JARPA Application for Proposed Master Plan Update Improvements at Seattle-Tacoma International Airport

Parametrix, Inc.
December 1996

Port of Seattle

December 18, 1996

Mr. Jack Kennedy
U.S. Army Corps of Engineers
Seattle District Office
P.O. Box 3755
Seattle, Washington 98124-2255

Dear Mr. Kennedy:

The Port of Seattle is pleased to submit this Section 404 Application to place fill material into waters of the United States at Seattle Tacoma International Airport associated with the Master Plan Update improvements, as well as associated backup information.

1. **Background**

The Port Commission's approval of the Master Plan Update in August 1996 was the culmination of nearly ten years of regional process regarding the need for additional airport capacity in the Puget Sound Region. It is the result of significant technical and environmental analyses; a comprehensive public information and involvement program; and extensive review of the airport capacity issue by airlines, other Airport users, citizens, and local and regional policy makers.

A 39-member panel with representatives from cities and counties throughout the Region, aviation industry experts, citizens, and the State - known as the Puget Sound Air Transportation Committee (PSATC) - was assembled and conducted the three-year long Flight Plan Study. The purpose of the Flight Plan was to develop a regional solution that would meet the Region's commercial air travel needs to the year 2020 and beyond. The PSATC conducted a thorough review of a wide range of options, including a replacement airport, supplemental airports, new navigational technologies, demand management, and high speed rail. The PSATC, Port and PSRC prepared and issued for public review and comment a report examining the potential environmental impacts of the studied alternatives. Following its deliberations, the PSATC recommended a multiple airport system that includes a new air carrier runway at Sea-Tac Airport.

On April 29, 1993, the PSRC General Assembly adopted by a vote of 89% in favor, Resolution A-93-03 which stated that "The third runway shall be authorized by April 1, 1996," subject to three conditions: 1) a regional feasibility study of potential supplemental airport sites; 2) consideration of demand & system management measures; and 3) independent evaluation of whether noise reduction goals at Sea-Tac Airport have been met. PSRC made this decision as a result of the three year "Flight Plan" study which evaluated a range of potential options for addressing the region's long-term air travel needs and based on a subsequent six month review process.

The first condition for PSRC runway approval was fulfilled on October 27, 1994 with the PSRC Executive Board adoption of Resolution EB-94-01 which concluded that "there are no feasible sites for a major supplemental airport within the four-county region." This finding was based on PSRC evaluation and public review of twenty-six existing and potential new airport sites. A number of technical documents that were prepared as part of this effort will be supplied to the Army Corps of Engineers in

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International Airport
P.O. Box 68727
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support of this determination. Included in these studies were consideration of the wetland and natural resource impacts associated with a supplemental or replacement airport. The studies indicated that a supplemental or replacement airport would result in greater wetland impacts than would occur through development of a third runway at Sea-Tac Airport.

The second condition was fulfilled in 1995 when after a year of review, the independent PSRC Expert Panel (Panel) determined that a range of demand and system management measures would neither obviate nor defer the need for the third runway. The Panel's specific findings are discussed in written documents it released on July 27, 1995 and December 8, 1995. The third condition was fulfilled in 1996 when the PSRC General Assembly adopted Resolution A-96-02 which amends the Metropolitan Transportation Plan (MTP) to include a third runway with additional noise reduction measures. The PSRC General Assembly adopted this resolution by a vote of 84% in favor.

2. Environmental Impact Statement

In February 1996, the Federal Aviation Administration (FAA) and the Port of Seattle issued a joint National Environmental Policy Act (NEPA) and State Environmental Policy Act (SEPA) Final EIS for the proposed improvements. The U.S. Army Corps of Engineers was a cooperating agency on the EIS. The Final EIS presented the impacts of the proposed Master Plan Update improvements by examining impacts to 24 environmental and social conditions.

The following four purpose and need statements were defined in the Final Environmental Impact Statement:

(1) Improve the poor weather airfield operating capability in a manner that accommodates aircraft activity with an acceptable level of aircraft delay;

(2) Provide sufficient runway length to accommodate warm weather operations without restricting passenger load factors or payloads for aircraft types operating to the Pacific Rim;

(3) Provide Runway Safety Areas (RSAs) that meet current FAA standards; and

(4) Provide efficient and flexible landside facilities to accommodate future aviation demand.

The wetland impacts associated with each of these purpose and need statements are:

Third Parallel Runway	7.38 acres (including on-site borrow sources)
34R Extension by 600 feet	0 acres
Runway Safety Areas (16L/R)	2.34 acres
Terminal/Landside improvements	2.51 acres (associated with the South Aviation Support Area and North Employee Parking Lot)
Subtotal	12.23 acres

The primary impacts to wetlands are a result of the Port's desire to remedy the poor weather operating constraints to the existing airfield. The close spacing (800 feet) between Sea-Tac's existing two parallel runways does not allow for two arrival streams whenever cloud ceilings drop below 5,000 feet or whenever visibility is reduced below 5 miles. These conditions occur, which occur about 44% of the year, reduce the total number of arrivals that can be accommodated from 60 per hour to as low as 24,

resulting in inefficient operations and aircraft delay. This condition exists today, but is expected to become increasingly severe as air traffic increases. Because pilots can not maintain visual separation in these conditions, FAA air traffic control rules require at least 2,500 feet between parallel runways for two staggered (dependent) arrival streams in such "poor weather". Over 85 percent of total Sea-Tac delays are incurred by arriving aircraft.

While Sea-Tac currently has sufficient operating capability during good weather conditions, the existing runway system produces extensive arrival delays during poor weather. For instance, when weather worsens from Visual Flight Rule 1 (VFR1) to VFR2, average arrival delay increases by more than ten-fold (from 1 minute to 11.4 minutes). Delays further worsen when Instrument Flight Rule (IFR1/2/3) conditions occur. In these cases, average arrival delay increases more than twenty-fold over VFR1 (21.7 minutes Vs 1.0 minutes). Because these delay statistics represent averages, some flights experience less delay, while others experience substantially higher delay. The FAA's National Plan of Integrated Airport Systems concludes that when annual average delay exceed 9 minutes an airport is experiencing severe delay.

Using average aircraft operating costs developed by the FAA, Sea-Tac aircraft delays cost the airlines about $42 million annually under 1992 demand. When annual aircraft operations reach 425,000, delay costs are anticipated to exceed $176 million annually. Without the third parallel runway at this level of activity, average VFR2 arrival delay would exceed 40 minutes and IFR delay would exceed 70 minutes.

The third parallel runway, located 2,500 feet west of the existing 16R/34L, would permit staggered dual stream arrivals in poor weather conditions. It would decrease average arrival delays by about 80 percent in comparison to the Do-Nothing and result in a savings of $132 million per year.

Your prompt attention to the processing of this permit application is appreciated.

Sincerely,

Barbara Hinkle
Senior Environmental Specialist

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AGENCY USE ONLY

Agency Reference #:_____ Date Received:_____

SEPA Lead Agency:_____

Other:_____

—JARPA APPLICATION FORM—

- for use in Washington State-

PLEASE TYPE OR PRINT IN BLUE OR BLACK INK

Based on the preceding checklist, I am sending copies of this application to the following: *(check all that apply)*

- ☐ Local Government: for shoreline ☐ Substantial Development ☐ Conditional Use ☐ Variance ☐ Exemption: or ☐ Floodplain Management ☐ Critical Areas Ordinance
- ☒ Washington Department of Fish and Wildlife for HPA
- ☒ Washington Department of Ecology Approval to Allow Temporary Exceedance of Water Quality Standards
- ☐ 401 Water Quality Certification Nationwide Permits
- ☒ Corps Engineers for Section 404 or Section 10 permit(s)

SECTION A - Use for all permits covered by this application. Be sure to also complete Section C (Signature Block) for all permit applications.

1. Applicant Port of Seattle contact: Barbara Hinkle

   Mailing Address P.O. Box 68727

   Seattle, WA 98168

   Work Phone: (206) 728-3193 Home Phone: ( ) –

   Fax Number: (206) 431-4458

If an agent is acting for the applicant during the permit process, complete #2 & 3.

2. Authorized Agent_____

   Mailing Address_____

   Work Phone: ( )_____ Home Phone: ( )_____

   Fax Number: ( )_____

3. Designation of Authorized Agent, if applicable:

   I hereby designate _____ to act as my agent in matters related to this application for permit(s). I understand that if a Federal permit is issued, I must sign the permit.

   _____ _____

   Signature of Applicant Date

4. Relationship of applicant to property: ☒ Owner ☒ Purchaser ☐ Lessee ☐ Other (_____)

5. Name, address, and phone number of property owner(s), if other than applicant:

   The Port of Seattle will purchase the properties affected by implementation of the proposed improvements to the Airport. A list of these owners is available on request. Owners of properties (other than the Port) with waters of the United States are listed in the answer to question 19 of this application.

6. Location where proposed activity exists or will occur:

Street Address Seattle-Tacoma International Airport, 17801 Pacific Highway South

Seattle, King, Washington 98185
City, County, State, Zip Code

Waterbody Miller Creek; wetlands
DNR Stream Type (if known) Type 3
Tributary of Puget Sound

Legal Description: See Attachment A
Tax Parcel No.: See Attachment A

¼	¼	Section	Township	Range
		20, 21, 28, 29, 32, 33	23N	4E
		4, 5	22N	4E

7. Describe the current use of the property, and structures existing on the property. If any portion of the proposed activity is already completed on this property, indicate month and year of completion.

The majority of the project site is owned by the Port of Seattle and is currently undeveloped or vacant land surrounding the active airport. The area south of Runway 34R, also owned by the Port, is currently leased to a golf course operator. Impacts to wetlands will also occur to the west of the existing Port property. This area, which will be purchased by the Port, is primarily used as single and multi-family housing. No portion of the proposed activity is completed.

Is the property agricultural land? ☐ Yes ☒ No Are you a USDA program participant? ☐ Yes ☒ No

8. Describe the proposed activity, and the activity's purpose. Include expected water quality and fish impacts, and proposed actions to reduce the duration and severity of those impacts and provide proper protection for fish life. Complete plans and specifications should be provided for all work waterward of the Ordinary High Water Mark or Line, including types of equipment to be used, and for all work if applying for a shoreline permit. If additional space is needed, please attach a separate sheet.

The overall project purpose is to implement certain development actions at Seattle-Tacoma International Airport including construction of a third parallel runway. The purpose of these actions is to meet four identified needs at the airport:

- Improve poor weather airfield operating capability to accommodate aircraft activity with an acceptable level of aircraft delay;
- Provide sufficient runway length to accommodate either warm weather operations without restricting passenger load factors or payloads for aircraft types operating to the Pacific Rim;
- Provide runway safety areas (RSAs) that meet current FAA standards; and
- Provide efficient and flexible landside facilities to accommodate future aviation demand.

The Federal Aviation Administration (FAA) and the Port of Seattle undertook a master planning effort to determine how to meet these four needs. A Final EIS on the Master Plan Update (in which the Corps was a cooperating agency) was released in February 1996. The Plan identified the following necessary improvements to meet the four needs (elements with jurisdictional wetland/stream impacts are denoted with an asterisk):

- Addition of a third parallel runway with a length of up to 8,500 ft and associated taxiway and navigational aids*
- Extension of Runway 34R by 600 ft*
- Establishment of standard RSAs for existing runways*
- Addition of a new air traffic control tower
- Improvements and expansion of the main terminal and access system
- Development of new parking facilities and expansion of existing parking*
- Development of a new north unit terminal, roadway system, and parking facility
- Development of the South Aviation Support Area (SASA) for cargo and/or maintenance facilities*
- Relocation, redevelopment, and expansion of support facilities.

(See Attachment B)

Preparation of drawings: See Appendix A - sample drawings and checklist for completing the drawings. One set of original or good quality reproducible drawings must be attached. NOTE: Applicants are encourage to submit photographs of the project site but these do not substitute for drawings. THE CORPS OF ENGINEERS REQUIRES DRAWINGS ON 8-½ X 11 INCH SHEETS. Larger drawings may be required by other agencies.

9. Proposed Starting Date: mid-1997 Estimated duration of activity: Full build-out in 2020. Activities disturbing wetlands and stream will be completed in 2004

Will the project be constructed in stages? ☒ Yes ☐ No

10. Will any structures be placed:
    a. waterward of the Ordinary High Water Mark or Line for fresh or tidal water? ☒ Yes ☐ No
    b. waterward of Mean High Water Line in tidal waters? ☐ Yes ☒ No

11. Will fill material (rock, fill, bulkhead, pilings or other material) be placed waterward of Ordinary High Water Mark or Line for fresh or tidal waters? ☒ Yes ☐ No
    a. If "yes," in fresh water indicate volume in cubic yards: 12.13 acres of wetlands + 1,080 ft of Miller Creek + 1,400 ft of drainage channels x depth of fill (up to 160 ft - average range 30 ft to 100 ft)
    b. If "yes," in tidal waters, indicate volume in cubic yards waterward of the line of mean higher high water: _____

12. Will Material be placed in wetlands? ☒ Yes ☐ No *If yes,* impacted area: 12.13* (acres)
**This is an estimate. Most wetlands have been delineated. However, some wetlands are on private property and have not been delineated due to lack of access. See Attachment C.*
    If yes:
    a. Has a delineation been completed? ☒ Yes (partial) ☐ No (If yes, please submit with application.)
    b. Type and composition of fill material (e.g., sand, etc.): Engineered fill using various grades of material fill
    c. Material source: Approved sources
    d. List all soil series (type of soil) located at the project site, & indicate if they are on the county's list of hydric soils: Soils information can be obtained from the Natural Resources Conservation Service (NRCS), formerly Soil Conservation Service (SCS). Alderwood gravelly sandy loam; Arents, Alderwood material; Bellingham silt loam (hydric); Everett gravelly sandy loam; Indianola loamy fine sand; Norma sandy loam (hydric)

13. Will proposed activity cause flooding or draining of wetlands? ☐ Yes ☒ No *If yes,* impacted area: _____ (acres)

14. Will excavation or dredging be required in water or wetlands? ☒ Yes ☐ No
    If yes, impacted area: unknown at this time (cubic yards)
    a. Composition of material removed: Material removed from wetland areas will selectively be used for fill as appropriate
    b. Disposal site for excavated material: Construction area at airport
    c. Method of dredging: Bull dozer, back hoe

15. List other applications, approvals, or certifications from other Federal, state or local agencies for any structures, construction, discharges, or other activities described in the application (i.e., preliminary plat approval, health district approval, building permit, SEPA review, FERC license, Forest Practices Application, etc.) Also indicate whether work has been completed and indicate all existing work on drawings.

Type of Approval	Issuing Agency	Identification No.	Date of Application	Date Approved	Complete? Yes or No
See Attachment D.					
With the exception of the permits covered by this application, no permits have been applied for.					

SEPA Lead Agency: Port of Seattle SEPA Decision Date: FEIS issued February 1996; Port Commission decision August 1996.

16. Has any agency denied approval for the activity described herein or for any activity directly related to the activity described herein? ☐ Yes ☒ No *If yes*, explain:

SECTION B - Use for Shoreline & Corps of Engineers permits only:

17. Total cost of Project. This means the fair market value of the project, including materials, labor, machine rentals, etc.

$1.5 billion for all the Master Plan Update improvements

18. Local government w/ jurisdiction: Port of Seattle*

**Sea-Tac Airport is located within the City of SeaTac. The jurisdiction of the City of SeaTac is the subject of an interlocal process between the Port and the City. Certain wetlands in borrow sources are located in the City of Des Moines. The wetland mitigation site is located within the City of Auburn.*

Shoreline Environment designation: NA Zoning designation: Airport

19. For Corps permits, provide names, addresses, and telephone numbers of adjoining property owners, lessees, etc..

See Attachment E

PLEASE NOTE: Shoreline management compliance may require additional notice—consult your local government.

SECTION C - Complete for any permit covered by this application

20. Application is hereby made for a permit or permits to authorize the activities described herein. I certify that I am familiar with the information contained in this application, and that to the best of my knowledge and belief, such information is true, complete, and accurate. I further certify that I possess the authority to undertake the proposed activities. I hereby grant to the agencies to which this application is made, the right to enter the above-described location to inspect the proposed or completed work.

Barbara Shultz — Dec. 18, 1996

Signature of Applicant or Authorized Agent (REQUIRED) — Date

Signature of Landowner (REQUIRED if other than applicant) — Date

This application must be signed by the applicant. If an authorized agent is to be designated, the applicant must also sign at Item #3.

18 U.S.C. §1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly falsifies, conceals, or covers up by any trick, scheme, or device a material fact or makes any false, fictitious, or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious, or fraudulent statement or entry, shall be fined not more than $10,000 or imprisoned not more than 5 years or both.

DO NOT SEND FEDERAL PROCESSING FEE WITH APPLICATION

TO BE COMPLETED BY LOCAL OFFICIAL

A. Nature of the existing shoreline. (Describe type of shoreline, such as marine, stream, lake, lagoon, marsh, bog, swamp, flood plain, floodway, delta; type of beach, such as accretion, erosion, high bank, low bank, or dike; material such as sand, gravel, mud, clay, rock, riprap; and extent and type of bulkheading, if any:)_____

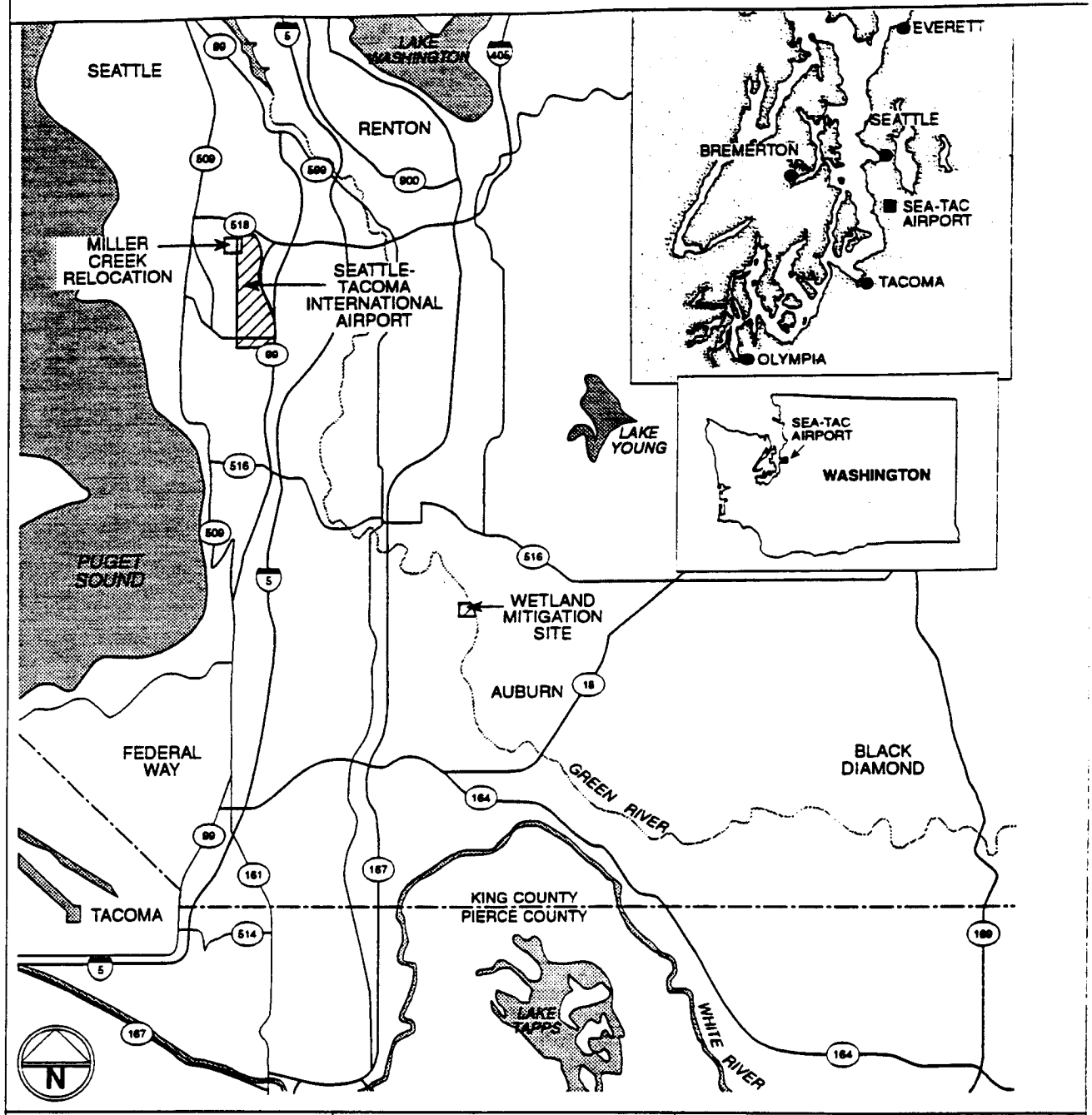
B. In the event that any of the proposed buildings or structures will exceed a height of thirty-five feet above the average grade level, indicate the approximate location of and number of residential units, existing and potential, that will have an obstructed view:_____

C. If the application involves a conditional use or variance, set forth in full that portion of the master program which provides that the proposed use may be a conditional use, or, in the case of a variance, from which the variance is being sought:_____

These Agencies are Equal Opportunity and Affirmative Action employers.

For special accommodation needs, please contact the appropriate agency from Appendix A.

AR 040259



PURPOSE: IMPLEMENTATION OF THE MASTER PLAN UPDATE SEATTLE-TACOMA INTERNATIONAL AIRPORT

VICINITY MAP

0 15,000' 30,000'

SCALE

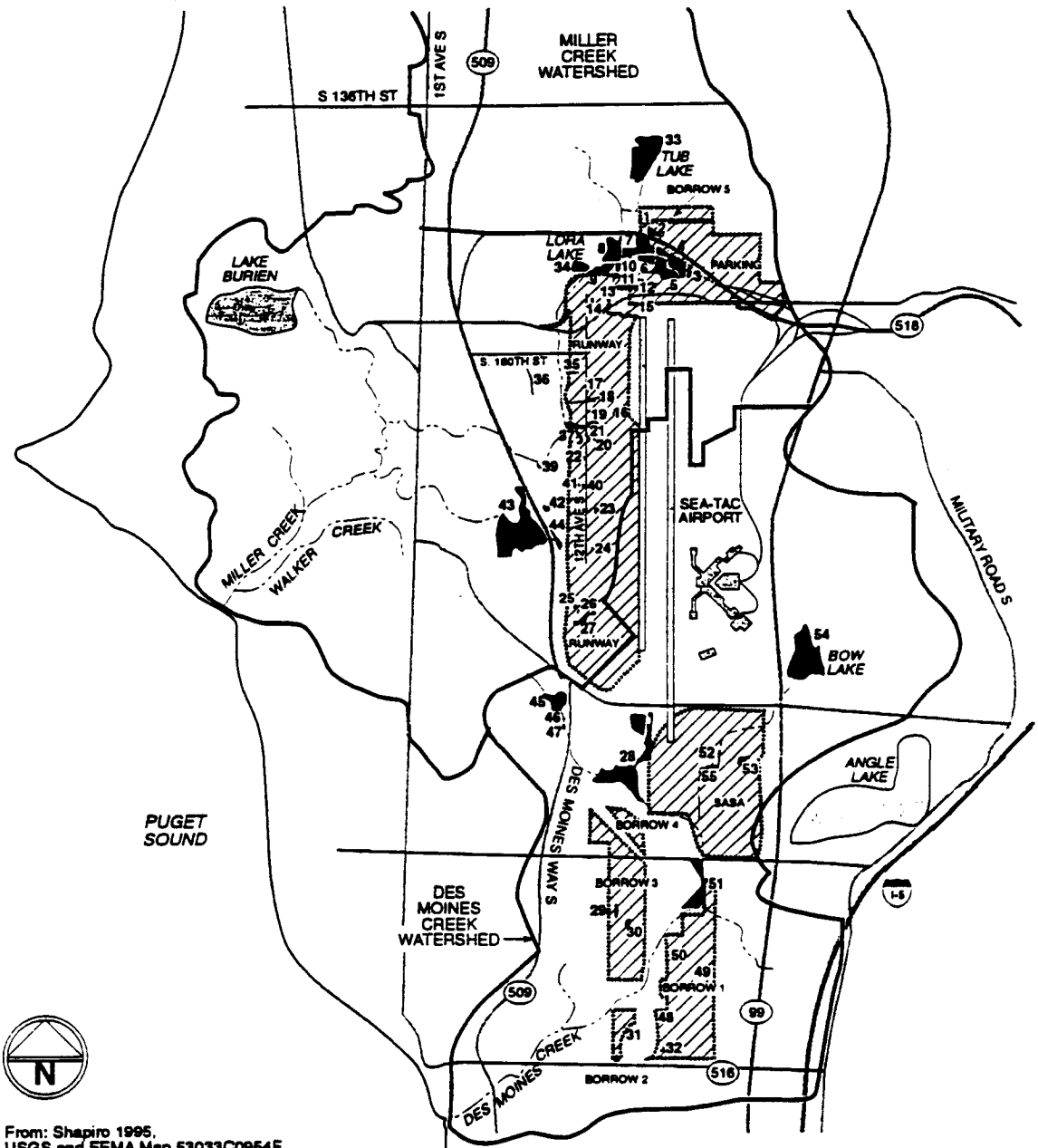
IMPACT/MITIGATION SITES

COUNTY OF: KING STATE: WA

APPLICATION BY: PORT OF SEATTLE

SHEET 1 of 44 DECEMBER 1996

AR 040260



From: Shapiro 1995,
USGS and FEMA Map 53033C0954F

PURPOSE: IMPLEMENTATION OF THE MASTER PLAN UPDATE SEATTLE-TACOMA INTERNATIONAL AIRPORT

WETLANDS AFFECTED BY SEATTLE - TACOMA INTERNATIONAL AIRPORT MASTER PLAN IMPROVEMENTS

0 4,408' 8,816'

SCALE

IMPACT/MITIGATION SITES

IN: SECTIONS 20, 21, 28, 29, 32,AND 33 TOWNSHIP 23N, RANGE 4E
IN: SECTION 4,5, TOWNSHIP 22N, RANGE 4E
COUNTY OF: KING STATE: WA
APPLICATION BY: PORT OF SEATTLE
SHEET 2 of 44 DECEMBER 1996

AR 040261

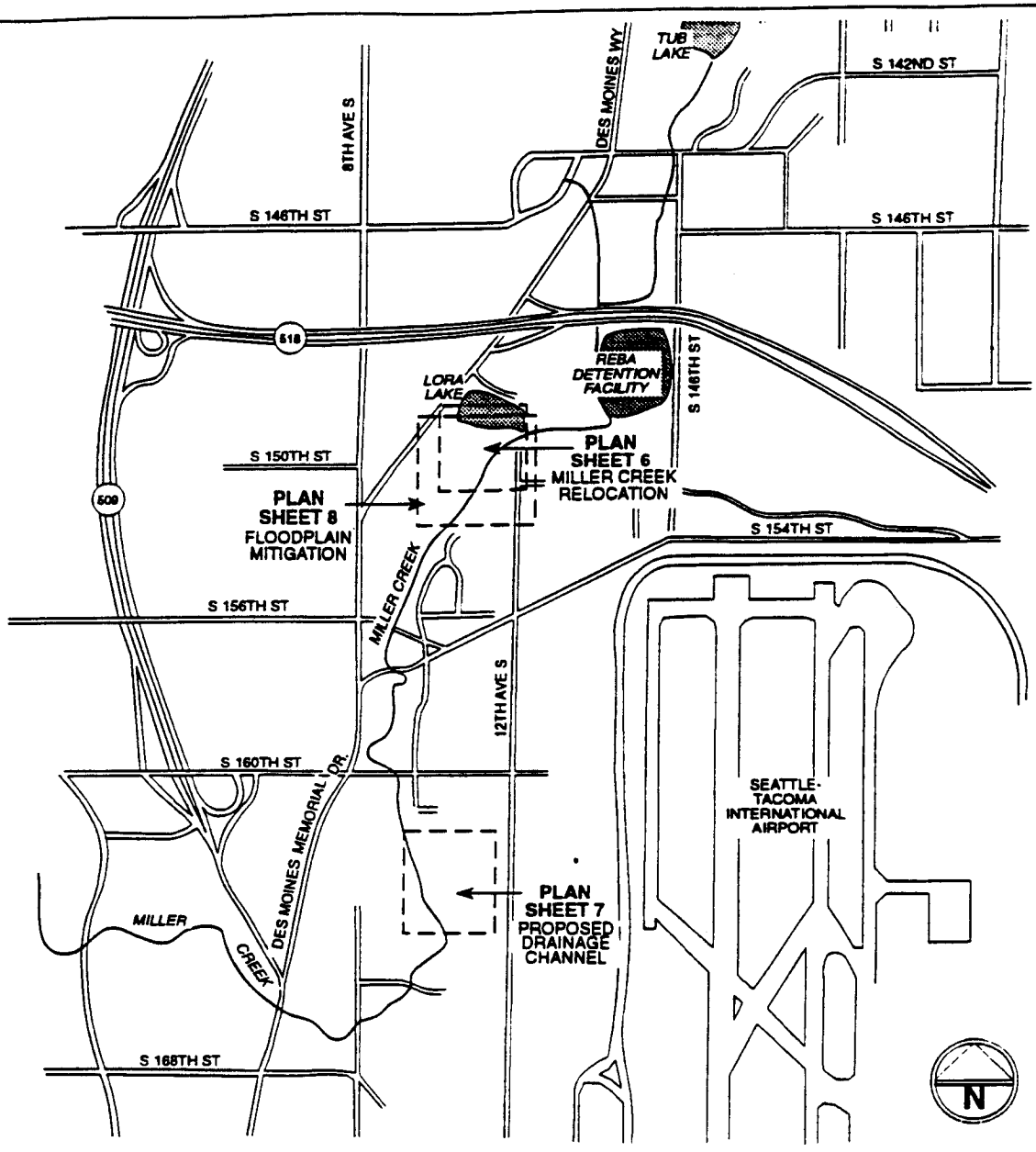
WETLAND NUMBER	CLASSIFICATION[1]	WETLAND SIZE (ACRES)	TOTAL IMPACT[5] (ACRES)	VEGETATION COVER TYPES IMPACTED (ACRES)		
				FORESTED	SHRUB-SCRUB	EMERGENT
1	Forested	0.07	0.07	0.07	–	–
2	Forested/Emergent (60/40)	0.74	0.74	0.44	–	0.29
3	Forested	0.56	0.19	0.19	–	–
4	Forested	5.02	0.46	0.46	–	–
5	Forested/Shrub-Scrub (10/90)	4.58	1.69	0.17	1.52	–
6	Shrub-Scrub	0.87	0.00	–	–	–
7	Forested/Open Water/Emergent	6.70	0.00	–	–	–
8	Shrub-Scrub/Emergent	4.95	0.00	–	–	–
9	Emergent/Forested (60/40)	2.85	0.13	0.05	–	0.08
10	Shrub-Scrub	0.31	0.00	–	–	–
11	Forested/Emergent (80/20)	0.50	0.47	0.37	–	0.09
12	Emergent/Forested (80/20)	0.21	0.21	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	–	0.06	0.01
21	Forested	0.22	0.22	0.22	–	–
22	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
27	Emergent[2]	0.00	0.00	–	–	–
28	Open Water/ Shrub-Scrub (O/100)	18.10	0.06	–	0.06	–
29	Forested	0.74	0.74	0.74	–	–

PURPOSE: IMPLEMENTATION OF THE MASTER PLAN UPDATE SEATTLE-TACOMA INTERNATIONAL AIRPORT	CLASSIFICATION, SIZE AND IMPACTS TO WETLANDS IN THE PROPOSED SEATTLE - TACOMA INTERNATIONAL AIRPORT MASTER PLAN UPDATE STUDY AREA	IMPACT/MITIGATION SITES COUNTY OF: KING STATE: WA APPLICATION BY: PORT OF SEATTLE SHEET 3 of 44 DECEMBER 1996

WETLAND NUMBER	CLASSIFICATION[1]	WETLAND SIZE (ACRES)	TOTAL IMPACT[2] (ACRES)	VEGETATION COVER TYPES IMPACTED (ACRES)		
				FORESTED	SHRUB-SCRUB	EMERGENT
30	Forested/Shrub-Scrub (80/20)	0.50	0.50	0.40	0.10	–
31	Emergent	0.05	0.00	–	–	–
32	Emergent	0.05	0.05	–	–	0.05
33	Forested/Shrub-Scrub/ Emergent/Open Water	17.60	0.00	–	–	–
34	Open Water	1.40	0.00	–	–	–
35	Emergent	0.21	0.18	–	–	0.18
36	Forested/Emergent	0.30	0.00	–	–	–
37	Forested/Shrub-Scrub (70/30)	2.41	1.68	1.17	–	0.15
38	Emergent/Shrub-Scrub[3]	0.00	0.00	–	–	–
39	Forested	0.07	0.00	–	–	–
40	Forested	0.09	0.09	0.09	–	–
41	Emergent	0.08	0.08	–	–	0.08
42	Emergent	0.50	0.00	–	–	–
43	Emergent/Shrub-Scrub/ Forested/Open Water	30.30	0.00	–	–	–
44	Forested/Shrub-Scrub	0.07	0.00	–	–	–
45	Emergent	5.00	0.00	–	–	–
46	Open Water	0.06	0.00	–	–	–
47	Open Water	0.20	0.00	–	–	–
48	Emergent	0.04	0.00	–	–	–
49	Emergent	0.03	0.03	–	–	0.03
50	Shrub-Scrub	0.12	0.12	–	0.12	–
51	Forested	8.10	0.48	0.48	–	–
52	Forested/Shrub-Scrub (90/10)	1.00	1.00	0.90	0.10	–
53	Forested	0.60	0.60	0.60	–	–
54	Shrub-Scrub/Open Water	25.70	0.00	–	–	–
55	Shrub-Scrub	0.04	0.04	–	0.04	–
TOTAL[4]		143.86	12.23	7.34	2.01	2.88

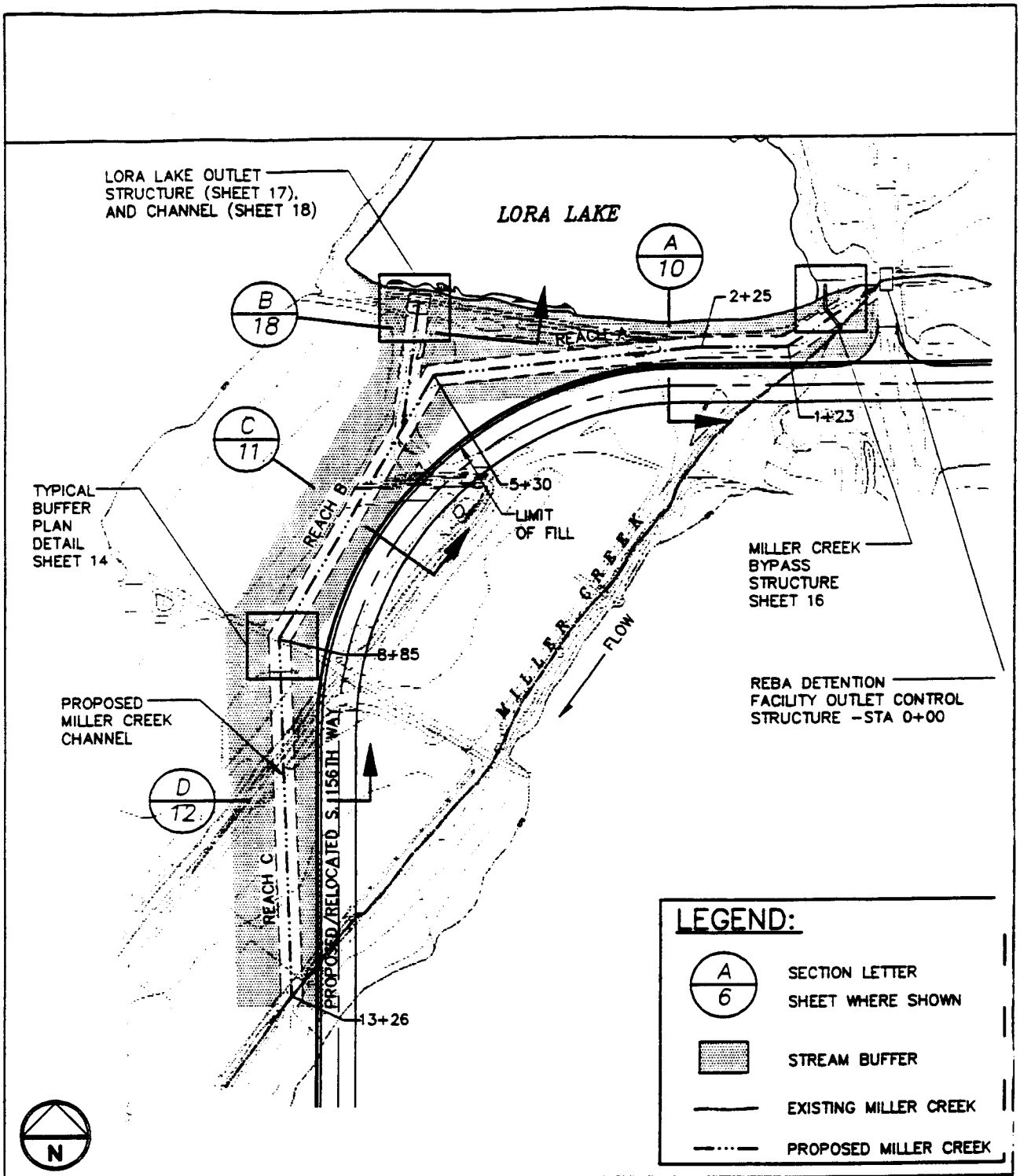
1 All wetland are palustrine based on USFWS classification system (Cowardin et al. 1979). Where more than one cover type, the percent impact to each cover type is shown in parenthesis.
2 Fill of this wetland completed with an approved Section 404 Nationwide 26 permit.
3 This wetland was determined not to be a regulated wetland by the City of Sea-Tac and the Corps of Engineers.
4 Values are rounded to two significant figures. Actual values differ slightly due to the effects of rounding.

PURPOSE: IMPLEMENTATION OF THE MASTER PLAN UPDATE SEATTLE-TACOMA INTERNATIONAL AIRPORT	CLASSIFICATION, SIZE AND IMPACTS TO WETLANDS IN THE PROPOSED SEATTLE - TACOMA INTERNATIONAL AIRPORT MASTER PLAN UPDATE STUDY AREA	IMPACT/MITIGATION SITES COUNTY OF: KING STATE: WA APPLICATION BY: PORT OF SEATTLE SHEET 4 of 44 DECEMBER 1996



PURPOSE: IMPLEMENTATION OF THE MASTER PLAN UPDATE SEATTLE-TACOMA INTERNATIONAL AIRPORT	MILLER CREEK RELOCATION VICINITY MAP 0 1,332' 2,664' SCALE	PROPOSED MILLER CREEK RELOCATION IN: SECTION 20, TOWNSHIP 23N, RANGE 4E COUNTY OF: KING STATE: WA APPLICATION BY: PORT OF SEATTLE SHEET 5 of 44 DECEMBER 1996

AR 040264



PURPOSE: IMPLEMENTATION OF THE MASTER PLAN UPDATE FOR SEATTLE-TACOMA INTERNATIONAL AIRPORT

MILLER CREEK RELOCATION
PLAN VIEW

0 150' 300'

SCALE

CONTOUR INTERVAL: 2 FEET

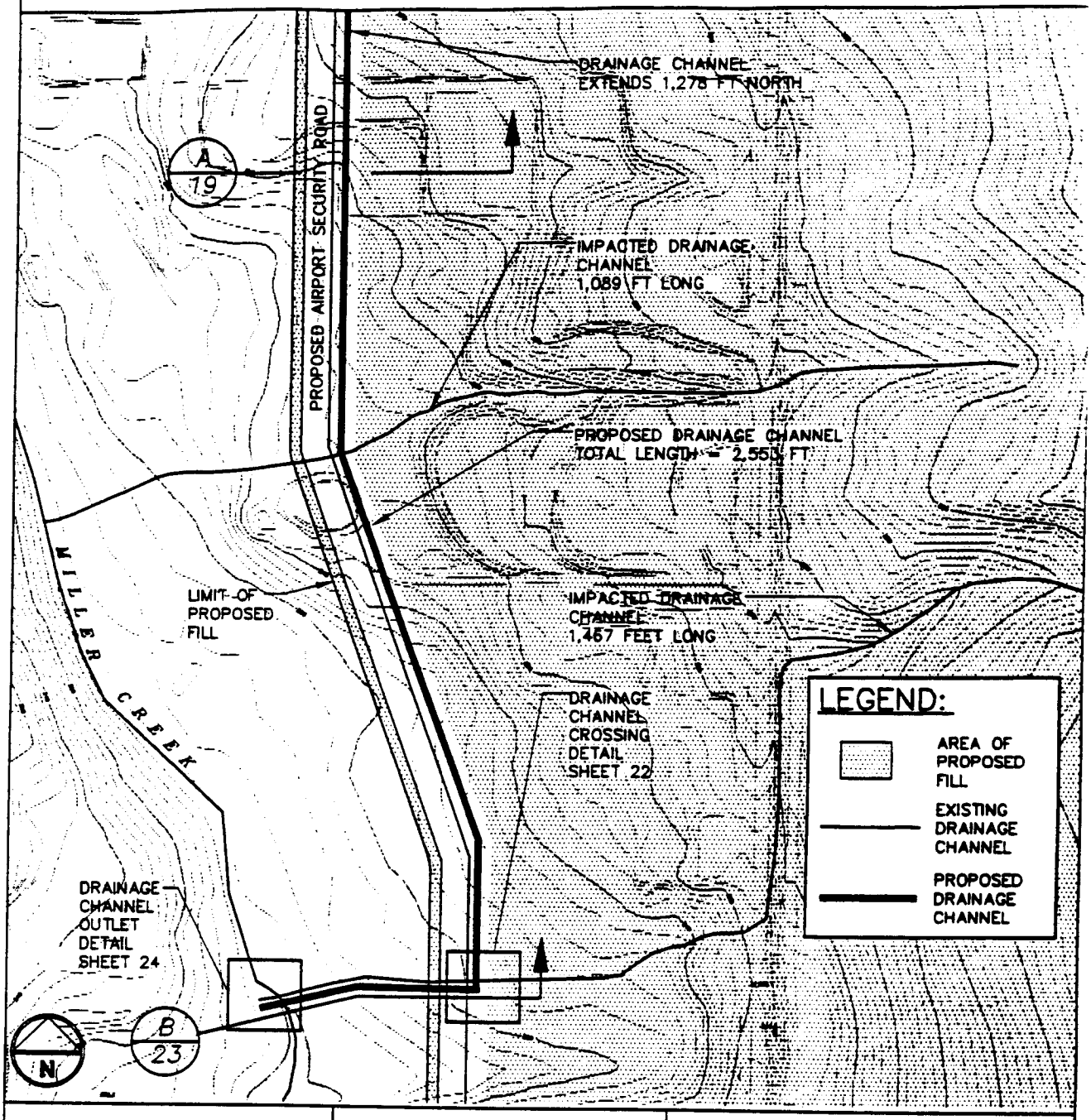
PROPOSED MILLER CREEK RELOCATION

IN: SECTION 20, TOWNSHIP 23N, RANGE 4E

COUNTY OF: KING STATE OF: WA.

APPLICATION BY: PORT OF SEATTLE

SHEET 6 OF 44 DECEMBER 1996



PURPOSE: IMPLEMENTATION OF THE MASTER PLAN UPDATE FOR SEATTLE-TACOMA INTERNATIONAL AIRPORT

DRAINAGE CHANNEL PLAN VIEW

0 200' 400'

SCALE

CONTOUR INTERVAL: 2 FEET

PROPOSED MILLER CREEK RELOCATION

IN: SECTION 20, TOWNSHIP 23N, RANGE 4E

COUNTY OF: KING STATE OF: WA.

APPLICATION BY: PORT OF SEATTLE

SHEET 7 OF 44 DECEMBER 1996

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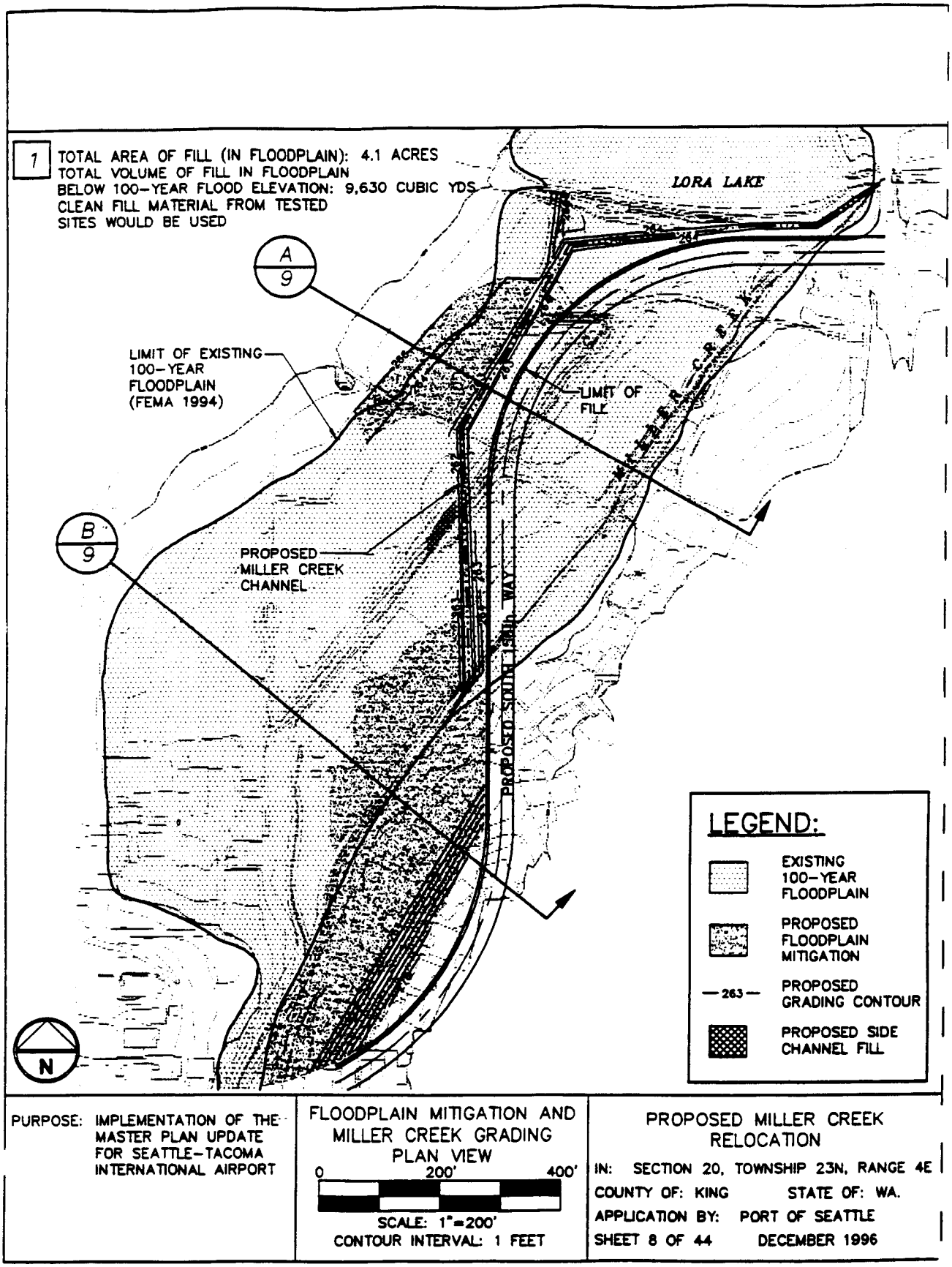
AR 040266



PURPOSE: IMPLEMENTATION OF THE MASTER PLAN UPDATE FOR SEATTLE-TACOMA INTERNATIONAL AIRPORT

FLOODPLAIN MITIGATION AND MILLER CREEK GRADING
PLAN VIEW
0 200' 400'
SCALE: 1"=200'
CONTOUR INTERVAL: 1 FEET

PROPOSED MILLER CREEK RELOCATION
IN: SECTION 20, TOWNSHIP 23N, RANGE 4E
COUNTY OF: KING STATE OF: WA.
APPLICATION BY: PORT OF SEATTLE
SHEET 8 OF 44 DECEMBER 1996

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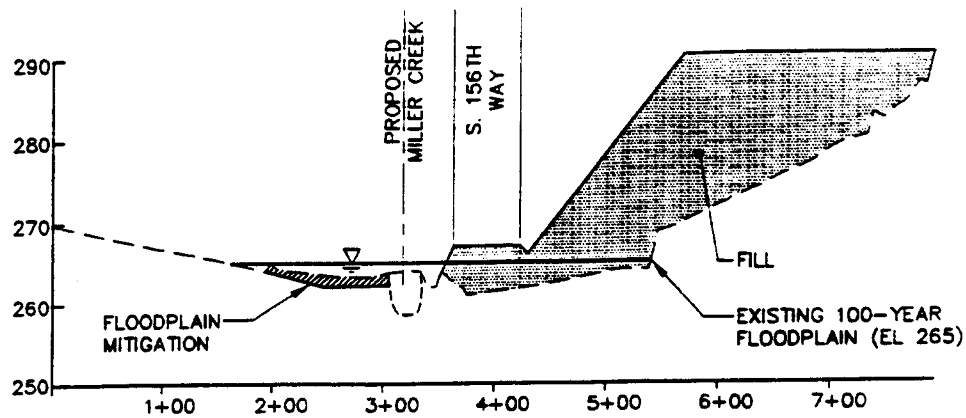
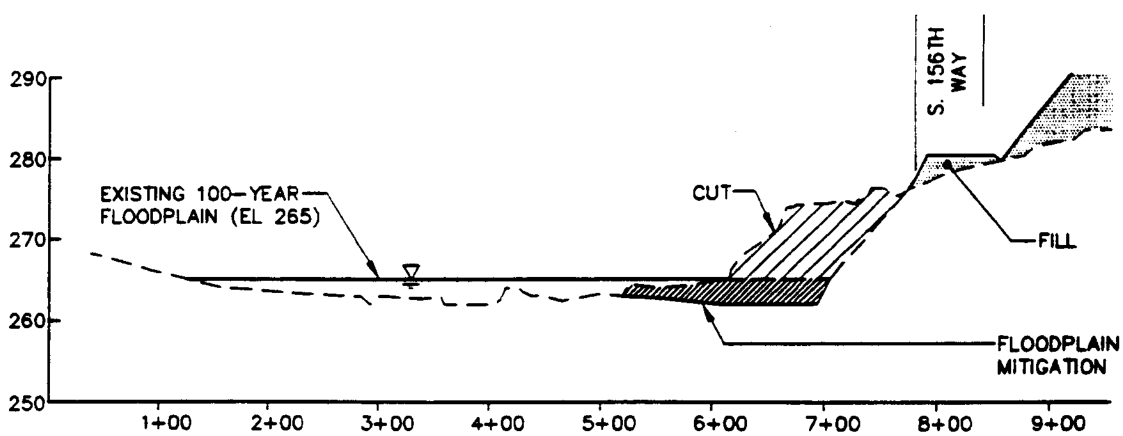
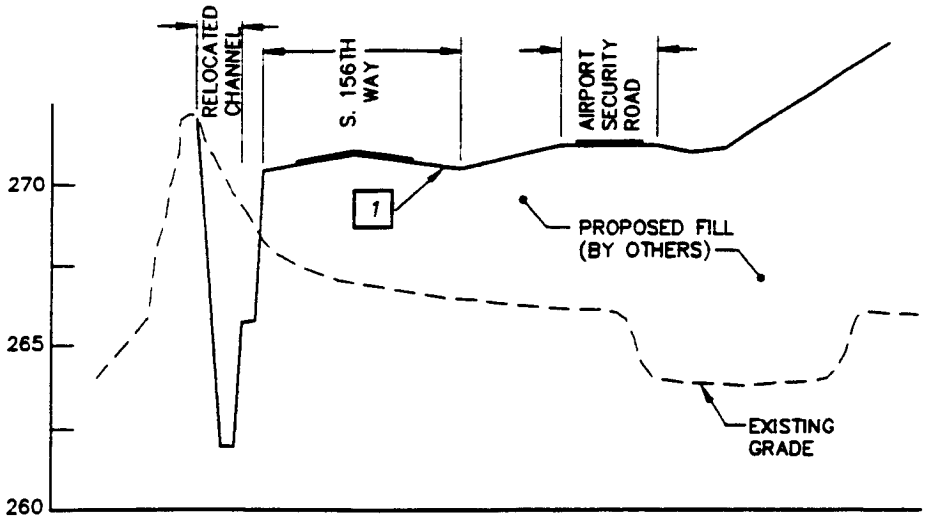


SECTION A/8



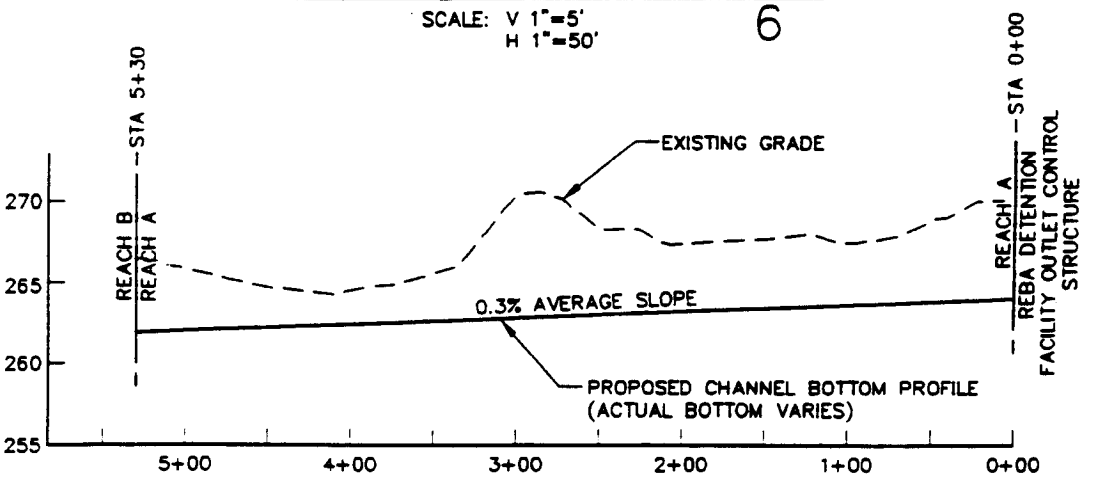
SECTION B/8

PURPOSE: IMPLEMENTATION OF THE MASTER PLAN UPDATE FOR SEATTLE-TACOMA INTERNATIONAL AIRPORT	FLOODPLAIN SECTIONS 0 150' 300' 1"=150' HORIZONTAL 1"=20' VERTICAL	PROPOSED MITIGATION WETLAND SITE IN: SECTION 20, TOWNSHIP 23N, RANGE 4E COUNTY OF: KING STATE OF: WA. APPLICATION BY: PORT OF SEATTLE SHEET 9 OF 44 DECEMBER 1996



SECTION A-6

SCALE: V 1"=5'
H 1"=50'

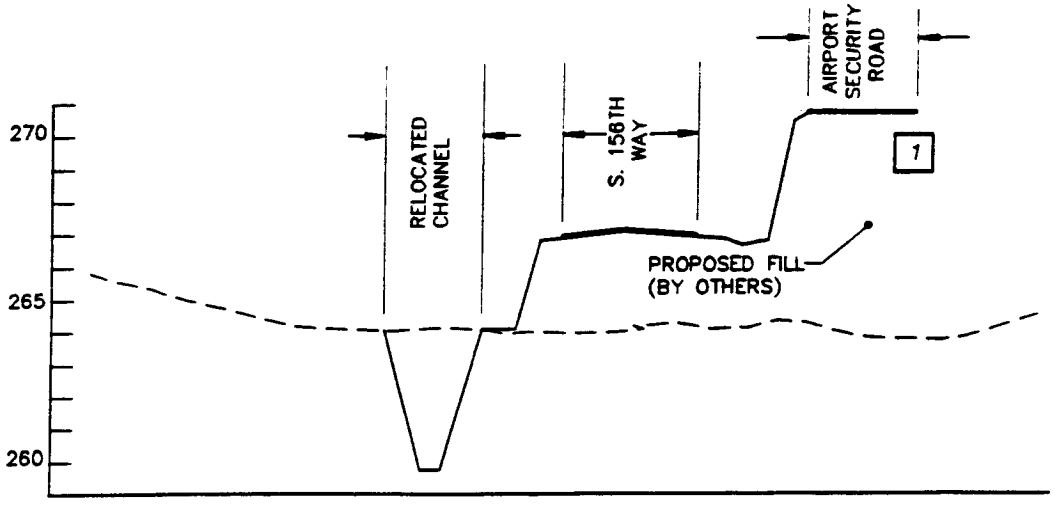


PROFILE

SCALE: V 1"=5'
H 1"=100'

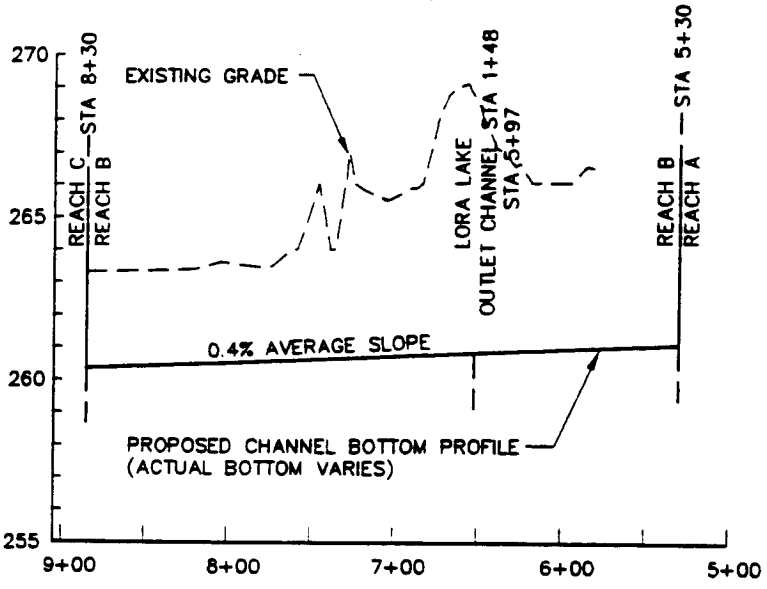
1 FILL ELEVATIONS AND FINISHED ROAD GRADES ARE ESTIMATED FOR ILLUSTRATION ONLY.

