points out, "the U.S. Environmental Protection Agency has determined that most metals in storm water runoff are associated with or bound to suspended solids and, thus, generally are not available to aquatic life as potential toxics." The FEIS does not state that the increases in impervious surface would lead to acute and chronic effects on aquatic biota. Instead, the FEIS states that the increases could result in the impairment of the propagation of aquatic biota. In fact, the storm water monitoring data collected to date supports the opposite conclusion. The FEIS was drafted before most of this storm water monitoring data was conducted and before the improvements outlined above were undertaken. The NPDES permit requires acute toxicity testing of the storm water at four outfalls to confirm that storm water discharges at the airport are not toxic. Thus, the NPDES permit adequately addresses any concerns over storm water toxicity.

The comments concerning the State's Antidegradation Policy are addressed by the Port's NPDES permit. As discussed in the Fact Sheet at page 23, the discharges authorized by the permit "should not cause further degradation which would interfere with or become injurious to existing beneficial uses."

Once the third runway is constructed, future NPDES permits will regulate that activity. These permits will preserve and protect water quality. Draft permits will be subject to public notice and

comment. Further, the Governor's Certificate and FAA ROD requirements require the Port to "obtain and comply" with all permits.

6. The ACC asserts that the Port's mitigation plan is inconsistent with the ordinances of Burien, Des Moines, Normandy Park, Tukwila, and SeaTac and, therefore, the Corps must deny the 404 permit for the wetland fill pursuant to 33 CFR § 320.4 (j). However, Burien, Normandy Park, and Tukwila have no jurisdiction over the Port's wetland and stream activities. The Port is proposing to discharge fill material only in the cities of SeaTac (for the third runway, SASA, and portions of the on-site borrow sources) and Des Moines (for portions of the on-site borrow sources). There are no affected water bodies in the other cities listed by the ACC.

With regard to the City of SeaTac, the ACC points out that the City commented on the Draft Master Plan Update EIS that its city ordinance requires that wetland mitigation occur in the same sub-drainage basin as the wetlands being filled. However, what the ACC did not point out is that, subsequent to the City's submission of this comment, the Port and the City of SeaTac entered into an Interlocal Agreement that addresses permitting issues at the airport. Interlocal Agreement Between Port of Seattle and City of SeaTac, dated September 4, 1997 ("Port/SeaTac ILA").[8/] Pursuant to this agreement, the City agreed that its critical area regulations (which include the in-basin mitigation provision referenced by the ACC) would not apply to the mitigation of wetlands in Auburn for the 3rd runway and other Master Plan Update projects. Port/SeaTac ILA, Exhibit A, Attachment A-4, p. 6. That is, the City of SeaTac has specifically considered the issue of out-of-basin wetland mitigation for the Port's projects and has specifically determined that mitigation in Auburn would not be governed by its critical area provisions.

Portions of proposed on-site borrow sources #1 and #3, and borrow source #2, are located in the City of Des Moines. (The line between the Cities of SeaTac and Des Moines in this area is South 208th Street.) Wetlands 31, 32, 48, 49, and 50 are located in this area. (See Final Master Plan Update EIS, Exhibit IV.11-2, p. IV.11-6E). The City of Des Moines has not made any decisions with regard to city permits for these proposed on-site borrow sources. The Central Puget Sound Growth Management Hearings Board has ruled in *Port of Seattle v. City of Des Moines*, that the airport expansion is an essential public facility under the state Growth Management Act and the City of Des Moines may not take actions that preclude this facility. It is appropriate for the Corps to proceed with processing the 404 permit application for these portions of the on-site borrow sources. 33 CFR § 320.4 (j) provides as follows:

> Processing of an application for a DA (Department of Army, Corps of Engineers) permit normally will proceed concurrently with the processing of other required Federal, state, and/or local authorizations or certifications. Final action on the DA permit will normally not be delayed pending action by another Federal, state or local agency.

It is appropriate for the Corps to consider the comments of the City of Des Moines on those portions of the south borrow sources within the city limits, but it is also appropriate for the Corps to continue processing the Port's 404 permit for the wetland impacts in these borrow sources since the City of Des Moines has not denied any permits for those activities.

[8/] The City of Sea-Tac and the Port have differing views on the extent of the City's legal jurisdiction over airport projects. A declaratory judgment action was brought in King County Superior Court to seek a resolution of these differing views. In settlement of this litigation, the parties agreed to cooperate on land use planning for the airport properties and agreed on the application of certain land use regulations to airport projects.

1G-2 CASE

1. As noted in the FSEIS (page F-113), the volume of fill noted in the FEIS and FSEIS accounts for both the shrinking and swelling of material as it is hauled and placed. A combined value of 15 percent was used to adjust the required fill volumes. The comment suggests that this value is 6 percent too low. The actual value will depend on the specific conditions of the fill material being hauled, and the compaction density at which it is placed, which varies depending on the location within the embankment. The adjustment value of 15 percent was determined based on the Preliminary Engineering evaluation conducted by the Port and discussions with local contractors.

   If the higher value were used, it would not significantly change the outcome of the construction impact evaluation performed for the FEIS and the FSEIS. This higher shrink/swell factor would result in an approximate 6 percent increase in estimated trucks, or only 1 to 3 trucks per hour, per direction, on average. This small increase would not affect the analysis and is offset by the conservative nature of the haul analysis reflected in the FSEIS. The assumptions for the haul analysis are conservative because: (1) the volume of material a truck can transport ranges from 22 to 28 cubic yards and the analysis assumed 22 cubic yards; (2) the analysis focused on the peak year conditions (i.e., highest background traffic volumes) for a five-year haul process, and (3) the use of the peaking factor.

2. Comments noted.

3. The joint Corps/Ecology public hearing was held April 9, 1998.

4. A proposed permit has not been drafted. It appears the commenter is referring to the Public Notice. The permit application contains all of the requisite information including scope of the actions, size of the wetland impacts, and mitigation measures.

5. The process the Corps is following meets the public participation requirements of the Clean Water Act. Without any specific examples in the submitted comment concerning the public process, another response is not possible.

6. As the commenter provided no specific information concerning the alleged "missing information" and "misleading and erroneous input" no further response is possible.

7. In this comment, CASE states that a 404 permit should not be issued until pending litigation is resolved. However, the existence of litigation regarding other permits and approvals for the Master Plan Update actions is not a valid basis to withhold a decision on the 404 permit.

   In addition, it should be noted that in each litigation matter that has proceeded to a decision, the ruling body has decided in favor of the Master Plan Development actions (including the third runway). There is no provision in the statutes and regulations governing the Corps consideration of 404 permits that requires the Corps to withhold action on the permit pending the outcome of litigation on other permits and approvals for the project. Construction of the third runway is scheduled to be completed in 2004. Given the Puget Sound Region's pressing need for this project, it is imperative that a Corps permit be issued as soon as possible and not be delayed simply because litigation has been filed by those opposing the project.

8. See General Response 2.

9. See the response to Letter 1E-1, Comment 3.

10. See the response to Letter1L-6, Comment 2.

11. The earlier SASA project did not propose to mitigate wetland wildlife habitat in the Des Moines Creek basin. It did propose to mitigate other wetland functions (e.g. flood storage, groundwater recharge, and water quality) in the basin. This is similar to what the Port is proposing to do today. See the response to Comment 21 of your letter for the reasons why the Port cannot create new wetlands with wildlife habitat within 10,000 ft of the runways.

12. See the response to Comment 4 of your letter.

13. See the response to Comment 7 of your letter.

14. See the response to Comment 7 of your letter.

15. Page 38 of the Public Notice is a "Notice of Application" not a Notice of Availability. The certification has not been issued.

16. Again, this page of the Public Notice is a "Notice of Application." A certification has not been issued.

17. Comments acknowledged.

18. Ecology does not issue a "wetlands permit". Ecology's primary regulatory interest in wetlands comes through Section 401 of the Clean Water Act and its review role for other natural resource permits, including Section 404 permits.

    Similarly, the Washington Department of Fish and Wildlife does not issue a "wetlands permit" but is responsible for Hydraulic Project Approval (HPA) permits. The Port of Seattle has applied for both the 401 and HPA approval, along with the 404 permit, in its Joint Aquatic Resources Permit Application, submitted in December 1996.

19. Normandy Park and Tukwila have no regulatory jurisdiction over wetlands affected by the project. Wetlands in Des Moines may be affected. See the response to Letter 1G-1, Comment 6.

20. The adequacy of the EIS under SEPA was challenged to an independent Hearing Examiner retained by the Port. Following extensive briefing of the issues and a week-long hearing, the Hearing Examiner ruled that the EIS was legally adequate. The Hearing Examiner's decision is currently being appealed to King County Superior Court.

    The mitigation plan is consistent with the FAA Advisory Circular, which became final on May 1, 1997 and was reproduced in the FSEIS.

21. Advisory Circular 1500/5200-33 (at Section 2-4) recognizes a difference between expansion of an existing airport and creation of new wetland mitigation project. While it is not often practical to avoid expansion of airports near wetlands, it is possible to site newly-created wetlands more than 10,000 ft from existing airports at which expansion will disturb wetlands.

22. The commenter notes the availability of "400 acres of undeveloped land within the project boundary." As is noted in the permit application, these sites do not meet the criteria established by the FAA Advisory Circular.

23. See the response to Comment 11 of your letter.

24. Wetlands were delineated according to standards required by federal, local, and state agencies, and followed the procedures outlined in the. The detailed procedure for wetland delineation is explained in these manuals and in the *Jurisdictional Wetland Determination for Seattle-Tacoma International Airport Master Plan Update* (Shapiro and Associates 1995; Appendix H-A of the FEIS).

Wetland delineation methods followed those required in the *Federal Manual for identifying and Delineating Jurisdictional Wetlands* (January 1989) and the *Corps of Engineers Wetlands Delineation Manual* (January 1987). The delineation generally followed the "Intermediate Level Onsite Determination Method" of the 1989 Manual (pp35-39) and the "Comprehensive Determination" method of the 1987 Manual (pp70-82).

These methods do not required "paired plot" data sheets to be collected for all wetlands. The methods describe an approach for evaluating and correlating vegetation conditions to the presence of wetland hydrology and hydric soils, as was done in the Port's wetland determination. The wetland report presents adequate data to document wetland versus upland conditions as required by the Corps of Engineers-Seattle District when reviewing wetland boundaries. For boundaries that have been delineated, the Corps has approved the delineation.

As previously identified by the Port in all relevant documents, several wetlands located west of 12 Avenue South have not been delineated. The acreage reported for these wetlands is estimated visually from observations made from public rights-of-way and from aerial photographs. Five wetlands are known to occur in this area.

25. The level of detail in the plans attached to the EIS was appropriate for that analysis. The JARPA application included a Wetland Mitigation Plan and a Miller Creek Relocation Plan, which added more detail and is consistent with the FEIS/FSEIS. As the Port negotiates permit conditions with the Corps and other resource agencies, the plans will become even more precise. This plan development is standard and appropriate and meets the requirments of NEPA and SEPA.

26. See the response to Comment 20.

27. Comments noted.

1G-3 CASE

1. Comments noted. The initial comment period ran from December 19, 1997 to January 20, 1998. Based on these comments, a joint Corps/Ecology public hearing was held on April 9, 1998. A second Corps comment period went from April 9 to April 20, 1998. A second Ecology comment period ran from April 9 to April 29, 1998.

2. Comments noted. However, the Corps review has been performed consistent with the Clean Water Act requirements.

3. See the response to Letter 1G-2, Comment 4.

4. See the response to Letter 1G-2, Comment 5.

5. See the response to Letter 1G-2, Comment 6.

6. See the response to Letter 1G-2, Comment 7.

7. See the response to Letter 1G-2, Comment 8.

8. See the response to Letter 1G-2, Comment 9.

9. Comments noted.

1G-4 League of Women Voters of King County South

1. See General Response 2.

2. The Port believes the mitigation proposal will protect downstream users and maintain hydrologic connectivity to Puget Sound.

3. See the response to Letter 1L-6, Comment 6.

4. The wetlands are not being moved to avoid birds around the Airport. The wetlands need to be filled because they are located in areas that Port intends to use to expand the Airport. Many of the functions of these wetlands will be replaced on-site with the exception of bird habitat. To mitigate for that impact, the Port is proposing the mitigation wetland site in Auburn. Tub Lake, Lora Lake, and the Reba Detention Facility will not be disturbed, nor will the majority of the wetlands surrounding them.

5. See the response to Letter 1G-3, Comment 1.

1G-5 Parks, Arts, and Recreation Council

1. Comments noted.

2. See General Response 2.

1G-6 RCAA

1. The public participation process has followed the procedures outlined in the Clean Water Act. See the response to Letter 1G-3, Comment 1.

2. The 20.4 million cubic yards is the fill necessary for the components of the Master Plan Update that require 404 approval (i.e., the third runway, SASA, and the RSAs).

3. See the response to Letter 1G-2, Comment 1.

4. See the response to Comment 1 of your letter.

5. Use of these reliever airports does not meet the purpose and need as it is outlined in the FEIS and FSEIS for the Master Plan Update. As is shown by the PSRC's Major Supplemental Airport Study, a supplemental airport would impact more wetland than would be affected by a third runway at Sea-Tac. See the response to Letter 1E-1, Comment 3.

6. See General Response 5.

7. See General Response 5.

8. See the response to Letter 1L-6, Comment 2.

9. See the response to Letter 1G-2, Comment 6.

10. See the response to Letter 1G-2, Comment 7.

11. See the response to Letter 1G-2, Comment 11.

12. See the response to Letter 1G-2, Comment 7, and Letter 1G-1, Comment 4/5..

13. See General Response 1.

14. Comment noted.

15. See the response to Letter 1G-2, Comments 18 and 19 and Letter 1G-1, Comment 6.

16. See the response to Letter 2G-10, Comment 2.

17. See the response to Letter 1G-2, Comment 22.

18. See the response to Letter 1G-2, Comment 23.

19. See the response to Letter 1G-2, Comment 24.

20. See the response to Letter 1G-2, Comment 25.

21. See the response to Letter 1G-2, Comment 26.

22. Comment noted.

1P-1 Patricia Miller

1. Comments noted.

1P-2 Shirle Falk

1. The Port is being held to the same requirements as other applicants. See the response to Letter 1L-6, Comment 2.

2. Comments noted.

1P-3 Imogene and Warren Pugh

1. The public participation process has followed the guidelines of the Clean Water Act. See the response to Letter 1G-3, Comment 1.

2. See the response to Letter 1G-3, Comment 1.

3. See the response to Letter 1L-6, Comment 2.

4. See General Response 2.

5. Comments noted.

1P-4 Frank Osbun

1. The Port is being held to the same requirements as other applicants.

2. See the response to Letter 1L-3, Comment 4.

3. The Port will be held responsible for mitigating impacts to all affected wetlands. See the response to Letter 1L-6, Comment 2.

4. See General Response 2.

5. Flood plain impacts must be mitigated, which the Port is proposing.

6. A public hearing was held on April 9, 1998.

1P-5 James Bartlemay

1. A public hearing was held on April 9,1998.

2. See the response to Letter 1G-3, Comment 1.

3. See the response to Letter 1G-2, Comment 7.

1P-6 Greg Wingard

1. The public participation requirements of the Clean Water Act are being adhered to.

2. See the response to Letter 1G-3, Comment 1.

1P-7 Wilma Steigers

1. A public hearing was held on April 9,1998. The Port is being held to the same requirements as other applicants.

1P-8 A. Brown

1. A public hearing was held on April 9, 1998.

2. The comment period was extended for an additional ten days after the hearing.

3. See the response to Letter 1L-6, Comment 2.

4. An approved monitoring plan for the mitigation project will be a condition of the final permit.

5. See the response to Letter 1G-2, Comment 20.

6. This comment appears to refer to the construction at the North Employee Parking Lot. See the response to Letter 1L-6, Comment 6.

7. The airport with the third runway will not be beyond "practical capacity" when the third runway is completed. This issue was discussed at length in Chapter 2, pages 2-1 through 2-28 of the FSEIS.

8. See the response to Letter 1L-6, Comment 2.

9. See the response to Comment 4 of this letter.

10. See the response to Letter 1G-1, Comments 4 and 5.

11. See the response to Letter 1G-1, Comments 4 and 5 and General Response 6. Regarding the comment concerning the "non-standard" design of the retaining wall, retaining walls are designed and engineered to serve an intended purpose. Any retaining walls used in the Third Runway embankment represent walls that can be engineered and designed.

12. The FEIS and FSEIS are supporting documents to the permit application; references to information in them is entirely appropriate.

13. See the response to Letter 1G-1, Comments 4 and 5.

14. See the response to Letter 1G-1, Comments 4 and 5.

15. See the response to Letter 1G-2, Comment 7.

16. See the response to Letter 1P-22, Comment 2.

17. The Port will be required to abide by any conditions that are made part of the final permit.

18. These wetlands provide minimal wildlife habitat. However, it is true that if wildlife using the wetlands did not flee as construction started (which is highly likely), it would likely be killed.

19. See the response to Comment 18 of your letter.

20. This issue was addressed at page R-156 of the FEIS. Vibration is not expected to have significant impacts to properties in proximity to the construction activity.

21. As stated on page F-132 of the FSEIS, subsurface material over most of the site is primarily till and recessional outwash that has moderate to good bearing capacity, low to moderate compressibility, and is suitable subgrade material. Over-excavation of unsuitable material beneath the proposed new runway, taxiways, and embankment toes would be required, however. Over-excavation would include 10 to 20 ft of soft soils in swales that cross the new runway and north safety areas; two existing fills, ranging from 15 to 42-ft thick; and potentially, soils in wetland areas.

    The Port's 1995 *Seattle-Tacoma International Airport Third Dependent Runway Preliminary Engineering Report* evaluated these areas, and quantified the amount of suitable and unsuitable

soils in the fill placement areas of South 154th/156th Street relocation. Chapter IV, section 19 "Earth" of the FEIS discusses the impacts of the proposed Master Plan Update improvements on earth conditions, including seismic and landslide conditions. Two seismic hazard areas occur on the site of the proposed new parallel runway. Geotechnical investigations indicate these seismic hazards are loose, saturated sediment, about 5 to 20 ft deep, that likely would liquefy during a seismic event. During runway construction, the sediment would be removed and replaced with compacted fill. No new information has arisen to alter this conclusion.

The preliminary assessment indicated that there is little potential for contamination associated with activities that have occurred or currently occur on the undeveloped northwestern portion of the Airport facility. A review of federal and state agency data bases revealed one site north of SR-518, two sites immediately south of South 176th Street, three sites on the Airport, and five sites west of the Airport in the new parallel runway development area that are either confirmed or suspected as environmental contamination risk sites.

The potential for widespread contamination of the area appears relatively low. Localized contamination, however, is likely. Potential risks include soil and groundwater contamination by petroleum products associated with underground storage tanks at existing or former residential properties, current or former gas stations, and commercial and industrial facilities, including the Airport. Any site on which machinery that uses petroleum products operates or is serviced presents a small risk. When working in these areas, proper precautions will be taken and all applicable federal and state requirements will be followed to minimize any risks.

The Port does not currently plan to use contaminated material in the new fill. However, if such fill were used it would be encapsulated in such a manner, in accordance with Federal and State standards, to ensure that risk of spreading does not occur. Suitable construction debris may be used if the material meets the requirements of ensuring that the embankment is stable.

22. Pages IV.23-8 through IV-23-10 of the FEIS includes a discussion of fugitive dust emissions during construction and proposed mitigation measures.

23. The FEIS and FSEIS are a comprehensive analysis of the environmental impacts of the project. See the response to Letter 1G-2, Comment 20.

24. See the response to Comment 21 of your letter. Following these reports, Ecology contacted the Port and a site visit was conducted. Ecology was satisfied that the reports were in error.

25. See the response to Letter 1L-6, Comment 6.

26. As stated on page F-135 of the FSEIS, the presence of existing low permeability silts, clays, and glacial till between potential sources of contamination and the aquifers restricts infiltration and percolation of contaminants originating on the ground surface downward into the aquifers. For this reason, the aquifers currently have low susceptibilities to contamination and are unlikely to be adversely affected by Airport operations. There are no reports of contamination to this aquifer from Airport activities.

27. See the response to Comment 21 of your letter.

28. See General Response 6.

29. This appears to be a question regarding the NDPES permit. See the response to Letter 1G-1, Comments 4/5.

30. See the response to Letter 1G-2, Comment 7.

31. See General Response 6.

32. The Port stands by its evaluation of the wetlands.

33. See the response to Letter 1E-1, Comment 3.

34. Comments noted.

35. The 100-year floodplain study on upper Miller Creek between Lake Reba and South 156th was recently revised and updated by the Federal Emergency Management Agency (FEMA), the agency responsible for overseeing national flood control and disaster assistance. A revised floodplain map was made effective on May 16, 1995. The detailed study accounts for new development up to the time of the study, and includes the affects of the Miller Creek Detention Facility. New development since the study and in the future, including the Master Plan Projects, are required to provide storm water controls, which means that there would be no more increased flow through the flood study area. Further study updates are not needed.

