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**Final Draft Conceptual Borrow Material  
Development and Reclamation Plan  
Borrow Areas 3 and 4  
Sea-Tac International Airport  
City of SeaTac, Washington**



**Prepared for  
Port of Seattle**

**August 15, 2001  
4978-65**

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**FINAL DRAFT CONCEPTUAL BORROW MATERIAL  
DEVELOPMENT AND RECLAMATION PLAN  
BORROW AREAS 3 AND 4  
SEA-TAC INTERNATIONAL AIRPORT  
CITY OF SEATAC, WASHINGTON**

**1.0 INTRODUCTION**

This document presents the Conceptual Borrow Material Development and Reclamation Plan (Conceptual Plan) prepared on behalf of the Port of Seattle (the Port). The conceptual plan presents the Port's concepts for developing borrow materials from locations adjacent to the Seattle-Tacoma International Airport (STIA) facility. It also describes how these sites will be reclaimed and managed to mitigate potential environmental impacts from borrow activities. The borrow materials will be extracted from Port-owned property for use in constructing an embankment to support a third runway at STIA.

The Port plans to obtain a portion of the embankment fill material from Port-owned property adjacent to the airfield. Conceptual excavation and reclamation plans discussed below characterize proposed excavation at two sites, referred to as Borrow Areas 3 and 4. The Port expects to obtain approximately 1.0 million cubic yards (cy) of earth fill from Borrow Area 3 and 1.2 million cy from Borrow Area 4. Drawing No. 1 shows the location and general setting of the borrow areas and the airfield.

This document presents the Port's conceptual plan for the development and reclamation of two borrow sites, and includes a list of referenced documents and the accompanying set of 19 drawings. The drawings include maps, plans, and cross sections, depicting the location and the general characteristics of work described herein.

The Port may prepare a more detailed reclamation plan, which, along with other relevant supporting Port technical studies and permitting documents, will be used to develop, operate, and reclaim the borrow sites.

***1.1 Purpose of the Conceptual Plan***

The Port prepared the Conceptual Plan to describe the Port's concepts for developing on-site borrow materials for use in constructing the third runway at STIA. The information will be used in developing and finalizing permits and plans needed to develop the borrow areas.

The Port intends to develop and reclaim the borrow areas and comply with environmental standards contained in its agreements with the City of SeaTac. The Port intends to pursue other local and state permits as necessary, including a grading permit in accordance with the Port of Seattle's Interlocal Agreement (ILA) with the City of SeaTac; and a National Pollutant Discharge Elimination System (NPDES) Sand and Gravel General Permit from the Washington State Department of Ecology (General Permit).

## **1.2 Project Proponent and Overview**

The Port of Seattle operates the Seattle-Tacoma International Airport (STIA), which is located primarily within the City of SeaTac. A site map is shown on Drawing No. 1.

In 1997, the Port adopted the development actions contained in the Master Plan Update. These actions included a proposal to construct a new 8,500-foot runway to meet the demands for travel and to reduce arrival delays associated with inclement weather. A third runway would alleviate this congestion.

The present configuration of two closely spaced runways has caused significant delays, a condition aggravated by poor weather conditions. These delays result in slowed inbound air traffic, prevent timely flight departures from originating airports, and create inefficient airfield operations. Regional population growth is expected to contribute to a growing demand for airport services that will increase current burdens and inefficiencies at STIA. Unabated, the present runway configuration is predicted to cause increasingly longer delays in the future.

A more complete scope, purpose, and statement of need for the third runway and other Master Plan Update improvements are described in Chapter 1 of the Final Environmental Impact Statement (FEIS) (FAA and Port of Seattle, 1996) and the Final Supplemental Environmental Impact Statement (FSEIS) (FAA and Port of Seattle, 1997) prepared for the STIA Master Plan Update.

As described in the FEIS and FSEIS (or collectively EIS documents) (FAA, 1997), to construct the third runway, an earth-fill embankment needs to be constructed to support the new runway. The earth fill used for embankment construction will be obtained from a combination of on-site (borrow) and off-site sources (import). The Master Plan Update EIS, including plans for the borrow sites and use of imported fill, was approved in 1997 by a National Environmental Policy Act (NEPA) Record of Decision (FAA, 1997).

### **1.3 Project Summary Description**

Seattle-Tacoma International Airport is undertaking construction of a third runway parallel to and 2,500 feet west of the two existing runways. About 17 million cy of earth fill are needed to construct the embankment and support the new runway. The EIS documents prepared for STIA's Master Plan Update development actions discussed a number of alternatives for the runway. The development of construction fill material from borrow areas on Port property, as well as use of fill from off-site sources, was evaluated in depth during the EIS process. Development of on-site borrow areas will produce cost savings to the Port as well as reduce traffic impacts to local streets and public highways associated with truck traffic from off-site sources.

Proposed Borrow Areas 3 and 4 are located at the south end of the airfield, as shown on Drawing No. 1, within property acquired by the Port as part of its noise remedy program. The Port is coordinating the excavation of Borrow Area 4 with the Washington State Department of Transportation (WSDOT) to ensure that the final grade and configuration will facilitate the future SR 509 extension. WSDOT is still developing a final alignment and grade, so it is possible that some minor adjustments in the borrow area contours may be necessary. As of March 2001, the proposed alignment of SR 509 through Borrow Area 4 was primarily south of WSDOT's right of way with ramps terminating at South 200th Street.

Because these borrow sites are contiguous to the airfield, fill can be delivered by truck across Port property. The Port has met with the City of SeaTac to obtain concurrence on where the proposed haul route would cross city streets between adjacent Port-owned parcels. The Port and the City of SeaTac have established an ILA that establishes the basis for addressing construction-related issues such as haul permits.

Preliminary investigations supporting the Master Plan Update EIS included identification and preliminary assessment of eight potential sources of fill within property controlled by the Port (Draft Borrow Source Study, AGI, 1995). Based on several factors (including wetlands impacts, material types, operational costs) the FSEIS indicated that four of these eight on-site resource areas could likely be used to provide a maximum quantity of 15.4 million cy of fill material.

To avoid impacts to wetlands, potential borrow areas were eliminated or modified. At this time, the Port proposes to use three on-site borrow areas located on airport property between 24th Avenue South and 15th Avenue South, and between South 196th and South 216th Streets. These borrow areas are planned to supply approximately 6.4 million cy of fill material. Current

engineering estimates suggest that Borrow Site 1 will supply up to 4.2 million cy, Borrow Site 3 will supply approximately 1.0 million cy, and Borrow Site 4 will supply approximately 1.2 million cy. This document discusses conceptual development and reclamation plans for Borrow Areas 3 and 4.

Embankment construction to date (1998 to present) has used fill from a number of commercial sources operating under existing Department of Natural Resources (DNR) permits, as well as soil from large construction excavations in the Seattle/Bellevue metropolitan area. The Port has applied for Clean Water Act Section 404 and 401 and Hydraulic Project Approval for the Master Plan Update projects (including borrow area excavation). Following receipt of these permits, the Port will proceed with extraction of the sand and gravel resources in Borrow Areas 3 and 4.

The Port proposes to obtain construction fill materials from Borrow Areas 3 and 4 in contracts scheduled for 2002 and 2003. Borrow Area development will avoid and minimize impacts to wetlands as described here and in the Port's *Natural Resource Mitigation Plan* (Parametrix 2000a) (NRMP) and *Wetland Functional Assessment and Impact Analysis* (Parametrix 2000b) (Functional Assessment).

Stormwater management and temporary erosion and sediment control (TESC) facilities would be installed prior to site development consistent with provisions of an NPDES Sand and Gravel General Permit. Groundwater seepage into the Borrow Area 3 excavation from a perched zone would also be collected and managed to ensure the preservation of seepage flows to downgradient wetlands in the southern half of Borrow Area 3. During the site clearing and pre-production stage, topsoil would be stockpiled adjacent to areas utilized for excavation and outside of wetland protection areas. The stockpiled soils would be utilized in reclaiming each area.

Borrow materials will be transported to the embankment construction site along a haul route across upland portions of the existing aviation operations area (AOA) and onto the airfield. Part of the AOA has previously been used as the Tyee Golf Course, which will be closed prior to development of Borrow Areas 3 and 4. The Port proposes to use a portion of the upland area of the AOA (former Tyee Golf Course) as a staging area for Borrow Areas 3 and 4, and for the temporary location of topsoil stockpile(s), and possibly TESC pond(s). The Port intends to use 30-ton highway haul trucks along a haul route which would extend north from the vicinity of South 200th Street where it passes between Borrow Areas 3 and 4. This haul route has been designed to avoid or minimize impacts to wetlands and aquatic resources.

The haul route would traverse north from the borrow areas through the port of the AOA formerly used as the Tyee Golf Course, across South 188th Street, and then along the southern and western side of the airfield to the embankment construction site, as shown on Drawing No. 1. The truck crossing at South 200th Street would likely be an at-grade crossing, whereas the truck crossing at South 188th Street would use the existing Port bridge.

The use of Borrow Areas 3 and 4 may be separated into two 1-year embankment contracts. The Port plans to develop the borrow areas in segments and use contemporaneous reclamation. The fill material from Borrow Areas 3 and 4 is moisture-sensitive, thus excavation is expected to be limited to the dry summer months, roughly late May to October. Each area would be reclaimed and revegetated at the end of the construction season. The sites would then be periodically monitored to verify success of the reclamation. A further part of the mitigation plan would include Port monitoring of the wetland hydrology within Borrow Area 3 (Parametrix, 2000a).

## **2.0 SURROUNDING ENVIRONMENT**

### **2.1 Overview of the Borrow Areas and the Master Plan Update EIS Process**

Drawing No. 3 shows the location of Borrow Areas 3 and 4 along with adjacent land use and zoning.

Borrow Areas 3 and 4 are situated within the STIA's property, and are contiguous to the airfield. These areas are zoned for commercial aviation use (AVC), and a small portion of the northwest corner of Borrow Area 4 is zoned as Aviations Operations (AVO).

Other land users bound Borrow Areas 3 and 4 as follows:

- ▶ Residential areas bound each area on the west side, and the site of the former Maywood Elementary School is immediately west of Borrow Area 4;
- ▶ Tyee Valley Golf Course (also part of the Aviation Operations Zone) is immediately east and north of Borrow Area 4;
- ▶ Undeveloped land owned by the State of Washington (future right of way for SR 509) is located east of Borrow Area 3; and
- ▶ The Des Moines Creek Park is situated south of Borrow Area 3.



The Port has characterized the surrounding environment in the EIS documents and supported the completed EIS process with relevant baseline studies and other technical studies. In addition, the Port has evaluated the environmental impacts and discussed mitigation for the Master Plan Update projects, including borrow area excavation, in the Functional Assessment (Parametrix, 2000b) and the NRMP (Parametrix, 2000a). Potential impacts of Master Plan Update projects on endangered species have been evaluated in the Biological Assessment (Parametrix, 2000c) and in the Biological Opinion received in May 2001 from the United States Fish and Wildlife with concurrence from the National Marine Fisheries Service.

Development and transportation of borrow materials were two construction activities specifically addressed by the Master Plan Update EIS documents. The Port has addressed potential impacts to wetlands, streams, endangered species, floodplain, drainage channels, and stormwater in the Des Moines Creek Basin through the EIS documents as well as subsequent studies to support the 401 and 404 permits.

The impacts from and mitigation of borrow area development and transport activities are described in Chapter IV, Sections 19 (Earth) and 23 (Construction) of the FEIS and reconsidered in Chapter 5-4 (Construction Impacts) of the FSEIS.

Recent wetland mitigation measures were developed to facilitate issuance of a Section 404 permit to the Port for the range of activities, including borrow development proposed by the Master Plan Update. Details of wetland mitigation and seepage control for Borrow Area 3 are described in a report entitled "Evaluation of Perched Zone Interception and Possible Impacts to Wetland Hydrology, Borrow Area 3." (Hart Crowser, 2000a)

## ***2.2 Site Soils and Geology***

The airport and surrounding areas are part of the Des Moines Drift Plain in the Puget Sound Lowland, whereupon a substantial thickness of glacial soils were deposited that include Borrow Areas 3 and 4. The hill forming Borrow Areas 3 and 4 is a drumlin—an elongated mound deposited beneath glacial ice, and typically capped with glacial till. Borrow Areas 3 and 4 slope moderately to the east toward the upper reaches of Des Moines Creek (the creek is not located within either area).

Borrow area soils have been identified as belonging to either the Alderwood, Everett, or Indianola soil associations (USDA-SCS, 1973). Surficial soils within the borrow areas tend to be thinly developed, characteristically reflect the underlying glacial lithology, and texturally range from gravelly to sandy loams with variable drainage characteristics. Thicker sequences occur sporadically and are generally associated with alluvial fill.

Underlying glacial sediments include a range of silts, sands, and gravels, with typically variable gradations in the amount of silt within each lithologic unit. Glacial sediments have been deposited in this area and extensively reworked by glacial episodes.

Except for the topsoil, the materials excavated from the borrow areas would be used as common fill. These fill materials are referred to as "moisture sensitive," because they typically have more than about 12 percent fines (silt and clay). Compaction for use as embankment fill can only be accomplished when the soil moisture content is suitable, which means the borrow materials cannot be used in the winter. Excavation and stockpiling of these materials needs to be avoided in the winter months, to avoid increasing moisture content prior to placement in the embankment. As a result the borrow sites are planned to provide "fair weather fill."

Drawing No. 4 illustrates the site exploration plan used to delineate geologic profiles of the borrow resources and related hydrogeologic information, as discussed below.

### 2.3 Site Hydrology

Glacial deposits beneath the site include relatively permeable sands and gravels, interbedded with low-permeability glacial till or other silty/clayey members. The primary aquifers, as noted in a series of studies and analyses for the project, are indicated below in **bold type**, and occur within the deeper porous strata below the borrow sites (AGI, 1996, and Hart Crowser, 1998, 1999, 2000a, 2000b, and 2001).

- |  |   |                                 |
|--|---|---------------------------------|
| ▶ Fill, Alluvium, Vashon Recessional Outwash | — | Perched Zones                   |
| ▶ Vashon Till                                | — | Aquitard                        |
| ▶ Vashon Advance Outwash                     | — | <b>Shallow Regional Aquifer</b> |
| ▶ Lawton Clay                                | — | Aquitard                        |

- ▶ "Third" Coarse-Grained Deposit — Intermediate Aquifer
- ▶ Puyallup Formation — Aquitard
- ▶ "Fourth" Coarse-Grained Deposit — Deep Aquifer

The borrow areas are located within the upper sequence of recessional outwash deposits and glacial till, and extend into the upper part of the advance outwash deposits. Borrow Areas 3 and 4 contain perched groundwater zones (see Drawing No. 4) but are situated above the water table referred to as the Shallow Regional Aquifer (see Drawing No. 5). A conceptual cross section through the borrow areas, showing the relationships between the site geology and hydrogeology, is presented on Drawing No. 6.

Development of materials within Borrow Area 3 is anticipated to encounter a relatively flat-lying perched zone of shallow groundwater along parts of the western and northern excavation slopes. The Port plans to collect this seepage in a bench-supported grassy swale and convey it to augment existing surface water and shallow groundwater discharging into wetlands, in the unexcavated portion of Borrow Area 3 as depicted in Drawing Nos. 7 and 8 and described below in Section 2.4.2. Any excess water above that needed to sustain the wetlands will be diverted to the stormwater management system (Hart Crowser, 2000b and Parametrix, 2000a).

The proposed excavation sites lie within the Des Moines watershed, where stormwater generally drains to the east. Stormwater runoff from Borrow Area 3 appears to infiltrate on site, or pool in low areas to the southeast. Stormwater runoff from most of Borrow Area 4 flows into roadside ditches along South 196th Street and 18th Avenue South.

## 2.4 Wetlands

Wetlands within the STIA Master Plan Update improvement area were originally delineated during preparations for the FEIS (1996) and FSEIS (1997). The Port re-evaluated the wetlands and other aquatic resources to present updated information to the U.S. Army Corps of Engineers (Corps) in 1998 and 1999; (Port, 1999 and Parametrix, 2000d). The wetlands delineation, functional analysis, and impact assessment and mitigation are set forth in a series of technical reports prepared by Parametrix (2000d).

### **2.4.1 Wetland Impacts**

Development of Borrow Areas 3 and 4 will not have any direct impact on the wetlands located near the excavation resources within the borrow areas, as shown on Drawing No. 7. Excavation of Borrow Area 3 has been designed to avoid wetlands and to maintain at least 50-foot buffers around existing wetlands (Drawing No. 7). Borrow Area 4 does not contain wetlands and excavation will not result in wetland impacts. The haul route alignment through the Tyee Golf Course parcel may have the potential for minor impact on a small wetland area. The temporary topsoil stockpile site, immediately east of Borrow Area 4 in the Tyee Golf Course, does not contain wetlands.