PURPOSE: IMPLEMENTATION OF THE MASTER PLAN UPDATE FOR SEATTLE-TACOMA INTERNATIONAL AIRPORT	MILLER CREEK MITIGATION CHANNEL – REACH A SECTION AND PROFILE SCALE AS NOTED	PROPOSED MILLER CREEK RELOCATION IN: SECTION 20, TOWNSHIP 23N, RANGE 4E COUNTY OF: KING STATE OF: WA. APPLICATION BY: PORT OF SEATTLE SHEET 10 OF 44 DECEMBER 1996



SECTION C

SCALE: V 1"=5'
H 1"=50'



1 FILL ELEVATIONS AND FINISHED ROAD GRADES ARE ESTIMATED FOR ILLUSTRATION ONLY.

PROFILE

SCALE: V 1"=5'
H 1"=100'

PURPOSE: IMPLEMENTATION OF THE MASTER PLAN UPDATE FOR SEATTLE-TACOMA INTERNATIONAL AIRPORT	MILLER CREEK MITIGATION CHANNEL – REACH B SECTION AND PROFILE SCALE AS NOTED	PROPOSED MILLER CREEK RELOCATION IN: SECTION 20, TOWNSHIP 23N, RANGE 4E COUNTY OF: KING STATE OF: WA. APPLICATION BY: PORT OF SEATTLE SHEET 11 OF 44 DECEMBER 1996

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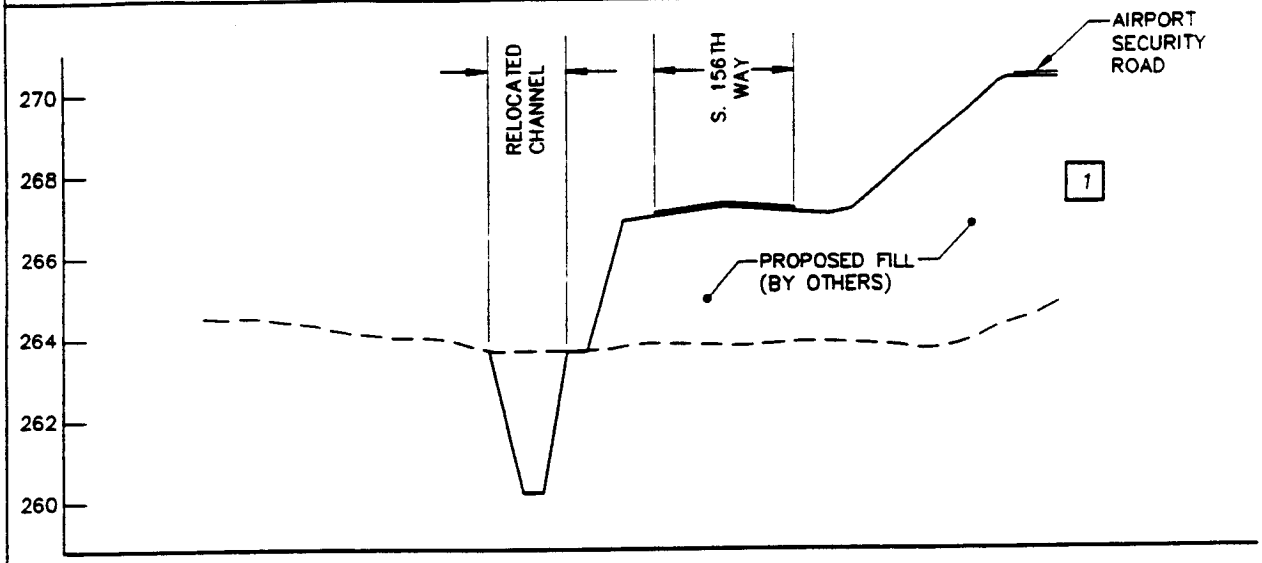
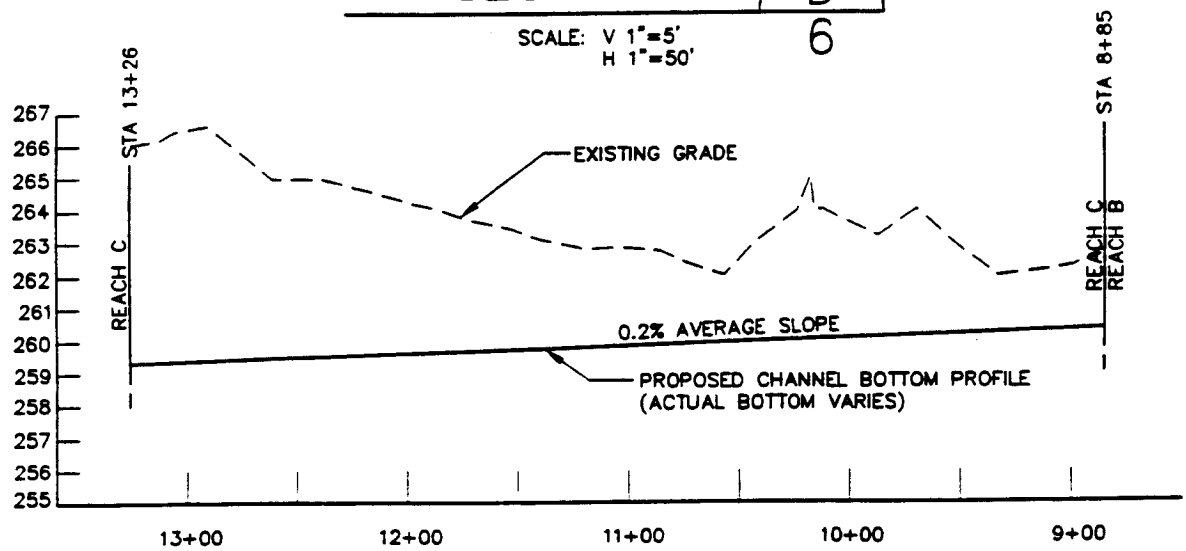


SECTION D 6

SCALE: V 1"=5'
H 1"=50'



1 FILL ELEVATIONS AND FINISHED ROAD GRADES ARE ESTIMATED FOR ILLUSTRATION ONLY.

PROFILE

SCALE: V 1"=5'
H 1"=75'

PURPOSE: IMPLEMENTATION OF THE MASTER PLAN UPDATE FOR SEATTLE-TACOMA INTERNATIONAL AIRPORT	MILLER CREEK MITIGATION CHANNEL – REACH C SECTION AND PROFILE SCALE AS NOTED	PROPOSED MILLER CREEK RELOCATION IN: SECTION 20, TOWNSHIP 23N, RANGE 4E COUNTY OF: KING STATE OF: WA. APPLICATION BY: PORT OF SEATTLE SHEET 12 OF 44 DECEMBER 1996

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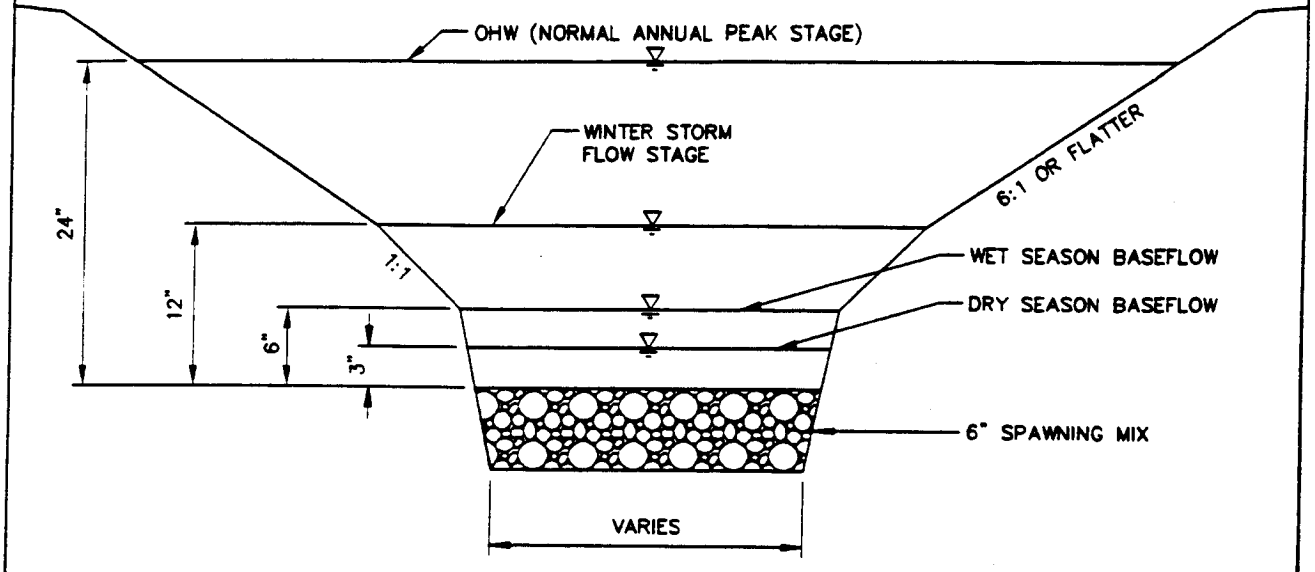

PURPOSE: IMPLEMENTATION OF THE MASTER PLAN UPDATE FOR SEATTLE–TACOMA INTERNATIONAL AIRPORT	TYPICAL MILLER CREEK CHANNEL SECTION NOT TO SCALE	PROPOSED MILLER CREEK RELOCATION IN: SECTION 20, TOWNSHIP 23N, RANGE 4E COUNTY OF: KING STATE OF: WA. APPLICATION BY: PORT OF SEATTLE SHEET 13 OF 44 DECEMBER 1996

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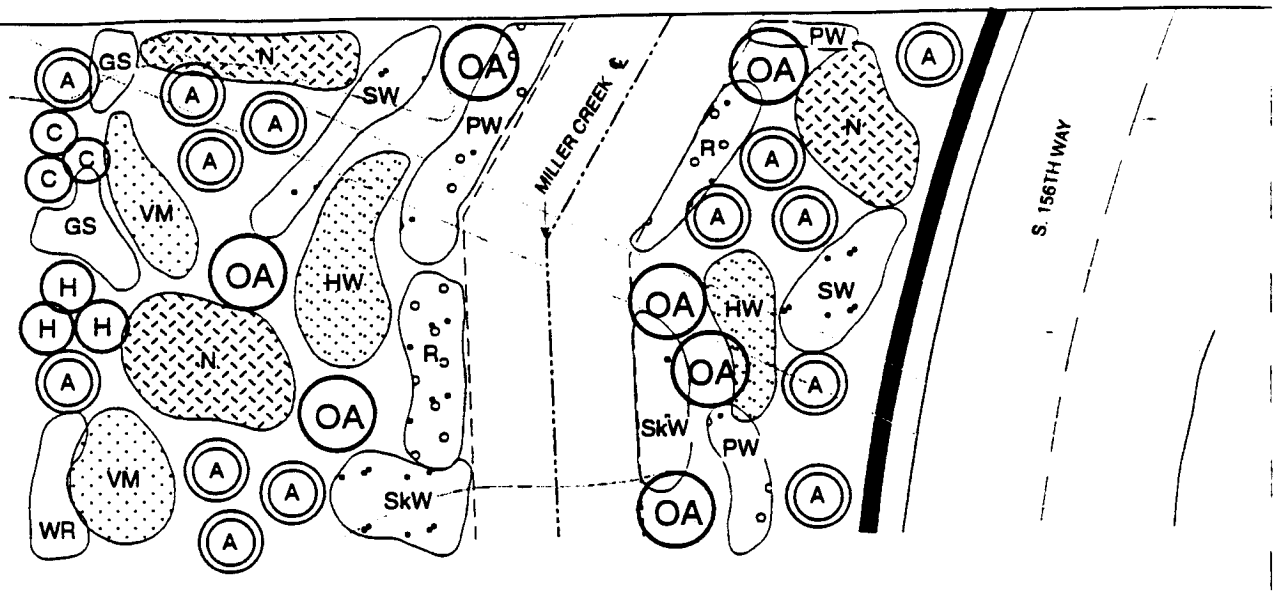
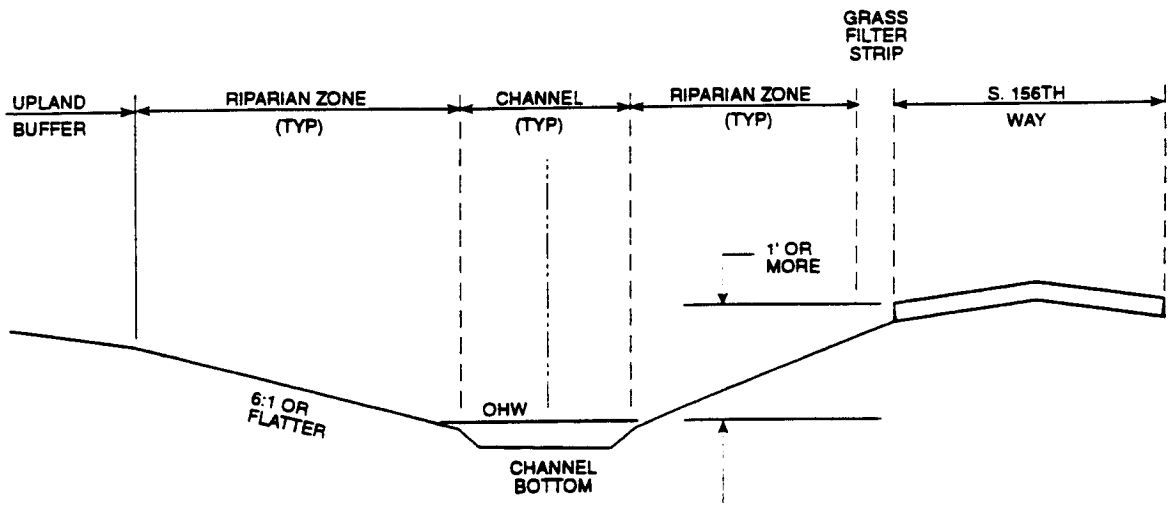


TYPICAL PLAN



SECTION

PURPOSE: IMPLEMENTATION OF THE MASTER PLAN UPDATE SEATTLE-TACOMA INTERNATIONAL AIRPORT	TYPICAL BUFFER PLANTING DETAIL - RELOCATED MILLER CREEK 0 30' 60' SCALE	PROPOSED MILLER CREEK RELOCATION IN: SECTION 20, TOWNSHIP 23N, RANGE 4E COUNTY OF: KING STATE: WA APPLICATION BY: PORT OF SEATTLE SHEET 14 of 44 DECEMBER 1996

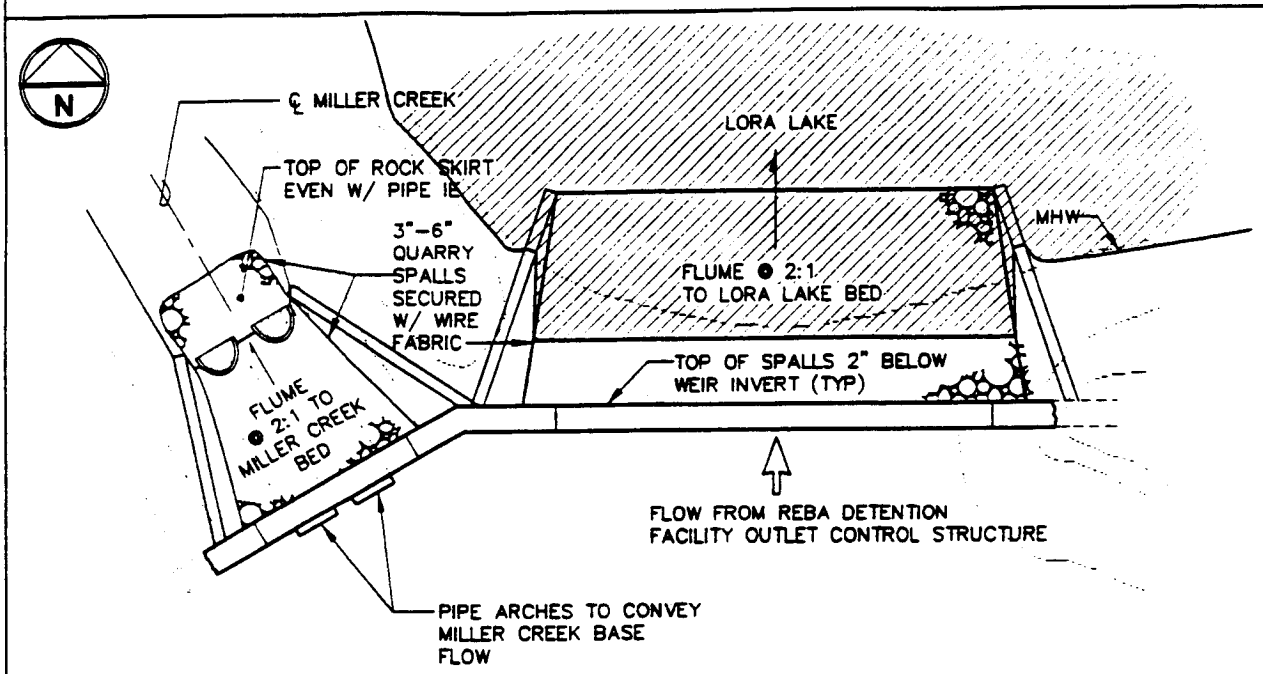
Plant species proposed for Miller Creek streamside zone

Scientific Name	Common Name	Symbol	Condition	Comments
Trees				
Alnus rubra	red alder	A	container	At least 100 trees/
Fraxinus latifolia	Oregon ash	OA	container	acre would be planted
Salix lasiandra	Pacific willow	PW	bareroot	in this area.
Shrubs				
Acer circinatum	vine maple	VM	container	35 to 50% of
Cornus stolonifera	red osier dogwood	R	bareroot	the area would be
Physocarpus capitatus	Pacific ninebark	N	container	planted with shrubs.
Salix hookerana	Hooker's willow	HW	bareroot/livestake	
Salix scouleriana	Scouler's willow	SW	bareroot/livestake	
Salix sitchensis	Sitka willow	SkW	bareroot/livestake	

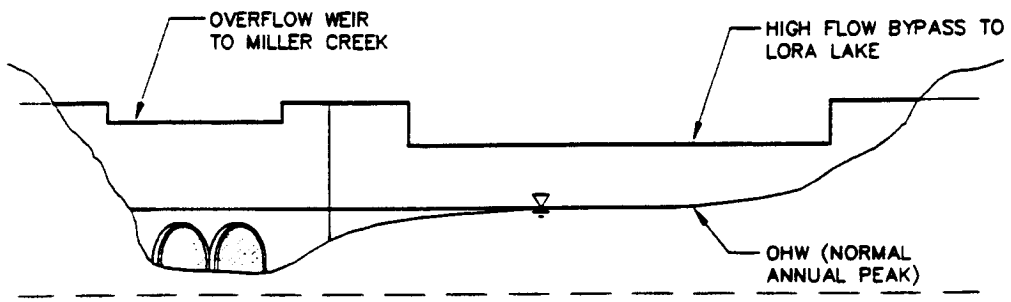
Plant species proposed for Miller Creek upland buffer

Scientific Name	Common Name	Symbol	Condition	Comments
Trees				
Alnus rubra	red alder	A	container	At least 100 trees/
Corylus cornuta	Western hazelnut	H	container	acre would be planted
Rhamnus purshiana	cascara	C	container	in the upland buffer.
Shrubs				
Acer circinatum	vine maple	VM	container	30 to 40% of the
Gaultheria shallon	salal	GS	container	buffer zone would be
Physocarpus capitatus	Pacific ninebark	N	container	planted with shrubs.
Rosa woodsii	Wood's rose	WR	container	

PURPOSE: IMPLEMENTATION OF THE MASTER PLAN UPDATE SEATTLE-TACOMA INTERNATIONAL AIRPORT	PLANTING SCHEDULE - RELOCATED MILLER CREEK	PROPOSED MILLER CREEK RELOCATION IN: SECTION 20, TOWNSHIP 23N, RANGE 4E COUNTY OF: KING STATE: WA APPLICATION BY: PORT OF SEATTLE SHEET 15 of 44 DECEMBER 1996



PLAN



ELEVATION

PURPOSE: IMPLEMENTATION OF THE MASTER PLAN UPDATE FOR SEATTLE–TACOMA INTERNATIONAL AIRPORT

MILLER CREEK HIGH FLOW BYPASS STRUCTURE PLAN & ELEVATION

0 6' 12'

SCALE: 1" = 6'

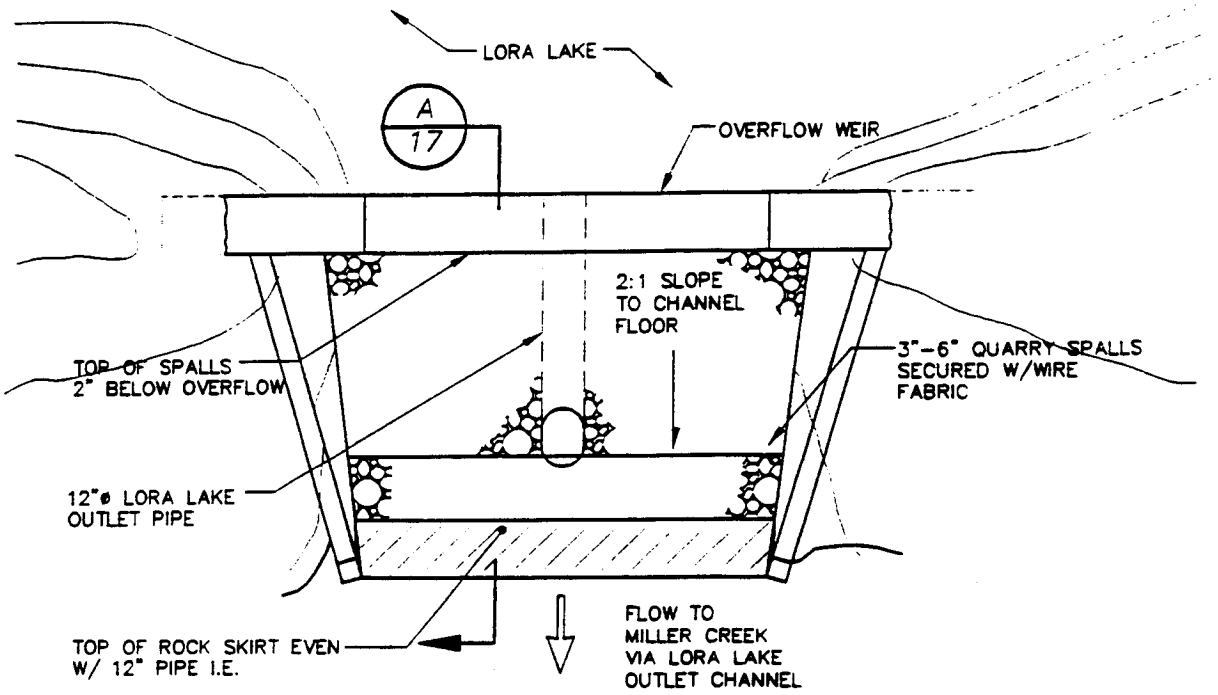
PROPOSED MILLER CREEK RELOCATION

IN: SECTION 20, TOWNSHIP 23N, RANGE 4E

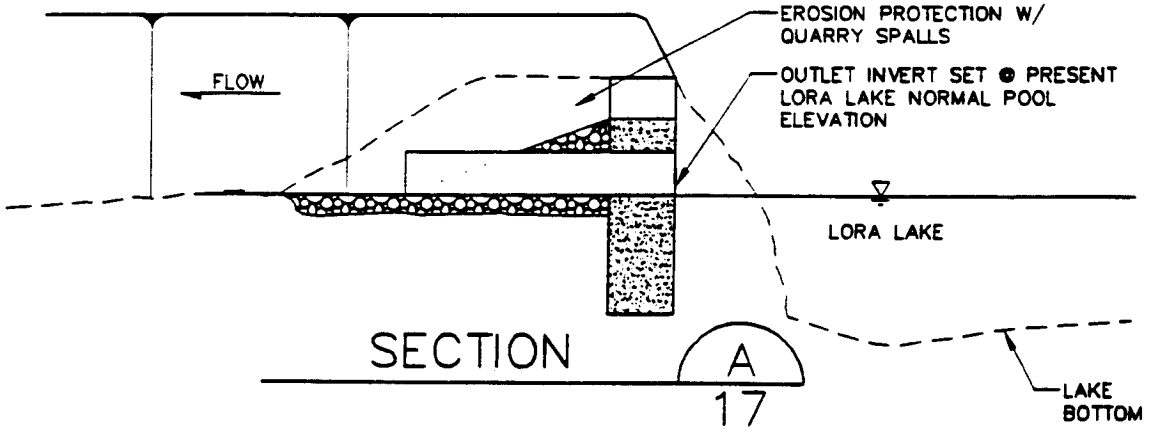
COUNTY OF: KING STATE OF: WA.

APPLICATION BY: PORT OF SEATTLE

SHEET 16 OF 44 DECEMBER 1996



PLAN



SECTION A 17

PURPOSE: IMPLEMENTATION OF THE MASTER PLAN UPDATE FOR SEATTLE-TACOMA INTERNATIONAL AIRPORT	LORA LAKE OUTLET STRUCTURE PLAN & SECTION 0 4' 8' SCALE: 1" = 4'	PROPOSED MILLER CREEK RELOCATION IN: SECTION 20, TOWNSHIP 23N, RANGE 4E COUNTY OF: KING STATE OF: WA. APPLICATION BY: PORT OF SEATTLE SHEET 17 OF 44 DECEMBER 1996

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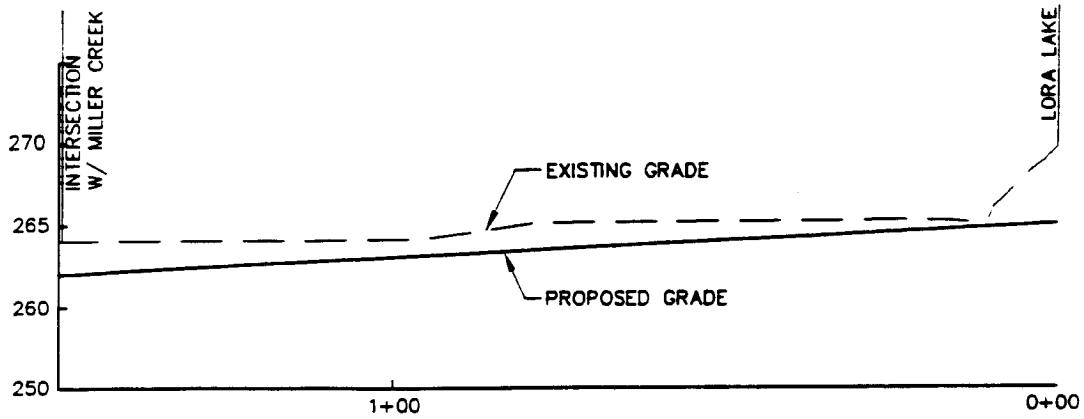
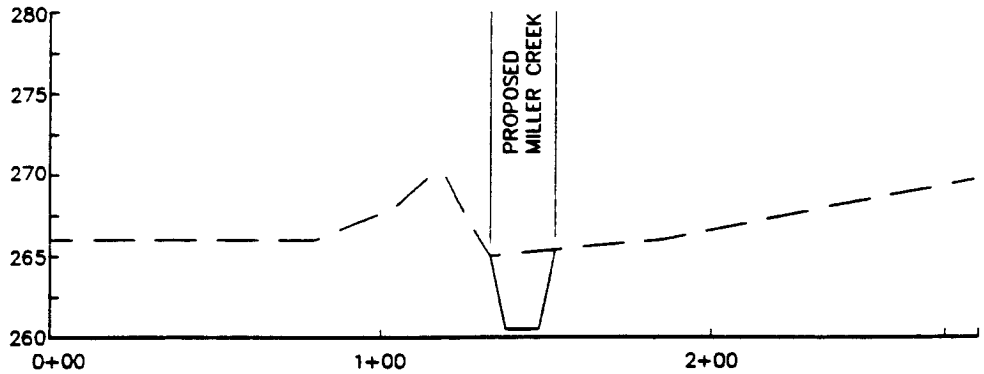


PROFILE

H: 1"=25'
V: 1"=10'



SECTION B

H: 1"=50'
V: 1"=10'

6

PURPOSE: IMPLEMENTATION OF THE MASTER PLAN UPDATE FOR SEATTLE-TACOMA INTERNATIONAL AIRPORT	LORA LAKE OUTLET CHANNEL DETAIL PROFILE AND SECTION SCALE AS NOTED	PROPOSED MILLER CREEK RELOCATION IN: SECTION 20, TOWNSHIP 23N, RANGE 4E COUNTY OF: KING STATE OF: WA. APPLICATION BY: PORT OF SEATTLE SHEET 18 OF 44 DECEMBER 1996

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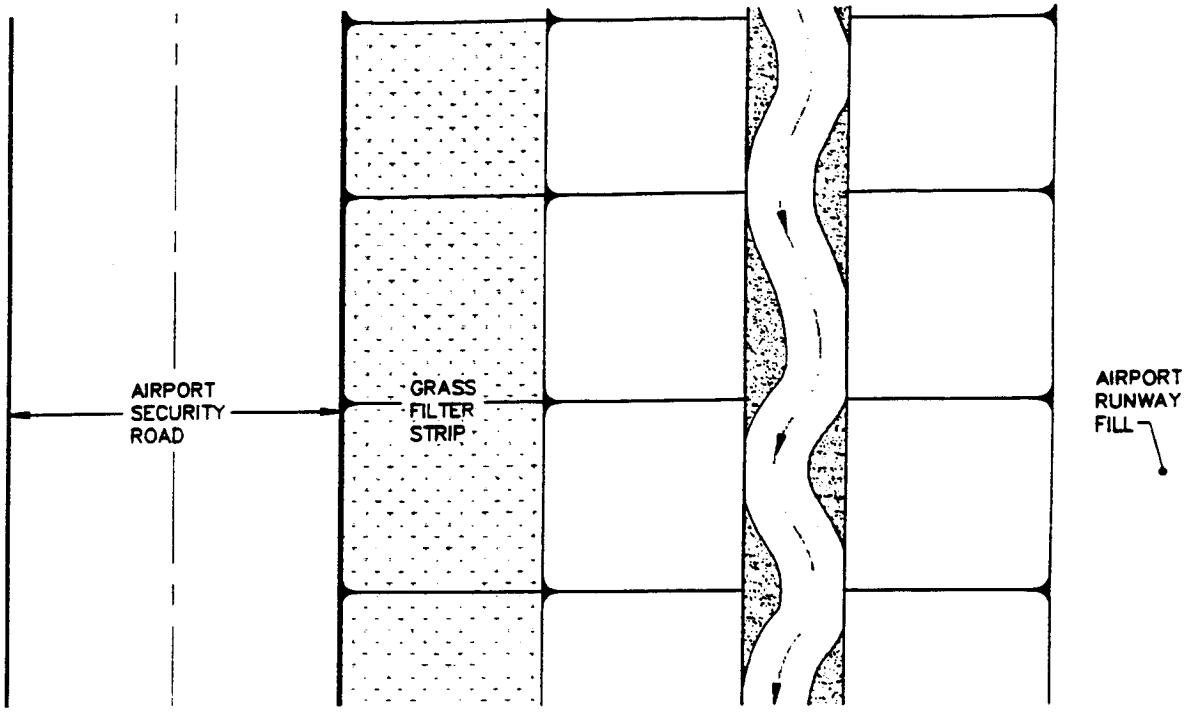
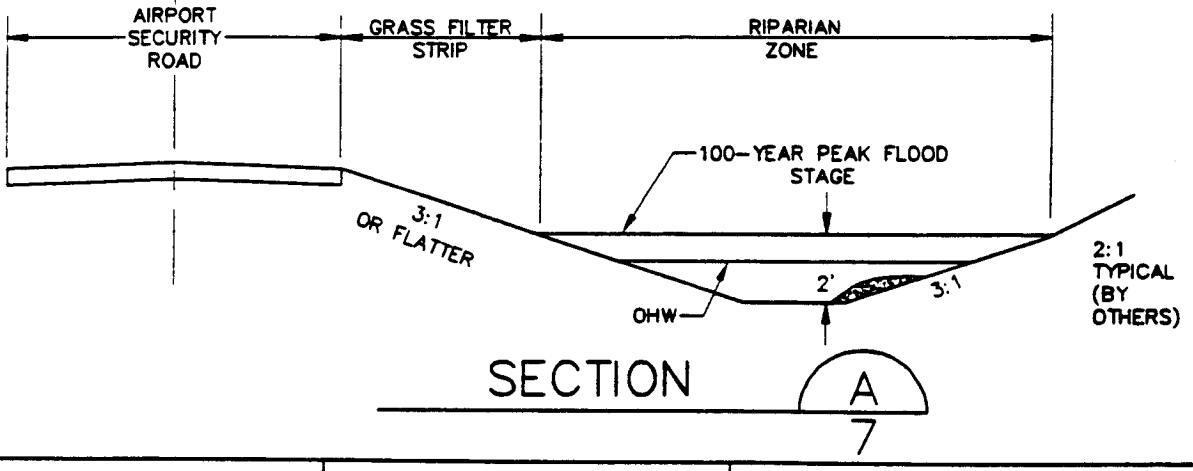


PLAN



SECTION A

7

PURPOSE: IMPLEMENTATION OF THE MASTER PLAN UPDATE FOR SEATTLE-TACOMA INTERNATIONAL AIRPORT

TYPICAL DRAINAGE CHANNEL

0 10' 20'

SCALE: 1" = 10'

PROPOSED MILLER CREEK RELOCATION

IN: SECTION 20, TOWNSHIP 23N, RANGE 4E

COUNTY OF: KING STATE OF: WA.

APPLICATION BY: PORT OF SEATTLE

SHEET 19 OF 44 DECEMBER 1996

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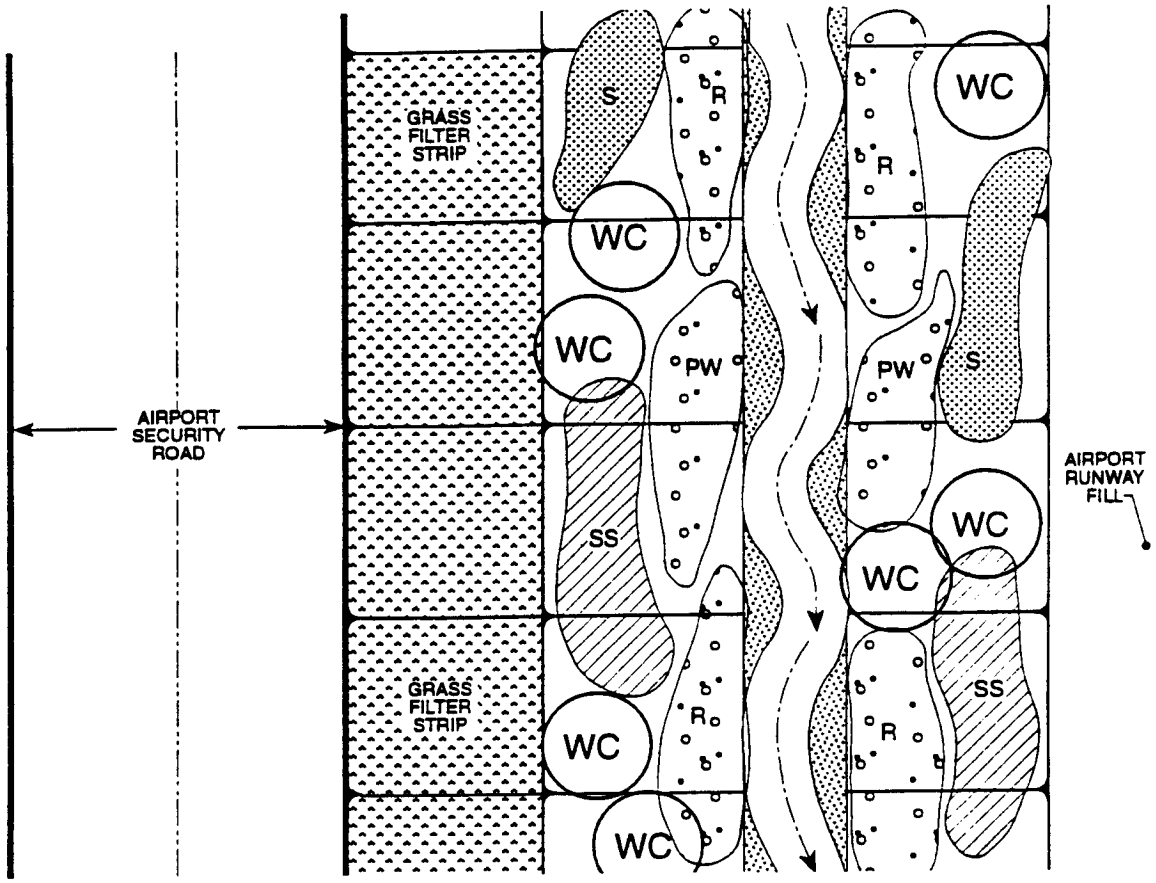


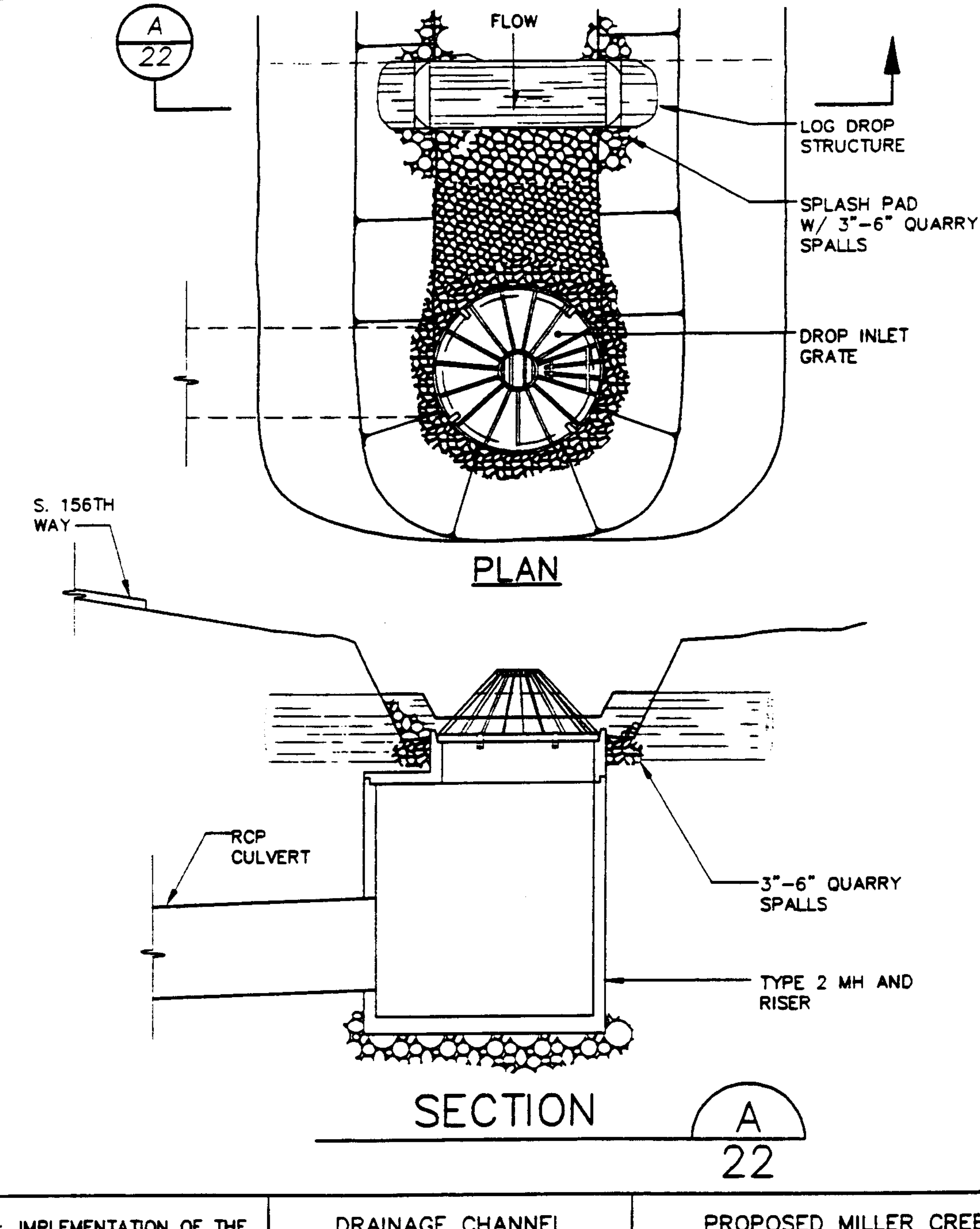
TYPICAL PLAN

PURPOSE: IMPLEMENTATION OF THE MASTER PLAN UPDATE SEATTLE-TACOMA INTERNATIONAL AIRPORT	TYPICAL PLANTING PLAN DRAINAGE CHANNEL 0 10' 20' SCALE	PROPOSED MILLER CREEK RELOCATION IN: SECTION 20, TOWNSHIP 23N, RANGE 4E COUNTY OF: KING STATE: WA APPLICATION BY: PORT OF SEATTLE SHEET 20 of 44 DECEMBER 1996

Plant species proposed for drainage channel plantings

Scientific Name	Common Name	Symbol	Condition	Comments
Shrubs				
Cornus stolonifera	red osier dogwood	R	container	50 to 70% of these
Pyrus fusca	Western crabapple	WC	container	areas would be
Rubus spectabilis	salmonberry	S	bareroot/livestake	planted with shrubs.
Salix lasiandra	Pacific willow	PW	bareroot/livestake	
Salix scouleriana	Scouler's willow	SW	bareroot/livestake	

PURPOSE: IMPLEMENTATION OF THE MASTER PLAN UPDATE SEATTLE-TACOMA INTERNATIONAL AIRPORT	TYPICAL PLANTING PLAN SCHEDULE - DRAINAGE CHANNEL	PROPOSED MILLER CREEK RELOCATION IN: SECTION 20, TOWNSHIP 23N, RANGE 4E COUNTY OF: KING STATE: WA APPLICATION BY: PORT OF SEATTLE SHEET 21 of 44 DECEMBER 1996



PURPOSE: IMPLEMENTATION OF THE MASTER PLAN UPDATE FOR SEATTLE-TACOMA INTERNATIONAL AIRPORT

DRAINAGE CHANNEL CROSSING OF THE AIRPORT SECURITY ROAD

NOT TO SCALE

PROPOSED MILLER CREEK RELOCATION

IN: SECTION 20, TOWNSHIP 23N, RANGE 4E

COUNTY OF: KING STATE OF: WA.

APPLICATION BY: PORT OF SEATTLE

SHEET 22 OF 44 DECEMBER 1996

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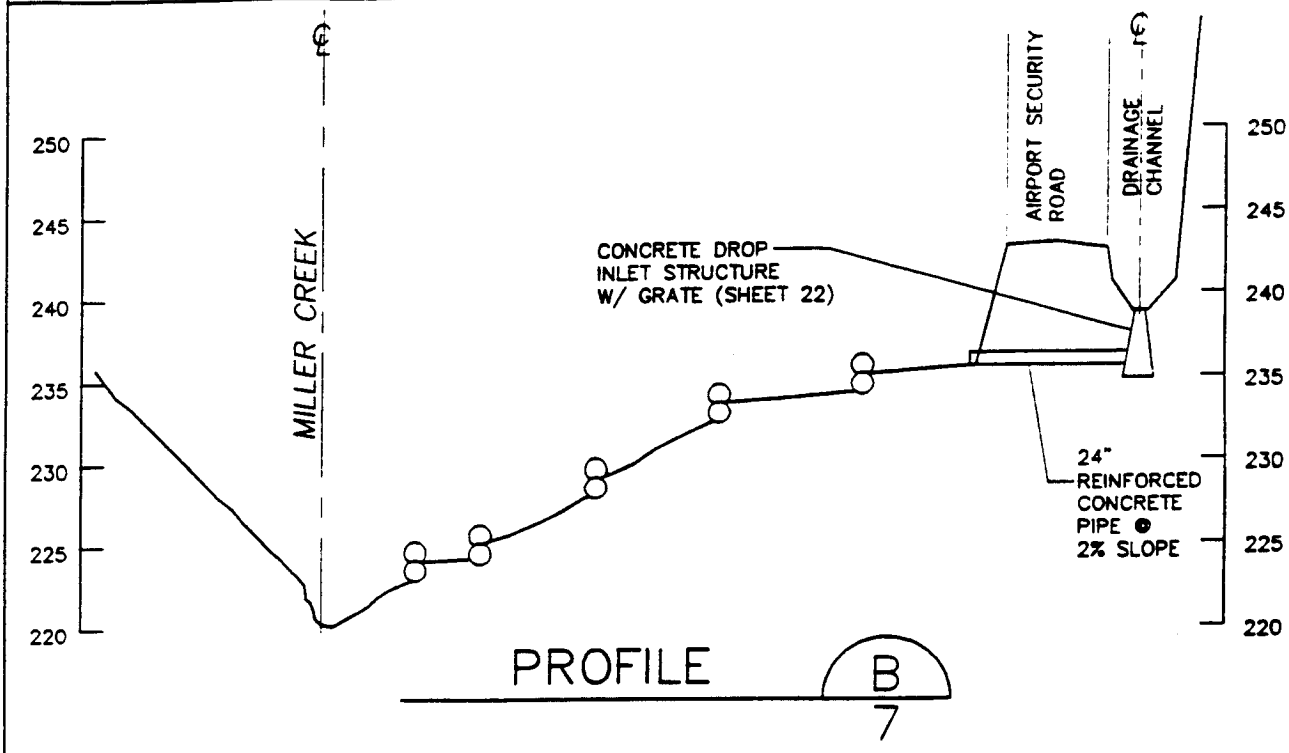
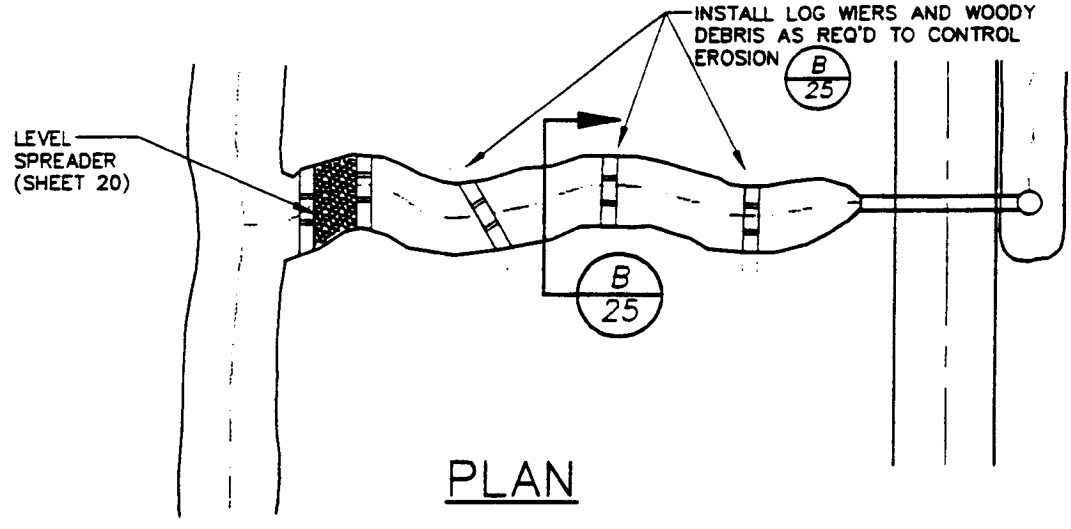
AR 040281



PROFILE B/7



PLAN

PURPOSE: IMPLEMENTATION OF THE MASTER PLAN UPDATE FOR SEATTLE-TACOMA INTERNATIONAL AIRPORT	DRAINAGE CHANNEL PLAN AND PROFILE 0 50' 100' SCALE: 1"=50' HORIZONTAL 1"=5' VERTICAL	PROPOSED MILLER CREEK RELOCATION IN: SECTION 20, TOWNSHIP 23N, RANGE 4E COUNTY OF: KING STATE OF: WA. APPLICATION BY: PORT OF SEATTLE SHEET 23 OF 44 DECEMBER 1996

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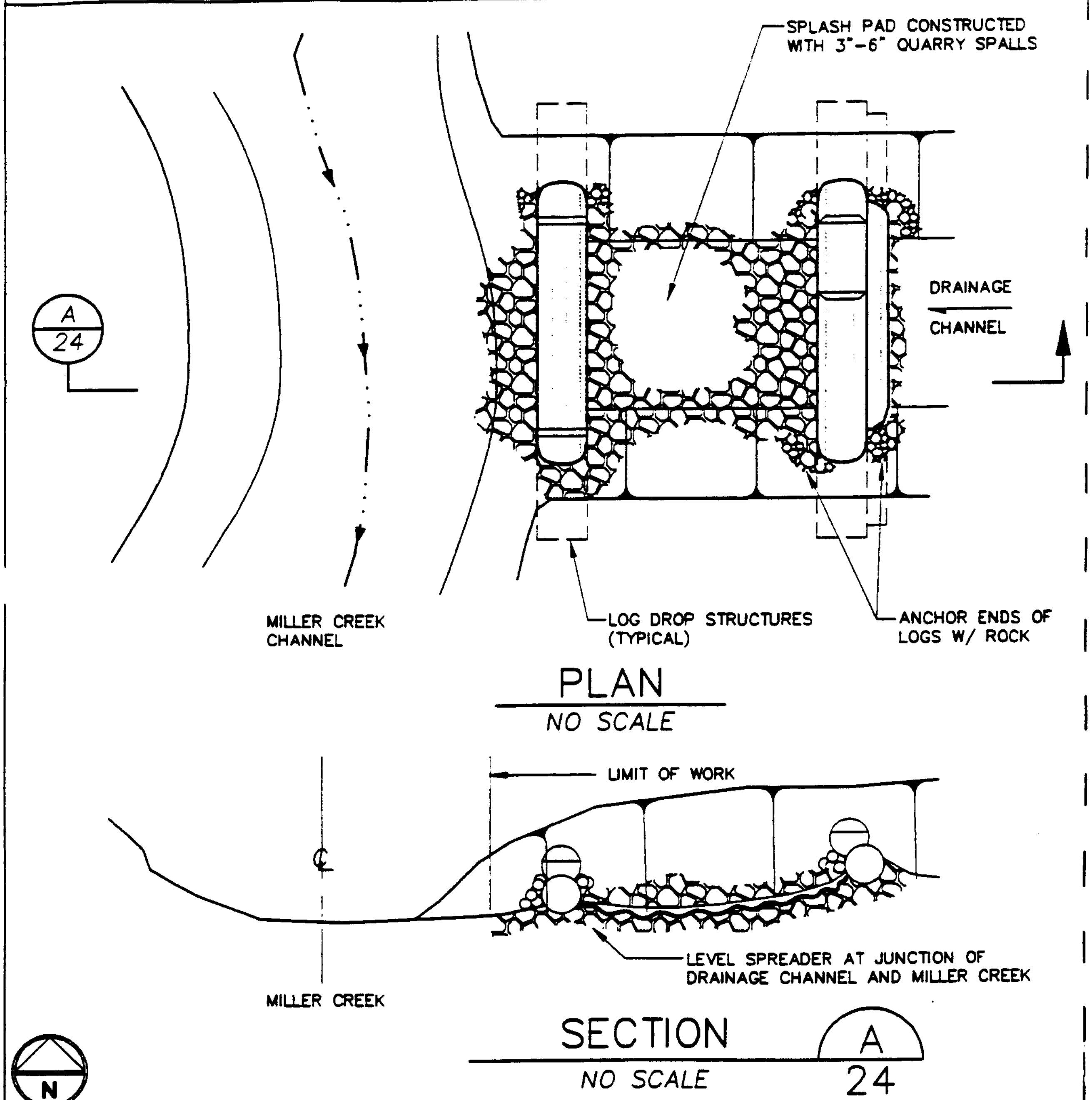


PURPOSE: IMPLEMENTATION OF THE MASTER PLAN UPDATE FOR SEATTLE-TACOMA INTERNATIONAL AIRPORT

DRAINAGE CHANNEL OUTLET AT MILLER CREEK

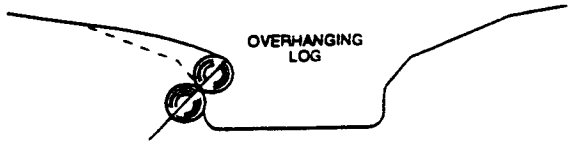
PROPOSED MILLER CREEK RELOCATION

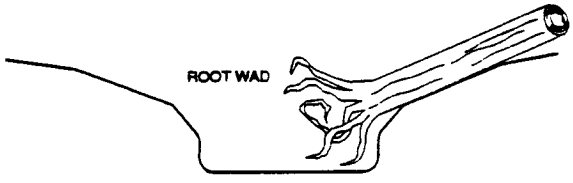
IN: SECTION 20, TOWNSHIP 23N, RANGE 4E

COUNTY OF: KING STATE OF: WA.