    The proposed fill in the Miller Creek floodplain will be mitigated on the west side of the floodplain (opposite the fill area) to ensure that there would be no increased flood stage as a result of the project. The Port will own most of the floodplain between the Miller Creek Detention Facility and 156th and would not fill additional floodplain without mitigation.

36. See General Response 6.

37. See General Response 6.

38. There are a number of potential sources of fill. The Port has been approached by numerous contractors with fill to sell, however, no decisions have been made at this time. All material will be analyzed to determine its quality and will be rejected if it is not appropriate.

39. See the response to Comment 38 of your letter.

40. The environmental impacts of the proposal were thoroughly discussed in the FEIS and FSEIS.

41. Without specific examples, it is difficult to address your concern regarding how farmlands, wetlands, or tributaries were portrayed in the EIS.

42. See the response to Letter 1G-2, Comment 11.

43. See General Response 6.

44. As stated in the FEIS (page F-117), the Port is aware of the presence of peat on Port-owned land in the Airport vicinity. Areas of known peat presence are in the vicinity of Tub Lake, in the area north of South 154th Street (between 16th and 24th) and near the Northwest Ponds. Based on the preliminary engineering analysis, no peat is known to exist in the area where the Third Runway will be built. However, during the preliminary engineering effort, the Port did consider how the

embankment could be engineered if peat were discovered. It was found that the embankment could be engineered in such a manner that the peat is not removed and the embankment would be reinforced/strengthened to allow stabilization.

45. All the actions currently taking place are allowed under law. There is no evidence to support the allegation that the Port's previous analysis of the project impacts is "obsolete".

46. Air traffic safety issues were discussed at pages IV.7-17 through IV.7-22 of the FEIS.

47. The assumptions and estimates made in the environmental analysis were appropriate. See the response to Letter 1G-2, Comment 20.

48. See the response to Comment 47 of your letter.

49. See the response to Letter 1E-1, Comment 3.

50. The Port has prepared a financing plan for the proposed improvements and determined that the improvements can be completed through use of funding from the Aviation Trust Fund, use of Passenger Facility Charges (the $3 ticket tax), and bond financing. The proposed financing plan does not rely on the Port's overall County tax levy, which has not been used at Sea-Tac Airport to finance past improvements.

The cost of the proposed Master Plan Update improvements presented in the Final EIS represented the cost of the project without escalation and taxes. The cost of the Third Runway was identified in the Final EIS as $450 million (acquisition, runway, and mitigation) while the entire Master Plan Update was estimated at about $1.6 billion. Since the issuance of the Final EIS, the Port has prepared its financing plan for the runway, representing the new construction schedule assessed in the Draft Supplemental EIS. With the new construction phasing, the Port was then able to estimate cost escalation and taxes, increasing the cost of the runway to $587 million. Included in the new cost evaluation is a 30% contingency. Independently, the FAA has reviewed the cost estimates and determined that they have been formed using standard methods and reflect a reasonable planning level cost estimate.

In February 1997, the Port of Seattle released a financing plan in response to Port Commission Resolution 3212. Key elements of the financing plan are:

1. Port seeking maximum amount of Federal funding from the Aviation Trust Fund. Since issuance of the FSEIS, the Port has received a letter of intent from the FAA for $161 million. In addition, the FAA has committed discretionary funding to the third runway;
2. Port leveraging the Passenger Facility Charge, as many other airports have begun to do. Approximately $100 million of the runway would be funded in this manner;
3. Approximately $27 million from Airport retained earnings expected over the next five years;
4. Issuance of Airport revenue bonds to be paid back by the airlines operating at the Airport. Two bond issues are currently envisioned: $30 million which was issued in 1997 and about $170 million which would be issued in 2001; and
5. No local real property taxes would be used and funds from the Port tax levy would not be used - such that all costs are paid for or recovered through airport user fees.

In March 1998, the Port of Seattle's bond rating was increased based on the financial communities belief that Port is well suited to implement its capital programs and has sufficient sources of funds to cover the costs of these improvements.

51. See the response to Comment 47 of your letter.

52. See the response to Comment 47 of your letter.

Enclosure B – These comments were addressed in the FSEIS (see Appendix F, Volume 2).

1P-9 Patricia Emerson

1. The public hearing was held April 9, 1998.

2. See the response to Letter 1G-3, Comment 1.

1P-10 Philip Emerson

1. The public hearing was held April 9, 1998.

2. See the response to Letter 1G-3, Comment 1.

1P-11 Janice Clark

1. The proposal does not include filling all wetlands around the Airport. See the response to Letter 1G-3, Comment 1.

2. The FAA Advisory Circular recognizes that many airports were originally sited near resources that are wildlife attractants, particularly open water bodies. The FAA guidance is not an attempt to remove or modify existing natural features, unless they serve as attractants to such hazards. Instead, the FAA guidance reflects issues that must be considered in siting new resources, such as wetland mitigation sites.

3. A Biological Assessment completed under Section 7 of the Endangered Species Act found that the no significant impacts on threatened or endangered species are expected as a result of the proposal.

4. See the response to Comment 1 of your letter.

1P-12 Harvey Pittelko

1. The Corps is assessing the Port's proposal under the regulatory analysis requirements of the Clean Water Act, as it does with all permit applications it receives. See General Response 1.

1P-13 Stanley Scarvie

1. The Port is being treated as any other applicant.

2. See General Response 2.

3. A public hearing was held April 9, 1998.

1P-14 Arlene Weidel

1. Comments noted.

2. Comments noted.

3. Comments noted

4. Comments noted.

1P-15 George Badalich

1. The FAA Advisory Circular recommends against placing wildlife attractants, including open water features, within 10,000 ft of an active jet runway. See General Response 2.

1P-16 Thomas Beach

1. The Port is being held to the same standards as any other applicants. See General Response 1.

2. Chinook salmon are not found in Miller or Des Moines creeks. The mitigation site, however, is adjacent to the Green River, one of the most important chinook habitats in the area. Implementation of the mitigation proposal will be beneficial to chinook salmon.

3. Comments noted.

1P-17 Barbara Stuhring

1. See the response to Letter 1G-3, Comment 1.

2. The public hearing was held April 9, 1998.

1P-18 Richard and Dorothy Wilson

1. These wetlands provide minimal wildlife habitat. However, it is true that if wildlife using the wetlands did not flee as construction started (which is highly likely), it would likely be killed.

2. Comments noted.

3. Comments noted.

4. See the response to Letter 1E-1, Comment 3.

1P-19 Ingrid Barrett

1. The groundwater conveyance functions of the wetlands have been considered in the mitigation proposal. That feature will be mitigated for in the basin. See General Response 2.

1P-20 Tracy Lee Brink

1. See the response to Letter 1L-6, Comment 2 and Letter 1L-3, Comment 4.

2. See the response to Comment 1 of your letter.

3. Several mitigation projects in Washington State have included habitat mitigation in watersheds outside of the basin of impact. For example, Paine Field has recently entered into a Memorandum of Agreement with resource agencies for a wetland mitigation bank that includes wetland habitat mitigation in a watershed adjacent to the watershed of impact. Seattle City Light has negotiated Roosevelt Elk and wetland habitat mitigation in the Nooksack drainage basin to compensate for impacts associated with three reservoirs constructed in the Skagit River basin. Wetland mitigation projects for highway improvements, completed by the Washington State Department of Transportation, often consolidate impacts to several smaller wetlands into a larger wetland several miles from the area of impact.

4. See the response to Letter 1P-4, Comment 5.

1P-21 "Concerned Citizen"

1. Comments noted.

1P-22 Helen Kludt

1. See the response to Letter 1G-3, Comment 1.

2. A substantial amount of change has occurred in the Miller Creek Basin since this settlement. This case related to storm water runoff and flooding in the vicinity of Miller Creek, among other matters. In the settlement agreement, the Port agreed to undertake certain steps regarding drainage detention. The concerns addressed in the settlement agreement, i.e., storm water detention, have been considered with regard to the Master Plan Update projects, as documented in the FEIS and Supplemental EIS. Storm water detention to address storm water runoff from the Master Plan Update improvements is included in the Master Plan Update and assessed in the FEIS/Supplemental EIS. Also concerns with flooding in Miller Creek led to a desire to not increase in-stream flows. As is shown in the FEIS, the proposed Master Plan Update improvements will not increase in-stream flows (see FEIS, Chapter IV, Section 10 "Water Quality and Hydrology").

3. See General Responses 1 and 2.

4. Comments noted.

1P-23 Charles Green

1. The public hearing was held April 9, 1998.

2. The FEIS and FSEIS contain this information.

3. These alternatives were analyzed and rejected.

4. See the response to Letter1L-6, Comment 2.

5. Comments noted.

1P-24 Barbara Rodda

1. The public hearing was held April 9, 1998.

2. The Corps is assessing the Port's proposal under the regulatory analysis requirements of the Clean Water Act, as it does with all permit applications it receives. See General Response 1.

3. Comments noted.

1P-25 Barbara Bader

1. See the response to Letter 1G-3, Comment 1.

1P-26 Ann Bonney

1. Comments noted.

1P-27 George and Loretta Bowers

1. A public hearing was held on April 9,1998.

2. Without specifics regarding the completeness and accuracy of the application, it is difficult to address your concerns.

3. See the response to Letter 1G-2, Comment 11.

4. These topics have been the subject of extensive study and analysis, including three environmental impact statements (the Flight Plan EIS, the FEIS, and the FSEIS).

5. See the response to Comment 4.

6. See the response to Letter 1G-3, Comment 1.

1P-28 Minnie Brasher

1. A public hearing was held on April 9,1998.

2. The comment period was extended for an additional ten days after the hearing.

3. See the response to Letter 1L-6, Comment 2.

4. See the response to Letter 1E-1, Comment 3.

5. See General Response 6.

6. See the response to Letter 1L-6, Comment 2.

7. Wetlands 28, 52, 53, and 55 would be affected by the SASA development. The impact of 1.70 acres is accounted for in the total project impact number of 8.59 acres.

8. See General Response 6.

9. See General Response 2.

10. A water quality certification (401 permit) is required of any applicant for a federal license or permit to conduct any activity that may result in any discharge into surface waters. The federal agency (in this case, the Corps) is provided a certification from the state (Ecology) that the discharge complies with the discharge requirements of federal law and the aquatic protection requirements of state law. The timing of the certification is tied to the Corps permit application. In other words, the review occurs concurrently, but a 404 permit is not issued until the state certifies the discharge.

11. See the response to Letter 1L-6, Comment 4.

12. The Public Notice only lists the volume of fill associated with the third runway, runway safety areas and SASA – those projects that would involve wetland fill.

13. Lake Burien would not be affected by the project.

14. See General Response 3.

15. See General Response 6.

16. Comments noted.

17. The Port's position is that there will be an overall benefit to wetlands in the region after construction of the project and mitigation because several isolated, lower functioning wetlands would be replaced by a larger, ecologically-diverse wetland.

1P-29 David Dorough

1. It is difficult to tell from your description which wetland you are referring to. Wetlands 45 and 28 are both large wetlands in the general area you describe. Neither would be affected as a result of the proposal.

1P-30 Michael and Maria Little

1. The City of Auburn may elect to receive cash instead of the excess property the Port does not use for the mitigation wetland. The Port will retain ownership of the wetland.

2. The procedures of the Clean Water Act are being followed. See the response to Letter 1L-3, Comment 4.

3. Wetlands were not filled for the North Employee Parking Lot project.

4. See General Response 6.

5. See the response to Letter 1P-8, Comment 35.

6. The public hearing was held April 9, 1998.

1P-31 Joan McGilton

1. See General Response 2. To clarify, the Green River basin is part of the Puget Sound basin.

2. The public hearing was held April 9, 1998.

1P-32 Jack Provo

1. Comments noted.

2. Comments noted.

3. Comments noted.

1P-33 Cheryl Sack

1. Comments noted.

1P-34 Barbara Stuhring

1. See the response to Letter 1E-1, Comment 3.

2. In a letter dated October 31, 1997 from Gina Marie Lindsey (Port of Seattle Aviation Director) to Ms. Barbara Stuhring, the Port states "...the third runway is being built for two express purposes. First, to allow the airport to function more efficiently and safely during poor weather and low visibility conditions. Second, the runway will assist the airport in meeting projected increases in traffic into the next century." The FEIS/FSEIS clearly articulate the purpose and need for the third runway: "*Improve the poor weather airfield operating capability in a manner that accommodates aircraft activity with an acceptable level of aircraft delay*". As the EIS's showed, existing poor weather conditions require Sea-Tac Airport to reduce from two arrival streams to a single arrival stream. The consequence of this operational constraint is an increase in delay, congestion, and creation of operational inefficiencies. As is noted in the EIS's, as airport activity increases, delay and congestion are expected to increase exponentially. As a result, the third runway will enable Sea-Tac Airport to efficiently handle today's activity levels, as well as those that are currently projected to occur during the reasonably foreseeable future.

3. As explained on page I-18 of the FEIS, when the runways at Sea-Tac were originally built, the RSAs met the FAA standards. The FAA revised the standards because of a number of aircraft overruns and other incidents at airports around the U.S. The FAA is requiring the Port of Seattle to meet these new standards as it is requiring other airport operators around the country.

   The 34R RSA filled less than 5,000 ft^2 of wetland (as noted in the MDNS issued for that project in April 1996). The filling of this wetland was completed subject to a Nationwide 26 permit issued to the Port of Seattle by the U.S. Army Corps of Engineers (reference no. 93-4-00066).

4. See General Response 3.

5. Section 17 "Endangered Species of Flora and Fauna" of the Final EIS notes the nesting eagles at Angle Lake, located east of the existing airfield and other known eagle nesting locations in the communities near Sea-Tac. A biological assessment was prepared for the Final EIS, which confirmed that the Master Plan Update improvements would not adversely affect the habitat of the bald eagles.

6. As stated on page 4 of the Public Notice, the Port is preparing a Memorandum of Agreement for the sound insulation of the school in accordance with Section 106 of the National Historic

Preservation Act. That process includes review and coordination by the Washington State Office of Archaeology and Historic Preservation, and the Advisory Council on Historic Preservation, as appropriate. The school is not presently on the Register, but it is potentially eligible.

7. See General Response 6.

8. The Port has a Wildlife Management Plan (Appendix A) which it actively implements. See General Response 2 and the response to Letter 2G-10, Comment 2.

9. As stated on page F-40 of the FSEIS, the Master Plan Update FEIS and FSEIS assessed the differences between the SASA as proposed in the SASA EIS and the uses that would be contained in the SASA area as proposed in the Master Plan Update. That analysis updated the information from the SASA EIS and is supported by the ROD for the Master Plan Update.

10. As stated on page F-39 of the FSEIS, the present fuel storage facility maintains a 22-day supply. When 441,000 annual operations occur, the existing capacity could be reduced to about a 13-day supply; with 474,000 annual operations the supply could be about 11 days. Commercial airports typically operate with a 7 to 10 day supply. Therefore, with the present approach to fueling and forecast activity levels, expansion of the fuel storage facilities is not anticipated.

    The Port is presently considering ways of addressing terminal area aircraft fueling needs. The FEIS and FSEIS assumed that the existing terminal needs are met using the existing fueling system, while a hydrant fueling system would serve the North Unit Terminal. Any changes in this approach would be subject to the applicable environmental evaluations.

11. Copies of this material are available at Federal Center South, 4735 E. Marginal Way South, Seattle.

12. The Port has not initiated any site work at the Airport that would require 404 approval.

13. See the response to Letter 1G-2, Comment 7.

1P-35 Linda Bittenc

1. See General Response 2. The Port property in Auburn is approximately 69 acres, the vast majority of which is not wetland. Approximately 2.69 acres of wetland could be affected by the mitigation project.

1P-36 Richard Doane

1. The Port is being treated like any other applicant. See the response to Letter 1P-12, Comment 1.

2. See the response to Letter 1G-3, Comment 1.

3. Comments noted.

4. Comments noted.

1P-37 Evelyn Blake

1. A public hearing was held on April 9,1998.

2. See the response to Letter 1P-12, Comment 1.

1P-38 Joyce Kobela

1. See the response to Letter 1G-3, Comment 1.

1P-39 Doug Osterman

1. Comments noted. See General Response 2.

2. See the response to Letter 1C-1, Comment 1.

3. See the response to Letter 1C-1, Comment 1.

1P-40 George and Loretta Bowers

1. A public hearing was held on April 9,1998.

2. See the response to Letter 1G-3, Comment 1.

1P-41 Henry Frause

1. The U. S. Army Corps of Engineers has been regulating activities in the nation's waters since 1890. Until the 1960's the primary purpose of the regulatory program was to protect navigation. Since then, as a result of laws and court decisions, the program has been broadened so that it now considers the public interest for both the protection and utilization of water resources.

   For this permit, the regulatory authority and responsibility of the Corps is based on Section 404 of the Clean Water Act (33 U.S.C. 1344). Section 301 of this Act prohibits the discharge of dredged or fill material into waters of the United States without a permit from the Corps.

1P-42 Robert Schweitzer

1. See the response to Letter 1G-2, Comment 7.

2. See the response to Letter 1L-6, Comment 2.

3. See General Response 6.

4. A discussion of declared distances is found on page 5-5-8 of the FSEIS. As stated, the FAA noted to the Port in a February 1993 letter "The FAA strongly recommends that declared distances not be used at Seattle-Tacoma International Airport. Aircraft operations during low visibility conditions are major concern. Declared distance lighting would be required in addition to low visibility lighting and result in a confusing lighting system during low visibility operations. We recommend you consider relocating the threshold to adjoin the starting boundary of the RSA" (Letter from Paul Johnson, Civil Engineer, Seattle Airports District Office to the Port of Seattle, February 19, 1993)

5. See General Response 2.

1P-43 Glenn Brink

1. See the response to Letter 1G-3, Comment 1.

1P-44 P.H. Matthews

1. See the response to Letter 1E-1, Comment 3.

1P-45 Robert Bianco

1. The Port's application is being treated the same as any other. See the response to Letter 1P-12, Comment 1.

1P-46 Anna Denton

1. See the response to Letter 1P-18, Comment 1.

2. The public hearing was held April 9, 1998.

3. The Corps will require the Port to conduct long-term monitoring of the mitigation to ensure that it is meeting pre-established performance standards. The Port will be responsible for implementing contingency measures developed with the Corps and other resource agencies if the monitoring finds that standards are not being met.

4. The public hearing was held in Tukwila at the Foster Performing Arts Center, near the Airport.

1P-47 Pegi Kobela

1. See the response to Letter 1G-3, Comment 1.

2. Comments noted.

3. The Port is being treated like any other applicant. See the response to Letter 1P-12, Comment 1.

4. Comments noted.

1P-48 Carl Preusser

1. See the response to Letter 1G-3, Comment 1.

2. Several NEPA/SEPA EISs have been prepared and approved for the project. The Corps was a cooperating agency in the preparation of the 1996 FEIS for the Master Plan Update Improvements and the 1997 FSEIS. No appeal in litigation challenging the adequacy of the EIS or SEIS under NEPA has been filed. But even if an appeal is filed, the Corps' continuing to process the permit and even eventually issuing it will not make the Corps noncompliant with NEPA.

3. Chapter IV, Section 6 (Social Impacts) of the FEIS includes a full discussion of environmental justice issues. See General Response 2 regarding in-basin mitigation.

1P-49 David Wagner

1. The public hearing was held April 9, 1998. The draft Advisory Circular was finalized and signed on May 1, 1997. General Response 2 outlines the functions of the wetlands that will be replaced in the basin.

   Ratios are determined by the resource agencies through the permitting process. The Corps and the other resource agencies are considering these now.

   It is true that birds may still affect operations at the Airport. That is why the FAA requires the Port to write and maintain a Wildlife Management Plan (Appendix A). The retention ponds you describe will be designed not to have standing water in them for extended periods of time so they will not attract birds. If necessary, they may also have netting placed over them.

2. The Corps is continuing to consider the terms of the permit.

3. See General Response 2. All functions except wildlife habitat will be replaced in the affected basin.

4. See the response to Letter 1L-6, Comment 2.

5. See the response to Comment 1 of your letter.

6. See General Response 2. All functions except wildlife habitat will be replaced in the affected basin.

7. These types of conditions are part of the permit process, which is being conducted now. The Corps will require an adequate monitoring period to ensure project success.