Borrow area excavations have been designed to the extent practicable to avoid direct impacts to wetlands. Hydrological studies conducted by Hart Crowser (Hart Crowser, 2000a and 2000b) indicate that the potential for indirect impacts to the hydrology of wetlands near Borrow Area 3 is low. To avoid and mitigate for potential indirect impacts, during and after excavation, this borrow area will be graded to establish drainage swale bench that collects surface runoff and/or perched groundwater seepage and directs this water to the wetlands as shown in Drawing Nos. 7 and 8.

The proposed haul route has been aligned through Borrow Areas 3 and 4, and the former Tyee Golf course, with the goal of avoiding the potential for impacts to wetlands. The route laid out for the haul trucks will have some potentially minor temporary impact on a riparian wetland at the Des Moines Creek crossing. Appropriate buffers, and erosion and sediment control measures will avoid or mitigate the potential for impacts to nearby wetlands in accordance with a Clean Water Act Section 404 permit obtained by the Port.

### **2.4.2 Mitigation**

In Borrow Area 3, Wetland 29 occurs on the hillside at the west edge of the borrow area (see Drawing No. 4). Hydrology in this wetland is supported by seeps discharging on the face of the slope from a zone of perched groundwater that extends to the north and west (Hart Crowser, 2000a and 2000b). Wetlands 30, B7, B6, and B5 occupy a series of depressions in the lower southeastern corner of Borrow Area 3. These wetlands may be supported by precipitation and some shallow subsurface flow or interflow moving down-slope from Wetland 29 (Hart Crowser, 2000c). Since these wetlands occur below the main perched groundwater layer on this site, groundwater seepage is available to support wetland hydrology. Water is held in these wetlands by the relatively impermeable soils lining the depressions, promoting shallow perched conditions within the wetlands (Hart Crowser, 2000c).

A drainage swale will be installed during excavation of Borrow Area 3 to convey groundwater seeping from the perched zone to Wetland 29 and replace the potential loss of seepage from the perched groundwater zone as shown on Drawing No. 4 (see also Hart Crowser, 2000b, Figures 3, 7, and 8). Seepage generated from intersecting this zone is expected to vary seasonally but is estimated to be on the order of a few tens of gallons per minute (12.5 gpm) over the entire affected slope. This swale will collect groundwater seepage from the excavated slope face on the north and west sides of Borrow Area 3. Flow in this swale will be collected and conveyed along a benched surface in a swale that drains to the south into Wetland 29 (Drawing Nos. 7 and 8).

Since the swale will extend for the full length of the seepage face in the borrow area, it may convey flows in excess of those needed to support hydrology in Wetland 29 and downslope wetlands (i.e., Wetland 30, which receives overland flow and shallow interflow from Wetland 29). To optimize the distribution of water to Wetland 29, a flow control structure (weir and diversion structure) will be constructed in the swale just before it flows into Wetland 29 (Hart Crowser, 2000b, Figure 9).

This control structure will allow a controlled flow to be directed into Wetland 29 and enable diversion of other flows away from the wetland and into the base of Borrow Area 3. Diverted flows will either be allowed to infiltrate at the base of Borrow Area 3 or be diverted to stormwater management facilities that will be constructed to manage runoff from the remainder of the borrow area. The length of the collector swale can also be modified (consistent with the adaptive management approach) based on post-construction monitoring to control the amount of seepage and runoff that is collected in the swale and diverted to Wetland 29.

Evaluations indicate that impacts to the hydrology of the remaining wetlands (B5, B6, B7, B9a, B9b, B10, and 30) in Borrow Area 3 would not occur because these wetlands receive water from precipitation and/or seepage from Wetland 29 (Hart Crowser, 2000a and 2000b). Wetlands in Borrow Area 3 will be monitored before, during, and after excavation to verify that wetland hydrology is maintained.

## ***2.5 Other Anticipated Watershed and Habitat Issues***

The Port has addressed a number of other watershed issues including potential for erosion, flooding (avulsion), fisheries, and habitat issues, in the Master Plan Update EIS documents. The Port completed a mitigation plan and wetland

functional assessment as part of the 404 permit application (Parametrix, 2000b). The Port has also completed a detailed Biological Assessment (Parametrix, 2000c) to address endangered species issues as part of the wetlands permitting process. A Biological Opinion indicating a "may affect, not likely to affect" was received from U.S. Fish and Wildlife with concurrence from the National Marine Fisheries Service.

The Port, King County, and the Cities of SeaTac and Des Moines are currently involved in efforts to develop the Des Moines Creek Basin Plan through inter-local agreements among the jurisdictions. In addition to other improvements within the Des Moines Creek Basin, this plan provides for construction of a Regional Detention Facility (RDF) within the former Tyee Golf Course, near the haul route as indicated on Drawing No. 9. Development of Borrow Areas 3 and 4, and haulage, is not expected to affect construction of the RDF.

### **3.0 SUMMARY OF BORROW DEVELOPMENT OPERATIONS**

Embankment fill materials developed from Borrow Areas 3 and 4 are suitable for use only during the fair weather periods of the construction season, due to their moisture-sensitive nature, as noted above. Consequently, site preparations (TESC installation, site clearing, topsoil stockpiling, etc.) would occur during the first and second quarters of the year, followed by development of borrow materials. The "fair weather" borrow development period typically would not extend outside the period from late May to October, and may be further constrained within this period. Near the end of the third quarter, the borrow sites would be stabilized and both temporary and permanent reclamation and revegetation measures applied as appropriate. All borrow area development operations would be conducted in a manner consistent with the relevant environmental permit conditions and requirements.

#### ***3.1 Description of Site Preparation Activities***

##### **3.1.1 Site Description and Permit Boundaries**

As depicted on Drawing No. 1, the borrow development "project site" will include four basic land components: Borrow Areas 3 and 4, staging and haul areas within upland areas of the former Tyee Golf course, and a haul route that will border the south and west perimeter of the airfield operations area and terminate at the embankment construction site.

Surface disturbances related to the borrow material development permit would occur within the proposed permit boundary as generally depicted on Drawing

Nos. 1 and 8. The project site is generally located in portions of Sections 4 and 5, Township 22 North, Range 4 East, W.M., King County, Washington.

Borrow Area 3 is located south of the Airport's 34L runway, in the City of SeaTac. It consists of approximately 48 acres, bounded on the north by South 200th Street, and to the east by 18th Avenue South and the WSDOT right of way. The resource consists of glacially deposited, slightly silty to silty sands and gravels. Borrow Area 3 contains 2.35 acres of wetlands. Full utilization of the available resource would produce approximately 1.5 million bank cubic yards (bcy) of borrow material for use in the construction of the Third Runway embankment. Under the Port's current proposal, avoiding impacts to all the wetlands in Borrow Area 3, approximately 1.0 million bcy of the borrow resource would be available (see Drawing No. 7).

Immediately north of Borrow Area 3 and approximately 1,100 feet south-southwest of the runway is Borrow Area 4. It comprises an area of approximately 40 acres and is located west of the Tyee Golf Course. It is bounded to the south by South 200th Street, to the east by 18th Avenue South, and to the north by South 196th Street. The resource has been identified as being generally similar to that of Borrow Area 3. No wetlands exist in Borrow Area 4. Full utilization of the available resource will produce approximately 1.2 million bcy of borrow material for use as embankment fill.

Transfer of excavated materials from Borrow Areas 3 and 4 to the embankment construction site will be accomplished by conventional highway haul trucks. The conceptual haul route has been laid out to avoid wetlands impacts to the maximum extent possible, and to avoid conflicts with future construction of the proposed RDF to be located within the existing Port-owned Tyee Golf Course. Drawing Nos. 10 and 11 show conceptual haul route across Port property consisting of the Tyee Golf Course and the southern airport roadway system, to transport materials from Borrow Areas 3 and 4 as presented in the FSEIS.

### ***3.2 Description of Excavation Practices and Operating Plan***

#### ***3.2.1 Vegetation and Topsoil Removal***

This subsection discusses concepts the Port will use to address erosion control, vegetation and topsoil salvage, and the physical management of woody and other debris and topsoil. One or more contractors will accomplish most of the third runway embankment construction including development of the borrow areas, construction of the haul route, and reclamation of all permitted disturbances. Contracted material development and hauling activities will comply with the terms and conditions of the Port's Master Plan Update EIS and

ILA between the Port and the City of SeaTac (1997), such as material hauling hours, construction best management practices (BMPs), site-specific TESC plan, and relevant environmental permits.

Prior to commencing with borrow area and haul route development, approved TESC facilities will be installed. The TESC features will be placed around all borrow site, staging, and stockpiling areas associated with this work and are likely to include perimeter silt fencing and collection ditches, infiltration or sedimentation ponds, and stormwater treatment facilities. The collection ditches will be used to direct all site runoff to the proposed pond sites and sized to accommodate a 100-year storm event while providing filtration for lesser flows. The infiltration or sedimentation ponds will allow gravity removal of suspended solids and also provide stormwater detention. The stormwater treatment facility will remove any remaining turbidity and provide for pH adjustment of the stormwater before release. All measures will comply with the provisions of the NPDES Sand and Gravel General Permit and other relevant permits.

Site clearing preparations would consist of vegetation stripping and topsoil removal. Prior to vegetation stripping and topsoil removal, merchantable timber will be harvested and removed from the site in accordance with a Forest Practices Permit. All remaining vegetation would be removed and managed by composting or land filling as needed.

The Port will obtain a Forest Practices Permit to cover logging associated with the borrow areas. Typically, vegetation removal would follow installation of TESC measures and immediately precede topsoil removal. Tree felling activities may occur during the fall or winter preceding the first construction season.

### **3.2.2 Topsoil Stockpiling**

Use of topsoil is a critical component of the revegetation plan and will enhance recovery of reclaimed borrow site facilities. Topsoil is defined as the soil of the A and B horizons, or referred to as all solum materials that will sustain plant growth.

The Port has tested topsoil in Borrow Areas 3 and 4 and determined that it is similar to other undisturbed surficial soils in the surrounding area. The surficial 2 inches in Borrow Area 4 has been impacted by wind-blown dust containing arsenic from the former ASARCO smelter in Tacoma. A topsoil management plan will be developed to ensure the topsoil is handled in a suitable manner.



The opening of each borrow site will start with the removal and recovery of topsoil for reuse during the concurrent and final reclamation stages. A contractor will conduct topsoil salvage using graders, dozers, front-end loaders, haul trucks, and/or other equipment as deemed necessary. Topsoil will be stripped to a depth of 12 inches and temporarily stockpiled within Borrow Area 4 and in the area adjacent to Borrow Area 4 on the Tyee Golf Course area as indicated on Drawing Nos. 12 to 16.

Topsoil stockpiles will be constructed no higher than 20 feet and with slopes no steeper than two horizontal to one vertical (2H:1V). Stockpile heights may vary according to their duration of use to maintain adequate levels of bioorganic activity necessary to facilitate revegetation growth. Soil stockpiles may be located at alternative sites established in the borrow permit area outside of wetland protection areas.

Stormwater and erosion controls will be installed around each stockpile in a manner consistent with provisions of the NPDES Sand and Gravel General Permit. Topsoil will be used at the end of each year to facilitate revegetation of areas disturbed by borrow development operations. Thickness of the replaced topsoil will typically be a minimum of 12 inches or the same as is removed. To the extent necessary, additional topsoil can be recovered from the embankment construction area prior to filling and imported to the borrow areas for reuse.

### **3.2.3 Permanent Setbacks and Sight Screens**

The Port will maintain existing vegetation as visual barriers or sightscreens along the perimeter of the borrow sites. Surrounding residential areas are situated on terraces to the west of the borrow sites, which tends to obstruct a direct view of borrow activities.

The conceptual borrow development plan includes use of a 50-foot reclamation setback surrounding material extraction activities as indicated on Drawing Nos. 12 to 16. To the extent feasible, natural trees and vegetation within the setback will be preserved to maintain or enhance perimeter sightscreens. In the absence of existing trees, an earthen berm may be constructed as a noise and visual barrier within portions of the reclamation buffer near each of the active borrow extraction areas.

### **3.2.4 Borrow Material Development, Extraction, Loading, and Haul Methods**

The entire borrow material development and reclamation process is expected to last two construction seasons, with excavation and hauling limited to the fair

weather construction period of about mid-May to early October of each year. Winter shutdown would follow the cessation of first-year extraction activities, followed by temporary reclamation and revegetation, winter-season stormwater enhancements, and general site monitoring where necessary.

Initial excavation is planned to be in Borrow Area 4. The undisturbed contours shown on Drawing No. 12 would be altered as fill material is developed through a series of benched cuts down to the ultimate elevations indicated on Drawing No. 14. The Port expects glacial till and outwash deposits to be ripped by dozer and loaded by a wheeled bucket loader to facilitate a high production rate, but other types of equipment (e.g., a tracked excavator) could be used. Actual excavation equipment selection will be left up to the General Contractor.

No screening or washing activities will be used; the excavated soil material will be developed as "pit-run" embankment fill. Borrow Area 4 is expected to produce approximately 1.2 million bcy of fill material in the first year. Borrow Area 3 would provide another 1.0 million bcy of embankment fill during the second construction season.

As the first construction season draws to a close, TESC and site clearing preparations would be completed in Borrow Area 3. Regrading, topsoil replacement, revegetation, and landscaping measures will be conducted in Borrow Area 4.

Soil would be excavated and removed from Borrow Area 3 during the second construction season. The wetland swale would be constructed when the excavation intercepted the perched water zone, maintained during excavation, and incorporated into site reclamation activities. As with Borrow Area 4, regrading, constructing the interceptor swale and water diversion system, topsoil replacement, revegetation, and landscaping measures will be conducted at the end of material extraction.

The final shape and grade of the excavations are constrained by a number of factors:

- ▶ Maintaining operations within the defined property limits and haul routes;
- ▶ Providing a bench for the interception and conveyance of perched groundwater seepage in the north and west slopes of Area 3;
- ▶ Final grade shall be at least 10 feet in elevation above the Shallow Regional Aquifer;

- ▶ Maintaining a minimum 1.5 percent drainage grade on benches and the floor of the excavation; and
- ▶ Final excavation slopes shall be no steeper than 2H:1V permanent slopes ("high walls") within the borrow areas.

Final grades will be accomplished as a part of the borrow excavation process.

Excavated borrow materials would be hauled to the embankment construction site by conventional truck haulage using a dedicated haul road on Port property, as shown on Drawing Nos. 9 and 12. Conventional trucking could use existing Port roads and bridge adjacent to the South 188th Street runway crossing.

### **3.2.5 Erosion and Sediment Control**

This subsection discusses concepts the Port will use in its plans describing how excavation practices would be used to control erosion, temporary revegetation measures, and surface water flow control designs and features. All measures discussed in this section will be implemented in a manner consistent with the NPDES Sand and Gravel General Permit as shown on Drawing Nos. 13 through 16.

Prior to disturbing the borrow sites, sediment catchment basins and stormwater ponds designed for catching and storing sediment from exposed and erodible surfaces and infiltrating or detaining stormwater will be built. Appropriate borrow material extraction practices, including back-sloped slope benches and contoured bench drainage, will be implemented to control erosion of exposed topsoil and borrow material. Further erosion control will be accomplished by diverting existing drainage into engineered channels to control excess surface runoff.

Drainage will be managed within the borrow area or at approved erosion and sediment control points within the permit boundary. Topsoil stockpiles and stormwater detention ponds are initially planned to be located within the footprint of each borrow area, but may be located elsewhere within the project limits (i.e., within the portion of the AVO that is the former Tye Golf Course).

Drainage from topsoil stockpile runoff will be diverted into engineered runoff conveyance structures and guided (through check dams, hay bales, silt fences, etc.) into sediment catchment ponds to manage erosion of stored materials. All exposed soils and soil stockpiles maintained during the winter shutdown season

will be hydroseeded and managed in a manner to reduce or eliminate erosion. Erosion and sediment control and monitoring practices will be conducted in a manner consistent with other applicable STIA permitted stormwater control activities, including the NPDES Sand and Gravel General Permit.

Regrading during reclamation will be designed and conducted to minimize the potential for erosion.

### **3.2.6 Stormwater Management**

All Temporary Erosion and Sedimentation Control (TESC) and permanent, post-reclamation stormwater measures will be consistent with the NPDES Sand and Gravel General Permit, applicable portions of the King County Surface Water Design Manual (King County, 1998), and other applicable permits and approvals.

Stormwater management will be implemented as a staged approach as shown on Drawing No. 17. The first phase will implement TESC Best Management Practices (BMPs) to remove sediment from work area stormwater runoff. These BMPs will reduce borrow site erosion and reduce the sediment in the stormwater runoff from the work areas.

