CBNT SF
26.9.5.5

HARTCROWSER

Earth and Environmental Technologies

Completion Report
OFA/Pennwalt Area
Blair Backup Property
Port of Tacoma, Washington

Prepared for
Port of Tacoma

January 21, 1994
J-2350-24

USEPA SF
1266472

CONTENTS

	Page
1.0 INTRODUCTION	1
1.1 Purpose and Scope	1
1.2 Report Organization	2
2.0 BRIEF SITE BACKGROUND	3
2.1 Recommended Cleanup Alternative for the OFA/Pennwalt Area Slag/Soil	6
2.2 Recommended Cleanup Alternative for the Charcoal Briquettes/PAH-Contaminated Soil	7
2.3 Recommended Cleanup Alternative for the Sandblast Grit-Contaminated Soil	7
2.4 Recommended Cleanup Alternative for the Graving Dock and Upland Area Slag	8
3.0 ELEMENTS COMMON TO ALL CLEANUP ACTIONS	9
3.1 Well Abandonment	9
3.2 Site Preparation	9
3.3 Site Grading	10
3.4 Overall Site Drainage	10
3.5 Health and Safety Procedures	11
3.6 Groundwater Monitoring	12
4.0 OFA/PENNWALT AREA SOIL/SLAG MATERIAL	12
4.1 Demolition of Wood Shack and Railway	12
4.2 Sand and Gravel Cover Construction	13
5.0 CHARCOAL BRIQUETTES AND PAH-CONTAMINATED SOIL	13
5.1 Site Preparation	14
5.2 Excavation, Dewatering, Handling, and Backfilling of Charcoal Briquette-Laden Soil	14
5.3 Disposal of the Charcoal Briquette-Laden Soil	15

CONTENTS (Continued)

Page

6.0 ASPHALT CAPPED AREA CONSTRUCTION 16

6.1 Sand and Gravel Buffer Placement 17
6.2 Asphalt Subase Placement 17
6.3 Asphalt Cap Construction 18
6.4 Wearing Course Placement 19

7.0 SANDBLAST GRIT-CONTAMINATED SOIL 20

7.1 Excavation of Grit-Contaminated Soil and Excavation Backfilling 20
7.2 Hauling and Placement of Grit-Contaminated Soil 21

8.0 BLAIR WATERWAY PROPERTY SLAG AND INVESTIGATION-DERIVED WASTE 22

8.1 Placement of Slag and Sediment 22
8.2 Disposal of Investigation-Derived Waste 22

9.0 INSTITUTIONAL CONTROLS REQUIRED FOR THE SITE 23

10.0 INSPECTION OF DIFFERENT SYSTEMS 25

11.0 AGENCY AND TRIBE CONCURRENCE OF CLEANUP 25

12.0 CERTIFICATION 26

13.0 REFERENCES 27

TABLES

1 Estimated Sandblast Grit/Visibly Stained Soils Quantities 21

CONTENTS (Continued)

Page

FIGURES

1 Vicinity Map
2 Property Areas Map
3 Remedial Action Location Plan
4 Generalized Soft Subgrade, Quarry Spalls, and Separation Geosynthetic Location Plan - OFA/Pennwalt Area
5 As-Built Drainage Plan - OFA/Pennwalt Area
6 Cap/Cover As-Built Plan - OFA/Pennwalt Area
7 As-Built Grading Details - OFA/Pennwalt Area
8 As-Built Grading Details - OFA/Pennwalt Area
9 Charcoal Briquette Removal Plan
10 Site Plan Showing Top and Bottom Elevations of Import (ASARCO) Slag - OFA/Pennwalt Area

AS-BUILT SHEET INSERTS

C-16 Grading Plan
C-21 Drainage Plan
Charcoal Briquette Removal Plan
Areas Boundary Plan

APPENDIX A
PHOTOGRAPHIC LOG OF THE CLEANUP

APPENDIX B
CONSTRUCTION OBSERVATION FIELD REPORTS

APPENDIX C
WELL ABANDONMENT LOGS

APPENDIX D
DRAINAGE SYSTEM MATERIALS

CONTENTS (Continued)

Page

APPENDIX E
HEALTH AND SAFETY PLAN AND DAILY LOGS

FIGURES

E-1 Route to Hospital
E-2 Field Health and Safety Report
E-3 Record of Health and Safety Communication

APPENDIX F
NEW MONITORING WELL LOGS

APPENDIX G
GRAIN SIZE, PROCTOR, AND
FIELD DENSITY TEST RESULTS
OF IMPORT SOIL MATERIAL

APPENDIX H
ASPHALT CAP SYSTEM

APPENDIX I
TRIBAL FUTURE DESIGN CONSIDERATIONS
PLATE LOAD TEST DATA

CONTENTS (Continued)

Page

APPENDIX J
OPERATION AND MAINTENANCE PLAN
BLAIR BACKUP PROPERTY REMEDIATION

FIGURE

J-1 Monitoring/Inspection Schedule

APPENDIX K
PROJECT CORRESPONDENCE

APPENDIX L
DOCUMENTATION OF CONCURRENCE

APPENDIX M
POST-CLOSURE GROUNDWATER MONITORING AND SYSTEM INSPECTION REPORTS
(Under Separate Cover in Volume 2)

COMPLETION REPORT
OFA/PENNWALT AREA
BLAIR BACKUP PROPERTY
PORT OF TACOMA, WASHINGTON

1.0 INTRODUCTION

Hart Crowser prepared this Blair Backup Property Completion Report (Report) for the Port of Tacoma (Port) in accordance with the March 21, 1990, Memorandum of Agreement (MOA, 1990) between the United States Environmental Protection Agency (EPA), the Washington State Department of Ecology (Ecology), the Puyallup Tribe of Indians (Tribe), and the Port. The MOA guides the environmental investigation and any necessary cleanup of six parcels of property to be conveyed to the Tribe pursuant to the Puyallup Tribe of Indians Settlement Act of 1989 and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The 85-acre Blair Backup Property is one of the six parcels.

The cleanup-related activities of the property were done in accordance with the Blair Backup Property Analysis of Alternatives (Hart Crowser, 1992) and the Cleanup Plan (Hart Crowser, 1993), except as described herein. RCI Environmental, Inc. (RCIE) of Kent, Washington, provided the construction services. Hart Crowser, Inc., of Seattle, Washington, provided the cleanup-related consulting services to the Port including construction observation and reporting. The work was overseen by the Port's on-site representatives.