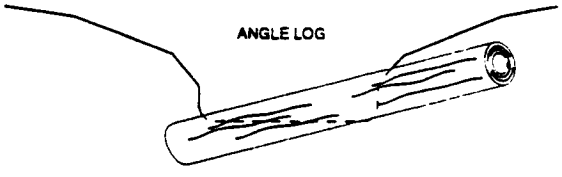
APPLICATION BY: PORT OF SEATTLE

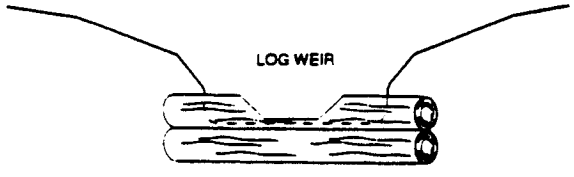
SHEET 24 OF 44 DECEMBER 1996





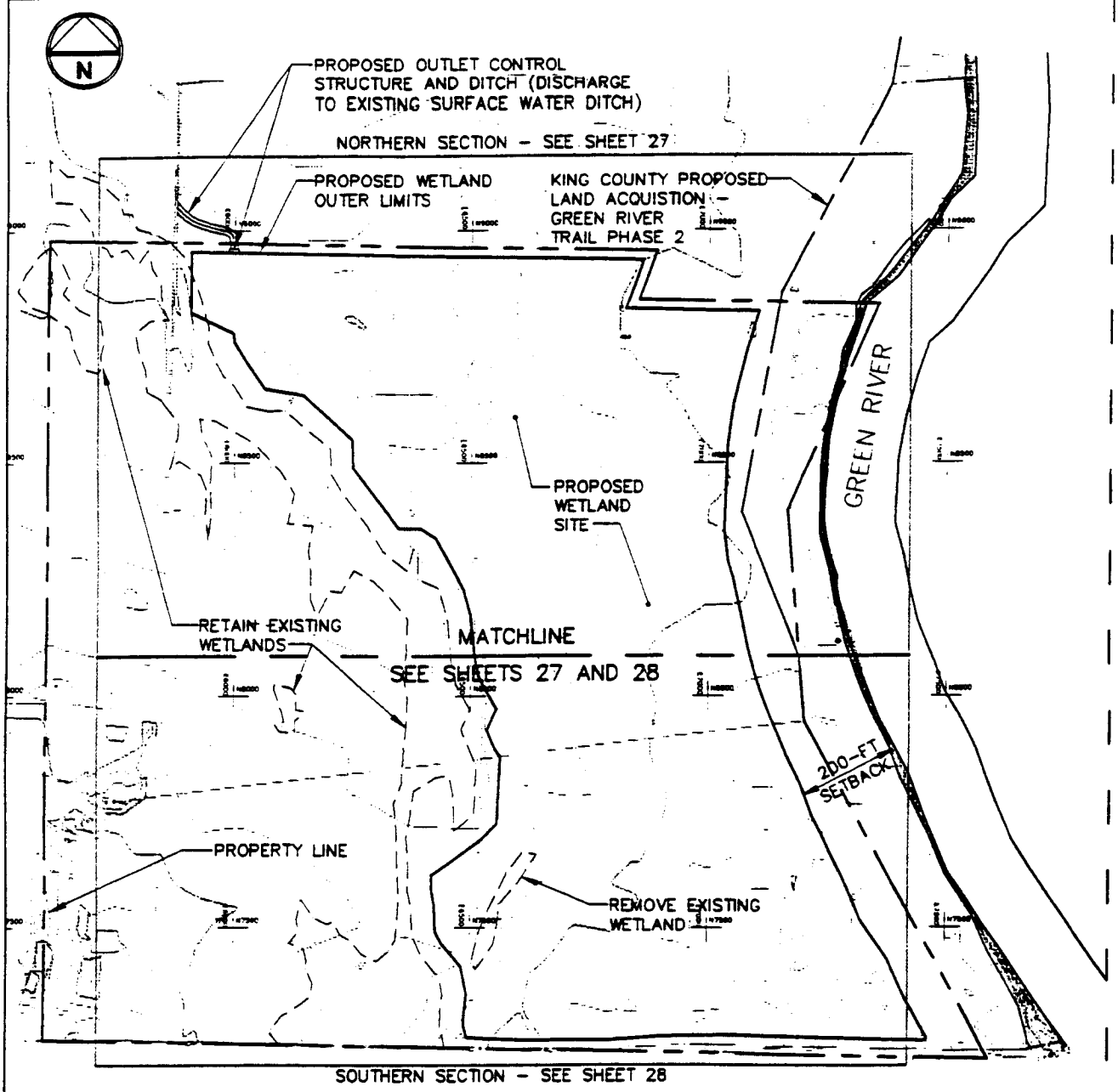
Miller Creek
Woody Debris Installation





B/23 Drainage Channel Woody Debris Installation

PURPOSE: IMPLEMENTATION OF THE MASTER PLAN UPDATE SEATTLE-TACOMA INTERNATIONAL AIRPORT	WOODY DEBRIS INSTALLATION DETAILS NOT TO SCALE	PROPOSED MILLER CREEK RELOCATION IN: SECTION 20, TOWNSHIP 23N, RANGE 4E COUNTY OF: KING STATE: WA APPLICATION BY: PORT OF SEATTLE SHEET 25 of 44 DECEMBER 1996



PURPOSE: IMPLEMENTATION OF THE MASTER PLAN UPDATE FOR SEATTLE-TACOMA INTERNATIONAL AIRPORT

DATUM: NGVD29-AUBURN

SITE PLAN

0 300' 600'

SCALE

CONTOUR INTERVAL = 1 FOOT

PROPOSED WETLAND MITIGATION

IN: SECTION 31, TOWNSHIP 22N, RANGE 5E

COUNTY OF: KING STATE OF: WA.

APPLICATION BY: PORT OF SEATTLE

SHEET 26 OF 44 DECEMBER 1996

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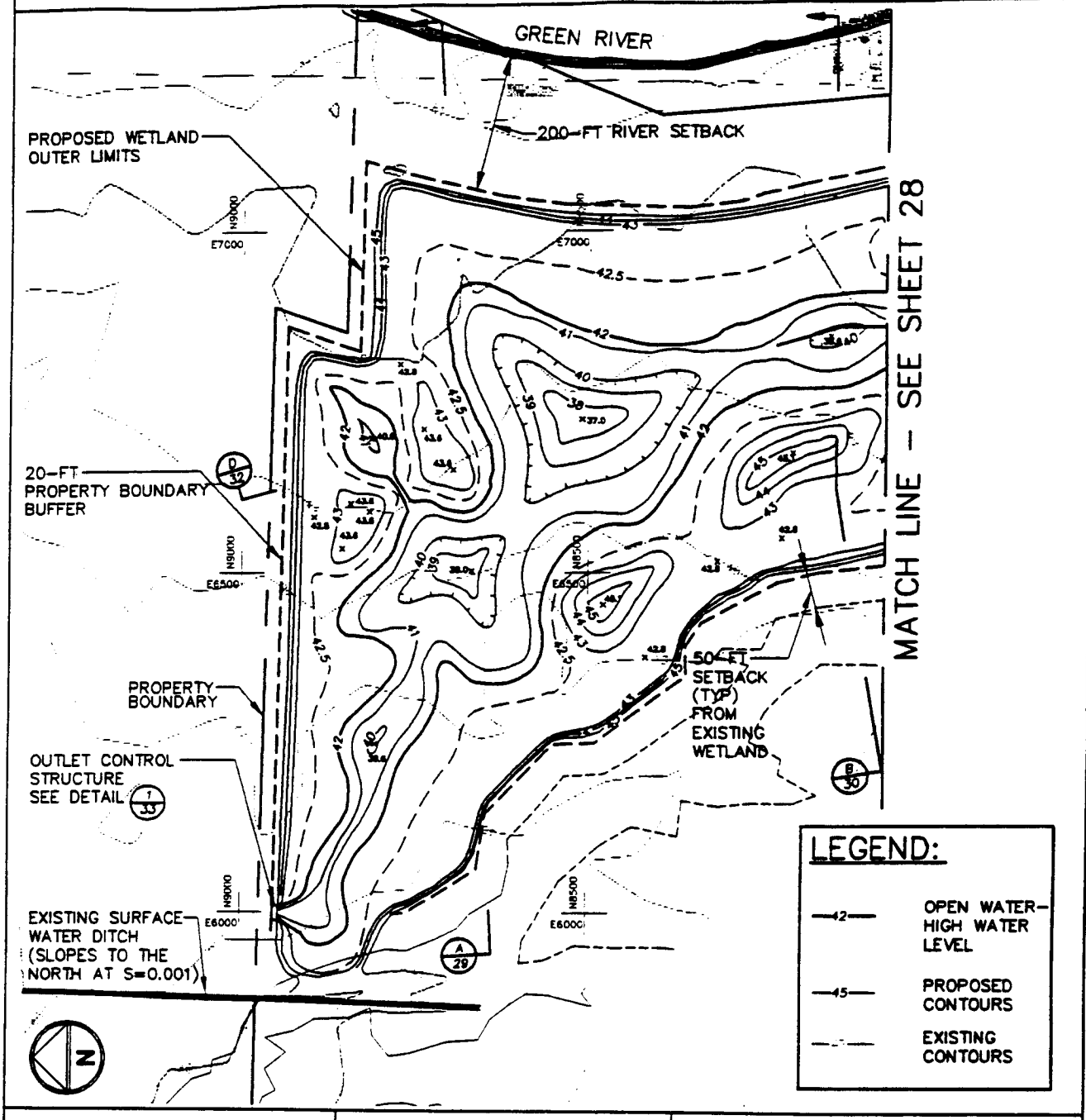

PURPOSE: IMPLEMENTATION OF THE MASTER PLAN UPDATE FOR SEATTLE-TACOMA INTERNATIONAL AIRPORT

DATUM: NGVD29-AUBURN

GRADING PLAN (NORTH)

0 200' 400'

SCALE

CONTOUR INTERVAL = 1 FOOT

PROPOSED WETLAND MITIGATION

IN: SECTION 31, TOWNSHIP 22N, RANGE 5E

COUNTY OF: KING STATE OF: WA.

APPLICATION BY: PORT OF SEATTLE

SHEET 27 OF 44 DECEMBER 1996

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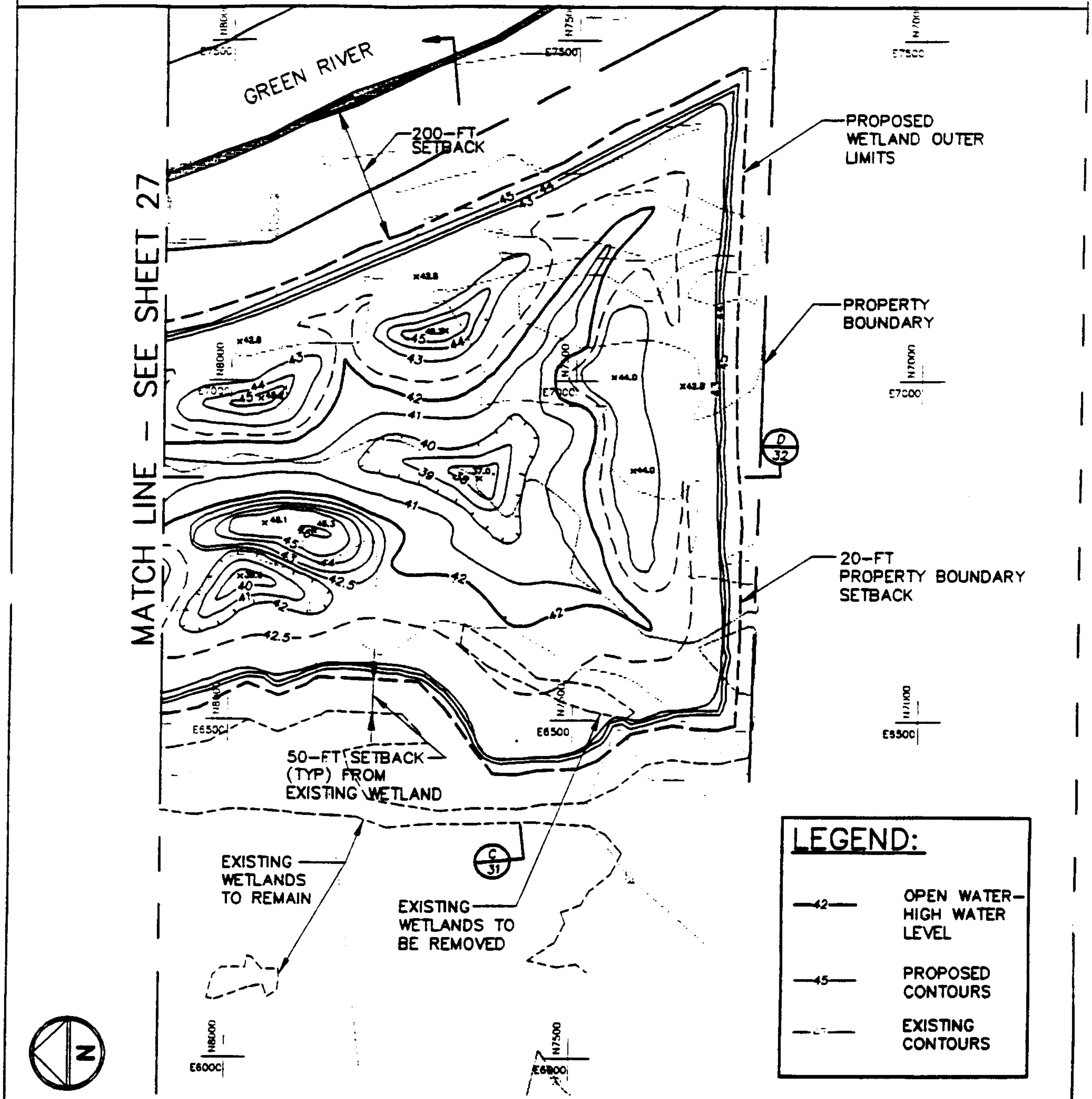
AR 040286



PURPOSE: IMPLEMENTATION OF THE MASTER PLAN UPDATE FOR SEATTLE-TACOMA INTERNATIONAL AIRPORT

DATUM: NGVD29-AUBURN

GRADING PLAN
(SOUTH)

0 200' 400'
SCALE
CONTOUR INTERVAL = 1 FOOT

PROPOSED WETLAND MITIGATION

IN: SECTION 31, TOWNSHIP 22N, RANGE 5E
COUNTY OF: KING STATE OF: WA.
APPLICATION BY: PORT OF SEATTLE
SHEET 28 OF 44 DECEMBER 1996

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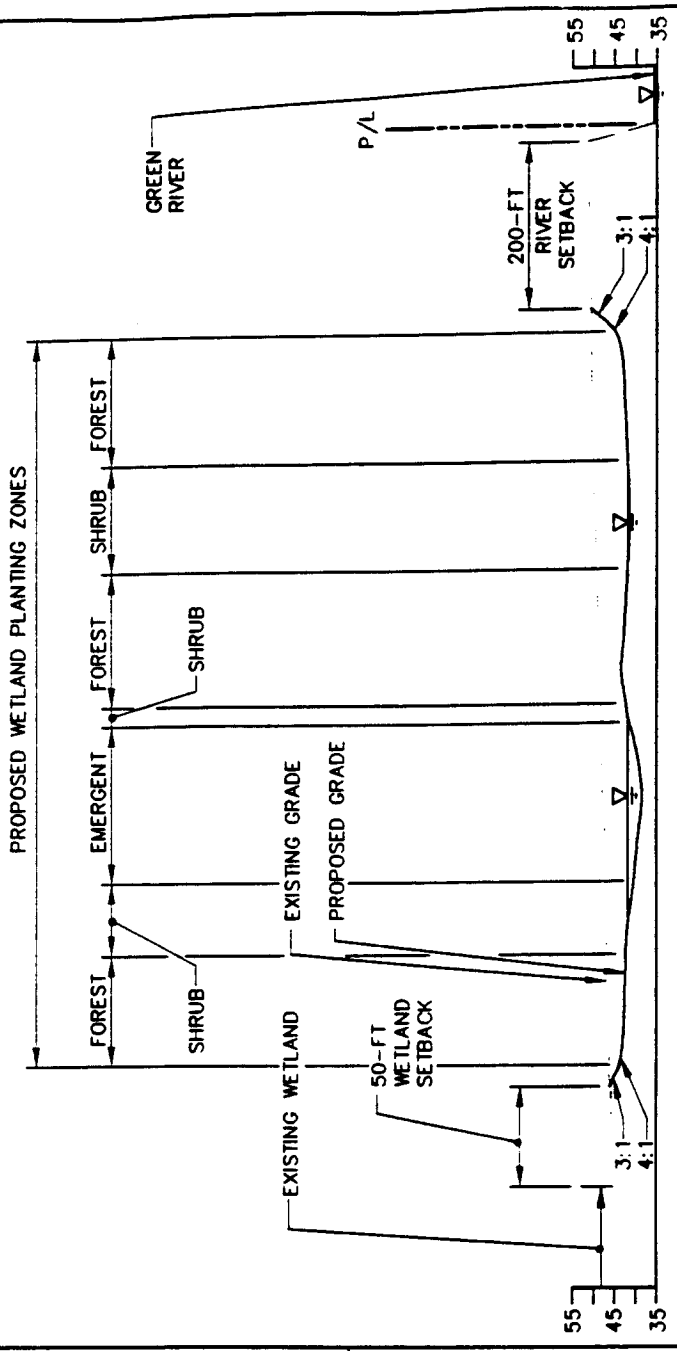

SECTION A 27

H: 1"=200' V: 1"=40'

LEGEND:

P/L PROPERTY LINE

HIGH WATER LEVEL (42-FT MSL) - NORMAL CONDITIONS

PURPOSE: IMPLEMENTATION OF THE MASTER PLAN UPDATE FOR SEATTLE-TACOMA INTERNATIONAL AIRPORT	SECTION VIEW	PROPOSED WETLAND MITIGATION
	SCALE AS SHOWN	IN: SECTION 31, TOWNSHIP 22N, RANGE 5E
		COUNTY OF: KING STATE OF: WA.
DATUM: NGVD29-AUBURN		APPLICATION BY: PORT OF SEATTLE
		SHEET 29 OF 44 DECEMBER 1996

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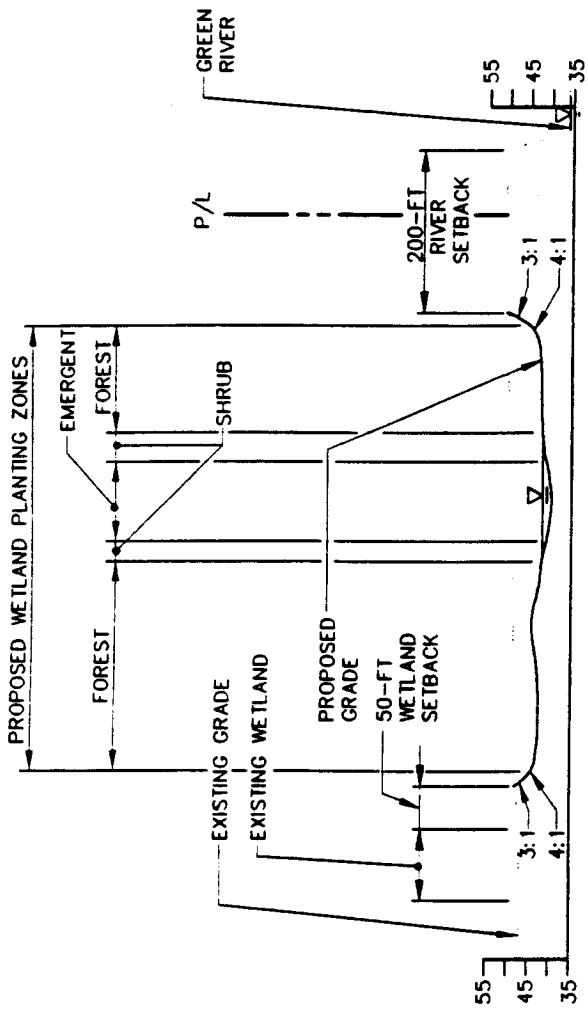

SECTION B 27

H: 1"=200' V: 1"=40'

LEGEND:

P/L PROPERTY LINE

HIGH WATER LEVEL (42-FT MSL) - NORMAL CONDITIONS

PURPOSE: IMPLEMENTATION OF THE MASTER PLAN UPDATE FOR SEATTLE-TACOMA INTERNATIONAL AIRPORT	SECTION VIEW	PROPOSED WETLAND MITIGATION
	SCALE AS SHOWN	IN: SECTION 31, TOWNSHIP 22N, RANGE 5E
		COUNTY OF: KING STATE OF: WA.
DATUM: NGVD29-AUBURN		APPLICATION BY: PORT OF SEATTLE
		SHEET 30 OF 44 DECEMBER 1996

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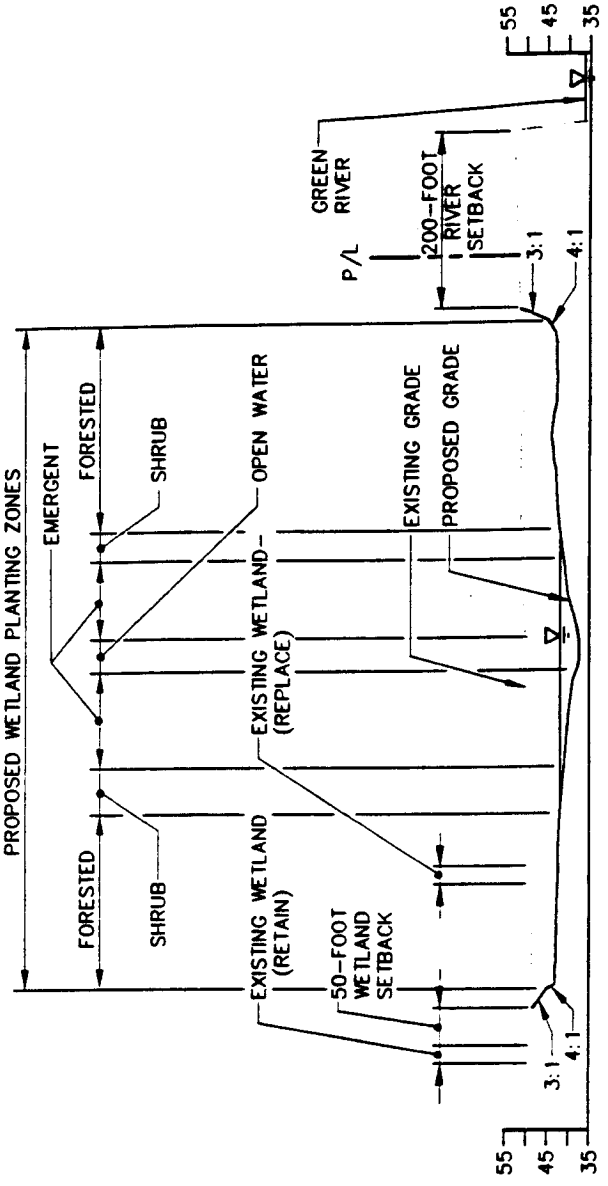

SECTION C

H: 1"=200' V: 1"=40'

28

LEGEND:

P/L PROPERTY LINE

HIGH WATER LEVEL (42-FT MSL) - NORMAL CONDITIONS

PURPOSE: IMPLEMENTATION OF THE MASTER PLAN UPDATE FOR SEATTLE-TACOMA INTERNATIONAL AIRPORT	SECTION VIEW	PROPOSED WETLAND MITIGATION
	SCALE AS SHOWN	IN: SECTION 31, TOWNSHIP 22N, RANGE 5E
		COUNTY OF: KING STATE OF: WA.
DATUM: NGVD29-AUBURN		APPLICATION BY: PORT OF SEATTLE
		SHEET 31 OF 44 DECEMBER 1996

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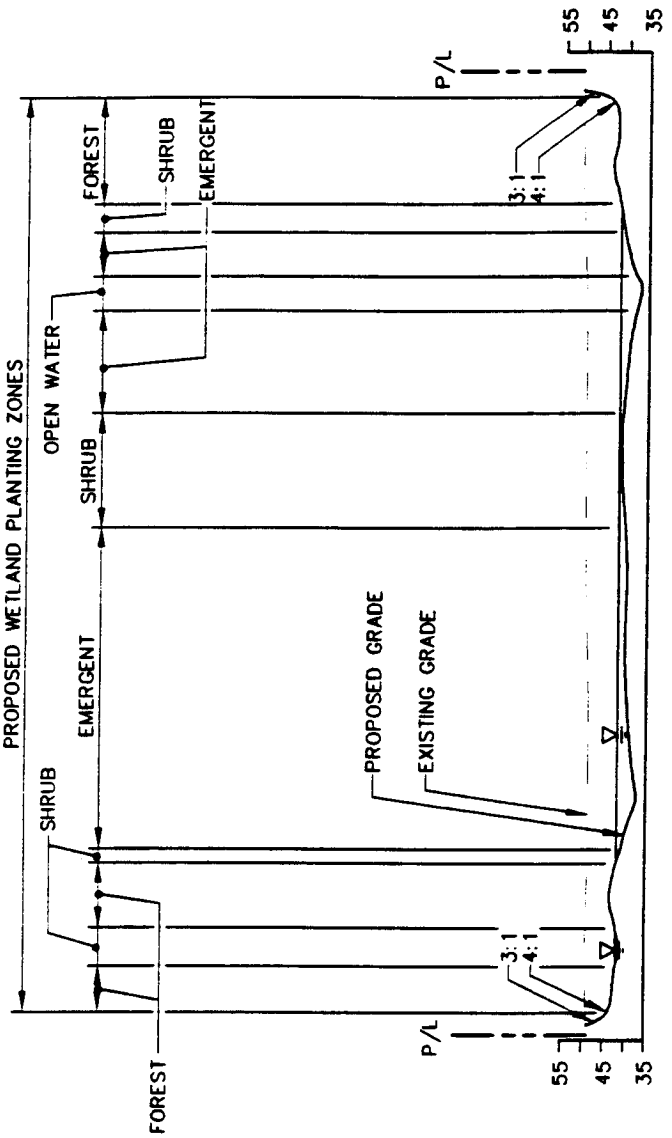

SECTION D

H: 1"=300' V: 1"=40' 27,28

LEGEND:

P/L PROPERTY LINE

HIGH WATER LEVEL (42-FT MSL) - NORMAL CONDITIONS

PURPOSE: IMPLEMENTATION OF THE MASTER PLAN UPDATE FOR SEATTLE-TACOMA INTERNATIONAL AIRPORT	SECTION VIEW	PROPOSED WETLAND MITIGATION
	SCALE AS SHOWN	IN: SECTION 31, TOWNSHIP 22N, RANGE 5E
		COUNTY OF: KING STATE OF: WA.
DATUM: NGVD29-AUBURN		APPLICATION BY: PORT OF SEATTLE
		SHEET 32 OF 44 DECEMBER 1996

PURPOSE: IMPLEMENTATION OF THE MASTER PLAN UPDATE FOR SEATTLE-TACOMA INTERNATIONAL AIRPORT DATUM: NGVD29-AUBURN	DETAIL No. 1 OUTLET CONTROL STRUCTURE SCALE AS SHOWN	PROPOSED WETLAND MITIGATION IN: SECTION 31, TOWNSHIP 22N, RANGE 5E COUNTY OF: KING STATE OF: WA. APPLICATION BY: PORT OF SEATTLE SHEET 33 OF 44 DECEMBER 1996

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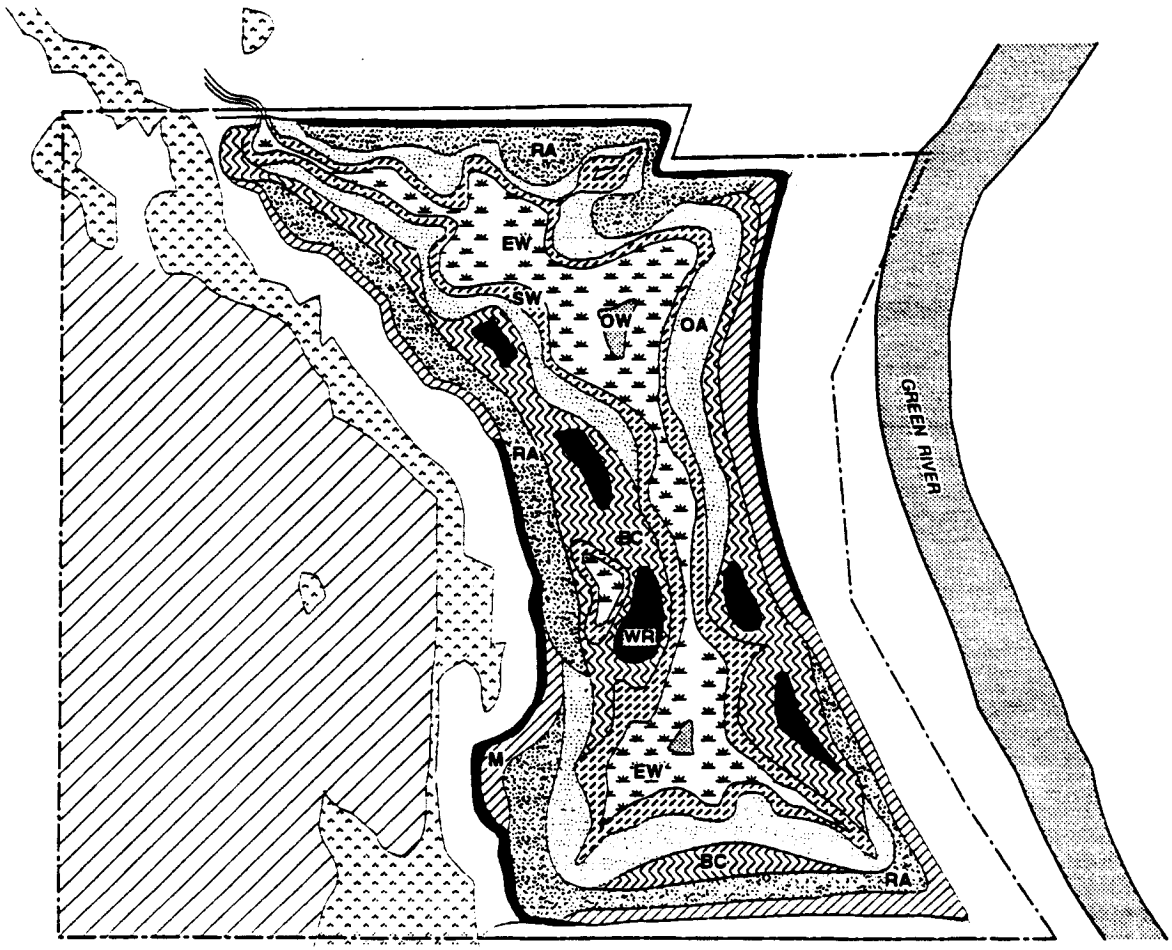


BC Black Cottonwood/Willow
RA Red Alder/Salmonberry
OA Oregon Ash/Slough Sedge
M Mixed Forest
WR Western Red Cedar
Existing Wetland
SW Shrub Wetland
EW Emergent Wetland
OW Open Water/Non-vegetated

PURPOSE: IMPLEMENTATION OF THE MASTER PLAN UPDATE SEATTLE-TACOMA INTERNATIONAL AIRPORT

PROPOSED WETLAND PLANT ASSOCIATIONS

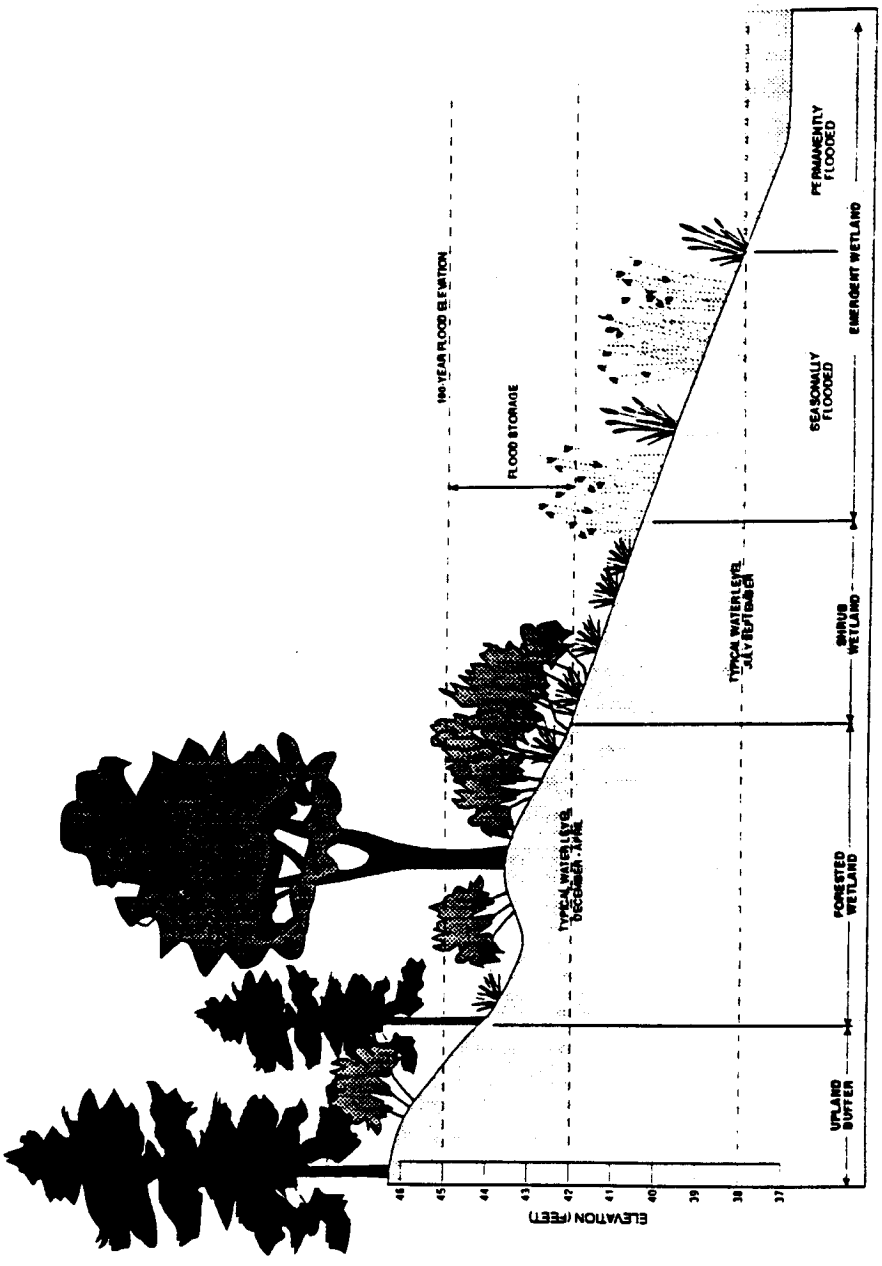
0 325' 650'

SCALE

PROPOSED WETLAND MITIGATION

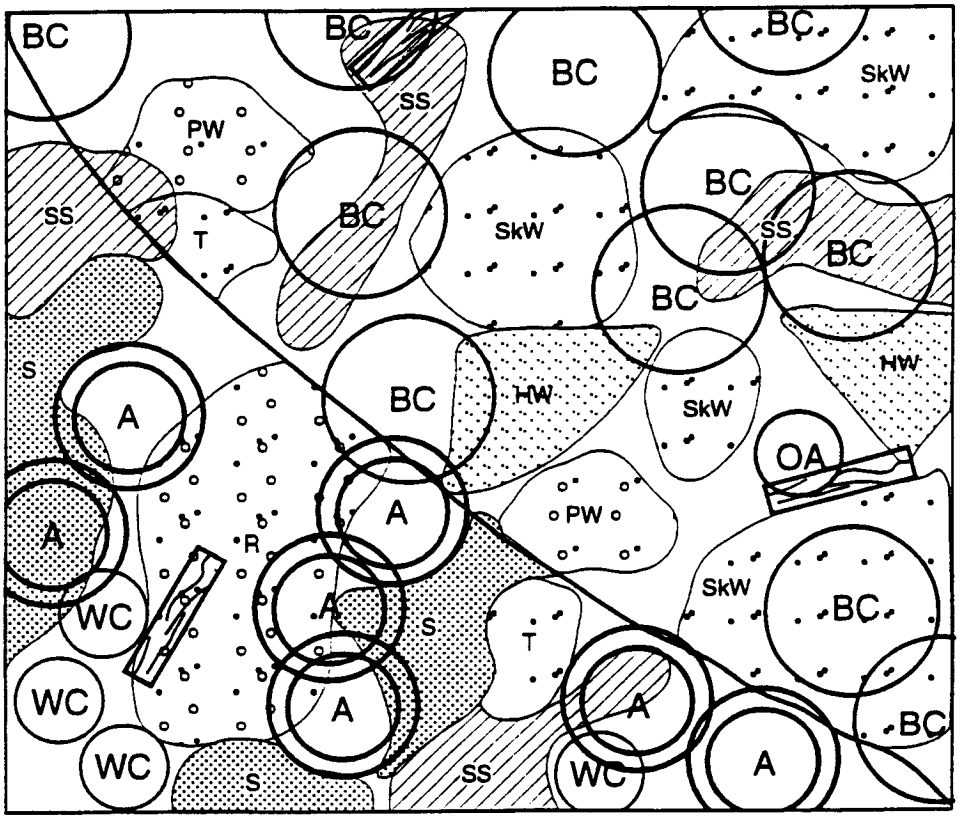
IN: SECTION 31, TOWNSHIP 22N, RANGE 5E
COUNTY OF: KING STATE: WA
APPLICATION BY: PORT OF SEATTLE
SHEET 34 of 44 DECEMBER 1996

AR 040293



PURPOSE: IMPLEMENTATION OF THE MASTER PLAN UPDATE SEATTLE-TACOMA INTERNATIONAL AIRPORT	RELATIONSHIP OF SEASONAL WATER LEVEL VARIATIONS TO PROPOSED WETLAND VEGETATION NOT TO SCALE	PROPOSED WETLAND MITIGATION IN: SECTION 31, TOWNSHIP 22N, RANGE 5E COUNTY OF: KING STATE: WA APPLICATION BY: PORT OF SEATTLE SHEET 35 of 44 DECEMBER 1996

Black Cottonwood/Willow



Red Alder/Salmonberry

PURPOSE: IMPLEMENTATION OF THE MASTER PLAN UPDATE SEATTLE-TACOMA INTERNATIONAL AIRPORT	TYPICAL PLANTING PLAN BLACK COTTONWOOD/ WILLOW AND RED ALDER/ SALMONBERRY ZONES NOT TO SCALE	PROPOSED WETLAND MITIGATION IN: SECTION 31, TOWNSHIP 22N, RANGE 5E COUNTY OF: KING STATE: WA APPLICATION BY: PORT OF SEATTLE SHEET 36 of 44 DECEMBER 1996

AR 040295

Black Cottonwood/Willow Zone

Scientific Name	Common Name	Symbol	Condition	Comments
Trees				
Fraxinus latifolia	Oregon ash	OA	container	Trees would be planted at densities of at least 120 plants per acre.
Populus trichocarpa	black cottonwood	BC	container/bareroot	
Salix lasiandra	Pacific willow	PW	bareroot/livestake	
Shrubs				
Lonicera involucrata	twinberry	T	container	Approximately 35 to 50% of this association would be planted with shrubs. Spacing would be about 5 ft on center.
Salix hookeriana	Hooker's willow	HW	bareroot/livestake	
Salix sitchensis	Sitka willow	SkW	bareroot/livestake	
Herbs				
Carex obnupta	slough sedge	SS	plug/seed	10 to 15% of the association would be planted with slough sedge. The remaining area would be seeded with a grass groundcover.
Downed Log				

Red Alder/Salmonberry Zone

Scientific Name	Common Name	Symbol	Condition	Comments
Trees				
Alnus rubra	red alder	A	container	Trees would be planted at densities of at least 120 plants per acre.
Pyrus fusca	western crabapple	WC	container	
Shrubs				
Cornus stolonifera	red-osier dogwood	R	bareroot/livestake	40 to 50% of the area would be planted with shrubs at an approximate spacing of 5 ft on center.
Lonicera involucrata	twinberry	T	container	
Rubus spectabilis	salmonberry	S	container/bareroot	
Herbs				
Carex obnupta	slough sedge	SS	plug/seed	Slough sedge would be planted in10 to 20% of the association. The remaining area would be seeded with a grass groundcover.
Downed Log				

PURPOSE: IMPLEMENTATION OF THE MASTER PLAN UPDATE SEATTLE-TACOMA INTERNATIONAL AIRPORT

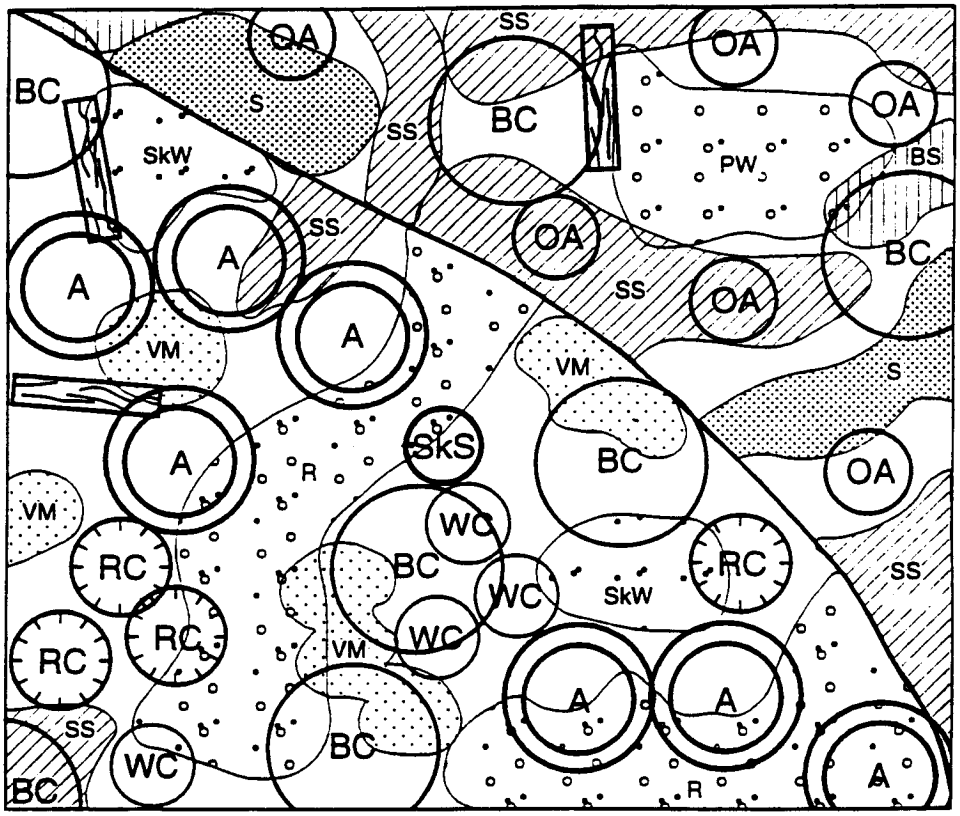
TYPICAL PLANTING PLAN
BLACK COTTONWOOD/
WILLOW AND RED ALDER/
SALMONBERRY ZONES

PROPOSED WETLAND MITIGATION

IN: SECTION 31, TOWNSHIP 22N, RANGE 5E
COUNTY OF: KING STATE: WA
APPLICATION BY: PORT OF SEATTLE
SHEET 37 of 44 DECEMBER 1996

AR 040296

Oregon Ash/Slough Sedge



Mixed Forest

PURPOSE: IMPLEMENTATION OF THE MASTER PLAN UPDATE SEATTLE-TACOMA INTERNATIONAL AIRPORT	TYPICAL PLANTING PLAN OREGON ASH/SLOUGH SEDGE AND MIXED FOREST ZONES NOT TO SCALE	PROPOSED WETLAND MITIGATION IN: SECTION 31, TOWNSHIP 22N, RANGE 5E COUNTY OF: KING STATE: WA APPLICATION BY: PORT OF SEATTLE SHEET 38 of 44 DECEMBER 1996

AR 040297

Oregon Ash/Slough Sedge Zone

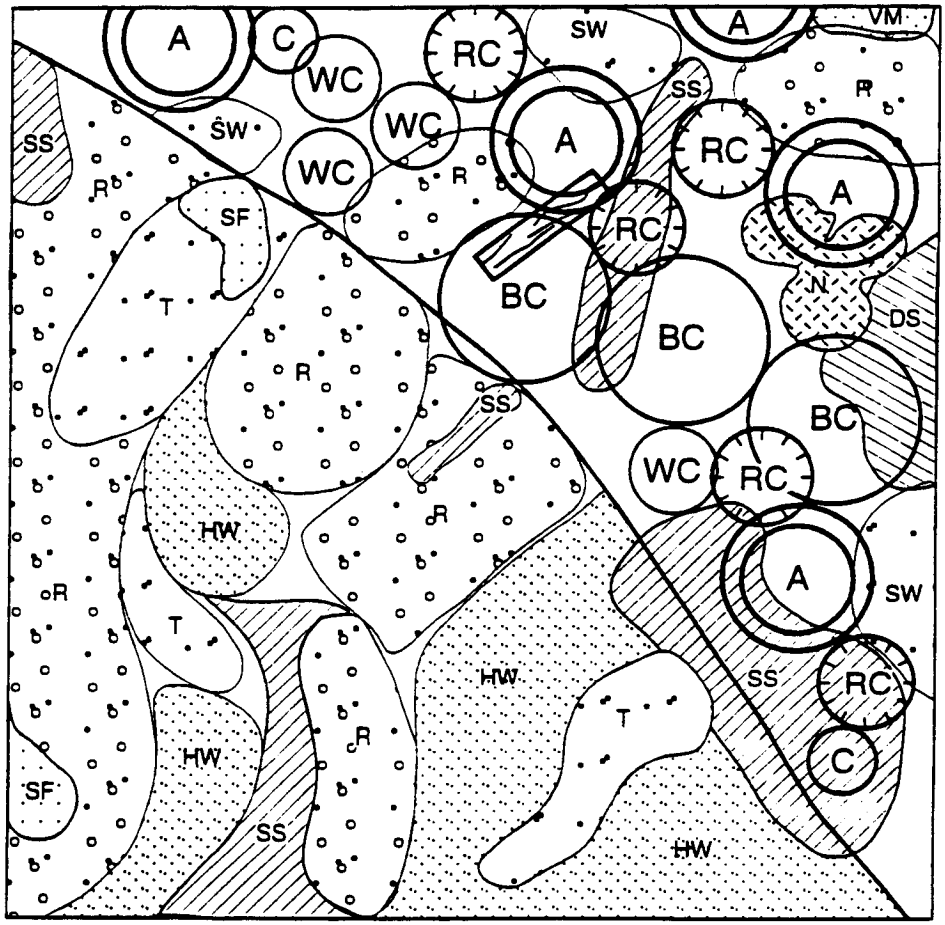
Scientific Name	Common Name	Symbol	Condition	Comments
Trees				
Fraxinus latifolia	Oregon ash	OA	container	At least 150 trees per acre would be planted in this association.
Salix lasiandra	Pacific willow	PW	bareroot	
Populas trichocarpa	Black Cottonwood	BC	container/livestake	
Shrubs				
Rubus spectabilis	salmonberry	S	container/bareroot	10 to 20% of the area would be planted with salmonberry at spacings of at least 5 ft on center.
Herbs				
Carex obnupta	slough sedge	SS	plug/seed	40 to 50% of this association would be planted and/or seeded with slough sedge. The remaining area would be seeded with a grass groundcover.
Carex rostrata	beaked sedge	BS	plug	
Downed Log				

Mixed Forest Zone

Scientific Name	Common Name	Symbol	Condition	Comments
Trees				
Alnus rubra	red alder	A	container	At least 120 trees per acre would be planted in this association.
Picea sitchensis	Sitka spruce	SkS	container	
Populus trichocarpa	black cottonwood	BC	container/bareroot	
Pyrus fusca	western crabapple	WC	container	
Thuja plicata	western red cedar	RC	container	
Shrubs				
Acer circinatum	vine maple	VM	container	40 to 50% of the area would be planted with shrubs at spacings of approximately 5 ft on center.
Cornus stolonifera	red-osier dogwood	R	bareroot/livestake	
Salix sitchensis	Sitka willow	SkW	bareroot/livestake	
Herbs				
Carex obnupta	slough sedge	SS	plug/seed	2 to 10% of the area would be planted with slough sedge. The remaining area would be seeded with a grass groundcover.
Downed Log				

PURPOSE: IMPLEMENTATION OF THE MASTER PLAN UPDATE SEATTLE-TACOMA INTERNATIONAL AIRPORT	TYPICAL PLANTING PLAN OREGON ASH/SLOUGH SEDGE AND MIXED FOREST ZONES	PROPOSED WETLAND MITIGATION IN: SECTION 31, TOWNSHIP 22N, RANGE 5E COUNTY OF: KING STATE: WA APPLICATION BY: PORT OF SEATTLE SHEET 39 of 44 DECEMBER 1996