Prior to disturbing the borrow areas, a range of TESC's will be constructed, such as:

- ▶ Silt fencing installed along the project perimeter;
- ▶ Construction accesses and/or wheel washes;
- ▶ Perimeter ditches to control stormwater runoff;
- ▶ Ditches along the perimeter of the project and inside the silt fencing as necessary to ensure that turbid stormwater runoff is controlled;
- ▶ Stormwater overland flow dispersion trenches; and
- ▶ Stormwater infiltration, detention and treatment ponds, as necessary.

During the mining of the borrow areas, appropriate BMPs may be employed to reduce erosion and/or sedimentation and will include:

- ▶ Soil may be temporarily stabilized with such treatments as soil cement or hydroseeding;
- ▶ Mining will be staged to reduce exposed soil and minimize erosion; and
- ▶ Stormwater treatment facilities will remove suspended solids in drainage until work areas have been closed and stabilized.

Near the end of each work season stabilization and reclamation efforts will be implemented to minimize the time that these temporary BMPs are necessary. These measures will include:

- ▶ Topsoiling and hydroseeding of exposed soils;
- ▶ Conversion of the sedimentation and infiltration ponds to detention ponds; and
- ▶ Returning portions of haul roads, construction staging areas, and stockpile areas to pre-construction conditions.

As each borrow site is reclaimed (concurrently or permanently), additional temporary or permanent erosion and stormwater control and monitoring measures will be implemented as necessary. These measures may include but not be limited to the phasing out of stormwater conveyance structures and ponds, treatment facilities, and other BMP measures.

### **3.2.7 Infrastructure and Utility Construction**

Infrastructure and utility construction for development of the borrow areas will consist of:

- ▶ Erosion and sedimentation controls;
- ▶ Stormwater conveyance and pond structures;
- ▶ Interceptor swale system for maintaining wetland hydrology;
- ▶ Traffic control systems;
- ▶ Two borrow excavation areas;
- ▶ A conventional truck haul route;
- ▶ A staging area; and
- ▶ Topsoil stockpiles.

TESC, stormwater, and topsoil stockpiles are discussed above. As needed for haulage, an "at-grade" or elevated street crossing may be constructed with appropriate traffic controls near the intersection of 18th Avenue South and South 200th Street, and over South 188th Street, respectively.

Local potable water and electrical systems present in South 200th Street may be extended to support temporary shop and office activities within the borrow sites or the adjacent AVO. Water trucks and portable electrical generators may be used if locally available fixed sources are impractical.

Portable fuel and maintenance trucks, offices, and sanitation facilities will be used to support work crews within the borrow areas. The construction

contractor(s) will perform fueling and maintenance activities at a designated off-site area in a manner consistent with the provisions of the Appendix D of the 1997 ILA between the Port and City of SeaTac. The contractor shall handle fuel or hazardous materials in accordance with the Hazardous Materials Management Plan and related conditions comparable to those set forth in the Project Manual Specifications for Third Runway Embankment Construction - Phase 3, 2000 (Port, 2000).

### **3.2.8 Noise Control**

The Port presented a thorough analysis of the noise impacts attributable to all Master Plan Update improvements, including borrow area operations, in the FEIS and FSEIS. Measures governing truck trips, traffic patterns, and hours of operation are addressed in these EIS documents and the 1997 ILA, and will control sources associated with use of Borrow Areas 3 and 4.

Aircraft and other noise mitigation measures have been and will continue to be implemented as needed in areas surrounding the borrow areas as part of the Port's noise reduction program, within the area depicted by the STIA noise remedy area on Drawing No. 3.

## **4.0 CONCEPTUAL RECLAMATION PLAN**

This conceptual reclamation plan describes the general approach the Port and its contractor will take to reclaiming borrow area-related surface disturbances. The general goal of this reclamation plan is to provide for the continued use of the land for purposes consistent with those set forth in the Master Plan Update.

The Port will manage borrow activities and reclaim surface disturbances in a manner consistent with the approaches set forth in the Master Plan Update and supporting EIS documents. All reclamation will meet the intent of the Surface Mining Act of 1993 (RCW 78.44), and rules and guidance adopted thereunder.

The following section describes general parameters that will govern the Port's borrow development and reclamation activities. The next sections present overviews of key site preparation and surface disturbance management concepts, and key reclamation efforts.

## **4.1 Description of General Parameters and Features**

### **4.1.1 Introduction**

This conceptual reclamation plan describes the basic steps the Port will take to protect the environment and surrounding land uses through timely reclamation of site disturbances. The plan is developed for the site-specific nature of the borrow areas and the overall STIA operations. The Port and its contractor will use appropriate reclamation procedures and technologies to reclaim borrow area-related disturbances to a productive land use that is consistent with the Aviation Commercial and Operations Zones.

### **4.1.2 Goals and Objectives**

Reclamation goals and objectives of this conceptual plan will include:

- ▶ Establishing stable surfaces, topography, drainage, and water quality conditions;
- ▶ Maintaining wetland hydrology to wetlands in Borrow Area 3;
- ▶ Re-establishing suitable soil conditions to support viable populations of vegetation necessary to control erosion and meet STIA landscaping requirements;
- ▶ Revegetation of disturbed areas to prevent erosion in a manner consistent with the Master Plan Update EIS and applicable landscaping plans;
- ▶ Addressing public safety issues by managing structures, wildlife attractants, landforms, and fill extraction activities to avoid a public hazard; and
- ▶ Revegetation concepts will address STIA's Wildlife Hazard Management Plan (WHMP) goal of creating an airport environment less attractive to wildlife species responsible for aircraft-bird strike hazards.

The Port has considered several objectives when evaluating how the borrow areas would be left upon completion of borrow material excavation. Among the possibilities were: enhancements to vehicular access, pedestrian and bicycle trails, SR 509 realignment, Des Moines Creek natural areas, and redevelopment sites, as discussed in Section 5-4 of the FSEIS (FAA and Port of Seattle, 1996).

At the end of the first construction season, excavation operations in Borrow Area 4 should be finished and final reclamation of related surface disturbances should

be completed. Excavation in Borrow Area 3 should be completed and the area reclaimed at the end of the second construction season.

Seeding and revegetation will be completed in the mid- to late-fall period of both the first and second years to take advantage of winter and spring moisture cycles.

## **4.2 Reclamation Measures**

This section includes the general steps the Port and its contractor would follow in reclaiming each of the disturbance areas. Reclamation measures will meet the intent of the Surface Mining Act (RCW 78.44) and incorporate measures that will also be consistent with the STIA natural resource mitigation plan (Parametrix, 2000a).

### **4.2.1 Schedule (Temporary and Permanent Shutdown)**

The borrow areas will be operated during the fair weather construction season from about mid-May to early October over a two-year construction period. Reclamation activities will be scheduled to occur as soon as possible after the excavation activities in a particular area are completed, thus avoiding or at least minimizing potential erosion and sedimentation.

Temporary shutdown of the borrow areas will occur between the first and second construction year. Measures to reclaim or stabilize the areas, and manage and monitor revegetation, slope stability, and water quality will continue throughout the "inactive" winter period. In the event of unanticipated temporary shutdowns, similar measures will be taken. Revegetation and reclamation, and stormwater monitoring, will proceed for two growing seasons as indicated later in this document.

### **4.2.2 Vegetation Clearing**

The Port plans to clear the borrow sites and harvest any merchantable timber from the site in accordance with applicable permits. All remaining vegetation will be removed or managed on-site in compost piles (no open burning). The Port will salvage topsoil for reuse in site reclamation.

### **4.2.3 Interceptor Drainage Swale**

The proposed drainage swale is designed to collect groundwater seepage from the excavated slope face on the north and west sides of Borrow Area 3 as shown on Drawing Nos. 7, 15, and 16. The groundwater seepage represents



the natural flow from the perched zone that is intercepted by and discharges at the cut slope face (Hart Crowser, 2000a and 2000b). The flow will be collected by a drainage swale constructed along a bench and conducted southward in a swale that drains into Wetland 29. Grades along the swale bench are expected to be between about 1 and 2 percent. Modeling shows there could be up to about 2,400 cubic feet per day (cfd) of groundwater flow available, compared to the projected maximum loss from Wetland 20 of 400 cfd (Hart Crowser, 2000a and 2000b).

Construction of the drainage swale will be integrated with the excavation and reclamation plan for the excavation of Borrow Area 3 (Hart Crowser, 2000b). This will prevent overexcavation of the perching layer in close proximity to the final slope contours for the excavation. Excavation will progress from the highest area of the site in the northwest part of Borrow Area 3, working down the slope and reclaiming the upper part of the final cut slope as excavation proceeds. The perched zone will be encountered as wet areas at the base of the working slope. Excavation will then be continued to allow sufficient bench area to be developed for establishing the drainage swale at the perching layer beneath the perched zone. The bench will be graded so that the swale is cut into the perched zone and underlying perching layer within the bench. Excavation will then proceed into the lower part of the slope beneath the drainage swale. The drainage swale will be protected from erosion using erosion control matting and hydroseeding.

#### **4.2.4 Borrow Area Recontouring**

The primary objective of recontouring is to grade each borrow area and the haul route to create safe and stable topographic features. Primary recontouring of the borrow areas with track-mounted dozers will occur during the extraction process to achieve 2H:1V or flatter slopes as represented on Drawing Nos. 13 to 16.

Relatively flat slopes at the base of the excavated areas will maintain a positive drainage surface of at least 1.5 percent. Benches will be sloped to facilitate drainage and bench widths reduced and rounded to break up the rectangular features where feasible.

The ultimate post-excavation contours represented on Drawing Nos. 14, 16, 18, and 19 will be established as the extraction process draws to a close. All surfaces will be ripped or scarified in preparation for topsoiling and revegetation.

#### **4.2.5 Topsoil Replacement**

Topsoil replacement will begin as soon as borrow material extraction activities in Borrow Area 4 have advanced sufficiently to prevent reclamation from interfering with active excavation. For example, reclamation activities could begin about the mid-year point in the extraction schedule and continue through the end of extraction (Drawing Nos. 13 and 14). At this time, the upper portions of the high wall slopes would be recontoured and prepared for topsoiling. As the slopes are progressively regraded, topsoiling of the upper reaches will extend across the mid-slope bench area as material extraction is extended to the ultimate borrow pit floor elevations.

Topsoil will be replaced evenly in a layer measuring 12 inches or more in thickness, depending on the quality of the topsoil and the available quantity. Some additional topsoil resources may be developed from the embankment construction site for use in re-topsoiling the borrow areas.

Once topsoiling has been completed, amendments or improvements will be made to the surface as needed prior to reseeding. In some cases, fertilizers will be used in site revegetation to provide an initial source of nutrients for establishment of the plant community. It will also contribute to nutrient cycling and later soil development by natural, self-supporting processes.

Topsoil will be treated to enhance or produce favorable conditions to facilitate plant growth. These treatments include:

- ▶ Stabilizing the soil system;
- ▶ Reducing soil erosion;
- ▶ Maintaining proper soil moisture levels;
- ▶ Soil ripping, tilling, and harrowing; and
- ▶ Slope tracking and raking.

#### **4.2.6 Stormwater Control**

Stormwater diversion swales and sediment ponds designed for catching and storing sediment from exposed and erodible surfaces will be built prior to excavation and modified or abandoned as appropriate during reclamation. Stormwater infiltration and detention ponds will be designed to encourage infiltration to the maximum extent possible. Each pond will be designed to manage stormwater and sediment where feasible.

Drainage channels will be created across the slope face and flat areas where necessary to direct runoff toward managed constructed stormwater control

facilities. Each of the borrow areas will be free-draining; excavation benches and floors will be regraded to maintain a positive 1.5 percent drainage slope. Stormwater and erosion control features will be consistent with those identified in the NPDES Sand and Gravel General Permit, the STIA Comprehensive Stormwater Management Plan, and other relevant permits, as shown on Drawing No. 17.

#### **4.2.7 Slope Stability**

Initial excavation in the upper elevation areas of both Borrow Areas 3 and 4 will create typical bench heights ranging from 20 to 30 feet with a typical working floor ranging from 60 to 80 feet wide to permit safe operation of a wheeled loader and a haul truck.

Typically a track-mounted dozer will push material from above onto the underlying catch bench where loading will take place. As extraction of borrow material reaches full production levels, the typical bench height could reach 40 feet and the typical floor could range up to 120 feet wide to allow for two-sided loading of highway haulers. In each case, the high wall portion of the initial and production level benches will be dozed to a slope equal to or flatter than 2H:1V. Interim and final reclamation slopes will be regraded to slopes equal to or flatter than 2H:1V. Final recontoured slopes will contain a mid-slope bench approximately 10 to 20 feet wide, with a six horizontal to one vertical (6H:1V) slope toward the recontoured face. The bench in Borrow Area 4 will have a 1 percent slope to convey drainage to diversion ditches located at the outside margins of the excavated area. The bench in Borrow Area 3 will also support the wetland protection swale.

### **4.3 Timing of Reclamation Activities**

#### **4.3.1 General Reclamation Procedures**

As mentioned above, reclamation procedures for the borrow areas generally start with initial pre-development activities. Initial grading activities will produce topsoil that will be available for use during the reclamation and revegetation of the disturbed areas. Once final slopes have been recontoured, topsoiling, soil conditioning, and revegetation efforts will be completed as described above. The following subsections outline interim and concurrent reclamation activities the Port would employ at the appropriate stage of the borrow development program.

#### **4.3.2 Interim Reclamation and Revegetation**

Interim reclamation will consist of taking measures to stabilize features on an interim basis, such as temporary road embankments and topsoil stockpiles. Interim reclamation of temporary haul roads and embankments will occur following relocation of borrow area access routes. Revegetation of these slopes and roads will occur as each borrow area reaches the point where it can be decommissioned and permanently regraded. Hydroseeding with a bonded fiber matrix will be used where appropriate as part of topsoil reseeding and revegetation efforts as depicted on Drawing Nos. 18 and 19. Additional plantings as part of reclamation will be compatible with the approved STIA landscaping plan.

#### **4.3.3 Concurrent Reclamation and Revegetation**

The process of reclamation in Borrow Area 4 may begin mid-year during the first construction season as soon as the initial upper bench cuts have been stabilized. Once these upper benches have been regraded, and the permanent drainage structures have been installed, topsoil will be placed and prepared for revegetation. As stated above, concurrent reclamation will occur as Borrow Area 4 slopes are regraded to their final post-excitation contour levels with a mid-slope catch bench shown on Drawing No. 18. Topsoiling of these stabilized slopes would follow completion of extraction and slope regrading activities. Slopes will be revegetated once regrading, topsoiling activities, and soil treatments have been completed.

#### **4.3.4 Final Reclamation of Project Disturbances**

While final regrading and revegetation of Borrow Area 4 will have been completed as a form of concurrent or interim reclamation during the first construction season, Borrow Area 3 will be permanently reclaimed at the end of the second season. Bench heights will be limited and regraded to blend into the surrounding contoured slopes to eliminate or reduce any rectilinear features.

All haul routes will be reclaimed in Borrow Areas 3 and 4 at the end of the second year. Hydroseeding with a bonded fiber matrix will be used where appropriate as part of topsoil reseeding and revegetation efforts as shown on Drawing No. 19. Additional plantings as part of reclamation will be compatible with the approved STIA landscaping plan.

## **5.0 REVEGETATION PLANNING, WEED CONTROL, AND WILDLIFE**

Revegetation planning for the borrow areas will consist of incorporating interim measures to control erosion at stockpile locations and exposed slopes into permanent landscaping. Interim and permanent landscaping, revegetation, and weed control measures used on the borrow areas and haul route will comply with the landscaping conditions of the Master Plan Update EIS documents and the Port's Interim Landscape standards. Revegetation concepts will address adjacent land-use issues, especially the need to maintain uses that are consistent with STIA's Wildlife Hazard Management Plan (WHMP) goal of creating an airport environment that is less attractive to wildlife species responsible for aircraft-bird strike hazards.

## **6.0 RECLAMATION AND REVEGETATION MONITORING PLAN**

### ***6.1 Reclamation and Slope Stability Monitoring Program***

The effectiveness of reclamation and revegetation of all surface disturbances within the permit boundary will be monitored for a minimum of 2 years to assure stability of all regraded slopes and the viability of all revegetated areas. Results of slope stability and revegetation monitoring activities will be compiled and retained by the Port.

### ***6.2 Revegetation and Stormwater Control Monitoring Program***

Revegetation monitoring locations will be established within the reclaimed borrow areas and the reclaimed portions of the haul route. Each location will be monitored for the soil conditions, the succession rates for replanted or reseeded species, and the general value to wildlife and other dependent uses created by surrounding land-use activities.