1.1 Purpose and Scope

Site cleanup activities were guided by the plans and specifications for contract 710 (Port of Tacoma, 1993), which were based on the Blair Backup Property Final Cleanup Plan (Hart Crowser, 1993). The purpose of this report is to describe the cleanup-related construction activities associated with the Blair Backup Property work. The scope of this report includes documenting the field activities.

1.2 Report Organization

This report is organized into thirteen sections including this introduction. The sections address each cleanup-related site activity for the Blair Backup Property cleanup. Sections to this report include:

2.0 Background review of the planned cleanups;

3.0 Elements common to all cleanup actions;

4.0 OFA/Pennwalt Area soil/slag material;

5.0 Charcoal briquettes and PAH-contaminated soil;

6.0 Asphalt capped area construction;

7.0 Sandblast grit-contaminated soil;

8.0 Blair Waterway Property slag and drummed material;

9.0 Institutional controls required for the site;

10.0 Inspection of cap, cover, and other systems;

11.0 Agency and Tribe Concurrence

12.0 Certification; and

13.0 References.

Appendices to the report include the following:

- Appendix A - Photographic Log of the Cleanup;
- Appendix B - Construction Observation Field Reports;
- Appendix C - Well Abandonment Logs;
- Appendix D - Drainage System Materials;
- Appendix E - Health and Safety Plan and Daily Logs;

- Appendix F - New Monitoring Well Logs;
- Appendix G - Grain Size, Proctor, and Field Density Test Results of Import Soil Material;
- Appendix H - Asphalt Cap System;
- Appendix I - Footing and Pavement Design Calculations;
- Appendix J - Operation and Maintenance Plan;
- Appendix K - Project Correspondence;
- Appendix L - Documentation of Concurrence; and
- Appendix M - Post-Closure Groundwater Monitoring and System Inspection Reports.

2.0 BRIEF SITE BACKGROUND

This section presents a brief background on the Blair Backup Property. The Final Investigation Report (Hart Crowser, 1992a), Blair Backup Property Analysis of Alternatives (Hart Crowser, 1992b), and the Final Cleanup Plan (Hart Crowser, 1993) should be reviewed for more details.

The Blair Backup Property is an x-shaped parcel about 85 acres in area as shown on Figure 1. To the north, it is bordered by Taylor Way and Atochem, to the west by Reichhold Chemicals Inc., to the south by Alexander Avenue, and to the east by Kaiser Aluminum and Chemical (see Figure 2). The property lies in the central area of the peninsula between the Blair and Hylebos Waterways. The property is relatively flat and was created by filling of tideflat and sediments dredged from the initial construction of the Blair and Hylebos Waterways. The site is located in a highly developed, industrial area and is zoned M-3 Heavy Industry by the City of Tacoma.

For the purposes of discussing environmental issues during the Site Investigation, Alternatives Analysis, and Cleanup Plan phases of the project, the property was divided into four areas. These areas as shown

on Figure 2 are based largely on past land uses, hydrology, and differences in environmental quality issues. The areas include:

- **The Ohio Ferro-Alloy (OFA)/Pennwalt Area,** which occupies the 21-acre eastern leg of the property, is the site of the former Ohio Ferro-Alloy smelter, bounds on a portion of the Atochem (former Pennwalt Chemical) facility, and is the area for which remedial action is described in this report;

- **The North Site Area,** which occupies roughly 11 acres in the northwestern portion of the property;

- **The General/Fill Area,** which is the largest portion occupying about 46 acres in the central and southern portion of the property; and

- **The Alexander Avenue Strip Area,** which occupies a 7-acre rectangular piece of land between Alexander Avenue and the Reichhold Chemical facility.

Of the environmental issues identified on the Blair Backup Property only the slag and charcoal on the OFA/Pennwalt area, and the sandblast grit-contaminated soil required cleanup alternative evaluation based on potential human health and environmental concerns. The specific cleanup needs identified and discussed in the Final Investigation Report (Hart Crowser, 1992a) included:

- **Charcoal and PAH-Contaminated Soil in the OFA/Pennwalt Area,** which posed a potential human health risk associated with future direct contact exposures to industrial site workers.

- **OFA Slag in the OFA/Pennwalt Area Soil,** which posed a potential chrome dust inhalation risk and direct contact risk from soil and sediment containing arsenic, and concerns with slag particulates being transported off site through drainage ditches.

- **Sandblast Grit-Contaminated Soil,** which was originally identified only as a nuisance material and was excavated and stockpiled as a voluntary cleanup action, but was later incorporated into this cleanup action because it was found to be more extensive than anticipated and that disposal was more costly.

Cleanup alternatives for each of these environmental concerns were developed and evaluated in the Analysis of Alternatives Report (Hart Crowser, 1992b). The process followed in the analysis of cleanup alternatives is consistent with the requirements of the MOA and the substantive provisions of the CERCLA feasibility study process (EPA, 1988). The analysis of alternatives included:

- Identification of cleanup objectives and development of cleanup levels for all chemicals identified to pose potential human health or environmental risk using chemical-specific applicable or relevant and appropriate requirements (ARARs);

- Development and screening of potential cleanup technologies;

- Formulations of viable alternatives and detailed analysis of those alternatives as to protection of human health and the environment; compliance with state and federal standards; short- and long-term effectiveness; implementability; reduction of toxicity, mobility, or volume; cost-effectiveness; and compatibility with future site development; and

- Selection of a preferred alternative.

Concurrent with the Blair Backup Property investigation and alternatives analysis, the Blair Waterway Property, located across Alexander Avenue (see Figure 1), was being evaluated for property transfer to the Puyallup Tribe. Asarco slag found lining the graving dock and scattered in the upland area adjacent to the graving dock was the principal issue identified for cleanup alternative evaluation on the Blair Waterway Property. The preferred alternative included combining the cleanup on both the Blair Backup and Blair Waterway properties by removing and placing the Blair Waterway Property slag in a portion of the Blair Backup Property with the OFA slag in the OFA/Pennwalt Area.

Figure 3 graphically illustrates the different elements of the proposed remedial action. Because both the Blair Waterway and Blair Backup properties are land settlement properties, adjacent to each other, consolidation of material from the Blair Waterway property is allowed under CERCLA's Area of Contamination Policy.