Western Red Cedar Forest



Shrub Zone

PURPOSE: IMPLEMENTATION OF THE MASTER PLAN UPDATE SEATTLE-TACOMA INTERNATIONAL AIRPORT	TYPICAL PLANTING PLAN WESTERN RED CEDAR FOREST AND SHRUB ZONES NOT TO SCALE	PROPOSED WETLAND MITIGATION IN: SECTION 31, TOWNSHIP 22N, RANGE 5E COUNTY OF: KING STATE: WA APPLICATION BY: PORT OF SEATTLE SHEET 40 of 44 DECEMBER 1996

Western Red Cedar Forest Zone

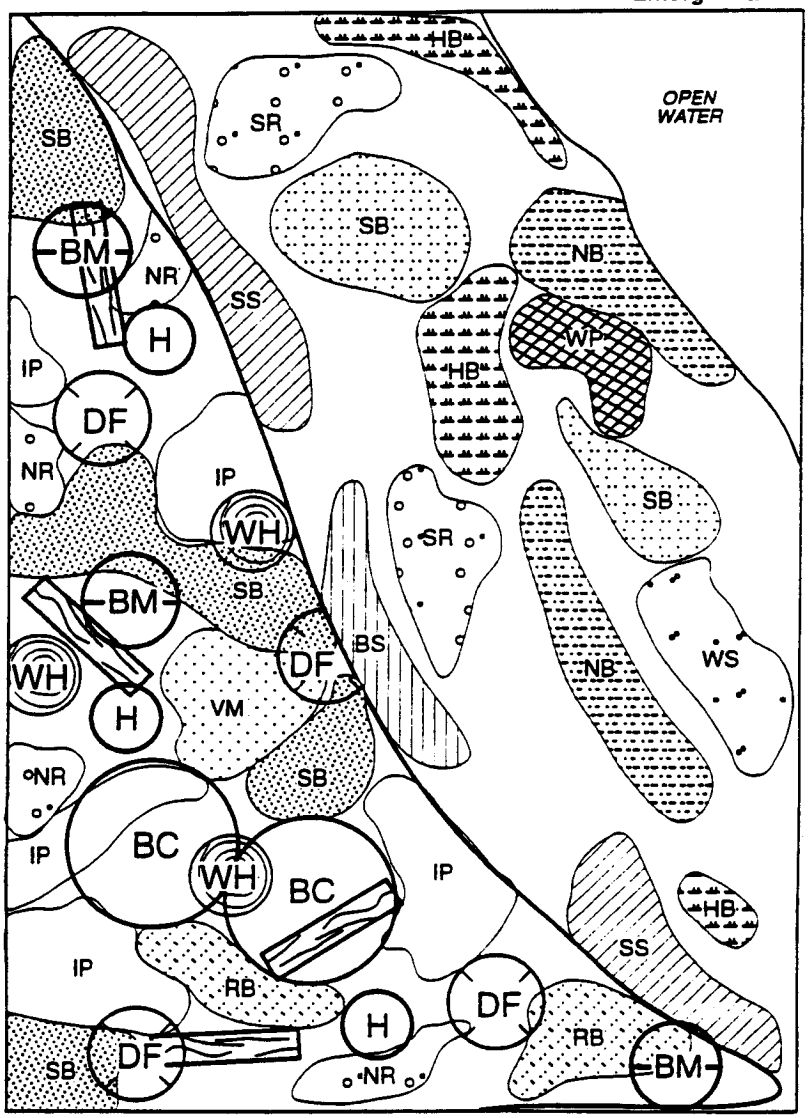
Scientific Name	Common Name	Symbol	Condition	Comments
Trees				
Alnus rubra	red alder	A	container	At least 150 trees per acre would be planted in this association.
Populus trichocarpa	black cottonwood	BC	container/bareroot	
Pyrus fusca	western crabapple	WC	container	
Rhamnus purshiana	cascara	C	container	
Thuja plicata	western red cedar	RC	container	
Shrubs				
Acer circinatum	vine maple	VM	container	20 to 30% of the area would be planted with shrubs. Spacing would be approximately 5 ft on center.
Cornus stolonifera	red-osier dogwood	R	bareroot/livestake	
Physocarpos capitatus	Pacific ninebark	N	container	
Salix scouleriana	Scouler's willow	SW	bareroot/livestake	
Herbs				
Carex deweyana	Dewey's sedge	DS	plug	15 to 25% of the area would be planted with sedges. The remaining area would be seeded with a grass groundcover.
Carex obnupta	slough sedge	SS	plug/seed	

Shrub Zone

Scientific Name	Common Name	Symbol	Condition	Comments
Shrubs				
Cornus stolonifera	red-osier dogwood	R	bareroot/livestake	Shrubs would be planted in approximately 85 to 90% of the shrub zone at spacings ranging from 5 to 8 ft on center.
Lonicera involucrata	twinberry	T	container	
Salix hookeriana	Hooker's willow	HW	bareroot/livestake	
Herbs				
Carex obnupta	slough sedge	SS	plug/seed	5 to 10% of the shrub zone would be planted and/or seeded with emergent species. The remaining area would be seeded with a grass groundcover.
Scirpus microcorpus	small-fruited bulrush	SF	seed	

PURPOSE: IMPLEMENTATION OF THE MASTER PLAN UPDATE SEATTLE-TACOMA INTERNATIONAL AIRPORT	TYPICAL PLANTING PLAN WESTERN RED CEDAR FOREST AND SHRUB ZONES	PROPOSED WETLAND MITIGATION IN: SECTION 31, TOWNSHIP 22N, RANGE 5E COUNTY OF: KING STATE: WA APPLICATION BY: PORT OF SEATTLE SHEET 41 of 44 DECEMBER 1996

Emergent Zone



Upland Buffer

PURPOSE: IMPLEMENTATION OF THE MASTER PLAN UPDATE SEATTLE-TACOMA INTERNATIONAL AIRPORT	TYPICAL PLANTING PLAN EMERGENT AND UPLAND BUFFER ZONES NOT TO SCALE	PROPOSED WETLAND MITIGATION IN: SECTION 31, TOWNSHIP 22N, RANGE 5E COUNTY OF: KING STATE: WA APPLICATION BY: PORT OF SEATTLE SHEET 42 of 44 DECEMBER 1996

AR 040301

Emergent Zone

Scientific Name	Common Name	Symbol	Condition	Comments
Herbs				
Carex obnupta	slough sedge	SS	plug	50 to 75% of the emergent zone would be planted with the listed plant species. The remaining area would be seeded (with grasses, sedges, and rushes) or left unseeded and subjected to natural colonization.
Carex rostrata	beaked sedge	BS	plug	
Eleocharis palustris	common spike-rush	SR	plug	
Oenanthe sarmentosa	water parsley	WP	container	
Polygonum amphibian	water smartweed	WS	container	
Scirpus acutis	hardstem bulrush	HB	plug	
Scirpus microcarpus	small-fruited bulrush	SB	seed	
Sparganium emersum	narrow-leaf burreed	NB	plug	
	Hydroseed mix/ Natural colonization			

Upland Buffer Zone

Scientific Name	Common Name	Symbol	Condition	Comments
Trees				
Acer macrophyllum	big-leaf maple	BM	container	At least 120 trees per acre would be planted in the upland buffer.
Populus trichocarpa	black cottonwood	BC	container/bareroot	
Pseudotsuga menziesii	Douglas-fir	DF	container	
Tsuga heterophylla	western hemlock	WH	container	
Shrubs				
Acer circinatum	vine maple	VM	container	30 to 40% of the area would be planted with shrubs at spacings ranging from 5 to 6 ft on center.
Corylus cornuta	hazelnut	H	container	
Oemeleria cerasiformis	Indian plum	IP	container	
Rosa nutkana	nootka rose	NR	container	
Symphoricarpos albus	snowberry	SB	container	

PURPOSE: IMPLEMENTATION OF THE MASTER PLAN UPDATE SEATTLE-TACOMA INTERNATIONAL AIRPORT

TYPICAL PLANTING PLAN
EMERGENT AND UPLAND BUFFER ZONES

PROPOSED WETLAND MITIGATION

IN: SECTION 31, TOWNSHIP 22N, RANGE 5E
COUNTY OF: KING STATE: WA
APPLICATION BY: PORT OF SEATTLE
SHEET 43 of 44 DECEMBER 1996

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PURPOSE: IMPLEMENTATION OF THE MASTER PLAN UPDATE FOR SEATTLE-TACOMA INTERNATIONAL AIRPORT

DATUM: NGVD29-AUBURN

PROPOSED WETLAND MITIGATION

IN: SECTION 31, TOWNSHIP 22N, RANGE 5E
COUNTY OF: KING STATE OF: WA.
APPLICATION BY: PORT OF SEATTLE
SHEET 44 OF 44 DECEMBER 1996

ATTACHMENT A

SEA-TAC INTERNATIONAL AIRPORT

Portions of the east half of Section 20, Section 21, Section 28, the east half of Section 29, the east half of Section 32 and Section 33, all in Township 23 North, Range 4 East, W.M. in the King County, Washington described as follows: Beginning at the intersection of the east margin of 12th Avenue South with the south margin of State Sign Route 518; thence easterly and southerly along said south margin and then continuing along the westerly margin of the Sea-Tac Airport Access Freeway to the projected south margin of South 160th Street; thence easterly along said south margin to the projected south margin of South 160th Street; thence easterly along said south margin to the easterly margin of said freeway; thence along said easterly margin to a point where it intersects the westerly margin of International Boulevard (SR 99); thence southerly along said westerly margin to the south line of the northeast quarter of Section 33, Township 23 North, Range 4 East; thence west along said line to the projected west margin of 28th Avenue South; thence southerly along said margin to the intersection with the north margin of South 188th Street; thence westerly and northwesterly along said north margin of South 188th Street and 12th Place South to the intersection with the easterly margin of State Sign Route 509; thence northerly along said margin to intersection with the south margin of South 176th Street; thence easterly along said south margin to the east margin of 12th Avenue South; thence northerly along said easterly margin of 12th Avenue South to the point of beginning.

Assessed in Tax Lot 16 in the Southeast quarter of Section 28, Township 23 North, Range 4 East, W.M.

ATTACHMENT B

POTENTIAL IMPACTS TO WATER QUALITY AND FISHERIES

A complete description of impacts to surface water, fisheries, and wetlands is included in Sections 10, 11, and 16 of Chapter IV, and Appendices F, H, and P, of the Final EIS for Proposed Master Plan Update Development Actions at Seattle-Tacoma International Airport (1996), and summarized below.

Impacts to Des Moines Creek will occur in later phases of construction activity. Specific construction plans have not been developed for the later phases, therefore a separate permit application for construction in Des Moines Creek will be submitted later once precise impacts to Des Moines Creek and its tributary are known. However, certain impacts, such as the addition of surface water volume into the stream as a result of increased impervious surface in the watershed and wetland fill can be reasonably quantified now and will be discussed here.

Streams

Although salmonids have not been captured in the reach of Miller Creek most affected by the Master Plan Update Improvements, cutthroat trout may occur there. Downstream reaches do support other salmonids and contain spawning habitat. Potential construction impacts to streams and fisheries resources relate to short-term increases in total suspended solids (TSS) from erosion and sedimentation and temporary loss of habitat due to creek relocation. Contaminants such as heavy metals and oil and grease from construction machinery tend to cling to sediments. The primary mechanism for delivery of sediment from the construction sites to the streams is in stormwater runoff as suspended solids. Since Phase I of the Master Plan Update Improvements covers the most area, it is likely to have the greatest impact on water resources. Construction of all phases is expected to increase TSS from 11 to 27 percent in Miller Creek and 14 to 36 percent for Des Moines Creek during and immediately after construction. As vegetation becomes established the first year after construction, sediment loading should decrease exponentially. Following construction, overall increase of sediment inputs into both Miller and Des Moines Creek will increase up to 4 percent per year compared to existing total loading.

Phase I construction will directly impact Miller Creek in three areas (see Miller Creek Relocation Plan, attached). Fill material will be placed in portions of the channelized mainstem and two drainage channels.

Operational impacts associated with the Master Plan Update Improvements are related to increased stormwater runoff due to the increase in impervious surfaces. Additional stormwater runoff will potentially increase the rate and duration of flows within the stream channels after storms. Proposed stormwater management facilities will remove most of the pollutants contained within the stormwater, but minor increases in heavy metals and oil and grease are likely to reach Miller and Des Moines Creeks. Stormwater runoff may also contain glycols and urea (used as de-icers in the winter).

Increased impervious surface area will contribute to reduced groundwater recharge, possibly reducing baseflows to the streams within the affected watersheds. Reduced baseflows could increase stream temperature and decrease dissolved oxygen levels which, in turn, could affect stream-dwelling organisms.

Stream Mitigation - Methods identified to reduce the duration and severity of both construction and operational impacts to surface water quality and fisheries resources are described in detail in the Final EIS. Generally, the following measures will be implemented before and during construction:

- An approved stormwater pollution prevention plan (including wet vaults and bioswales);
- An erosion and sedimentation control plan (including mulching, silt fencing, sediment basins, and check dams);
- Infiltration facilities;
- A spill prevention, control and countermeasures plan; and
- Best Management Practices.

In order to compensate for filling portions of Miller Creek as part of Phase I construction, a new segment of stream will be created. A thorough discussion of these mitigation measures are included in the attached Miller Creek Relocation Plan.

Wetlands

Approximately 12.23 acres of wetlands will be filled. The wetlands that will be filled are generally in close proximity to the existing airport facilities. Affected wetland classes are: 7.34 acres of forested wetland; 2.01 acres of scrub/shrub wetland; and 2.88 acres of emergent wetland. The affected wetlands are typically small and isolated from true aquatic or high quality upland habitat. For these reasons, and because they lack complex habitat features, they are generally of low functional value. A complete description of wetlands in the impact area is included in the attached Wetland Mitigation Plan.

Riparian wetlands along Miller and Des Moines Creeks downstream of the proposed projects may be indirectly affected by increased stormwater runoff. Since the mitigation measures mentioned above will be implemented prior to commencing construction activities, indirect impacts to wetlands should be minimal.

Wetland Mitigation - In order to reduce the duration and severity of impacts to wetlands, numerous mitigation measures have been undertaken, including avoidance. For example, Borrow Area 8 was identified as affecting a large area of higher quality wetlands. To reduce wetland impacts, Borrow Area 8 was eliminated from the project, reducing wetland fill from about 26 acres to 12.23 acres.

Compensatory wetland mitigation is proposed on an off-site location to maximize the benefits of replacing many small wetlands with one large wetland. An overall replacement ratio of 1.7:1 will be achieved at one location in Auburn, Washington. Since the mitigation site is adjacent to the Green River, it will function as part of a larger ecosystem. The attached Wetland Mitigation Plan describes the mitigation program in detail.

ATTACHMENT C

JURISDICTIONAL WETLAND DELINEATION

Appendix H-A

SEA-TAC AIRPORT MASTER PLAN UPDATE FINAL EIS

JURISDICTIONAL WETLAND DETERMINATION FOR SEATTLE-TACOMA INTERNATIONAL AIRPORT MASTER PLAN UPDATE

Prepared for

Port of Seattle

Prepared by

Aaron Simmons
Christopher W. Wright

SHAPIRO AND ASSOCIATES, INC.
1201 Third Avenue, Suite 1700
Seattle, WA 98101

April 1995

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Attachment: Field Data Forms

EXECUTIVE SUMMARY

Shapiro and Associates, Inc. (SHAPIRO) conducted a detailed wetland investigation of the Seattle-Tacoma International Airport Master Plan Update site during the months of August to December, 1994. The site is located in the City of SeaTac and the northern portion of the City of Des Moines, in King County, Washington. Wetlands were delineated in accordance with the criteria described in the *Federal Manual for Identifying and Delineating Jurisdictional Wetlands* (Federal Interagency Committee for Wetland Delineation, 1989), commonly referred to as the Unified Federal Method or the 1989 Manual. Delineated wetland boundaries do not differ from those that would be identified using the criteria described in the *U.S. Army Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory, 1987), commonly referred to as the 1987 Manual. By reviewing existing literature, conducting a field reconnaissance, and using photo-interpretation, SHAPIRO identified 54 wetlands on both private and Port-owned land. Of these, 32 wetlands, ranging in size from approximately 300 square feet to 7 acres were delineated. The remaining 22 wetlands were not delineated because (1) they were delineated during previous wetland investigations, (2) permission to access properties containing wetlands could not be obtained, or (3) they had been filled under authority of a Nationwide #26 permit since completion of previous documentation.

I. INTRODUCTION

A. GENERAL SITE DESCRIPTION

The area investigated for the presence of wetlands generally lies in the City of SeaTac and the northern portion of the City of Des Moines, in King County, Washington (Figure 1). The investigation was conducted in a 4 square mile area bounded by Highway 99 to the east, S. 140th Street to the north, State Route (SR) 509 and Des Moines Memorial Drive to the west, and S. 216th Street to the south (within Sections 16, 17, 20, 21, 28, 29, 32, and 33 of Township 23N, Range 4E and Sections 4, 5, 8, and 9 of Township 22N, Range 4E). The site includes land owned by both the Port of Seattle (Port) and by private individuals. Wetlands identified on land owned by the Port are located in the north borrow area, airport operations area (AOA), and south borrow area. Wetlands identified on private property are located predominantly between the AOA and the western study area boundary.

The north borrow area, also known as the Boeing Fill site, is a potential source of fill (see Figure 2). This area is bounded on the south by S. 154th Street, on the north by S. 146th Street, and on the west by Lora Lake, It is largely forested and contains Lake Reba: a King County regional stormwater detention facility. The surrounding system of wetlands is called the Lake Reba wetland complex. Miller Creek enters the north end of the borrow area, flows past the north end of Lake Reba, and exits to Lora Lake. Gravel occasionally is stored in the southern portion of this borrow area. Houses that once existed in this area have since been removed and residential streets provide access to much of the area.

The AOA is the area in which routine airport operations for the Seattle-Tacoma International Airport occur (Figure 2). It is bounded on the west by 12th Avenue S., on the east by runways, on the north by S. 154th Street, and on the south by S. 200th Street. Most of the wetlands are located west of the runway perimeter road. The perimeter road is a service road that circumscribes the runways and taxiways on the air field. The air field is at the same elevation as the existing runways and is characterized by frequently mowed grassland interrupted by an array of service roads and airport support structures. West of the air field the terrain is sloped and generally forested. Service roads provide access to most of this area.

The south borrow area is bounded on the south by S. 216th Street, on the north by S. 200th Street, on the east by 16th Avenue S., and on the west by 24th Avenue S (see Figure 2). This area is a potential source of fill. Houses that once existed in this area have since been removed allowing vegetative reclamation of the area, and abandoned residential streets provide access. Des Moines Creek flows from the north side of this area to the southwestern corner.

Wetlands on private property are located throughout the study area. These wetlands were not delineated because (1) they were delineated during a previous wetland investigation, or (2) permission to access properties containing wetlands could not be obtained.

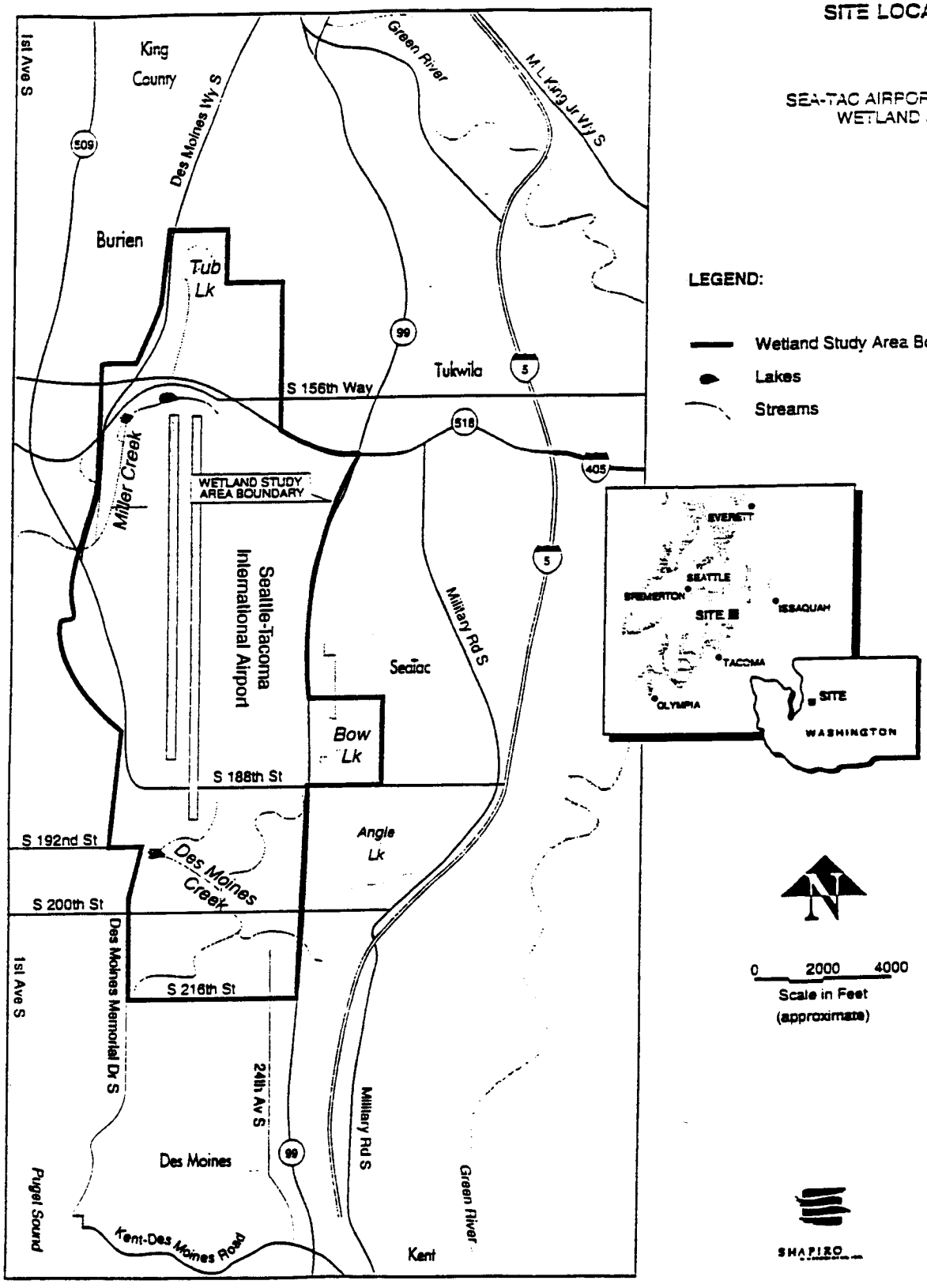
B. WETLAND AUTHORITY AND DEFINITION

Pursuant to the Clean Water Act and through the Section 404 permitting process, the U.S. Army Corps of Engineers (Corps) has been given the responsibility and authority to regulate the discharge of dredged or fill materials into waters and adjacent wetlands of the United States (*Federal Register*, 1986). In addition, under the City of SeaTac's *Sensitive Areas Ordinance* (1994), the City has been given the responsibility and authority to regulate environmentally sensitive areas, including wetlands and streams. The City of SeaTac uses the following definition of wetlands, which has been set forth by the Corps for administering the Section 404 permit program (*Federal Register*, 1980, 1982):

FIGURE

SITE LOCATION

SEA-TAC AIRPORT MP
WETLAND STUD



LEGEND:

- Wetland Study Area Bounda
- Lakes
- Streams

0 2000 4000
Scale in Feet
(approximate)

SHAPIRO

1/95

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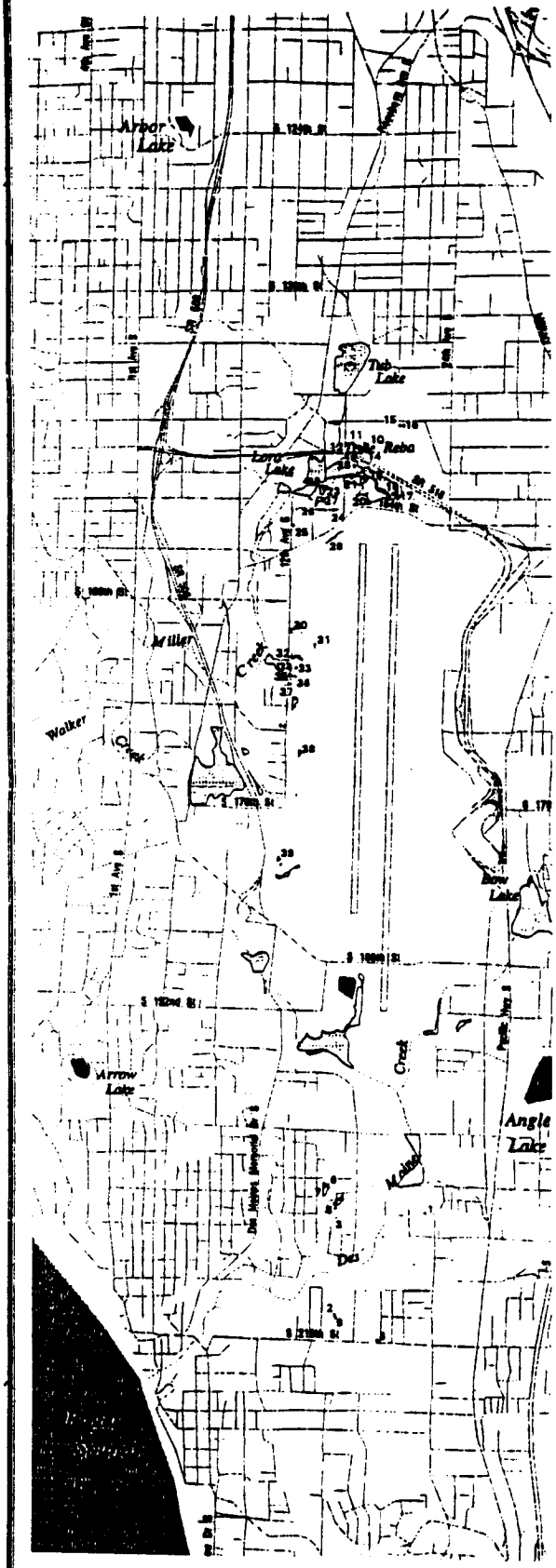

Seattle-Tacoma International Airport
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Figure 3

Sample Plot Locations

- Sample Plot Location
- Palustrine Wetland
- Lake
- Stream

Source: Gambrell Urban, Inc. and Shapiro & Associates, 1995
SASA Final EIS, 1994
King County Sensitive Areas Map Folio, 1990
City of SeaTac Wetland and Stream Classification, 1991
National Wetland Inventory, 1988
Port of Seattle Wetland Management Plan, 1992

Scale 1" = 2,500'

0 2500 5000

SCALE IN FEET

Projection: Lambert Conformal Conic
Coordinate System: State Plane NAD27

February 03, 1995

AR 040315

"Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions."

II. OBJECTIVE

Because federal and local regulations control filling of wetlands, the presence and extent of wetlands in the study area were determined to assess their implications for development plans. Two different delineation methods were used to achieve this objective because the Corps and City of SeaTac each require the use of a different delineation method. Please note that the extent to which the City of SeaTac's wetland regulatory provisions will regulate Master Plan Development activities is currently the subject of negotiation through the interlocal process between the Port and the City of SeaTac. This process should be completed prior to issuance of the Final Environmental Impact Statement. the Corps requires use of the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory, 1987), referred to as the 1987 Manual. The City of SeaTac requires use of the *Federal Manual for Identifying and Delineating Jurisdictional Wetlands* (Federal Interagency Committee for Wetland Delineation, 1989) referred to as the 1989 Manual. Where wetlands were found at the proposed project site, their boundaries were delineated and are detailed in this report.

III. METHODS

To determine the presence and extent of wetlands on the property, literature about the site was reviewed and an onsite investigation was conducted.

A. LITERATURE REVIEW

The following documents were consulted to gather preliminary information about the vegetative, soils, and hydrologic characteristics of the site before the onsite investigation:

- Butler & Associates and Sheldon & Associates, Revised January 22, 1992. *Sea-Tac Airport Wetland Management Plan.*
- CH2M Hill and Associated Firms. February 1995. *Port of Seattle Des Moines Creek Technology Campus, Final DEIS*
- King County, 1990. *King County Sensitive Areas Map Folio*. Department of Parks, Planning and Resources, Planning and Community Development Division, King County, Washington.
- Port of Seattle, 1991. *South Aviation Support Area (SASA) FEIS.*
- SeaTac, City of, 1991. *Wetlands and Streams Classifications in the City of SeaTac - Map Folio*.
- U.S. Department of Agriculture, Soil Conservation Service, 1952. Soil Survey of King County Washington.
- U.S. Department of Agriculture, Soil Conservation Service, 1991. *Hydric Soils of the United States*.

- U.S. Department of Agriculture, Soil Conservation Service, 1973. *Soil Survey of King County Area, Washington.*
- U.S. Fish and Wildlife Service, 1987. *National Wetlands Inventory, Des Moines, Washington, Quadrangle.*
- U.S. Geological Survey, Photorevised 1973. *7.5 Minute Topographic Series, Des Moines, Washington, Quadrangle.*

B. SITE-SPECIFIC INVESTIGATION

A Comprehensive Onsite Determination Method, as described in the 1987 Manual, and an Intermediate-level Onsite Determination Method, as described in the 1989 Manual, were used to determine wetland boundaries. Using these methods, vegetation, soils, and hydrology parameters were examined for wetland characteristics.

Representative sampling plots were established in the central portion of areas with homogeneous vegetation. A homogeneous area of vegetation is composed of one or more species of grass that make up a distinctive plant community. If an area of homogeneous vegetation extended over a range of topographic levels, a sample plot was located within each topographic level. At each sample plot, vegetation, soils, and hydrology data were collected and recorded on a data form (see Appendix).

After several plots were investigated, plant communities of similar composition and character were identified. Where these plant communities reoccurred, additional sample plots were not deemed necessary to accurately determine the presence and extent of wetland areas. Wherever new plant communities occurred or community composition varied, additional sample plots were established and the sampling procedure repeated.

1. Vegetation

Wetland plants are specifically adapted for life in saturated or anaerobic conditions. Such plants are described as hydrophytic. The Corps and the U.S. Fish and Wildlife Service have determined the frequency of various plant species' occurrence in wetlands and have assigned an "indicator status" to each species. Accordingly, plants may be categorized as obligate (OBL), facultative wetland (FACW), facultative (FAC), facultative upland (FACU), or upland (UPL). A plus (+) or minus (-) sign after the FACU, FAC, and FACW categories specifies a higher or lower frequency of occurrence in wetlands. Within the range of each category, a plus indicates more frequent occurrence in wetlands; a minus indicates less frequent occurrence in wetlands. Species with an indicator status of OBL, FACW, or FAC are considered adapted for life in saturated or anaerobic soil conditions. Definitions for each indicator status are listed in Table 1.

At each sample plot, vegetation was described by estimating the cover of each plant species occurring within the herb, shrub, and tree layers. Trees and shrubs within a 30-foot radius and herbs within a 5-foot radius of the center of the plot were identified and recorded on the data form. All species within the plot were recorded in descending order of abundance, and dominant species were determined. Dominant species are those that, when cumulatively totaled in descending order of abundance, immediately exceed 50% of the areal cover for each vegetative layer. Species considered to be dominant also include those individually representing 20% or more of the total areal cover for each vegetative layer. The indicator statuses of dominant species within each vegetation layer were used to determine the presence of wetland vegetation.

A sample plot was considered to have wetland vegetation if more than 50% of the dominant species had an indicator status of FAC, FACW, or OBL. In addition, if 25 to 50% of the

dominant species were OBL, FACW, and/or FAC, and hydric soils and wetland hydrology were present, the area was considered a "problem area wetland," and the vegetation was identified as hydrophytic.

Table 1: CATEGORIES OF INDICATOR STATUS FOR VEGETATION SPECIES

Indicator Symbol	Definition
OBL	Obligate. Species that almost always occur (estimated probability >99%) in wetlands under natural conditions.
FACW	Facultative wetland. Species that usually occur in wetlands (estimated frequency 67 to 99%), but occasionally are found in nonwetlands.
FAC	Facultative. Species that are equally likely to occur in wetlands or nonwetlands (estimated probability 34 to 66%).
FACU	Facultative upland. Species that usually occur in nonwetlands (estimated probability 67 to 99%), but occasionally are found in wetlands.
UPL	Upland. Species that occur almost always in nonwetlands under normal conditions (estimated probability >99%).
NI	No indicator. Species for which insufficient information was available to determine an indicator status.

Sources: Federal Interagency Committee for Wetland Delineation, 1989; Reed, 1988

2. Soils

One characteristic of wetlands is hydric soils. Hydric soils are defined as soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part of the soil profile (U.S. Soil Conservation Service, 1991). The growing season in the Puget Sound lowlands is generally recognized as the period between March 1 and October 31 when soil temperatures are usually above biological zero (5 degrees Celsius). The Soil Conservation Service (SCS), in cooperation with the National Technical Committee for Hydric Soils, has compiled a list of hydric soils in the United States. The list identifies soil series mapped by the SCS that meet hydric soil criteria. A map unit of upland (nonwetland) soil may have inclusions of hydric soil, and vice versa. These inclusions may not be delineated on the SCS maps; therefore, field examination of soil conditions is important to determine if inclusions of hydric soil exist.

Because of wet, anaerobic conditions, hydric soils exhibit certain characteristics that can be observed in the field. Such characteristics or indicators include the following: high organic content, accumulation of sulfidic material, greenish or bluish gray color (gley formation), spots or blotches of orange color (mottling), and/or dark soil colors (low soil chroma). Hydric soil indicators are summarized in Table 2.

Table 2: HYDRIC SOIL INDICATORS

Hydric Indicator	Diagnostic Criteria
Organic content	>50% by volume.
Sulfidic material	"Rotten egg" odor.
Soil color	Mottling; dark soil matrix color; gleyed colors.
Water saturation	In poorly drained soils or very poorly drained soils with low permeability, groundwater table is less than 1.5 feet from the surface for a significant period (usually a week or more) during the growing season.

Sources: Federal Interagency Committee for Wetland Delineation, 1989; U.S. Soil Survey Staff, 1975

Soil samples were obtained at each representative sampling plot either by digging a soil pit or by using a soil auger to excavate down to a depth of at least 18 inches. Soil samples were then examined for hydric indicators. Organic content was estimated visually and texturally; sulfidic material was determined by the presence of sulfide gases ("rotten egg" odor); and soil colors were determined by using a Munsell soil color chart (Munsell Color, 1988). Munsell soil color charts standardize soil color by using three color components: hue, value, and chroma. Soil colors are assigned both common names (e.g., dark grayish brown) and standardized Munsell color notations for hue, value, and chroma (e.g., 10YR 4/2). Additionally, if soils were observed to be saturated within 18 inches of the surface during the growing season, and if saturation had likely been present for several weeks or months during the growing season, soils were identified as hydric based on an assumed aquic soil moisture regime.

Hydric soils were assumed to be present in any sampling plot where evidence of wetland hydrology was present, and the vegetation community consists of either all dominant species with an indicator status of obligate, or all dominant species with an indicator status of facultative wetland or obligate and an abrupt wetland boundary. In those areas, soil data often were not collected.

3. Hydrology

Water must be present for wetlands to exist; however, it need not be present throughout the entire year. Wetland hydrology is considered to be present when there is permanent or periodic inundation or soil saturation for a significant period (usually a week or more) during the growing season (Federal Interagency Committee for Wetland Delineation, 1989).

Indicators of wetland hydrology were examined at each sampling plot. Such indicators include areas of ponding or soil saturation, drainage patterns, and evidence of previous inundation or saturation, such as dry algae on bare soil or soil mottling along live root channels. Where positive indicators of wetland hydrology were observed, wetland hydrology was assumed to occur for a significant period of the growing season. Table 3 summarizes some of the hydrologic regimes that can be encountered and their wetland characteristics.

Table 3: HYDROLOGIC REGIMES AND WETLAND CHARACTERISTICS

Degree of Inundation or Saturation	Duration of Inundation or Saturation*	Wetland Characteristics
Permanently inundated**	100%	present
Semipermanently to nearly permanently inundated or saturated***	>75% - <100%	present
Regularly inundated or saturated	>25% - <75%	usually present
Seasonally inundated or saturated	>12.5% - <25%	often present
Irregularly inundated or saturated	>5% - <12.5%	often absent
Intermittently or never inundated or saturated	<5%	absent

*percent of growing season
**inundation > 6.6 ft. mean water depth
***inundation < or = 6.6 ft. mean water depth

Sources: Environmental Laboratory, 1987. Clark and Benforado, 1981

4. Wetland Determination

Vegetation, soil, and hydrology data for each sampling plot were examined to determine the presence or absence of wetlands. If all three parameters exhibited wetland characteristics, or normally would have exhibited wetland characteristics for a significant period (usually one week or more) during the growing season, then a positive wetland determination was made for that area of homogeneous vegetation cover represented by the sampling plot. If any one of the parameters did not exhibit positive wetland indicators, the area was determined to be upland (nonwetland), unless problem or disturbed areas were encountered.

In disturbed areas, field indicators of one or more of the three wetland parameters are obliterated or absent because of some recent change. Disturbed areas include both wetlands and nonwetlands that have been modified to varying degrees by human activity (e.g., clearing of original vegetation, filling, or excavation) or natural events (e.g., avalanches, mudslides, fire, volcanic deposition, and beaver dams). In determining if a disturbed area is a wetland, both onsite observations and offsite research can be used. Historical records, aerial photographs, and preexisting soil surveys and wetland or vegetation inventories can reveal previous undisturbed conditions. Recent onsite observations may reveal remnants of wetland parameters (vegetation, soils, and the presence or absence of hydrologic indicators) that were later lost to disturbance. In addition, undisturbed areas adjacent or nearby may be used as reference sites to determine the former undisturbed conditions of the project site.

In problem areas, it is difficult to determine if an area is a wetland because field wetland indicators may be absent at certain times of the year. The difficulty in identification is generally related to normal environmental conditions and is not the result of human activities or catastrophic natural events, as is the case with disturbed areas. Examples of problem areas include wetlands on glacial till, highly variable seasonal wetlands, and wetlands where only 25 to 50% of the dominant plants are OBL, FACW, and/or FAC, but the area contains hydric soils and hydrologic indicators. Artificial wetlands are included in this category because their identification presents problems similar to natural problem area wetlands (Federal Interagency Committee for Wetland Delineation, 1989).

IV. RESULTS

Shapiro and Associates, Inc. (SHAPIRO) conducted a detailed wetland investigation of the Sea-Tac International Airport Master Plan Update site during the months of August through December 1994. The site is located in SeaTac and the northern portion of Des Moines, in King County, Washington. Using the criteria described in both the 1987 and 1989 Manuals, thirty-nine sample plots were established at various locations throughout those portions of the site owned by the Port of Seattle (Port) to determine characteristics that distinguish wetlands from uplands (Figure 3). The plots were established in areas with vegetative composition and character that are representative of both upland and wetland communities on the site. At each sample plot, vegetation, soils, and hydrology data were collected and recorded on data forms (see Attachments). The following sections summarize the data collected and discuss the wetland determination for the site.

A. WETLAND DELINEATION INVESTIGATION

1. Vegetation

Nineteen different vegetation communities were identified at the project site. Common and scientific names of plant species occurring in wetlands of the study area are presented in Table 4. Plant species occurring in upland areas are presented in Table 5. Scientific nomenclature follows Hitchcock and Cronquist (1976). Wetland vegetation communities found in the project area include: red alder-salmonberry swamp, willow swamp, mixed deciduous swamp, deciduous scrub-shrub swamp, willow shrub swamp, salmonberry swamp, reed canarygrass marsh, cattail marsh, and mixed grass-forb marsh. Upland vegetation communities found on the site include: mixed deciduous-coniferous forest, mixed deciduous forest, red alder-blackberry forest, red alder-salmonberry forest, coniferous forest; blackberry shrubland, scot's broom shrubland, Douglad spirea shrubland; mowed field; pasture; and grasslands. A number of ornamental and fruit tree species also were identified on the site and are noted in the following community descriptions.

Table 4: LIST OF OBSERVED PLANT SPECIES IN WETLAND AREAS AT THE SEA-TAC AIRPORT MPU SITE IN SEATAC, WASHINGTON

Scientific Name	Common Name	Wetland Indicator Status*
Herbs:		
Agropyron repens	quackgrass	FAC-
Agrostis alba	redtop bentgrass	FAC*
Agrostis stolonifera	spreading bentgrass	FAC*
Agrostis tenuis	colonial bentgrass	FAC
Alopecurus geniculatus	water foxtail	OBL
Alopecurus sp.	foxtail	OBL-FACW
Anthoxanthum odoratum	sweet vernalgrass	FACU
Athyrium filix-femina	lady-fern	FAC
Bidens cernua	nodding beggar-tick	FACW+
Brassica nigra	black mustard	FAC**
Bromus sp.	brome	UPL
Carex obnupta	slough sedge	OBLCAPA
Carex sp.	sedge	OBL-FAC
Cirsium arvense	Canadian thistle	FACU+
Cirsium vulgare	bull thistle	FACU

Table 4: LIST OF OBSERVED PLANT SPECIES IN WETLAND AREAS AT THE SEA-TAC AIRPORT MPU SITE IN SEATAC. WASHINGTON (CONT'D)

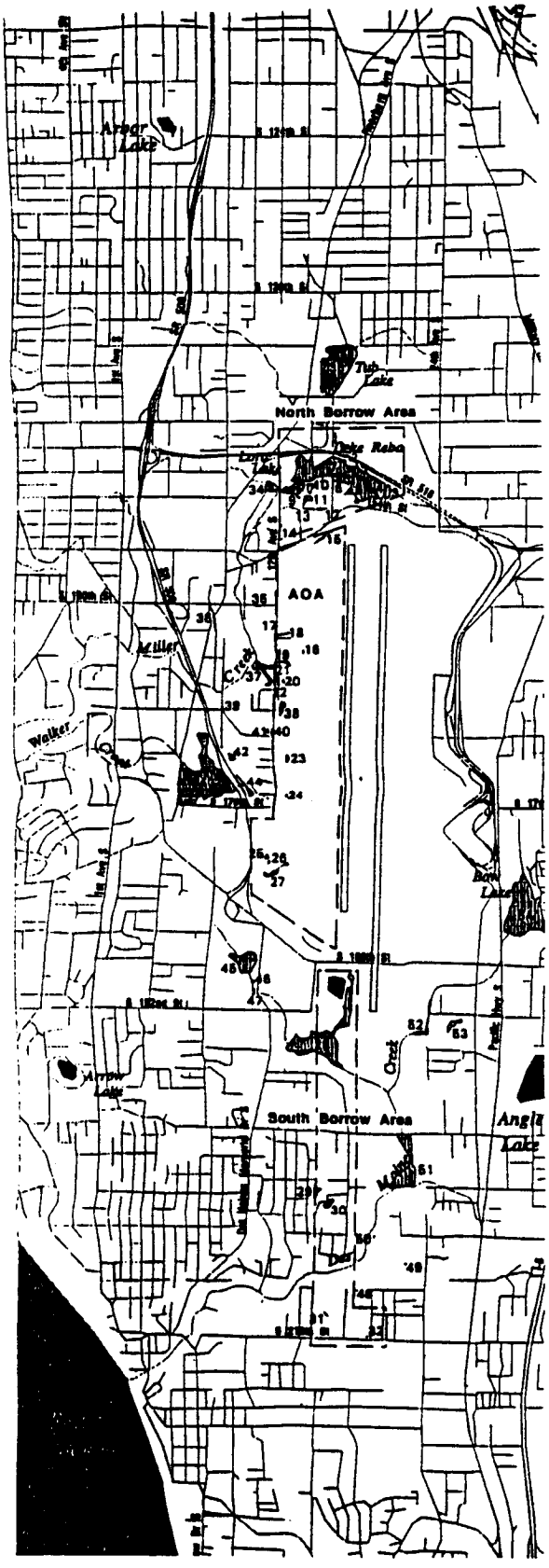
Scientific Name	Common Name	Wetland Indicator Status*
Conuoluulus arvensis	small bindweed	FAC
Dactylis glomerata	orchard-grass	FACU
Eleocharis ovata	ovate spike-rush	OBL
Eleocharis sp.	spike-rush	OBL
Epilobium watsonii	Watson's willow-herb	FACW
Equisetum arvense	field horsetail	FAC
Equisetum telmateia	giant horsetail	FACW
Festuca arundinacea	tall fescue	FAC-
Geum macrophyllum	large-leaf avens	FACW-
Glyceria elata	tall mannagrass	FACW+
Glyceria grandis	American mannagrass	OBL
Gnaphalium uliginosum	marsh cudweed	FACW**
Holcus lanatus	common velvet-grass	FAC
Impatiens noli-tangere	touch-me-not	FACW
Juncus bufonius	toad rush	FACW
Juncus effusus	soft rush	FACW
Juncus ensifolius	dagger-leaf rush	FACW
Juncus tenuis	slender rush	FACW-
Juncus sp	rush	OBL-FACW
Lathyrus sp.	peavine	FACU**
Lemna minor	common duckweed	OBL
Lolium multiflorum	Italian ryegrass	FACU**
Lolium perenne	perennial ryegrass	FACU
Lysichitum americanum	skunk cabbage	OBL
Lythrum salicaria	purple loosestrife	FACW+
Phalaris arundinacea	reed canarygrass	FACW
Phragmites australis	common reed	FACW+
Plantago lanceolata	English plantain	FAC
Plantago major	common plantain	FACU+
Polygonum sachalinense	giant knotweed	FACU*
Polystichum munitum	swordfern	FACU
Potentilla anserina	silverweed	OBL
Potentilla sp.	cinquefoil	OBL-FACU
Ranunculus repens	creeping buttercup	FACW
Rorippa nasturtium-aquaticum	watercress	OBL
Rosa pisocarpa	clustered wild rose	FAC
Rumex acetosella	sheep sorrel	FACU+
Rumex crispus	curly dock	FAC+
Scirpus americanus	American bulrush	OBL
Scirpus microcarpus	small-fruited bulrush	OBL
Solanum dulcamara	bittersweet nightshade	FAC+
Stachys cooleyae	Cooley's hedge-nettle	FACW**
Taraxacum officinale	common dandelion	FACU
Tiarella trifoliata	three-leaf foam flower	FAC-
Tolmiea menziesii	pig-a-back (youth-on-age)	FAC*
Trifolium pratense	red clover	FACU
Trifolium repens	white clover	FAC*

Table 4: LIST OF OBSERVED PLANT SPECIES IN WETLAND AREAS AT THE SEA-TAC AIRPORT MPU SITE IN SEATAC. WASHINGTON (CONT'D)

Scientific Name	Common Name	Wetland Indicator Status*
Typha angustifolia	narrow-leaved cattail	OBL
Typha latifolia	common cattail	OBL
Urtica dioica	stinging nettle	FAC+
Veronica americana	American speedwell	OBL
Shrubs:		
Acer circinatum	vine maple	FAC-
Cornus stolonifera	red-osier dogwood	FACW
Corylus cornuta	hazelnut	FACU
Cytisus scoparius	Scot's broom	UPL**
Ilex sp.	holly	FACU**
Oemleria cerasiformis	Indian plum	FACU
Rosa nutkana	Nootka rose	FAC
Rosa sp.	native rose	FACU-UPL
Rubus discolor	Himalayan blackberry	FACU
Rubus laciniatus	evergreen blackberry	FACU+
Rubus spectabilis	salmonberry	FAC+
Salix lasiandra	Pacific willow	FACW+
Salix scouleriana	Scouler willow	FAC
Salix sitchensis	Sitka willow	FACW
Sambucus racemosa	red elderberry	FACU
Spiraea douglasii	spirea	FACW
Trees and Saplings:		
Acer macrophyllum	big-leaf maple	FACU
Alnus rubra	red alder	FAC
Betula papyrifera	paper birch	FAC*
Fraxinus latifolia	Oregon ash	FACW
Picea sitchensis	Sitka spruce	FAC
Pinus contorta	lodgepole pine	FAC
Populus trichocarpa	black cottonwood	FAC
Prunus americana	American plum	FACU
Prunus sp.	cherry	FAC-FACU
Rhamnus purshiana	cascara	FAC-
Salix babylonica	weeping willow	FAC+
Salix lasiandra	Pacific willow	FACW+
Salix scouleriana	Scouler willow	FAC
Salix sitchensis	Sitka willow	FACW
Sambucus racemosa	red elderberry	FACU
Thuja plicata	western red cedar	FAC
Tsuga heterophylla	western hemlock	FACU-

* As defined in Table 1.

** Species that do not appear on the National List (Reed. 1988) were assigned an indicator status based on field observations and habitat information from the literature.



Seattle-Tacoma International Airport
Environmental Impact Statement
for the Master Plan Update

Figure 2

Wetland Locations

Palustrine Wetland

Lake

Stream

Delineated Areas

Source: Gambrell Urban, Inc. and Shapiro & Associates, 1994
BASA Final EIS, 1994
King County Sensitive Areas Map Folio, 1990
City of SeaTac Wetland and Stream Classification, 1991
National Wetland Inventory, 1988
Port of Seattle Wetland Management Plan, 1992

Scale 1" = 2,500'

SCALE IN FEET

Projection: Lambert Conformal Conic
Coordinate System: State Plane NAD27

January 10, 1994

AR 040324

Table 5: LIST OF OBSERVED PLANT SPECIES IN UPLAND AREAS AT THE SEA-TAC AIRPORT MPU SITE IN SEATAC, WASHINGTON

Scientific Name	Common Name	Wetland Indicator Status*
Herbs:		
Agropyron repens	quackgrass	FAC-
Agrostis alba	redtop bentgrass	FAC*
Agrostis stolonifera	spreading bentgrass	FAC*
Agrostis tenuis	colonial bentgrass	FAC
Anthoxanthum odoratum	sweet vernalgrass	FACU
Athyrium filix-femina	lady-fern	FAC
Berberis nervosa	dull Oregon grape	UPL**
Bidens cernua	nodding beggar-tick	FACW+
Brassica nigra	black mustard	FAC**
Bromus sp.	brome	UPL
Cirsium arvense	Canadian thistle	FACU+
Cirsium vulgare	bull thistle	FACU
Conuoluulus arvensis	small bindweed	FAC
Dactylis glomerata	orchard-grass	FACU
Epilobium angustifolium	fireweed	FACU+
Epilobium watsonii	Watson's willow-herb	FACW
Equisetum arvense	field horsetail	FAC
Equisetum telmateia	giant horsetail	FACW
Festuca arundinacea	tall fescue	FAC-
Galium sp.	bedstraw	FACW-UPL
Geranium robertianum	Robert geranium	FACU**
Hedera helix	English ivy	FACU**
Hieracium sp.	hawkweed	FACU**
Holcus lanatus	common velvet-grass	FAC
Hypochaeris radicata	spotted cats-ear	FACU*
Juncus effusus	soft rush	FACW
Lathyrus sp.	peavine	FACU**
Lolium multiflorum	Italian ryegrass	FACU**
Lolium perenne	perennial ryegrass	FACU
Lupinus sp.	lupine	**
Maianthemum dilatatum	false lily-of-the-valley	FAC
Matricaria matricarioides	pineapple-weed	FACU
Phalaris arundinacea	reed canarygrass	FACW
Phleum pratense	timothy	FAC-
Plantago lanceolata	English plantain	FAC
Plantago major	common plantain	FACU+
Poa pratensis	Kentucky bluegrass	FAC
Polystichum munitum	swordfern	FACU
Potentilla anserina	silverweed	OBL
Potentilla sp.	cinquefoil	OBL-FACU
Pteridium aquilinum	bracken fern	FACU
Ranunculus repens	creeping buttercup	FACW
Rumex crispus	curly dock	FAC+
Solanum dulcamara	bittersweet nightshade	FAC+
Stachys cooleyae	Cooley's hedge-nettle	FACW**
Tanacetum vulgare	common tansy	NI

Table 5: LIST OF OBSERVED PLANT SPECIES IN UPLAND AREAS AT THE SEA-TAC AIRPORT MPU SITE IN SEATAC, WASHINGTON (CONT'D)

Scientific Name	Common Name	Wetland Indicator Status*
Taraxacum officinale	common dandelion	FACU
Tolmiea menziesii	pig-a-back (youth-on-age)	FAC*
Trifolium pratense	red clover	FACU
Trifolium repens	white clover	FAC*
Urtica dioica	stinging nettle	FAC+
Vaccinium sp.	huckleberry	OBL-UPL
Verbascum thapsus	common mullein	**
Vicia sp.	vetch	FACU-UPL
Shrubs:		
Acer circinatum	vine maple	FAC-
Alnus rubra	red alder	FAC
Cornus stolonifera	red-osier dogwood	FACW
Cotula coronopifolia	brass buttons	FACW+
Cytisus scoparius	Scot's broom	UPL**
Gaultheria shallon	salal	FACU*
Glecoma hederacea	ground ivy	FAC**
Ilex sp.	holly	FACU**
Oemleria cerasiformis	Indian plum	FACU
Oplopanax horridum	devil's club	FAC+
Polygonum sachalinense	giant knotweed	FACU*
Rosa nutkana	Nootka rose	FAC
Rosa pisocarpa	clustered wild rose	FAC
Rosa sp.	native rose	FACU-UPL
Rubus discolor	Himalayan blackberry	FACU
Rubus laciniatus	evergreen blackberry	FACU+
Rubus spectabilis	salmonberry	FAC+
Rubus ursinus	Pacific blackberry	FACU
Salix scouleriana	Scouler willow	FAC
Salix sitchensis	Sitka willow	FACW
Sambucus racemosa	red elderberry	FACU
Spiraea douglasii	spirea	FACW
Symphoricarpos albus	common snowberry	FACU
Vaccinium parvifolium	red huckleberry	FACU**
Trees and Saplings:		
Acer macrophyllum	big-leaf maple	FACU
Alnus rubra	red alder	FAC
Arbutus menziesii	Pacific madroña	**
Betula papyrifera	paper birch	FAC*
Crataegus douglasii	black hawthorn	FAC
Crataegus monogyna	one-pistil hawthorn	FACU+*
Malus fusca	Pacific crabapple	FACW
Populus trichocarpa	black cottonwood	FAC
Populus tremuloides	quaking aspen	FAC+
Pseudotsuga menziesii	Douglas fir	FACU*
Pyrus sp.	apple	**

Table 5: LIST OF OBSERVED PLANT SPECIES IN UPLAND AREAS AT THE SEA-TAC AIRPORT MPU SITE IN SEATAC, WASHINGTON (CONT'D)

Scientific Name	Common Name	Wetland Indicator Status*
Rhamnus purshiana	cascara	FAC-
Rosa sp.	native rose	FACU-UPL
Salix babylonica	weeping willow	FAC+
Salix scouleriana	Scouler willow	FAC
Salix sitchensis	Sitka willow	FACW
Sambucus cerulea	blue elderberry	FACU
Sambucus racemosa	red elderberry	FACU
Thuja plicata	western red cedar	FAC
Tsuga heterophylla	western hemlock	FACU-

* As defined in Table 1.