Site reclamation and revegetation practices employed at the reclaimed borrow areas will also function as erosion and sediment control measures. Post-reclamation monitoring of stormwater pollution prevention and site stabilization measures will be employed as deemed necessary under the NPDES Sand and Gravel General Permit.

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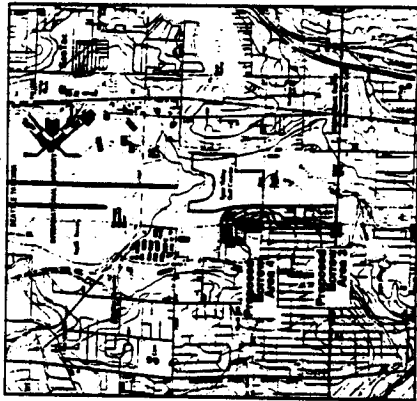
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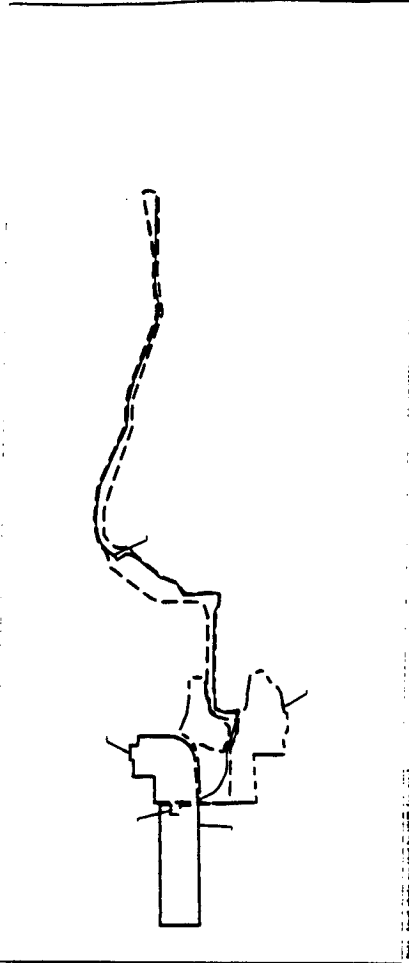
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# THIRD RUNWAY BORROW AREAS 3 AND 4 FINAL DRAFT CONCEPTUAL BORROW MATERIAL DEVELOPMENT AND RECLAMATION PLAN

Site Access and Location Map



Borrow Area and Haul Route Layout



Proposed Truck Haul Route  
Former 1966 Golf Course  
Boundary (Steeping Area for  
Equipment and Stockpiles)

Proposed Borrow Area  
Parcel Boundary

DRAWING NO.	TITLE
1	TITLE SHEET, DRAWING INDEX, SITE LOCATION MAP, AND BORROW AREA AND HAUL ROUTE LAYOUT
2	LEGEND AND NOTES
3	SOUTH AIRFIELD AND BORROW AREA ZONING MAP
4	SITE DEVELOPMENT PLAN AND FENCED WATER-BARING ZONE ELEVATION CONTOUR MAP
5	STATION ELEVATION CONTOUR MAP
6	BORROW AREA 3 AND 4 PRELIMINARY FENCED WATER-BARING ZONE AND SHALLOW AQUIFER
7	BORROW AREA 3 AND 4 PRELIMINARY FENCED WATER-BARING ZONE AND SHALLOW AQUIFER
8	HYDROLOGIC MODEL/ANALYSIS RESULTS FOR FENCED WATER-BARING ZONE AND SHALLOW AQUIFER
9	RELANDING MAP SHOWING PRE-1 RECLAMATION ELEVATION CONTOURS
10	CONCEPTUAL HAUL ROUTE FROM BORROW AREAS TO AIRFIELD
11	CONCEPTUAL DETAIL - HAUL ROUTE CROSSING DEE WINDS CREEK
12	PRE-1 RECLAMATION ELEVATION CONTOUR MAP
13	PRE-1 CONCEPTUAL 100-YEAR FLOODPLAIN PLAN
14	PRE-1 CONCEPTUAL 100-YEAR FLOODPLAIN PLAN NEAR END OF YEAR
15	PRE-1 CONCEPTUAL 100-YEAR FLOODPLAIN PLAN NEAR END OF YEAR
16	PRE-1 CONCEPTUAL 100-YEAR FLOODPLAIN PLAN NEAR END OF YEAR
17	STORMWATER QUALITY DISCHARGE PLAN NEAR END OF YEAR
18	YEAR 1 CONCEPTUAL END OF YEAR CONCEPTUAL RECLAMATION PLAN
19	YEAR 2 CONCEPTUAL END OF YEAR CONCEPTUAL RECLAMATION PLAN

NO.	DATE	BY	REVISION

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SEA-TAC THIRD RUNWAY BORROW AREAS 3 AND 4  
TITLE SHEET, DRAWING INDEX,  
SITE LOCATION MAP,  
AND BORROW AREA AND HAUL ROUTE LAYOUT



**LEGEND**

- 0 AS-910-08 Boring with Observation Well Location and Number
- 0 AS-914-04 Boring Location and Number
- 879 A1D Water Elevation in Feet At Time of Drilling
- 879 Best Paved Water-Bearing Zone
- 879 Groundwater Elevation in Feet
- Proposed Barron Development Project Boundary
- Part of Seattle Barron Area Property Boundary
- Coast Facility/Private Location and Disturbance
- Proposed Major Elevation Contour in Feet
- Existing Major Elevation Contour in Feet
- Existing Minor Elevation Contour in Feet
- Proposed Rehabilitation Subback - No Permanent Excavation within 50 Feet of Property Line
- Extent Barron Area of Disturbance
- Seepage Boundary
- Drainage Swale
- Restrictive Concrete Boundary
- Stormwater Collection and Discharge Line (Conceptual)
- Stormwater Detention and Sediment Pond (Conceptual)
- Temporary Topsoil Stockpile Area (Conceptual)
- Proposed Heat Route
- Withstand (Undisturbed by Paragraph 2.7(1) with 50-Foot "No-Excavation" Buffer and Withstand Number
- Regraded, Revegetated, and Topsoiled Area
- Initial Revegetation
- Equipment Staging and Topsoil Stockpile Area
- WSDOT Right of Way
- Seattle-Tacoma International Airport Survey Grid

- Inferred Contact between Geologic Units
- Contact between Geologic Units
- Aquifer
- Patched Water-Bearing Zone
- Proposed Base of Excavation
- Groundwater Elevation Contour in Feet
- 879 Groundwater Elevation Contour in Feet for Patched Water-Bearing Zone
- Best Paved Water-Bearing Zone Groundwater Elevation in Feet
- Boring Number
- Boring Location
- Groundwater Level at Time of Drilling
- Screened Interval
- Water Level in Patched Water-Bearing Zone
- Patching Layer
- Water Level in Underdrain
- Proposed Subsoil
- Drilling Distance and Direction
- Water Level in Patched Water-Bearing Zone
- Patching Layer
- Water Level in Underdrain
- Proposed Subsoil

- 8 (4) Discharge Point Location and Number**
- Subsoils and Materials Details**
- 1 Barron Area 1 Infiltration Basin
  - 2 Barron Area 3 Emergency Overflow
  - 3 Barron Area 3 Wetland Protection Swale to Wetland B-9 and Wetland 3D
  - 4 Barron Area 3 Wetland Protection Swale to Wetland 29
  - 5 Barron Area 4 Infiltration Basin
  - 6 Barron Area 4 Emergency Overflow
  - 7 Stockpile and Staging Area Detention Pond
  - 8 Heat Route Detention Pond

- Notes:**
- 1) Base maps prepared from drawings provided by 1941B entitled "Lands" dated April 2, 2001.
  - 2) Wetland delineation prepared from drawings provided by Parametric entitled "072001" dated February 20, 2001.
  - 3) Datum: State Plane - NAD 83 - Zone 10, 11N.
  - 4) Trench identification shown on Sheet 3 prepared from City of Seattle Trench Map provided by City of Seattle dated March 1, 1999.
  - 5) Hole Boring Program shown on Sheet 3 prepared from map provided by City of Seattle entitled "Soil Boring Information Report - Hole Boring Program" dated 12/7/98.
  - 6) Additional soil and groundwater information is provided in Subsoils Condition Data Report, Barron Area 3, dated 1/11/99, and "Barron Source Study, Proposed Heat Route, Seattle-Tacoma International Airport, Seattle, Washington," dated 1/11/99.

**HARTCROWSER**

1900 1st Avenue, Suite 100  
Seattle, WA 98101  
Phone: 206.461.1111  
Fax: 206.461.1112

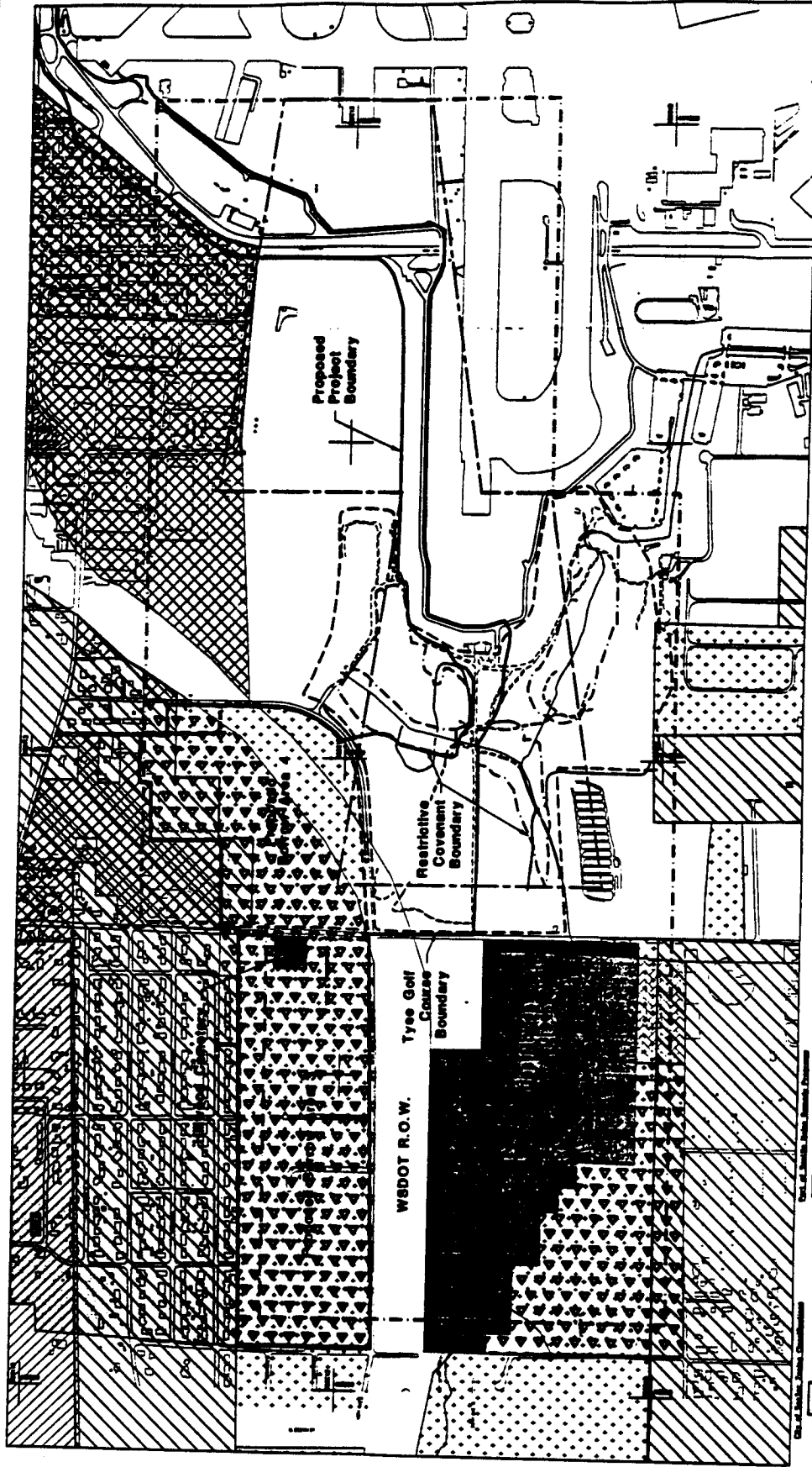
Project No.	AS-910-08
Client	City of Seattle
Location	Seattle-Tacoma International Airport
Scale	AS-BUILT
Revision	1
Date	7/2/01
Drawn by	J. H. H. / J. H. H.
Checked by	J. H. H. / J. H. H.
Approved by	J. H. H. / J. H. H.
Project Manager	J. H. H. / J. H. H.

SEA-TAC THIRD RUNWAY BARRON AREAS 3 AND 4

**LEGEND AND NOTES**

Scale: 1" = 100'

North Arrow

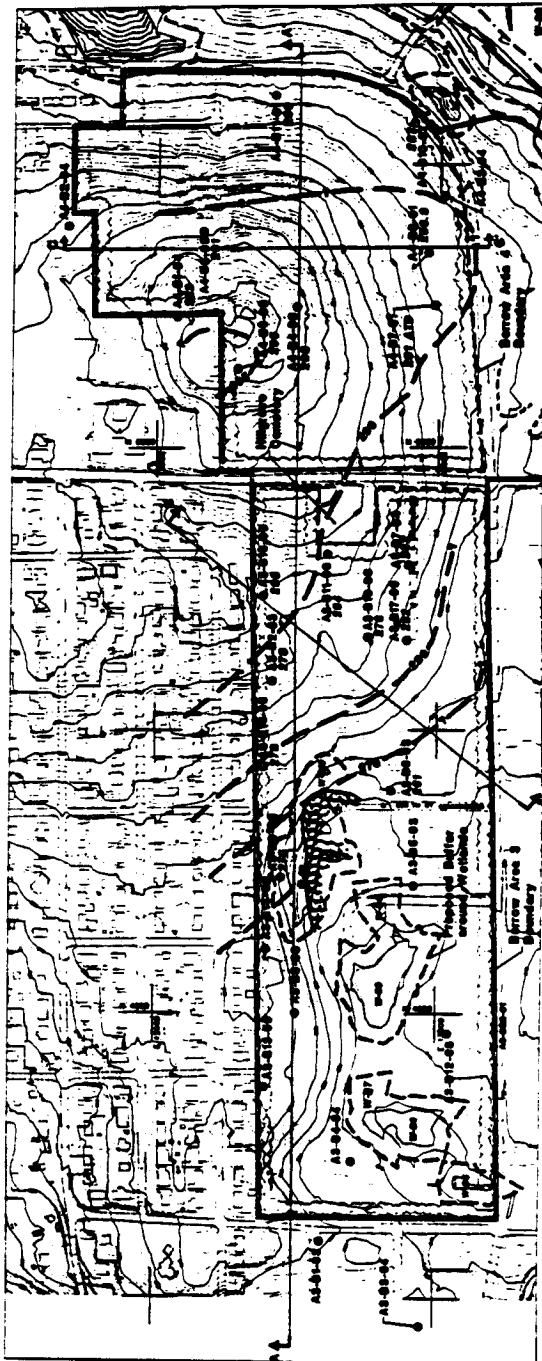


SEA-TAC THIRD RUNWAY BORROW AREAS 3 AND 4  
 SOUTH AIRFIELD AND BORROW AREA  
 ZONING MAP

**HART CROWNSER**  
 ENGINEERS ARCHITECTS  
 1000 1st Avenue, Suite 1000  
 Seattle, WA 98101  
 Phone: 206.465.1100  
 Fax: 206.465.1101  
 Email: info@hartcrownsers.com

NO.	DATE	DESCRIPTION	BY
1	10/15/10	ISSUED FOR PERMIT	J. SMITH
2	11/10/10	REVISION	J. SMITH
3	12/15/10	REVISION	J. SMITH
4	01/15/11	REVISION	J. SMITH
5	02/15/11	REVISION	J. SMITH
6	03/15/11	REVISION	J. SMITH
7	04/15/11	REVISION	J. SMITH
8	05/15/11	REVISION	J. SMITH
9	06/15/11	REVISION	J. SMITH
10	07/15/11	REVISION	J. SMITH
11	08/15/11	REVISION	J. SMITH
12	09/15/11	REVISION	J. SMITH
13	10/15/11	REVISION	J. SMITH
14	11/15/11	REVISION	J. SMITH
15	12/15/11	REVISION	J. SMITH
16	01/15/12	REVISION	J. SMITH
17	02/15/12	REVISION	J. SMITH
18	03/15/12	REVISION	J. SMITH
19	04/15/12	REVISION	J. SMITH
20	05/15/12	REVISION	J. SMITH
21	06/15/12	REVISION	J. SMITH
22	07/15/12	REVISION	J. SMITH
23	08/15/12	REVISION	J. SMITH
24	09/15/12	REVISION	J. SMITH
25	10/15/12	REVISION	J. SMITH
26	11/15/12	REVISION	J. SMITH
27	12/15/12	REVISION	J. SMITH
28	01/15/13	REVISION	J. SMITH
29	02/15/13	REVISION	J. SMITH
30	03/15/13	REVISION	J. SMITH
31	04/15/13	REVISION	J. SMITH
32	05/15/13	REVISION	J. SMITH
33	06/15/13	REVISION	J. SMITH
34	07/15/13	REVISION	J. SMITH
35	08/15/13	REVISION	J. SMITH
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37	10/15/13	REVISION	J. SMITH
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39	12/15/13	REVISION	J. SMITH
40	01/15/14	REVISION	J. SMITH
41	02/15/14	REVISION	J. SMITH
42	03/15/14	REVISION	J. SMITH
43	04/15/14	REVISION	J. SMITH
44	05/15/14	REVISION	J. SMITH
45	06/15/14	REVISION	J. SMITH
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53	02/15/15	REVISION	J. SMITH
54	03/15/15	REVISION	J. SMITH
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62	11/15/15	REVISION	J. SMITH
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64	01/15/16	REVISION	J. SMITH
65	02/15/16	REVISION	J. SMITH
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68	05/15/16	REVISION	J. SMITH
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70	07/15/16	REVISION	J. SMITH
71	08/15/16	REVISION	J. SMITH
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74	11/15/16	REVISION	J. SMITH
75	12/15/16	REVISION	J. SMITH
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89	02/15/18	REVISION	J. SMITH
90	03/15/18	REVISION	J. SMITH
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94	07/15/18	REVISION	J. SMITH
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97	10/15/18	REVISION	J. SMITH
98	11/15/18	REVISION	J. SMITH
99	12/15/18	REVISION	J. SMITH
100	01/15/19	REVISION	J. SMITH

- WSDOT R.O.W.
- Type Golf Course Boundary
- Restrictive Covenant Boundary
- Proposed Project Boundary
- Proposed Acquisition Area
- Utility Protection Zone (UPZ)
- Approved Treatment Zone (ATZ)
- See notes on Sheet 2



1. This map was prepared from aerial photography provided by the U.S. Army Corps of Engineers, Mobile District, Mobile, Alabama, and is not to be used for any purpose other than that for which it was prepared.