Based on the Alternatives Analysis, the preferred remedial actions on the OFA/Pennwalt Area of the Blair Backup Property included the following:

- Clearing and grubbing the eastern 17 acres of the OFA/Pennwalt Area (the Site) by removing vegetation and large debris.
- Grading the entire 17 acres sloping the Site at 0.5 percent toward a central ditch.
- Excavating approximately 4,100 cubic yards (cy) of charcoal briquette-laden soil from the Site and backfilling the excavation.
- Placing the 14,600 cy of Blair Waterway Property slag/soil and 850 cy of sandblast grit-contaminated soil on a 7-acre portion of the Site. This material would be placed on a 6-inch buffer of sand and gravel. The material would then be covered with a 6-inch thickness of crushed rock base course, 3 inches of asphalt with a central paving fabric, and topped with 8 inches of crushed rock wearing course.
- Covering the remaining 10 acres of the Site not covered by the asphalt cap with 2 feet of sand and gravel.

Below, the recommended cleanup actions are discussed.

2.1 Recommended Cleanup Alternative for the OFA/Pennwalt Area Slag/Soil

The recommended alternative for the OFA slag/soil was to grade and cover the Site outside of the asphalt capped portion with two feet of sand and gravel.

First the Site would be graded to achieve a more uniform elevation and to improve site drainage. Earth moving equipment would cut material from the Site's west side. This cut material would be placed and compacted in the low areas of the Site's central and eastern end. Grading would also entail developing a ditch system to promote runoff and to prevent run-on to the area. Finally a 2-foot-thick sand and gravel cap would be placed and compacted over the Site outside of the asphalt capped portion. Therefore, the entire 17 acres would either be covered with 2 feet of sand and gravel cover or the asphalt cap.

Institutional controls would consist of restrictions on use of groundwater, requirements for health and safety provisions for subsurface work, maintenance of the cover, industrial zoning, and notification requirements.

2.2 Recommended Cleanup Alternative for the Charcoal Briquettes/PAH-Contaminated Soil

The preferred alternative for the PAH-contaminated soil was to overexcavate and dispose of the charcoal briquettes, backfill the excavation with structural fill. The charcoal briquette-contaminated soil was exempted from the Washington State Dangerous Waste Regulations, Chapter 173-303 WAC (Hart Crowser, 1992c). The majority of the PAH-contaminated soil area would then be covered by the asphalt cap. The remaining portions would be covered by the sand and gravel cover.

This alternative would consist of overexcavating the charcoal briquettes with a backhoe. Staging of overexcavated soil would be required to allow water to drain. The briquettes would be hauled off site after they drain using either rail cars or trucks. The material would be disposed of at an approved landfill.

The majority of the PAH-contaminated soil area would then be covered by the asphalt cap. The remaining portions would be covered by the sand and gravel cover.

2.3 Recommended Cleanup Alternative for the Sandblast Grit-Contaminated Soil

The recommended alternative for the sandblast grit-contaminated soil was to securely place the material beneath the asphalt-capped portion in the OFA/Pennwalt Area. The material would be moved to the OFA/Pennwalt Area prior to March 18, 1993.

The stockpiled sandblast grit-contaminated soil would be hauled to the OFA/Pennwalt Area. A minimum six-inch buffer of imported sand and gravel would be placed prior to the placement of the sandblast grit-contaminated soil. The sandblast grit-contaminated soil would then be placed and compacted in lifts with the Blair Waterway Property slag.

A pavement section would then be placed on the grit/soil to help minimize surface water infiltration. The pavement section would consist of six inches of crushed rock base course overlain by 3 inches of asphalt with a central paving fabric. The cap would be covered with 8 inches of crushed rock wearing course.

The existing excavations for the grit removal would be backfilled and regraded for positive drainage.

Institutional controls would consist of restrictions on use of groundwater, requirements for health and safety provisions for subsurface work, industrial zoning, and notification requirements.

2.4 Recommended Cleanup Alternative for the Graving Dock and Upland Area Slag

This recommended alternative consisted of excavating and hauling the slag and ditch sediments from the Blair Waterway Property and placing the material in a 7-acre asphalt-capped portion of the OFA/Pennwalt Area of the Blair Backup Property. Remediation activities for the Blair Waterway Property are described in the Blair Waterway Cleanup Plan (Landau, 1992).

Trucks would be used to haul the slag and ditch sediments. A minimum 6-inch thickness of clean, well-graded sand and gravel would be placed over the prepared subgrade. The slag soil and ditch sediments would then be placed in lifts with the sandblast grit-contaminated soil. A pavement section would then be placed on the grit/soil to help minimize surface water infiltration. The pavement section would consist of six inches of crushed rock base course overlain by 3 inches of asphalt with a central paving fabric. The cap would be covered with 8 inches of crushed rock wearing course.

Institutional controls would consist of restrictions on use of groundwater, requirements for health and safety provisions for subsurface work, industrial zoning, and notification requirements.

3.0 ELEMENTS COMMON TO ALL CLEANUP ACTIONS

3.1 Well Abandonment

Seven wells were abandoned per the original contract. The seven wells (EPA-8I, EPA-9S, HC-11S, EPA-7S, EPA-6I, HC-15S, and HC-15I) were abandoned in accordance with Chapter 173-160-560 WAC. We understand that the Contractor submitted the proper forms to Ecology after abandonment. Twenty-one additional monitoring wells were abandoned as an add-on to the original contract. The wells (HC-1S, HC-2I, HC-2S, HC-3I, HC-3S, HC-6I, HC-6S, HC-7S, HC-8S, HC-9S, HC-10I, HC-13I, HC-13S, HC-14I, HC-14S, HC-17I, HC-17S, HC-18S, HC-21S, HC-24S, and HC-25S) were located on the Blair Backup Property outside of the 17-acre contract area.

Soil Sampling Service, a subconsultant to RCIE, abandoned the wells. Soil Sampling Service tremied "enviroplug" grout slurry to the bottoms of the wells until the well casings were completely filled.

See Field Report Nos. 28 and 40 in Appendix B for description of the abandonment procedure. Appendix C contains the well abandonment logs and the locations of the former wells.

3.2 Site Preparation

Site preparation included clearing and grubbing and hauling of debris off site for disposal. Clearing and grubbing was completed using bulldozers, a backhoe, and dump trucks. The dozer stacked wood debris in piles and the backhoe loaded the debris into dump trucks for off-site disposal. The small building near Taylor Way was demolished using the backhoe. The material was also loaded into dump trucks for disposal.

The site preparation work was done before the main contracted work under a separate contract. Woodworth Construction of Tacoma, Washington, completed this phase of the work.

See Field Reports Nos. 1 through 18 in Appendix B for description of the site preparation work.