8. See the response to Comment 1 of your letter.

9. See the response to Comment 1 of your letter.

1P-50 Greg Wingard

1. See the response to Letter 1G-3, Comment 1.

2. An errata sheet was issued with the notice of the Public Hearing.

3. See the response to Letter 1G-3, Comment 1.

4. The impacts to Walker Creek are accounted for in the mitigation proposal. Walker Creek, a tributary to Miller Creek, will benefit from the upstream improvements to Miller Creek. Walker Creek is fed from groundwater seeps. The drainage channel mitigation discussed in the Public Notice is designed to maintain this connection.

5. See the response to Letter 1G-1, Comment 3.

6. See General Response 2.

7. The design of the North Employee Parking Lot was modified to avoid impacts to waters of the United States. The construction impacts you mention in your comment were inadvertent. The Corps has inspected the site and is satisfied with the remediation conducted by the Port. See the response to Letter 1L-6, Comment 6.

8. See the response to Comment 1 of your letter.

1P-51 Mike Anderson

1. Comments noted.

2. The technology to build large embankment projects is well understood.

3. The Department of Ecology issues 401 permits. Section 401 of the Clean Water Act requires a water quality certification for a federal license or permits to conduct any activity that may result in any discharge into surface waters. This includes discharge of dredge and fill material into water or wetlands.

4. Comments noted.

5. Comments noted. The Flight Plan Study and the Major Supplemental Airport Study analyzed these regional airport siting questions. See the response to Letter 1E-1, Comment 3.

6. See General Response 5.

7. See the response to Letter 1G-3, Comment 1.

1P-52 Debi DesMarais

1. The Corps has forwarded copies of the comment letters it has received and good faith efforts have been made to respond to the comment letters.

2. See General Response 3 regarding the need for SASA. The wetlands impacted by the RSA project were permitted under a previously approved Nationwide 26 permit. See the response to Letter 1P-34, Comment 3.

   See the response to Letter 2G-10, Comment 5 concerning Des Moines Creek.

   The SASA project will affect 1.7 acres of wetlands. See the response to Letter 1G-2, Comment 11 for a discussion of the previously proposed SASA wetland mitigation.

3. See the response to Comment 2 of your letter. Also see the response to Letter 1P-50, Comment 7.

4. No wetlands by Tub Lake will be affected by the proposal.

5. See the response to Comment 2 of your letter.

6. We are unable to determine the settlement agreement you are referring to. The impacts attributable to SASA are discussed in the FEIS, FSEIS, and the Public Notice. See General Response 3.

7. See General Response 2. See the response to Letter 2G-10, Comment 2 for a discussion of the FAA Advisory Circular. See the response to Letter 1G-2, Comment 11 for a discussion of the previously proposed SASA wetland mitigation.

8. See the response to Letter 1G-1, Comment 3.

9. The Port successfully worked with the Seattle Water Department during the development of the North Employee Parking Lot to satisfy the Department's concerns. The Port will not fill wetlands without a permit.

   Regarding wetlands on property not currently owned by the Port, see the response to Letter 1L-6, Comment 2.

10. See General Response 1.

11. This permit application is for the projects that are part of the Port's Master Plan Update. The other projects you list (some of which have proponent's other than the Port), if they are initiated, will be the subject of separate applications.

12. See the response to Letter 1P-50, Comment 4.

13. As stated on page 4, the Flight Plan EIS was a SEPA document. The SASA EIS was prepared under the guidelines of NEPA and SEPA. Contrary to your statement, the SASA EIS included a cumulative affects analysis and analyzed the project for impacts to all environmental factors, including air and water quality.

14. See the response to Letter 1G-2, Comment 7.

1P-53 Colleen Derry

1. Comments noted. A public hearing was held April 9, 1998.

1P-54 H. Ted Dunham

1. Comments noted.

2. Comments noted.

1P-55 Susan Osterman

1. A public hearing was held April 9, 1998.

2. Comments noted.

1P-56 Greg Wingard

1. The Department of Ecology is aware of the Port's actions regarding the North Employee Parking Lot. See the response to Letter 1L-6, Comment 6.

1P-57 Michael Wray

1. Comments noted. See the response to Letter 1L-6, Comment 6.

2. See General Response 2.

1P-58 Ann Bonney

1. See the response to Letter 1P-26, Comment 1.

1P-59 Helen Kludt

1. Comments noted.

2. Comments noted. As stated on page F-34 of the FSEIS, contrary to your comment, on-time performance has declined at the Airport.

3. Chapter 1 of the FEIS reviews the regional decision-making process that culminated in this proposal. See the response to Letter 1E-1, Comment 3.

4. Comments noted.

1P-60 Tyson Dickman

1. Your example is not analogous. See General Response 2.

2. The Port is required to manage wildlife. See General Response 2.

3. See the response to Letter 1L-6, Comment 6.

1P-61 L.A. Hulsman

1. Comments noted.

1P-62 Debi Jones

1. See the response to Letter 1L-3, Comment 4.

2. See the response to Letter 1L-6, Comment 2.

3. See General Response 2.

4. As stated on page 5-5-21 of the FSEIS, approximately 9,630 cubic yards of floodplain storage would be lost in the proposed fill area due to the Master Plan Update Improvements. Approximately 10,000 cubic yards of floodplain storage and floodway conveyance would be created, not including storage for the proposed stream channel.

1P-63 Rosemarie McKeeman

1. See the response to Letter 1G-3, Comment 1.

2. The hearing was held in the Foster Performing Arts Center in Tukwila.

3. See the response to Letter 1L-6, Comment 2.

4. See General Response 2.

5. The Corps treats all applicants in a similar manner. See the response to 1P-12, Comment 1.

1P-64 Barita Reister

1. Comments noted.

1P-65 Alan Sawtelle

1. See the response to Letter 1L-3, Comment 4.

2. See the response to Letter 1L-6, Comment 2.

3. See General Response 2.

4. As stated on page 5-5-21 of the FSEIS, approximately 9,630 cubic yards of floodplain storage would be lost in the proposed fill area due to the Master Plan Update Improvements. Approximately 10,000 cubic yards of floodplain storage and floodway conveyance would be created, not including storage for the proposed stream channel.

1P-66 Todd Speer

1. The Corps treats all applicants in a similar manner. See the response to Letter 1P-12, Comment 1.

2. The public hearing was held on April 9, 1998.

1P-67 Group Letter

1. See the response to Letter 1L-6, Comment 2.

2. The Corps is following the procedures outlined in the Clean Water Act.

3. See the response to Letter 1G-2, Comment 4.

4. The fact that some issues are in litigation does not prohibit the Corps from continuing its review of the application. For specifics on the NPDES issues, see the response to Letter 1G-1, Comment 4/5.

5. See the response to Letter 1G-2, Comment 11.

6. See General Response 1 and the response to Letter 1E-1, Comment 3.

1P-68 Group Letter

1. See the response to Letter 1G-3, Comment 1.

Transcript of Joint Corps/Ecology Public Hearing (April 9, 1998)

State Senator Julia Patterson

1. See the response to Letter 1E-1, Comment 2.

2. See the response to Letter 1E-1, Comment 3.

3. See General Response 2.

State Senator Michael Heavey

4. See the response to Letter 1P-59, Comment 2.

5. See the response to Letter 1E-1, Comment 3.

6. See Letter 1F-1 and General Response 2.

Jennifer Holms on behalf of Metropolitan King County Councilmember Chris Vance

7. See the response to Letter 1E-1, Comment 2.

8. See the response to Letter 1G-1, Comment 4/5.

9. See the response to Letter 1C-1, Comment 3.

Kathleen Quong-Vermeire, Normandy Park City Councilmember

10. Lake Reba is carefully controlled to prevent discharge of turbid storm water by closing the outlet gate. Storm water is slowly released from the lake to ensure compliance with the requirements of the Port's NPDES permit. This slow, controlled release of storm water from the lake has no adverse impacts on Miller Creek and in fact may improve creek hydrology by delaying and reducing downstream peak flows.

    Sediment collected in the lake since its construction will be dredged this summer (1998). The lake will return to normal operation after dredging is completed.

11. The receipt of fines for violations is not a 404 matter.

12. This is not a 404 concern.

13. Comments noted.

Terry Brazil, Des Moines Mayor Pro Tem

14. Comments noted. See the response to Letter 1C-1, Comment 3.

15. See General Response 2.

16. Comments noted.

17. See General Response 2.

Tony Paisecki, Des Moines City Manager

18. Comments noted. See General Response 2.

State Representative Karen Keiser

19. Comments noted.

20. The Port has prepared and released a financing plan as stated on page F-41 of the FSEIS.

21. See General Response 2.

22. See the response to Letter 1E-1, Comment 2.

State Representative Jim McCune

23. See the response to Letter 1G-1, Comments 4/5.

24. See the response to Letter 1E-1, Comment 2.

Don Newby, Burien City Councilmember

25. Comments noted.

Carolyn Read, Federal Aviation Administration

26. Comments noted.

Eric Johnson, Washington Public Ports Association

27. Comments noted.

Randy Taylor

28. See General Response 6.

Kathleen Quong-Vermeire

29. Comments noted.

J. Gary Oldenburg, United States Department of Agriculture

30. Comments noted.

Mike Linnell, United States Department of Agriculture

31. Comments noted.

Dan Caldwell

32. See General Response 6.

33. See General Response 6.

Randall Parsons, City of Burien Planning Commission Chair

34. The affected wetlands are not within the jurisdiction of the City of Burien.

35. Comments noted. See General Response 2.

36. Comments noted.

37. Comments noted.

LeeAnne Walker, Washington Airport Management Association

38. Comments noted.

John Rankin, Airport Communities Coalition

39. The Corps is following the public participation process as outlined in the Clean Water Act and its implementing regulations.

State Representative Dow Constantine

40. Comments noted.

Stuart Creighton, Normandy Park City Councilmember

41. See the response to Letter 2G-10, Comment 2.

42. See General Response 2, particularly Figure 3.

43. For a discussion of Airport storm water, see the response to Letter 1G-1, Comments 4/5.

44. See General Response 2.

Bill Arthur, Segale Business

45. Comments noted.

John Delvento

46. Comments noted.

John Wiltse, Normandy Park Mayor

47. The Port reviewed many sites before choosing the one in Auburn. See General Response 2 and Section 3.2.3 of the Wetland Mitigation Plan that was attached to the JARPA application submitted to the Corps in December 1996.

Tom Roush, Sea-Tac Business Committee, Southwest King County Chamber of Commerce

48. Comments noted.

Charles Frame, Baker Commodities

49. Comments noted.

50. The actual acreage of the proposed mitigation is closer to 25 acres.

Bruce Robertson

51. See the response to Letter 1E-1, Comment 2.

Bruce Harpham

52. The Port and the City of Auburn, with consultation from the Corps, carefully considered how the proposal fit with the proposed Mill Creek Special Area Management Plan. The mitigation site is not within the boundary of the designated Special Area. Also, establishment of wetlands on the site does not conflict with or preclude mitigation or development opportunities within the Mill Creek basin. For those reasons, it was concluded that the proposal does not conflict with the SAMP, which has not been finalized.

53. See General Response 2.

54. Comments noted.

55. Ratios apply to wetland compensation, not stream relocation. The section of Miller Creek to be moved will have adequate buffers on either side.

56. The purpose of the FAA Advisory Circular is to discourage the development of new wildlife attractants (in this case, mitigation wetlands) near airports and to require the management of existing attractants. The AC does not suggest or advise that existing attractants be removed; only that wildlife attracted to them be managed. See the response to Letter 2G-10, Comment 2.

James J. Lilje

57. Comments noted.

Steven Leahy, Greater Seattle Chamber of Commerce

58. Comments noted.

Michael Anderson

59. See General Response 2.

60. Comments noted.

61. Fill will come from approved, permitted sources.

62. There are a number of potential sources of fill. The Port has been approached by numerous contractors with fill to sell, however, no decisions have been made at this time. All material will be analyzed to determine its quality and will be rejected if it is not appropriate.

63. See General Response 5.

Becky Cox, League of Women Voters of King County

64. Wetlands 1 through 8, 10, and 34 will not be affected by the proposal. Of the total 4.08 acres of the other wetlands you identify, 1.31 acres must be filled for the proposal.

65. The straight, angular lines on Sheet 17 of the Public Notice are not meant to represent the actual design of the stream channel but the area in which the stream will move. Sheet 26 is a more accurate representation of the stream design. The stream will be designed to meander as much as is practically possible, given the relatively flat slope of the site.

66. Comments noted.

67. Comments noted.

68. See the response to Letter 1E-1, Comment 2.

69. See General Response 6.

Philip Emerson

70. Neither the Port nor the FAA is proposing to remove all open water within 10,000 ft of the runways. The intent of the mitigation proposal (following the guidance of the Advisory Circular) is to not create new attractants near the Airport. The AC says that if there are existing attractants (for instance, Lora Lake), a Wildlife Management Plan must be implemented. The Port has an approved plan, has been implementing successfully, and will continue to manage the hazard.

71. See the response to Letter 1L-6, Comment 2.

72. Excavation of borrow material could potentially alter wetlands located near a borrow area by altering ground water or surface water conditions in adjacent areas. Except for wetlands that would be eliminated from the borrow source areas, the only wetland located close to a borrow area is Wetland 51. This wetland is downslope of borrow area 1 and adjacent to Des Moines Creek. The wetland should not be impacted by nearby excavation because it is a riparian wetland with its hydrology supported by Des Moines Creek.

73. See General Response 6.

74. These functions of the wetlands will be replaced in the basin. See General Response 2.

75. Comments noted.

Candice L. Corvari – CASE

76. See General Response 6.

77. See General Response 6.

78. See General Response 2.

79. See the response to Letter 1P-8, Comment 21.

80. See the response to Letter 1G-1, Comments 4/5.

81 The Port is not proposing to pipe runoff directly to Puget Sound.

82. There are a number of potential sources of fill. The Port has been approached by numerous contractors with fill to sell, however, no decisions have been made at this time. All material will be analyzed to determine its quality and will be rejected if it is not appropriate.

83. See General Response 5. The other alternatives you list were all reviewed and found to not meet the purpose and need of the project.

Paul Tappel

84. Comments noted.

85. Comments noted.

86. Comments noted.

87. Base flow impacts to Miller and Des Moines Creeks were discussed at page IV.10-11 of the FEIS. More recently, this issue has been addressed in a report prepared by Parametrix, Inc. entitled "*Evaluation of Base Flow Impacts to Miller and Des Moines Creeks*" dated May 1998. A copy of this report is available at the Corps of Engineers, Department of Ecology, and the Port. This report demonstrates that project impacts to the base flow of the creeks will be minimal and, for Miller Creek, reduction of existing water withdrawals from domestic and commercial use will more than compensate for potential base flow impacts.

88. Comments noted.

89. Comments noted.

Russ Richter

90. See General Response 6.

91. See the response to Letter 1G-1, Comments 4/5 for a discussion of stormwater management at the Airport. It is incorrect to state the runoff from the Airport now flows to a wetland.

92. See the response to Comment 70 of the Public Hearing.

93. Comments noted.

Rose Clark

94. See the response to Letter 1G-1, Comment 4/5.

95. See the response to Comment 62 of the Public Hearing.

96. The FEIS and FSEIS fully disclose the probable impacts of the Master Plan Update improvements. As is shown in these documents, the significant adverse environmental impacts can be mitigated, as proposed.

97. Comments noted.

Chris Clifford

98. See the response to Letter 1L-3, Comment 4.

99. See the response to Comment 70 of the Public Hearing.

100. Your opinions regarding the Port's process are noted.

101. Comments noted.

Lawrence Corvari – CASE

102. See the response to Letter 1G-1, Comment 4/5. The proposal does not conflict with the new NPDES permit.

103. There is adequate information available in each of the identified areas for the resource agencies to be able to make their decision.

104. The public comment and public hearing procedures of the Clean Water Act and its implementing regulations have been fully complied with.

Sandy Miedema

105. Comments noted.

Jeff Ferrell

106. Comments noted.

107. See the response to Letter 1P-11, Comment 3.

Simon Miedema – The Sierra Club

108. Fill will only come from approved, permitted sources. The impacts associated with extracting and transporting fill will have been addressed by the environmental documentation associated with the specific fill site.

109. See the response to Letter 1P-8, Comment 21.

110. See General Response 6.

111. See General Response 2.

112. A comprehensive mitigation plan was attached to the JARPA application submitted in December 1996. The details of the plan are the subject of negotiation between the applicant and the permitting authorities.

113. See the response to Comment 20 of the Public Hearing.

114. Your opinion regarding the Port's motivations is noted.

Stuart Weiss

115. See General Response 6.

116. See the response to Letter 1G-1, Comment 4/5.

117. Runoff from the Port is treated according to applicable standards.

118. Comments noted.

Juleen Mattern

119. See General Response 6.

120. No unique species of plant life will be affected by the proposal.

121. See the response to Comment 62 of the Public Hearing.

122. Section 5-4 of the FSEIS states that the fill required for the Master Plan Update improvements is about 24 million cubic yards. For the third runway project, fill material would be hauled over a 5-year period between 1997 and 2002.

123. See General Response 6.

124. See General Response 1.

125. See the response to Comment 70 of the Public Hearing.

126. The permitting process has and will to continue to follow the guidelines of the Clean Water Act.

Molly Nordhaus

127. See General Response 2.

128. Comments noted. See the response to Letter 1E-1, Comment 2.

Joanne Cox

129. Comments noted.

130. The Port will be responsible for the long-term viability of the mitigation site.

131. The Port is not being given special treatment and is following regulations and guidelines. See General Response 1.

132. The impacts of the project were analyzed in a FEIS and FSEIS that have survived every appeal to date.

133. See Comment 132.

Charles Sullivan

134. Comments noted.

Pierre Matthews

136. As stated on page F-118 of the FSEIS, based on the preliminary engineering analysis, no peat is known to exist in the area where the Third Runway embankment will be built. However, during the preliminary engineering effort, the Port did consider how the embankment could be engineered if peat were discovered. It was found that the embankment could be engineered in such a manner that the peat is not removed and the embankment would be reinforced/strengthened to allow stabilization.

136. The FAA Advisory Circular states that wildlife attractants not be sited within 5,000 feet of airports serving piston-powered aircraft, like the Auburn Airport.

Al Furney – RCAA

137. See the response to Letter 1L-6, Comment 2.

138. See the response to Letter 2G-10, Comment 2.

139. See the response to Letter 1G-2, Comment 7.

140. See the response to Comment 20 of the Public Hearing.

141. Comments noted. Mr. Furney has extracted comments from several airlines at Sea-Tac concerning amendments to the Port's collection of the $3 passenger facility charge. He correctly notes that several airlines expressed reservations and concerns with specific approaches to the financing. However, it must be noted that much of the airline concern with the cost of the runway has been resolved through coordination between the Port and airline representatives and the

revised cost used in the Supplemental EIS reflect adjustments requested by the airlines. Other concerns of the airlines surrounded the amount of funds that they would be required to provide, before the FAA had issued its letter of intent. Regardless of these concerns, the airlines have approved the project to proceed, through their approval of the land acquisition and acquisition of fill during the 1997 and 1998 construction season.

142. See the response to Comment 20 of the Public Hearing.

Wallace Meyers

143. The proposed wetlands are not in an existing flood plain. However, the mitigation proposal calls for creating additional 100-year floodplain which will alleviate flooding concerns as the area develops according to Auburn's Comprehensive Plan.

144. The project would impact less than 10 acres of the 144 acres of wetlands in the study area.

145. See the response to Comment 70 of the Public Hearing.

146. See General Response 2.

147. Comments noted.

Mayo Alberigi

148. See General Response 2.

149. See Letter 1S-1 for the Washington Department of Fish and Wildlife's favorable evaluation of the Miller Creek relocation plan.

150. Comments noted.

Loretta Bowers

151. Comment noted

Edmund Ryder

152. Comments noted. The hydrologic functions of the impacted wetland will be replaced in the affected drainage basin.

Dennis Robertson

153. See the response to Letter 1E-1, Comment 3.

154. See the response to Letter 1E-1, Comment 3.

155. Comments noted.

Jane Rees

156. Comments noted.

Nancy Clemingshaw

157. See General Response 5. See Comment 88 regarding impacts to salmon.

Kenneth Wooding

158. If wildlife using the wetlands did not flee as construction started (which is highly likely), it would likely be killed.

Scott McBreen

159. The section of Miller Creek proposed for relocation is a ditch through an actively farmed field. It is currently plowed up to the bank, which leaves little to no riparian vegetation to act as a buffer. See Letter 1S-1 for the Washington Department of Fish and Wildlife's favorable evaluation of the proposed mitigation plan for Miller Creek.