NO.	DATE	BY	DESCRIPTION
1	10/1/58	J. H. HART	PREPARED
2	10/1/58	J. H. HART	REVISED
3	10/1/58	J. H. HART	REVISED
4	10/1/58	J. H. HART	REVISED
5	10/1/58	J. H. HART	REVISED
6	10/1/58	J. H. HART	REVISED
7	10/1/58	J. H. HART	REVISED
8	10/1/58	J. H. HART	REVISED
9	10/1/58	J. H. HART	REVISED
10	10/1/58	J. H. HART	REVISED

**HART CROWSER**  
 ENGINEERS  
 1000 PINE STREET  
 MOBILE, ALABAMA 36680  
 PHONE 833-1111  
 TELETYPE 833-1111

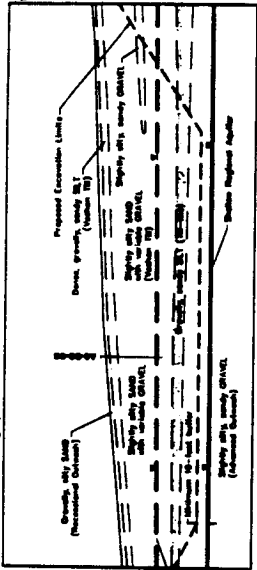
BEA-TAC THIRD RUNWAY BORROW AREAS 3 AND 4  
 SITE EXPLORATION PLAN AND  
 PERCHED WATER-BEARING ZONE  
 ELEVATION CONTOUR MAP

SHEET NO. 4  
 OF 4



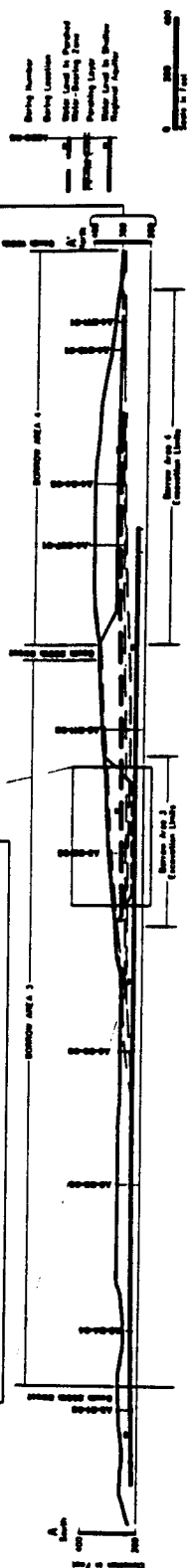
**Hydrogeologic Cross Section A-A'**  
Borrow Areas 3 and 4

**Representative Stratigraphic Section**

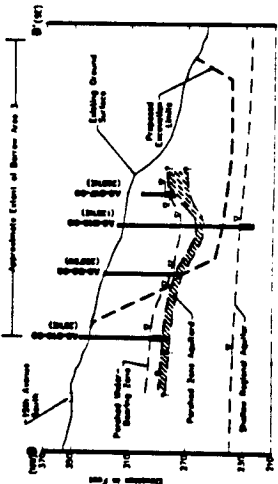


Projected Top of Perched Water-Bearing Zone

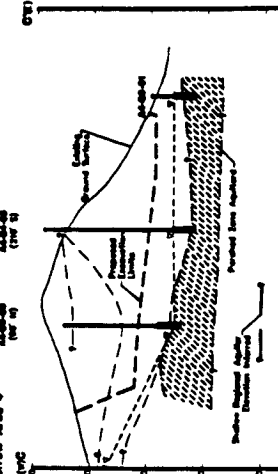
Formation	Quality/Quantity	Approximate Thickness in Feet
FL Shale, Yellow Unconsolidated Deposit	Perched Zone	100
Shale	Aquifer	100
Shale	Shale Regional Aquifer	100
London Clay	Aquifer	Sea Level
'Thin' Coarse-Sand Deposit	Intermediate Regional Aquifer	100
Pyritic Formation	Aquifer	100
'Thick' Coarse-Sand Deposit	Deep Regional Aquifer	100



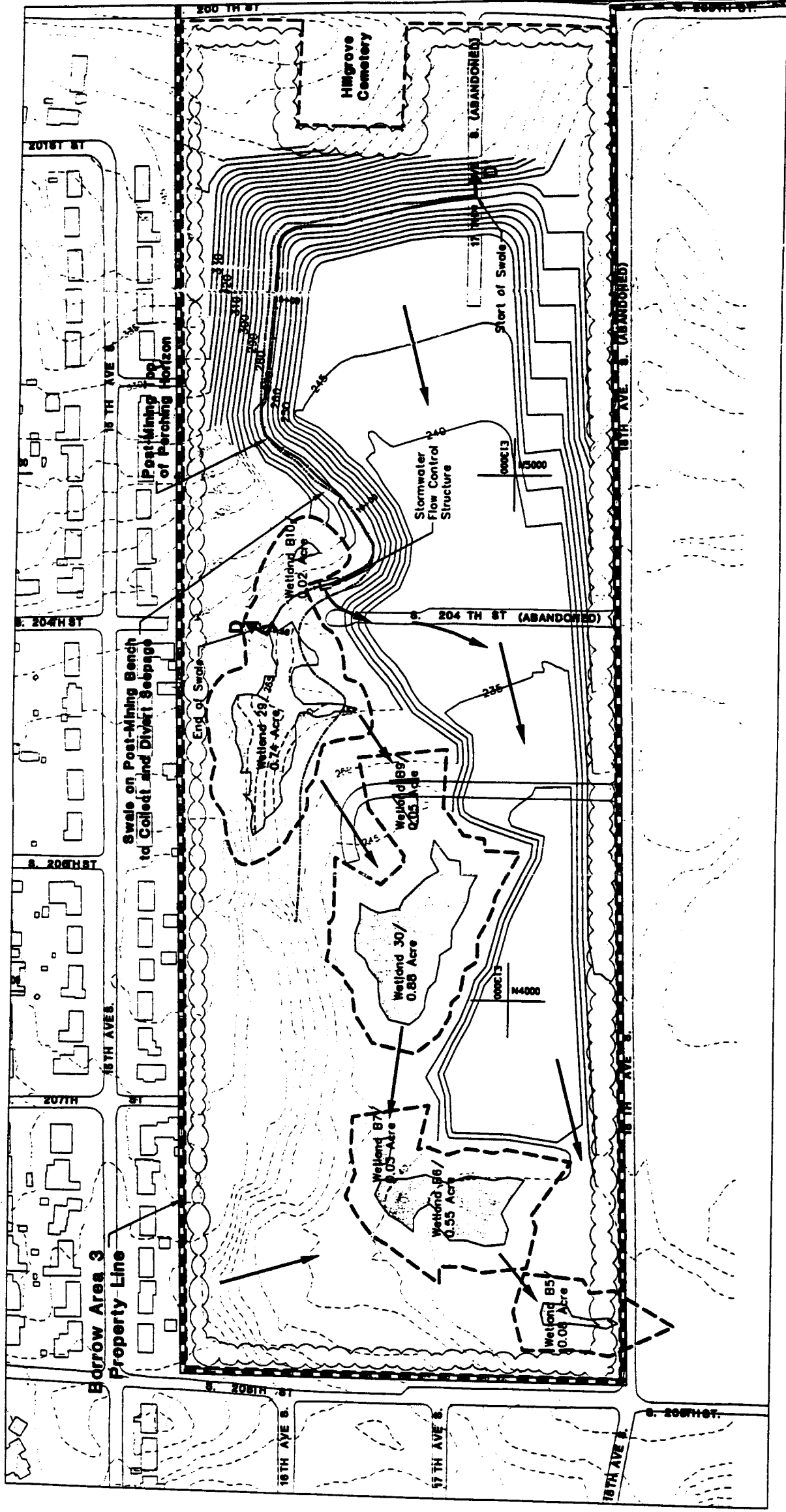
**Cross Section B-B'**  
Borrow Area 3



**Cross Section C-C'**  
Borrow Area 4



Scale	1" = 100'
North Arrow	True North
Prepared by	J. M. [Name]
Checked by	[Name]
Project No.	[Number]
Date	[Date]

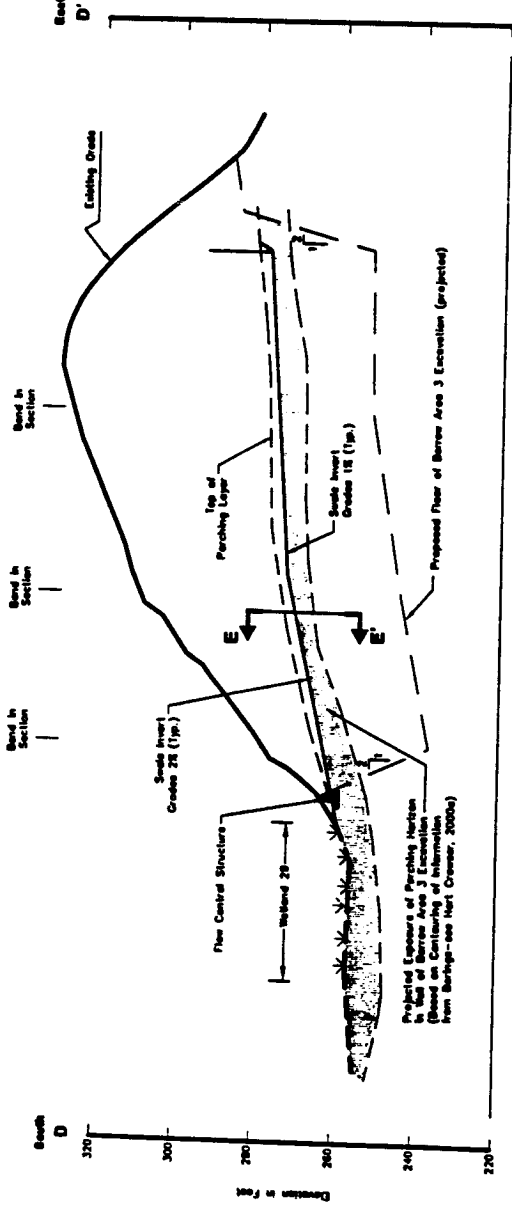


AR 051090

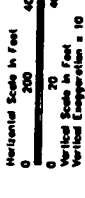
SEA-TAC THIRD RUNWAY BORROW AREAS 3 AND 4	
BORROW AREA 3 WETLAND PROTECTION SWALE, POST-RECLAMATION TOPOGRAPHY AND DRAINAGE FACILITIES	
Drawn By: M. J. BAILEY	Checked By: E. J. BROWN
Designed By: R. HASTINGS	Reviewed By: M. J. BAILEY
Date: 8/15/01	Scale: AS SHOWN
Sheet No: 4918-05	Sheet 7 of 10

**HARTCROWSER**  
 Hart Crowser, Inc.  
 1900 Lehigh Avenue East  
 South, Westborough, MA 01581  
 Phone: 508.359.8500  
 Fax: 508.359.8505

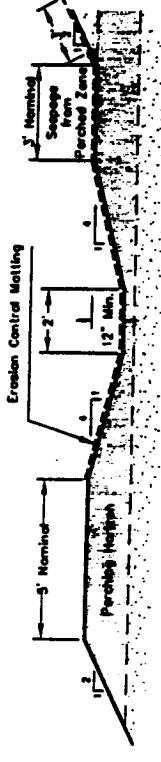
**Drainage Swale - Profile D-D'**  
Borrow Area 3



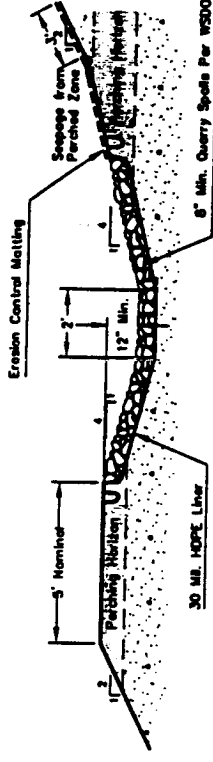
Note: Correlate information and verify soil based upon hydrogeologic investigation to confirm soil characteristics and permeability of substrate.