** Species that do not appear on the National List (Reed. 1988) were assigned an indicator status based on field observations and habitat information from the literature.

Forested Swamp

Red alder- and salmonberry-dominated swamps occur throughout the site. They are most prevalent in the south borrow area. Big-leaf maple, western red cedar, Sitka willow, and black cottonwood occur as associated species in the overstory. Associated understory plants include Indian plum, blackberry species, and English ivy. The most common herbaceous species observed include horsetail, lady-fern, and reed canarygrass. Other herbaceous plants found in forested swamps on the site include stinging nettle, tall mannagrass, creeping buttercup, bittersweet nightshade, and Watson's willow-herb.

The greatest concentration of willow-dominated swamp is in the Lake Reba wetland complex. Sitka and Pacific willow dominate this vegetation community. Red alder, black cottonwood, and Scouler's willow are associated canopy species. The understory is dominated by willow shrubs. Herbaceous species that grow under the relatively thick canopy include tall mannagrass, small-fruited bulrush, common and giant horsetail, lady-fern, creeping buttercup, watercress, American speedwell, and soft rush.

Mixed deciduous swamp occurs throughout the study area. The overstory consists of a mixture of hydrophytic trees such as red alder, black cottonwood, Pacific willow, Sitka willow, and western red cedar. The undergrowth varies considerably with the hydroperiod, amount of sunlight received, and soils. Some of the most commonly observed shrubs include Himalayan blackberry, willow, salmonberry, red elderberry, and Douglas spirea. Herbaceous species found growing below the canopy include creeping buttercup, bentgrass, soft rush, lady-fern, swordfern, reed canarygrass, and common horsetail.

Scrub-Shrub Swamp

Scrub-shrub swamp vegetation occurs in the southern and western portions of the AOA in areas that have previously been cleared and presently are revegetating with tree saplings. The dominant vegetation species are red alder, black cottonwood, and willow. Common herbaceous plants include velvet-grass, soft rush, bentgrass, and Watson's willow-herb.

Willow-dominated scrub-shrub swamp is located predominantly in the north borrow area where soils are saturated to the surface for most of the year. Pacific willow and Sitka willow share dominance of these areas. Common understory herbaceous species are the same as those described for the willow forest community.

Salmonberry-dominated swamp occurs in the north borrow area upslope of the willow-dominated depressions. Herbaceous species that occur in this community are similar to those in the red alder and salmonberry swamp community.

Emergent Marsh

Monotypic stands of reed canarygrass are located throughout the site. These areas are often bordered by stands of Himalayan blackberry or forested swamp. Species found in association with the reed canarygrass stands include Canadian thistle, black mustard, bentgrass, cattail, and stinging nettle.

There are two large stands of cattail on the site. One of these is located between Lake Reba and Lora Lake. The other stand is north of Tyee Golf Course at the south end of the runways. The stand in the north borrow area is bordered on one side by a service road and on the remaining sides by reed canarygrass. Miller Creek provides water to this community year-round. Associated species include reed canarygrass, soft rush, and bittersweet nightshade. The community of cattail in the southern portion of the site has common reedgrass, soft rush, Watson's willow-herb, and reed canarygrass as associated species.

Mixed grass and forb emergent marsh occurs on the air field in the AOA, in several depressions with compact soils, and in association with several hillside seeps. These areas are characterized by a mixture of hydrophytic forbs such as soft rush, toad rush, cudweed, Watson's willow-herb, common and giant horsetail, common cattail, and an array of hydrophytic grasses such as common velvet-grass, bentgrass, reed canarygrass, and foxtail.

Upland Forest

Mixed deciduous and coniferous forest covers the western portion of the AOA and occurs in both the north and south borrow areas. Red alder, big-leaf maple, western red cedar, Douglas fir, black cottonwood and introduced species such as ornamental maple, apple, and weeping willow occur in this community. Common understory shrubs include Indian plum, English ivy, and blackberry. Creeping buttercup, swordfern, bracken fern, and three-leaf foam flower grow on the forest floor.

Mixed deciduous forest occurs throughout the study area. The overstory consists of a mixture of deciduous tree species such as red alder, black cottonwood, big-leaf maple, hazelnut, and paper birch. The most commonly observed shrubs include Himalayan blackberry, Pacific blackberry, Indian plum, red elderberry, and salmonberry. Common forbs include creeping buttercup, swordfern, English ivy, and stinging nettle.

Upland forest dominated by red alder and Himalayan blackberry is found in the north borrow area. Associated species include black cottonwood, salmonberry, Pacific blackberry, and grasses.

Upland forest dominated by red alder and salmonberry is most prevalent in the south borrow area. Associated canopy species include big-leaf maple and black cottonwood. Species occasionally found in association with salmonberry include Himalayan blackberry, Pacific blackberry, and red elderberry. Herbaceous species include bentgrass, velvet-grass, creeping buttercup, and bluegrass.

Douglas-fir dominated forest occurs in the northwest quarter of the south borrow area. Associated canopy species include big-leaf maple and western hemlock. The shrub layer is dominated by salal. Associated species include salmonberry, English ivy, Himalayan blackberry, bracken fern, Pacific blackberry, and Indian plum.

Shrubland

Himalayan blackberry thickets occur throughout the site. Himalayan blackberry occurs in both upland and wetland areas and is one of the most common vegetation species seen at the site. Species associated with Himalayan blackberry thickets include Scot's broom, reed canarygrass, Pacific blackberry, evergreen blackberry, Douglas spirea, bentgrass, salmonberry, horsetail, and grasses.

Stands of Scot's broom grow in disturbed areas throughout the site. Relatively large stands occur along the edge of the air field, in areas where houses have been removed, and along service roads throughout the site. Associated species include sweet vernalgrass; quackgrass; ryegrass; bromes; and Himalayan, evergreen, and Pacific blackberry.

Monotypic stands of Douglas spirea are located in several areas in the north borrow site. These stands are relatively small and are located in upland areas. Spirea grows throughout the site as an associated species in both hydrophytic and non-hydrophytic vegetation communities. Cement drain tiles or culverts appear to have effectively drained soils associated with the largest stand of spirea on the site. Soils in this area were black (10YR 2/1) loam over olive brown (2.5Y 4/3) sandy loam with mottles. During December, soils were unsaturated to a depth of 24 inches. The tiles were found at 20 inches below the soil surface.

Grassland

Except for runways, roads, and a few patches of forest and shrubland, the air field is entirely covered by frequently mowed grassland. The most common species in this area are sweet vernalgrass, bentgrass, ryegrass, quackgrass, and red and white clover. Mowed Scot's broom, red alder, and black cottonwood seedlings can be found in some areas. Several small grassland areas also are located in the north and south borrow areas.

Pasture

Pasture is located in the south borrow area. This pasture is associated with what appears to be an abandoned horse arena. Quackgrass is the dominant species. Bluegrass, timothy, tall fescue, dandelion, Canadian thistle, and ryegrass are a few of the associated species.

Ornamental/Fruit

Ornamental plants and fruit trees can be found throughout the site. Many of these may have been planted as landscaping for residences that have since been removed. Other non-native species have escaped cultivation and grow at this site. Ornamentals and fruit trees found on the site include apple, ornamental maple, English ivy, holly, laurel, juniper, yucca, black locust, monkey-puzzle tree, weeping willow, and various species of rose, pine, and spruce.

Using the criteria of both the 1987 and 1989 Manuals, 35 of 39 sample plots contained a prevalence of hydrophytic vegetation. A summary of vegetation observed in the study area is presented in Table 6.

Table 6: SUMMARY OF VEGETATION DATA AT THE SEA-TAC AIRPORT MPU SITE IN SEATAC, WASHINGTON

Plot #	Vegetation Determination	% of dominant species that are FAC, FACW, or OBL
1	Hydrophytic	100
2	Hydrophytic	100
3	Hydrophytic	100
4	Hydrophytic	100
5	Hydrophytic	83
6	Hydrophytic	50
7	Hydrophytic	100
8	Hydrophytic	75
9	Non-hydrophytic	0
10	Hydrophytic	80
11	Hydrophytic	80
12	Hydrophytic	40
13	Hydrophytic	100
14	Hydrophytic	50
15	Non-hydrophytic	0
16	Hydrophytic	100
17	Hydrophytic	83
18	Hydrophytic	100
19	Hydrophytic	86
20	Hydrophytic	100
21	Hydrophytic	100
22	Hydrophytic	78
23	Non-hydrophytic	25
24	Hydrophytic	100
25	Hydrophytic	100
26	Hydrophytic	100
27	Hydrophytic	75
28	Hydrophytic	67
29	Hydrophytic	50
30	Hydrophytic	100
31	Hydrophytic	50
32	Non-hydrophytic	40
33	Hydrophytic	80
34	Hydrophytic	67
35	Hydrophytic	67
36	Hydrophytic	67
37	Hydrophytic	100
38	Hydrophytic	100
39	Hydrophytic	80

2. Soils

The *Soil Survey of King County Area* (SCS, 1973) only identifies soil series in the southernmost borrow source areas. SCS typically does not map soils in urban areas. The SCS identified six different soil series, or types, in the south borrow source area: Alderwood gravely sandy loam; Arents, Alderwood material; Bellingham silt loam; Everett gravely sandy loam; Indianola loamy fine sand; and Norma sandy loam. Only the Bellingham and Norma series soils are identified as hydric (SCS, 1987), however, inclusions of hydric soils within the other soil series is acknowledged. An earlier soil survey of the project area (SCS, 1952) identifies the region as containing predominantly Alderwood series soils.

SHAPIRO distinguished six basic soil types in the project area. Four of the six soil types were determined to be hydric because of the presence of redoximorphic features such as mottles, gleyed color formation, or low chromas and saturated (aquic) soil conditions. Soils where these features were absent were considered to be non-hydric.

The most common soil observed in the project area is generally a brown (10YR 3/3) loam over light brown (10YR 4/3) sandy loam. These soils often are gravely and appear to be fill material; they most closely match the SCS description of Arents, Alderwood material. Because of a lack of redoximorphic features, these soils were not considered to be hydric. This soil was observed in sample plots 5, 6, 9, 10, 12, 14, 15, 16, and 34 (see attachments).

Very dark brown and black (10YR 3/2 and 10YR 2/1) loams and sandy loams overlying grayish brown (2.5Y 5/2) sandy loams and gravely sandy loams are the most common hydric soils observed in the project area. These soils typically have medium and coarse, strong brown (7.5YR 4/6), distinct and prominent mottles in the subsurface horizons. Soils matching this general description were observed in Sample plots 2, 7, 8, 13, 24, 27, 28, 31, 36, 37, and 38 (see attachments).

Very dark grayish brown (10YR 3/2) to black (10YR 2/0) loam soils found throughout the northern portions of the project area were determined to be hydric where aquic soil moisture regimes and low-matrix chromas were encountered. Where these soils were observed to be dry and contained higher matrix chromas, they were not considered hydric. Sample plots 3, 7, 8, 21, and 28 contained this type of soil (see attachments).

Saturated, dark greenish gray (5G 4/1) sands were observed in the northern borrow source areas. Because these soils exhibit low-matrix chromas and an aquic moisture regime they are considered hydric. This soil was observed in Sample plots 17, 18, and 30 (see attachments).

Dark brown (10YR 2/2) loams overlying grayish brown and dark grayish brown (10YR 5/1 and 2.5Y 5/2) silt loams, often with prominent mottles, are found throughout the AOA portions of the site. These soils are considered hydric because they exhibit low-matrix chromas and mottles. Sample plots 11, 25, 29, and 35 contain soils matching this general description (see attachments).

Two different organic soils were observed in the project area. The first generally has 6 to 8 inches of black (10YR 2/1) loam over highly decomposed muck. This soil was seen in Sample plots 19 and 21. The second is generally a muck or mucky peat soil overlying gleyed mineral soils. A portion of the north borrow source area (Sample plot 20) exhibited interbeded peat and mineral soil horizons. Sample plots 4, 20, and 26 exhibited organic soils overlying mineral soil horizons. Soils with high organic contents are considered to be hydric.

According to criteria expressed in both the 1987 and 1989 Manuals, 25 of 39 plots contained hydric soils. A summary of the soils data is presented in Table 7.

Table 7: SUMMARY OF SOILS DATA AT THE SEA-TAC AIRPORT MPU SITE IN SEATAC, WASHINGTON

Plot #	Soils Determination	Basis for Determination
1	Non-hydric	Lack of hydric indicators
2	Hydric	Low chroma, mottles
3	Non-hydric	Low chroma, mottles
4	Hydric	Organics, low chroma, gleyed
5	Non-hydric	Lack of hydric characteristics
6	Non-hydric	Lack of hydric characteristics
7	Hydric	Low chroma
8	Hydric	Active rhizospheres
9	Non-hydric	Lack of hydric characteristics
10	Hydric	Lack of hydric characteristics
11	Hydric	Low chroma, mottles
12	Non-hydric	Lack of hydric characteristics
13	Hydric	Low chroma, mottles
14	Non-hydric	Lack of hydric characteristics
15	Non-hydric	Lack of hydric characteristics
16	Non-hydric	Lack of hydric characteristics
17	Non-hydric	Lack of hydric characteristics
18	Hydric	Gley soil
19	Hydric	Low chroma, organics
20	Hydric	Low chroma, organics
21	Hydric	Low chroma
22	Hydric	Low chroma, organics
23	Non-hydric	Lack of hydric characteristics
24	Hydric	Low chroma, gleyed, mottled
25	Hydric	Low chroma, mottles
26	Hydric	Low chroma, mottles
27	Hydric	Low chroma, mottles, gleyed
28	Hydric	Low chroma
29	Hydric	Low chroma, mottles
30	Hydric	Low chroma, gleyed colors
31	Hydric	Low chroma, mottles
32	Non-hydric	Lack of hydric characteristics
33	Non-hydric	Lack of hydric characteristics
34	Non-hydric	Lack of hydric characteristics
35	Hydric	Gleyed, low chroma, mottles
36	Hydric	Low chroma, mottles
37	Hydric	Low chroma, mottles
38	Hydric	Low chroma, mottles
39	Hydric	Low chroma, aquic moisture regime

3. Hydrology

Hydrologic features on the site include lakes, streams, seeps, and numerous seasonally saturated to permanently flooded depressions. Field studies for this investigation took place over a five month period, during the summer and fall of 1994. Because of this, observed onsite hydrology changed dramatically during the investigation. Many areas that, during the early part of the

growing season, may have enough water to support hydrophytic vegetation, were dry to 30 inches below during late summer. In these areas, the presence of hydrology during the growing season was inferred from the presence of hydric soil and hydrophytic vegetation. During the December field visits, storm events were observed that flooded the site in several locations. Much of the Lake Reba complex was inundated with up to several feet of standing water on December 20, 1994.

Lakes

There are several lakes in the study area. The northernmost, Tub Lake, is located between S. 140th Street and S. 144th Street in the northernmost portion of the study area. It is surrounded by an extensive wetland system. Miller Creek originates as the outfall of this lake.

Lake Reba is located at the south side of the north borrow area. This lake is currently used as a stormwater retention facility (Wells, 1995). Lake Reba receives water via conveyance systems from SR 518 to the north and impervious surfaces that are part of the AOA to the east and south. Water also enters the area via discharge of shallow groundwater. Surface water discharges from Lake Reba into Miller Creek (discussed under streams) via a culvert. During storm events, water overflows a water-control structure at the lake's west end. Lake Reba is part of an extensive wetland system called the Lake Reba wetland complex.

Lora Lake is located west-southwest of Lake Reba and adjacent to the western boundary of the north borrow area. Single-family residences border the north and west sides of the lake. Farmland borders the lake's southern side. Lora Lake receives water from Miller Creek, which enters and exits the lake's southeast corner.

An industrial wastewater detention and treatment facility is located at the southern end of the AOA. This facility includes several wastewater detention ponds and a treatment plant. Two of the ponds are located north of S. 188th Street and southwest of the western runway. During periods of heavy runoff, wastewater overflow is conveyed to a pond south of S. 188th Street and west of the south end of the eastern runway. Water is pumped from this overflow pond back up to the treatment facility when capacity allows.

Three individual ponds, separated by rows of willow trees, comprise the Northwest Ponds. These ponds are located southwest of the southern end of the eastern runway (34R) between S. 192nd Street and S. 196th Street. The easternmost pond abuts the northwest side of the Tyee Golf Course. A stream enters the northeast corner of the eastern pond. This stream is fed by seeps and stormwater runoff. The outflow for these ponds, the western tributary to Des Moines Creek, is at the southeast corner of the eastern pond. Water flows through the golf course to the main stem of Des Moines Creek (Port of Seattle, 1991).

Streams

Seven streams were identified on the site. The largest are Miller Creek and Des Moines Creek. Miller Creek originates at Tub Lake at the north end of the site and flows south to the north side of SR 518. It passes beneath SR 518 in culverts and flows past the west end of Lake Reba. Lake Reba discharges its overflow via another culvert to Miller Creek. From here Miller Creek flows southwest to Lora Lake. Water flows from Lora Lake south through a residential area in the western portion of the site. The stream flows through culverts under roadways throughout its length and overflows its banks during storm events. Wetlands are associated with Miller Creek in areas with relatively flat to gently sloping topography such as in the north borrow area.

Des Moines Creek originates at Bow Lake and is conveyed in culverts for about 4,000 feet to a well-incised channel excavated between a series of parking lots. The creek then flows to the

northeast corner of the Tyee Golf Course where it is associated with a hillside seep wetland. After connecting with the outfall of the Northwest Ponds it flows south through the south borrow area in a narrow, deeply incised channel.

Several small streams originate in the vegetated western portion of the AOA and flow west to Miller Creek. They are located in ravines and are associated with wetlands. Waters from these streams combine along the east side of 12th Avenue S. in a roadside ditch and then enter a relatively large wetland system between S. 160th Street and S. 168th Street. At the time of the investigation, observed flow in the streams was no more than 3-inches wide and 2-inches deep.

Small streams or watercourses also are present throughout the Lake Reba wetland complex. These streams enter this area via channelized overland flow; combined seep discharges: and culverts that convey water from areas higher in elevation to the north, east, and south. These streams generally flow west and southwest toward Lora Lake. In the depressional areas they often follow braided channels.

Seeps

A number of seeps were identified throughout the site. Many of these areas appear to be hydrologically supported by infiltration and percolation that occurs on the air field.

Several hillsides that border the Lake Reba wetland complex, particularly those along the slopes north of S. 154th Street, had free-standing water at the surface during the time of the investigation and are sufficiently wet to support the formation of organic soils.

A hillside seep is located directly below the north end of the western existing runway (16R/34L) south of the perimeter road. This seep starts approximately 40 feet above the road on a 40 degree slope. Subsurface water likely flows along an impermeable soil layer until it is discharged at this location.

Another hillside seep in the central portion of the AOA discharges water at the top of a small knoll and likely is the result of hydrostatically pressurized groundwater. Soils in this mounded area were wetter at the time of the investigation than soils several yards away and lower in elevation.

The south borrow area has a relatively large seep area north of S. 208th and west of 16th Avenue S. Water is discharged along a 20-degree slope. During the time of the investigation standing water was at 10 inches below the ground surface and soils were saturated to the surface.

Depressions

Several depressional areas in the north borrow area, north of SR 518, collect and retain enough water to support wetland vegetation.

The area between SR 518 and S. 154th Street contains a number of depressions separated by service roads. The wetlands associated with these depressions are part of the Lake Reba wetland complex. Most of the lower depressions are semi-permanently flooded. The depressions that occur on higher ground are semi-permanently saturated. Much of the area was observed to be inundated by up to 1 foot of water during a storm event in December 1994. Stormwater was exceeding the capacity of the storm drainage facilities to convey water from the site and was flooding upland areas and roadways. This area is utilized as a stormwater detention area (Wells, 1995). The focal component of this area for stormwater detention is Lake Reba. The surrounding depressions, however, provide a significant amount of stormwater storage.

The air field has several shallow depressions with compact soils that likely pool water during the wet season. At the time of the investigation, surface water was not present in these shallow depressions.

Several depressions supporting hydrophytic vegetation occur in the south borrow area. Stormwater runoff hydrologically supports these depressional wetland areas.

Using the criteria described in both the 1987 and 1989 Manuals, 25 of the 39 plots contained wetland hydrology. A summary of hydrologic data is presented in Table 8.

4. Wetland Determination

The USFWS *National Wetlands Inventory* (U.S. Fish and Wildlife Service, 1987) identifies 15 wetlands on the site. The northernmost wetland identified on the site is Tub Lake. This wetland is classified as a palustrine forested, scrub-shrub, emergent, and open-water wetland. Four wetlands are identified by USFWS in the Lake Reba wetland complex. Lake Reba and Lora Lake are classified as open-water areas. Scrub-shrub wetland surrounds Lake Reba and several emergent wetlands are identified between Lake Reba and Lora Lake. A large wetland is identified in an area west of 12th Avenue S. and between S. 168th Street and S. 176th Street. This wetland is classified as a palustrine forested, scrub-shrub, emergent, and open-water wetland. Several open-water ponds identified south of the runways are industrial wastewater ponds. Open-water ponds adjacent to the west side of the Tyee Golf Course have a scrub-shrub vegetative component. Bow Lake, located east of the airport, has a large open-water section with surrounding scrub-shrub vegetation.

Butler & Associates and Sheldon & Associates (Revised January 22, 1992) identified 12 wetlands in the study area. These wetlands are described in the *Sea-Tac Airport Wetland Management Plan.* In conducting this study, Butler & Associates and Sheldon & Associates used photo-interpretation and ground-truthing to locate and describe these wetlands; they did not conduct delineations. Wetlands identified in the plan roughly correspond to Wetlands 3 through 11 in the Lake Reba wetland complex; Wetlands 37 and 43 west of the AOA; and Wetlands 29 and 30 in the south borrow area, which are described below.

CH2M Hill and Associated Firms (February 1995) identified three wetlands in the east-central portion of the south borrow area. Two of these were delineated for, and all three wetlands are described in, the *Port of Seattle Des Moines Creek Technology Campus, Final DEIS.* These wetlands are briefly described below as Wetlands 48, 49, and 50.

Parametrix, Inc. identified and delineated several wetlands on the Tyee Golf Course at the south end of the runways. These wetlands are described in detail in the *South Aviation Support Area (SASA)* FEIS (Port of Seattle, 1991). Descriptions of these wetlands are summarized below as Wetlands 52 and 53.

King County Sensitive Areas Map Folio (King County, 1990a) identifies one wetland in the study area. This wetland is described below as Wetland 43.

The City of SeaTac *Wetlands and Streams Classifications Map* (SeaTac, 1991) identifies eight wetlands in the study area. These wetlands largely correspond to open-water areas and large wetland systems on the site, including: Tub Lake, Lake Reba, Lora Lake, Tyee Ponds, and Bow Lake.

Table 8: SUMMARY OF HYDROLOGY DATA AT THE SEA-TAC AIRPORT MPU SITE IN SEATAC, WASHINGTON

Plot #	Hydrology Determination	Basis for Determination
1	Negative	Lack of hydrologic indicators
2	Positive	Saturation to surface, freestanding water at 10 inches below soil surface
3	Negative	Lack of hydrologic indicators
4	Positive	Saturation to surface
5	Negative	Lack of hydrologic indicators
6	Negative	Lack of hydrologic indicators
7	Positive	Saturation to surface
8	Positive	Saturation to surface
9	Negative	Lack of hydrologic indicators
10	Positive	Saturation at 14 inches
11	Positive	Saturation above 18 inches
12	Negative	Lack of hydrologic indicators
13	Positive	Saturation, redoximorphic features
14	Negative	Lack of hydrologic indicators
15	Negative	Lack of hydrologic indicators
16	Negative	Lack of hydrologic indicators
17	Negative	Aquic moisture regime
18	Positive	Saturation to surface
19	Positive	Saturation at 3 inches
20	Positive	Saturation to surface
21	Positive	Saturation to surface
22	Positive	Saturation to surface
23	Negative	Lack of hydrologic indicators
24	Positive	Saturation to surface
25	Positive	Saturation at 18 inches
26	Positive	Saturation at 14 inches
27	Positive	Saturation to surface
28	Positive	Saturation at surface, free-standing water at 8 inches below soil surface
29	Positive	Saturation, wetland drainage patterns, oxidized root zones
30	Positive	Saturation to surface, wetland drainage patterns, water-stained leaves
31	Positive	Oxidized root zones, wetland drainage patterns
32	Negative	Lack of hydrologic indicators
33	Negative	Lack of hydrologic indicators
34	Negative	Lack of hydrologic indicators
35	Positive	Saturation at 18 inches
36	Positive	Saturation at 12 inches
37	Positive	Wetland drainage patterns, obligate vegetation, hydric soils
38	Positive	Wetland drainage patterns, hydric soils
39	Positive	Algal mats, water marks, wetland drainage patterns

SHAPIRO identified 54 wetlands in the study area. Thirty-two of these were delineated. Figure 2 shows the approximate location and extent of the wetlands. Delineated wetlands range in size from approximately 300 square feet to 7 acres. Boundaries between wetland and upland were marked by lettered, and sequentially numbered, orange flags placed every 10 to 30 feet.

Table 9 contains the criteria used in making wetland determinations on the site. Twenty-five of 39 sample plots were located in wetlands.

Table 9: SUMMARY OF DATA AT THE SEA-TAC AIRPORT MPU SITE IN SEATAC, WASHINGTON

Plot #	Vegetation	Soils	Hydrology	Wetland Determination
1	Hydrophytic	Non-hydric	Negative	Upland
2	Hydrophytic	Hydric	Positive	Wetland
3	Hydrophytic	Non-hydric	Negative	Upland
4	Hydrophytic	Hydric	Positive	Wetland
5	Hydrophytic	Non-hydric	Negative	Upland
6	Hydrophytic	Non-hydric	Negative	Upland
7	Hydrophytic	Hydric	Positive	Wetland
8	Hydrophytic	Hydric	Positive	Wetland
9	Non-hydrophytic	Non-hydric	Negative	Upland
10	Hydrophytic	Hydric	Positive	Wetland*
11	Hydrophytic	Hydric	Positive	Wetland
12	Hydrophytic	Non-hydric	Negative	Upland
13	Hydrophytic	Hydric	Positive	Wetland
14	Hydrophytic	Non-hydric	Negative	Upland
15	Non-hydrophytic	Non-hydric	Negative	Upland
16	Hydrophytic	Non-hydric	Negative	Upland
17	Hydrophytic	Non-hydric	Negative	Wetland
18	Hydrophytic	Hydric	Positive	Wetland
19	Hydrophytic	Hydric	Positive	Wetland
20	Hydrophytic	Hydric	Positive	Wetland
21	Hydrophytic	Hydric	Positive	Wetland
22	Hydrophytic	Hydric	Positive	Wetland
23	Non-hydrophytic	Non-hydric	Negative	Upland
24	Hydrophytic	Hydric	Positive	Wetland
25	Hydrophytic	Hydric	Positive	Wetland
26	Hydrophytic	Hydric	Positive	Wetland
27	Hydrophytic	Hydric	Positive	Wetland
28	Hydrophytic	Hydric	Positive	Wetland
29	Hydrophytic	Hydric	Positive	Wetland
30	Hydrophytic	Hydric	Positive	Wetland
31	Hydrophytic	Hydric	Positive	Wetland
32	Non-hydrophytic	Non-hydric	Negative	Upland
33	Hydrophytic	Non-hydric	Negative	Upland
34	Hydrophytic	Non-hydric	Negative	Upland
35	Hydrophytic	Hydric	Positive	Wetland
36	Hydrophytic	Hydric	Positive	Wetland
37	Hydrophytic	Hydric	Positive	Wetland
38	Hydrophytic	Hydric	Positive	Wetland
39	Hydrophytic	Hydric	Positive	Wetland

*Based on a conversation with the U.S. Army Corps of Engineers, this area would not be regulated as wetland bacause it is located in a roadside ditch that otherwise would be in upland.

Wetland Descriptions

North Borrow Area Wetlands

Fourteen wetlands were delineated in the north borrow area during December 1994. Wetlands located in the southern portion of north borrow area are part of the Lake Reba wetlands complex. Most of the wetlands in this area are separated from each other by roadway fill. Culverts convey water generally to the west from one wetland to another. Lake Reba is located in the center of this complex. Lora Lake (not delineated) is at the western end of the complex. Miller Creek flows south and then west through the complex. The portion of the north borrow area, north of SR 518, contains two wetlands in its southwest corner.

Wetland 1 is located north of SR 518 in the west-central portion of the north borrow area. It is approximately 4,000 square feet in size and would be classified under the U.S. Fish and Wildlife Survey classification system (Cowardin, et al., 1979) as palustrine forested, broad-leaved deciduous, saturated. It is bounded on the south by a road and on the north by fill. The wetland is dominated by black cottonwood in the overstory. Red alder and willow also are present. The understory is dominated by blackberry and Douglas spirea. Reed canarygrass and soft rush grow in the forb layer. Soils consist of very dark brown (10YR 2/2) loam overlying very dark grayish brown (10YR 3/2) gravelly sandy loam. Dark brown (7.5YR 3/3) mottles are present in the subsoil. At the time of the field investigation (December 6, 1994), water was seeping into the soil pit along a cemented soil layer at 16 inches below the surface.

Wetland 2 occupies a depression north of SR 518 in the north borrow area. It is approximately 0.8 acre in size and would be classified as a palustrine forested, broad-leaved deciduous, emergent, saturated system. The forested portions of the wetland are dominated by a mixture of black cottonwood, red alder, and willow. The understory is dominated by patches of spirea, Himalayan blackberry, and willow shrubs. Bentgrass, Watson's willow-herb, soft rush, swordfern, and sedge grow in the forb layer. The emergent area of the wetland is dominated by reed canarygrass. Cattail grows in the lowest portions of the wetland and soft rush grows throughout. Himalayan blackberry hedges define the boundary of the emergent areas. Soils consist of dark brown (10YR 3/3) gravely sandy loam overlying gray (5Y 5/1) sandy loam with gravels. Yellowish brown (10YR 5/8) mottles and oxidized rhizospheres occur in the subsoil. Soils in the lowest portions of the wetland were saturated to the surface at the time of the investigation (December 6, 1994).

Wetland 3 is located near the southeast corner of the north borrow area and is the easternmost wetland in the Lake Reba complex. This wetland would classify as palustrine forested, broad-leaved deciduous, seasonally flooded. The wetland is approximately 0.9 acre in size. It is bounded on its eastern side by a relatively steep embankment and on its west side by a service road. Willow dominates the overstory. Black cottonwood and red alder are additional components of the overstory. Himalayan blackberry, willow shrubs, red alder saplings, salmonberry, and Pacific blackberry grow in the understory. The forb layer is dominated by horsetail. Associated species include reed canarygrass, bittersweet nightshade, creeping buttercup, lady-fern, and swordfern. Soils consist of dark grayish brown (2.5Y 4/2) sand; which becomes gleyed at 32 inches below the ground surface. The sandy surface material apparently has washed down from a sand stock-pile upslope to the east of the wetland. Soils in the lower area to the north consist of mucks and mineral soil. A 36-inch culvert conveys water from the north AOA to the southern tip of the wetland and a 60-inch culvert conveys water from the hill (to the east) to the southeast corner of the wetland. A channel along the western side of the wetland at the base of the road carries water to two 5-foot outlet culverts, one of which is filled with sediment. The operational culvert conveys water to Wetland 4. At the time of the investigation (December 7, 1994) flows in the channel were about 4 inches wide and 1 inch deep.

Soils in the southern half of the wetland were moist at the time of the investigation. Standing water was observed in the north half of the wetland.

Wetland 4 is a relatively large wetland in the east portion of the Lake Reba wetland complex. This wetland would classify as a palustrine, forested, broad-leaved deciduous, seasonally flooded system and is approximately 5.3 acres in size. Wetland 4 is surrounded by service roads. Willow is the dominant overstory species. Black cottonwood and red alder occur as associated species. The understory is dominated by willow shrubs. Salmonberry also grows in the wetland. Herbaceous species include: horsetail, American speedwell, tall mannagrass, creeping buttercup, reed canarygrass, sedges, small-fruited bulrush, swordfern, soft rush, stinging nettle, and bentgrass. At the east end of the wetland, soils consist of dark greenish gray (5GY 4/1) sand. Organic soils, muck and mucky peat, increase in the western portion of the wetland. At the time of the investigation (December 7, 1994), soils were saturated to the surface and pools of standing water were present throughout the wetland. Water was observed flowing from the hillside in the southeast corner of the wetland. Culverts convey water to Wetland 4 from impervious surfaces associated with SR 518 to the north and the AOA to the south. Surface water generally flows to the west in several braided channels.

Wetland 5 is located in the north borrow area. This palustrine, forested, and scrub-shrub, broad-leaved deciduous wetland is approximately 5.4 acres in size. Vegetation in its northern half is similar to that of Wetland 4. The southern half of the wetland is dominated by red alder and salmonberry. Arborescent willows and several large hemlock trees also were observed in the southern portion of this wetland. Indian plum, Himalayan blackberry, and willow shrubs are found in the understory. Herbaceous species growing in the wetland include lady-fern, horsetail, tall mannagrass, creeping buttercup, and small-fruited bulrush. Soils in the wetland's northern half consist of dark gray (10YR 4/1) loam over very dark brown (10YR 2/2) mucky loam. Soils along the hillslope in the southern half of the wetland consist of layers of black (10YR 2/1) peaty muck and dark greenish gray (5GY 4/1) loamy sand. Soils were saturated to the surface at the time of the investigation (December 12, 1994). Small depressions and channels throughout the wetland were inundated with water. Seeps along the hillslope contribute water to this wetland. Two culverts discharge water to the wetland's south side and southwest corner. Water also enters this wetland via a culvert from Wetland 4. A culvert at the northwest end of Wetland 5 discharges water to Wetland 6.

Wetland 6 is located south of Lake Reba in the northern borrow area. It is bounded on the north and east sides by roads. Its southern edge is at the base of a fill. A silt fence is just upslope of the southern boundary. This wetland would classify as a palustrine, scrub-shrub, broad-leaved, deciduous, seasonally-flooded system and is approximately 1.8 acres in size. The vegetation composition is similar to that of Wetland 4. Soils consist of black (10YR 2/1) loam. At the time of the investigation (December 12, 1994), soils were saturated to the surface. A culvert conveys water to the southeast corner of this wetland where it sheetflows to the northwest.

Wetland 7 is located in the north borrow area. Lake Reba lies within the wetland boundary. This palustrine, forested, broad-leaved deciduous, open-water and emergent seasonally and permanently flooded wetland is approximately 7.2 acres in size. The vegetative composition of the forested portion of this wetland is similar to that described for Wetland 4. The emergent vegetation community is dominated by reed canarygrass. Canadian thistle, bittersweet nightshade, and bentgrass also grow in emergent areas. Soils consist of black (10YR 2/1) loam over black (10YR 2/1) gravely sandy loam. At the time of the investigation (December 29, 1994), soils were saturated to the surface throughout most of the wetland. A culvert conveys water from Wetland 4, past the eastern portion of Wetland 7, to the east end of Lake Reba. Lake Reba outflow is conveyed past a water detention structure at the west end of the lake to Miller Creek. Lake Reba is used as a regional stormwater detention facility.

Wetland 8 is located west of Lake Reba and separated from Wetland 7 by fill that serves to dam Lake Reba. This wetland is approximately 6.2 acres in size and would classify as palustrine scrub-shrub, broad-leaved deciduous, emergent, semi-permanently and seasonally saturated. Forested portions of the wetland have a vegetation community very much like Wetland 4. A monotypic stand of reed canarygrass occurs along the northern side of the wetland. This wetland receives water from a variety of sources. Miller Creek enters the northeast corner, the outflow of Lake Reba is conveyed via a culvert to the east side, and runoff from SR 518 is conveyed to the north side of this wetland. Miller Creek flows southwest to the south side of the wetland where it flows through a culvert to Wetland 9 and ultimately to Lora Lake. On December 29, 1994, soils throughout the wetland were saturated to the surface and, in many areas, inundated to varying depths.

Wetland 9 is located southwest of Lake Reba in the north borrow area. It is approximately 2.4 acres in size and would classify as a palustrine, emergent, and forested broad-leaved deciduous, intermittently-exposed and saturated system. The eastern and northern portions of this wetland are dominated by cattail and reed canarygrass. The scrub-shrub portions are dominated by willow shrubs. Associated species include Himalayan blackberry, spirea, and red elderberry. Herbaceous species include reed canarygrass, horsetail, lady-fern, and creeping buttercup. Red alder, paper birch, and black cottonwood grow in some areas. Watercress dominates a permanently inundated area that extends south and east of the main portion of the wetland. Soils consist of black (10YR 2/1) silt loam with strong brown (7.5YR 4/6) mottles. Soils have a high organic content. At the time of the investigation (December 29, 1994) soils were saturated to the surface or inundated. Miller Creek enters the northern side of the wetland via several culverts and flows west toward Lora Lake.

Wetland 10 is located south of Lake Reba. This palustrine, scrub-shrub, broad-leaved deciduous, seasonally flooded wetland is approximately 0.6 acre in size. The dominant overstory species is willow. Himalayan blackberry, salmonberry, and red elderberry grow in association with the willow. Himalayan blackberry dominates the northwest corner of the wetland. Soils consist of black (10YR 2/0) loamy muck over very dark gray (10YR 3/1) and black (10YR 2/1) mucky loam and black (10YR 2/1) mucky peat. Soils were saturated to the surface and depressions were inundated at the time of the investigation. A newly installed polyvinyl chloride (PVC) pipe conveys stormwater from a recently constructed stormwater detention facility east of the wetland. A silt fence has been installed on fill material deposited to the east. Another culvert conveys water from Wetland 9 to the south side of Wetland 10. Water flows north to the lowest portion of the wetland. Soils throughout the wetland were saturated to the surface during the field investigation on December 12, 1994.

Wetland 11 is located west of, and approximately 20-feet higher than, Wetland 10 in the north borrow area. It is approximately 0.5 acre in size and would classify as palustrine, forested, broad-leaved deciduous, emergent, intermittently-exposed and saturated. There are three distinct vegetation zones that occur in this wetland. The southern arm is dominated by red alder and has an understory dominated by reed canarygrass, horsetail, and small-fruited bulrush. The eastern portion of the wetland is dominated by lady-fern and reed canarygrass. Associated species include small-fruited bulrush, horsetail, tall mannagrass, Watson's willow-herb and soft rush. A large number of black cottonwood seedlings were also seen. The forested portion of the wetland, in the northwest corner, is dominated by black cottonwood. These trees overhang a semi-permanantly flooded depression. Himalayan blackberry borders the north side of the wetland. Soils in the southern arm consist of very dark gray (10YR 3/1) mucky loam overlying black (5Y 2.5/1) sandy loam with dark red (2.5YR 4/6) mottles. Soils in the emergent area consist of black (10YR 2/0) loam overlying dark greenish gray (10YR 4/1 and 5GY 4/1) loam with strong brown (7.5YR 4/6) mottles. At the time of the investigation (December 13, 1994) soils were saturated to the surface in most areas. Water in both the southern arm and the emergent area flow to the forested section. The depression under the canopy retains water throughout most years. Water

flows out of this depression to the roadside ditch where it enters a culvert. The culvert conveys water to Wetland 10 to the east.

Wetland 12 is a hillside seep located in the southwest portion of the north borrow area. This wetland would classify as a palustrine, emergent, and forested broad-leaved deciduous, saturated system and is approximately 6,000 square feet in size. The wetland is located on a 10% slope and is approximately 30-feet wide and 200-feet long. The north side borders a road and the south side borders a hedge of Himalayan blackberry and Scot's broom. Willow and red alder are the dominant overstory species. The understory is dominated by a mixture of soft rush, cattail, small-fruited bulrush, Watson's willow-herb, and blackberry seedlings. Soils consist of very dark grayish brown (10YR 3/2) sandy loam overlying dark greenish gray (5GY 4/1 and 5GY 3/1) sandy loam with gravel. Brown (7.5YR 4/4) and strong brown (7.5YR 4/6) mottles occur in the subsoil. The hydrology source appears to be discharge of shallow groundwater along the hillside.

Wetland 13 is associated with a hillside seep located in the southwest portion of the north borrow area. This wetland would classify as a palustrine,emergent, permanently saturated system and is approximately 2,000 square feet in size. Wetland B is separated from Wetland 12 by a service road. It is located on a 10% slope and is approximately 10-feet wide and 200-feet long. The vegetation is essentially the same as that of Wetland 12. Like Wetland 12, the source of hydrology appears to be discharge of shallow groundwater along the hillside.

Wetland 14 is located in a depression in the southwest corner of the north borrow area. This palustrine forested broad-leaved deciduous saturated wetland is approximately 2,800 square feet in size. Red alder and black cottonwood dominate the overstory. The herbaceous undergrowth is dominated by creeping buttercup. Soft rush, horsetail, bentgrass, and Himalayan blackberry also were observed. Soils consist of very dark gray (10YR 3/1) loam over dark gray (10YR 3/1) and gray (10YR 4/1) silt loam. The silt loam horizon has strong brown (7.5YR 4/6) mottles. Soils were saturated at a depth of 18 inches at the time of the investigation (December 13, 1994).

AOA Wetlands

Thirteen wetlands were delineated in the AOA during August and September 1994. This area is bounded on the west by 12th Avenue S., on the east by runways, on the north by S. 154th Street, and on the south by S. 200th Street. Soils throughout this area consist of fill and are highly compacted.

Wetland 15 is located north of, and below, the western existing runway at the north side of the AOA. It is associated with a seep that originates halfway up the 40-degree slope south of the perimeter road. Water flows downhill to a ditch along the road. This palustrine, emergent, permanently saturated wetland is approximately 4,000 square feet in size. Horsetail, Watson's willow-herb, and Himalayan blackberry are the dominant plant species on the hill. The ditch along the road contains cattail, soft rush, bentgrass, and red alder, willow, and black cottonwood saplings. Soils are dark grayish brown (10YR 4/2) loam overlying gray (5Y 5/2) gravelly silty loam with yellowish brown (10YR 5/6) mottles. Soils were moist or saturated to the surface at the time of the investigation (September 1, 1994).

Wetland 16 is located in a narrow 200-foot-long depression along the east side of a north-south oriented service road in the center of the AOA. This wetland would classify as a palustrine, emergent, seasonally saturated system. The wetland is approximately 1,500 square feet in size and is dominated by bentgrass and common velvet-grass. Associated species include soft rush, curly dock, Himalayan blackberry, Scot's broom, and red alder. Soils consist of extremely compact dark grayish brown (2.5Y 4/2) loam with brown (7.5YR 4/3) rhizospheres and mottles overlying olive gray (5Y 5/2) silt loam. Soils were dry at the time of the investigation (August

19, 1994). Wetland hydrology was inferred based upon a predominance of hydrophytic vegetation and presence of hydric soils. A stormwater drain located at the south end of the wetland conveys water from the wetland.

Wetland 17 is located in the west-central portion of the AOA. This palustrine, emergent, permanently saturated wetland is approximately 500 square feet in size. Reed canarygrass is the dominant plant species. Associated species include horsetail and Himalayan blackberry. Red alder and weeping willow hang over the wetland. Soils were moist at the time of the investigation (September 23, 1994). The wetland terminates at a culvert that conveys water west underneath the a service road to a ditch on the east side of 12th Avenue S.

Wetland 18 is located in a narrow east-west oriented trough in the west-central portion of the AOA. This wetland is approximately 7,000 square feet in size and would classify as palustrine, forested, broad-leaved deciduous, seasonally saturated. A mixture of red alder, big-leaf maple, and red cedar dominates the overstory. The understory is dominated by salmonberry. Himalayan blackberry occurs along wetland's edge. Dominant forbs include lady-fern and horsetail. Associated forbs include skunk cabbage, tall mannagrass, Watson's willow-herb, and bracken fern. Soils at the wetland's eastern end consist of dark gray (10YR 4/1) sandy loam. Muck soils occur in the wetland's central portion. The west end of the wetland contains gleyed loam soil. Soils were saturated at depths ranging from 8 inches to the surface at the time of the investigation (September 1, 1994). A small perennial stream flows west to a culvert at the west end of the wetland. The culvert conveys water to the ditch on the east side of 12th Avenue S.

Wetland 19 is a relatively large forested wetland located in the west-central portion of the AOA. This wetland would classify as a palustrine, forested, broad-leaved deciduous, semi-permanently and seasonally saturated system. The wetland is approximately 20,000 square feet in size and confined by the side-slopes of a ravine. Red alder dominates the overstory. Black cottonwood, big-leaf maple, and red cedar also occur in the overstory. The understory is dominated by salmonberry. Indian plum, Himalayan blackberry, Pacific blackberry, and hazelnut occur as associated species. The forb layer is dominated by lady-fern and horsetail. Associated species include reed canarygrass, skunk cabbage, and stinging nettle. Soils consist of very dark gray (10YR 3/1) silt loam overlying greenish gray (5Y 5/1) silt loam. High concentrations of organic matter occur throughout the soil profile. A perennial stream flows the length of the wetland. The stream originates as a seep at the base of fill in the wetland's eastern end. The stream enters a culvert at the wetland's west end and is discharged to the eastern side of 12th Avenue S. At the time of the investigation (August 25, 1994), water flowing in the stream was 3-inches wide and 2-inches deep at its western end. Soils throughout the wetland were moist or saturated to the surface.

Wetland 20 is located in the west-central portion of the AOA. It is approximately 7,000 square feet in size and would classify as palustrine, scrub-shrub, broad-leaved deciduous, and emergent, semi-permanently and seasonally saturated. This wetland is associated with a hillside seep. Slopes average approximately 20%. The wetland is dominated by lady-fern, horsetail, and Himalayan blackberry. Associated species include skunk cabbage, black cottonwood, and red elderberry. Big-leaf maple occurs along the margins of the wetland. Soils consist of very dark gray (10YR 3/1) loam overlying dark grayish brown (2.5Y 4/2) loam. Strong brown (7.5YR 5/6) mottles are present in the subsoil. At the time of the investigation (August 23, 1994) soils were saturated to the surface along the wetland's upper margin (south side) where water is discharged to the surface. Soils become progressively drier down-slope (north).

Wetland 21 is located in the west-central portion of the AOA east of 12th Avenue S. and a service road. It is approximately 10,000 square feet in size and would classify as palustrine, forested, broad-leaved deciduous, semi-permanently and seasonally saturated. Wetland 21 occurs on a 15% slope and is associated with a hillside seep. Precipitation likely infiltrates the

soil in the AOA to the east and flows along relatively impervious soil layers ultimately discharging to the surface at this location. Topography of the wetland is a series of hummocks and depressions. The dominant overstory species is red alder. The understory is dominated by salmonberry, horsetail, and Himalayan blackberry. Associated understory species include lady-fern, ivy, and reed canarygrass. Soils consist of black (10YR 2/1) loam overlying gray (10YR 5/1) and dark gray (10YR 4/1) silt clay loam and dark gray (10YR 4/1) and bluish gray (5B 5/1) silt loam. Lenses of sand occur below 14 inches. At the time of the investigation (August 23, 1994) soils were moist.

Wetland 22 is located south and uphill of Wetland 21 in the west-central portion of the site. It is approximately 2,000 square feet in size, is located in a depression, and would classify as a palustrine, scrub-shrub, broad-leaved deciduous, and emergent, saturated system. Red alder saplings dominate the shrub layer. Sitka willow, Pacific willow, black cottonwood saplings, Himalayan and Pacific blackberry also are found. The herbaceous layer is dominated by bentgrass and common velvet-grass. Associated herbaceous species include creeping buttercup, reed canarygrass, curly dock, and Watson's willow-herb. Soils consist of very dark grayish brown (10YR 3/2) gravelly sandy loam overlying dark grayish brown (2.5Y 4/2) and grayish brown (2.5Y 5/2) sandy loam. Strong brown (7.5YR 4/6) mottles are present in the subsoil. Soils were dry at the time of the investigation (August 25, 1994); wetland hydrology was assumed from vegetation and soils data.

Wetland 23 is located in the central portion of the AOA in the regularly mowed grassy fields. A public observation area is northeast of the wetland. This wetland would classify as a palustrine, emergent, seasonally saturated system and is approximately 11,000 square feet in size. Bentgrass and common velvet-grass are the dominant plant species. Associated species include soft rush, white clover, common plantain, Watson's willow-herb, and sweet vernalgrass. Regular mowing keeps trees and shrubs from growing in this wetland. Soils consist of dark grayish brown (10YR 4/2) and grayish brown (10YR 5/2) fine sandy loam overlying dark grayish brown (10YR 4/2) and dark brown (10YR 4/3) gravely loam with brown (7.5YR 4.4) mottles. At the time of the investigation (August 30, 1994) soils were dry. Stormwater drains convey water from the center and south end of the wetland.

Wetland 24 is located in the southern portion of the AOA and northwest of the Weyerhaeuser hanger. It is located in a small depression and is bounded on the east by a service road and on the south by a fence. A small portable building is located in the southeast corner of the wetland. This palustrine emergent, seasonally flooded wetland is approximately 1,600 square feet in size. It is dominated by bentgrass and common velvet-grass. Associated species include white clover, common plantain, soft rush, cattail, and cudweed. Soils are compacted and were dry at the time of the investigation (September 1, 1994). Wetland hydrology was inferred from the presence of algal mats, predominance of hydrophytic vegetation, and presence of hydric soils.

Wetland 25 is located at the south end of the AOA and is bounded on its west side by a service road. The palustrine, forested, broad-leaved deciduous, seasonally flooded wetland is approximately 2,500 square feet in size. It lies in a depression that is characterized by hummock and swale topography. The overstory is dominated by black cottonwood and willow. The understory is largely unvegetated due to inundation for much of the year. Spike-rush, cattail, bentgrass, and soft rush grow in some areas. Dried algal mats and water lines on tree trunks were present at the time of the investigation. Pacific madrona, Himalayan blackberry, and Scot's broom occur on the hummocks. Soils consist of dark gray (10YR 4/1) loamy sand overlying dark gray (10YR 4/1) very gravelly loamy coarse sand. Soils were dry at the time of the investigation (August 19, 1994). Wetland hydrology was inferred from algal mats and water marks on tree trunks. The depression provides some stormwater storage.

Wetland 26 is located at the south end of the AOA southeast of Wetland 25. It is bounded on the east by the perimeter road. This 1,000 square foot wetland would classify as palustrine, emergent, seasonally saturated. Bentgrass dominates this wetland. Associated species include tall fescue, common velvet-grass, curly dock, soft rush, and Himalayan blackberry. Although soils were dry at the time of the investigation (August 19, 1994), the presence of wetland hydrology was inferred from dried algal mats located in the center of the wetland.

Wetland 27 is located at the south end of the AOA inside of the perimeter road. It lies east of a group of abandoned terminal walkways. Prior to the filling of its south and west portions, this wetland was approximately 10,000 square feet in size and classified as palustrine, emergent, seasonally saturated. The northern end of the wetland is in a shallow depression, which is connected to an excavated ditch. The ditch carries water south to several small deeper depressional areas. Water flows south from these depressions to a broad swale that has since been filled under authority of Nationwide Permit #26, Reference 93-4-00066. This broad swale, which contained numerous, large tire ruts where water collected during the wet season, carries water to the perimeter road. The scrub-shrub portion of the wetland occurs in the north end along the ditch. Red alder, black cottonwood, and willow saplings are the dominant shrubs. The forb layer is dominated by bentgrass, common velvet-grass, and soft rush. Cattails dominate the central depressional areas. Bentgrass, and foxtail occur as associated species. Prior to the placement of fill the southern emergent depression was dominated by common velvet-grass, bentgrass, and toad rush. Quackgrass and curly dock occur as associated species. Soils primarily consist of compacted gravelly sandy loam. Soils were dry to moist at the time of the investigation (September 23, 1994) but algal mats were found in the central depressions and in the tire ruts throughout the southern swale area.

South Borrow Area Wetlands

Five wetlands were delineated by SHAPIRO in the south borrow area during November, 1994. This area is located between 16th Avenue S., 24th Avenue S., S. 216th Street, and S. 200th Street. Three additional wetlands, described below as Wetlands 48, 49, and 50, were delineated during a separate wetlands study and are described in the *Port of Seattle Des Moines Creek Technology Campus, Final DEIS* (CH2M Hill and Associated Firms, 1995). Des Moines Creek traverses this area in a relatively deep ravine.