160. The Port is not proposing widening of the160th Street Bridge as part of the Master Plan or this permit application.

161. See the response to Letter 1L-6, Comment 6.

Mary Seccetti

162. See the response to Comment 158 of the Public Hearing.

Pat Pompio

163. See General Response 6.

164. The Port is aware of the Southwest Suburban Sewer District sanitary sewer line in the vicinity of Miller Creek. The design team has contacted the District on several occasions and discussed the approach and requirements for moving the sewer where necessary and protecting the sewer that will not be directly affected. The Port will continue dialogue with the District as detailed design moves forward. Relocation plans will be submitted to the District for review.

165. See General Response 6.

166. Comments noted.

167. See the response to Letter 1E-1, Comment 3.

Jim Bartlemay

168. See the response to Letter 1E-1, Comment 3.

169. The FEIS and FSEIS contain the information on environmental impacts, including traffic.

170. Comments noted. See General Response 4.

171. Comment noted.

172. Your opinion regarding the Port is noted.

Chase Calvin (Chas H.W. Talbot)

173. Page IV.2-7 of the FEIS and page 5-6-6 of the FSEIS discuss Approach Transitional Areas. The FAA has indicated that they could provide funding for the acquisition of properties up to 1,250 ft laterally from the runway centerline and 5,000 ft beyond each end of the primary surface. These properties were included in the FEIS/FSEIS because it is anticipated that upon completion of the new runway, low overflights will be annoying to residents in these areas. During the preparation of the Draft EIS, comments were solicited from affected residents concerning this program. Due to the minimal number of comments received, the FAA has recommended that this acquisition be coordinated with area residents during the 1998 Part 150 Noise Compatibility Planning

The speaker implies that acquisition of these properties will have natural resource impacts. The Port is not proposing to acquire these properties as part of this application. If residential properties are acquired in the future and there is any redevelopment that would cause natural resource impacts, the Port would apply for the appropriate permits.

174. The speaker is referring to an application made by the Port of Seattle to the FAA to enable the Port to impose a Passenger Facility Charge. The funds would be used to partly finance projects in the Master Plan Update. See the response to Letter 1P-8, Comment 50.

175. The wildlife hazard presented by the Tyee Valley Golf Course is actively managed by the Port as part of the Wildlife Management Plan.

176. See the response to Letter 2G-10, Comment 2.

Debbie Reimer – CASE

177. Your example demonstrates the need to manage wildlife near airports.

178. Page F-43 of the FSEIS states:

"The FAA's 1995 Capacity Enhancement Study Update . . . examined the impacts associated with Sea-Tac and Boeing Field. 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."

"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. In many cases, procedures are established so that the reliever airport is subservient to the primary airport."

179. Comments noted. The impacts of the proposal were analyzed in the FEIS and FSEIS.

180. See the response to Letter 1E-1, Comment 3.

Anna Hansen – PARKA

181. See General Response 2.

182. See General Response 2.

Clark Grant

183. Comments noted.

184. The configuration of the new runway relative to the edge of the fill slope will be similar to the relationship with the current westerly runway and the current edge of the fill.

185. You are comparing a controlled situation to a completely uncontrolled situation.

186. The management techniques you list have been and will continue to be used at Sea-Tac Airport. However, such techniques are not nearly as effective in preventing bird strike hazards as creating wetlands away from the Airport.

187. The fact that bird strikes can happen at various altitudes and distances from airports does not diminish the fact that they are more likely to occur at low elevations as airplanes are departing or landing.

188. The fact that there may be other potential safety concerns with air travel besides bird strikes does not result in the conclusion that airports should not be properly designed and managed to minimize bird strike safety issues.

There are many other busy airports in the United States that operate with three parallel runways. These include Dallas-Fort Worth, Atlanta-Hartsfield, Los Angeles, Denver International, Pittsburgh, Salt Lake City, Memphis, and Orlando. This information is presented in Table R-12 of the FSEIS (Volume 4).

189. See the response to Letter 1G-1, Comment 4/5.

Harvey Rowe

190. Comments noted. However, constructed wetlands have proven to be successful when properly designed and monitored.

191. Airport planners and the FAA agree that the proposed runway configuration meets the needs of Sea-Tac.

192. See General Response 6.

193. See the response to Letter 1G-1, Comment 4/5 regarding glycol use at Sea-Tac Airport. Also, the situation you describe would occur at every airport where glycol is used, not just Sea-Tac.

194. See the response to Comment 70 of the Public Hearing.

195. See General Response 6.

196. Comments noted.

197. Comments noted.

Arlene Brown

198. See the response to Comment 188 of the Public Hearing.

199. Chapter 2 of the FSEIS discusses the estimated life of the proposed improvements. The airfield capability of the Airport is forecast to reach its theoretical capacity by 2030 with current air traffic control technology and procedures. The runway is scheduled to be operational by 2005. The majority of impacts to waters of the United States (the subject of the hearing) are due to the construction of the third runway.

200. The Master Plan Update improvements will not reduce air traffic capacity in the region.

201. The assumptions and estimates made in the environmental analysis were appropriate. See the response to Letter 1G-2, Comment 20.

202. See the response to your previous comment.

203. Comments noted.

Rosemarie McKinnen

204. The Advisory Circular is attached as Appendix A.

205. Neither the Port nor the FAA is proposing to remove all existing wildlife attractants within 10,000 ft of the runways. The intent of the mitigation proposal (following the guidance of the Advisory Circular) is to not create new attractants near the Airport. The AC says that if there are existing attractants or hazards, a Wildlife Management Plan must be implemented. The Port has an approved plan, has been implementing successfully, and will continue to manage the hazard.

Doug Osterman

206. See General Response 2.

207. These impacts were analyzed in the FEIS and FSEIS.

208. See General Response 2.

209. Comments noted.

Shirley Basarab – Burien Deputy Mayor

210. See the response to Comment 62 of the Public Hearing.

211. See the response to Letter 1E-1, Comment 3.

212. Comments noted.

213. There will be no wetland impacts within the city limits of Burien.

214. See the response to Comment 173 of the Public Hearing.

215. See General Response 2.

216. See General Response 6.

Letters to the Corps Submitted During Second Comment Period (April 9, 1998 to April 20, 1998)

2F-1 Federal Aviation Administration

1. Comments noted.

2F-2 United States Department of Agriculture – Wildlife Services

1. Comments noted.

2C-1 King County Executive Office

1. Thank you for the clarification.

2L-1 City of Burien Planning Commission

1. Comments noted. See the response to Comment 34 of the Public Hearing and Letter 1G-1, Comment 6.

2L-2 City of Auburn – Office of the Mayor

1. Comments noted.

2L-3 City of Des Moines

1. Comments noted. See General Response 2.

2. See the response to Letter 1G-2, Comment 1.

3. See General Response 4.

4. See the response to Letter 1G-2, Comment 1.

2L-4 City of Auburn

1. Comments noted.

2L-5 Southwest Suburban Sewer District

1. The Port is aware of the Southwest Suburban Sewer District sanitary sewer line in the vicinity of Miller Creek. The design team has contacted the District on several occasions and discussed the approach and requirements for moving the sewer where necessary and protecting the sewer that will not be directly affected. The Port will continue dialogue with the District as detailed design moves forward. Relocation plans will be submitted to the District for review.

2. See the response to Comment 1 of your letter.

3. See the response to Comment 1 of your letter.

4. See General Response 2.

5. See the response to Letter 1P-22, Comment 2.

2L-6 Highline Water District

1. See General Response 6.

2E-1 Burien Councilmember Don Newby

See the response to Comment 25 of the Public Hearing.

2E-2 Normandy Park Councilmember Kathleen Quong-Vermeire

See the response to Comments 10 through 13 of the Public Hearing.

2E-3 Highline Water District Commissioner Kathleen Quong-Vermeire

1. See General Response 6.

2E-4 King County Councilmember Chris Vance

See the response to Comments 7 through 9 of the Public Hearing.

2E-5 State Representative Karen Keiser

See the response to Comments 19 through 22 of the Public Hearing.

2E-6 U.S. Congressmember Jack Metcalf

1. Comments noted.

2E-7 U.S. Congressmember Jennifer Dunn

1. Comments noted.

2G-1 CASE (March 31, 1998)

1. See General Response 4 regarding the use of on-site borrow sources. A conveyor through Des Moines is not currently part of the Port's proposal.

2. See the response to Comment 62 of the Public Hearing.

3. See the response to Comment 72 of the Public Hearing.

4. Chapter IV, Section 9 of the FEIS (at IV.9-1) and Chapter 5 of the FSEIS (starting at page 5-2-1) include a thorough discussion of the air quality impacts associated with the construction and operation of the proposed improvements.

5. See the response to Letter 1E-1, Comment 2. A Biological Assessment attached to the FEIS found that no significant impacts to threatened or endangered species are expected as a result of the proposal.

6. Comments noted.

7. Comments noted. As stated on page F-93 of the FEIS, four schools were identified specifically by the Draft SEIS as requiring sound insulation because the project would increase noise by 1.5 DNL or more within the 65 DNL and greater noise exposure contour over the Do-Nothing noise levels. The contour reflects average noise over a 24-hour period, in accordance with FAA guidelines.

   The Port and the Highline School District are currently entering into a memorandum of agreement concerning the Port funding the District's audit of school facilities. The Port has agreed to fund the effort if the District agrees to use general industry accepted procedures and protocols for such activities.

8. Comments noted.

9. Noise impacts of the Master Plan Update development actions were extensively considered at Section IV.1of the FEIS and Section 5-3 of the FSEIS.

10. Air quality impacts of the Master Plan Update development actions were extensively considered at Section IV.9 of the FEIS and Section 5-2 of the FSEIS. Following review of this and other data in the record, the three federal, state, and local air quality agencies concluded that the Master Plan Update development actions would conform to applicable air quality standards.

11. Your opinion of the Biological Assessment is noted.

12. Appendix K of the Final EIS includes an extensive discussion of bald eagle use of the area. Nine of the eleven exhibits focus on bald eagles.

13. The FEIS and FSEIS both provided a cumulative impact analysis, as required by NEPA and SEPA.

14. The Port and the FAA have independently concluded that the proposal meets the purpose and need of the project.

15. Your opinion regarding the analysis of the Do-Nothing alternative is noted. See the response to Letter 1G-2, Comment 20.

16. See the response to Comments 10 and 15 of your letter.

17. Comments noted.

18. The Governor's Certificate does not certify the air or water quality of the project. Instead, it certifies that the Governor has reasonable assurance that the project can be located, designed, built, and operated in accordance with air and water quality standards.

19. Aviation forecasts prepared by the Port and FAA are reasonable predictions of future aviation activity. They were prepared by recognized experts using standard methodologies long-accepted in the aviation forecasting industry.

20. The primary purpose of the third runway is to address the poor weather arrival constraints of the existing airfield. The FEIS and FSEIS discuss the usage of the runways and indicate that the third runway will occasionally be used for departures. Because its purpose is to address arrival constraints, it is expected that the runway will be primarily used for arrivals. The noise analysis is the EISs reflects this anticipated use for arrivals and departures.

21. See the response to Letter 1E-1, Comment 2.

22. See the response to Comment 15 of your letter.

23. See Chapter I of the FEIS and Chapters 1 and 2 of the FSEIS for a definition of the project purpose and need. The purpose of the third runway is "to improve the poor weather airfield operating capability in a manner that accommodates aircraft activity with an acceptable level of delay". The purpose of the third runway is to address poor weather operating constraints and these constraints affect the capacity of the existing airfield. Thus, the constraints affect the operational efficiency of the airfield under the level of operations today, which will be exacerbated in the future with added levels of operations. When this constraint is relieved, added airfield capacity would be available, as demonstrated by the "With Project" scenarios being able to accommodate the forecast demand now anticipated to occur between 2008 and 2010. The forecasts prepared for the Master Plan, and updated for the FSEIS, reflect reasonable estimates of future growth in air travel demand. These forecasts are comparable to the forecasts prepared by the FAA and other aviation forecasting groups.

24. During poor weather today, the close separation between parallel runways forces Sea-Tac Airport into a single arrival stream. During good weather, staggered arrivals occur, but during poor weather (about 44% of the time) only a single arrival stream is allowed. Thus, the new parallel runway will alleviate this constraint and enable two arrival streams, although staggered, to occur.

25. The Supplemental EIS was prepared as a result of the FAA's and the Port's review of recent growth in air travel demand at Sea-Tac Airport. During 1994, 1995, and 1996, air travel demand at Sea-Tac grew at a 7 percent annual growth rate, which is substantially greater than the national average. As a result, the 1996 annual aircraft operations levels at Sea-Tac Airport (395,200 operations) exceeded the Master Plan Update forecast for the year 2005. In addition, the FAA's fiscal years 1996 and 1997 Terminal Area Forecast (TAF) for Sea-Tac anticipates faster growth rates than were used in the Master Plan Update. As a result, the Port prepared a new forecast for Sea-Tac Airport that reflects current population and income growth in the Puget Sound region, as well as the most recent forecast of how air travel ticket fares could change in the future. The new data indicates that demand at Sea-Tac by 2010 could be 17 percent higher than was forecast by the Master Plan Update.

26. See General Response 2.

27. See the response to Comment 72 of the Public Hearing.

28. Corps approval is required when locating a structure, excavating, or discharging dredged or fill material in waters of the United States.

29. See the response to Letter 1L-6, Comment 2. The wetland acreage number has been dropping for two reasons. First, when the initial studies were done, the project was in preliminary stage and impact analysis was at a relatively imprecise planning level, which is appropriate for that stage of the process. As the project has been refined, actual impacts have been determined. Second,

engineers continue to modify the design to reduce impacts to streams and wetlands. See General Response 1.

30. The North Employee Parking Lot was part of the Master Plan Update environmental review process.

31. See the response to Letter1L-6, Comment 6.

32. Both these projects were included in the Master Plan Update FEIS and FSEIS.

33. The Tyee Pond is a storm water management feature created and operated by King County. It is not a wetland.

34. See the response to Letter 2G-1, Comment 5. Rechanneling a creek or eliminating headwaters is illegal without appropriate permits.

35. The Corps was a cooperating agency on the FEIS and is in the process of gathering the appropriate information with which to make a permit decision.

36. See the response to Comment 72 of the Public Hearing regarding indirect impacts to wetland in the borrow sources. The Port is not proposing to fill wetlands in order to construct warehouses at the north end of the Airport as part of this permit application.

The Master Plan Update FEIS and FSEIS updated the SASA EIS. The SASA EIS and the FEIS and FSEIS for the Master Plan Update included a cumulative effects analysis as required by NEPA and SEPA.

37. The Port stands by its analysis of the functional value of the wetlands. Representatives from the resource agencies have conducted site visits and have not disputed the analysis.

38. See the response to Comment 37.

39. See the response to Letter 1L-6, Comment 6.

40. The Port stands by its analysis of the aquifer which is thoroughly documented in the FEIS and FSEIS and all associated documents.

41. The Port has obtained all necessary approvals to complete the land clearing activities presently underway. Wetlands are not being affected; a 404 approval is not required.

42. See the response to Letter 1L-6, Comment 6.

43. A total of 399,000 cubic yards were used for the RSA project for which the Port issued a Mitigated Determination of Nonsignificance. Turbid water was originally an issue during construction of the RSA but it was corrected. However, no fill material or slides washed downstream. The plan included a construction detention facility large enough to handle possible storm events. Damage to First Avenue South was not related to the Port's RSA project.

The storm water detention functions currently performed by the Tyee Pond would be replaced with valuts and storm water ponds.

44. The SASA fill is included in the Public Notice. The 509/South Access project is not part of this permit application.

45. See General Response 2 for a description of the wetland impacts attributable to the Master Plan Update.

46. These other projects have not been designed and are not part of this permit application.

47. The Vacca Farms area has been reviewed by wetland ecologists. They have found areas of hydric soil and wetland hydrology. They have also found areas that exhibit seasonal ponding.

The Port is preparing information to submit to the Corps for its determination of whether these areas qualify as jurisdictional wetlands (thus requiring a 404 approval) or prior converted farmland. If the Corps determines that impacts to these areas must be mitigated, the Port will do so.

48. Comments noted. See the response to Letter 1L-6, Comment 2.

49. The Corps has conducted site visits.

50. See General Response 2.

51. See the response to Letter 2G-10, Comment 2.

52. See the response to Comment 188 of the Public Hearing.

53. The Port stands by its analysis of the aquifer which is thoroughly documented in the FEIS and FSEIS and all associated documents.

54. Tub Lake, which is upstream of the Airport, will not be affected by the project.

55. Your opinion regarding the project is noted.

56. Comments noted.

57. See the response to Letter 1E-1, Comment 2 regarding ESA and Letter 1G-1, Comment 4/5 regarding storm water runoff to the creeks.

58. See the response to Comment 10 of your letter.

59. See the response to Comment 62 of the Public Hearing.

60. See the response to Comment 61 of the Public Hearing.

61. See General Response 2.

62. Comments noted.

2G-2 Miller Creek Management Coalition

1. The Master Plan Update has gone through an extensive NEPA/SEPA review process with two EISs specifically addressing the impacts of implementing the projects in the Update. See the response to Letter 1G-2, Comment 20.

2. Comments noted.

2G-3 ACC

1. See the response to Comment 39 of the Public Hearing.

2G-4 Washington Airport Management Coalition

1. Comments noted.

2G-5 League of Women Voters – King County

See the responses to Comments 64 through 69 of the Public Hearing.

2G-6 CASE (April 9, 1998)

1. See the response to Letter 1P-67, Comment 1.

2. See the response to Letter 1P-67, Comment 3.

3. See the response to Letter 1P-67, Comment 4.

4. See the response to Letter 1P-67, Comment 5.

5. See the response to Letter 1P-67, Comment 6.

6. Comments noted.

7. See General Response 1 and the response to Letter 1E-1, Comment 3.

8. Comments noted.

9. See General Response 2.

10. See General Response 1.

11. See the response to Letter 1G-1, Comment 4/5.

12. See the response to Letter 1E-1, Comment 2.

13. See the response to Comment 103 of the Public Hearing.

14. See the response to Comment 103 of the Public Hearing.

15. See the response to Comment 103 of the Public Hearing.

16. See General Response 4.

17. The wetland impacts of the proposal were thoroughly addressed in the FEIS and FSEIS. See the response to Comment 72 of the Public Hearing.

18. See the response to Comment 103 of the Public Hearing.

19. See the response to Letter 1L-6, Comment 6.

20. The numbering system for Airport outfalls does not have bearing on the 404 application.

21. The Port will obtain all necessary permits.

22. See the response to Comment 62 of the Public Hearing.

23. The Port chose to rebid the contract due to an error in the first submittal of bid responses.

24. See the response to Letter 1L-6, Comment 6.

25. We assume the commenter is referring to compliance with local ordinances. See the response to Letter 1G-1, Comment 6.

26. A supplementary EIS is not necessary.

27. See the response to Letter 1L-3, Comment 4.

28. See the response to letter 1L-6, Comment 2.

29. See the response to Letter 1F-2, Comment 2.

30. Comments noted.

31. See the response to Letter 1G-2, Comment 7.

32. See the response to Letter 1G-2, Comment 7.

33. See the response to Letter 1L-6, Comment 6.

34. Monitoring requirements will be a condition of the permit.

35. See the response to Letter 1G-1, Comment 4/5.

36. See the response to Letter 1P-22, Comment 2.

37. The Port stands by its analysis of the functional value of the wetlands.

38. See the response to Letter 1P-8, Comment 35.

39. See the response to Comment 72 of the Public Hearing.

40. See General Response 1.

41. See the response to Letter 1E-1, Comment 3.

42. See the response to Letter 1E-1, Comment 3.

43. See the response to Letter 1E-1, Comment 3.

44. See General Response 5.

45. See General Response 5.

46. See the response to Letter 1P-8, Comment 7.

47. See General Response 2 and the response to Letter 1F-2, Comment 8.

48. See the response to Letter 2G-10, Comment 2 and General Response 2.

49. See the response to Letter 2G-10, Comment 2.

50. See the response to Letter 2G-10, Comment 2.

51. See the response to Letter 2G-10, Comment 2

52. See the response to Letter 2G-10, Comment 2.

53. See General Response 2.

54. See the response to Letter 1F-2, Comment 6.

55. See the response to Letter 2G-10, Comment 2.

56. This mitigation project could benefit chinook salmon in the Green River watershed.

57. See the response to Letter 1F-2, Comment 8.

58. See the response to Letter 1G-1, Comment 4/5.

59. See Letter 1S-1 for WDFW's favorable opinion of the relocation plans.

60. The rest of WDFW's comment suggests hiring a Sedimentation and Erosion Control Representative, which the Port will do. See the response to Letter 1S-1, Comment 3.

61. This parameter is not typically included in water quality modeling.

62. See the response to Letter 1G-1, Comment 6.

63. See the response to Letter 2G-10, Comment 2.

64. Comments noted.

65. See the response to Letter 1E-1, Comment 2.

2G-7 Bellevue Chamber of Commerce

1. Comments noted.

2G-8 ACC/Cutler & Stanfield (April 14, 1998)

1. See the response to Letter 1G-3, Comment 1.

2G-9 RCAA

1. See the response to Letter 1L-6, Comment 2.

2. Impacts to Miller Creek were thoroughly discussed in the FEIS and FSEIS. The mitigation proposal includes improvements to the riparian buffers of Miller Creek through the buyout area. See General Response 2.