**Typical Swale Cross Sections E-E'**  
Borrow Area 3 Drainage Swale



**(a) DRAINAGE SWALE (TYPICAL)**  
Not to Scale



**(b) LINED DRAINAGE SWALE (AS NEEDED)**  
Not to Scale

8" Min. Quarry Spots Per WSDOT 9-13.6

AR 051091

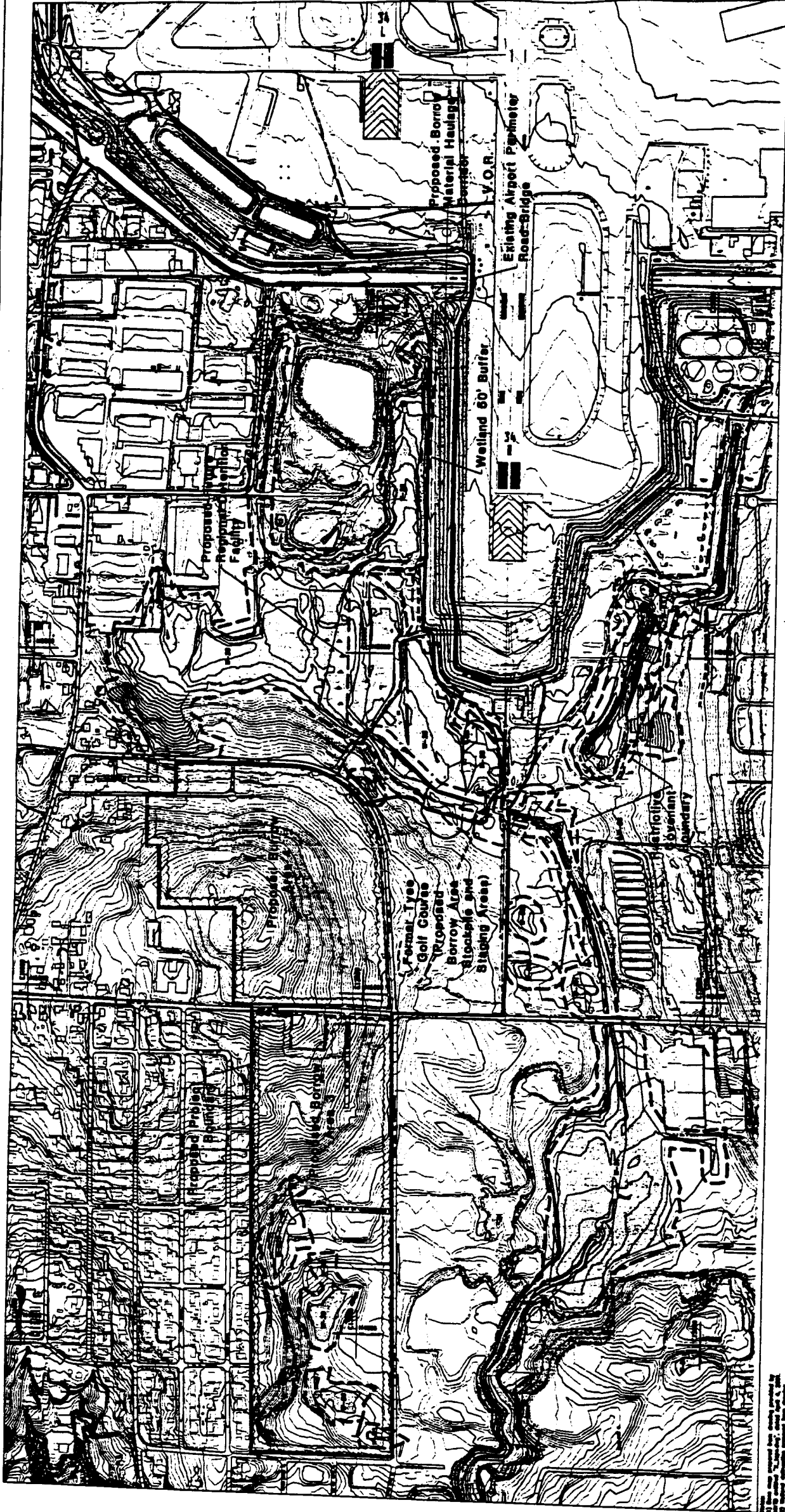
Bench Mark See note 3 on sheet 7

Proj. No.	Design	Checked	Drawn	By	Date
AR 051091	E-1083	C. T. BOYD	M. J. BAILEY	M. J. BAILEY	9/18/01
Approved: <i>[Signature]</i> Checked: <i>[Signature]</i> Date: 9/18/01 By: M. J. BAILEY Title: Project Engineer					

**HARTCROWSER**  
 1710 Parkside Avenue, Suite 200  
 Seattle, Washington 98107-3505  
 Tel: 206-325-7500  
 Fax: 206-325-7505

SEA-TAC THIRD RUNWAY BORROW AREAS 3 AND 4  
 HYDROGEOLOGIC PROFILE/CROSS SECTIONS  
 FOR PERCHED WATER-BEARING ZONE AND  
 WETLAND DRAINAGE SWALE

Sheet No.	6 of 10
Date	8/15/01
Drawn	DRAT
Project No.	AR 051091



AR 051092

Sheet No. 3 of 3 on sheet 2

Drawn By: M. J. BAILEY	Designed By: R. HALSTED	Drawn By: R. CHAO
Checked By: C. T. BOYD	Reviewed By: M. J. BAILEY	Scale:
Date: 7/23/01	By: [Signature]	Updated from sheet: [Blank]

**HARTCROWSER**  
 1710 Parkside Avenue, Suite 200  
 South, Washington, DC 20034  
 Tel: 202.297.2200

SEA-TAC THIRD RUNWAY BORROW AREAS 3 AND 4

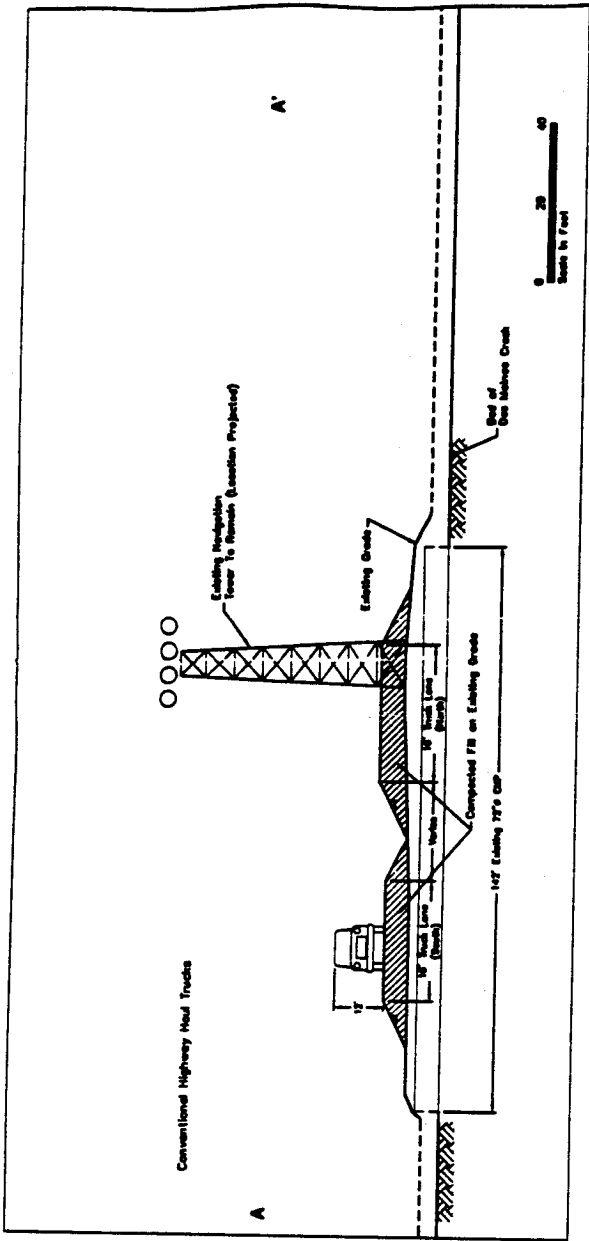
WETLANDS MAP SHOWING  
 PRE-EXCAVATION ELEVATION CONTOURS

Sheet No. 3 of 3	Drawn By: M. J. BAILEY	Designed By: R. HALSTED	Drawn By: R. CHAO	Scale:
Date: 7/23/01	By: [Signature]	Updated from sheet: [Blank]	Project No. 4978-05	Sheet No. 3 of 3

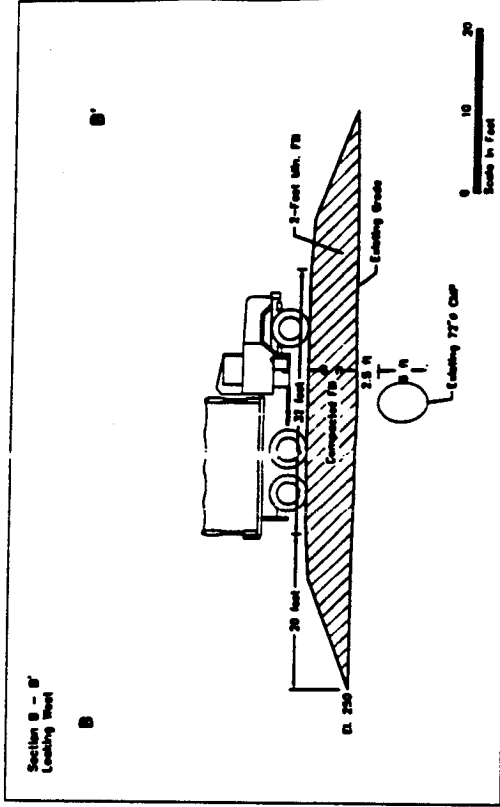




Conceptual Haul Route Crossing  
of Des Moines Creek

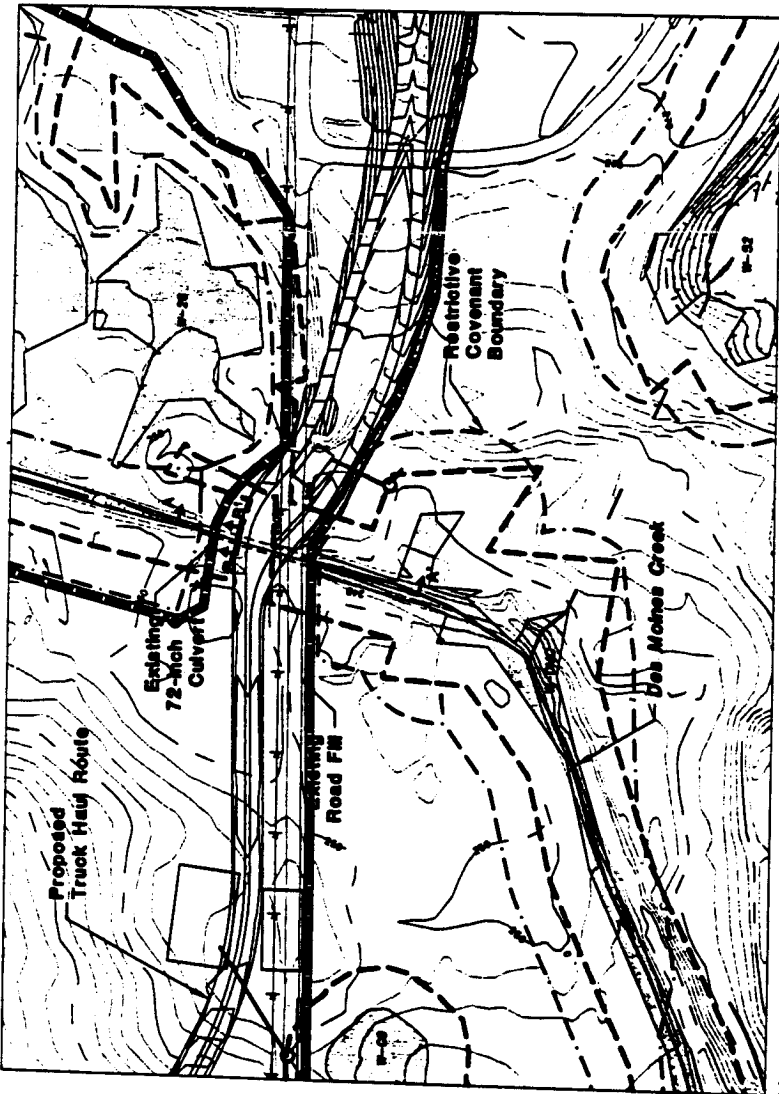


Conceptual FM Section at Haul Route Crossing  
Des Moines Creek



AR 051094

Conceptual Des Moines Creek - Haul Road Crossing Map



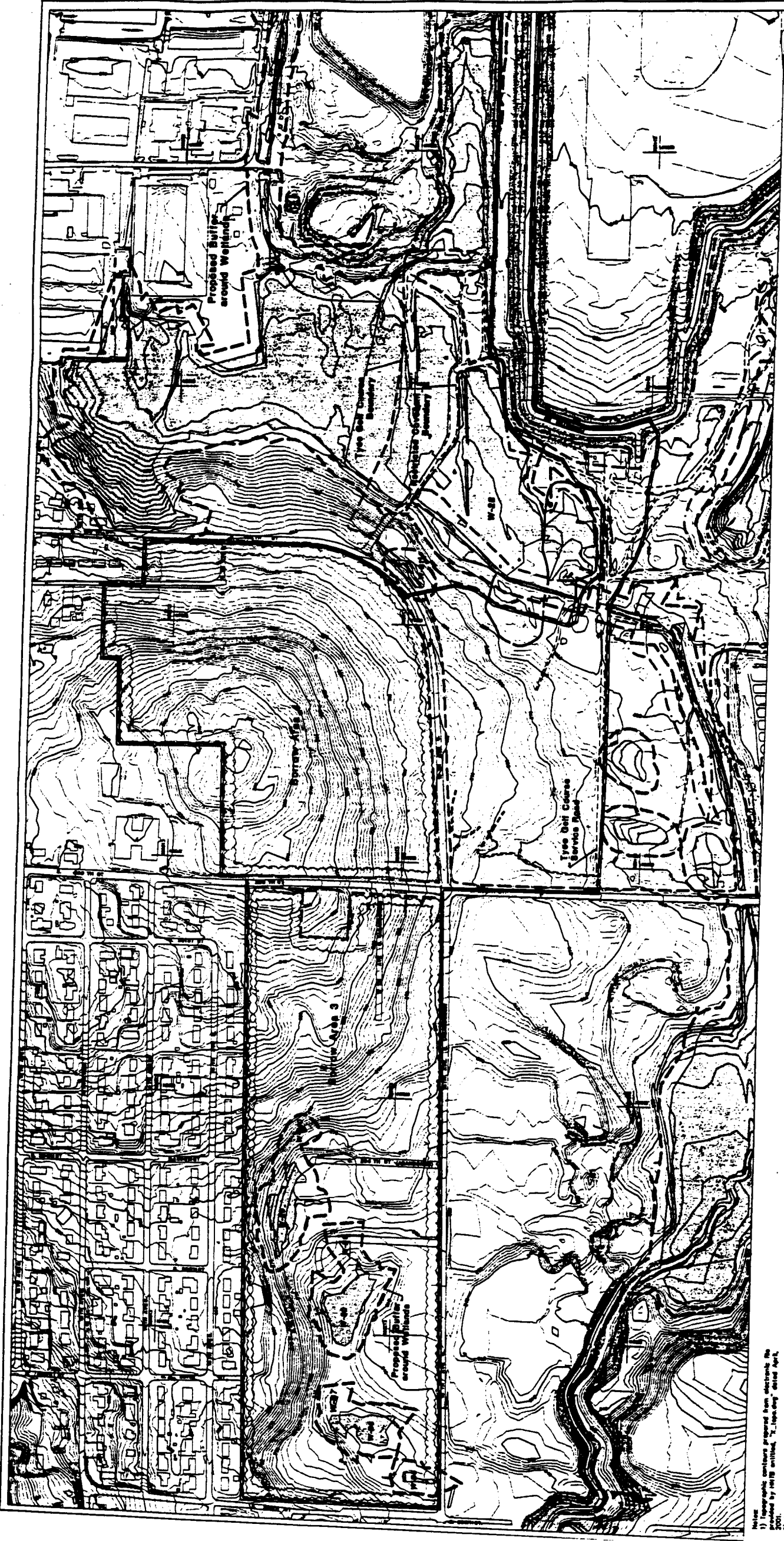
- Notes:
- 1) Base map prepared from drawings provided by HNTB entitled "Landscape" dated April 4, 2001.
  - 2) Technical information prepared from drawings provided by Pennebaker entitled "FM" dated February 20, 2001.
  - 3) Wetlands shown without 30-foot protective buffers.