Wetland 28 is located south of the existing runways and abuts the northwest edge of the Tyee Golf Course. The wetland extends north along the west side of the southernmost runway almost to S. 188th Street. Wetland 28 would classify as a palustrine, open-water and scrub-shrub broad-leaved deciduous, permanently-flooded and temporarily-flooded system and is approximately 18 acres in size. Only the eastern third of this wetland was delineated. Sitka and Pacific willow dominate the scrub-shrub portions of this wetland. Red elderberry and red alder also are commonly found in the overstory. The understory is dominated by a mixture of cattail, bittersweet nightshade, creeping buttercup, and bentgrass. Soft rush, reed canarygrass, watercress, small-fruited bulrush, Watson's willow-herb, and blackberry seedlings occur as associated species. Several small patches of emergent vegetation in the wetland's northern arm are dominated by cattail. Associates include common reedgrass, soft rush, spike-rush, and bittersweet nightshade. Soils consist of black loam. Mucky peat is found in willow-dominated areas. Stormwater enters the north end of the wetland via a large culvert. Seeps also are found along this arm. Flattened vegetation, drift-lines, drainage patterns, and scoured areas are evidence of substantial flows during storm events. Stormwater flows south to the northern edge of Tyee Golf Course where it enters a narrow drainageway. This drainageway conveys water to the easternmost of the three Tyee Ponds. The outfall for the Tyee Ponds is at the southeast corner of the eastern pond. At the time of the investigation (December 29, 1994) water was flowing south in a braided pattern to the Tyee Ponds and many areas were inundated by up to several inches of water.

Wetland 29 is located in the northwest portion of the south borrow area. This approximately 0.8 acres wetland would classify as palustrine, forested, broad-leaved deciduous, seasonally flooded. The overstory is dominated by red alder. Salmonberry dominates the understory. Himalayan blackberry and Pacific blackberry occur as associated species. Lady-fern, horsetail, tall mannagrass, reed canarygrass, and swordfern grow below the shrub layer. Soils consist of black (10YR 2/0) loam over very dark gray (10YR 3/1) gravelly sandy loam. The western boundary of this wetland occurs along the upper edge of a hillside seep. Water generally flows downhill to the east where it collects in a depression. During wetter times of the year, water likely flows southeast from the depression via an intermittent stream. Soils were saturated and standing water was observed at a depth of 10 inches at the time of the investigation (December 1, 1994). Old building foundations are located at the wetland's north end, near the road.

Wetland 30 is located in the northwest quarter of the south borrow area. This wetland would classify as palustrine, scrub-shrub and forested, broad-leaved deciduous, seasonally flooded. The wetland is approximately 0.8 acre in size and is located in an isolated depression. Dominant scrub-shrub and tree species are Pacific and Sitka willow. Associated species include spirea, creeping buttercup, water parsley, tall mannagrass, American speedwell, and bittersweet nightshade. Soils consist of black (10YR 2/1) mucky peat overlying gray (5Y 5/1 and 5Y 6/1) silt loam. At the time of the investigation (November 30, 1994) standing water was at the soil surface.

Wetland 31 is located in the southwest corner of the south borrow area. It is approximately 1,700 square feet in size and would classify as a palustrine, emergent, saturated system. It is located in the upper portions of a ravine that bisects a small pasture adjacent to an abandoned horse arena. Creeping buttercup, bentgrass, quackgrass, and Himalayan blackberry dominate various portions of this wetland. Associated species include bluegrass, ryegrass, and stinging nettle. Soils consist of very dark grayish brown (10YR 3/2) loam overlying gray (10YR 5/1) and dark grayish brown (10YR 4/2) sandy loam with brown (10YR 4/4) mottles and oxidized rhizospheres. At the time of the investigation (December 1, 1994) soils were saturated to the surface and water was entering the side of the soil pit at 4 inches below the ground surface. Water flows northwest to a small culvert at the wetland's northwest end.

Wetland 32 is located in the south borrow area at the northwest quadrant of the intersection of S. 216th Street and 20th Avenue S. This approximately 2,400 square-foot wetland would classify as palustrine, emergent, temporarily flooded. Bentgrass is the dominant species. Associated species include velvet-grass, soft rush, dandelion, horsetail, Watson's willow-herb, and black cottonwood saplings. A weeping willow overhangs the north arm of this L-shaped wetland. Soils consist of dark brown (10YR 3/3) loam overlying olive brown (2.5Y 4/3) sandy loam with dark yellowish brown (10YR 3/6 and 10YR 4/6) rhizospheres. At the time of the investigation (December 1, 1994) soils were saturated to the surface and water was seeping into the observation hole at 5 inches below the surface. The source of hydrology for this wetland appears to be runoff from a road.

Undelineated Wetlands

By reviewing existing literature, conducting a field reconnaissance, and using photo-interpretation, SHAPIRO identified 21 additional wetlands on both private and Port-owned land. These wetlands were not delineated because (1) they were delineated during previous wetland investigations, or (2) permission to access properties containing wetlands could not be obtained. These wetlands are located throughout the study area and are described below as they occur from north to south in the project area. Wetlands 34-37, 39-41, and 48-50 were identified during field reconnaissance. Wetland 44 was identified through photo-interpretation. The remaining wetlands were identified in other literature sources.

Wetland 33 is located north of the north borrow area and includes Tub Lake. According to the *National Wetlands Inventory Map, Des Moines, Washington* (U.S. Fish and Wildlife Service, 1987), this is a palustrine, forested, scrub-shrub, broad leaved deciduous, emergent, and open-water system. Its size is estimated to be 18 acres.

Wetland 34 is located at the north end of the site and includes Lora Lake. According to the *National Wetlands Inventory Map, Des Moines, Washington* (U.S. Fish and Wildlife Service, 1987), this wetland is classified as an open-water system. It is approximately 3.5 acres in size.

Wetland 35 is located west of the AOA along the south side of S. 160th Street. It is approximately 50-feet wide and 200-feet long with a total area of approximately 9,000 square feet. It was determined from field observations that this wetland likely would be classified as palustrine emergent.

Wetland 36 is located west of the AOA south of the corner of Des Moines Memorial Drive S. and S. 160th Street. This wetland is estimated to be 14,000 square feet in size and likely would be classified as palustrine, forested, broad-leaved deciduous, and emergent. The wetland is located in a drainage corridor.

Wetland 37 is located in a relatively wide topographic trough west of the AOA. This wetland is estimated to be 2.4 acres in size and likely would be classified as palustrine, forested and scrub-shrub broad-leaved deciduous. Its waters flow west to Miller Creek.

Wetland 38 is located in the central portion of the AOA. This area was described in the Sea-Tac Airport Wetland management Plan (Butler & Associates and Sheldon & Associates, 1992). This area was determined not to be a regulated wetland by the City of SeaTac and the Corps after a site visit in October 1992. The Port has since filled and graded this area.

Wetland 39 is located at the northeast corner of S. 168th Street and 8th Avenue S. This wetland is approximately 3,200 square feet in size and likely would be classified as palustrine, forested, broad-leaved deciduous.

Wetland 40 is located west of the AOA at the northwest corner of S. 170th Street and 12th Avenue S. It is approximately 3,900 square feet in size and likely would be classified as a palustrine forested, broad-leaved deciduous wetland.

Wetland 41 is located west of the AOA near the northwest corner of S. 170th Street and 12th Avenue S. It is approximately 3,300 square feet in size and likely would be classified as palustrine emergent.

Wetland 42 is located west of the AOA adjacent to SR 509. It is approximately 0.5 acre in size and according to the *National Wetlands Inventory Map, Des Moines, Washington* (U.S. Fish and Wildlife Service, 1987), is palustrine emergent.

Wetland 43 is located west of the AOA, north of S. 176th Street between SR 509 and Des Moines Memorial Drive S. It is approximately 30 acres in size and, according to the *National Wetlands Inventory Map, Des Moines, Washington* (U.S. Fish and Wildlife Service, 1987), is palustrine forested and scrub-shrub, broad-leaved deciduous.

Wetland 44 is located west of the AOA between S. 174th Street and SR 509. As determined from photo-interpretation, it is approximately 0.74 acre in size and likely would be classified as a palustrine, forested and scrub-shrub, broad-leaved deciduous wetland.

Wetland 45 is located south of the southern end of SR 509 between Des Moines Memorial Drive S. and 8th Avenue S. It is approximately 5.0 acres in size and, according to the *National Wetlands Inventory Map, Des Moines, Washington* (U.S. Fish and Wildlife Service, 1987), is palustrine emergent.

Wetland 46 is located south of the southern end of SR 509 between Des Moines Memorial Drive S. and 8th Avenue S. It is approximately 2,700 square feet in size and, according to the *National Wetlands Inventory Map, Des Moines, Washington* (U.S. Fish and Wildlife Service, 1987), is palustrine open-water.

Wetland 47 is located south of the southern end of SR 509 between Des Moines Memorial Drive S. and 8th Avenue S. It is approximately 7,000 square feet in size and, according to the *National Wetlands Inventory Map, Des Moines, Washington* (U.S. Fish and Wildlife Service, 1987), is palustrine open-water.

Wetland 48 is located in the south-central portion of the south borrow area at the west end of S. 212th Street. This wetland was delineated and is described in the *Port of Seattle Des Moines Creek Technology Campus, Final DEIS* (CH2M Hill and Associated Firms, 1995). It is approximately 1,800 square feet in size and is a palustrine emergent wetland. Creeping buttercup, white clover, soft rush, and field horsetail grow in this wetland.

Wetland 49 is located immediately south of S. 210th Street approximately 300 feet west of 24th Avenue S. This wetland was delineated and is described in the *Port of Seattle Des Moines Creek Technology Campus, Final DEIS* (CH2M Hill and Associated Firms, 1995). It is a palustrine, emergent wetland of approximately 1,200 square feet. The dominant species are creeping buttercup and colonial bentgrass. Associated species are Himalayan blackberry, common velvet-grass, small-fruited bulrush, Canadian thistle, curly dock, vetch, and a non-native spruce. Soils consist of dark yellowish brown sandy loam over grayish brown and light olive brown gravelly sandy loam with orange mottles. Soils were saturated at 10 inches below the surface on the day of the field investigation (October 19, 1994), and water was flowing in the roadside ditch to a depth of 1 inch.

Wetland 50 is located in the central portion of the south borrow area at the west end of S. 210th Street. This wetland was delineated and is described in the *Port of Seattle Des Moines Creek Technology Campus, Final Draft EIS* (CH2M Hill and Associated Firms, 1995). It is approximately one-eighth of an acre in size and is a palustrine, scrub-shrub wetland. Salmonberry and creeping nightshade are the dominant species. Associated species include stinging nettle, red elderberry, lady-fern, and red alder. Soils consist of dark gray loamy sand, black sandy muck, very dark brown mucky sand, and gleyed sandy gravel. Soils were saturated to the surface on the day of the field visit (October 19, 1994), and there was areas of inundation of up to 0.5 inch.

Wetland 51, identified by the City of SeaTac (1992), is located between the southern tip of the easternmost existing runway and Highway 99. It is approximately 8.1 acres in size and likely would be classified as a palustrine, forested, broad-leaved, deciduous wetland. Des Moines Creek flows south through the center of the wetland.

Wetland 52 is located on the southern bank of Des Moines Creek in the Tyee Golf Course south of the runways. This wetland was delineated by Parametrix, Inc. during November 1991 and is described in the *Port of Seattle South Aviation Support Area Final EIS, Technical Appendices* (1991). It is approximately 0.3 acre in size and is a palustrine scrub-shrub, forested wetland. Red alder dominates the forested portion of the wetland. Understory species include Himalayan blackberry, madrone saplings, and Indian plum. The scrub-shrub portions of the wetland are dominated by willow and Himalayan blackberry. Dark grayish brown (10YR 4/2) sandy loams

and very dark brown muck were observed in the wetland. Groundwater seeps saturate hillside soils. Numerous drainage channels flow from the base of the hillside during dry summer months.

Wetland 53 is located in depression between the southern tip of the southernmost runway and Highway 99, between S. 192nd Street and S. 194th Street. This wetland was delineated by Parametrix, Inc. during November 1991 and is described in the *Port of Seattle South Aviation Support Area Final EIS, Technical Appendices* (1991). It is approximately 0.1 acre in size and is a palustrine, forested, broad-leaved, deciduous wetland. Red alder dominates the overstory. Douglas spirea, Indian plum, Himalayan and Pacific blackberry form a sparse shrub layer. Herbaceous vegetation includes dense horsetail, slough sedge, and bracken-fern. Very dark gray (10YR 3/1) silt loam with brown mottles was observed. Wetland hydrology was not present at the time of the investigation.

Wetland 54, known as Bow Lake, is located north of S. 188th Street between Highway 99 and 32nd Avenue S. It is approximately 26 acres in size and, according to the *National Wetlands Inventory Map, Des Moines, Washington* (U.S. Fish and Wildlife Service, 1987), is palustrine, open-water, scrub-shrub, and scrub-shrub/forested.

B. WETLAND AND STREAM RATING AND BUFFER REQUIREMENTS

Both the City of SeaTac (SeaTac, 1994) and the City of Des Moines (Des Moines, 1994) categorize wetlands into different classes that require protective buffers. Wetlands within both cities are classified according to the following criteria:

- Class I Wetlands:
  1. Have present species listed by the federal or state government as endangered or threatened or outstanding actual habitat;
  2. Have 40% to 60% permanent open water in dispersed patches with two or more classes of vegetation;
  3. Are equal or greater than 10 acres in size and have three or more wetland classes, one of which is open water;
  4. Have present plant associations of infrequent occurrence;
  5. Are spaghnum or peat wetlands; or
  6. Are forested wetlands equal or greater than 1 acre in size.

- Class II wetlands:
  1. Are greater than 1 acre in size;
  2. Are equal to or less than 1 acre in size and have three or more wetland classes;
  3. Are forested wetlands less than 1 acre in size and larger than 2,500 square feet; or
  4. Contain heron rookeries or raptor nesting trees.

- Class III Wetlands are equal to or smaller than 1 acre and have two or fewer classes.

Class I, II, and III wetlands are required to have a 100-, 50-, and 35-foot buffer from the wetland edge, respectively (SeaTac, 1994 and Des Moines, 1994)).

In addition to wetlands, a number of streams occur on the site. Streams in both SeaTac and Des Moines are classified according to the following criteria:

- Class 1 streams only include streams inventoried as "Shorelines of the State" under the adopted Shoreline Master Program, pursuant to RCW 90.58.
- Class 2 streams only include streams smaller than Class I streams that flow year-round during years of normal rainfall or those that are used by salmonids.

- Class 3 streams are intermittent or ephemeral during years of normal rainfall and are not used by salmonids.

Class 1 and Class 2 streams with salmonids, Class 2 streams without salmonids, and Class 3 streams require a 100-, 50-, and 25-foot buffer on each side of the ordinary high water mark or top of bank, respectively (SeaTac, 1994 and Des Moines, 1994).

V. SUMMARY

SHAPIRO conducted a detailed wetland investigation of the Seattle-Tacoma International Airport Master Plan Update site from August through December 1994. The site is located in SeaTac and the northern portion of Des Moines, King County, Washington. Wetlands were delineated in accordance with the criteria described in the 1989 Manual. Delineated wetland boundaries do not differ from those that would be identified using the criteria described in the 1987 Manual. By reviewing existing literature, conducting a field reconnaissance, and using photointerpretation, SHAPIRO identified 54 wetlands on both private and Port-owned-land. Of these, 32 wetlands, ranging in size from approximately 300 square feet to 7 acres, were delineated. The remaining 22 wetlands were not delineated because (1) they were delineated during previous wetland investigations, or (2) permission to access properties containing wetlands could not be obtained.

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ATTACHMENT

FIELD DATA FORMS

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WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
VEGETATION UNIT SAMPLING PROCEDURE

Project Number: 6943017 **Date:** 11/29/94
Project/Site: SeaTac - Borrow sites - Area 1 **Sample Plot #:** 1
Field Investigator(s): AS/SL

Herbs & Bryophytes	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
			Sum of Midpoints:		
			Dominance Threshold:		

Shrubs	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Rubus spectabilis	FAC+	85	6	85.5	1*
Rubus discolor	FACU	5	1	3.0	2
			Sum of Midpoints:	88.5	
			Dominance Threshold:	44.3	

Saplings	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Alnus rubra	FAC	15	2	10.5	1*
			Sum of Midpoints:	10.5	
			Dominance Threshold:	5.3	

Trees	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Alnus rubra	FAC	45	4	38.0	1*
			Sum of Midpoints:	38.0	
			Dominance Threshold:	19.0	

% of Dominants that are OBL, FACW, and/or FAC: 3/3 = 100%
Hydrophytic Vegetation? YES

Comments: FORESTED UPLAND.
Plot located in depression dominated by FAC vegetation. Spirea stand located in depression.

To determine dominants, first rank species by midpoints. Then sum midpoints in order until 50% of total for all species (dominance threshold) is immediately exceeded. All species contributing to this cumulative total plus any others having 20% of the total midpoint value are marked with an asterisk.

** Species that do not appear on the National List (Reed, 1988) may have been assigned an indicator status based on field observations and habitat information from the literature.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
SOILS, HYDROLOGY & SUMMARY

Project Number: 6943017
Project/Site: SeaTac - Borrow sites - Area 1
Field Investigator(s): AS/SL
Date: 11/29/94
Sample Plot #: 1

SOILS

SCS Mapping Unit: Alderwood gravelly sandy loam, 6-15
Field Identification: Alderwood
Is soil on hydric soils list? no

Is soil a histosol? no
Histic epipedon present? no
- Is soil mottled? yes
Is soil gleyed? no

Horizon	Horizon Depth	Texture	Matrix Color	Mottle Color	Occurrence of Mottles	Clay Color	Organic Content
A	0-14	sandy loam	10YR 2/2 10YR 3/2				
B	14-18	sandy loam	10YR 4/3 10YR 3/3	7.5YR 4/4	c,1,d		

Landform/Topography: flat, barely depressional.
Comments:

Hydric Soils? NO **Basis:** Lack of hydric characteristics.

HYDROLOGY

Is ground surface inundated? no
Is soil saturated? no
Depth to free-standing water in pit: N/A

Surface water depth: N/A
Depth to saturation: N/A

- ☒ Yes ☐ No -Oxidized root zones
- ☐ Yes ☒ No -Water marks
- ☐ Yes ☒ No -Drift lines
- ☐ Yes ☒ No -Water-borne sediment deposits
- ☐ Yes ☒ No -Water-stained leaves
- ☐ Yes ☒ No -Surface scoured areas
- ☐ Yes ☒ No -Wetland drainage patterns
- ☐ Yes ☒ No -Morphological plant adaptations

Comments: There are a few oxidized rhizospheres in B horizon.

Wetland Hydrology? NO **Basis:** Lack of hydrologic indicators.

SUMMARY

Do normal environmental conditions exist at the plant community? yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? no

Disturbed area? no **Basis:** no recent disturbance
Problem area? no **Basis:** normal environmental conditions observed

Comments:

Is the hydrophytic vegetation criterion met? YES
Is the hydric soil criterion met? NO
Is the wetland hydrology criterion met? NO
Is the vegetation unit or plot wetland? NO

Rationale for jurisdictional decision: Soils and hydrology parameters do not satisfy wetland criteria.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
VEGETATION UNIT SAMPLING PROCEDURE

Project Number: 6943017 **Date:** 11/29/94
Project/Site: SeaTac - Borrow sites - Area 2 **Sample Plot #:** 2
Field Investigator(s): AS/SL

Herbs & Bryophytes	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Ranunculus repens	FACW	65	5	63.0	1*
Poa sp.	FACW-UPL**	5	1	3.0	3
Lolium perenne	FACU	5	1	3.0	3
Geranium molle	FACW**	15	2	10.5	2
Agrostis tenuis	FAC	15	2	10.5	2
		Sum of Midpoints:		90.0	
		Dominance Threshold:		45.0	

Shrubs	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
		Sum of Midpoints:			
		Dominance Threshold:			

Saplings	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
		Sum of Midpoints:			
		Dominance Threshold:			

Trees	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
		Sum of Midpoints:			
		Dominance Threshold:			

% of Dominants that are OBL, FACW, and/or FAC: 1/1 = 100%

Hydrophytic Vegetation? YES

Comments: GRASSLAND.
Area is abandoned pasture. Pasture grasses give way to buttercup in lowest portions of small depression at head of drainage.

To determine dominants, first rank species by midpoints. Then sum midpoints in order until 50% of total for all species (dominance threshold) is immediately exceeded. All species contributing to this cumulative total plus any others having 20% of the total midpoint value are marked with an asterisk.

** Species that do not appear on the National List (Reed, 1988) may have been assigned an indicator status based on field observations and related information from the literature.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
SOILS, HYDROLOGY & SUMMARY

Project Number: 6943017
Project/Site: SeaTac - Borrow Sites - Area 2
Field Investigator(s): AS/SL
Date: 11/29/94
Sample Plot #: 2

SOILS

SCS Mapping Unit: Alderwood Gravelly sandy loam, 6-15
Field Identification: Alderwood
Is soil on hydric soils list? no

Is soil a histosol? no
Histic epipedon present? no
Is soil mottled? no
Is soil gleyed? no

Horizon	Horizon Depth	Texture	Matrix Color	Mottle Color	Occurrence of Mottles	Clay Color	Organic Content
A	0-10	loam	10YR 3/2				
B	10-18	sandy loam	10YR 4/2	7.5YR 4/4	c,1,d		

Landform/Topography: drainageway bottom, hilly
Comments:

Hydric Soils? YES **Basis:** low chroma, mottles

HYDROLOGY

Is ground surface inundated? no
Is soil saturated? yes
Depth to free-standing water in pit: 10

Surface water depth: N/A
Depth to saturation: surface

- ☒ Yes ☐ No -Oxidized root zones
- ☐ Yes ☒ No -Water marks
- ☐ Yes ☒ No -Drift lines
- ☐ Yes ☒ No -Water-borne sediment deposits
- ☐ Yes ☒ No -Water-stained leaves
- ☐ Yes ☒ No -Surface scoured areas
- ☒ Yes ☐ No -Wetland drainage patterns
- ☐ Yes ☒ No -Morphological plant adaptations

Comments: Water seeping into pit at 4 inches. Oxidized root zones at 10-18 inches. Plot located in bottom of drainageway. Water flows to small culvert at Wetland D's west end.

Wetland Hydrology? YES **Basis:** saturation to surface and free standing water at 10 inches.

SUMMARY

Do normal environmental conditions exist at the plant community? yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? no

Disturbed area? no **Basis:** No recent disturbance
Problem area? no **Basis:** Normal environmental conditions observed

Comments:

Is the hydrophytic vegetation criterion met? YES
Is the hydric soil criterion met? YES
Is the wetland hydrology criterion met? YES
Is the vegetation unit or plot wetland? YES

Rationale for jurisdictional decision: All three parameters satisfy wetland criteria.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
VEGETATION UNIT SAMPLING PROCEDURE

Project Number: 6943017
Project/Site: SeaTac - Borrow sites - Area 3
Field Investigator(s): AS/SL

Date: 11/30/94
Sample Plot #: 3

Herbs & Bryophytes	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
			Sum of Midpoints:		
			Dominance Threshold:		

Shrubs	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Rubus spectabilis	FAC+	65	5	63.0	1*
			Sum of Midpoints:	63.0	
			Dominance Threshold:	31.5	

Saplings	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Alnus rubra	FAC	10	2	10.5	1*
			Sum of Midpoints:	10.5	
			Dominance Threshold:	5.3	

Trees	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Alnus rubra	FAC	55	5	63.0	1*
Populus trichocarpa	FAC	2	1	3.0	2
Rhamnus purshiana	FAC-	tr	1	3.0	2
			Sum of Midpoints:	69.0	
			Dominance Threshold:	34.5	

% of Dominants that are OBL, FACW, and/or FAC: 3/3 = 100%

Hydrophytic Vegetation? YES

Comments: UPLAND FOREST.
Plot located in large depressional area dominated by FAC vegetation.

To determine dominants, first rank species by midpoints. Then sum midpoints in order until 50% of total for all species (dominance threshold) is immediately exceeded. All species contributing to this cumulative total plus any others having 20% of the total midpoint value are marked with an asterisk.

** Species that do not appear on the National List (Reed, 1988) may have been assigned an indicator status based on field observations and habitat information from the literature.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
SOILS, HYDROLOGY & SUMMARY

Project Number: 6943017
Project/Site: SeaTac - Borrow sites - Area 3
Field Investigator(s): AS/SL
Date: 11/30/94
Sample Plot #: 3

SOILS

SCS Mapping Unit: Indianola loamy fine sand, 4-15% slop
Field Identification: Inclusion
Is soil on hydric soils list? no

Is soil a histosol? no
Histic epipedon present? no
Is soil mottled? yes
Is soil gleyed? no

Horizon	Horizon Depth	Texture	Matrix Color	Mottle Color	Occurrence of Mottles	Clay Color	Organic Content
A	0-5	loam	10YR 2/2				
B	5-18	loam	10YR 3/2 10YR 3/3	10YR 3/4	f/c,1,f		

Landform/Topography: flat, barely depressional
Comments:

Hydric Soils? YES **Basis:** low chroma and mottles

HYDROLOGY

Is ground surface inundated? no
Is soil saturated? no
Depth to free-standing water in pit: N/A

Surface water depth: N/A
Depth to saturation: N/A

- ☒ Yes ☐ No -Oxidized root zones
- ☐ Yes ☒ No -Water marks
- ☐ Yes ☒ No -Drift lines
- ☐ Yes ☒ No -Water-borne sediment deposits
- ☐ Yes ☒ No -Water-stained leaves
- ☐ Yes ☒ No -Surface scoured areas
- ☐ Yes ☒ No -Wetland drainage patterns
- ☐ Yes ☒ No -Morphological plant adaptations

Comments: A few rhizospheres occur along old root channels. None apparent along live root channels.

Wetland Hydrology? NO **Basis:** Lacks hydrologic characteristics

SUMMARY

Do normal environmental conditions exist at the plant community? yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? no

Disturbed area? no **Basis:** no recent disturbance
Problem area? no **Basis:** normal environmentla conditions observed

Comments:

Is the hydrophytic vegetation criterion met? YES
Is the hydric soil criterion met? YES
Is the wetland hydrology criterion met? NO
Is the vegetation unit or plot wetland? NO

Rationale for jurisdictional decision: Hydrologic paramenter does not satisfy wetland criteria.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
VEGETATION UNIT SAMPLING PROCEDURE

Project Number: 6943017
Project/Site: SeaTac - Borrow sites - Area 3
Field Investigator(s): AS/SL

Date: 11/30/94
Sample Plot #: 4

Herbs & Bryophytes	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Glyceria grandis	OBL	5	1	3.0	1*
Veronica americana	OBL	1	1	3.0	1*
		Sum of Midpoints:		6.0	
		Dominance Threshold:		3.0	

Shrubs	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Spiraea douglasii	FACW	5	1	3.0	1*
		Sum of Midpoints:		3.0	
		Dominance Threshold:		1.5	

Saplings	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
		Sum of Midpoints:			
		Dominance Threshold:			

Trees	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Salix lasiandra	FACW+	25	3	20.5	1*
Salix sitchensis	FACW	20	3	20.5	1*
		Sum of Midpoints:		41.0	
		Dominance Threshold:		20.5	

% of Dominants that are OBL, FACW, and/or FAC: 5/5 = 100%

Hydrophytic Vegetation? YES

Comments: PFO/SS.
Plot located in depression and dominated by FACW vegetation.

To determine dominants, first rank species by midpoints. Then sum midpoints in order until 50% of total for all species (dominance threshold) is immediately exceeded. All species contributing to this cumulative total plus any others having 20% of the total midpoint value are marked with an asterisk.

** Species that do not appear on the National List (Reed, 1988) may have been assigned an indicator status based on field observations and habitat information from the literature.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
SOILS, HYDROLOGY & SUMMARY

Project Number: 6943017
Project/Site: SeaTac - Borrow sites - Area 3
Field Investigator(s): AS/SL
Date: 11/30/94
Sample Plot #: 4

SOILS

SCS Mapping Unit: Indianola loamy fine sand, 4-15% slop
Field Identification: Inclusion
Is soil on hydric soils list? no

Is soil a histosol? no
Histic epipedon present? yes
Is soil mottled? no
Is soil gleyed? yes

Horizon	Horizon Depth	Texture	Matrix Color	Mottle Color	Occurrence of Mottles	Clay Color	Organic Content
A	0-8	mucky peat	10YR 2/1				high
B	8-18	silt loam	5Y5/1 5Y6/1				low

Landform/Topography: flat, depressional
Comments:

Hydric Soils? YES **Basis:** organics, low chroma, gleyed

HYDROLOGY

Is ground surface inundated? no
Is soil saturated? yes
Depth to free-standing water in pit: surface

Surface water depth:
Depth to saturation: surface

- ☐ Yes ☒ No -Oxidized root zones
- ☒ Yes ☐ No -Water marks
- ☐ Yes ☒ No -Drift lines
- ☐ Yes ☒ No -Water-borne sediment deposits
- ☒ Yes ☐ No -Water-stained leaves
- ☐ Yes ☒ No -Surface scoured areas
- ☒ Yes ☐ No -Wetland drainage patterns
- ☐ Yes ☒ No -Morphological plant adaptations

Comments: Large depression likely is saturated to surface for most of the year.

Wetland Hydrology? YES **Basis:** saturated to surface

SUMMARY

Do normal environmental conditions exist at the plant community? yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? no

Disturbed area? no **Basis:** no recent disturbance
Problem area? no **Basis:** normal environmental conditions observed

Comments:

Is the hydrophytic vegetation criterion met? YES
Is the hydric soil criterion met? YES
Is the wetland hydrology criterion met? YES
Is the vegetation unit or plot wetland? YES

Rationale for jurisdictional decision: All three criteria for wetland determination satisfied.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
VEGETATION UNIT SAMPLING PROCEDURE

Project Number: 6943017
Project/Site: SeaTac - Borrow sites - Area 3
Field Investigator(s): AS/SL

Date: 11/30/94
Sample Plot #: 5

Herbs & Bryophytes	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Athyrium filix-femina	FAC	10	2	10.5	1*
Solanum dulcamara	FAC+	10	2	10.5	1*
Ranunculus repens	FACW	2	1	3.0	2
		Sum of Midpoints:		24.0	
		Dominance Threshold:		12.0	

Shrubs	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Cornus stolonifera	FACW	20	3	20.5	1*
Spiraea douglasii	FACW	20	3	20.5	1*
Rubus spectabilis	FAC+	2	1	3.0	2
		Sum of Midpoints:		44.0	
		Dominance Threshold:		22.0	

Saplings	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
		Sum of Midpoints:			
		Dominance Threshold:			

Trees	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Alnus rubra	FAC	35	4	38.0	1*
Acer macrophyllum	FACU	15	2	10.5	2*
		Sum of Midpoints:		48.5	
		Dominance Threshold:		24.3	

% of Dominants that are OBL, FACW, and/or FAC: 5/6 = 83%

Hydrophytic Vegetation? YES

Comments: UPLAND FOREST.
Plot located just south of Wetland A in north side of same large depression in which Plot 3 is located.

To determine dominants, first rank species by midpoints. Then sum midpoints in order until 50% of total for all species (dominance threshold) is immediately exceeded. All species contributing to the cumulative total plus any others having 20% of the total midpoint value are marked with an asterisk.

** Species that do not appear on the National List (Reed, 1988) may have been assigned an indicator status based on field observations and habitat information from the literature.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
SOILS, HYDROLOGY & SUMMARY

Project Number: 6943017
Project/Site: SeaTac - Borrow sites - Area 3
Field Investigator(s): AS/SL
Date: 11/30/94
Sample Plot #: 5

SOILS

SCS Mapping Unit: Indianola loamy fine sand, 4-15% slop
Field Identification: Indianola
Is soil on hydric soils list? no

Is soil a histosol? no
Histic epipedon present? no
Is soil mottled? no
Is soil gleyed? no

Horizon	Horizon Depth	Texture	Matrix Color	Mottle Color	Occurrence of Mottles	Gley Color	Organic Content
A	0-6	loam	10YR 3/2				
B1	6-12	loamy sand	2.5Y 4/3	10YR3/4,3/6			
B2	12-22	loamy sand	2.5Y 4/2				
B3	22-30	loam	10YR 2/1				

Landform/Topography: flat, barely depressional
Comments:

Hydric Soils? NO **Basis:** lack of hydric characteristics.

HYDROLOGY

Is ground surface inundated? no
Is soil saturated? no
Depth to free-standing water in pit:

Surface water depth:
Depth to saturation: 22 inches

- ☐ Yes ☒ No -Oxidized root zones
- ☐ Yes ☒ No -Water marks
- ☐ Yes ☒ No -Drift lines
- ☐ Yes ☒ No -Water-borne sediment deposits
- ☐ Yes ☒ No -Water-stained leaves
- ☐ Yes ☒ No -Surface scoured areas
- ☐ Yes ☒ No -Wetland drainage patterns
- ☐ Yes ☒ No -Morphological plant adaptations

Comments: Oxidized rhizospheres were found at 22-30 inches. Soils appear moderately well drained.

Wetland Hydrology? NO **Basis:** Lack of hydrologic indicators.

SUMMARY

Do normal environmental conditions exist at the plant community? yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? no

Disturbed area? no **Basis:** no recent disturbance
Problem area? no **Basis:** normal environmental conditions observed

Comments:

Is the hydrophytic vegetation criterion met? YES
Is the hydric soil criterion met? NO
Is the wetland hydrology criterion met? NO
Is the vegetation unit or plot wetland? NO

Rationale for jurisdictional decision: Soils and hydrologic parameters do not satisfy wetland criteria.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
VEGETATION UNIT SAMPLING PROCEDURE

Project Number: 6943017 **Date:** 11/29/94
Project/Site: SeaTac - Borrow sites - Area 3 **Sample Plot #:** 6
Field Investigator(s): AS/SL

Herbs & Bryophytes	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
			Sum of Midpoints:		
			Dominance Threshold:		

Shrubs	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Rubus discolor	FACU	85	6	85.5	1*
Rubus spectabilis	FAC+	10	2	10.5	2
Laurus sp.	FACU**	T	1	3.0	3
			Sum of Midpoints:	99.0	
			Dominance Threshold:	49.5	

Saplings	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
			Sum of Midpoints:		
			Dominance Threshold:		

Trees	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Alnus rubra	FAC	90	6	85.5	1*
Populus trichocarpa	FAC	10	2	10.5	2
			Sum of Midpoints:	96.0	
			Dominance Threshold:	48.0	

% of Dominants that are OBL, FACW, and/or FAC: 1/2 = 50%

Hydrophytic Vegetation? NO

Comments: UPLAND FOREST.
Plot located in red alder dominated upland forest adjacent to Wetland B.

To determine dominants, first rank species by midpoints. Then sum midpoints in order until 50% of total for all species (dominance threshold) is immediately exceeded. All species contributing to the cumulative total plus any others having 20% of the total midpoint value are marked with an asterisk.

** Species that do not appear on the National List (Reed, 1988) may have been assigned an indicator status based on field observations and habitat information from the literature.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
SOILS, HYDROLOGY & SUMMARY

Project Number: 6943017
Project/Site: SeaTac - Borrow sites - Area 3
Field Investigator(s): AS/SL
Date: 11/30/94
Sample Plot #: 6

SOILS

SCS Mapping Unit: Urban land
Field Identification: Urban land
Is soil on hydric soils list? no

Is soil a histosol? no
Histic epipedon present? no
Is soil mottled? yes
Is soil gleyed? no

Horizon	Horizon Depth	Texture	Matrix Color	Mottle Color	Occurrence of Mottles	Clay Color	Organic Content
A	0-3	loam	10YR 3/2				
B1	3-14	loamy sand	10YR 3/3	5YR 5/8	m, 1, d		
				10YR 4/6	c, 2, f&d		
B2	14-24	loamy sand	2.5Y 4/4	10YR 3/3	c, 1&2, d		

Landform/Topography: flat to hummocky
Comments:

Hydric Soils? NO **Basis:** Lack of hydric characteristics

HYDROLOGY

Is ground surface inundated? no
Is soil saturated? no
Depth to free-standing water in pit:

Surface water depth:
Depth to saturation:

- ☐ Yes ☒ No -Oxidized root zones
- ☐ Yes ☒ No -Water marks
- ☐ Yes ☒ No -Drift lines
- ☐ Yes ☒ No -Water-borne sediment deposits
- ☐ Yes ☒ No -Water-stained leaves
- ☐ Yes ☒ No -Surface scoured areas
- ☐ Yes ☒ No -Wetland drainage patterns
- ☐ Yes ☒ No -Morphological plant adaptations

Comments: Soils moist at time of investigation.

Wetland Hydrology? NO **Basis:** Lack of hydrologic characteristics.

SUMMARY

Do normal environmental conditions exist at the plant community? yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? no

Disturbed area? no **Basis:** no recent disturbance
Problem area? no **Basis:** normal environmental conditions observed

Comments:

Is the hydrophytic vegetation criterion met? NO
Is the hydric soil criterion met? NO
Is the wetland hydrology criterion met? NO
Is the vegetation unit or plot wetland? NO

Rationale for jurisdictional decision: None of the parameters satisfy wetland determination criteria.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
VEGETATION UNIT SAMPLING PROCEDURE

Project Number: 6943017 **Date:** 11/30/94
Project/Site: SeaTac - Borrow sites - Area 3 **Sample Plot #:** 7
Field Investigator(s): AS/SL

Herbs & Bryophytes	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Athyrium filix-femina	FAC	2	1	3.0	1*
Equisetum arvense	FAC	2	1	3.0	1*
Polystichum munitum	FACU	1	1	3.0	1
		Sum of Midpoints:		9.0	
		Dominance Threshold:		4.5	

Shrubs	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Rubus spectabilis	FAC+	65	5	63.0	1*
Rubus ursinus	FACU	10	2	10.5	2
		Sum of Midpoints:		73.5	
		Dominance Threshold:		36.8	

Saplings	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
		Sum of Midpoints:			
		Dominance Threshold:			

Trees	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Alnus rubra	FAC	85	6	85.5	1*
		Sum of Midpoints:		85.5	
		Dominance Threshold:		42.8	

% of Dominants that are OBL, FACW, and/or FAC: 4/4 = 100%

Hydrophytic Vegetation? YES

Comments: PFO.
Plot located in red alder/salmonberry dominated forest in Wetland B.

To determine dominants, first rank species by midpoints. Then sum midpoints in order until 50% of total for all species (dominance threshold) is immediately exceeded. All species contributing to this cumulative total plus any others having 20% of the total midpoint value are marked with an asterisk.

** Species that do not appear on the National List (Reed, 1988) may have been assigned an indicator status based on field observations and related information from the literature.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
SOILS, HYDROLOGY & SUMMARY

Project Number: 6943017
Project/Site: SeaTac - Borrow sites - Area 3
Field Investigator(s): AS/SL
Date: 11/30/94
Sample Plot #: 7

SOILS

SCS Mapping Unit: Indianola loamy fine sand, 4-15% slop
Field Identification: Inclusion
Is soil on hydric soils list? no

Is soil a histosol? no
Histic epipedon present? no
Is soil mottled? no
Is soil gleyed? no

Horizon	Horizon Depth	Texture	Matrix Color	Mottle Color	Occurrence of Mottles	Gley Color	Organic Content
A	0-14	loam	10YR 2/0				
B	14+	gravelly sandy loam	10YR 3/1				

Landform/Topography: 20 degree slope.
Comments:

Hydric Soils? YES **Basis:** low chroma

HYDROLOGY

Is ground surface inundated? no
Is soil saturated? yes
Depth to free-standing water in pit: 10

Surface water depth:
Depth to saturation: surface

- ☐ Yes ☒ No -Oxidized root zones
- ☐ Yes ☒ No -Water marks
- ☐ Yes ☒ No -Drift lines
- ☐ Yes ☒ No -Water-borne sediment deposits
- ☐ Yes ☒ No -Water-stained leaves
- ☐ Yes ☒ No -Surface scoured areas
- ☐ Yes ☒ No -Wetland drainage patterns
- ☐ Yes ☒ No -Morphological plant adaptations

Comments: Water seeps from hillside at plot and along much of the western slope of Wetland B.

Wetland Hydrology? YES **Basis:** saturated to surface

SUMMARY

Do normal environmental conditions exist at the plant community? yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? no

Disturbed area? no **Basis:** no recent disturbance
Problem area? no **Basis:** normal environmental conditions observed

Comments: Plot located in Wetland B.

Is the hydrophytic vegetation criterion met? YES
Is the hydric soil criterion met? YES
Is the wetland hydrology criterion met? YES
Is the vegetation unit or plot wetland? YES

Rationale for jurisdictional decision: All three parameters satisfy wetland determination criteria.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
VEGETATION UNIT SAMPLING PROCEDURE

Project Number: 6943017 **Date:** 12/1/94
Project/Site: SeaTac - Borrow sites - Area 1 **Sample Plot #:** 8
Field Investigator(s): AS/SL

Herbs & Bryophytes	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Juncus effusus	FACW	15	2	10.5	2
Agrostis tenuis	FAC	65	5	63.0	1*
Holcus lanatus	FAC-	2	1	3.0	3
Taraxacum officinale	FACU	1	1	3.0	3
		Sum of Midpoints:		79.5	
		Dominance Threshold:		39.8	

Shrubs	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Rubus discolor	FACU	2	1	3.0	1*
		Sum of Midpoints:		3.0	
		Dominance Threshold:		1.5	

Saplings	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Alnus rubra	FAC	T	1	3.0	1*
		Sum of Midpoints:		3.0	
		Dominance Threshold:		1.5	

Trees	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Salix babylonica	FAC+	20	3	20.5	1*
		Sum of Midpoints:		20.5	
		Dominance Threshold:		10.3	

% of Dominants that are OBL, FACW, and/or FAC: 3/4 = 75%
Hydrophytic Vegetation? YES

Comments: PEM.
Plot located in wet meadow adjacent to S. 216th. Other species present include EPWA and POTR sapling.

To determine dominants, first rank species by midpoints. Then sum midpoints in order until 50% of total for all species (dominance threshold) is immediately exceeded. All species contributing to this cumulative total plus any others having 20% of the total midpoint value are marked with an asterisk.

** Species that do not appear on the National List (Reed, 1988) may have been assigned an indicator status based on field observations and habitat information from the literature.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
SOILS, HYDROLOGY & SUMMARY

Project Number: 6943017
Project/Site: SeaTac - Borrw sites - Area 1
Field Investigator(s): AS/SL

Date: 12/1/94
Sample Plot #: 8

SOILS

SCS Mapping Unit: Alderwood gravelly sandy loam, 6-15
Field Identification: Inclusion
Is soil on hydric soils list? no

Is soil a histosol? no
Histic epipedon present? no
Is soil mottled? yes
Is soil gleyed? no

Horizon	Horizon Depth	Texture	Matrix Color	Mottle Color	Occurrence of Mottles	Clay Color	Organic Content
A	0-18	loam	10YR3/3				
B	6-18	sandy loam	2.5Y4/3	10YR 4/6 10YR 3/6			

Landform/Topography: flat, slightly depressional
Comments: Soil likely is fill.

Hydric Soils? YES **Basis:** Aquic moisture regime. The development of active rhizospheres in probable fill.

HYDROLOGY

Is ground surface inundated? no
Is soil saturated? yes
Depth to free-standing water in pit: 12"

Surface water depth:
Depth to saturation: surface

- ☒ Yes ☐ No -Oxidized root zones
- ☐ Yes ☒ No -Water marks
- ☐ Yes ☒ No -Drift lines
- ☐ Yes ☒ No -Water-borne sediment deposits
- ☐ Yes ☒ No -Water-stained leaves
- ☐ Yes ☒ No -Surface scoured areas
- ☒ Yes ☐ No -Wetland drainage patterns
- ☐ Yes ☒ No -Morphological plant adaptations

Comments: Water entering soil pit at 5 inches. Soource of hydrology is road runoff from S. 216th.

Wetland Hydrology? YES **Basis:** saturation to surface

SUMMARY

Do normal environmental conditions exist at the plant community? yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? no

Disturbed area? no **Basis:** no recent disturbance
Problem area? no **Basis:** normal environmental conditions observed

Comments:

Is the hydrophytic vegetation criterion met? YES
Is the hydric soil criterion met? YES
Is the wetland hydrology criterion met? YES
Is the vegetation unit or plot wetland? YES

Rationale for jurisdictional decision: All three parameters satisfy wetland determination criteria.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
VEGETATION UNIT SAMPLING PROCEDURE

Project Number: 6943017
Project/Site: SeaTac - Borrow sites - Area 2
Field Investigator(s): AS/SL

Date: 12/1/94
Sample Plot #: 9

Herbs & Bryophytes	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Taraxacum officinale	FACU	1	1	3.0	3
Cirsium arvense	FACU+	1	1	3.0	3
Festuca arundinacea	FAC-	5	1	3.0	3
Phleum pratense	FAC-	5	1	3.0	3
Poa sp.	FACW-UPL**	30	4	38.0	2
Agropyron repens	FAC-	60	5	63.0	1*
		Sum of Midpoints:		113.0	
		Dominance Threshold:		56.5	

Shrubs	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
		Sum of Midpoints:			
		Dominance Threshold:			

Saplings	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
		Sum of Midpoints:			
		Dominance Threshold:			

Trees	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
		Sum of Midpoints:			
		Dominance Threshold:			

% of Dominants that are OBL, FACW, and/or FAC: 0/1 = 0%

Hydrophytic Vegetation? NO

Comments: GRASSLAND/PASTURELAND.
Upland plot in abandoned pasture south of Wetland D.

To determine dominants, first rank species by midpoints. Then sum midpoints in order until 50% of total for all species (dominance threshold) is immediately exceeded. All species contributing to this cumulative total plus any others having 20% of the total midpoint value are marked with an asterisk.

** Species that do not appear on the National List (Reed, 1988) may have been assigned an indicator status based on field observations and habitat information from the literature.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
SOILS, HYDROLOGY & SUMMARY

Project Number: 6943017
Date: 12/1/94
Project/Site: SeaTac - Borrow sites - Area 2
Sample Plot #: 9
Field Investigator(s): AS/SL

SOILS

SCS Mapping Unit: Alderwood gravelly sandy loam, 6-15
Field Identification:
Is soil on hydric soils list? no

Is soil a histosol? no
Histic epipedon present? no
Is soil mottled? yes
Is soil gleyed? no

Horizon	Horizon Depth	Texture	Matrix Color	Mottle Color	Occurrence of Mottles	Clay Color	Organi Conten
A	0-3	loam	10YR 3/3				
B	3-18	sandy loam	10YR 3/3	10YR 5/8	f,3,f&d		

Landform/Topography: upslope of drainageway in horse pasture.
Comments: Soils varigated.

Hydric Soils? NO **Basis:** lack of hydric characteristics

HYDROLOGY

Is ground surface inundated? no
Is soil saturated? no
Depth to free-standing water in pit:

Surface water depth:
Depth to saturation:

☐ Yes ☒ No -Oxidized root zones
☐ Yes ☒ No -Water marks
☐ Yes ☒ No -Drift lines
☐ Yes ☒ No -Water-borne sediment deposits

☐ Yes ☒ No -Water-stained leaves
☐ Yes ☒ No -Surface scoured areas
☐ Yes ☒ No -Wetland drainage patterns
☐ Yes ☒ No -Morphological plant adaptations

Comments:

Wetland Hydrology? NO **Basis:** lack of hydrologic indicators

SUMMARY

Do normal environmental conditions exist at the plant community? yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? no

Disturbed area? no **Basis:** no recent disturbance
Problem area? no **Basis:** normal environmental conditions observed

Comments: Soils moist at the time of the investigation.

Is the hydrophytic vegetation criterion met? NO
Is the hydric soil criterion met? NO
Is the wetland hydrology criterion met? NO
Is the vegetation unit or plot wetland? NO

Rationale for jurisdictional decision: None of the parameters satisfy wetland determination criteria.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
VEGETATION UNIT SAMPLING PROCEDURE

Project Number: 6943017
Project/Site: SeaTac - Borrow sites - Area 5
Field Investigator(s): AS/SL
Date: 12/6/94
Sample Plot #: 10

Herbs & Bryophytes	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Ranunculus repens	FACW	60	5	63.0	1*
Juncus effusus	FACW	20	3	20.5	2*
Agrostis sp.	FACW-FACU	15	2	10.5	3
		Sum of Midpoints:		94.0	
		Dominance Threshold:		47.0	

Shrubs	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Rubus discolor	FACU	6	2	10.5	1*
		Sum of Midpoints:		10.5	
		Dominance Threshold:		5.3	

Saplings	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Alnus rubra	FAC	5	1	3.0	1*
Populus trichocarpa	FAC	4	1	3.0	1*
		Sum of Midpoints:		6.0	
		Dominance Threshold:		3.0	

Trees	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
		Sum of Midpoints:			
		Dominance Threshold:			

% of Dominants that are OBL, FACW, and/or FAC: 4/5 = 80%

Hydrophytic Vegetation? YES

Comments: HERBACEOUS VEGETATION.
Plot located in roadside depression. ALRU and POTR rooted upslope.

To determine dominants, first rank species by midpoints. Then sum midpoints in order until 50% of total for all species (dominance threshold) is immediately exceeded. All species contributing to the cumulative total plus any others having 20% of the total midpoint value are marked with an asterisk.

** Species that do not appear on the National List (Reed, 1988) may have been assigned an indicator status based on field observations and habitat information from the literature.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
SOILS, HYDROLOGY & SUMMARY

Project Number: 6943017
Date: 12/6/94
Project/Site: SeaTac - Borrow sites - Area 5
Sample Plot #: 10
Field Investigator(s): AS/SL

SOILS

SCS Mapping Unit: Not mapped (Urban land)
Field Identification: Urban land
Is soil on hydric soils list?

Is soil a histosol? no
Histic epipedon present? no
Is soil mottled? yes
Is soil gleyed? no

Horizon	Horizon Depth	Texture	Matrix Color	Mottle Color	Occurrence of Mottles	Gley Color	Organic Content
A	0-9	gravelly sandy loam	10YR 3/3 10YR 3/2				
B1	9-14	gravelly sandy loam	10YR 4/4				
B2	14-18	sandy loam	2.5Y 4/4	10YR 5/8	f, 3,d		

Landform/Topography: roadside depressional area
Comments: Flecks of rotten rock (5YR 5/8) throughout profile.

Hydric Soils? NO **Basis:** lack of hydric characteristics

HYDROLOGY

Is ground surface inundated? no
Is soil saturated? yes
Depth to free-standing water in pit:

Surface water depth:
Depth to saturation: 14 inches

- ☐ Yes ☒ No -Oxidized root zones
- ☐ Yes ☒ No -Water marks
- ☐ Yes ☒ No -Drift lines
- ☐ Yes ☒ No -Water-borne sediment deposits
- ☐ Yes ☒ No -Water-stained leaves
- ☐ Yes ☒ No -Surface scoured areas
- ☒ Yes ☐ No -Wetland drainage patterns
- ☐ Yes ☒ No -Morphological plant adaptations

Comments: Plot in roadside ditch/depression. Soils moist throughout at the time of the investigation.

Wetland Hydrology? YES **Basis:** saturation at 14 inches

SUMMARY

Do normal environmental conditions exist at the plant community? yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? no

Disturbed area? no **Basis:** no recent disturbance
Problem area? no **Basis:** normal environmental conditions observed

Comments:

Is the hydrophytic vegetation criterion met? YES
Is the hydric soil criterion met? NO
Is the wetland hydrology criterion met? YES
Is the vegetation unit or plot wetland? NO

Rationale for jurisdictional decision: Soil parameter does not satisfy wetland determination criteria.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
VEGETATION UNIT SAMPLING PROCEDURE

Project Number: 6943017 **Date:** 12/6/94
Project/Site: SeaTac - Borrow sites - Area 5 **Sample Plot #:** 11
Field Investigator(s): AS/SL

Herbs & Bryophytes	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Phalaris arundinacea	FACW	20	3	20.5	1*
		Sum of Midpoints:		20.5	
		Dominance Threshold:		10.3	

Shrubs	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Rubus discolor	FACU	10	2	10.5	1*
		Sum of Midpoints:		10.5	
		Dominance Threshold:		5.3	

Saplings	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Salix sp.	OBL-FACU	5	1	3.0	1*
Populus trichocarpa	FAC	2	1	3.0	1*
		Sum of Midpoints:		6.0	
		Dominance Threshold:		3.0	

Trees	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Populus trichocarpa	FAC	35	4	38.0	1*
Salix sp.	OBL-FACU	5	1	3.0	2
Alnus rubra	FAC	5	1	3.0	2
		Sum of Midpoints:		44.0	
		Dominance Threshold:		22.0	

% of Dominants that are OBL, FACW, and/or FAC: 4/5 = 80%
Hydrophytic Vegetation? YES

Comments: PFO.
Plot located in roadside depression.

To determine dominants, first rank species by midpoints. Then sum midpoints in order until 50% of total for all species (dominance threshold) is immediately exceeded. All species contributing to the cumulative total pass any others having 20% of the total midpoint value are marked with an asterisk.

** Species that do not appear on the National List (Reed, 1988) may have been assigned an indicator status based on field observations and related information from the literature.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
SOILS, HYDROLOGY & SUMMARY

Project Number: 6943017
Project/Site: SeaTac - Borrow sites - Area 5
Field Investigator(s): AS/SL
Date: 12/6/94
Sample Plot #: 11

SOILS

SCS Mapping Unit: Not mapped (Urban land)
Field Identification: Urban land
Is soil on hydric soils list? no

Is soil a histosol? no
Histic epipedon present? no
Is soil mottled? no
Is soil gleyed? no

Horizon	Horizon Depth	Texture	Matrix Color	Mottle Color	Occurrence of Mottles	Clay Color	Organic Content
A1	0-4	loam	10YR 2/2				
A2	4-16	gravelly sandy loam	10YR 3/2				
B	16-18	silt loam	2.5Y 5/2	7.5 YR 4/6	m,3,p		

Landform/Topography: wide roadside depression
Comments: Silt loam is strongly cemented. Rotten reddish rock throughout profile.