3.3 Site Grading

Site grading included excavating, backfilling, and grading the on-site material. The site was graded at a 0.5 percent slope toward a central ditch. The ditch flowed from the west edge of the site to the east. Near Taylor Way the ditch changed direction to the southeast to an existing culvert. The contractor used a combination of equipment for grading including scrapers, dozers, and a grader.

The entire site was graded per plans except the PAH-area, which was graded later. The eastern area was also graded steeper than the 0.5 percent slope to make the cut and fill balance work. This area ended up having slightly lower elevations along the ditch. As discussed later the lower areas along the ditch and within the capped area needed additional buffer to raise the finished elevation above 15.5 feet.

Figure 4 illustrates the softer subgrade areas where either quarry spalls or a separation geosynthetic were placed to stabilize the subgrade. An Amoco Style 2006 woven separation geosynthetic was used in some areas below the buffer. Quarry spalls were per 9-13.6 of the Washington Department of Transportation 1991 Standard Specifications.

The majority of the site grading work was also done before the main contracted work under a separate contract. Woodworth Construction of Tacoma, Washington, completed this phase of the work.

See Photo No. 1 in Appendix A for illustration of the site grading work. See Field Reports Nos. 1 through 18 in Appendix B for description of the site grading work.

3.4 Overall Site Drainage

Site drainage consists of the following (see Figure 5):

- Seven manholes and two catch basins drain the surface water.
- 24-inch-diameter corrugated metal pipe (CMP) starting at invert elevation 14.89 feet (MLLW) at MH#7 and sloping to an invert elevation of 10.28 feet at MH#1 drains the manholes.

- Six-inch-diameter perforated pipe installed at an invert elevation of 16.0 feet (immediately on the asphalt cap) connected from MH#3 to MH#4 to MH#5 and up to MH#7, but not connected to MH#6 or MH#7 drains any water that accumulates within the 8-inch-thick wearing coarse above the asphalt cap.

- Six-inch-diameter perforated pipe installed at an invert elevation of 14.5 feet connected from MH#2 to MH#3 and up to MH#5, but not connected to MH#4 or MH#5, drains any water that rises near the slag. This feature is a safety factor since high groundwater level is not expected to rise above elevation 15 feet.

- Red Valve Tideflex check valves (tide gates) were installed at MH#1 and MH#2 to control backflow at high tide.

Variations from the CUP and Plans and Specifications that occurred during construction include:

- The tide gates installed at MH#1 and MH#2.

- The changed CMP slope between manholes. Use of an incorrect datum at the existing CMP below Taylor Way had the invert elevation 7 feet lower than it actually was. This was why the redesign was required. With the new invert elevations and CMP slope the system will become a pressure conduit during the 25-year design storm.

See Photo Nos. 2 and 3 in Appendix A for illustration of the drainage system. See Field Reports Nos. 26 through 32, 45, 62, 63, and 65 in Appendix B for description of the drainage system installation. Appendix D presents descriptions of the materials used for the drainage system. See the March 18 and 24, 1993, correspondence from Hart Crowser to EPA and the March 18, April 14, and April 21, 1993, correspondence from EPA to the Port in Appendix K for discussions and approvals of the drainage system modifications.

3.5 Health and Safety Procedures

RCIE retained an industrial hygienist to develop a site-specific safety plan. According to RCIE all workers at the site had completed 40

hours of safety and health instruction specified in WAC 296-62-3040 and the site-specific health and safety training program.

RCIE coordinated the work to limit, as much as practicable, the exposure of equipment to contaminated soil to limit the need for equipment decontamination. When decontamination was required a dry decontamination was completed. This entailed driving trucks on racks and brushing off material from tires, sides, etc. The only time a washed decontamination was completed was after charcoal briquette excavation. The equipment was washed with high pressure water within the PAH area.

RCIE controlled dust by continuously wetting the subgrade when it became dry.

Decontamination procedures are discussed in several of the Field Reports of Appendix B. Appendix E contains the Health and Safety Plan and Daily Logs for the project.

3.6 Groundwater Monitoring

Five new monitoring wells were installed to replace the seven abandoned wells, designated EPA-7SR, EPA-9SR, EPA-11SR, HC-15SR, and HC-26S, as shown on Figure 6. Appendix F contains the well logs of the five wells. Appendix A of the CUP describes the OFA/Pennwalt Area Groundwater Compliance Program. In general, the groundwater compliance program will consist of comparing baseline OFA/Pennwalt Area groundwater quality data to post-placement groundwater quality results. Appendix M contains the post closure groundwater monitoring reports.

4.0 OFA/PENNWALT AREA SOIL/SLAG MATERIAL

4.1 Demolition of Wood Shack and Railway

The wood shack located in the northeast corner of the site was demolished during site preparation using a backhoe. Prior to demolition work, asbestos-containing material was removed by the Port. The debris from the shack was loaded in dump trucks for off-site

disposal. This work was conducted under a separate contract. Field Report No. 2 in Appendix B describes the wood shack demolition.

The railway located along the northern edge of the site was demolished by RCIE's subcontractor Salm Construction Company. Field Report Nos. 93 and 94 in Appendix B describe the railway demolition.

4.2 Sand and Gravel Cover Construction

A two-foot sand and gravel cap was constructed over the OFA slag/soil portion of the site that is not within the asphalt-capped 7 acres. This area covered roughly 10 acres. Figure 6 shows the sand and gravel cap location. Details G-2 of Figure 7 and G-4 of Figure 8 illustrate the as-built section of the sand and gravel cover.

The sand and gravel material was typically placed in roughly 1-foot-thick lifts and compacted with a smooth vibratory drum roller. RCIE typically used a Sakai 91D vibratory drum roller.

See Photo Nos. 4 and 5 in Appendix A for illustration of the sand and gravel cover placement. Sand and gravel cover placement is discussed in different field reports in Appendix B, although report Nos. 19 through 36 do discuss a majority of its placement. Appendix G presents the grain size, proctor, and in-place density results pertaining to the sand and gravel cover (Tests C-1 through C-21 and density tests DT-1, DT-7, DT-9, DT-10, DT-14, DT-18, DT-20, DT-28, DT-30, DT-33, DT-35, DT-53, DT-3, DT-6, DT-17, DT-19, DT-22, DT-23, DT-25, DT-29, DT-32, DT-34, DT-58, DT-54, DT-102, and DT-103). Appendix I contains the plate load test data on the sand and gravel cover material.