3. See General Response 6.

4. See the response to Comments 61 and 62 of the Public Hearing.

5. See the response to Letter 1G-2, Comment 11.

6. See the response to Comment 20 of the Public Hearing.

7. See the response to Comment 20 of the Public Hearing.

8. See the response to Letter 1G-2, Comment 7 and Letter 1G-1, Comment 4/5.

9. See the response to Letter 2G-10, Comment 2.

10. See General Response 5 and the response to Letter 1E-1, Comment 3.

11. See the response to Comment 174 of the Public Hearing.

12. See the response to Letter 2G-10, Comment 2.

13. The two items mentioned in this comment involve normal Port/consultant relationships and do not serve as a basis for any appearance of fairness or conflict of interest concerns.

2G-10 ACC/Cutler & Stanfield (April 20, 1998)

1. The ACC comments that FAA Advisory Circular 150/5200-33 has no legal binding effect and therefore the Port need not be bound by it and may create/enhance wetlands within 10,000 feet of the airport runways. However, whether the Advisory Circular, on its face, is a recommendation or a legally binding commitment does not resolve this issue. For the reasons set forth below, the

Port must abide by the recommendations in the Advisory Circular and not create or enhance wetlands within 10,000 feet of the airport runways.[1]

A. Bird strikes are a serious air safety issue. Since 1995, 74 people have been killed in collisions worldwide between aircraft and birds. One of these accidents resulted from a USAF AWACs E-3 (modified Being 707) striking a flock of geese at Elmendorf Air Force Base in Alaska in September 1995, killing twenty-four crewmembers and destroying a $189 million airplane. In the U.S., more than 1,700 aircraft bird strikes occur each year. The Animal Damage Control Office of the U.S. Department of Agriculture, in a letter to the Corps of Engineers dated April 15, 1998, describes the bird strike safety concerns at STIA and strongly recommends against the creation or enhancement of wetlands within 10,000 feet of the STIA runways.

B. The FAA required, in its Record of Decision (ROD), compliance with the Advisory Circular's recommendations on distance from runways and it required such compliance as a condition of receiving federal grant money for the STIA improvements. On page 26 of the ROD, the FAA stated that it would not be appropriate to create man-made wetlands adjacent to the airport's aircraft movement areas, due to the risk of bird/aircraft strikes. It concluded that "there is no practicable alternative to the replacement of these impacted wetlands outside of the Sea-Tac watershed." On page 40 of the ROD, the FAA stated that "off-site, out-of-watershed mitigation ... will be required as a condition of FAA grant assurances associated with Federal funding of the Master Plan Update development projects."

C. The Port cannot ignore the Advisory Circular's recommendations regarding location of wetlands near runways for reasons of potential liability. The Port is the operator of Sea-Tac airport. The FAA is the federal agency responsible for air travel safety. If the Port chose not to follow an air safety recommendation of the FAA, a serious question would arise as to the Port's liability in the event of bird/aircraft accidents. Courts have determined that airport operators have a duty to keep airports free from hazards.

The ACC also comments that the wetlands to be filled for the Master Plan Update actions provide unique ecological functions and, therefore, they qualify for the Advisory Circular's exception that permits such wetlands in the airport vicinity. However, these wetlands do not have unique ecological functions. The ecological functioning of wetlands for wildlife and fish habitat, flood storage, groundwater exchange, or water quality are largely determined by a variety of physical and biological attributes of the wetland itself and uplands immediately adjacent to it. (The attributes of wetlands that are commonly recognized as providing various functions are listed in Tables 2.2-3 and Table 2.2-4 of the *Wetland Mitigation Plan* (December 1996) attached to the JARPA Application). As documented in the Natural Resource Mitigation Plan at FEIS Appendix P (Table 3.2-3), the biological and physical functions of the wetlands to be filled for the Master Plan Update actions have been assessed as low to moderate.

The fact that other wetlands in the basin have been filled does not lead to the conclusion that these wetlands provide unique ecological functions. If this were true, most low-to-moderate functioning wetlands in most urbanized watersheds would be categorized as unique, which is

[1] As discussed elsewhere, the Port is replacing certain wetland functions in the same basin with the airport, e.g., surface water detention, and groundwater discharge and conveyance. However, the habitat functions of the impacted wetlands (which will be replaced by the creation of new wetlands) must be replaced more than 10,000 feet from the runways.

certainly not consistent with the intent of the Advisory Circular. Moreover, the physical characteristics relative to ecological functions of wetlands are typically not altered when other wetlands in a watershed are filled. For example, a wetland may provide wildlife habitat to support certain populations of birds because of the amount of available food present and the type and density of vegetation present for cover and nesting. Filling of an adjacent wetland will not increase available food or other habitat attributes in the remaining wetland, and thus, the function of the remaining wetland cannot increase. Similarly, the groundwater recharge potential of a wetland is largely dependent on the permeability of the wetland sub-soils, local rainfall, drainage patterns, and wetland topography. These wetland attributes are not altered when another wetland in the watershed is filled, and thus the groundwater recharge functions of remaining wetlands is not likely to increase.

The ACC also comments that wildlife can be managed at wetlands in the airport vicinity. Activities to manage wildlife at the airport include, among other actions, vegetation management, trapping, and hazing. Such management activities diminish the usefulness of the wetlands and render them less valuable ecologically than replacement wetlands in a nearby basin that are not subject to such management activities. Also, such management activities represent a costly, ongoing responsibility and yet they do not offer absolute assurance that birds will not be attracted to the created wetlands.

The ACC attached to its comments a list of potential in-basin mitigation sites and a map showing their locations. All of the suggested sites are located in the proscribed area within 10,000 feet of the airport runways. Moreover, most of them are directly under the runway flight paths, a location that poses the greatest safety danger to aircraft. For this reason, none of the suggested sites is suitable.

In addition, the ACC-proposed approach would entail multiple smaller wetlands rather than a single consolidated wetland as proposed by the Port. Mitigating the impacts to multiple smaller wetlands by creating a single mitigation project, as proposed by the Port, allows an overall gain in habitat value. While most impacted wetlands are rated as Category III and IV (lower value) wetlands, the mitigation wetland will meet the criteria of a Category II (higher value) wetland. A larger mitigation site also allows area for wetland buffers, required to screen the wetland area from any adjacent development.

The ACC comments that the FAA and the Port should not have rejected in-basin sites that were less than 10 acres in size, citing Corps and EPA guidance documents that encourage in-basin mitigation. However, the guidance documents do not require in-basin mitigation and they do not require development of multiple smaller wetland sites rather than a single larger site. The guidance documents are written in discretionary terms, requiring the reasoned exercise of judgment to decide when it is appropriate to utilize in-basin mitigation on smaller sites vs. out-of-basin mitigation on a single larger site. *See, Federal Guidance for the Establishment, Use and Operation of Mitigation Banks,* 60 Federal Register 58605 (November 28, 1995); *Memorandum of Agreement Between the Environmental Protection Agency and Department of the Army Concerning the Determination of Mitigation Under the Clean Water Act Section 404(b((1) Guidelines* (February 6, 1990). Here, the FAA/Port decision to consolidate new wetland creation at a single larger site more than 10,000 feet from the runways, while mitigating many of the wetland impacts in the same basin, was a reasonable decision in light of all the factors.

2. The ACC comments that the Interlocal Agreement between the Port and the City of Auburn will prevent a successful wetland mitigation project for several reasons. First, the ACC alleges that the Agreement does not place any restrictions on the use of the "Excess Area" adjacent to the

wetland project and, therefore, the Agreement fails to assure that future uses are not inconsistent with the success of the wetland. However, the types of uses that are likely to occur on the Excess Area are storm water detention, residential subdivision, or agricultural uses, all of which are compatible with a wetland use. Moreover, the ACC's comment assumes that the future owner of the adjacent property, i.e., the City of Auburn, or the Port if the property is not transferred to Auburn, would use the property in some unspecified other manner that would threaten the viability of the wetland. This is extremely unlikely, since both the City and Port have a strong interest in assuring the success of the wetland. Even more important, however, is that the wetland mitigation includes buffers to protect the wetland from adjacent development. While the current condition of these buffers is open field, the plan proposes to densely vegetate them with plantings of native evergreen and deciduous trees and shrubs. This action will provide habitat and screen the wetland area from potential future development. The mitigation wetland is setback between 100 and 300 feet from the "Excess Area".

Second, the ACC alleges that nearby infrastructure projects (street and utility construction, storm water facilities, etc.) are likely to adversely affect the hydrology of the area and thus the viability of the wetlands. However, the wetland site is located *upstream* of the nearby street and utility construction, storm water facilities, etc. (with the exception of a small area south of the wetland, which presumably would be developed in compliance with applicable storm water regulations, thereby preventing adverse off-site storm water impacts). The ACC allegations apparently assume that the City of Auburn will design and construct improvements downstream of the wetland that would illegally block drainage from the wetland without proper regard for local drainage. This is extremely unlikely.

The proposed wetland outlet weir would control surface hydrology in the wetland. This weir would be controlled by the Port and unaffected by downstream over-drainage. In the event that downstream property owners attempted to over-drain property north of the wetland, drainage would only be effective to the invert of the culvert under South 277th, which would not adversely affect surface hydrology in the wetland. Flood water from the Green River backing into the wetland would be infrequent (typically during the 10-year or less frequent flood); northwest wetlands are tolerant of this type of infrequent, short-duration flooding.

Next, the ACC asserts that the hydrology of the wetland area must be deficient because the Agreement calls for the City to supply water to the site for the initial growing seasons following planting. However, this irrigation is necessary only in the initial growing seasons until the plants' root systems are established. Such irrigation does not indicate that the property has deficient hydrology. The engineers who designed the wetlands area have conducted hydrological monitoring of the site, are aware of the amount of water that will be on the site, and have concluded that the hydrology will be sufficient for the intended wetland plants. Wetland plants proposed for the site includes native plant species adapted to the wetland conditions of Puget Sound shrub and forested wetlands. These wetlands are typically dry for 2 – 4 months during early summer through early fall period, and are thus adapted to the hydrologic conditions observed on the mitigation site.

Finally, the ACC states that issuance of a 404 permit would be contrary to the goal of the Clean Water Act Action Plan that calls for an increase in wetland acres each year until the year 2005. In fact, this mitigation plan will further this goal, since the acreage of wetlands will be greater after the mitigation plan is completed because the replacement ratio will be considerably greater than one to one. In addition, the mitigation proposal increases wetland function, by providing greater habitat value to a broader array of wildlife species. This is reflected by the classification of the

wetland as Category II, compared to the Category III and IV rating assigned to most wetlands affected by the project.

3. The ACC asserts that the EIS and SEIS are inadequate because they failed to address reasonable alternatives that could avoid wetland impacts. Although not stated explicitly, the ACC is presumably referring to the shorter-runway alternative discussed in its first set of comments on the 404 permit. As discussed in our response to that comment, the shorter runway (6,000 – 6,700 feet) is not a reasonable alternative to the Port's proposed 8,500-foot runway. See the response to Letter 1G-1, Comment 2.

Next, the ACC comments that the EISs did not discuss in adequate detail the on-site and same-watershed mitigation options. To the contrary, this issue was discussed in the FEIS at p. IV.11-6 and in the FSEIS at pp. 5-5-13 through 28 (plus attached copy of FAA Advisory Circular 150/5200-33). The FSEIS discussed the FAA recommendation that new wetlands not be sited within 10,000 feet of runways with turbine engine aircraft. It also summarized the analysis conducted by Parametrix regarding possible wetland creation sites within the Miller and Des Moines Creek basins.

Finally, the ACC states that the EISs must be supplemented to address the potential impacts of the Master Plan improvements on chinook and chum salmon and steelhead trout. However, as discussed in more detail below, there are no anadromous fish is Des Moines or Miller Creeks, nor any species listed or proposed for listing as endangered or threatened species.

4. The ACC comments that the Corps should delay issuance of the 404 permit because the Port has not acquired state and local permits for the wetlands fill. The ACC cites 33 C.F.R. § 320.4, the section of the Corps regulations relating to state and local permits. This regulation provides, in pertinent part, as follows:

> *(j) Other Federal, state, or local requirements.* (1) Processing of an application for a DA [Department of the Army] permit normally will proceed concurrently with the processing of other required Federal, state, and/or local authorizations or certifications. Final action on the DA permit will normally not be delayed pending action by another Federal, state, or local agency (See 33 CFR 325.2(d)(4)). ...
>
> (2) The primary responsibility for determining zoning and land use matters rests with state, local and tribal governments. The district engineer will normally accept decisions by such governments on those matters unless there are significant issues of overriding national importance. ...

In its comment, the ACC mentions three state and local provisions: (1) the Washington State Shoreline Management Act, (2) wetlands regulations of the cities of SeaTac and Des Moines, and (3) an archaic state statute that purports to grant to cities the authority to prevent and punish the pollution of streams outside their corporate limits.

In its discussion of the Shoreline Management Act, the ACC does not identify what body of water on or adjacent to the airport invokes the jurisdiction of the act. Miller and Des Moines Creeks, in the area where the 3rd runway and other airport improvements will occur, have mean annual flows that are less than the threshold of Shoreline 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 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. If a shoreline permit is required for this work, a permit application will be processed in the usual and customary matter, and there is no reason to believe that a permit would not be granted in due course.

The Port has already responded to the ACC comment regarding wetland regulations of the cities of SeaTac and Des Moines. With regard to SeaTac, the issue has been addressed in the September 1997 Port/SeaTac Interlocal Agreement in which the City agreed that the City's wetland regulations will not apply to the airport projects so long as certain mitigation measures are carried out. With regard to Des Moines, it is appropriate for the Corps to continue with processing the Port's 404 permit application for the on-site borrow sources located in Des Moines and any required local permitting process will be followed at the appropriate time in the future.

The ACC cites RCW 35.22.280(29) for the proposition that the adjacent cities (that oppose the 3rd runway) have the power to deny authorizations for the 3rd runway, because this statute grants them the authority to prevent the pollution of streams that run through their corporate limits and for a distance of five miles beyond their corporate limits. The airport projects will affect Miller and Des Moines Creeks at points within five miles of the corporate limits of some of the ACC cities, so the ACC apparently takes the position that these cities have the authority to deny authorizations for the airport projects. However, RCW 35.22.280(29) was not intended to grant to the adjacent cities the type of project approval authority contemplated in the Corps regulation at 33 C.F.R. § 320.4 (quoted above). This archaic state statute, which was enacted in 1890, was intended to authorize cities to take enforcement-type actions to prevent or punish polluting activities. It was not intended to authorize cities to grant "authorizations or certifications" for nearby construction projects. It is longstanding policy in Washington state that only the local government within which the construction activity takes place has the authority to require permits, authorizations or certifications for the construction activity. Thus, the ACC's reliance on this statute, to support an assertion of permitting authority over the 3rd runway project, is misplaced.

Instead of adopting the ACC's view of RCW 35.22.280(29) -- that the adjacent cities have permit and approval authority over the 3rd runway -- the Corps should recognize that this statute gives cities up to five miles downstream from the project site an interest in the project and, accordingly, the Corps should give due consideration to their official views. That is what the Corps' regulation on the matter requires:

> Even if official certification and/or authorization is not required by state or federal law, but a state, regional, or local agency having jurisdiction or interest over the particular activity comments on the application, due consideration shall be given to those official views as a reflection of local factors of the public interest.

33 C.F.R. § 320.4(j)(1).

5. The ACC comments that, without more information regarding the relocation of Des Moines Creek, the Corps cannot approve this activity under the Port's current permit application. The ACC also comments that the Corps should consider the impacts of the Des Moines Creek relocation as cumulative impacts under NEPA. The Port acknowledges these comments. As

stated in the JARPA application, the Port is not seeking Corps approval for the Des Moines Creek relocation as part of this permit application and it will submit a separate permit application in the future when more is known about the proposed location of this creek. Until the Port knows more about other projects in the vicinity affecting the creek's location (e.g., extension of SR 509 and the south access to the airport), the Port cannot determine a proposed location for the creek. Meanwhile, the Port considered what it now knows about potential creek relocation, and the EIS included this information thereby satisfying the purpose of cumulative impacts consideration. *See* FEIS at Chapter IV.16.

6. The ACC comments that the Endangered Species Act (ESA) requires an analysis of the effects of a project on federally proposed endangered or threatened species. The ACC also states that the status of chinook and chum salmon and steelhead trout has only recently become known and constitutes new information that has become available after completion of the NEPA process.

Chum salmon and steelhead trout are not listed or proposed for listing as an endangered or threatened species in Puget Sound. On March 9, 1998 the National Marine Fisheries Service (NMFS) proposed listing the chinook salmon Puget Sound ESU as a threatened species under the Endangered Species Act (ESA). The NMFS' proposed rule includes its proposal to designate critical habitat for the chinook, limited to the species' current freshwater and estuarine range, which includes waterways, substrate and adjacent riparian zones below longstanding, impassible, natural barriers. 63 Federal Register 11482 (March 9, 1998).

The Corps of Engineers is not required to commence a consultation process under Section 7 of the ESA because the Third Runway project will not jeopardize the continued existence of any listed species. Fish habitat surveys included in the EIS disclosed that there are no chinook salmon in Des Moines or Miller creeks, and impassable fish barriers exist in both creeks well below the area impacted by the airport redevelopment project. Final EIS, IV.16-5; comment letter from NMFS to Corps of Engineers dated January 15, 1998. There is no available information indicating that chinook salmon habitat would be impacted, and therefore the proposed listing of the chinook salmon Puget Sound ESU is not "new information" on the airport redevelopment project's impacts that would require supplementation of the NEPA EIS.

Even though not required by the ESA, the proposed project includes benefits to the fisheries habitat of Miller Creek. The project is protective of on-site and downstream fish habitat because of the extensive mitigation designed to preserve and enhance riparian habitat, replace the ditched creek channel with natural habitat, and control storm water runoff quality and quantity above typical requirements for development projects.

2G-11 Seattle Community Council Federation

1. Comments noted.

2. See General Response 2.

3. See the response to Comment 20 of the Public Hearing.

4. See the response to Comment 39 of the Public Hearing.

5. See General Response 1 and the response to Letter 1G-1, Comment 4/5.

6. The Wetland Mitigation Plan attached to the JARPA application is a comprehensive planning-level assessment of the mitigation proposal. The Port has a thorough understanding of the site, including nearly 3 years worth of weekly groundwater monitoring data.

   Long-term monitoring of the site will be a permit condition. The Port will be responsible for submitting annual monitoring reports. If monitoring shows the pre-set performance standards are not being met, the Corps will require the Port to implement contingency actions.

7. See General Comment 2 and the response to Letter 1G-1, Comment 6.

8. See the response to Letter 2G-10, Comment 2.

9. See General Comment 6.

10. See the response to Comment 174 of the Public Hearing.

2G-12 CASE/Candy Corvari

See the response to Comments 76 through 83 of the Public Hearing

2B-1 Boeing

1. Comments noted.

2B-2 Alaska Airlines

1. Comments noted.

2B-3 John Lewis

1. Comments noted.

2B-4 M. A. Segale

1. Comments noted.

2B-5 PGAL

1. See General Response 2. The FEIS and FSEIS both analyzed the mitigation proposal; another EIS is not necessary.

2. See the response to Letter 1P-8, Comment 21.

3. Retaining walls are being proposed for specific sections of the toe of the fill slope, specifically to reduce impacts to wetlands and streams.

4. See General Response 2.

2B-6 Alaska Airlines

1. Comments noted.

2P-1 Rose Clark

1. See the response to Letter 1G-1, Comment 4/5.

2. See the response to Letter 1L-6, Comment 6.

3. See the response to Comment 62 of the Public Hearing.

4. The full impact of the proposed improvements has been documented in the FEIS and FSEIS. As is shown in those documents, all significant impacts can be mitigated, as proposed.

5. See the response to Letter 1G-1, Comment 4/5.

6. See General Response 2. In addition to the deteriorated habitat conditions in the Miller Creek basin, several natural and manmade barriers appear to limit anadromous fish access to the upper basin. The most prominent barrier on Miller Creek is an 8-ft waterfall about 0.2 mile upstream of Southwest 160th Street. This barrier effectively keeps anadromous fish from the project site.

7. See the response to Comment 1G-2, Comment 21.

8. See General Response 6.

9. See the response to Comment 72 of the Public Hearing.

10. The FEIS and FSEIS both analyzed the mitigation proposal; another EIS is not necessary. See General Response 2 and the response to Letter 2G-10, Comment 2.