Sheet Mark: See sheets 3 and sheet 2

Proj. No.	Proj. Name	Designed By	Checked By	Drawn By	Date
AR 051094	SEA-TAC Third Runway Borrow Areas 3 and 4	D. CHARLTON	C. I. BISH	R. CHAD	7/13/01

**HARTCROWSER**  
 Hart Crowser Inc.  
 1900 Columbia Avenue  
 South, Washington, MO 63077-3800  
 Phone: (636) 298-2000  
 Fax: (636) 298-2000

SEA-TAC THIRD RUNWAY BORROW AREAS 3 AND 4  
 CONCEPTUAL DETAILS - HAUL ROUTE  
 CROSSING DES MOINES CREEK



AR 051095



Rev.	Date	By	Description
1	7/29/20	M. J. BAILEY	Initial Design
2		E. I. BROWN	Check
3		R. J. HASTINGS	Design
4		M. J. BAILEY	Check

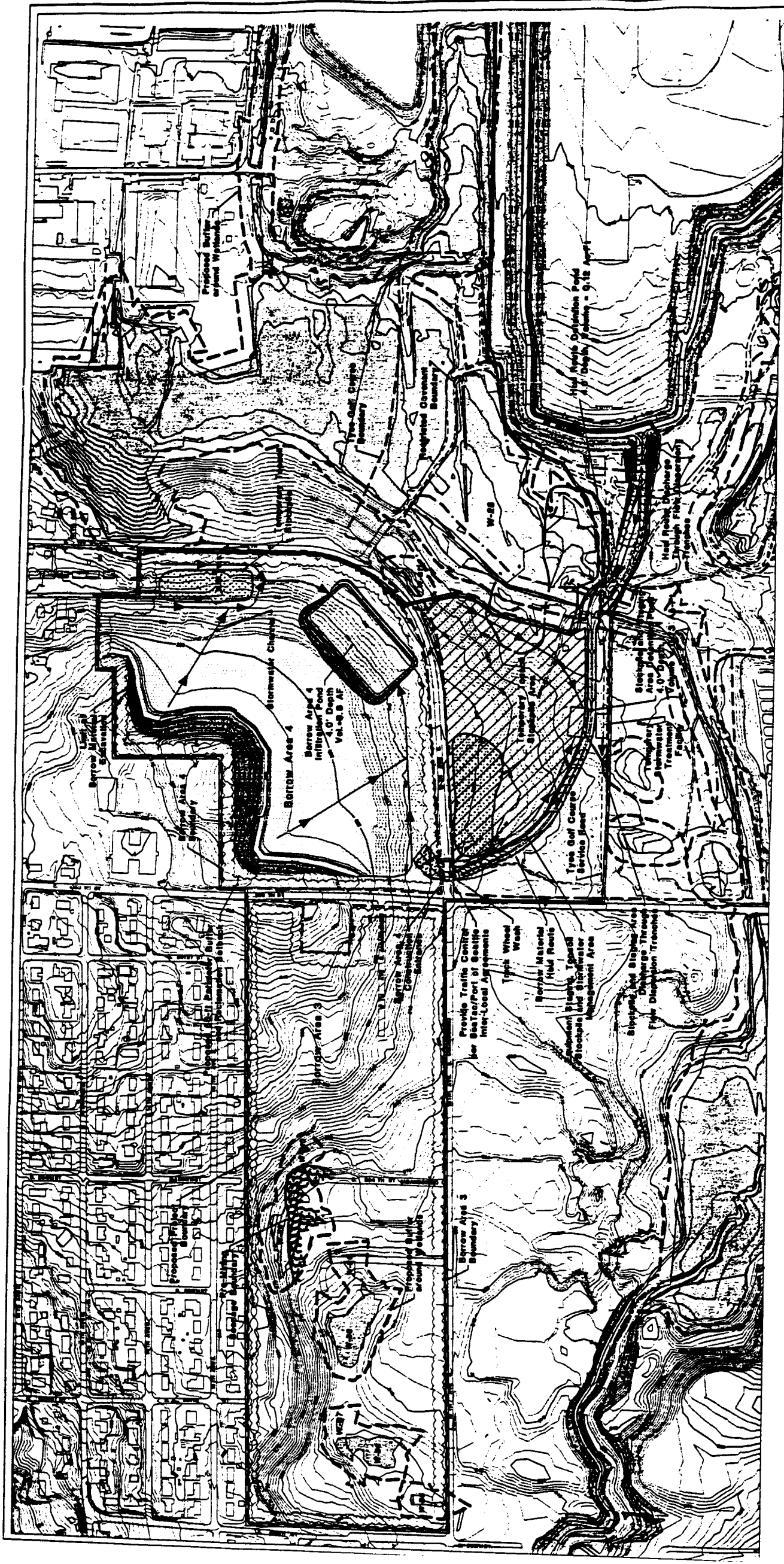
**HARTCROWSER**  
 1910 Lehigh Avenue East  
 Suite 200  
 Harrisburg, PA 17105  
 Tel: 717.634.1234

SEA-TAC THIRD RUNWAY BORROW AREAS 3 AND 4

**PRE-EXCAVATION  
 ELEVATION CONTOUR MAP**

Scale: 1" = 200'  
 Date: 8/15/20  
 Job No: 4878-05  
 Sheet No: 12 of 18

Notes:  
 1) Topographic contours prepared from electronic data provided by the USGS, "1:25000", dated April, 2001.  
 2) Wetland delineation prepared from ground provided by Pennsylvania Wildlife, "032001", dated January 20, 2001.



AR 051096

0 200 400  
Feet

Project No.	AR 051096	Scale	AS SHOWN	Date Issue	8/13/01	Project	SEA-TAC	Sheet	13 of 18
Client	SEA-TAC	Drawn By	E. BAILEY	Checked By	E. BAILEY	Approved By	E. BAILEY	YEAR 1: CONCEPTUAL MID-YEAR EXCAVATION PLAN	

**HARTCROWSER**  
 1110 E. Pike Street, Suite 200  
 Seattle, WA 98101  
 Phone: 206.462.5000  
 Fax: 206.462.5001

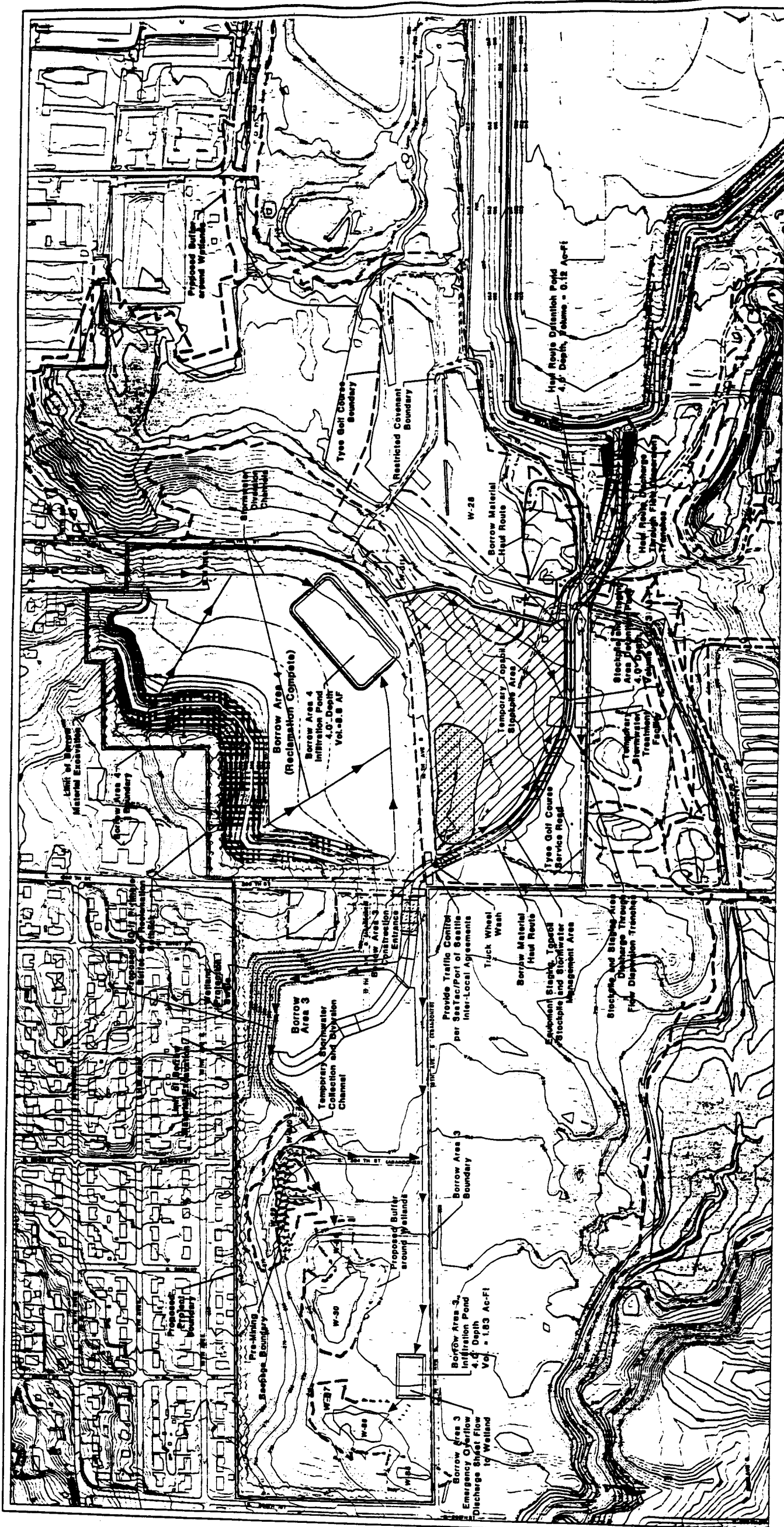
Sheet No. See note 3 on sheet 1

Rev.	Date	By	Description
1	7/28/01	E. BAILEY	Issue for Construction
2	8/13/01	E. BAILEY	Issue for Construction

- YEAR 1 CONCEPTUAL MID-YEAR ACTIVITIES**
- Install truck entrances and traffic control systems across public R.O.W.
  - Construct IESC Material Transfer Facility as needed.
  - Construct IESC Material Transfer Facility as needed.
  - Construct Borrow Material Haul Road.
  - Remove trees and clear other vegetation except within setback areas (may be segmented as excavation proceeds).
  - Pre-sitg and stockpile topsoil from Borrow Area 4.
  - Develop Borrow Area 4 and haul borrow materials.
  - Construct stormwater treatment area (contour slopes) and accomplish contemporaneous reclamation in Borrow Area 4.

Note:  
 1) Topographic contours prepared from electronic data provided by HNTB entitled, "Topography" dated April, 2001.  
 2) Wetland delineation prepared from existing provided by HNTB entitled, "Wetland Delineation" dated April, 2001.  
 3) Proposed Stormwater Collection and Discharge Channel System is conceptual only and would be adjusted as grading occurs.





AR 051098



SEA-TAC THIRD RUNWAY BORROW AREAS 3 AND 4

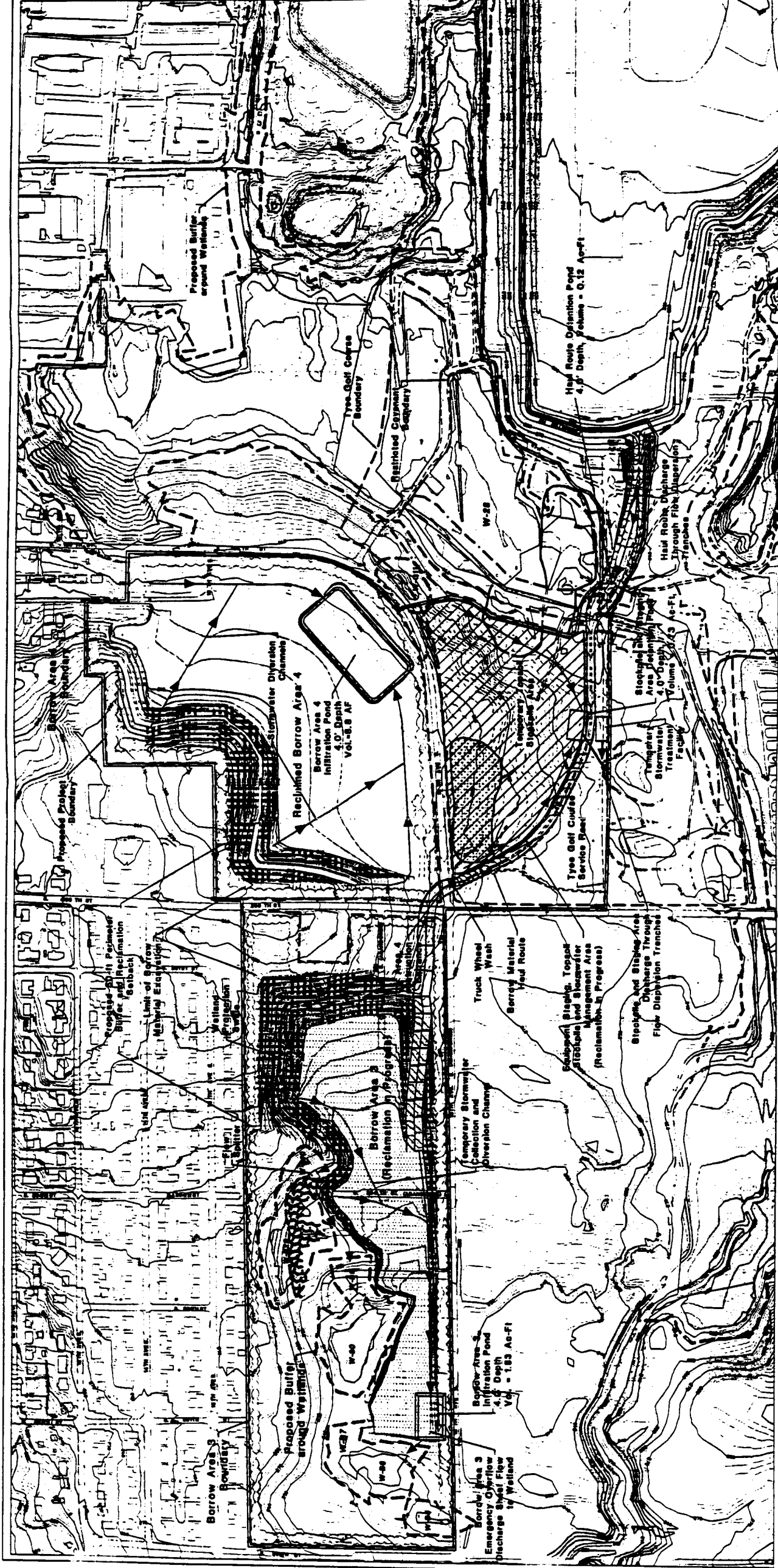
YEAR 2: CONCEPTUAL MID-YEAR EXCAVATION PLAN



Rev.	Date	By	Description
1	7/28/09	ME/CM	Issue Stormwater Ponds, Wetlands, and Control Facilities
2	8/10/09	ME/CM	Issue Stormwater Ponds, Wetlands, and Control Facilities

- YEAR 2 CONCEPTUAL MID-YEAR MINING ACTIVITIES**
1. Prepare Area 3 for removal of trees and vegetation except within wetlands and riparian buffer areas (see excavation process).
  2. Extend, maintain, and operate TSC system.
  3. Extend Borrow Material Head Rails to Borrow Area 3.
  4. Extend Borrow Material Head Rails to Borrow Area 3.
  5. Remove trees and vegetation except within wetlands areas (may be represented as excavation process).
  6. Prepare and haul Borrow Area 3.
  7. Develop and haul Borrow Area 3.
  8. Initiate permanent revegetation and landscaping in Borrow Area 4.
  9. Complete permanent revegetation and landscaping in Borrow Area 4.

**Notes:**  
 1) Topographic contours prepared from electronic file dated by 10/18/08 without "L" label only dated April, 2001.  
 2) Wetland delineation prepared from geospatial data by Paragon Software, Inc. 03/20/09 only.  
 3) All borrow areas are to be excavated and stored to be used as borrow material.



Notes:  
 1) Topographic contours prepared from electronic data provided by H&B entitled, "Topo.dwg", dated April 2001.  
 2) Station definition prepared from grading provided by H&B entitled, "102001.rdg", dated February 20, 2001.  
 3) Temporary Stormwater Collection and Diversion Channel layout is conceptual only and used to illustrate the grading intent.  
 4) Monitor and maintain vegetation and landscaping.

YEAR 2 CONCEPTUAL ACTIVITIES NEAR END OF YEAR  
 1. Install wetland protection sods when excavation reaches perching horizon.  
 2. Complete permanent revegetation and landscaping in Borrow Area 3.  
 3. Complete permanent revegetation and landscaping in Borrow Area 4.  
 4. Decommission and reclaim and Topsoil Stockpile and Staging Area.  
 5. Decommission and reclaim and Topsoil Stockpile and Staging Area.  
 6. Monitor and maintain vegetation and landscaping.