5.0 CHARCOAL BRIQUETTES AND PAH-CONTAMINATED SOIL

The PAH-contaminated soil is comprised of two materials: charcoal briquettes interlayered with sand and gravel fill materials; and soil and some debris containing cPAH concentrations exceeding the MTCA cleanup level of 20 mg/kg. The attached sheet drawing titled Areas Boundary Plan, identifies the area of charcoal briquette-contaminated soil which was removed and the cPAH-contaminated area existing at the site. As can be seen on the sheet drawing, the majority of the cPAH-

contaminated material still on site is located beneath the asphalt cap. The remaining portions are below the sand and gravel cover.

5.1 Site Preparation

RCIE's surveyor Coates Surveying Service laid out stakes on a 25-foot grid in the planned excavation areas. Thirteen test pits were then excavated within the excavation area to better identify the extent of charcoal briquettes.

RCIE then built a bermed area for temporary storage of the charcoal briquette-contaminated soil. The bermed area was roughly 200 by 200 feet in dimension. The berms were three feet in height. RCIE then placed a 10 mil black plastic sheeting over the bottom of the bermed area. Four inches of sand and gravel buffer were placed over the plastic sheeting as a drainage layer. In the southeast corner of the site RCIE constructed a sump, which drained the temporary storage area.

Temporary infiltration ponds, roughly 50 feet by 20 feet in dimension, were constructed in the northwest corner of the PAH area. The ponds were 2 feet deep and lined with Polyfelt TS 500 (a non-woven geotextile). The geotextile allowed direct infiltration of water from the excavation and stockpile in the ground but retained the soil particles. The geotextile was later disposed of with the charcoal briquette-contaminated soil.

Figure 9 illustrates the location of the bermed area and infiltration ponds.

See Photo Nos. 6 and 7 in Appendix A illustrating site preparation activities.

5.2 Excavation, Dewatering, Handling, and Backfilling of Charcoal Briquette-Laden Soil

Excavation was generally started by stripping off a thin section of soil not containing the charcoal briquette-laden soil. The charcoal briquette-laden soil was then systematically excavated such that one portion of the total area was excavated and backfilled followed by another portion until the entire area was excavated and backfilled. RCIE used a John Deere JD 490D trackhoe for most excavation. At

times RCIE had a second trackhoe working. While each area was open during excavation all side walls and the bottom were observed for the presence of charcoal briquettes. If briquettes were observed the excavation was widened or deepened in that direction. This method of excavation limited the amount of water being removed and reinfiltrated into the ground. Figure 9 defines the extent and depth of the excavation required to remove the charcoal briquette-laden soil.

Excavations were backfilled with non-briquette-laden soils removed during excavation and excess soils graded from the PAH area.

Excavated material was hauled by trucks to the Temporary Containment Area. Trucks were dry-decontaminated by checking for and brushing off any soil on the outside of the truck box. Upon completion of the excavation the stockpiled area was covered with plastic sheeting, which was secured with sandbags and netting. RCIE drained the sump daily by pumping to the infiltration pond in the PAH area.

See Photo Nos. 10 and 11 in Appendix A for illustration of the charcoal briquette-laden soil excavation. See Field Reports Nos. 40 through 53 in Appendix B for description of the excavation, dewatering, handling, and backfilling of charcoal briquette-laden soil.

5.3 Disposal of the Charcoal Briquette-Laden Soil

Rabanco delivered railcars to the Blair Backup Property, typically five cars with two containers on each car. RCIE used Komatsu KL 451 front end loaders to haul material from the stockpile to the rail containers. The containers were lined with 6 mil visqueen and were then covered with visqueen when full. The visqueen was tied and sandbagged. RCIE would recover the Temporary Containment Area at the end of each day.

The loader removed the briquette soil down to the clean original ground, removing the plastic sheeting and four inches of drainage material. Before the loader left the Temporary Containment Area it would shake the bucket removing any loose material. Spilled soil was removed from the outside of containers and rail cars prior to covering soil in containers and returned to the containers.

A total of 4,264 tons of charcoal briquette-laden soil were removed from the site. The soil was hauled by rail to the Regional Disposal Company Facility (Roosevelt Regional Landfill). The charcoal briquette-laden soil was exempted from the Washington State Dangerous Waste Regulations, Chapter 173-303 WAC (Hart Crowser, 1992c).

See Photo Nos. 12, 13, and 14 in Appendix A for illustration of the charcoal briquette-laden soil disposal. See Field Reports Nos. 76 through 94 in Appendix B for description of the charcoal briquette-laden soil disposal. See the May 24, 1993, correspondence from Ecology to the Port and the June 14 and July 28, 1993, correspondence from the Port to Ecology in Appendix K for discussions and approvals of the charcoal briquette removal.

6.0 ASPHALT CAPPED AREA CONSTRUCTION

The asphalt capped area construction consisted of the following sections:

- Sand and gravel buffer placement.
- Sandblast grit-contaminated soil and Asarco slag layer placement.
- Asphalt subase placement.
- Asphalt cap construction.
- Wearing course placement.

The asphalt cap boundary line as shown on Figure 6 and on the sheet drawing Areas Boundary Plan represents the outside edge of the asphalt capped portion. This is illustrated in Detail G-3 on Figure 7.

The sand and gravel buffer material was placed first during construction. After it was shaped and compacted, the sandblast grit-contaminated soil and Blair Waterway property import soils were placed. The asphalt subase, asphalt cap, and wearing course material were then placed on top.

Details G-1 and G-3 of Figure 7 and detail G-5 of Figure 8 illustrate the as-built section of the asphalt capped area section. The asphalt cap edges were flattened from 33 percent slope to roughly 6 percent slope along the central ditch and a maximum of 8 percent along the outside

edges of the cap. This allowed the asphalt cap edges to be placed by machine instead of by hand. See the May 17, 1993, correspondence from the Port to EPA in Appendix K for discussion of the changed slope.

The northern edge of the asphalt cap was moved south because of reduced fill volumes. All figures in this document contain the revised northern boundary. See the May 3, 1993, correspondence from EPA to the Port in Appendix K for approval of the revised cap boundary.

All but the grit-contaminated soil and Asarco slag layer placement is discussed within this section. Sections 7.0 and 8.0 discuss the sandblast grit-contaminated soil and Asarco slag layer placement, respectively.

6.1 Sand and Gravel Buffer Placement

A six-inch sand and gravel buffer was constructed over the OFA slag/soil portion of the site that is within the asphalt-capped 7 acres. Figure 6 shows the asphalt cap location.

The sand and gravel buffer material was typically placed in one lift and compacted with a smooth vibratory roller. RCIE typically static rolled the site using a Sakai 91D drum roller.