11. The Port has revised its mitigation plan to identify further mitigation actions in the affected watersheds that will not produce wildlife attractants within 10,000 ft of the runways.

12. See General Response 2 and the response to Letter 1G-1, Comment 6.

13. See the response to Letter 1E-1, Comment 3 and General Response 1.

14. See General Response 6. Chapter IV, Section 19 "Earth" of the FEIS discusses the impacts of the proposed Master Plan Update improvements on earth conditions, including seismic and landslide conditions.

2P-2 Jeff and Terri Coop

1. See General Responses 1 and 2.

2P-3 Mayo Alberigi

1. See General Response 2.

2. See the response to Letter 1L-6, Comment 6.

3. See the mitigation plans attached to the JARPA application, the information presented in the Public Notice, the FEIS and FSEIS, and General Response 2.

2P-4 Michael Anderson

1. See General Response 2.

2. See General Response 6.

3. See Letter 1S-1, Comment 1 for WDFW's favorable opinion regarding the Miller Creek relocation plan.

4. See the response to Comments 61 and 62 of the Public Hearing.

5. See the response to Comment 62 of the Public Hearing.

6. If the Maury Island quarry is proposed to be reactivated, appropriate environmental review would occur.

7. See the response to Comment 20 of the Public Hearing.

8. The FEIS and FSEIS provided the environmental analysis you request.

9. See General Response 5.

10. The commenter incorrectly portrays the forecast of aircraft operations in year 2010 as the capacity of the Airport. As is shown in Chapter 2 of the Final Supplemental EIS, demand for air travel in the Puget Sound Region is anticipated to generate about 474,000 annual aircraft operations in 2010. As is discussed on Page 2-26 of the FSEIS, the operational capability of Sea-Tac's airfield with the third parallel runway with today's air traffic technology is about 630,000 annual operations – and could be greater with future improvements in air traffic technology. As the FSEIS notes, assuming demand continues at it recent accelerated pace, demand for air travel in the Puget Sound Region would not reach 630,000 operations until after the year 2030.

11. See the response to Letter 1E-1, Comment 3 regarding alternative locations for airport operations.

2P-5 Jim Bartlemay

1. See the responses to Letter 1E-1, Comment 3 and Letter 1L-3, Comment 4.

2. See the response to Letter 1G-1, Comment 2 and General Response 5.

3. See General Responses 1 and 2.

4. See General Response 6.

5. See General Response 2.

6. Comments noted. The Public Notice lists the amount of fill that will directly impact waters of the United States.

7. Third runway development activities are proceeding in a manner consistent with the schedule set forth in the FSEIS.

8. See the response to Letter 1G-2, Comment 7 for a discussion of the relationship between the current litigation and the permitting process.

9. See General Response 2 for a discussion of how the mitigation proposal will meet State Water Quality Standards. See the response to Letter 1P-8, Comment 21 for a discussion of seismic issues.

10. See the response to Letter 1G-1, Comment 4/5.

2P-6 Jessie and R. C. Bolles

1. See General Response 2.

2. See the response to Letter 1G-1, Comment 4/5 for a comprehensive discussion of Port storm water.

3. Comments noted.

4. Comments noted. See the response to Letter 1E-1, Comment 3.

5. The Port of Seattle is legally recognized as a municipal corporation of the State of Washington and conducts its business accordingly.

2P-7 Loretta Bowers

1. The proposal would significantly increase the wetland acreage due to the proposed ratio.

2. As stated on page IV.10-1 of the FEIS, although pollutant loading would increase somewhat because of greater amounts of stormwater runoff associated with the "With Project" alternatives, compliance with mitigation requirements would be expected to prevent significant pollution or degradation of surface and groundwater resources.

3. See General Responses 1 and 2. To clarify, the Port is not proposing to "move" wetlands and does not believe that its mitigation proposal is "doomed to failure."

2P-8 George Bowers

1. The Port is an active participant in inter-jurisdictional efforts in both basins. See the response to Letter 1C-1, Comment 3.

2. See General Response 2.

3. See the response to Letter 1L-6, Comment 2.

2P-9 James and Carolyn Carpenter

1. See General Response 2.

2P-10 Philip Emerson

See the response to Comments 70 through 75 of the Public Hearing.

2P-11 Charlie Frame

1. Comments noted.

2P-12 Carl Hansen

1. See the response to Letter 2P-7, Comment 2.

2. See General Response 2.

3. See the response to Letter 1E-1, Comment 3.

4. See the response to Letter 2G-10, Comment 2.

5. See General Response 2.

6. See the response to Letter 1P-59, Comment 2.

7. See General Response 2.

2P-13 Janet Johnson

1. See the response to Letter 1G-1, Comment 4/5.

2. The Port is not proposing to put Miller Creek in a tube. See Letter 1S-1 for WDFW's favorable review of the Miller Creek relocation plan.

2P-14 Helen Kludt

1. See General Response 2.

2. See General Response 2 and the response to Letter 1F-2, Comment 8.

3. See General Response 2 and the response to Letter 2G-10, Comment 2.

4. See the response to Letter 1P-22, Comment 2.

5. Comments noted.

2P-15 Maria Little

1. See the response to Letter 1L-3, Comment 4.

2. See the response to Letter 1E-1, Comment 2.

3. The Corps treats all applicants equally.

2P-16 Juleen Mattern

1. See the response to Comment 61 of the Public Hearing.

2, See the response to Comment 62 of the Public Hearing.

3. See the response to Comment 122 of the Public Hearing.

4. See General Response 6.

5. See Letter 2C-1.

6. See General Response 1.

2P-17 John Matthews

1. The Port maintains that impacts associated with the proposal will be mitigated with implementation of the mitigation plan.

2. See General Response 6.

3. Comments noted.

4. See the response to Letter 2G-10, Comment 2.

5. Comments noted.

6. See the response to Letter 1G-1, Comment 6.

2P-18 Sherrill Miller

1. The Port is not proposing to fill Lora Lake.

2. See the response to Comment 1 of your letter.

3. See General Response 2 for a description of the Port's Wildlife Management policy.

4. Comments noted.

2P-19 Molly Nordhaus

1. See the response to Letter 1G-1, Comment 6.

2. See General Response 6.

3. See the response to Letter 1E-1, Comment 2 for a discussion of the endangered salmon issue. The response to Letter 1P-48, Comment 3 addresses the environmental justice issue.

2P-20 Doug Osterman

1. See the response to Letter 1P-39, Comment 1.

2. See the response to Letter 1P-39, Comment 2.

3. See the response to Letter 1P-39, Comment 3.

4. See the response to Letter 1E-1, Comment 2.

2P-21 Warren Pugh

1. See Letters 2L-2 and 2L-4 in which the City of Auburn expresses its support for the permit application.

2. See the response to Letter 2G-10, Comment 2.

2P-22 Russell Richter

1. See General Response 6.

2. See the response to Letter 1G-1, Comments 4/5 for a discussion of storm water management at the Airport. It is incorrect to state the runoff from the Airport now flows to a wetland.

3. See the response to Comment 70 of the Public Hearing.

4. Comments noted.

5. See the response to Letter 1E-1, Comment 3.

2P-23 Harvey Rowe

See the response to Comments 190 through 197 of the Public Hearing.

2P-24 Paul Tappel

See the response to Comments 84 through 89 of the Public Hearing.

2P-25 Group Letter

1. See the response to Letter 2G-6, Comment 1.

2. See the response to Letter 2G-6, Comment 2.

3. See the response to Letter 2G-6, Comment 3.

4. See the response to Letter 2G-6, Comment 4.

5. See the response to Letter 2G-6, Comment 5.

6. See the response to Letter 1E-1, Comment 2.

2P-26 Stuart Weiss

1. See General Responses 2 and 6.

2. See the response to Letter 1G-1, Comment 4/5.

2P-27 John and JoAnn Bolender

1. See General Response 2.

2P-28 Ann Bonney

1. See the responses to Letters 1P-26 and 1P-58.

2P-29 Dan Caldwell

1. See General Response 6.

2. See General Response 2. Impacts to groundwater functions are proposed to be mitigated in the basin of impact.

2P-30 Ingrid Hansen/Arlene Brown Emails

1. See the response to Comment 62 of the Public Hearing.

2. Comments noted.

2P-31 Robert Sealey

1. See General Response 1.

2. Comments noted.

2P-32 R. Earl Jobe

1. See General Response 6.

2P-33 Barbara Stuhring

1. See the response to Letter 1E-1, Comment 2.

2. See General Response 6.

3. See General Response 3.

4. See the response to Letter 1E-1, Comment 3.

5. See the response to Comments 61 and 62 of the Public Hearing.

6. As stated on page IV.10-11 of the FEIS, approximately 97 acres of new impervious surface area and 264 acres of fill area would drain to Miller Creek. Approximately 95 acres of new impervious surface area and 282 acres of fill area would drain to Des Moines Creek.

7. See the response to Letter 2G-1, Comment 47.

2P-34 Helen Kludt

1. Comments noted. See the response to Letter 1L-6, Comment 6.

2P-35 Carlyn and Michael Roedell

1. See the response to Letter 2G-10, Comment 2 and General Response 2.

2. See the response to Letter 1F-2, Comment 1.

2P-36 Barbara Stuhring

1. Canada geese use many habitats including wetlands and open grassy areas.

2. The streams that will be impacted by the proposal are listed in the Public Notice.

3. The Port actively implements a Wildlife Management Plan and is considering the use of netting.

4. Comments noted.

2P-37 Arlene Brown (April 15, 1998)

1. See the response to Comment 104 of the Public Hearing.

2. See the response to Letter 2G-10, Comment 2.

3. See the response to Comment 188 of the Public Hearing.

4. The required safety areas are not missing.

5. This is a comment concerning the NDPES permit.

6. See the response to Letter 1G-1, Comment 4/5.

7. See the response to Comment 122 of the Public Hearing.

8. The impacts of using the on-site borrow sources and bringing material from off-site sources was thoroughly examined in the FEIS and FSEIS. Another EIS is not required.

9. Your allegations are not accurate. See the response to Letter 1P-8 and Letter 1G-1, Comment 4/5.

10. The transportation impacts of the proposal were thoroughly analyzed in the FEIS and FSEIS.

11. If Maury Island is proposed as a source of fill, appropriate environmental and technical review would occur.

12. See the response to Comment 11 of your letter and General Response 4.

13. See General Response 4.

14. See the response to Comment 62 of the Public Hearing.

15. See the response to Letter 2G-6, Comment 23.

16. The Corps has a prescribed format it must follow in its 404(b)(1) analysis. See the response to Letter 1L-3, Comment 4.

17. Comments noted. It is not likely that the two actions are related.

18. Comments noted. See the response to Letter 1G-1, Comment 4/5.

19. See General Response 6.

20. See General Response 6.

2P-38 Jessie Murray

1. See General Response 2.

2P-39 Dorothy Tarbet

1. See the response to Letter 1P-8, Comment 7.

2. See General Response 2.

2P-40 Sally Mackey

1. The Port has obtained all necessary approvals for the work it is presently doing including a Forest Practices permit from the Department of Natural Resources.

2P-41 Marjorie O'Neill

1. Comments noted.

2. See General Response 2.

2P-42 James Rymsza

1. Comments noted. See the response to Letter 1E-1, Comment 2.

2P-43 Barbara Stuhring

1. The Port has no plans at this time to fill any wetlands for the North Employee Parking Lot.

2P-44 Steve Backstrom

1. The Port is proposing mitigation to address impacts.

2. See the response to Letter 1E-1, Comment 2.

2P-45 Patty and Charles Burgess

1. See the response to 1G-1, Comment 4/5 concerning the quality of runoff from the Airport.

2. See Letter 1S-1 for WDFW's favorable opinion of the Miller Creek relocation plan.

2P-46 Albert Kaufman

1. See the response to Letter 1E-1, Comment 2.

2P-47 Mrs. Joseph Pompeo

1. See General Response 6.

2. See the response to Letter 2L-5.

3. See General Response 6. Angle Lake will not be affected by the proposal.

4. Comments noted.

5. Comments noted.

6. See the response to Letter 2G-10, Comment 2. Also see the response to Comment 136 of the Public Hearing.

2P-48 Deloris Voyvodich

1. Comments noted.

2P-49 Henry Hopkins (including comments from Environmental Transport L.L.C.)

1. The Corps' concern is with fill placed in waters of the United States. Therefore, the 20.6 million cubic yard volume used in the Public Notice is appropriate.

2. See General Response 4.

   The conveyor belt project is not a practicable alternative to the Port's proposed on-site borrow sources at this time due to (a) the current local permit requirements for the conveyor belt, and (b) the higher costs of dirt delivered via the conveyor belt vis-à-vis the dirt from on-site borrow sources.

2P-50 Russell Richter

See the response to Letter 2P-22.

2P-51 Henry Shomber

1. See General Response 2; the response to Letter 1L-6, Comment 6; and the response to Letter 1G-1, Comment 4/5.

2P-52 Arunkumar Jhaveri

1. See the response to Letter 2G-10, Comment 4.

2. Comments noted.

3. The Port will be required to maintain the mitigation wetland as a permit condition. See Letters 2L-2 and 2L-4 in which the City of Auburn expresses its support for the permit application.

4. The impacts associated with the proposal, including the wetland mitigation plan, have been thoroughly analyzed in two EISs. No further NEPA/SEPA analysis is necessary.

2P-53 Jean and Greg Anderson

1. See General Response 2 and the response to Letter 1F-2, Comment 1.

2P-54 Arlene Brown (April 19, 1998)

1. See General Response 6.

2P-55 Maryilyn Hoff

1. See General Response 2.

2P-56 Maria Little

1. See General Response 1.

2. Chapter IV, Section 6 (Social Impacts) of the FEIS includes a full discussion of environmental justice issues.

3. See the response to Letter 1G-1, Comment 2.

4. See the response to Comment 61 of the Public Hearing.

5. See Chapter IV of the FEIS for a discussion of groundwater quality. Most notably, see Appendix Q-A of the FSEIS, the Baseline Groundwater Study.

6. See the response to Letter 1G-2, Comment 7.

7. See the response to Letter 1E-1, Comment 2.

8. See the response to Comment 39 of the Public Hearing.

9. Your January 14 letter is included as Letter 1P-30.

10. See the response to Letter 2G-10, Comment 2.

2P-57 Jean Mayer

1. See General Response 2.

2P-58 Gary Wagner

1. Walker Creek, a tributary to Miller Creek, will benefit from the upstream improvements to Miller Creek. Walker Creek is fed from groundwater seeps. The drainage channel mitigation discussed in the Public Notice is designed to maintain this connection.

   Additionally, retaining walls are proposed for the fill to avoid wetlands at the headwaters of Walker Creek.

2. See the response to Letter 1P-8, Comment 7.

3. Comments noted.

4. See the response to Letter 1E-1, Comment 4/5 regarding the quality of runoff from the Airport. Groundwater seepage will be collected in drainage channels that will flow to Miller Creek.

2P-59 Donald Cone

1. Comments noted. See the response to Letter 1E-1, Comment 2.

2P-60 Kathryn Dunn

1. See General Response 2.

2P-61 Susan Osterman

1. See General Response 2.

2. See the response to Letter 1E-1, Comment 2.

3. See General Response 6. Impacts to air quality were discussed in the FEIS and FSEIS.

4. Comments noted.

2P-62 Sharon Patton

1. Comments noted.

2P-63 Carl Torkko

1. See General Response 2.

2P-64 Margaret Van Gasken

1. Comments noted.

2. See the response to Comment 62 of the Public Hearing regarding contaminated fill. See the response to Letter 1P-8, Comment 21 regarding the seismic issue.

3. The Port will be required as a permit condition to complete and maintain its mitigation obligation.

2P-65 Mark Van Gasken

1. With the proposed mitigation, downstream impacts in Des Moines Creek will be minimized.

2. See the response to Letter 2P-64, Comment 3.

3. See General Response 2.

2P-66 Diane Olson

1. Comments noted.

2. See General Response 6.

3. See the response to Letter 1E-1, Comment 3.

4. This is not a 404 issue.

5. Comments noted.

2P-67 Simon Miedema

See the responses to Comments 108 through 113 of the Public Hearing.

2P-68 Sandy Miedema

1. See the response to Letter 1L-6, Comment 2.

2P-69 Charles and Charlotte Sullivan

1. The Port has all necessary approvals for clearing land on the west side of the Airport. No wetlands are being impacted by this work. See the response to Letter 1G-1, Comment 4/5 regarding the quality of storm water runoff from the Airport.

2. See General Response 6.

3. Comments noted.

2P-70 Scott McBreen

1. See Letter 1S-1 for WDFW's favorable opinion of the Miller Creek relocation plan.

2. See the response to Letter 1L-6, Comment 6.

2P-71 James Lilje

See the response to Comment 57 of the Public Hearing.

2P-72 Donald Gestner

1. The Port is not proposing to fill Lora Lake. See General Response 2.

2P-73 Arlene Brown (no date)

See the responses to Comments 198 through 203 of the Public Hearing.

2P-74 Dan Caldwell (May 8, 1998)

1. The Las Vegas airport does not operate under the same weather conditions at Sea-Tac.

2. See the response to Comment 188 of the Public Hearing.

3. See the response to Letter 1P-34, Comment 2.

4. See General Response 5.

5. See the response to Comment 141 of the Public Hearing.

Letters to Ecology
(December 19, 1997 to April 29, 1998)

DOE-L-1 City of Des Moines

1. Comments noted. See the response to Letter 1G-3, Comment 1 concerning the comment schedule.

2. See General Response 2.

DOE-L-2 City of Des Moines

1. See General Response 2.

2. The Port is an active participant in planning efforts focused on Des Moines Creek and maintains that the proposed mitigation will adequately address impacts from the Master Plan Update projects.

3. See the response to Letter 2G-10, Comment 2.

4. See the response to Letter 2G-10, Comment 2.

5. Comments noted.

DOE -L-3 Highline Water District

1. See General Response 6.

2. See General Response 6.

DOE-L-4 Southwest Suburban Sewer District

See the response to Letter 2L-5.

DOE-E-1 King County Councilmember Chris Vance

See the response to Letter 1E-3.

DOE-E-2 State Representative Karen Keiser

1. See General Response 2 and the response to Letter 2G-10, Comment 2.

2. The Port is not proposing a mitigation bank. See General Response 2.

3. The Port is an active participant in basin planning efforts.

DOE-E-3 Normandy Park Councilmember Kathleen Quong-Vermeire

See the response to Letter 2P-43.

DOE-E-4 Highline Water Commissioner Kathleen Quong-Vermeire

See the response to Letter 2P-44.

DOE-G-1 RCAA

1. The referenced page in the Public Notice is a "Notice of Application" not a "Notice of Availability."

2. The 401 process is being coordinated with the Corps' 404 process, as required.

DOE-G-2 RCAA

See the response to Letter 1G-6.

DOE-G-3 ACC/Cutler & Stanfield

See the response to Letter 1G-1.

DOE-G-4 CASE

1. Comments noted.

2. Comments noted.

See the response to Letter 2G-6.

DOE-G-5 ACC/Cutler & Stanfield

See the response to Letter 2G-10.

DOE-G-6 Seattle Community Council Federation

1. Comments noted.

2. The potential noise impacts of the Master Plan Update improvements were extensively considered in the FEIS and FSEIS, and were the subject of major consideration by the PSRC and FAA in reaching their decisions to approve the project.

3. Comments noted.

4. See General Response 1 and the response to Letter 1E-1, Comment 3.

5. See the response to Letter 1E-1, Comment 3.

6. The Final EIS and Final Supplemental EIS contain a detailed discussion of the purpose and need for the Master Plan Update improvements, including the third parallel runway. Please see appendix R of the Final EIS and Appendix F of the Final Supplemental EIS for responses to comments submitted on those documents.

7. See Chapter I of the FEIS and Chapters 1 and 2 of the FSEIS for a definition of the project purpose and need. The purpose of the third runway is "to improve the poor weather airfield operating capability in a manner that accommodates aircraft activity with an acceptable level of delay". The purpose of the third runway is to address poor weather operating constraints and these constraints affect the capacity of the existing airfield. Thus, the constraints affect the operational efficiency of the airfield under the level of operations today, which will be exacerbated in the future with added levels of operations. When this constraint is relieved, added airfield capacity would be available, as demonstrated by the "With Project" scenarios being able to accommodate the forecast demand now anticipated to occur between 2008 and 2010. The forecasts prepared for the Master Plan, and updated for the FSEIS, reflect reasonable estimates of future growth in air travel demand. These forecasts are comparable to the forecasts prepared by the FAA and other aviation forecasting groups.