Hydric Soils? YES **Basis:** low chroma, mottles

HYDROLOGY

Is ground surface inundated? no
Is soil saturated? yes
Depth to free-standing water in pit: N/A

Surface water depth: N/A
Depth to saturation: ?

- ☐ Yes ☒ No -Oxidized root zones
- ☐ Yes ☒ No -Water marks
- ☐ Yes ☒ No -Drift lines
- ☐ Yes ☒ No -Water-borne sediment deposits
- ☐ Yes ☒ No -Water-stained leaves
- ☐ Yes ☒ No -Surface scoured areas
- ☒ Yes ☐ No -Wetland drainage patterns
- ☐ Yes ☒ No -Morphological plant adaptations

Comments: Water seeping into pit at 16 inches.

Wetland Hydrology? YES **Basis:** saturation and seepage above 18 inches

SUMMARY

Do normal environmental conditions exist at the plant community? yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? no

Disturbed area? no **Basis:** no recent disturbance
Problem area? no **Basis:** normal environmental conditions observed

Comments:

Is the hydrophytic vegetation criterion met? YES
Is the hydric soil criterion met? YES
Is the wetland hydrology criterion met? YES
Is the vegetation unit or plot wetland? YES

Rationale for jurisdictional decision: All three parameters satisfy wetland determination criteria.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
VEGETATION UNIT SAMPLING PROCEDURE

Project Number: 6943017
Project/Site: SeaTac - Borrow sites - Area 5
Field Investigator(s): AS/SL

Date: 12/6/94
Sample Plot #: 12

Herbs & Bryophytes	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
			Sum of Midpoints:		
			Dominance Threshold:		

Shrubs	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Rubus discolor	FACU	15	2	10.5	2*
Rubus ursinus	FACU	25	3	20.5	1*
			Sum of Midpoints:	31.0	
			Dominance Threshold:	15.5	

Saplings	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Betula papyrifera	FAC*	5	1	3.0	1*
Pseudotsuga menziesii	FACU*	5	1	3.0	1*
			Sum of Midpoints:	6.0	
			Dominance Threshold:	3.0	

Trees	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Populus trichocarpa	FAC	90	6	85.5	1*
Betula papyrifera	FAC*	3	1	3.0	2
			Sum of Midpoints:	88.5	
			Dominance Threshold:	44.3	

% of Dominants that are OBL, FACW, and/or FAC: 2/5 = 40%

Hydrophytic Vegetation? NO

Comments: FORESTED UPLAND.
Plot located to the west of Plot 11 in same depression.

To determine dominance, first rank species by midpoints. Then sum midpoints in order until 50% of total for all species (dominance threshold) is immediately exceeded. All species contributing to this cumulative total plus any others having 20% of the total midpoint value are marked with an asterisk.

** Species that do not appear on the National List (Reed, 1988) may have been assigned an indicator status based on field observations and limited information from the literature.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
SOILS, HYDROLOGY & SUMMARY

Project Number: 6943017
Project/Site: SeaTac - Borrow sites - Area 5
Field Investigator(s): AS/SL

Date: 12/6/94
Sample Plot #: 12

SOILS

SCS Mapping Unit: Not mapped (Urban land)
Field Identification: Urban land
Is soil on hydric soils list? no

Is soil a histosol? no
Histic epipedon present? no
Is soil mottled? yes
Is soil gleyed? no

Horizon	Horizon Depth	Texture	Matrix Color	Mottle Color	Occurrence of Mottles	Gley Color	Organic Content
A	0-10	loam	10YR 3/2 10YR 3/3				
B	10-18	gravelly sand	2.5Y 5/4 2.5Y 4/4	7.5YR 5/8	f&c,3,p		

Landform/Topography: flatt, roadside depression
Comments:

Hydric Soils? NO **Basis:** Lack of hydric characteristics.

HYDROLOGY

Is ground surface inundated? no
Is soil saturated? no
Depth to free-standing water in pit:

Surface water depth:
Depth to saturation:

- ☐ Yes ☒ No -Oxidized root zones
- ☐ Yes ☒ No -Water marks
- ☐ Yes ☒ No -Drift lines
- ☐ Yes ☒ No -Water-borne sediment deposits
- ☐ Yes ☒ No -Water-stained leaves
- ☐ Yes ☒ No -Surface scoured areas
- ☐ Yes ☒ No -Wetland drainage patterns
- ☐ Yes ☒ No -Morphological plant adaptations

Comments:

Wetland Hydrology? NO **Basis:** Lack of hydrologic indicators

SUMMARY

Do normal environmental conditions exist at the plant community? yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? no

Disturbed area? no **Basis:** no recent disturbance
Problem area? no **Basis:** normal environmental conditions observed

Comments:

Is the hydrophytic vegetation criterion met? YES
Is the hydric soil criterion met? NO
Is the wetland hydrology criterion met? NO
Is the vegetation unit or plot wetland? NO

Rationale for jurisdictional decision: None of the parameters satisfy the wetland criteria.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
VEGETATION UNIT SAMPLING PROCEDURE

Project Number: 6943017 **Date:** 12/6/94
Project/Site: SeaTac - Borrow sites - Area 5 **Sample Plot #:** 13
Field Investigator(s): AS/SL

Herbs & Bryophytes	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Agrostis sp.	FACW-FACU	60	5	63.0	1*
Carex sp.	OBL-FAC	8	2	10.5	2
Epilobium watsonii	FACW	1	1	3.0	3
Juncus effusus	FACW	1	1	3.0	3
Polystichum munitum	FACU	3	1	3.0	3
		Sum of Midpoints:		82.5	
		Dominance Threshold:		41.3	

Shrubs	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Spiraea douglasii	FACW	8	2	10.5	1*
Rubus discolor	FACU	4	1	3.0	2
Rubus ursinus	FACU	1	1	3.0	2
Rubus laciniatus	FACU+	1	1	3.0	2
		Sum of Midpoints:		19.5	
		Dominance Threshold:		9.8	

Saplings	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
		Sum of Midpoints:			
		Dominance Threshold:			

Trees	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Salix sp.	OBL-FACU	50	4	38.0	1*
Populus trichocarpa	FAC	45	4	38.0	2*
		Sum of Midpoints:		76.0	
		Dominance Threshold:		38.0	

% of Dominants that are OBL, FACW, and/or FAC: 4/4 = 100%

Hydrophytic Vegetation? YES

Comments: PFO

To determine dominants, first rank species by midpoints. Then sum midpoints in order until 50% of total for all species (dominance threshold) is immediately exceeded. All species contributing to this cumulative total plus any others having 20% of the total midpoint value are marked with an asterisk.

** Species that do not appear on the National List (Reed, 1988) may have been assigned an indicator status based on field observations and habitat information from the literature.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
SOILS, HYDROLOGY & SUMMARY

Project Number: 6943017
Project/Site: SeaTac - Borrow sites - Area 5
Field Investigator(s): AS/SL
Date: 12/6/94
Sample Plot #: 13

SOILS

SCS Mapping Unit: Not mapped (Urban land)
Field Identification: Urban land
Is soil on hydric soils list? no

Is soil a histosol? no
Histic epipedon present? no
Is soil mottled? yes
Is soil gleyed? yes

Horizon	Horizon Depth	Texture	Matrix Color	Mottle Color	Occurrence of Mottles	Clay Color	Organic Content
A	0-4	gravelly sandy loam	10YR 3/3				
B	4-16	sandy loam	5Y 5/1	10YR5/8	m, 1&2, p	5Y 5/1	

Landform/Topography: hilly
Comments: Cobbles prevent penetration below 16 inches. Wavy boundary between horizons.

Hydric Soils? YES **Basis:** Low chroma, mottles

HYDROLOGY

Is ground surface inundated? no
Is soil saturated? yes
Depth to free-standing water in pit:

Surface water depth:
Depth to saturation: apx 10 inches

- ☒ Yes ☐ No -Oxidized root zones
- ☐ Yes ☒ No -Water marks
- ☐ Yes ☒ No -Drift lines
- ☐ Yes ☒ No -Water-borne sediment deposits
- ☐ Yes ☒ No -Water-stained leaves
- ☐ Yes ☒ No -Surface scoured areas
- ☒ Yes ☐ No -Wetland drainage patterns
- ☐ Yes ☒ No -Morphological plant adaptations

Comments:

Wetland Hydrology? YES **Basis:** Saturation, redoximorphic features.

SUMMARY

Do normal environmental conditions exist at the plant community? yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? no

Disturbed area? no **Basis:** no recent disturbance
Problem area? no **Basis:** normal environmental conditions observed

Comments:

Is the hydrophytic vegetation criterion met? YES
Is the hydric soil criterion met? YES
Is the wetland hydrology criterion met? YES
Is the vegetation unit or plot wetland? YES

Rationale for jurisdictional decision: All three parameters satisfy wetland criteria.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
VEGETATION UNIT SAMPLING PROCEDURE

Project Number: 6943017
Project/Site: SeaTac - Borrow sites - Area 5
Field Investigator(s): AS/SL

Date: 12/7/94
Sample Plot #: 14

Herbs & Bryophytes	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
		Sum of Midpoints:			
		Dominance Threshold:			

Shrubs	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Rubus discolor	FACU	100	7	98.0	1*
		Sum of Midpoints:		98.0	
		Dominance Threshold:		49.0	

Saplings	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
		Sum of Midpoints:			
		Dominance Threshold:			

Trees	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Alnus rubra	FAC	60	5	63.0	1*
Populus trichocarpa	FAC	10	2	10.5	2
		Sum of Midpoints:		73.5	
		Dominance Threshold:		36.8	

% of Dominants that are OBL, FACW, and/or FAC: 1/2 = 50%

Hydrophytic Vegetation? YES

Comments: FORESTED UPLAND.
Plot located in red alder and blackberry dominated forest. Species outside plot include POMU, PTAR, and RUUR.

To determine dominants, first rank species by midpoints. Then sum midpoints in order until 50% of total for all species (dominance threshold) is immediately exceeded. All species contributing to this cumulative total plus any others having 20% of the total midpoint value are marked with an asterisk.

** Species that do not appear on the National List (Reed, 1988) may have been assigned an indicator status based on field observations and habitat information from the literature.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
SOILS, HYDROLOGY & SUMMARY

Project Number: 6943017
Project/Site: SeaTac - Borrow sites - Area 5
Field Investigator(s): AS/SL
Date: 12/7/94
Sample Plot #: 14

SOILS

SCS Mapping Unit: Not mapped (Urban land)
Field Identification: Urban land
Is soil on hydric soils list? no

Is soil a histosol? no
Histic epipedon present? no
Is soil mottled? no
Is soil gleyed? no

Horizon	Horizon Depth	Texture	Matrix Color	Mottle Color	Occurrence of Mottles	Gley Color	Organic Content
A	0-11	sandy loam	10YR 3/2				
B	11-20	sandy loam	2.5Y 4/4				

Landform/Topography: hillside plot in hilly area
Comments: Streaks occur from 14-20 inches - 10YR 5/6.

Hydric Soils? NO **Basis:** Lack of hydric characteristics

HYDROLOGY

Is ground surface inundated? no
Is soil saturated? yes
Depth to free-standing water in pit:

Surface water depth:
Depth to saturation: 20 inches

- ☐ Yes ☒ No -Oxidized root zones
- ☐ Yes ☒ No -Water marks
- ☐ Yes ☒ No -Drift lines
- ☐ Yes ☒ No -Water-borne sediment deposits
- ☐ Yes ☒ No -Water-stained leaves
- ☐ Yes ☒ No -Surface scoured areas
- ☐ Yes ☒ No -Wetland drainage patterns
- ☐ Yes ☒ No -Morphological plant adaptations

Comments:

Wetland Hydrology? NO **Basis:** Lack of hydrologic indicators

SUMMARY

Do normal environmental conditions exist at the plant community? yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? no

Disturbed area? no **Basis:** no recent disturbance
Problem area? no **Basis:** normal environmental conditions observed

Comments:

Is the hydrophytic vegetation criterion met? YES
Is the hydric soil criterion met? NO
Is the wetland hydrology criterion met? NO
Is the vegetation unit or plot wetland? NO

Rationale for jurisdictional decision: Soils and hydrology parameters do not satisfy wetland criteria.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
VEGETATION UNIT SAMPLING PROCEDURE

Project Number: 6943017 **Date:** 12/7/94
Project/Site: SeaTac - Borrow sites - Area 5 **Sample Plot #:** 15
Field Investigator(s): AS/SL

Herbs & Bryophytes	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Bromus sp.	**	90	6	85.5	1*
		Sum of Midpoints:		85.5	
		Dominance Threshold:		42.8	

Shrubs	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Rubus ursinus	FACU	2	1	3.0	1*
		Sum of Midpoints:		3.0	
		Dominance Threshold:		1.5	

Saplings	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Robinia pseudo-acacia	FACU	5	1	3.0	1*
		Sum of Midpoints:		3.0	
		Dominance Threshold:		1.5	

Trees	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Robinia pseudo-acacia	FACU	25	3	20.5	1*
		Sum of Midpoints:		20.5	
		Dominance Threshold:		10.3	

% of Dominants that are OBL, FACW, and/or FAC: 0/4 = 0%
Hydrophytic Vegetation? NO

Comments: GRASSLAND

To determine dominants, first rank species by midpoints. Then sum midpoints in order until 60% of total for all species (dominance threshold) is immediately exceeded. All species contributing to this cumulative total plus any others having 20% of the total midpoint value are marked with an asterisk.

** Species that do not appear on the National List (Reed, 1988) may have been assigned an indicator status based on field observations and habitat information from the literature.

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WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
SOILS, HYDROLOGY & SUMMARY

Project Number: 6943017
Date: 12/7/94
Project/Site: SeaTac - Borrow sites - Area 5
Sample Plot #: 15
Field Investigator(s): AS/SL

SOILS

SCS Mapping Unit: Not mapped (Urban land)
Field Identification: Urban land
Is soil on hydric soils list? no

Is soil a histosol? no
Histic epipedon present? no
Is soil mottled? no
Is soil gleyed? no

Horizon	Horizon Depth	Texture	Matrix Color	Mottle Color	Occurrence of Mottles	Gley Color	Organic Content
A1	0-11	gravelly sandy loam	10YR 3/2				
A2	11-20	sandy loam	10YR 3/3				

Landform/Topography: flat, top of hill
Comments:

Hydric Soils? NO **Basis:** Lack of hydric characteristics.

HYDROLOGY

Is ground surface inundated? no
Is soil saturated? no
Depth to free-standing water in pit:

Surface water depth:
Depth to saturation:

- ☐ Yes ☒ No -Oxidized root zones
- ☐ Yes ☒ No -Water marks
- ☐ Yes ☒ No -Drift lines
- ☐ Yes ☒ No -Water-borne sediment deposits
- ☐ Yes ☒ No -Water-stained leaves
- ☐ Yes ☒ No -Surface scoured areas
- ☐ Yes ☒ No -Wetland drainage patterns
- ☐ Yes ☒ No -Morphological plant adaptations

Comments:

Wetland Hydrology? NO **Basis:** Lack of hydrologic indicators.

SUMMARY

Do normal environmental conditions exist at the plant community? yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? no

Disturbed area? no **Basis:** no recent disturbance
Problem area? no **Basis:** normal conditions observed

Comments:

Is the hydrophytic vegetation criterion met? NO
Is the hydric soil criterion met? NO
Is the wetland hydrology criterion met? NO
Is the vegetation unit or plot wetland? NO

Rationale for jurisdictional decision: None of the parameters satisfy the wetland criteria.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
VEGETATION UNIT SAMPLING PROCEDURE

Project Number: 6943017 **Date:** 12/7/94
Project/Site: SeaTac - Borrow sites - Area 5 **Sample Plot #:** 16
Field Investigator(s): AS/SL

Herbs & Bryophytes	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
			Sum of Midpoints:		
			Dominance Threshold:		

Shrubs	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Spiraea douglasii	FACW	95	6	85.5	1*
Rubus laciniatus	FACU+	T	1	3.0	2
Rubus discolor	FACU	T	1	3.0	2
			Sum of Midpoints:	91.5	
			Dominance Threshold:	45.8	

Saplings	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
			Sum of Midpoints:		
			Dominance Threshold:		

Trees	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
			Sum of Midpoints:		
			Dominance Threshold:		

% of Dominants that are OBL, FACW, and/or FAC: 1/1 = 100%

Hydrophytic Vegetation? YES

Comments: SHRUBLAND.
Plot in monotypic stand of spirea. Appears area was drained many years ago to accomodate development.
Rubus sp., ALRU, ACMA, PYRUS, and COCO occur as associated species outside of plot.

To determine dominants, first rank species by midpoints. Then sum midpoints in order until 50% of total for all species (dominance threshold) is immediately exceeded. All species contributing to this cumulative total plus any others having 20% of the total midpoint value are marked with an asterisk.

** Species that do not appear on the National List (Reed, 1988) may have been assigned an indicator status based on field observations and habitat information from the literature.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
SOILS, HYDROLOGY & SUMMARY

Project Number: 6943017
Project/Site: SeaTac - Borrow sites - Area 5
Field Investigator(s): AS/SL
Date: 12/7/94
Sample Plot #: 16

SOILS

SCS Mapping Unit: Not mapped (Urban land)
Field Identification: Urban land
Is soil on hydric soils list? no

Is soil a histosol? no
Histic epipedon present? no
Is soil mottled? no
Is soil gleyed? no

Horizon	Horizon Depth	Texture	Matrix Color	Mottle Color	Occurrence of Mottles	Clay Color	Organic Content
Oi	3-0	duff					
A1	0-20	loam	10YR 2/1				
B	20-24+	sandy loam	2.5Y 4/3	7.5YR 4/4	m, 1&2, d		

Landform/Topography: flat
Comments: Drain tile or old cement pipe found at 20 inches. Soils appear drained

Hydric Soils? NO **Basis:** Lack of hydric characteristics

HYDROLOGY

Is ground surface inundated? no
Is soil saturated? no
Depth to free-standing water in pit:

Surface water depth:
Depth to saturation:

☐ Yes ☒ No -Oxidized root zones
☐ Yes ☒ No -Water marks
☐ Yes ☒ No -Drift lines
☐ Yes ☒ No -Water-borne sediment deposits
☐ Yes ☒ No -Water-stained leaves
☐ Yes ☒ No -Surface scoured areas
☐ Yes ☒ No -Wetland drainage patterns
☐ Yes ☒ No -Morphological plant adaptations

Comments: Drain tile or cement pipe found at 20 inches. Area appears to have been drained.

Wetland Hydrology? NO **Basis:** Lack of hydrologic indicators.

SUMMARY

Do normal environmental conditions exist at the plant community? yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? no

Disturbed area? no **Basis:** no recent disturbance
Problem area? no **Basis:** normal environmental conditions observed

Comments:

Is the hydrophytic vegetation criterion met? YES
Is the hydric soil criterion met? NO
Is the wetland hydrology criterion met? NO
Is the vegetation unit or plot wetland? NO

Rationale for jurisdictional decision: Soils and hydrology parameters do not satisfy wetland criteria.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
VEGETATION UNIT SAMPLING PROCEDURE

Project Number: 6943017
Project/Site: SeaTac - Borrow sites - Area 8
Field Investigator(s): AS/SL
Date: 12/9/94
Sample Plot #: 17

Herbs & Bryophytes	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Geum macrophyllum	FACW-	1	1	3.0	3
Equisetum arvense	FAC	35	4	38.0	1*
Agrostis tenuis	FAC	25	3	20.5	2*
Holcus lanatus	FAC	5	1	3.0	3
Festuca sp.	FACW-UPL**	1	1	3.0	3
		Sum of Midpoints:		67.5	
		Dominance Threshold:		33.8	

Shrubs	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Rubus discolor	FACU	T	1	3.0	1*
		Sum of Midpoints:		3.0	
		Dominance Threshold:		1.5	

Saplings	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Alnus rubra	FAC	T	1	3.0	1
Salix sitchensis	FACW	5	1	3.0	1*
		Sum of Midpoints:		6.0	
		Dominance Threshold:		3.0	

Trees	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Salix sp.	OBL-FACU	50	4	38.0	1*
Populus trichocarpa	FAC	7	2	10.5	2*
		Sum of Midpoints:		48.5	
		Dominance Threshold:		24.3	

% of Dominants that are OBL, FACW, and/or FAC: 5/6 = 83%

Hydrophytic Vegetation? YES

Comments: PFO.
Plot located in the willow dominated forest of Wetland G.

To determine dominance, first rank species by midpoints. Then sum midpoints in order until 50% of total for all species (dominance threshold) is immediately exceeded. All species contributing to the cumulative total plus any others having 20% of the total midpoint value are marked with an asterisk.

** Species that do not appear on the National List (Reed, 1988) may have been assigned an indicator status based on field observations and habitat information from the literature.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
SOILS, HYDROLOGY & SUMMARY

Project Number: 6943017
Project/Site: SeaTac - Borrow sites - Area 8
Field Investigator(s): AS/SL
Date: 12/9/94
Sample Plot #: 17

SOILS

SCS Mapping Unit: Not mapped (Urban land)
Field Identification: Urban land
Is soil on hydric soils list? no

Is soil a histosol? no
Histic epipedon present? no
Is soil mottled? no
Is soil gleyed? no

Horizon	Horizon Depth	Texture	Matrix Color	Mottle Color	Occurrence of Mottles	Gley Color	Organic Content
A	0-30	sand	2.5Y 4/2				

Landform/Topography: flat area at base of large hill
Comments: sand gleyed at 32". Soil appears to be fill and eroded/deposited material from slope to east.

Hydric Soils? NO **Basis:** Lack of hydric characteristics.

HYDROLOGY

Is ground surface inundated? no
Is soil saturated? no
Depth to free-standing water in pit:

Surface water depth:
Depth to saturation:

- ☐ Yes ☒ No -Oxidized root zones
- ☐ Yes ☒ No -Water marks
- ☐ Yes ☒ No -Drift lines
- ☐ Yes ☒ No -Water-borne sediment deposits
- ☐ Yes ☒ No -Water-stained leaves
- ☐ Yes ☒ No -Surface scoured areas
- ☐ Yes ☒ No -Wetland drainage patterns
- ☐ Yes ☒ No -Morphological plant adaptations

Comments: Soil appears to be an aquent. Hydrology is inferred from this moisture regime and vegetation is hydrophytic.

Wetland Hydrology? YES **Basis:** Inferred from aquic moisture regime and veg.

SUMMARY

Do normal environmental conditions exist at the plant community? no
Has the vegetation, soils, and/or hydrology been significantly disturbed? yes

Disturbed area? yes **Basis:** recent erosional deposition
Problem area? yes **Basis:** soils do not display hydric characteristics

Comments:

Is the hydrophytic vegetation criterion met? YES
Is the hydric soil criterion met? NO
Is the wetland hydrology criterion met? YES
Is the vegetation unit or plot wetland? YES

Rationale for jurisdictional decision: Vegetation and hydrology parameters met. Recent soil deposition over hydric soil.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
VEGETATION UNIT SAMPLING PROCEDURE

Project Number: 6943017
Project/Site: SeaTac - Borrow sites - Area 8
Field Investigator(s): AS/SL

Date: 12/7/94
Sample Plot #: 18

Herbs & Bryophytes	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Equisetum telmateia	FACW	30	4	38.0	1*
Veronica americana	OBL	5	1	3.0	2
Glyceria grandis	OBL	5	1	3.0	2
Holcus lanatus	FAC	1	1	3.0	2
Rorippa nasturtium-aquaticum	OBL	1	1	3.0	2
		Sum of Midpoints:		50.0	
		Dominance Threshold:		25.0	

Shrubs	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Rubus spectabilis	FAC+	T	1	3.0	1*
		Sum of Midpoints:		3.0	
		Dominance Threshold:		1.5	

Saplings	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Salix sitchensis	FACW	20	3	20.5	1*
		Sum of Midpoints:		20.5	
		Dominance Threshold:		10.3	

Trees	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Salix lasiandra	FACW+	55	5	63.0	1*
		Sum of Midpoints:		63.0	
		Dominance Threshold:		31.5	

% of Dominants that are OBL, FACW, and/or FAC: 4/4 = 100%

Hydrophytic Vegetation? YES

Comments: PFO.
Plot located in forested Wetland H.

To determine dominants, first rank species by midpoints. Then sum midpoints in order until 50% of total for all species (dominance threshold) is immediately exceeded. All species contributing to the cumulative total plus any others having 20% of the total midpoint value are marked with an asterisk.

** Species that do not appear on the National List (Reed, 1988) may have been assigned an indicator status based on field observations and habitat information from the literature.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
SOILS, HYDROLOGY & SUMMARY

Project Number: 6943017
Project/Site: SeaTac - Borrow sites - Area 8
Field Investigator(s): AS/SL
Date: 12/7/94
Sample Plot #: 18

SOILS

SCS Mapping Unit: Not mapped (Urban land)
Field Identification: Urban land
Is soil on hydric soils list? no

Is soil a histosol? no
Histic epipedon present? no
Is soil mottled? no
Is soil gleyed? yes

Horizon	Horizon Depth	Texture	Matrix Color	Mottle Color	Occurrence of Mottles	Gley Color	Organi Conten
A	0-18	sand				5G 4/1	

Landform/Topography: flat, low area
Comments:

Hydric Soils? YES **Basis:** Gley soil

HYDROLOGY

Is ground surface inundated? no
Is soil saturated? yes
Depth to free-standing water in pit: surface

Surface water depth:
Depth to saturation: surface

- ☐ Yes ☐ No -Oxidized root zones
- ☒ Yes ☐ No -Water marks
- ☐ Yes ☒ No -Drift lines
- ☒ Yes ☐ No -Water-borne sediment deposits
- ☒ Yes ☐ No -Water-stained leaves
- ☒ Yes ☐ No -Surface scoured areas
- ☒ Yes ☐ No -Wetland drainage patterns
- ☒ Yes ☐ No -Morphological plant adaptations

Comments:

Wetland Hydrology? YES **Basis:** Saturation to surface and other indicators.

SUMMARY

Do normal environmental conditions exist at the plant community? yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? no

Disturbed area? no **Basis:** no recent disturbance
Problem area? no **Basis:** normal environmental conditions observed

Comments:

Is the hydrophytic vegetation criterion met? YES
Is the hydric soil criterion met? YES
Is the wetland hydrology criterion met? YES
Is the vegetation unit or plot wetland? YES

Rationale for jurisdictional decision: All three parameters satisfy wetland criteria.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
VEGETATION UNIT SAMPLING PROCEDURE

Project Number: 6943017 **Date:** 12/8/94
Project/Site: SeaTac - Borrow sites - Area 8 **Sample Plot #:** 19
Field Investigator(s): JT/CW

Herbs & Bryophytes	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Glyceria grandis	OBL	2	1	3.0	1*
Ranunculus repens	FACW	3	1	3.0	1*
Scirpus microcarpus	OBL	5	1	3.0	1*
Urtica dioica	FAC+	3	1	3.0	1*
Phalaris arundinacea	FACW	1	1	3.0	1*
		Sum of Midpoints:		15.0	
		Dominance Threshold:		7.5	

Shrubs	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Rubus discolor	FACU	5	1	3.0	1*
		Sum of Midpoints:		3.0	
		Dominance Threshold:		1.5	

Saplings	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
		Sum of Midpoints:			
		Dominance Threshold:			

Trees	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Populus trichocarpa	FAC	10	2	10.5	2
Salix sitchensis	FACW	15	2	10.5	2
Salix lasiandra	FACW+	35	4	38.0	1*
		Sum of Midpoints:		59.0	
		Dominance Threshold:		29.5	

% of Dominants that are OBL, FACW, and/or FAC: 6/7 = 86%

Hydrophytic Vegetation? YES

Comments: PFO.
Plot located in Wetland L

To determine dominance, first rank species by midpoints. Then sum midpoints in order until 50% of total for all species (dominance threshold) is immediately exceeded. All species contributing to this cumulative total plus any others having 20% of the total midpoint value are marked with an asterisk.

** Species that do not appear on the National List (Reed, 1988) may have been assigned an indicator status based on field observations and habitat information from the literature.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
SOILS, HYDROLOGY & SUMMARY

Project Number: 6943017
Project/Site: SeaTac - Borrow sites - Area 8
Field Investigator(s): JT/CW
Date: 12/8/94
Sample Plot #: 19

SOILS

SCS Mapping Unit: Not mapped (Urban land)
Field Identification: Inclusion
Is soil on hydric soils list? no

Is soil a histosol? no
Histic epipedon present? no
Is soil mottled? no
Is soil gleyed? no

Horizon	Horizon Depth	Texture	Matrix Color	Mottle Color	Occurrence of Mottles	Gley Color	Organic Content
A	0-3	loam	10YR 4/1				med-high
B	3-13	mucky loam	10YR 2/2				high

Landform/Topography: flat, low area
Comments:

Hydric Soils? YES **Basis:** Low chroma and high organic content

HYDROLOGY

Is ground surface inundated? no
Is soil saturated? yes
Depth to free-standing water in pit: 8 inches

Surface water depth:
Depth to saturation: 3 inches

- ☐ Yes ☒ No -Oxidized root zones
- ☐ Yes ☒ No -Water marks
- ☐ Yes ☒ No -Drift lines
- ☐ Yes ☒ No -Water-borne sediment deposits
- ☐ Yes ☒ No -Water-stained leaves
- ☐ Yes ☒ No -Surface scoured areas
- ☐ Yes ☒ No -Wetland drainage patterns
- ☐ Yes ☒ No -Morphological plant adaptations

Comments:

Wetland Hydrology? YES **Basis:** Saturation at 3 inches

SUMMARY

Do normal environmental conditions exist at the plant community? yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? no

Disturbed area? no **Basis:** no recent disturbance
Problem area? no **Basis:** normal environmental conditions observed

Comments:

Is the hydrophytic vegetation criterion met? yes
Is the hydric soil criterion met? yes
Is the wetland hydrology criterion met? yes
Is the vegetation unit or plot wetland? yes

Rationale for jurisdictional decision: All three parameters satisy wetland criteria.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
VEGETATION UNIT SAMPLING PROCEDURE

Project Number: 6943017
Project/Site: SeaTac - Borrow sites - Area 8
Field Investigator(s): AS/JT

Date: 12/12/94
Sample Plot #: 20

Herbs & Bryophytes	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
moss	••	5	1	3.0	2
Equisetum arvense	FAC	18	3	20.5	1*
		Sum of Midpoints:		23.5	
		Dominance Threshold:		11.8	

Shrubs	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Rubus discolor	FACU	25	3	20.5	2*
Rubus spectabilis	FAC+	70	5	63.0	1*
Oemleria cerasiformis	FACU	15	2	10.5	3
		Sum of Midpoints:		94.0	
		Dominance Threshold:		47.0	

Saplings	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
		Sum of Midpoints:			
		Dominance Threshold:			

Trees	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Alnus rubra	FAC	20	3	20.5	1*
		Sum of Midpoints:		20.5	
		Dominance Threshold:		10.3	

% of Dominants that are OBL, FACW, and/or FAC: 3/4 = 100%

Hydrophytic Vegetation? YES

Comments: PFO/SS.
Plot located in small PFO/SS portion of forested Wetland C.

To determine dominants, first rank species by midpoints. Then sum midpoints in order until 50% of total for all species (dominance threshold) is immediately exceeded. All species contributing to this cumulative total plus any others having 20% of the total midpoint value are marked with an asterisk.

** Species that do not appear on the National List (Reed, 1988) may have been assigned an indicator status based on field observations and habitat information from the literature.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
SOILS, HYDROLOGY & SUMMARY

Project Number: 6943017
Project/Site: SeaTac - Borrow sites - Area 8
Field Investigator(s): AS/JT

Date: 12/12/94
Sample Plot #: 20

SOILS

SCS Mapping Unit: Not mapped (Urban land)
Field Identification: Urban land
Is soil on hydric soils list? no

Is soil a histosol? yes
Histic epipedon present? yes
Is soil mottled? yes
Is soil gleyed? yes

Horizon	Horizon Depth	Texture	Matrix Color	Mottle Color	Occurrence of Mottles	Gley Color	Organic Content
Oa	1-3	peaty muck	10YR 2/1				H
B	3-8	loamy sand		7.5YR 4/6	c, 1, d	5GY 4/1	H
2O	8-12	peaty muck	10YR 2/1				H
2B	12+	loamy sand	10YR 4/1				H

Landform/Topography: flat, low area
Comments:

Hydric Soils? YES **Basis:** Low chroma, organics.

HYDROLOGY

Is ground surface inundated? no
Is soil saturated? yes
Depth to free-standing water in pit: 12 inches

Surface water depth:
Depth to saturation: surface

- ☐ Yes ☒ No -Oxidized root zones
- ☐ Yes ☒ No -Water marks
- ☐ Yes ☒ No -Drift lines
- ☐ Yes ☒ No -Water-borne sediment deposits
- ☐ Yes ☒ No -Water-stained leaves
- ☐ Yes ☒ No -Surface scoured areas
- ☐ Yes ☒ No -Wetland drainage patterns
- ☐ Yes ☒ No -Morphological plant adaptations

Comments:

Wetland Hydrology? YES **Basis:** Saturation to surface

SUMMARY

Do normal environmental conditions exist at the plant community? yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? no

Disturbed area? no **Basis:** no recent disturbance
Problem area? no **Basis:** normal environmental conditions observed

Comments:

Is the hydrophytic vegetation criterion met? YES
Is the hydric soil criterion met? YES
Is the wetland hydrology criterion met? YES
Is the vegetation unit or plot wetland? YES

Rationale for jurisdictional decision: All three parameters satisfy wetland criteria.

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WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
VEGETATION UNIT SAMPLING PROCEDURE

Project Number: 6943017 **Date:** 12/12/94
Project/Site: SeaTac - Borrow sites - Area 8 **Sample Plot #:** 21
Field Investigator(s): AS/JT

Herbs & Bryophytes	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Ranunculus repens	FACW	35	4	38.0	1*
Phalaris arundinacea	FACW	25	3	20.5	2*
Urtica dioica	FAC+	3	1	3.0	4
Glyceria grandis	OBL	10	2	10.5	3
Agrostis sp.	FACW-FACU	1	1	3.0	4
Equisetum arvense	FAC	2	1	3.0	4
Juncus effusus	FACW	10	2	10.5	3
		Sum of Midpoints:		88.5	
		Dominance Threshold:		44.3	

Shrubs	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
		Sum of Midpoints:			
		Dominance Threshold:			

Saplings	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Salix lasiandra	FACW+	40	4	38.0	1*
Alnus rubra	FAC	10	2	10.5	2
Salix sitchensis	FACW	40	4	38.0	1*
		Sum of Midpoints:		86.5	
		Dominance Threshold:		43.3	

Trees	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Alnus rubra	FAC	15	2	10.5	2*
Salix lasiandra	FACW+	40	4	38.0	1*
		Sum of Midpoints:		48.5	
		Dominance Threshold:		24.3	

% of Dominants that are OBL, FACW, and/or FAC: 6/6 = 100%
Hydrophytic Vegetation? YES

Comments: PFO.
Plot located in forested Wetland J.

To determine dominants, first rank species by midpoints. Then sum midpoints in order until 50% of total for all species (dominance threshold) is immediately exceeded. All species contributing to this cumulative total plus any others having 20% of the total midpoint value are marked with an asterisk.

** Species that do not appear on the National List (Reed, 1988) may have been assigned an indicator status based on field observations and habitat information from the literature.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
SOILS, HYDROLOGY & SUMMARY

Project Number: 6943017
Date: 12/12/94
Project/Site: SeaTac - Borrow sites - Area 8
Sample Plot #: 21
Field Investigator(s): AS/JT

SOILS

SCS Mapping Unit: Not mapped (Urban land)
Field Identification: Inclusion
Is soil on hydric soils list? no

Is soil a histosol? no
Histic epipedon present? no
Is soil mottled? no
Is soil gleyed? no

Horizon	Horizon Depth	Texture	Matrix Color	Mottle Color	Occurrence of Mottles	Clay Color	Organic Content
A	0-18	loam	10YR 2/1				high

Landform/Topography: flat, low area
Comments:

Hydric Soils? YES **Basis:** Low chroma

HYDROLOGY

Is ground surface inundated? no
Is soil saturated? yes
Depth to free-standing water in pit:

Surface water depth:
Depth to saturation: surface

☐ Yes ☒ No -Oxidized root zones
☐ Yes ☒ No -Water marks
☐ Yes ☒ No -Drift lines
☐ Yes ☒ No -Water-borne sediment deposits

☐ Yes ☒ No -Water-stained leaves
☐ Yes ☒ No -Surface scoured areas
☐ Yes ☒ No -Wetland drainage patterns
☐ Yes ☒ No -Morphological plant adaptations

Comments:

Wetland Hydrology? YES **Basis:** Saturation to surface

SUMMARY

Do normal environmental conditions exist at the plant community? yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? no

Disturbed area? no **Basis:** no recent disturbance
Problem area? no **Basis:** normal environmental conditions observed

Comments:

Is the hydrophytic vegetation criterion met? YES
Is the hydric soil criterion met? YES
Is the wetland hydrology criterion met? YES
Is the vegetation unit or plot wetland? YES

Rationale for jurisdictional decision: All three parameters satisfy wetland criteria.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
VEGETATION UNIT SAMPLING PROCEDURE

Project Number: 6943017 **Date:** 12/12/94
Project/Site: SeaTac - Borrow sites - Area 8 **Sample Plot #:** 22
Field Investigator(s): AS/ JT

Herbs & Bryophytes	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Phalaris arundinacea	FACW	15	2	10.5	2*
Urtica dioica	FAC+	3	1	3.0	3
Glyceria grandis	OBL	15	2	10.5	2*
Potentilla sp.	OBL-FACU	20	3	20.5	1*
Scirpus microcarpus	OBL	1	1	3.0	3
Equisetum arvense	FAC	10	2	10.5	2*
		Sum of Midpoints:		58.0	
		Dominance Threshold:		29.0	

Shrubs	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Sambucus racemosa	FACU	15	2	10.5	1*
Rubus discolor	FACU	8	2	10.5	1*
Rubus spectabilis	FAC+	15	2	10.5	1*
		Sum of Midpoints:		31.5	
		Dominance Threshold:		15.8	

Saplings	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
		Sum of Midpoints:			
		Dominance Threshold:			

Trees	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Salix lasiandra	FACW+	60	5	63.0	1*
Salix sitchensis	FACW	20	3	20.5	2*
		Sum of Midpoints:		83.5	
		Dominance Threshold:		41.8	

% of Dominants that are OBL, FACW, and/or FAC: 7/9 = 78%

Hydrophytic Vegetation? YES

Comments: PFO.
Plot located in forested Wetland K.

To determine dominants, first rank species by midpoints. Then sum midpoints in order until 50% of total for all species (dominance threshold) is immediately exceeded. All species contributing to the cumulative total plus any others having 20% of the total midpoint value are marked with an asterisk.

** Species that do not appear on the National List (Reed, 1988) may have been assigned an indicator status based on field observations and habitat information from the literature.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
SOILS, HYDROLOGY & SUMMARY

Project Number: 6943017
Date: 12/12/94
Project/Site: SeaTac - Borrow sites - Area 8
Sample Plot #: 22
Field Investigator(s): AS/JT

SOILS

SCS Mapping Unit: Not mapped (Urban land)
Field Identification: Urban land
Is soil on hydric soils list? no

Is soil a histosol? yes
Histic epipedon present? yes
Is soil mottled? no
Is soil gleyed? no

Horizon	Horizon Depth	Texture	Matrix Color	Mottle Color	Occurrence of Mottles	Gley Color	Organic Content
O1	0-2	loamy muck	10YR 2/0				H
O2	2-8	mucky loam	10YR 3/1 10YR 3/2				H
O3	8-18	mucky peat	10YR 2/1				H

Landform/Topography: flat, low area
Comments: Large woody debris present throught profile.

Hydric Soils? YES **Basis:** Histosol

HYDROLOGY

Is ground surface inundated? no
Is soil saturated? yes
Depth to free-standing water in pit: 7 inches

Surface water depth:
Depth to saturation: surface

- ☐ Yes ☒ No -Oxidized root zones
- ☐ Yes ☒ No -Water marks
- ☐ Yes ☒ No -Drift lines
- ☐ Yes ☒ No -Water-borne sediment deposits
- ☐ Yes ☒ No -Water-stained leaves
- ☐ Yes ☒ No -Surface scoured areas
- ☐ Yes ☒ No -Wetland drainage patterns
- ☐ Yes ☒ No -Morphological plant adaptations

Comments:

Wetland Hydrology? YES **Basis:** Saturation to the surface

SUMMARY

Do normal environmental conditions exist at the plant community? yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? no

Disturbed area? no **Basis:** no recent disturbance
Problem area? no **Basis:** normal environmental conditions observed

Comments:

Is the hydrophytic vegetation criterion met? YES
Is the hydric soil criterion met? YES
Is the wetland hydrology criterion met? YES
Is the vegetation unit or plot wetland? YES

Rationale for jurisdictional decision: All three parameters satisfy wetland criteria.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
VEGETATION UNIT SAMPLING PROCEDURE

Project Number: 6943017 **Date:** 12/12/94
Project/Site: SeaTac - Borrow sites - Area 8 **Sample Plot #:** 23
Field Investigator(s): AS/JT

Herbs & Bryophytes	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
moss		20	3	20.5	
		Sum of Midpoints:		20.5	
		Dominance Threshold:		10.3	

Shrubs	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Rubus discolor	FACU	5	1	3.0	2*
Rubus ursinus	FACU	7	2	10.5	1*
		Sum of Midpoints:		13.5	
		Dominance Threshold:		6.8	

Saplings	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
		Sum of Midpoints:			
		Dominance Threshold:			

Trees	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Salix sp.	OBL-FACU	40	4	38.0	2*
Sambucus racemosa	FACU	60	5	63.0	1*
		Sum of Midpoints:		101.0	
		Dominance Threshold:		50.5	

% of Dominants that are OBL, FACW, and/or FAC: 1/4 = 25%

Hydrophytic Vegetation? NO

Comments: FORESTED UPLAND.
Plot located upslope and south of Plot 22 and Wetland K.

To determine dominants, first rank species by midpoints. Then sum midpoints in order until 50% of total for all species (dominance threshold) is immediately exceeded. All species contributing to this cumulative total plus any others having 20% of the total midpoint value are marked with an asterisk.

** Species that do not appear on the National List (Reed, 1988) may have been assigned an indicator status based on field observations and habitat information from the literature.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
SOILS, HYDROLOGY & SUMMARY

Project Number: 6943017
Date: 12/12/94
Project/Site: SeaTac - Borrow sites - Area 8
Sample Plot #: 23
Field Investigator(s): AS/JT

SOILS

SCS Mapping Unit: Not mapped (Urban land)
Field Identification: Urban land
Is soil on hydric soils list? no

Is soil a histosol? no
Histic epipedon present? no
Is soil mottled? no
Is soil gleyed? no

Horizon	Horizon Depth	Texture	Matrix Color	Mottle Color	Occurrence of Mottles	Gley Color	Organic Content
Oi	1-0	duff					
Oa	0-7	peat	7.5YR 3/2				H
B1	7-14	sandy loam	2.5Y 4/2				H
B2	14-18	sandy loam	2.5Y 3/2				H
			2.5Y 4/2				

Landform/Topography: upslope of wetland in rolling terrain
Comments:

Hydric Soils? NO **Basis:** Lack of hydric characteristics

HYDROLOGY

Is ground surface inundated? no
Is soil saturated? no
Depth to free-standing water in pit:

Surface water depth:
Depth to saturation:

- ☐ Yes ☒ No -Oxidized root zones
- ☐ Yes ☒ No -Water marks
- ☐ Yes ☒ No -Drift lines
- ☐ Yes ☒ No -Water-borne sediment deposits
- ☐ Yes ☒ No -Water-stained leaves
- ☐ Yes ☒ No -Surface scoured areas
- ☐ Yes ☒ No -Wetland drainage patterns
- ☐ Yes ☒ No -Morphological plant adaptations

Comments:

Wetland Hydrology? NO **Basis:** Lack of hydrologic indicators

SUMMARY

Do normal environmental conditions exist at the plant community? yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? no

Disturbed area? no **Basis:** no recent disturbance
Problem area? no **Basis:** normal conditions observed

Comments:

Is the hydrophytic vegetation criterion met? NO
Is the hydric soil criterion met? NO
Is the wetland hydrology criterion met? NO
Is the vegetation unit or plot wetland? NO

Rationale for jurisdictional decision: None of the parameters satisfy wetland criteria.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
VEGETATION UNIT SAMPLING PROCEDURE

Project Number: 6943017 **Date:** 12/12/94
Project/Site: SeaTac - Borrow sites - Area 8 **Sample Plot #:** 24
Field Investigator(s): AS/JT

Herbs & Bryophytes	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Typha latifolia	OBL	12	2	10.5	3
Juncus effusus	FACW	50	4	38.0	1*
Scirpus microcarpus	OBL	20	3	20.5	2*
Epilobium watsonii	FACW	20	3	20.5	2*
Equisetum arvense	FAC	5	1	3.0	4
		Sum of Midpoints:		92.5	
		Dominance Threshold:		46.3	

Shrubs	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
		Sum of Midpoints:			
		Dominance Threshold:			

Saplings	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
		Sum of Midpoints:			
		Dominance Threshold:			

Trees	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Salix lasiandra	FACW+	45	4	38.0	1*
Salix sitchensis	FACW	15	2	10.5	2
Alnus rubra	FAC	10	2	10.5	2
		Sum of Midpoints:		59.0	
		Dominance Threshold:		29.5	

% of Dominants that are OBL, FACW, and/or FAC: 4/4 = 100%

Hydrophytic Vegetation? YES

Comments: PFO/PEM.
Plot located on hillside in seep area in Wetland L. RUDI and CYSC located along south edge of wetland.

To determine dominants, first rank species by midpoints. Then sum midpoints in order until 50% of total for all species (dominance threshold) is immediately exceeded. All species contributing to the cumulative total plus any others having 20% of the total midpoint value are marked with an asterisk.

** Species that do not appear on the National List (Reed, 1988) may have been assigned an indicator status based on field observations and habitat information from the literature.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
SOILS, HYDROLOGY & SUMMARY

Project Number: 6943017
Date: 12/12/94
Project/Site: SeaTac - Borrow sites - Area 8
Sample Plot #: 24
Field Investigator(s): AS/JT

SOILS

SCS Mapping Unit: Not mapped (Urban land)
Field Identification: Urban land
Is soil on hydric soils list? no

Is soil a histosol? no
Histic epipedon present? no
Is soil mottled? yes
Is soil gleyed? yes

Horizon	Horizon Depth	Texture	Matrix Color	Mottle Color	Occurrence of Mottles	Gley Color	Organi. Conten
A	0-8	sandy loam	10YR 3/2				M
B	8-18	gravelly sandy loam		7.5Y 4/4	c,1,d	5GY 4/1	
				7.5Y 4/6		5GY 3/1	

Landform/Topography: 20 degree slope, hillside seep.
Comments:

Hydric Soils? YES **Basis:** Low chroma, gley, mottles

HYDROLOGY

Is ground surface inundated? no
Is soil saturated? yes
Depth to free-standing water in pit: < 10 inches

Surface water depth:
Depth to saturation: surface

☐ Yes ☒ No -Oxidized root zones
☐ Yes ☒ No -Water marks
☐ Yes ☒ No -Drift lines
☐ Yes ☒ No -Water-borne sediment deposits

☐ Yes ☒ No -Water-stained leaves
☐ Yes ☒ No -Surface scoured areas
☐ Yes ☒ No -Wetland drainage patterns
☐ Yes ☒ No -Morphological plant adaptations

Comments:

Wetland Hydrology? YES **Basis:** Saturated to surface

SUMMARY

Do normal environmental conditions exist at the plant community? yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? no

Disturbed area? no **Basis:** no recent disturbance
Problem area? no **Basis:** normal environmental conditions observed

Comments:

Is the hydrophytic vegetation criterion met? YES
Is the hydric soil criterion met? YES
Is the wetland hydrology criterion met? YES
Is the vegetation unit or plot wetland? YES

Rationale for jurisdictional decision: All three parameters satisfy wetland criteria

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
VEGETATION UNIT SAMPLING PROCEDURE

Project Number: 6943017
Project/Site: SeaTac - Borrow sites - Area 8
Field Investigator(s): AS/JT
Date: 12/12/94
Sample Plot #: 25

Herbs & Bryophytes	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Ranunculus repens	FACW	50	4	38.0	1*
Equisetum arvense	FAC	18	3	20.5	2*
		Sum of Midpoints:		58.5	
		Dominance Threshold:		29.3	

Shrubs	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
		Sum of Midpoints:			
		Dominance Threshold:			

Saplings	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
		Sum of Midpoints:			
		Dominance Threshold:			

Trees	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Populus trichocarpa	FAC	60	5	63.0	1*
Alnus rubra	FAC	40	4	38.0	2*
		Sum of Midpoints:		101.0	
		Dominance Threshold:		50.5	

% of Dominants that are OBL, FACW, and/or FAC: 4/4 = 100%

Hydrophytic Vegetation? YES

Comments: PFO.
Plot in slight depression. Deciduous forest overstory. Rubus/red alder upland outside of wetland.

To determine dominants, first rank species by midpoints. Then sum midpoints in order until 50% of total for all species (dominance threshold) is immediately exceeded. All species contributing to this cumulative total plus any others having 20% of the total midpoint value are marked with an asterisk.

** Species that do not appear on the National List (Reed, 1988) may have been assigned an indicator status based on field observations and related information from the literature.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
SOILS, HYDROLOGY & SUMMARY

Project Number: 6943017
Project/Site: SeaTac - Borrow sites - Area 8
Field Investigator(s): AS/JT

Date: 12/12/94
Sample Plot #: 25

SOILS

SCS Mapping Unit: Not mapped (Urban land)
Field Identification: Inclusion
Is soil on hydric soils list? no

Is soil a histosol? no
Histic epipedon present? no
Is soil mottled? yes
Is soil gleyed? yes

Horizon	Horizon Depth	Texture	Matrix Color	Mottle Color	Occurrence of Mottles	Gley Color	Organic Content
A	1-3	loam	10YR 3/1				low
B1	3-17	silt loam		7.5YR 4/6	c, 1-2, d	10Y 5/1 10Y 4/1	
B2	17-20	sand		7.5YR 4/6	c, 1-2 , d	10Y 4/1	

Landform/Topography: flat, slight depression
Comments:

Hydric Soils? YES **Basis:** Low chroma, mottles

HYDROLOGY

Is ground surface inundated? no
Is soil saturated? yes
Depth to free-standing water in pit:

Surface water depth:
Depth to saturation: 18"

- ☐ Yes ☒ No -Oxidized root zones
- ☐ Yes ☒ No -Water marks
- ☐ Yes ☒ No -Drift lines
- ☐ Yes ☒ No -Water-borne sediment deposits
- ☐ Yes ☒ No -Water-stained leaves
- ☐ Yes ☒ No -Surface scoured areas
- ☐ Yes ☒ No -Wetland drainage patterns
- ☐ Yes ☒ No -Morphological plant adaptations

Comments:

Wetland Hydrology? YES **Basis:** Saturation within 18 inches.

SUMMARY

Do normal environmental conditions exist at the plant community? yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? no

Disturbed area? no **Basis:** no recent disturbance
Problem area? no **Basis:** normal environmental conditions observed

Comments:

Is the hydrophytic vegetation criterion met? YES
Is the hydric soil criterion met? YES
Is the wetland hydrology criterion met? YES
Is the vegetation unit or plot wetland? YES

Rationale for jurisdictional decision: All three parameters satisfy wetland criteria.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
VEGETATION UNIT SAMPLING PROCEDURE

Project Number: 6943017
Project/Site: SeaTac - Borrow sites - Area 8
Field Investigator(s): AS/JT

Date: 12/12/94
Sample Plot #: 26

Herbs & Bryophytes	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Scirpus microcarpus	OBL	15	2	10.5	2*
Equisetum arvense	FAC	15	2	10.5	2*
Phalaris arundinacea	FACW	20	3	20.5	1*
Poa sp.	FACW-UPL**	5	1	3.0	3
		Sum of Midpoints:		44.5	
		Dominance Threshold:		22.3	

Shrubs	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Rubus discolor	FACU	tr	1	3.0	1*
Ilex sp.	FACU**	tr	1	3.0	1*
		Sum of Midpoints:		6.0	
		Dominance Threshold:		3.0	

Saplings	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
		Sum of Midpoints:			
		Dominance Threshold:			

Trees	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Alnus rubra	FAC	100	7	98.0	1*
		Sum of Midpoints:		98.0	
		Dominance Threshold:		49.0	

% of Dominants that are OBL, FACW, and/or FAC: 4/4 = 66%

Hydrophytic Vegetation? YES

Comments: PFO.
Plot located in roadside depression portion of Wetland P.

To determine comments, first rank species by midpoints. Then sum midpoints in order until 50% of total for all species (dominance threshold) is immediately exceeded. All species contributing to the cumulative total plus any others having 20% of the total midpoint value are marked with an asterisk.