See Photo No. 15 in Appendix A for illustration of the sand and gravel buffer placement. Sand and gravel buffer placement is discussed in different field reports in Appendix B. Appendix G presents the grain size, proctor, and in-place density results pertaining to the sand and gravel buffer (Tests B-2 and B-5 and density tests DT-11, DT-12, DT-13, DT-15, DT-38, DT-39, DT-40, DT-41, DT-42, DT-43, and DT-45).

6.2 Asphalt Subase Placement

RCIE placed the crushed rock base course over the confined material limiting contact with the material below. They first established a roadway across the pads. Trucks constructing the roadways had any adhering soil brushed of the truck wheels prior to leaving the pads. After the roadway was completed trucks ran only on clean imported material.

An 8-inch loose thickness of crushed rock base course was placed and compacted to 6 inches. RCIE used dozers, a grader, and a vibratory roller to place and compact the material.

As seen in Details G-1 and G-3 of Figure 7 and G-5 of Figure 8, additional thicknesses of crushed rock were placed on both the north and south pads. This was done to produce a non-yielding subgrade for asphalt cap construction. The additional crushed rock thickness was as follows:

- An additional 1½ inches of 5/8-inch minus top course on the south pad.
- An additional 2 inches of base course under 1½ inches of 5/8-inch minus top course on the north pad.

See Photo No. 16 in Appendix A for illustration of the base course placement. Base course placement is discussed in different field reports in Appendix B. Appendix G presents the grain size, proctor, and in-place density results pertaining to the base course (Tests W-1 and W-2 and density tests DT-59 through DT-71). See the July 1, 1993, correspondence from the Port to EPA and the July 9, 1993, correspondence from EPA to the Port in Appendix K for discussions and approvals of the additional crushed rock placement.

6.3 Asphalt Cap Construction

Prior to construction the asphalt cap material was evaluated against the specifications. Appendix H presents a summary of the mix design evaluation. A laboratory prepared sample was evaluated for permeability using a flexible wall permeability test completed in accordance with ASTM D 5084 (Raising Tailwater Method). The permeability on the laboratory sample was measured at 1.2×10^{-8} cm/sec.

RCIE's subcontractor Watson Paving constructed the asphalt cap. During construction of the first lift asphalt was hauled by truck and trailer to the Barber Green pavers directly over the subgrade. During construction of the top lift the asphalt was usually off loaded and reloaded into single trucks for transport to the paver. Usually Watson had at least two rollers behind the paving machine with as many as four

at times. Typical rolling pattern consisted of immediate rolling with double drum vibratory roller followed by pneumatic roller. The additional rollers included another smaller double drum roller and a single drum roller.

Between lifts Watson placed Amopave 4599 paving fabric and AR4000 asphalt. The asphalt was placed first, by spraying from a tank truck equipped with a computerized rate control asphalt distributor. The paving fabric was placed from a small tractor equipped with a roller carrier and brooms to smooth and tension the fabric as it was placed. Rolls and joints were lapped a minimum of three inches. After placing the fabric, the surface was lightly rolled with a medium sized drum roller to set the fabric into the asphalt.

See Photo Nos. 17 through 20 in Appendix A for illustration of the asphalt cap placement. Asphalt cap placement is discussed primarily in Field Reports 97, 98, 101, 103, 104, 105, and 107 in Appendix B. Appendix H presents the submittals pertaining to the asphalt cap system, field confirmation test results, and field density test results. See the June 21, 1993, correspondence from Hart Crowser to EPA and the April 29, July 6, and October 5, 1993, correspondence from EPA to the Port in Appendix K for discussions and approvals of the asphalt cap.

6.4 Wearing Course Placement

RCIE placed the wearing course in a single 8-inch-thick lift. The wearing course material was spread across the asphalt by the dump trucks, shaped with a grader, moisture conditioned by water truck, and then compacted with a vibratory roller.

Wearing course placement is discussed primarily in Field Reports 108 through 110 in Appendix B. Appendix I contains the plate load test data completed on the wearing course material.

Appendix G presents the grain size, proctor, and in-place density results pertaining to the wearing course (Tests W-2, W-3, W-4, W-5, W-6, and W-7 and density tests DT-90 through DT-101).

7.0 SANDBLAST GRIT-CONTAMINATED SOIL

7.1 Excavation of Grit-Contaminated Soil and Excavation Backfilling

The grit-contaminated soil was excavated and stockpiled under separate contracts. There are two different materials consisting of the grit-contaminated soil: sandblast grit and visibly stained heavy hydrocarbon soil. The sandblast grit soil was placed on the native soil ground surface in five general areas. The five areas have been identified as Areas A, B, C, D, and F based on their locations. In addition, two other areas on the property had visibly stained soil. The soil staining is believed to have occurred due to the leakage of drums storing used automotive waste oils. The two visibly stained soil areas have been identified as Areas E and G.

Between December 17 and 19, 1991, approximately 400 cubic yards of sandblast grit were excavated from all five sandblast grit areas, and about 50 cubic yards of soil were excavated from the two visibly stained soil areas. Sandblast grit and soil removed from these seven areas were stockpiled separately on site and covered with visqueen.

After obtaining soil verification test results from the seven areas, an additional 350 cubic yards of sandblast grit and 100 cubic yards of visibly stained soil were removed from Areas D, F, and G between February 14 and 20, 1992. This material was also stockpiled and covered on site.

The second round of soil verification test results indicated additional sandblast grit material from Area F required excavation. Consequently, on April 24, 1992, approximately 15 cubic yards of sandblast grit were removed from Area F and stockpiled on site. This completed the excavation and stockpiling portion of work for the sandblast grit and visibly stained soil material at the Blair Backup Property. Table 1 summarizes the estimated quantities of stockpiled sandblast grit and visibly stained soils.

Table 1 - Estimated Sandblast Grit/Visibly Stained Soils Quantities

SANDBLAST GRIT	Material excavated and stockpiled between 12/17 - 19/91	Material excavated and stockpiled between 2/14 - 20/92	Material excavated and stockpiled on 4/24/92	Estimated Total
Areas A and B	10 CY			
Area C	10 CY			
Area D	300 CY	340 CY		
Area F	80 CY	10 CY	15 CY	
	400 CY	350 CY	15 CY	765 CY
VISIBLY STAINED SOIL				
Area E	10 CY			
Area G	40 CY	100 CY		
	50 CY	100 CY		150 CY

The excavations were backfilled with compacted structural fill to final elevations which will promote positive drainage.

See Photo Nos. 21 and 22 in Appendix A for illustration of the grit-contaminated soil removal. See Field Reports A through H in Appendix B for description of the excavation procedures.