8. See the response to Comment 141 of the Public Hearing.

9. See General Response 6.

10. See the response to Letter 1G-1, Comment 4/5.

11. See General Response 2.

12. 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 FEIS, 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, FAA Air Traffic Manager, Seattle Tower. However, based on more recent conversations with Mr. Davidson, he confirmed that one reported fuel dumping incident may have occurred on July 8, 1996. No additional data is available concerning the amount or location of the fuel dumping. Mr. Davidson indicated that fuel dumping incidents are rare. If an emergency incident arises and it becomes necessary to release fuel, the Seattle FAA TRACON personnel recommend that the fuel be dumped over non-populated areas. In addition, the cost to the airlines of unnecessarily fuel dumping would also be prohibitive due to the high cost of fuel.

    In instances where fuel is dumped, the evaporative nature of fuel results in it evaporating before it reaches ground, as aircraft are at an altitude above 3,000 feet as they are vectored to return or land at Sea-Tac. No information exists concerning the quantity of fuel dumped on the July 8, 1996 incident.

    As is noted in the FEIS, testing was conducted of residue identified by area residents due to concerns with fuel dumping and engine exhaust residue. The lab testing indicated that the material is essentially biological, consisting of mold and bee pollen. This material was found to have an oily consistency, which would account for it being difficult to remove from certain surfaces.

DOE-B-1 Segale Business Park

See the response to Letter 2B-4.

DOE-P-1 Harold Hardwick

1. Comments noted.

DOE-P-2 Diane Olson

1. That section of Miller Creek will not be relocated.

2. The Port maintains that the proposal will effectively mitigate impacts. There will be no impacts to threatened or endangered species.

3. See General Response 2.

4. Fill will come from approved, permitted sources.

5. Comments noted.

DOE-P-3 A. Brown

See the response to Letter 1P-8.

DOE-P-4 Minnie Brasher

1. The 404 and 401 notices are issued concurrently. This is standard and appropriate under federal regulations.

2. The Port believes that there is adequate information available for the resource agencies to make their permit decisions.

3. See the response to Letter 1G-3, Comment 1.

4. See the response to Letter 1L-6, Comment 2.

5. See the response to Letter 1E-1, Comment 3.

6. See General Response 6.

7. See the response to Letter 1L-6, Comment 2.

8. The Public Notice only lists the volume of fill associated with the third runway, runway safety areas and SASA – those projects that would involve wetland fill.

9. See the response to 1P-28, Comment 8.

10. See General Response 2.

11. See the response to 1P-28, Comment 10

12. See the response to 1P-28, Comment 11.

13. See the response to 1P-28, Comment 12.

14. See the response to 1P-28, Comment 13.

15. See the response to 1P-28, Comment 14.

16. See the response to 1P-28, Comment 15.

17. See the response to 1P-28, Comment 16.

18. See the response to 1P-28, Comment 17.

DOE-P-5 Barbara Stuhring

1. See the response to Letter DOE-P-4, Comment 1.

2. See the response to Letter 1G-3, Comment 1.

3. The Public Notice is the information you are requesting.

See the response to Letter 1P-34.

DOE -P-6 Henry Frause

See the response to Letter 1P-41.

DOE-P-7 Henry Frause

See the response to Letter 1P-41.

DOE-P-8 David Dorough

1. See General Response 2. These are wetlands of low to moderate value. If anything of archaeological significance is discovered during construction, work will be halted and consultation will occur with appropriate authorities.

2. See the response to Letter 1G-1, Comment 4/5 regarding the quality of storm water from the Airport.

DOE-P-9 Barbara Stuhring

1. See the response to Comment 61 of the Public Hearing.

DOE-P-10 Henry Frause

1. Comments noted.

DOE-P-11 Henry Frause

1. Comments noted.

DOE-P-12 Robert Durham

1. Comments noted. See General Response 2.

DOE-P-13 Carol Colburn

1. Comments noted. See General Response 2.

2. Comments noted. See General Response 2.

DOE-P-14 Mayo Alberigi

1. Comments noted. See General Response 2.

2. See the response to Letter 1L-6, Comment 6.

3. See the mitigation plans attached to the JARPA application, the information presented in the Public Notice, the FEIS and FSEIS, and General Response 2.

DOE-P-15 Sherrill Miller

See the response to Letter 2P-18.

DOE-P-16 Molly Nordhaus

See the response to Letter 2P-19.

DOE-P-17 John and JoAnn Bolender

See the response to Letter 2P-27.

DOE-P-18 Dan Caldwell

See the response to Letter 2P-29.

DOE-P-19 Donald Gestner

1. Comments noted.

DOE-P-20 Carlyn and Michael Roedell

See the response to Letter 2P-35.

DOE-P-21 A. Brown

See the response to Letter 2P-37.

DOE-P-22 A. Brown

See the response to Letter 2P-54.

DOE-P-23 Maria Little

See the response to Letter 2P-56.

DOE-P-24 Margaret Van Gasken

1. See the response to Comment 62 of the Public Hearing.

2. See General Response 6.

3. Comments noted. Air quality and noise were extensively considered in the FEIS, FSEIS, and related studies and permit discussions.

4. See General Response 2.

DOE-P-25 Mark Van Gasken

1. See the response to Letter 2P-65, Comment 1.

2. See General Response 2.

3. See the response to Comment 62 of the Public Hearing.

4. A conveyor is not proposed as part of this project. See the response to Letter 2P-49.

DOE-P-26 Donald Gestner

1. Comments noted.

DOE-P-27 Scott McBreen

1. The road realignment is necessary. The current alignment will be covered with fill embankment for the new parallel runway.

DOE-P-28 Diane Olson

See the response to Letters 2P-66 and DOE-P-2.

APPENDIX A

SEATTLE-TACOMA INTERNATIONAL AIRPORT

WILDLIFE HAZARD MANAGEMENT PLAN

WILDLIFE HAZARD MANAGEMENT

PORT OF SEATTLE
SEATTLE-TACOMA INTERNATIONAL AIRPORT

PO BOX 68727
SEATTLE, WASHINGTON 98168

Gina Marie Lindsey
Managing Director, Aviation Division

HISTORY

Prior to 1977, wildlife control at Seattle-Tacoma International Airport was not conducted in accord with a formally organized program. In mid 1977, it became apparent that something needed to be done to rid Sea-Tac of the large numbers of starlings that were roosting on airport property. Those birds, numbering up to 150,000 at times, represented a very real danger to aircraft using Sea-Tac Airport. Assistance was requested from the U.S. Fish and Wildlife Service, the U.S. Air Force, and any other source that might help in formulating a viable Wildlife Control Program for Sea-Tac.

Personnel from the U.S. Fish and Wildlife conducted a cursory ecological survey of airport property to determine the extent of the starling problem and identify any other obvious problem species or environmental factors that were contributing to the potential hazard to aircraft posed by wildlife.

A biologist working in another capacity for the Port of Seattle was solicited into the Wildlife Control Team and charged with the responsibility of designing a permanent Wildlife Control Program for Sea-Tac Airport. A positive Wildlife Control Program was formulated and subsequently implemented to minimize the danger to aircraft operations caused by wildlife. This program was developed incorporating those recommendations deemed applicable from the various agencies whose help was initially solicited. Also, a more extensive ecological study was undertaken by the Port biologist to identify environmental factors that would be attractive to wildlife on airport property. The biologist then recommended procedures to reduce or eliminate those factors.

The Wildlife Control Program as it currently exists at Sea-Tac Int'l. Airport has evolved from those actions. The airport environment is dynamic and ever changing and requires continual surveillance to minimize the airport's attractiveness to wildlife.

It must be remembered that almost anything one may do will be attractive to some species of living creature. Consequently, a control program will manipulate factors to maintain what is a delicately balanced environment, minimizing the attractiveness of the airport to as many species of wildlife as possible, while specifically targeting especially hazardous (to aircraft) species.

PURPOSE

The purpose of this section is to fully describe the Wildlife Control Program and fix responsibilities thereto.

Wildlife control at an airport must be considered a major safety item, and thus, every person working at the airport must share in the responsibility for an effective Wildlife Control Program.

ABBREVIATIONS and DEFINITIONS

- AMA - Aircraft Movement Area. Runways, taxiways and other airport areas used for taxiing or hover taxiing, air taxiing, takeoff and landing of aircraft, excluding loading ramps and aircraft parking areas.
- AOA - Aircraft Operating Area. Any area enclosed by the airport security fence, including ramps, aprons, runways, taxiways, gate positions, airport parking areas and FAA facilities.
- Adjacent to the AOA - All properties or structures immediately adjacent to the perimeter fence that surrounds the aircraft movement and operating areas.
- Airport - The entirety of Sea-Tac International Airport and properties owned by the Port of Seattle in and around the airport as shown on the Airport Layout Plan.
- Airport Layout Plan - A periodically updated Port of Seattle drawing giving detailed information useful in the design and location of facilities and improvements.
- Airport Supervisor - Duty Airport Supervisor, Airport Operations Section.
- Biologist - The person designated by the Port of Seattle to design, monitor and update the Wildlife Control Program.
- FAA - The Federal Aviation Administration.
- Harborage - Anything that will sustain wildlife (nesting roosting, burrowing, etc.).
- Leased Areas - Port owned property or structures under lease to another entity.
- Lessee - Entity leasing property or services from the Port of Seattle.
- Port - Port of Seattle.
- Program - The Sea-Tac Airport Wildlife Control Program.
- Sea-Tac - Seattle-Tacoma International Airport.
- Senior Ramp Controller - Provides inspections, escorts, enforcement of rules and regulations and accountability of transient aircraft. Provides animal and bird control within the AOA.
- Structure - Any man made item.
- Terrain Alteration - Any change to an existing condition (a new structure, paving, landscaping, etc.).
- Wildlife Attractant - Anything that may attract wildlife.

OBJECTIVES

- Minimize the day-to-day hazard to aircraft caused by wildlife that may frequent airport property.
- Reduce or eliminate those features on the airport that are found to be attractive to wildlife.
- Monitor and evaluate the effectiveness of the Wildlife Control Program, incorporating changes in the program as required by the dynamic nature of the airport environment.

PROGRAM

The Wildlife Control Program consists of two principal parts:

1. **Short Range Program**
   Involves those procedures implemented on a day-to-day basis to minimize the hazard to aircraft caused by wildlife. Essentially, the program includes observation, reporting, dispersal of birds or other wildlife and continued surveillance of same to ensure that, once dispersed, they do not return unnoticed.

2. **Long Range Program**
   Involves research in the areas of wildlife population dynamics and behavior, and the identification, alteration or elimination of features on the airport that are attractive to wildlife.

PROGRAM DIRECTION

The overall Wildlife Control Program is under the direction of the airport's General Manger, Aeronautical/Terminal (GMAT). Assisting the GMAT is the Port of Seattle Biologist, who works closely with the U.S. Fish and Wildlife Service in developing and recommending to the GMAT methodology for:

- Dispersing flocks of birds or other wildlife that frequent airport property; and
- Mechanical or chemical alteration of environmental factors that attract wildlife.

EQUIPMENT, PROCEDURES, and RESPONSIBILITIES

1. **Basic Equipment**

The Biologist's vehicle and each Sr. Ramp Control vehicle will be equipped or have available the following:

- Radio capabilities–Tower, Ground Control, Fire, Police, Maintenance, Central Control, Airport Operations.
- Double barreled, open bore (no choke) 12-gauge shotgun and appropriate safety and hearing protection devices.
- Various pyrotechnic devices (cracker shells, etc.).
- Appropriate birdshot shells.
- Cracker pistols (6mm blank).
- Plastic trash bags (for animal remains).
- Disposable, impermeable gloves.
- Tape deck, outside speakers.
- Appropriate tapes of bird distress cries.
- Large, dog size transport kennel and catching equipment (leash, snare pole, etc.).
- A freezer will be available for preservation of animal remains found on runways, etc.
- Binoculars.
- All-purpose rated fire extinguisher.
- 35mm camera.
- Spotlight.

2. **Short Range Program**

- All personnel working at the airport are requested to pick up and properly dispose of all trash and debris. Such items are especially attractive to gulls and crows and certain rodent species.

- All dumpsters and trash receptacles shall have lids.

- All personnel are requested to see that dumpsters and trash receptacles remain covered.

- All personnel are requested not to feed birds or other wildlife on or near airport property.

- All personnel are requested to report all sightings of bird flocks or other wildlife to the Airport Operations office (433-5385) as soon as possible after the sighting.

- Any closed portion of any runway, taxiway, or any part of the AOA will be examined for, and cleared of, wildlife activity prior to reopening for use by aircraft.

- Reaction to Wildlife Sightings

  a. The Sr. Ramp Controller is dispatched to observe and disperse birds or other wildlife if they maneuver or settle within airport boundaries. Sr. Ramp Controllers disperse birds using such techniques as bird distress calls broadcast from a tape deck installed in each Sr. Ramp Controller's vehicle and/or fire shot and/or cracker shells from 12-gauge shotguns or other devices. Sr. Ramp Controllers continue to pursue and harass flocks until they move away from airport property. These activities will be coordinated with the Tower if conditions warrant.

  b. When flocks are stubborn or large, or tend to maneuver back and forth across runways and approach areas, the Airport Supervisor will publish appropriate NOTAMs advising aircraft crews of the hazard. The Airport Supervisor may choose to close runways temporarily if birds or other animals cross or approach runway surfaces.

- Wildlife Strikes or Near Miss Incidents

  a. Aircraft operators are requested to report wildlife strikes or near miss incidents to the Airport Operations office (433-5385) if the incident occurred on or over airport property. Generally, the information to be reported should be the same as that indicated on FAA Form 5200-7, Bird Strike/Incident Report (Attachment C-1).

  b. If evidence of a possible wildlife strike is found on airport property (bird or animal carcass, or parts of birds or animals) but no report is received from aircraft operators, all available information pertaining to the incident will be relayed to the port Biologist for a follow-up investigation. All such remains found will be placed in a proper container and stored in a freezer supplied for such purpose.

     1) If a wildlife strike or near miss occurs or is suspected of having occurred, i.e., animal remains found on or near runways or taxiways, a Wildlife Incident Report (Attachment C-4) is prepared by the duty Airport Supervisor and retained in the Airport Operations office where it is also accessible to the Port Biologist.

  c. The Daily Wildlife Activity Report (Attachment C-5) is completed by each Sr. Ramp Controller if wildlife activity occurs on his or her shift. This report is used by the Port Biologist as a daily trace of the wildlife populations, and is a principal tool in the scientific evaluation of the Wildlife Control Program.

3. **Long Range Program**

The program is also an on-going process of data collection, evaluation, and positive action directed toward the reduction of wildlife hazards at the airport, as well as adjusting any aspect of the program that may be required to adapt it to the dynamic airport environment. All living creatures must have food, water, and harborage. Therefore, this aspect of the program is designed to identify those factors and minimize or eliminate them as indicated below.

- Collection and evaluation of data from day-to-day wildlife observations as follows:

  a. Identification of species of wildlife frequenting the airport.
  b. Observation of each specie to determine frequency and duration of visit.
  c. Identification of areas on the airport that are attractive to wildlife, and determination of the specific activity wildlife is engaged in at each area.

- All areas of surface water on or adjacent to the AOA will be identified and eliminated where feasible.

  a. No open air fountains, permanent standing water, or any other exposed sources of water will be allowed on or near the AOA or adjacent areas of the airport except existing natural watercourses that make up part of the overall drainage system of the area.

     Note: The three Port of Seattle waste water treatment plant lagoons are exempted from the above.

- All existing structures on or adjacent to the AOA will be surveyed to identify areas where wildlife may harbor, loaf, or otherwise be attracted to.

  a. All such identified areas will, where possible, be altered or eliminated.

- Any proposed new structure or terrain alterations on or adjacent to the AOA will be reviewed by the Airport Operations office to evaluate potential attractiveness to wildlife.

- The Biologist will survey all vegetative areas of the airport at least twice each year to determine the population dynamics of the various species of creatures and plants that may act as attractants to other more dangerous (to aircraft) forms of wildlife.

  a. If any of the above mentioned populations are deemed to be an attractant, the Biologist will recommend procedures to reduce them to an acceptable level.

- All grassy areas not required to be shorter by other considerations, and which are adjacent to and between runways and taxiways, will be maintained at a height of 8-12 inches where possible.

  a. These areas will be bottomed out (cut short) in the spring as soon as the ground will support the equipment and will then be maintained at 8-12 inches throughout the growing season.

- For all areas of the airport under lease, the lessee shall be responsible for wildlife control in their leased areas and shall not do anything which will sustain (feed, water, or harbor) wildlife. Further, if the lessee does not abate a wildlife attractant immediately, the Port may take any measures deemed necessary to abate such an attractant and bill all costs for such abatement to the responsible lessee.

- The Biologist, or other designated Port of Seattle employee, will communicate with all other pertinent agencies regarding wildlife control on the lands surrounding the airport that may be a contributing factor to the overall airport wildlife hazard potential.

  a. An example of this would be encouraging the pertinent agency or agencies involved with construction of highway overpasses near the airport to design them so that pigeons are not able to roost or nest on or under them.

- All Port of Seattle airport employees will, upon hire, receive indoctrination regarding wildlife control at the airport, including reading the wildlife control section of the Airport Operations Manual.

  a. All Port employees working on the AOA will receive more extensive wildlife control indoctrination and training.

  b. Sr. Ramp Control personnel will be trained to effect extensive wildlife control measures when needed, including, but not limited to:

     1) Use of shotguns using birdshot and/or cracker shells.
     2) Use of other pyrotechnic devices.
     3) Proper use of recorded wildlife distress cries using the broadcast equipment supplied in the patrol vehicles.
     4) Any other approved control techniques or procedures.

- When required, other Port employees, such as Fire or Police personnel, may be called upon to assist Airport Operations personnel in abating a wildlife hazard.

- The Biologist shall continuously monitor and evaluate all aspects of the program and recommend changes or adjustments to the program as deeded necessary.

- Sea-Tac Wildlife Control Committee

  a. When deemed necessary, a Wildlife Control Committee shall be appointed, consisting of representatives from the following:
     Airport Operations, Facilities and Maintenance, Business and Property Management, Engineering, FAA, and any interested airlines using Sea-Tac.

  b. When standing, the Committee shall meet at least annually, or as often as is deemed necessary, to review the Program and recommend any needed changes.

- Funding and Implementation of Corrective Action

  a. The General Manager, Aeronautical/Terminal (GMAT) budgets for the ongoing Wildlife Control Program on an annual basis, and requests special funding in those instances where major expenditures for environmental alteration is required.

  b. The GMAT reviews the recommendations of the Biologist and takes action to request maintenance or other support, within budgetary limitations, to correct the noted deficiencies.

ATTACHMENT C-1

Form Approved
OMB No. 2120-0045

BIRD STRIKE INCIDENT/INGESTION REPORT

Other Wildlife Species May Be Described Here

Operation Cost and Engine Damage Information

1. Name of Operator	2. Aircraft Make/Model	3. Engine Make/Model

4. Aircraft Registration	5. Date of Incident (DD, MM, YY)	6. Local Time of Incident
		☐ Dawn ☐ Dusk ☐ Day ☐ Night

7. Aerodrome Name	8. Runway Used	9. Location if En Route (Nearest Town/Reference and State)

10. Height (AGL)	11. Speed (IAS)	
feet	*knots*	

12. Phase of Flight

- ☐ A. Parked
- ☐ B. Taxi
- ☐ C. Take-off
- ☐ D. Climb
- ☐ E. En Route
- ☐ F. Descent
- ☐ G. Approach
- ☐ H. Landing Roll

13. Part(s) of Aircraft Struck or Damaged

	Struck	Damaged		Struck	Damaged
A. Radome	☐	☐	H. Propeller	☐	☐
B. Windshield	☐	☐	I. Wing/Rotor	☐	☐
C. Nose	☐	☐	J. Fuselage	☐	☐
D. Engine No. 1	☐	☐	K. Landing Gear	☐	☐
E. Engine No. 2	☐	☐	L. Tail	☐	☐
F. Engine No. 3	☐	☐	M. Lights	☐	☐
G. Engine No. 4	☐	☐	N. Other *(specify)*	☐	☐

14. Effect on Flight

- ☐ None
- ☐ Aborted Take-Off
- ☐ Precautionary Landing
- ☐ Engines Shut Down
- ☐ Other *(specify)*

15. Sky Condition

- ☐ No Cloud
- ☐ Some Cloud
- ☐ Overcast

16. Precipitation

- ☐ Fog
- ☐ Rain
- ☐ Snow

17. Bird Species

18. Number of birds seen and/or struck

Number of Birds	Seen	Struck
1	☐	☐
2-10	☐	☐
11-100	☐	☐
more than 100	☐	☐

19. Size of Bird(s)

- ☐ Small
- ☐ Medium
- ☐ Large

20. Pilot Warned of Birds

☐ Yes ☐ No

21. Remarks *(describe damage, injuries and other pertinent information).*

ENGINE DAMAGE COST INFORMATION

22. Aircraft time out of service:	23. Estimated cost of repairs or replacement ($ U.S. in thousands):	24. Estimated other cost ($ U.S. thousands) (e.g. loss of revenue, fuel, hotels):
hours	$	$

Reported by *(Optional)*	Title	Date

FAA Form 5200-7 (2-90) Supersedes Previous Edition

Continued on Reverse

BIRD STRIKE INCIDENT/INGESTION REPORT (Continued)

SPECIAL INFORMATION ON ENGINE DAMAGE STRIKES

Reason for failure/shutdown	Engine 1	Engine 2	Engine 3	Engine 4	Comments
Unconditional Failure	☐	☐	☐	☐	
Fire	☐	☐	☐	☐	
Shutdown — Vibration	☐	☐	☐	☐	
Shutdown — Temperature	☐	☐	☐	☐	
Shutdown — Fire warning	☐	☐	☐	☐	
Shutdown — Other *(specify)*	☐	☐	☐	☐	
Shutdown — Unknown	☐	☐	☐	☐	
	☐	☐	☐	☐	
Estimated percentage of thrust loss*					
Estimated number of birds ingested					

*These may be difficult to determine but even estimates are useful.