** Species that do not appear on the National List (Reed, 1988) may have been assigned an indicator status based on field observations and related information from the literature.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
SOILS, HYDROLOGY & SUMMARY

Project Number: 6943017
Project/Site: SeaTac - Borrow sites - Area 8
Field Investigator(s): AS/JT
Date: 12/12/94
Sample Plot #: 26

SOILS

SCS Mapping Unit: Not mapped (Urban land)
Field Identification: Inclusion
Is soil on hydric soils list? no

Is soil a histosol? no
Histic epipedon present? yes
Is soil mottled? yes
Is soil gleyed? yes

Horizon	Horizon Depth	Texture	Matrix Color	Mottle Color	Occurrence of Mottles	Gley Color	Organic Content
Oa	0-10	mucky loam	10YR 3/1				
B	10-18	sandy loam		7.5YR 4/6	f,1,f	5Y 2.5/1	

Landform/Topography: depression in flat area in rolling terrain
Comments:

Hydric Soils? YES **Basis:** Histic epipedon, low chroma, mottles

HYDROLOGY

Is ground surface inundated? no
Is soil saturated? yes
Depth to free-standing water in pit: 14 inches
Surface water depth:
Depth to saturation: surface

- ☐ Yes ☒ No -Oxidized root zones
- ☐ Yes ☒ No -Water marks
- ☐ Yes ☒ No -Drift lines
- ☐ Yes ☒ No -Water-borne sediment deposits
- ☐ Yes ☒ No -Water-stained leaves
- ☐ Yes ☒ No -Surface scoured areas
- ☒ Yes ☐ No -Wetland drainage patterns
- ☐ Yes ☒ No -Morphological plant adaptations

Comments:

Wetland Hydrology? YES **Basis:** Saturated at 14 inches

SUMMARY

Do normal environmental conditions exist at the plant community? yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? no

Disturbed area? no **Basis:** no recent disturbance
Problem area? no **Basis:** normal environmental conditions observed

Comments:

Is the hydrophytic vegetation criterion met? YES
Is the hydric soil criterion met? YES
Is the wetland hydrology criterion met? YES
Is the vegetation unit or plot wetland? YES

Rationale for jurisdictional decision: All three parameters satisfy wetland criteria.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
VEGETATION UNIT SAMPLING PROCEDURE

Project Number: 6943017 **Date:** 12/12/94
Project/Site: SeaTac - Borrow sites - Area 8 **Sample Plot #:** 27
Field Investigator(s): AS/JT

Herbs & Bryophytes	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Glyceria grandis	OBL	2	1	3.0	3
Scirpus microcarpus	OBL	10	2	10.5	2
Epilobium watsonii	FACW	8	2	10.5	2
Juncus effusus	FACW	6	2	10.5	2
Phalaris arundinacea	FACW	30	4	38.0	1*
Equisetum arvense	FAC	5	1	3.0	3
Polystichum munitum	FACU	10	2	10.5	2
Athyrium filix-femina	FAC	50	4	38.0	1*
		Sum of Midpoints:		124.0	
		Dominance Threshold:		62.0	

Shrubs	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Rubus discolor	FACU	25	3	20.5	1*
		Sum of Midpoints:		20.5	
		Dominance Threshold:		10.3	

Saplings	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Populus trichocarpa	FAC	20	3	20.5	1*
		Sum of Midpoints:		20.5	
		Dominance Threshold:		10.3	

Trees	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
		Sum of Midpoints:			
		Dominance Threshold:			

% of Dominants that are OBL, FACW, and/or FAC: 3/4 = 75%

Hydrophytic Vegetation? YES

Comments: PEM.

To determine dominants, first rank species by midpoints. Then sum midpoints in order until 50% of total for all species (dominance threshold) is immediately exceeded. All species contributing to the cumulative total plus any others having 20% of the total midpoint value are marked with an asterisk.

** Species that do not appear on the National List (Reed, 1988) may have been assigned an indicator status based on field observations and habitat information from the literature.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
SOILS, HYDROLOGY & SUMMARY

Project Number: 6943017
Project/Site: SeaTac - Borrow sites - Area 8
Field Investigator(s): AS/JT
Date: 12/12/94
Sample Plot #: 27

SOILS

SCS Mapping Unit: Not mapped (Urban land)
Field Identification: Urban land
Is soil on hydric soils list? no

Is soil a histosol? no
Histic epipedon present? no
Is soil mottled? yes
Is soil gleyed? yes

Horizon	Horizon Depth	Texture	Matrix Color	Mottle Color	Occurrence of Mottles	Gley Color	Organic Content
A	0-12	loam	10YR 2/0				
B	12-18	sandy loam		7.5YR 4/6	c, 1-2, d	10Y 4/1 10GY4/1	

Landform/Topography: Slight slope. Slight depression.
Comments:

Hydric Soils? YES **Basis:** Low chroma, mottles, gley

HYDROLOGY

Is ground surface inundated? no
Is soil saturated? yes
Depth to free-standing water in pit:

Surface water depth:
Depth to saturation: surface

- ☐ Yes ☒ No -Oxidized root zones
- ☒ Yes ☐ No -Water marks
- ☐ Yes ☒ No -Drift lines
- ☐ Yes ☒ No -Water-borne sediment deposits
- ☒ Yes ☐ No -Water-stained leaves
- ☐ Yes ☒ No -Surface scoured areas
- ☒ Yes ☐ No -Wetland drainage patterns
- ☐ Yes ☒ No -Morphological plant adaptations

Comments: Water slowly seeping into pit at about 6 inches. Inundated areas throughout the wetland - 1-6 inches.

Wetland Hydrology? YES **Basis:** Saturation to surface

SUMMARY

Do normal environmental conditions exist at the plant community? yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? no

Disturbed area? no **Basis:** no recent disturbance
Problem area? no **Basis:** normal environmental conditions observed

Comments:

Is the hydrophytic vegetation criterion met? YES
Is the hydric soil criterion met? YES
Is the wetland hydrology criterion met? YES
Is the vegetation unit or plot wetland? YES

Rationale for jurisdictional decision: All three parameters satisfy wetland criteria.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
VEGETATION UNIT SAMPLING PROCEDURE

Project Number: 6943017
Project/Site: SeaTac - Borrow sites - Area 8
Field Investigator(s): AS/CW

Date: 12/20/94
Sample Plot #: 28

Herbs & Bryophytes	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Cirsium arvense	FACU+	18	3	20.5	2*
Festuca arundinacea	FAC-	2	1	3.0	4
Urtica dioica	FAC+	10	2	10.5	3
Phalaris arundinacea	FACW	25	3	20.5	2*
Brassica nigra	FAC**	10	2	10.5	3
Agrostis stolonifera	FAC*	40	4	38.0	1*
		Sum of Midpoints:		103.0	
		Dominance Threshold:		51.5	

Shrubs	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
		Sum of Midpoints:			
		Dominance Threshold:			

Saplings	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
		Sum of Midpoints:			
		Dominance Threshold:			

Trees	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
		Sum of Midpoints:			
		Dominance Threshold:			

% of Dominants that are OBL, FACW, and/or FAC: 2/3 = 67%

Hydrophytic Vegetation? YES

Comments: PEM.
Plot located in flat area east of Lake Reba.

To determine dominants, first rank species by midpoints. Then sum midpoints in order until 50% of total for all species (dominance threshold) is immediately exceeded. All species contributing to the cumulative total plus any others having 20% of the total midpoint value are marked with an asterisk.

** Species that do not appear on the National List (Reed, 1988) may have been assigned an indicator status based on field observations and habitat information from the literature.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
SOILS, HYDROLOGY & SUMMARY

Project Number: 6943017
Date: 12/20/94
Project/Site: SeaTac - Borrow sites - Area 8
Sample Plot #: 28
Field Investigator(s): AS/CW

SOILS

SCS Mapping Unit: Not mapped (Urban land)
Field Identification: Urban land
Is soil on hydric soils list? no

Is soil a histosol? no
Histic epipedon present? no
Is soil mottled? no
Is soil gleyed? no

Horizon	Horizon Depth	Texture	Matrix Color	Mottle Color	Occurrence of Mottles	Gley Color	Organic Content
A	0-8	loam	10YR 2/1				m
B	8-12+	gravelly sandy loam	10YR 2/1				m/h

Landform/Topography: flat
Comments: wood chunks below 8 inches.

Hydric Soils? YES **Basis:** Low chroma

HYDROLOGY

Is ground surface inundated? no
Is soil saturated? yes
Depth to free-standing water in pit: 8 inches

Surface water depth:
Depth to saturation: surface

- ☐ Yes ☒ No -Oxidized root zones
- ☐ Yes ☒ No -Water marks
- ☐ Yes ☒ No -Drift lines
- ☐ Yes ☒ No -Water-borne sediment deposits
- ☐ Yes ☒ No -Water-stained leaves
- ☐ Yes ☒ No -Surface scoured areas
- ☐ Yes ☒ No -Wetland drainage patterns
- ☐ Yes ☒ No -Morphological plant adaptations

Comments: Pit dug during storm with heavy precipitation.

Wetland Hydrology? YES **Basis:** saturation, standing water

SUMMARY

Do normal environmental conditions exist at the plant community? yes
Has the vegetation, soils, and/or hydrology been significantly disturbed? no

Disturbed area? no **Basis:** no recent disturbance
Problem area? no **Basis:** normal environmental conditions observed

Comments:

Is the hydrophytic vegetation criterion met? YES
Is the hydric soil criterion met? YES
Is the wetland hydrology criterion met? YES
Is the vegetation unit or plot wetland? YES

Rationale for jurisdictional decision: All three parameters satisfy wetland criteria.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
VEGETATION UNIT SAMPLING PROCEDURE

SHAPIRO & ASSOCIATES

Project/Site: SeaTac - Operations area
Field Investigator(s): AS, CW

Sample Plot #: 29
Date: 9/1/94

Herbs & Bryophytes	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Equisetum arvense	FAC	60	5	63.0	1*
Typha latifolia	OBL	15	2	10.5	2
Epilobium watsonii	FACW	12	2	10.5	2
Holcus lanatus	FAC	6	2	10.5	2
Agrostis sp.	FACW-FACU	1	1	3.0	3
		Sum of Midpoints:		97.5	
		Dominance Threshold:		48.8	

Shrubs	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Rubus laciniatus	FACU+	1	1	3.0	2
Rubus discolor	FACU	10	2	10.5	1*
		Sum of Midpoints:		13.5	
		Dominance Threshold:		6.8	

Saplings	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
		Sum of Midpoints:			
		Dominance Threshold:			

Trees	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
		Sum of Midpoints:			
		Dominance Threshold:			

% of Dominants that are OBL, FACW, and/or FAC: 1/2 = 50%

Hydrophytic Vegetation? YES

Comments:

To determine dominants, first rank species by midpoints. Then sum midpoints in order until 50% of total for all species (dominance threshold) is immediately exceeded. All species contributing to this cumulative total plus any others having 20% of the total midpoint value are marked with an asterisk.

** Species that do not appear on the National List (Reed, 1988) may have been assigned an indicator status based on field observations and habitat information from the literature.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
SOILS, HYDROLOGY & SUMMARY

SHAPIRO & ASSOCIATES

Project/Site: SeaTac - Operations area
Field Investigator(s): AS, CW
Sample Plot #: 29
Date: 9/1/94

SOILS

SCS Mapping Unit: Unclassified (Urban Land)
Field Identification: Urban Land
Is soil on hydric soils list? NO

Is soil a histosol? NO
Histic epipedon present? NO
Is soil mottled? YES
Is soil gleyed? YES

Horizon	Horizon Depth	Texture	Matrix Color	Mottle Color	Occurrence of Mottles	Gley Color	Organic Content
A	0-6"	loam	10YR 4/2				med/hi
B	6-12"	silt loam	5Y5/2 5Y5/1	10YR 5/6	C,1,P		

Landform/Topography: Steep fill material.
Comments: Soil on steep fill material deposited as foundation for runways

Hydric Soils? YES **Basis:** Low chroma, mottles

HYDROLOGY

Is ground surface inundated? NO
Is soil saturated? YES
Depth to free-standing water in pit: 12"

Surface water depth: NA
Depth to saturation: 8"

- X Oxidized root zones
- Water marks
- Drift lines
- Water-borne sediment deposits
- Water-stained leaves
- Surface scoured areas
- X Wetland drainage patterns
- Morphological plant adaptations

Comments: Water discharges along steep hillside (up to 45%).

Wetland Hydrology? YES **Basis:** Saturation, wetland drainage patterns, oxidized root zones.

SUMMARY

Do normal environmental conditions exist at the plant community? YES
Has the vegetation, soils, and/or hydrology been significantly disturbed? NO

Disturbed area? NO **Basis:** no recent disturbance
Problem area? NO **Basis:** normal environmental conditions observed

Comments: Wetland associated with a hillside seep.

Is the hydrophytic vegetation criterion met? YES
Is the hydric soil criterion met? YES
Is the wetland hydrology criterion met? YES
Is the vegetation unit or plot wetland? YES

Rationale for jurisdictional decision: All three wetland parameters met

SHAPIRO & ASSOCIATES

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
VEGETATION UNIT SAMPLING PROCEDURE

Project/Site: SeaTac - Operations area
Field Investigator(s): AS, CW

Sample Plot #: 30
Date: 8/25/94

Herbs & Bryophytes	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Athyrium filix-femina	FAC	35	4	38.0	1*
Polystichum munitum	FACU	10	2	10.5	3
Equisetum telmateia	FACW	25	3	20.5	2*
Lysichitum americanum	OBL	10	2	10.5	3
Phalaris arundinacea	FACW	5	1	3.0	4
		Sum of Midpoints:		82.5	
		Dominance Threshold:		41.3	

Shrubs	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Rubus spectabilis	FAC+	35	4	38.0	1*
Oemleria cerasiformis	FACU	5	1	3.0	2
Rubus ursinus	FACU	5	1	3.0	2
Corylus cornuta	FACU	5	1	3.0	2
		Sum of Midpoints:		47.0	
		Dominance Threshold:		23.5	

Saplings	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
		Sum of Midpoints:			
		Dominance Threshold:			

Trees	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Alnus rubra	FAC	70	5	63.0	1*
Acer macrophyllum	FACU	10	2	10.5	2
		Sum of Midpoints:		73.5	
		Dominance Threshold:		36.8	

% of Dominants that are OBL, FACW, and/or FAC: 4/4 = 100%

Hydrophytic Vegetation? YES

Comments:

To determine dominants, first rank species by midpoints. Then sum midpoints in order until 50% of total for all species (dominance threshold) is immediately exceeded. All species contributing to the cumulative total plus any others having 20% of the total midpoint value are marked with an asterisk.

** Species that do not appear on the National List (Reed, 1988) may have been assigned an indicator status based on field observations and habitat information from the literature.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
SOILS, HYDROLOGY & SUMMARY

SHAPIRO & ASSOCIATES

Project/Site: SeaTac - Operations area
Field Investigator(s): AS, CW
Sample Plot #: 30
Date: 8/25/94

SOILS

SCS Mapping Unit: Unclassified (Urban Land)
Field Identification: Urban Land
Is soil on hydric soils list? NO

Is soil a histosol? NO
Histic epipedon present? NO
Is soil mottled? NO
Is soil gleyed? YES

Horizon	Horizon Depth	Texture	Matrix Color	Mottle Color	Occurrence of Mottles	Gley Color	Organic Content
A	0-10"	sandy loam	10YR 3/1				med/hi
						5GY 4/1	
B	10-18"	sandy loam				5Y 4/1	med/hi

Landform/Topography: East-west oriented ravine.
Comments:

Hydric Soils? YES **Basis:** Low chroma, gleyed colors

HYDROLOGY

Is ground surface inundated? NO
Is soil saturated? YES
Depth to free-standing water in pit: 20"

Surface water depth: NA
Depth to saturation: Surface

	Oxidized root zones
	Water marks
	Drift lines
	Water-borne sediment deposits
X	Water-stained leaves
	Surface scoured areas
X	Wetland drainage patterns
	Morphological plant adaptations

Comments: Plot located adjacent to small stream.

Wetland Hydrology? YES **Basis:** Saturation, wetland drainage patterns, water-stained leaves

SUMMARY

Do normal environmental conditions exist at the plant community? YES
Has the vegetation, soils, and/or hydrology been significantly disturbed? NO

Disturbed area? NO **Basis:** no recent disturbance
Problem area? NO **Basis:** normal environmental conditions observed

Comments: Located at west end of ravine. Stream enters culvert at this end and exits at 12th.

Is the hydrophytic vegetation criterion met? YES
Is the hydric soil criterion met? YES
Is the wetland hydrology criterion met? YES
Is the vegetation unit or plot wetland? YES

Rationale for jurisdictional decision: All three wetland parameters met.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
VEGETATION UNIT SAMPLING PROCEDURE

SHAPIRO & ASSOCIATES

Project/Site: SeaTac - Operations area
Field Investigator(s): AS, CW

Sample Plot #: 31
Date: 8/19/94

Herbs & Bryophytes	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Holcus lanatus	FAC	30	4	38.0	1*
Agrostis stolonifera	FAC*	30	4	38.0	1*
Agrostis tenuis	FAC	25	3	20.5	2
Rumex crispus	FAC+	1	1	3.0	
Juncus effusus	FACW	6	2	10.5	
Anthoxanthum odoratum	FACU	10	2	10.5	
Epilobium watsonii	FACW	1	1	3.0	
		Sum of Midpoints:		123.5	
		Dominance Threshold:		61.8	

Shrubs	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Rubus discolor	FACU	5	1	3.0	1*
Cytisus scoparius	UPL**	2	1	3.0	1*
		Sum of Midpoints:		6.0	
		Dominance Threshold:		3.0	

Saplings	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
		Sum of Midpoints:			
		Dominance Threshold:			

Trees	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
		Sum of Midpoints:			
		Dominance Threshold:			

% of Dominants that are OBL, FACW, and/or FAC: 2/4 = 50%

Hydrophytic Vegetation? YES

Comments: DEPRESSIONAL AREA AT TOE OF SLOPE, SOME ALDER AND WILLOW TREES ALONG WETLAND EDGES AT SOUTHERN END. SHRUBS LARGELY ROOTED OUTSIDE OF WETLAND.

To determine dominants, first rank species by midpoints. Then sum midpoints in order until 50% of total for all species (dominance threshold) is immediately exceeded. All species contributing to the cumulative total plus any others having 20% of the total midpoint value are marked with an asterisk.

** Species that do not appear on the National List (Reed, 1988) may have been assigned an indicator status based on field observations and habitat information from the literature.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
SOILS, HYDROLOGY & SUMMARY

SHAPIRO & ASSOCIATES

Project/Site: SeaTac - Operations area
Field Investigator(s): AS, CW
Sample Plot #: 31
Date: 8/19/94

SOILS

SCS Mapping Unit: Unclassified (Urban Land)
Field Identification: Urban Land
Is soil on hydric soils list? NO

Is soil a histosol? NO
Histic epipedon present? NO
Is soil mottled? YES
Is soil gleyed? YES

Horizon	Horizon Depth	Texture	Matrix Color	Mottle Color	Occurrence of Mottles	Clay Color	Organic Content
A	0 - 4"	loam	2.5Y 4/2				medium
B	4 - 12"	loam	2.5Y 4/2	7.5YR 4/6	M, 2, D		medium
C	12 - 18"	sandy loam	5Y 5/2				low

Landform/Topography: Depression at toe of slope.
Comments: B horizon is densely compacted hardpan.

Hydric Soils? YES **Basis:** Low chroma, mottles

HYDROLOGY

Is ground surface inundated? NO
Is soil saturated? NO
Depth to free-standing water in pit: NA

Surface water depth: NA
Depth to saturation: NA

X	Oxidized root zones		Water-stained leaves
	Water marks		Surface scoured areas
	Drift lines	X	Wetland drainage patterns
	Water-borne sediment deposits		Morphological plant adaptations

Comments: Depression at toe of slope, oxidized root zones in upper portion of B horizon. Root penetration to 9 inches.

Wetland Hydrology? YES **Basis:** Oxidized root zones, wetland drainage patterns, hydric soil.

SUMMARY

Do normal environmental conditions exist at the plant community? YES
Has the vegetation, soils, and/or hydrology been significantly disturbed? NO

Disturbed area? NO **Basis:** No recent disturbance.
Problem area? NO **Basis:** Normal environmental conditions exist.

Comments: Wetland occurs between roadway and toe of slope, drains south to drop structure.

Is the hydrophytic vegetation criterion met? YES
Is the hydric soil criterion met? YES
Is the wetland hydrology criterion met? YES
Is the vegetation unit or plot wetland? YES

Rationale for jurisdictional decision: All three wetland parameters met.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
VEGETATION UNIT SAMPLING PROCEDURE

SHAPIRO & ASSOCIATES

Project/Site: SeaTac - Operations area
Field Investigator(s): AS, CW

Sample Plot #: 32
Date: 8/25/94

Herbs & Bryophytes	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Polystichum munitum	FACU	4	1	3.0	1*
		Sum of Midpoints:		3.0	
		Dominance Threshold:		1.5	

Shrubs	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Rubus spectabilis	FAC+	25	3	20.5	2*
Rubus discolor	FACU	40	4	38.0	1*
Unknown shrub		5	1	3.0	3
Rubus ursinus	FACU	20	3	20.5	2*
Ilex sp.	FACU**	2	1	3.0	3
		Sum of Midpoints:		85.0	
		Dominance Threshold:		42.5	

Saplings	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
		Sum of Midpoints:			
		Dominance Threshold:			

Trees	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Acer macrophyllum	FACU	15	2	10.5	2
Alnus rubra	FAC	60	5	63.0	1*
Corylus cornuta	FACU	10	2	10.5	2
		Sum of Midpoints:		84.0	
		Dominance Threshold:		42.0	

% of Dominants that are OBL, FACW, and/or FAC: 2/5 = 40%

Hydrophytic Vegetation? NO

Comments:

To determine dominance, first rank species by midpoints. Then sum midpoints in order until 50% of total for all species (dominance threshold) is immediately exceeded. All species contributing to the cumulative total plus any others having 20% of the total midpoint value are marked with an asterisk.

** Species that do not appear on the National List (Reed, 1988) may have been assigned an indicator status based on field observations and habitat information from the literature.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
SOILS, HYDROLOGY & SUMMARY

SHAPIRO & ASSOCIATES

Project/Site: SeaTac - Operations area
Field Investigator(s): AS, CW

Sample Plot #: 32
Date: 8/25/94

SOILS

SCS Mapping Unit: Unclassified (Urban Land)
Field Identification: Urban Land
Is soil on hydric soils list? NO

Is soil a histosol? NO
Histic epipedon present? NO
Is soil mottled? NO
Is soil gleyed? NO

Horizon	Horizon Depth	Texture	Matrix Color	Mottle Color	Occurrence of Mottles	Gley Color	Organic Content
A	0-4"	silt loam	10YR 4/2				med/hi
B1	4-16"	silt loam	10YR 4/3				med/hi
B2	16-18"	silt loam	10YR 3/3				med

Landform/Topography: East-west oriented ravine. Rolling terrain outside of steep ravine.
Comments:

Hydric Soils? NO **Basis:** Lack of hydric indicators.

HYDROLOGY

Is ground surface inundated? NO
Is soil saturated? NO
Depth to free-standing water in pit: NA

Surface water depth: NA
Depth to saturation: NA

Oxidized root zones
Water marks
Drift lines
Water-borne sediment deposits

Water-stained leaves
Surface scoured areas
Wetland drainage patterns
Morphological plant adaptations

Comments:

Wetland Hydrology? NO **Basis:** Lack of hydrologic indicators.

SUMMARY

Do normal environmental conditions exist at the plant community? YES
Has the vegetation, soils, and/or hydrology been significantly disturbed? NO

Disturbed area? NO **Basis:** no recent disturbance
Problem area? NO **Basis:** normal environmental conditions observed

Comments: Wetland located apx 150 feet southeast of Plot #8 at the top of the southern slope of the ravine.

Is the hydrophytic vegetation criterion met? NO
Is the hydric soil criterion met? NO
Is the wetland hydrology criterion met? NO
Is the vegetation unit or plot wetland? NO

Rationale for jurisdictional decision: None of the wetland parameters met.

SHAPIRO & ASSOCIATES

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
VEGETATION UNIT SAMPLING PROCEDURE

Project/Site: SeaTac - Operations area
Field Investigator(s): AS, CW

Sample Plot #: 33
Date: 8/23/94

Herbs & Bryophytes	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Ranunculus repens	FACW	9	2	10.5	2*
Equisetum arvense	FAC	4	1	3.0	
Urtica dioica	FAC+	2	1	3.0	
Bidens cernua	FACW+	4	1	3.0	
Agrostis tenuis	FAC	10	2	10.5	1*
Tiarella trifoliata	FAC-	1	1	3.0	
Poa sp.	FACW-UPL**	5	1	3.0	
Convovulus arvensis	FAC**	1	1	3.0	
Polystichum munitum	FACU	1	1	3.0	
		Sum of Midpoints:		42.0	
		Dominance Threshold:		21.0	

Shrubs	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Rubus spectabilis	FAC+	10	2	10.5	2*
Rubus discolor	FACU	50	4	38.0	1*
Rubus ursinus	FACU	5	1	3.0	
Oemleria cerasiformis	FACU	1	1	3.0	
		Sum of Midpoints:		54.5	
		Dominance Threshold:		27.3	

Saplings	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
		Sum of Midpoints:			
		Dominance Threshold:			

Trees	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Alnus rubra	FAC	80	6	85.5	1*
Acer macrophyllum	FACU	10	2	10.5	
		Sum of Midpoints:		96.0	
		Dominance Threshold:		48.0	

% of Dominants that are OBL, FACW, and/or FAC: 4/5 = 80%

Hydrophytic Vegetation? YES

Comments:

To determine dominants, first rank species by midpoints. Then sum midpoints in order until 50% of total for all species (dominance threshold) is immediately exceeded. All species contributing to the cumulative total plus any others having 20% of the total midpoint value are marked with an asterisk.

** Species that do not appear on the National List (Reed, 1988) may have been assigned an indicator status based on field observations and habitat information from the literature.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
SOILS, HYDROLOGY & SUMMARY

SHAPIRO & ASSOCIATES

Project/Site: SeaTac - Operations area
Field Investigator(s): AS, CW
Sample Plot #: 33
Date: 8/23/94

SOILS

SCS Mapping Unit: Unclassified (Urban Land)
Field Identification: Urban Land
Is soil on hydric soils list? NO

Is soil a histosol? NO
Histic epipedon present? NO
Is soil mottled? NO
Is soil gleyed? NO

Horizon	Horizon Depth	Texture	Matrix Color	Mottle Color	Occurrence of Mottles	Clay Color	Organic Content
A	0 - 7"	sandy loam	10YR 3/2				med/high
C	7 - 14"	sandy loam	10YR 3/3				medium
R	14"+	basalt regolith (glacial erratic)					

Landform/Topography: Topographic trough
Comments: East-west trending trough, west-central portion of POS property.

Hydric Soils? NO **Basis:** High chromas, no redoxymorphic features.

HYDROLOGY

Is ground surface inundated? NO
Is soil saturated? NO
Depth to free-standing water in pit: NA

Surface water depth: NA
Depth to saturation: NA

Oxidized root zones
Water marks
Drift lines
Water-borne sediment deposits

Water-stained leaves
Surface scoured areas
Wetland drainage patterns
Morphological plant adaptations

Comments: Ponding may occur in isolated depressions during wetter times of the year.

Wetland Hydrology? NO **Basis:** Lack of hydrologic indicators.

SUMMARY

Do normal environmental conditions exist at the plant community? YES
Has the vegetation, soils, and/or hydrology been significantly disturbed? NO

Disturbed area? NO **Basis:** No recent disturbance.
Problem area? NO **Basis:** Normal environmental conditions observed.

Comments:

Is the hydrophytic vegetation criterion met? YES
Is the hydric soil criterion met? NO
Is the wetland hydrology criterion met? NO
Is the vegetation unit or plot wetland? NO

Rationale for jurisdictional decision: Only one of three wetland parameters meet.

SHAPIRO & ASSOCIATES

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
VEGETATION UNIT SAMPLING PROCEDURE

Project/Site: SeaTac - Operations Area
Field Investigator(s): AS, CW

Sample Plot #: 34
Date: 8/23/94

Herbs & Bryophytes	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Equisetum telmateia	FACW	55	5	63.0	1*
Polystichum munitum	FACU	10	2	10.5	
Hedera helix	FACU**	15	2	10.5	
Epilobium angustifolium	FACU+	2	1	3.0	
		Sum of Midpoints:		87.0	
		Dominance Threshold:		43.5	

Shrubs	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Rubus discolor	FACU	30	4	38.0	1*
		Sum of Midpoints:		38.0	
		Dominance Threshold:		19.0	

Saplings	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
		Sum of Midpoints:			
		Dominance Threshold:			

Trees	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Alnus rubra	FAC	55	5	63.0	1*
		Sum of Midpoints:		63.0	
		Dominance Threshold:		31.5	

% of Dominants that are OBL, FACW, and/or FAC: 2/3 = 67%

Hydrophytic Vegetation? YES

Comments: LOCATED AT TOE OF SLOPE.

To determine dominants, first rank species by midpoints. Then sum midpoints in order until 50% of total for all species (dominance threshold) is immediately exceeded. All species contributing to the cumulative total plus any others having 20% of the total midpoint value are marked with an asterisk.

** Species that do not appear on the National List (Reed, 1988) may have been assigned an indicator status based on field observations and habitat information from the literature.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
SOILS, HYDROLOGY & SUMMARY

SHAPIRO & ASSOCIATES

Project/Site: SeaTac - Operations area
Field Investigator(s): AS, CW
Sample Plot #: 34
Date: 8/23/94

SOILS

SCS Mapping Unit: Unclassified (Urban Land)
Field Identification: Urban Land
Is soil on hydric soils list? NO

Is soil a histosol? NO
Histic epipedon present? NO
Is soil mottled? YES
Is soil gleyed? NO

Horizon	Horizon Depth	Texture	Matrix Color	Mottle Color	Occurrence of Mottles	Gley Color	Organic Content
A	0 - 7"	loam	10YR 3/3				medium
B	7 - 18"	loam	10YR 3/4	7.5YR 3/4	F, 1, D		low

Landform/Topography: Hillside slope
Comments: Area topographically lower than Sample Plot #35, approximately 50 feet west.

Hydric Soils? NO **Basis:** High chroma

HYDROLOGY

Is ground surface inundated? NO
Is soil saturated? NO
Depth to free-standing water in pit: NA

Surface water depth: NA
Depth to saturation: NA

Oxidized root zones
Water marks
Drift lines
Water-borne sediment deposits

Water-stained leaves
Surface scoured areas
Wetland drainage patterns
Morphological plant adaptations

Comments:

Wetland Hydrology? NO **Basis:** Lack of hydrologic indicators.

SUMMARY

Do normal environmental conditions exist at the plant community? YES
Has the vegetation, soils, and/or hydrology been significantly disturbed? NO

Disturbed area? NO **Basis:** No recent disturbance.
Problem area? NO **Basis:** Normal environmental conditions observed.

Comments:

Is the hydrophytic vegetation criterion met? YES
Is the hydric soil criterion met? NO
Is the wetland hydrology criterion met? NO
Is the vegetation unit or plot wetland? NO

Rationale for jurisdictional decision: Only one of three wetland parameters met.

SHAPIRO & ASSOCIATES

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
VEGETATION UNIT SAMPLING PROCEDURE

Project/Site: SeaTac - Operations area
Field Investigator(s): AS, CW

Sample Plot #: 35
Date: 8/23/94

Herbs & Bryophytes	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Athyrium filix-femina	FAC	45	4	38.0	1*
Equisetum arvense	FAC	25	3	20.5	2*
Equisetum telmateia	FACW	20	3	20.5	3*
Urtica dioica	FAC+	1	1	3.0	
Pteridium aquilinum	FACU	5	1	3.0	
		Sum of Midpoints:		85.0	
		Dominance Threshold:		42.5	

Shrubs	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Rubus spectabilis	FAC+	3	1	3.0	2*
Rubus discolor	FACU	5	1	3.0	1*
		Sum of Midpoints:		6.0	
		Dominance Threshold:		3.0	

Saplings	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
		Sum of Midpoints:			
		Dominance Threshold:			

Trees	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Alnus rubra	FAC	25	3	20.5	
Acer macrophyllum	FACU	85	6	85.5	1*
		Sum of Midpoints:		106.0	
		Dominance Threshold:		53.0	

% of Dominants that are OBL, FACW, and/or FAC: 4/6 = 67%

Hydrophytic Vegetation? YES

Comments: WETLAND ASSOCIATED WITH SIDEHILL SEEP.

To determine dominants, first rank species by midpoints. Then sum midpoints in order until 50% of total for all species (dominance threshold) is immediately exceeded. All species contributing to this cumulative total plus any others having 20% of the total midpoint value are marked with an asterisk.

** Species that do not appear on the National List (Reed, 1988) may have been assigned an indicator status based on field observations and habitat information from the literature.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
SOILS, HYDROLOGY & SUMMARY

SHAPIRO & ASSOCIATES

Project/Site: SeaTac - Operations area
Field Investigator(s): AS, CW
Sample Plot #: 35
Date: 8/23/94

SOILS

SCS Mapping Unit: Unclassified (Urban Land)
Field Identification: Urban Land
Is soil on hydric soils list? NO

Is soil a histosol? NO
Histic epipedon present? NO
Is soil mottled? YES
Is soil gleyed? YES

Horizon	Horizon Depth	Texture	Matrix Color	Mottle Color	Occurrence of Mottles	Gley Color	Organic Content
A	0 - 9"	loam	10YR 2/1				high
Btg	9 - 14"	silty clay loam	10YR 5/1	5YR 4/6	C, 2 & 3, P		medium
C	14 - 18"+	sandy loam	10YR 4/1	5YR 4/6	C, 2 & 3, P	5B 5/1	medium

Landform/Topography: Hummocky protrusion on slope.

Comments: Mottles occur along root channels and pores in Btg horizon. Lenses of fine material (silts and clays) within C horizon.

Hydric Soils? YES **Basis:** Gleyed, low chroma, mottles.

HYDROLOGY

Is ground surface inundated? NO
Is soil saturated? YES
Depth to free-standing water in pit: NA

Surface water depth: NA
Depth to saturation: 18 inches

	Oxidized root zones	
	Water marks	
	Drift lines	
	Water-borne sediment deposits	
		Water-stained leaves
		Surface scoured areas
X		Wetland drainage patterns
		Morphological plant adaptations

Comments: Sample plot topographically higher than surrounding area, saturated soil may be result of artesian flow from area to east.

Wetland Hydrology? YES **Basis:** Saturation at 18", hydric soils.

SUMMARY

Do normal environmental conditions exist at the plant community? YES
Has the vegetation, soils, and/or hydrology been significantly disturbed? NO

Disturbed area? NO **Basis:** No recent disturbance
Problem area? NO **Basis:** Normal environmental conditions exist at site.

Comments: Wetland may be result of artesian flow from eastern area.

Is the hydrophytic vegetation criterion met? YES
Is the hydric soil criterion met? YES
Is the wetland hydrology criterion met? YES
Is the vegetation unit or plot wetland? YES

Rationale for jurisdictional decision: All three wetland parameters met.

SHAPIRO & ASSOCIATES

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
VEGETATION UNIT SAMPLING PROCEDURE

Project/Site: SeaTac - Operations area
Field Investigator(s): AS, CW

Sample Plot #: 36
Date: 8/23/94

Herbs & Bryophytes	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Equisetum telmateia	FACW	50	4	38.0	1*
Athyrium filix-femina	FAC	2	1	3.0	
		Sum of Midpoints:		41.0	
		Dominance Threshold:		20.5	

Shrubs	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Rubus discolor	FACU	50	4	38.0	1*
		Sum of Midpoints:		38.0	
		Dominance Threshold:		19.0	

Saplings	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
		Sum of Midpoints:			
		Dominance Threshold:			

Trees	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Acer macrophyllum	FACU	50	4	38.0	1*
		Sum of Midpoints:		38.0	
		Dominance Threshold:		19.0	

% of Dominants that are OBL, FACW, and/or FAC: 2/3 = 67%

Hydrophytic Vegetation? YES

Comments: MID-SLOPE SEEP AREA.

To determine dominants, first rank species by midpoints. Then sum midpoints in order until 50% of total for all species (dominance threshold) is immediately exceeded. All species contributing to the cumulative total plus any others having 20% of the total midpoint value are marked with an asterisk.

** Species that do not appear on the National List (Reed, 1988) may have been assigned an indicator status based on field observations and habitat information from the literature.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
SOILS, HYDROLOGY & SUMMARY

SHAPIRO & ASSOCIATES

Project/Site: SeaTac - Operations area
Field Investigator(s): AS, CW
Sample Plot #: 36
Date: 8/23/94

SOILS

SCS Mapping Unit: Unclassified (Urban Land)
Field Identification: Urban Land
Is soil on hydric soils list? NO

Is soil a histosol? NO
Histic epipedon present? NO
Is soil mottled? YES
Is soil gleyed? NO

Horizon	Horizon Depth	Texture	Matrix Color	Mottle Color	Occurrence of Mottles	Gley Color	Organic Content
A	0 - 12"	loam	10YR 3/1				med/high
B	12 - 18"+	loam	2.5Y 4/2	7.5YR 5/6	C, 1 & 2, D		medium

Landform/Topography: Hillside seep
Comments: no root penetration below 6"

Hydric Soils? YES **Basis:** Low chroma, mottles

HYDROLOGY

Is ground surface inundated? NO
Is soil saturated? YES
Depth to free-standing water in pit: NA

Surface water depth: NA
Depth to saturation: 12"

Oxidized root zones
Water marks
Drift lines
Water-borne sediment deposits

Water-stained leaves
Surface scoured areas
Wetland drainage patterns
Morphological plant adaptations

Comments: Uphill edge of wetland saturated to ground surface, pockets of inundation.

Wetland Hydrology? YES **Basis:** Saturation at 12".

SUMMARY

Do normal environmental conditions exist at the plant community? YES
Has the vegetation, soils, and/or hydrology been significantly disturbed? NO

Disturbed area? NO **Basis:** No recent disturbance
Problem area? NO **Basis:** Normal environmetal conditions exist.

Comments: Wetland appears to be a seep from filled hillside.

Is the hydrophytic vegetation criterion met? YES
Is the hydric soil criterion met? YES
Is the wetland hydrology criterion met? YES
Is the vegetation unit or plot wetland? YES

Rationale for jurisdictional decision: All three wetland parameters met.

SHAPIRO & ASSOCIATES

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
VEGETATION UNIT SAMPLING PROCEDURE

Project/Site: SeaTac - Operations area
Field Investigator(s): AS, CW

Sample Plot #: 37
Date: 8/25/94

Herbs & Bryophytes	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Typha latifolia	OBL	5	1	3.0	3
Holcus lanatus	FAC	28	4	38.0	1*
Agrostis stolonifera	FAC*	15	2	10.5	2*
Juncus effusus	FACW	7	2	10.5	2
Eleocharis sp.	OBL	5	1	3.0	3
Carex pachystachya	FAC	5	1	3.0	3
Dactylis glomerata	FACU	10	2	10.5	2
Rumex crispus	FAC+	5	1	3.0	3
Equisetum arvense	FAC	15	2	10.5	2*
		1	1	3.0	3
		Sum of Midpoints:		95.0	
		Dominance Threshold:		47.5	

Shrubs	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
		Sum of Midpoints:			
		Dominance Threshold:			

Saplings	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Salix lasiandra	FACW+	10	2	10.5	1*
Alnus rubra	FAC	15	2	10.5	1*
		Sum of Midpoints:		21.0	
		Dominance Threshold:		10.5	

Trees	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Alnus rubra	FAC	3	1	3.0	2
Populus trichocarpa	FAC	10	2	10.5	1*
Betula papyrifera	FAC*	6	2	10.5	1*
Acer macrophyllum	FACU	4	1	3.0	2
		Sum of Midpoints:		27.0	
		Dominance Threshold:		13.5	

% of Dominants that are OBL, FACW, and/or FAC: 7/7 = 100%

Hydrophytic Vegetation? YES

Comments: EPILOBIUM WATSONII ALSO IS PRESENT IN THE PLOT AT 1%. IT IS ASSUMED THAT, GIVEN THE STATUS OF KNOWN PLANTS, THAT THE UNKNOWN GRASS IS FAC.

To determine dominants, first rank species by midpoints. Then sum midpoints in order until 50% of total for all species (dominance threshold) is immediately exceeded. All species contributing to the cumulative total plus any others having 20% of the total midpoint value are marked with an asterisk.

** Species that do not appear on the National List (Reed, 1988) may have been assigned an indicator status based on field observations and habitat information from the literature.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
SOILS, HYDROLOGY & SUMMARY

SHAPIRO & ASSOCIATES

Project/Site: SeaTac - Operations area
Field Investigator(s): AS, CW
Sample Plot #: 37
Date: 8/25/94

SOILS

SCS Mapping Unit: Unclassified (Urban Land)
Field Identification: Urban Land
Is soil on hydric soils list? NO

Is soil a histosol? NO
Histic epipedon present? NO
Is soil mottled? YES
Is soil gleyed? NO

Horizon	Horizon Depth	Texture	Matrix Color	Mottle Color	Occurrence of Mottles	Gley Color	Organic Content
A	0-8"	gravelly sandy loam	10YR 3/2				med
B	8-16"	sandy loam	2.5Y 4/2	7.5YR 4/6	C,3,D		low-med

Landform/Topography: Slight depression on topographically high area. Surrounding terrain is hilly.
Comments: Soils extremely compact.

Hydric Soils? Yes **Basis:** Low chroma, mottles

HYDROLOGY

Is ground surface inundated? NO
Is soil saturated? NO
Depth to free-standing water in pit: NA

Surface water depth: NA
Depth to saturation: NA

Oxidized root zones
Water marks
Drift lines
Water-borne sediment deposits

Water-stained leaves
Surface scoured areas
X Wetland drainage patterns
Morphological plant adaptations

Comments:

Wetland Hydrology? YES **Basis:** Hydric soils, wetland drainage patterns, obligate vegetation.

SUMMARY

Do normal environmental conditions exist at the plant community? YES
Has the vegetation, soils, and/or hydrology been significantly disturbed? NO

Disturbed area? NO **Basis:** no recent disturbance
Problem area? NO **Basis:** normal environmental conditions observed

Comments: Located apx 100 feet south of Plot #6. Highly compacted soils in slight depression.

Is the hydrophytic vegetation criterion met? YES
Is the hydric soil criterion met? YES
Is the wetland hydrology criterion met? YES
Is the vegetation unit or plot wetland? YES

Rationale for jurisdictional decision: All three wetland parameters met.

SHAPIRO & ASSOCIATES

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
VEGETATION UNIT SAMPLING PROCEDURE

Project/Site: SeaTac - Operations area
Field Investigator(s): AS, CW

Sample Plot #: 38
Date: 8/30/94

Herbs & Bryophytes	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Holcus lanatus	FAC	25	3	20.5	2*
Juncus effusus	FACW	12	2	10.5	3
Anthoxanthum odoratum	FACU	5	1	3.0	4
Hieracium sp.	FACU**	1	1	3.0	4
Trifolium pratense	FACU	1	1	3.0	4
Lolium perenne	FACU	15	2	10.5	3
Agrostis sp.	FACW-FACU	40	4	38.0	1*
Plantago lanceolata	FAC	1	1	3.0	4
		Sum of Midpoints:		91.5	
		Dominance Threshold:		45.8	

Shrubs	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
		Sum of Midpoints:			
		Dominance Threshold:			

Saplings	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
		Sum of Midpoints:			
		Dominance Threshold:			

Trees	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
		Sum of Midpoints:			
		Dominance Threshold:			

% of Dominants that are OBL, FACW, and/or FAC: 2/2 = 100%

Hydrophytic Vegetation? YES

Comments: AGROSTIS ASSUMED TO BE A MIXTURE OF STOLINIFERA (FAC) AND TENUIS (FAC).

To determine dominants, first rank species by midpoints. Then sum midpoints in order until 50% of total for all species (dominance threshold) is immediately exceeded. All species contributing to this cumulative total plus any others having 20% of the total midpoint value are marked with an asterisk.

** Species that do not appear on the National List (Reed, 1988) may have been assigned an indicator status based on field observations and hydric information from the literature.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
SOILS, HYDROLOGY & SUMMARY

SHAPIRO & ASSOCIATES

Project/Site: SeaTac - Operations area
Field Investigator(s): AS, CW
Sample Plot #: 38
Date: 8/30/94

SOILS

SCS Mapping Unit: Unclassified (Urban Land)
Field Identification: Urban Land
Is soil on hydric soils list? NO

Is soil a histosol? NO
Histic epipedon present? NO
Is soil mottled? YES
Is soil gleyed? NO

Horizon	Horizon Depth	Texture	Matrix Color	Mottle Color	Occurrence of Mottles	Gley Color	Organic Content
A1	0-4"	sandy loam	10YR 4/2				
A2	4-9"	fine sandy loam	10YR 5/2	10YR 5/6	C,1,F		
C1	9-14"	gravelly loam	10YR 4/2	7.5YR 4/4	M,1,D		
C2	14-18+"	gravelly loam	10YR 4/3	7.5YR 4/4			

Landform/Topography: Flat area level with runways.
Comments: Little black nodules in C2 horizon could be Mn.

Hydric Soils? YES **Basis:** Low chroma, mottles.

HYDROLOGY

Is ground surface inundated? NO
Is soil saturated? NO
Depth to free-standing water in pit: NA

Surface water depth: NA
Depth to saturation: NA

	Oxidized root zones	
	Water marks	
	Drift lines	
	Water-borne sediment deposits	
		Water-stained leaves
		Surface scoured areas
X		Wetland drainage patterns
		Morphological plant adaptations

Comments: Drainage drop structures are positioned in the center of the wetland and in the southern corner.

Wetland Hydrology? YES **Basis:** Hydric soils, wetland drainage patterns

SUMMARY

Do normal environmental conditions exist at the plant community? YES
Has the vegetation, soils, and/or hydrology been significantly disturbed? NO

Disturbed area? NO **Basis:** no recent disturbance
Problem area? NO **Basis:** normal environmental conditions observed

Comments: Deep tire ruts left during the wet season.

Is the hydrophytic vegetation criterion met? YES
Is the hydric soil criterion met? YES
Is the wetland hydrology criterion met? YES
Is the vegetation unit or plot wetland? YES

Rationale for jurisdictional decision: All three wetland parameters met.

SHAPIRO & ASSOCIATES

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
VEGETATION UNIT SAMPLING PROCEDURE

Project/Site: SeaTac - Operations area
Field Investigator(s): AS, CW

Sample Plot #: 39
Date: 8/19/94

Herbs & Bryophytes	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Eleocharis sp.	OBL	40	4	38.0	1*
Holcus lanatus	FAC	1	1	3.0	
Typha latifolia	OBL	2	1	3.0	
Agrostis stolonifera	FAC*	1	1	3.0	
Anthoxanthum odoratum	FACU	1	1	3.0	
	Sum of Midpoints:			50.0	
	Dominance Threshold:			25.0	

Shrubs	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Rubus discolor	FACU	2	1	3.0	1*
	Sum of Midpoints:			3.0	
	Dominance Threshold:			1.5	

Saplings	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Salix lasiandra	FACW+	3	1	3.0	1*
	Sum of Midpoints:			3.0	
	Dominance Threshold:			1.5	

Trees	Indicator Status**	% Areal Cover	Cover Class	Midpoint	Rank
Populus trichocarpa	FAC	20	3	20.5	1*
Salix scouleriana	FAC	10	2	10.5	2*
Salix lasiandra	FACW+	1	1	3.0	
	Sum of Midpoints:			34.0	
	Dominance Threshold:			17.0	

% of Dominants that are OBL, FACW, and/or FAC: 4/5 = 80%

Hydrophytic Vegetation? YES

Comments: HUMMOCKY DEPRESSION

To determine dominants, first rank species by midpoints. Then sum midpoints in order until 50% of total for all species (dominance threshold) is immediately exceeded. All species contributing to this cumulative total plus any others having 20% of the total midpoint value are marked with an asterisk.

** Species that do not appear on the National List (Reed, 1988) may have been assigned an indicator status based on field observations and habitat information from the literature.

WETLAND DETERMINATION
INTERMEDIATE-LEVEL ONSITE METHOD
SOILS, HYDROLOGY & SUMMARY

SHAPIRO & ASSOCIATES

Project/Site: SeaTac - Operations area
Field Investigator(s): AS, CW
Sample Plot #: 39
Date: 8/19/94

SOILS

SCS Mapping Unit: Unclassified (Urban Land)
Field Identification: Urban Land
Is soil on hydric soils list? NO

Is soil a histosol? NO
Histic epipedon present? NO
Is soil mottled? NO
Is soil gleyed? NO

Horizon	Horizon Depth	Texture	Matrix Color	Mottle Color	Occurrence of Mottles	Gley Color	Organic Content
Oi	1 - 0"	bryophyte mat	10YR 2/1				high
A	0 - 3"	loamy coarse sand	10YR 4/1				medium
C	3 - 16"+	very gravelly loamy coarse sand	10YR 4/1				medium

Landform/Topography: Depressional area between two roadways.
Comments: Enclosed depression with evidence of prolonged inundation, maybe stormwater detention area.

Hydric Soils? YES **Basis:** Aquic moisture regime, low chroma

HYDROLOGY

Is ground surface inundated? NO
Is soil saturated? NO
Depth to free-standing water in pit: NA

Surface water depth: NA
Depth to saturation: NA

	Oxidized root zones	X	Water-stained leaves
X	Water marks	X	Surface scoured areas
X	Drift lines	X	Wetland drainage patterns
X	Water-borne sediment deposits	X	Morphological plant adaptations

Comments: Algal mats on ground surface, water marks on butressed tree trunks.

Wetland Hydrology? YES **Basis:** Algal mats, water marks, wetland drainage patterns.

SUMMARY

Do normal environmental conditions exist at the plant community? YES
Has the vegetation, soils, and/or hydrology been significantly disturbed? NO

Disturbed area? NO **Basis:** No recent disturbance
Problem area? NO **Basis:** Normal environmental conditions observed.

Comments: Area maybe stormwater detention area.

Is the hydrophytic vegetation criterion met? YES
Is the hydric soil criterion met? YES
Is the wetland hydrology criterion met? YES
Is the vegetation unit or plot wetland? YES

Rationale for jurisdictional decision: All three wetland parameters met.

ATTACHMENT D

Federal Permits/Approvals

Federal Aviation Administration
- Record of Decision
- Air Quality Conformity Decision
- Approval of Airport Layout Plan

United States Army Corps of Engineers
- Section 404 Permit*

State Permits/Approvals

Department of Ecology
- Water Quality Certification*
- National Pollutant Discharge Elimination System
- Temporary Modification of Water Quality*
- Dam Safety Approval

Department of Fish and Wildlife
- Hydraulic Project Approval*

Department of Natural Resources
- Forest Practices Permit

Governors Clean Air and Water Certification

Local Permits/Approvals

Puget Sound Regional Council review
Port of Seattle Commission project decisions
City of SeaTac Comprehensive Plan and Zoning process
City of Auburn Clearing and Grading permit
Demolition permits

*=Covered by this application

ATTACHMENT E - ADJOINING PROPERTY OWNERS

Parcel No.	Tax Payer		Property Address			Mailing Address			
202304 9065	Tony & Betty J	Vacca	15060 Des Moines Memorial	SeaTac	98148	15831 5th Pl S	Seattle	WA	98148
202304 9074	Marlene	Brougham				15325 6th Ave SW #1	Seattle	WA	98166
202304 9099	Tony & Betty J	Vacca				15831 5th Pl S	Seattle	WA	98148
202304 9122	Anthony	Genzale	15225 12th Ave S	SeaTac	98148	1824 SW 166th Pl	Seattle	WA	98166
202304 9144	Antonio	Scarsella				15325 10th Ave S	Seattle	WA	98148
202304 9453	Eric W	Grant	15443 12th Ave S	SeaTac	98148	14113 SE 243rd St	Kent	WA	98042
369680 0010	Howard W	Kehrer	15413 9th Pl S	Seattle	98148	15413 9th Pl S	Seattle	WA	98148
371180 0005	Antonio	Scarsella	15337 10th Ave S	SeaTac	98148	15325 10th Ave S	Seattle	WA	98148
371180 0010	Antonio	Scarsella	15325 10th Ave S	Seattle	98148	15325 10th Ave S	Seattle	WA	98148
371180 0015	Shawn D	Patterson	15322 10th Ave S	Seattle	98148	15322 10th Ave S	Seattle	WA	98148
440140 0005	James W & Virginia	Wilcher	15006 Des Moines Way S	Seattle	98148	15006 Des Moines Way S	Seattle	WA	98148
440140 0010	William F	Eisiminger	1003 S 150th St	SeaTac	98148	3644 Corliss Ave N	Seattle	WA	98103
440140 0015	Georgia	Wardall	1009 S 150th St	SeaTac	98148	26924 140th Ave SE	Kent	WA	98042
440140 0020	Mark J & Ilona	Brose	1021 S 150th St	SeaTac	98148	1021 S 150th St	SeaTac	WA	98148
440140 0025	Robert	Ventimiglio	1029 S 150th St	Seattle	98148	1029 S 150th St	Seattle	WA	98148
440140 0030	Kenneth E & Leona	Wooding	1033 S 150th St	Seattle	98148	1033 S 150th St	Seattle	WA	98148
440140 0035	Jimmie Irene	Breeze	1041 S 150th St	Seattle	98148	1041 S 150th St	Seattle	WA	98148
292304 9079	Beverly S	Tyler	1052 S 170th St	SeaTac	98148	3554 S 173rd St	Seattle	WA	98188
042204 9032	Pacific Gulf Properties		2315 S 200th St	Des Moines	98188	363 San Miguel Dr #100	Newport Beach	CA	92660
042204 9031	King County		3024 S 200th St	Des Moines	98188	500 KC Admin Bldg	Seattle	WA	98104
666300 0101	King County					500 KC Admin Bldg	Seattle	WA	98104