7.2 Hauling and Placement of Grit-Contaminated Soil

RCIE loaded the grit-contaminated soil into trucks, which dumped the material on the northeast corner of the capped area on the buffer material. The material was pushed into one large covered pile until it could be spread evenly beneath the northern portion of the asphalt cap.

See Photo Nos. 23 and 24 in Appendix A for illustration of the grit-contaminated soil hauling. See Field Reports Nos. 28 and 29 in Appendix B for description of the hauling and placement procedures.

8.0 BLAIR WATERWAY PROPERTY SLAG AND INVESTIGATION-DERIVED WASTE

8.1 Placement of Slag and Sediment

RCIE constructed a test section with the first quantities of Asarco slag and Weyerhaeuser Ditch sediments material brought to the capped area. This test section was 320 by 40 feet by 10 inches thick and constructed on the sand and gravel buffer. RCIE compacted the test section with a Sakai 91D self-propelled vibratory roller. Based on the test section it was determined that the slag material should be placed in 10 inch thick or less loose lift thicknesses, compacted with vibratory roller for six or more passes and that compaction would stop if the material started to pump.

RCIE hauled the material from the Blair Waterway Property with trucks to the Blair Backup Property. The slag was dumped on the buffer material and spread across the site with a small dozer. The slag was placed in two 10-inch-thick (maximum) loose lifts, then compacted. After the trucks dumped the import slag soil they were driven to a raised metal ramp where all the slag bearing soil outside the truck box was removed by brushing with a broom. This included wheels, flaps, truck box, chassis, and axles. Slag soil thus brushed off was consolidated periodically and removed to the cap area. Figure 10 illustrates the top and bottom elevations of the import slag material across the site.

See Photo Nos. 25 and 26 in Appendix A for illustration of the import slag placement. Import slag placement is discussed primarily in Field Report Nos. 37, 38, 39, 40, 41, 42, 44, 54, 56, and 57 in Appendix B.

Remediation activities associated with the Blair Waterway property are described in the Blair Waterway Property Completion Report (Landau, 1994).

8.2 Disposal of Investigation-Derived Waste

An addendum to the contract required RCIE to haul and dispose drums containing soil cuttings and well water from the Blair Waterway Property to the Blair Backup Property. The soil cuttings and well water

were generated during Blair Backup site investigation studies. The drums were disposed on the property where they were obtained.

The following drums were disposed of beneath the sand and gravel cover area on the Blair Backup Property:

1, 3, 8, 12-19, 21, 23-26, 30-33, 35, 39-41, 45, 46, 49-51, 54-57, 67-69, 98, 106, 109, 113, 131-154, 158, 163, 178, 179, 180, 181, 182, 188, 189, 198, and 201

The following drums were disposed of beneath the asphalt cap area on the Blair Backup Property:

A, B, C, D, 2, 5, 7-9, 20, 27-29, 37, 38, 42, 44, 47, 48, 52, 53, 58, 59, 61, 64, 70-72, 85, 87, 88, 92, 95, 102, 107, 110, 122, 126, 131, 144, 146-150, 155-157, 159-162, 164, 165, 168, 172, 174-176, 184, 195-197, 203, and 204.

Two drums numbered 202 were taken to the Murray Pacific Property and emptied in the northwest corner of the yard, approximately 200 feet from the Lincoln Avenue ditch and 100 feet from Port of Tacoma Road. The drum numbered 205 was taken to the Wasser Winters Property and emptied about 200 feet from Marine View Drive, 300 feet from Hylebos Creek.

After disposal the drums were pressured washed cleaned and taken off site for recycling.

See Photo No. 27 in Appendix A for illustration of emptying a drum containing investigation-derived waste. Emptying of drums is discussed in Field Report Nos. 41, 42, 73, and 74 in Appendix B. See the May 17, 1993, correspondence from the Port to EPA in Appendix K on the investigation-derived waste.

9.0 INSTITUTIONAL CONTROLS REQUIRED FOR THE SITE

Covenants will be placed in the property deed to ensure that operation and maintenance of all cleanup measures and monitoring of environmental media continues. Covenants will also be included to govern future subsurface site work.

Institutional controls for the Blair Backup Property will be set forth in a consent decree that is currently being negotiated between EPA, the Port of Tacoma, and the Puyallup Tribe. The following institutional controls are applicable to the Blair Backup Property:

- Future use of the Blair Backup Property will be industrial.

- The use of shallow and intermediate aquifer groundwater at the Blair Backup Property for drinking water purposes is prohibited.

- The use of shallow and intermediate aquifer groundwater in the Alexander Avenue Strip Area of the Blair Backup Property, which is impacted by a contaminated groundwater plume that is being remediated by Reichhold Chemicals Inc., for any purpose is prohibited to avoid potential exposure resulting from contact with or ingestion of groundwater. The boundaries of the Alexander Strip Area are defined in Hart Crowser 1992a.

- Within the boundaries of the asphalt capped and covered portions of the Blair Backup Property, as shown on Figure 6, the following applies: and the Areas Boundary Plan

  - Any activity within the capped or covered area of the Blair Backup Property that may result in the uncontrolled release of contaminated soil/slag is prohibited.

  - An appropriate health and safety plan shall be developed for any subsurface work on the site (OFA/Pennwalt Area). A CIH shall develop the health and safety plan.

  - Potential future exposure to subsurface soils shall be minimized. All future on-site workers shall observe health and safety precautions as appropriate for worker protection during subsurface work.

  - The cap and cover design are not intended for structural carrying capacity. An additional pavement section or fill thickness is required before any site activities. The Port will review all pavement and foundation designs before site activities commence.

- Site activities over the cap and cover portions shall be limited until an appropriate pavement section is constructed.

- The Port shall be notified in writing at least one week prior to any subsurface work on site which will penetrate and/or damage the sand and gravel cover or asphalt cap.

- Prior to any subsurface site work in the vicinity of the asphalt cap, the location of the cap should be confirmed.

- Future use of the shallow and intermediate aquifer, as defined in Hart Crowser, 1992a, in the capped or covered area for any purpose is prohibited. Drawdown of aquifer could induce settlement which could in turn crack the asphalt cap.

10.0 INSPECTION OF DIFFERENT SYSTEMS

Appendix J contains the Operation and Maintenance Plan for the site. This plan presents the scope and schedule for inspection of the asphalt cap, sand and gravel cover, drainage and groundwater monitoring systems. Appendix M contains the inspection reports.