Agency Display Of Estimated Burden For Bird Strike Incident/Ingestion Report

The public report burden for this collection of information is estimated to average 5 minutes per response.

If you wish to comment on the accuracy of the estimate or make suggestions for reducing this burden, please direct your comments to OMB and the FAA at the following addresses:

Office of Management and Budget
Paperwork Reduction Project 2120-0045
Washington, D.C. 20503

— and —

U.S. Department of Transportation
Federal Aviation Administration
Program Support Branch, ARP-11
800 Independence Avenue, S.W.
Washington, D.C. 20591

FAA Form 5200-7 (2-90)

U.S. Department of Transportation
Federal Aviation Administration
800 Independence Ave. S.W.
Washington D.C. 20591

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO 12438 WASHINGTON, D C

POSTAGE WILL BE PAID BY THE FEDERAL AVIATION ADMINISTRATION

FEDERAL AVIATION ADMINISTRATION
OFFICE OF AIRPORT SAFETY AND STANDARDS, AAS-310
800 INDEPENDENCE AVENUE, S.W.
WASHINGTON, D.C. 20591

ATTACHMENT C-2

3-201 (10/86)

DEPA' ...T OF THE INTERIOR
U.S. FI... ...D WILDLIFE SERVICE
911 N.E. 11th AVENUE
PORTLAND, OR 97232-4181

FEDERAL FISH AND WILDLIFE PERMIT

1. PERMITTEE

SEA-TAC INTERNATIONAL AIRPORT
POST OFFICE BOX 68727
SEATTLE WA 98188

2. AUTHORITY-STATUTES

16 USC 703-712

REGULATIONS (Attached)

50 CFR Part 13
50 CFR 21.41

3. NUMBER PRT-673470

4. RENEWABLE ☒ YES ☐ NO

5. MAY COPY ☒ YES ☐ NO

6. EFFECTIVE 1/ 1/94

7. EXPIRES 12/31/94

8. NAME AND TITLE OF PRINCIPAL OFFICER (If #1 is a business)

ENV. HEALTH SPECLST
DENNIS M. BULMAN

9. TYPE OF PERMIT

DEPREDATION

10. LOCATION WHERE AUTHORIZED ACTIVITY MAY BE CONDUCTED

SEA-TAC INTERNATIONAL AIRPORT; SEATTLE, WASHINGTON

11. CONDITIONS AND AUTHORIZATIONS:

A. GENERAL CONDITIONS SET OUT IN SUBPART D OF 50 CFR 13, AND SPECIFIC CONDITIONS CONTAINED IN FEDERAL REGULATIONS CITED IN BLOCK #2 ABOVE, ARE HEREBY MADE A PART OF THIS PERMIT. ALL ACTIVITIES AUTHORIZED HEREIN MUST BE CARRIED OUT IN ACCORD WITH AND FOR THE PURPOSES DESCRIBED IN THE APPLICATION SUBMITTED. CONTINUED VALIDITY, OR RENEWAL, OF THIS PERMIT IS SUBJECT TO COMPLETE AND TIMELY COMPLIANCE WITH ALL APPLICABLE CONDITIONS, INCLUDING THE FILING OF ALL REQUIRED INFORMATION AND REPORTS.

B. THE VALIDITY OF THIS PERMIT IS ALSO CONDITIONED UPON STRICT OBSERVANCE OF ALL APPLICABLE FOREIGN, STATE, LOCAL OR OTHER FEDERAL LAW.

C. VALID FOR USE BY PERMITTEE NAMED ABOVE.

D. Authorized to kill migratory birds by shooting, for the purpose of assuring safe aircraft operations. The killing of birds shall not be the principle control measure and is only to be employed in concert with an active scare and deterrent program. Killing must be held to the minimum number of birds necessary to accomplish the purpose of this permit.

E. The killing of eagles and endangered species is NOT authorized.

F. All birds killed under the authority of this permit must be picked up and disposed of by burning or burial, except that the temporary display of dead birds is authorized for the purpose of creating a distress condition prior to the final disposition.

G. This permit does not supersede any county, state, or municipal laws relating to the discharge of firearms.

☐ ADDITIONAL CONDITIONS AND AUTHORIZATIONS ON REVERSE ALSO APPLY

12. REPORTING REQUIREMENTS

FIRST ANNUAL REPORT DUE 1/10/95
REPORT NUMBER AND SPECIES OF BIRDS KILLED ON FORMS PROVIDED EACH FALL.

ISSUED BY Pamela E. Tate-Hall

TITLE APPLICATIONS EXAMINER
LAW ENFORCEMENT REGION 1

DATE 1/25/94

ORIGINAL

ATTACHMENT C-3
Form Approved
Budget Bureau No. 42-R324.5

U.S. Fish and Wildlife Service

YOUR PERMIT EXPIRES ON DECEMBER 31 OF THIS YEAR. WRITTEN JUSTIFICATION IS REQUIRED FOR RENEWAL.

REPORT OF MIGRATORY BIRDS TAKEN - Calendar Year 19 86

DEPREDATION CONTROL

Sea-Tac International Airport
Port of Seattle
P.O. Box 68727
Seattle, WA 98188

Permit Number:
673470

Permit regulations (50 CFR 21) require you to submit a report of operations ON OR BEFORE JANUARY 10, of each calendar year or whenever requested. Failure to comply is cause for revoking your permit. Please complete the report form below by listing the migratory birds, their nests or eggs taken under your permit during the calendar year. Indicate "NONE" if no activities were conducted. NOTE: Persons reporting their depredation permit activities only use "Common Name" and "Bird" columns. Mail completed form to: Special Agent in Charge, U.S. Fish and Wildlife Service,
847 NE 19th Avenue
Suite 225
Portland, OR 97232

AOU Number	Common and Scientific Name	State (Where collected)	NUMBERS COLLECTED		
			Birds	Nests	Eggs
Permittee's signature Dennis M. Bulman		TOTALS...	None		

Form 3-430a
(Revised Dec 1974)

AR 035301

UNITED STATES DEPARTMENT OF THE INTERIOR
Fish and Wildlife Service

REPORT OF MIGRATORY BIRDS TAKEN

NOTICE

In accordance with Privacy Act of 1974 (PL 93-579), please be advised that:

1. The gathering of information on migratory birds is authorized by the Migratory Bird Treaty Act (16 U.S.C. 703-711) and Title 50, Part 21, of the Code of Federal Regulations.

2. The disclosure of the requested information is required as a condition of your permit. The report also provides an inventory of migratory waterfowl and other migratory birds on hand at the end of the reporting period which will be used for statistical analyses of migratory bird populations.

3. Failure to disclose all of the requested information may be sufficient cause for (1) the U.S. Fish and Wildlife Service to revoke your permit, and (2) prosecution by the U.S. Department of Justice.

4. In the event there is indicated a potential violation of a statute, regulation, rule, order, or license, whether civil, criminal, or regulatory in nature, the requested information may be transferred to the appropriate Federal, State, local, or foreign agency charged with investigating or prosecuting such violations.

Form 3-430a

Port of Seattle

WILDLIFE INCIDENT REPORT

ATTACHMENT C-4

DATE	TIME OF INCIDENT

TYPE OF REPORT (Circle One)

WILDLIFE STRIKE NEAR MISS SIGHTING OTHER (Explain Below)

NAME OF PERSON RENDERING REPORT	TELEPHONE NUMBER

JOB TITLE	COMPANY NAME

LOCATION OF INCIDENT Describe, also indicate on back (See Map)

☐ N. Flow
☐ S. Flow

AIRCRAFT DAMAGE (If Applicable)

AIRCRAFT OWNER	AIRCRAFT TYPE	AIRCRAFT NUMBER

ESTIMATED NUMBER OF ANIMALS	SPECIES (If Known)

ACTION TAKEN (Check Boxes)

☐ DISPATCHED SENIOR RAMP CONTROL TO SCATTER BIRDS.

☐ ISSUED NOTAM TO FLIGHT SERVICE STATION AND CALLED AIRLINE OPERATIONS OFFICES ON HOT LINE.

☐ POSTED INCIDENT ON BIRD WATCH MAP.

☐ NOTIFIED FAA DUTY OFFICER OR FAA CERTIFICATION SAFETY OFFICER (Wildlife strike or near miss only) and TRACON SUPERVISOR. NAME OF PERSON(S) INFORMED _____

☐ COMPLETED ALL AVAILABLE ELEMENTS OF FAA FORM 5200-7 IF EVIDENCE OF A BIRD STRIKE IS DISCOVERED ON THE GROUND BUT NOT REPORTED BY AN AIRLINE.

☐ OTHER (Explain Below)

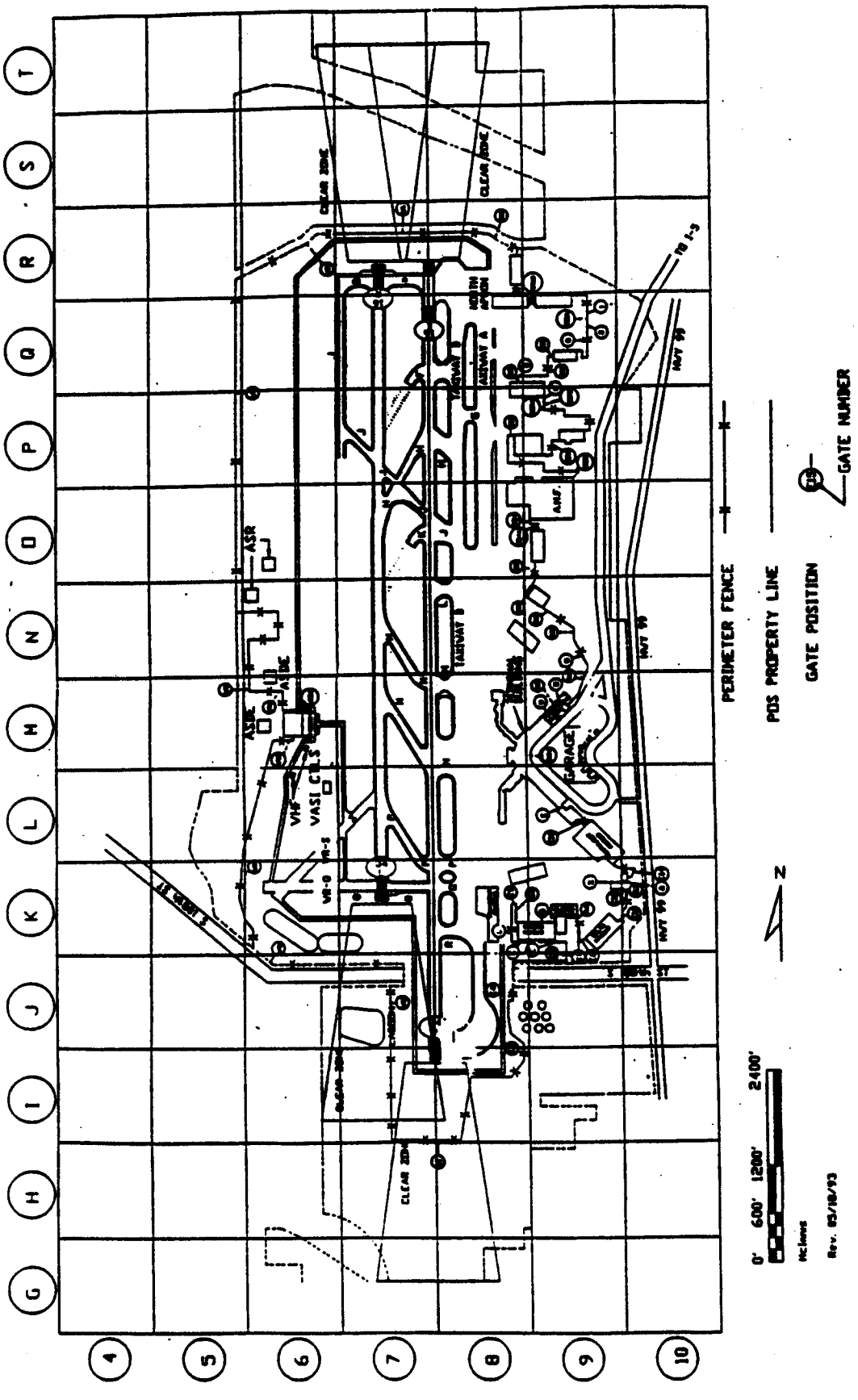
TIME NOTAM ISSUED (IF APPLICABLE)	TIME NOTAM CANCELLED

COMMENTS, EXPLANATIONS, RECOMMENDATIONS

REPORT COMPLETED BY

35-667 1/89

AR 035303


PERIMETER FENCE
POS PROPERTY LINE
GATE POSITION
GATE NUMBER
N
0' 600' 1200' 2400'
Rev. 05/10/93

DAILY WILDLIFE ACTIVITY REPORT

DATE

OBSERVER'S NAME	TELEPHONE NO.	SHIFT ☐ DAY ☐ SWING ☐ GRAVEYARD

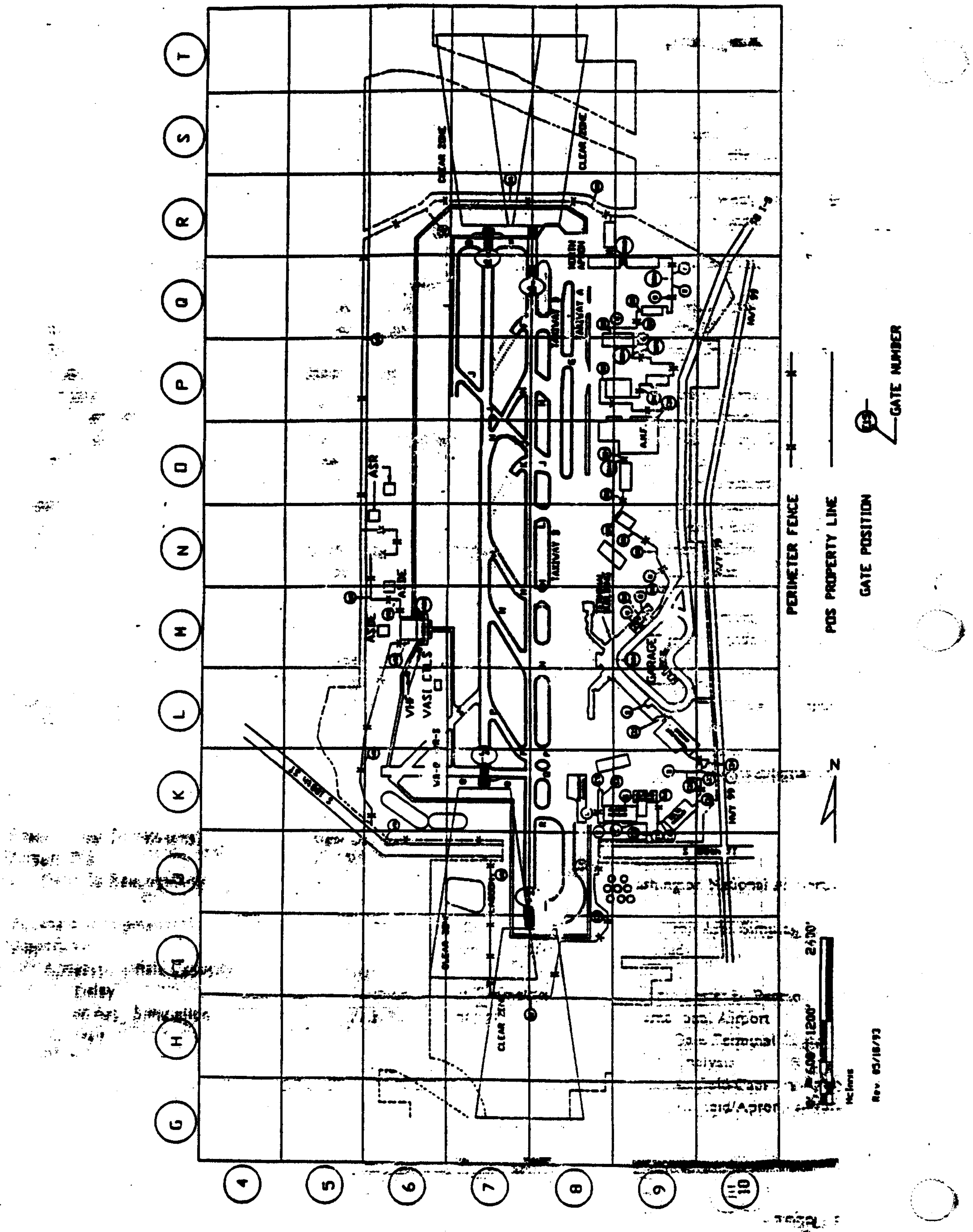
W...HER CONDITIONS CLOUD COVER %	TEMPERATURE F	PRECIPITATION ☐ NONE ☐ SLIGHT ☐ MODERATE ☐ HEAVY	WIND DIRECTION N E W S
WIND VELOCITY (ESTIMATED IN M.P.H.) CALM LIGHT MODERATE STRONG			

MARK LOCATION OF SIGHTINGS ON MAP ON OTHER SIDE IN WHICH THEY OCCURRED.

SIGHTING NUMBER	CREATURE OBSERVED	SPECIES. IF KNOWN & LOCATION	SUBSTRATE	BEHAVIOR	AIRCRAFT TRAFFIC PATTERN N. FLOW	S. FLOW	TIME	EST. COUNT
	☐ ANIMAL ☐ BIRD ☐ REPTILE ☐ ________		☐ LOGS ☐ TREES ☐ WATER ☐ GROUND ☐ ________	☐ FLYING ☐ SWIMMING ☐ PERCHING ☐ ________				
	☐ ANIMAL ☐ BIRD ☐ REPTILE ☐ ________		☐ LOGS ☐ TREES ☐ WATER ☐ GROUND ☐ ________	☐ FLYING ☐ SWIMMING ☐ PERCHING ☐ ________				
	☐ ANIMAL ☐ BIRD ☐ REPTILE ☐ ________		☐ LOGS ☐ TREES ☐ WATER ☐ GROUND ☐ ________	☐ FLYING ☐ SWIMMING ☐ PERCHING ☐ ________				
	☐ ANIMAL ☐ BIRD ☐ REPTILE ☐ ________		☐ LOGS ☐ TREES ☐ WATER ☐ GROUND ☐ ________	☐ FLYING ☐ SWIMMING ☐ PERCHING ☐ ________				
	☐ ANIMAL ☐ BIRD ☐ REPTILE ☐ ________		☐ LOGS ☐ TREES ☐ WATER ☐ GROUND ☐ ________	☐ FLYING ☐ SWIMMING ☐ PERCHING ☐ ________				
	☐ ANIMAL ☐ BIRD ☐ REPTILE ☐ ________		☐ LOGS ☐ TREES ☐ WATER ☐ GROUND ☐ ________	☐ FLYING ☐ SWIMMING ☐ PERCHING ☐ ________				
	☐ ANIMAL ☐ BIRD ☐ REPTILE ☐ ________		☐ LOGS ☐ TREES ☐ WATER ☐ GROUND ☐ ________	☐ FLYING ☐ SWIMMING ☐ PERCHING ☐ ________				
	☐ ANIMAL ☐ BIRD ☐ REPTILE ☐ ________		☐ LOGS ☐ TREES ☐ WATER ☐ GROUND ☐ ________	☐ FLYING ☐ SWIMMING ☐ PERCHING ☐ ________				

98-208 REV. 1/89

Port of Seattle


PERIMETER FENCE
POS PROPERTY LINE
GATE POSITION
GATE NUMBER
CLEAR ZONE
TAXIWAY A
TAXIWAY B
GARAGE
ASR
VASI
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