Project Name: **SEA-TAC THIRD RUNWAY BORROW AREAS 3 AND 4**

Designed By: **R. HASTINGS** | Drawn By: **R. CHAO**  
 Checked By: **C. T. BATH** | Approved By: **M. J. BAILEY**  
 Date: **7/29/01** | Date: **8/15/01**

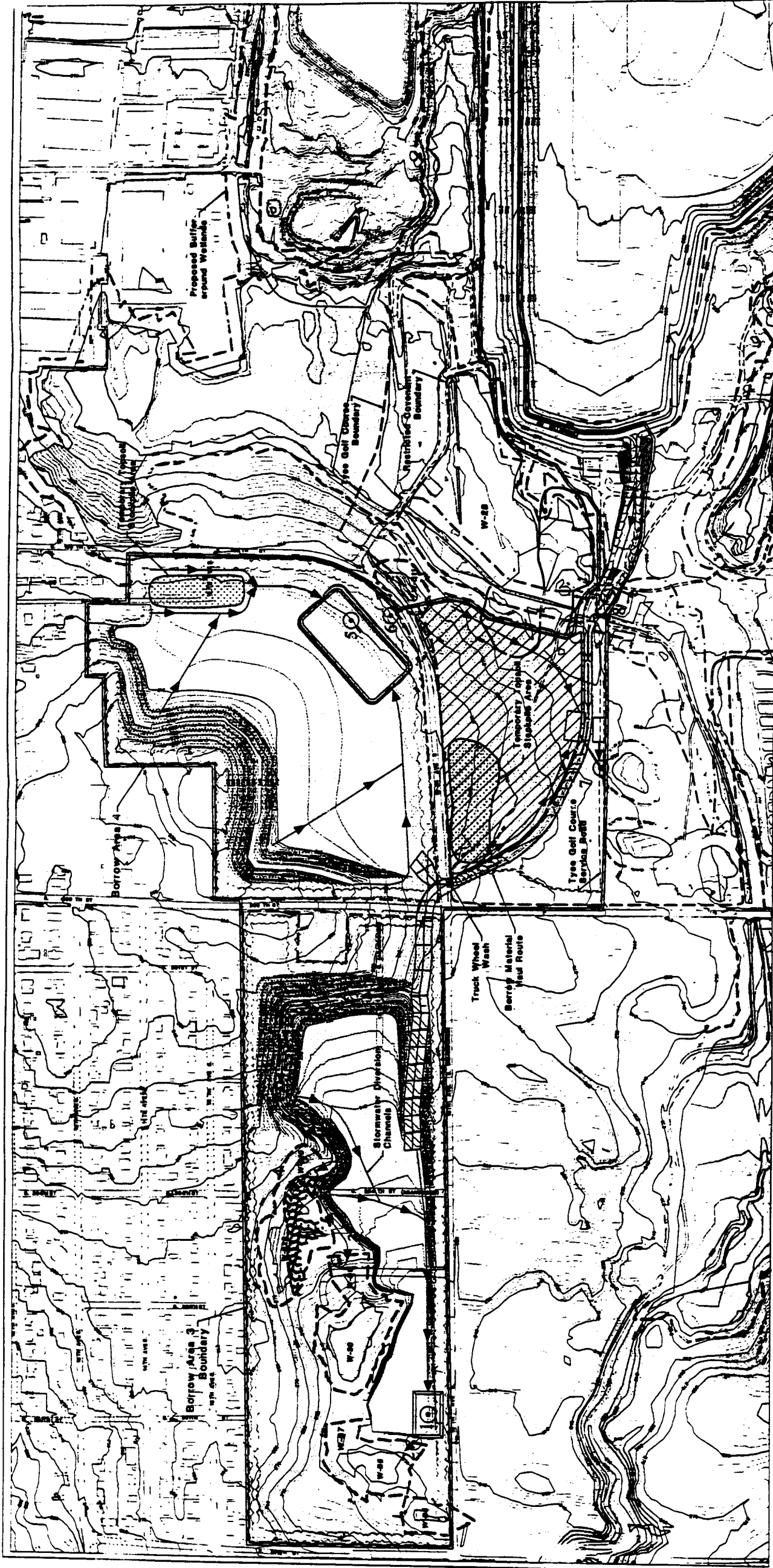
1. **7/29/01** | **8/15/01** | **8/15/01**  
 2. **8/15/01** | **8/15/01** | **8/15/01**

**HARTCROWSER**  
 Inc.  
 1810 Lehigh Avenue  
 Suite 200  
 Bethlehem, PA 18018  
 Phone: 610-748-1000  
 Fax: 610-748-1001

YEAR 2: CONCEPTUAL EXCAVATION PLAN  
 NEAR END OF YEAR

Sheet No. **22-34** | Date: **8/15/01** | Scale: **AS SHOWN** | Project: **SEA-TAC** | Drawing No.: **18**

AR 051099



Notes:  
 1) Topographic contours prepared from electronic data collected by 1978 contour, "L-Topo-100" dated April, 2001.  
 2) Wetland delineation prepared from a survey provided by Northwest Wetlands, "N-202001.dwg", dated 10/20/01.  
 3) Temporary Stormwater Collection and Storage Channel layout is conceptual only and would be adjusted as grading occurs.

80  
 Stormwater Discharge and Monitoring Point (See legend for complete list.)  
 Scale in Feet  
 0 200 400

Restricted Covenant Boundary  
 Part of Seattle Property Line (Borrow Areas 3 and 4)  
 Type Golf Course  
 Proposed MPOES Project Permit Boundary  
 Withstand with 50-Foot Buffer  
 Stormwater Control  
 Restricted Area  
 Receptacle Area  
 Extent of Excavation  
 Topsoil Stockpile Area  
 Staging and Stockpile Area

Stormwater Channel  
 Truck Wheel Wash  
 Borrow Materials Yard Route  
 Type Golf Course Service Buffer  
 Tree Golf Course  
 Proposed MPOES Project Permit Boundary  
 Withstand with 50-Foot Buffer  
 Stormwater Control

**BORROW AREAS 3 AND 4**  
 1) Installation of TSC measures and controls.  
 2) Land clearing, grubbing, and topsoil removal.  
 3) Grading and road bed preparation.  
 4) Road route construction and surface paving.  
 5) Hauling of excavated construction materials.  
 6) Collection and infiltration of stormwater.  
**STAGING AREA**  
 1) Installation of TSC measures and controls.  
 2) Land clearing and grading.  
 3) Temporary topsoil and woody material stockpiling area.  
 4) Mobile loading of on-site excavation equipment.  
 5) Emergency equipment repair.  
 6) Construction of on-site parking.  
 7) Diversion, collection, and infiltration of stormwater.  
 8) Remediation, recontouring, and revegetation.

**SWPPP ACTIVITY LIST**  
 BORROW AREAS 3 AND 4  
 1) Installation of TSC measures and controls.  
 2) Land clearing, grubbing, and topsoil removal.  
 3) Removal of remnant utilities and pavement, haul route construction.  
 4) Excavation of borrow construction materials.  
 5) Diversion, collection or infiltration of stormwater and emergency equipment repair.  
 6) Construction of truck wash with silt trap.  
 7) Mobile loading of on-site excavation equipment.  
 8) Emergency equipment repair.  
 9) Temporary topsoil stockpiling area.  
 10) Construct wetland storage swale.  
 11) Post-excavation recontouring, remediation, and revegetation.

SEA-TAC THIRD RUNWAY BORROW AREAS 3 AND 4  
 STORMWATER ACTIVITY DISCHARGE AND MONITORING PLAN  
 BORROW AREAS 3 AND 4

**HARTCROWSER**  
 1840 Columbia Ave.  
 Seattle, Washington 98102-3400  
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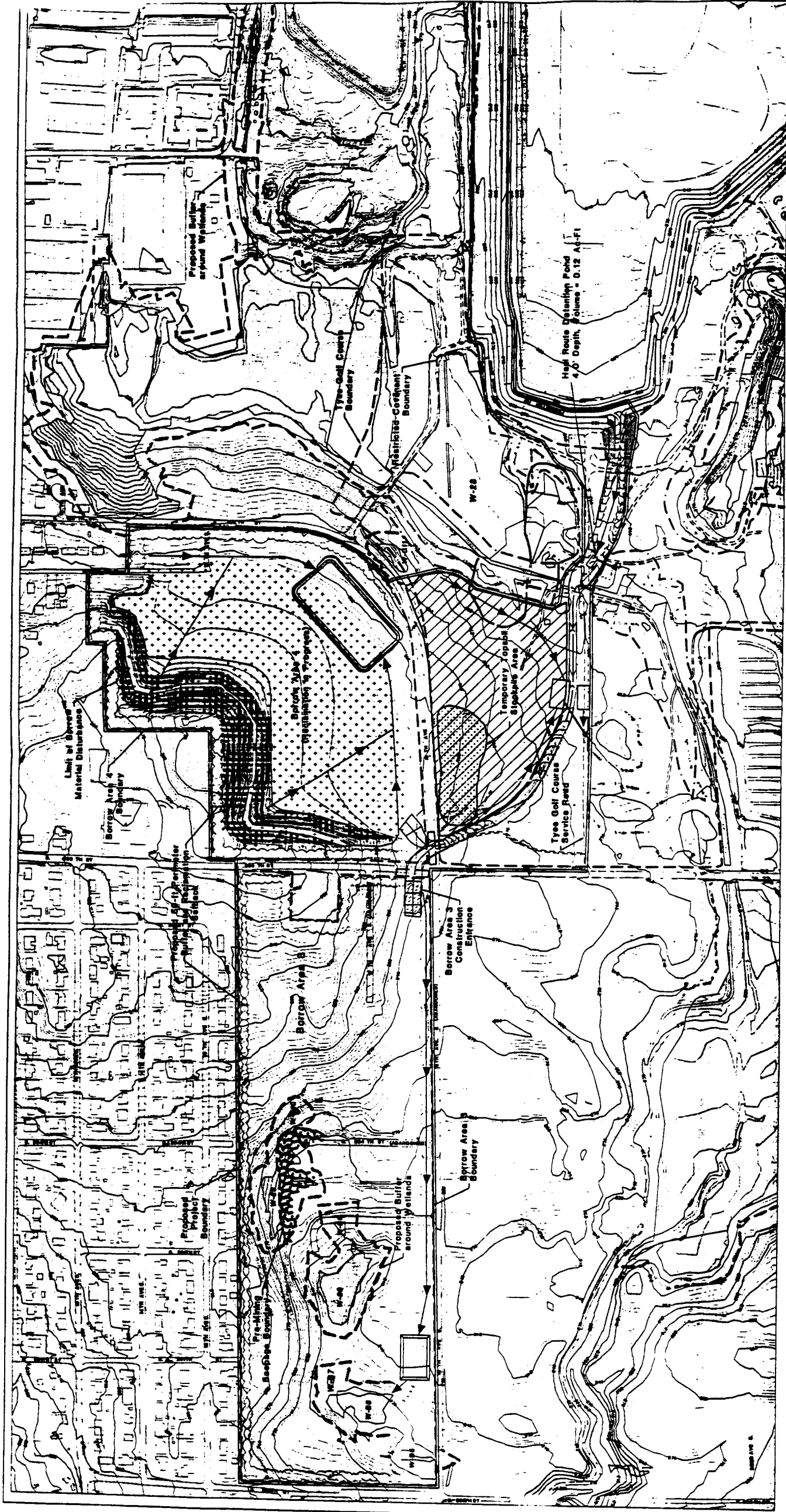
Project No.	SEA-TAC
Sheet No.	17 of 18
Scale	As Shown
Date	8/13/01
Drawn By	DAVE
Checked By	DAVE
Approved By	DAVE
Date	8/13/01
Project	SEA-TAC
Sheet	17 of 18

Project No. SEA-TAC  
 Drawn By: R. HASTINGS  
 Checked By: M. J. BAILEY  
 Approved By: M. J. BAILEY  
 Date: 7/29/01  
 Project: SEA-TAC  
 Sheet: 17 of 18

Project No. SEA-TAC  
 Drawn By: R. HASTINGS  
 Checked By: M. J. BAILEY  
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 Date: 7/29/01  
 Project: SEA-TAC  
 Sheet: 17 of 18

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 Date: 7/29/01  
 Project: SEA-TAC  
 Sheet: 17 of 18





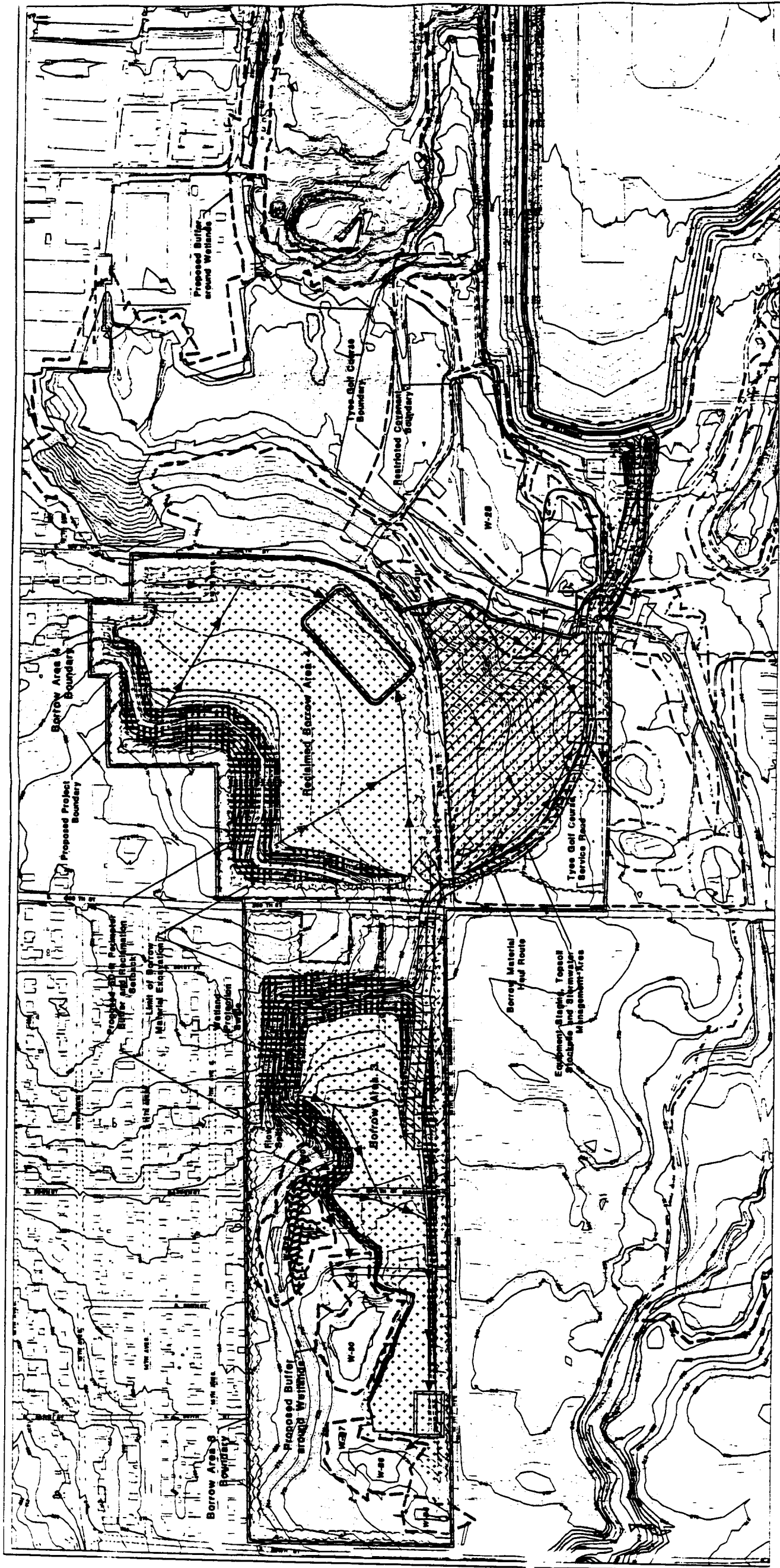
SEA-TAC THIRD RUNWAY BORROW AREAS 3 AND 4  
 YEAR 1: CONCEPTUAL END OF YEAR  
 CONCURRENT RECLAMATION PLAN

**HARTCROWSER**  
 1910 Lehigh Avenue East  
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Sheet No.	Proj. No.	Drawn By	Checked By	Date
18	4878-03	R. CHAO	M. J. BAILEY	7/28/01

- YEAR 1 CONCEPTUAL ACTIVITIES NEAR END OF YEAR**
1. Extend, maintain, and operate traffic control systems.
  2. Extend, maintain, and operate IESC system.
  3. Extend, maintain, and operate borrow material development.
  4. Extend, maintain, and operate borrow material development.
  5. Complete slope recontouring and topsoil replacement in Borrow Area 4.
  6. Complete permanent revegetation and landscaping in Borrow Area 3.
  7. Prepare Area 3 for removal of trees and vegetation except within setback areas (may be segmented as construction proceeds).

Notes:  
 1) Topographic contours prepared from electronic data provided by H&B entitled, "Topo2.dwg" dated April, 2001.  
 2) Utilities delineation prepared from drawing provided by Parametrix entitled, "032001.dwg", dated February 20, 2001.  
 3) Temporary Stormwater Collection and Detention structure locations shown on this drawing are subject to grading activity.



Notes  
 1) Topographic contours prepared from electronic file provided by H&B entitled, "Topo2.dwg" dated April, 1998.  
 2) Wetland delineation prepared from drawing provided by Parametrix entitled, "022001.dwg", dated February 20, 2001.  
 3) Temporary Stormwater Collection and Diversion System shown on drawing only and would be installed as grading occurs.

- YEAR 2: CONCESSIONAL ACTIVITIES NEAR END OF YEAR**
1. Install wetland protection areas when excavation reaches reaching horizon.
  2. Complete Borrow Area 3 borrow material development and haul.
  3. Complete permanent revegetation and topsoil replacement in Borrow Area 3.
  4. Complete permanent revegetation and landscaping in Borrow Area 3.
  5. Decommission and reclaim and topsoil Stockpile and Staging Area.
  6. Monitor and maintain TESC system.
  7. Monitor and maintain revegetation and landscaping.

Revised Date:

Rev. No.	Date	By	Description
1	7/28/01	MC/MS	Final Year 2 and Year 3 Contour, Final Haul, Stormwater Control, Wetland Stock, Reclamation
2	8/10/01	MC/MS	Final Stormwater Facilities

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SEA-TAC THIRD RUNWAY BORROW AREAS 3 AND 4  
**YEAR 2: CONCESSIONAL END OF YEAR RECLAMATION PLAN**

Client: SEA-TAC	Date: 8/15/01	Scale: 1" = 400'
Project: AS Design	Drawn: DMAT	Sheet No. 19 of 18
Drawn: DMAT	Checked: 8/15/01	Scale: 1" = 400'