11.0 AGENCY AND TRIBE CONCURRENCE OF CLEANUP

The regulatory agencies (EPA and Ecology) and the Tribe reviewed a draft of this document and concurred that no further actions are necessary under the Order for the following areas of the Blair Backup Property: OFA/Pennwalt Area, Charcoal Briquettes and PAH-Contaminated Soil, and the Sandblast Grit-Contaminated Soil. Documentation of this concurrence is provided in Appendix L.

12.0 CERTIFICATION

In accordance with 28 U.S.C. Section 1746, I certify under penalty of perjury under the laws of the United States that the information contained in and accompanying this certification is true, accurate, and complete. As to those identified portions of this document for which I cannot personally verify its truth and accuracy, I certify as the responsible official having supervisory responsibility for the persons who, acting under my direct instructions, made the verification that this information is true, accurate, and complete.

Dated this 21st day of January 1994.

Curtis L. Ratcliffe, P.E.
Chief Engineer
Port of Tacoma

13.0 REFERENCES

EPA, 1988. Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA, U.S. Environmental Protection Agency, OSWER Directive 9355.3-01, October 1988.

Hart Crowser, 1992a. Final Investigation Report, Blair Backup Property, Port of Tacoma, Washington, prepared for the Port of Tacoma, dated January 29, 1992, J-2350-07.

Hart Crowser, 1992b. Analysis of Alternatives, Blair Backup Property, Port of Tacoma, Washington, prepared for the Port of Tacoma, dated November 19, 1992, J-2350-20.

Hart Crowser, 1992c. Port of Tacoma Petition for Exemption of Charcoal Briquettes and Associated Charcoal-Contaminated Soils from Washington Dangerous Waste Regulations, Chapter 173-303 WAC, Blair Backup Property, Port of Tacoma, Washington, prepared for the Port of Tacoma, dated December 16, 1992.

Hart Crowser, 1993. Final Cleanup Plan, OFA/Pennwalt Area, Blair Backup Property, Port of Tacoma, Washington, prepared for the Port of Tacoma, dated February 17, 1993, J-2350-21.

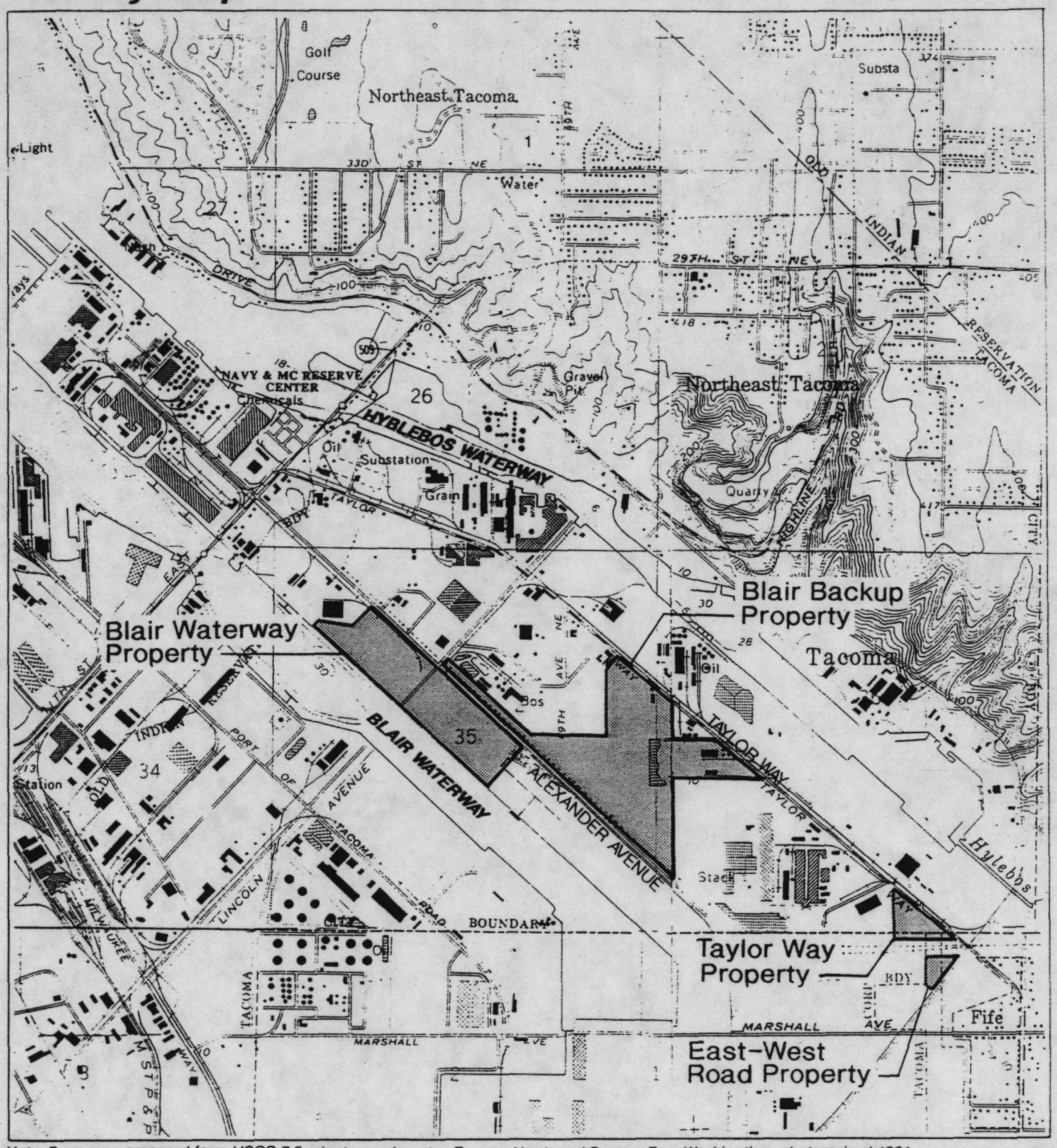
Landau Associates, Inc., 1992. Cleanup Plan, Blair Waterway Property, Tacoma, Washington, prepared for the Port of Tacoma dated February 19, 1993.

Landau Associates, Inc., 1994. Blair Waterway Property Completion Report, Port of Tacoma, Tacoma, Washington, prepared for the Port of Tacoma, dated February 1994.

Tacoma, Port of, 1990. Memorandum of Agreement (MOA), Among the Puyallup Tribe of Indians, the Port of Tacoma, the Washington Department of Ecology, and the U.S. Environmental Protection Agency Regarding Implementation of the August 27, 1988 Puyallup Land Settlement Agreement, March 8, 1990.

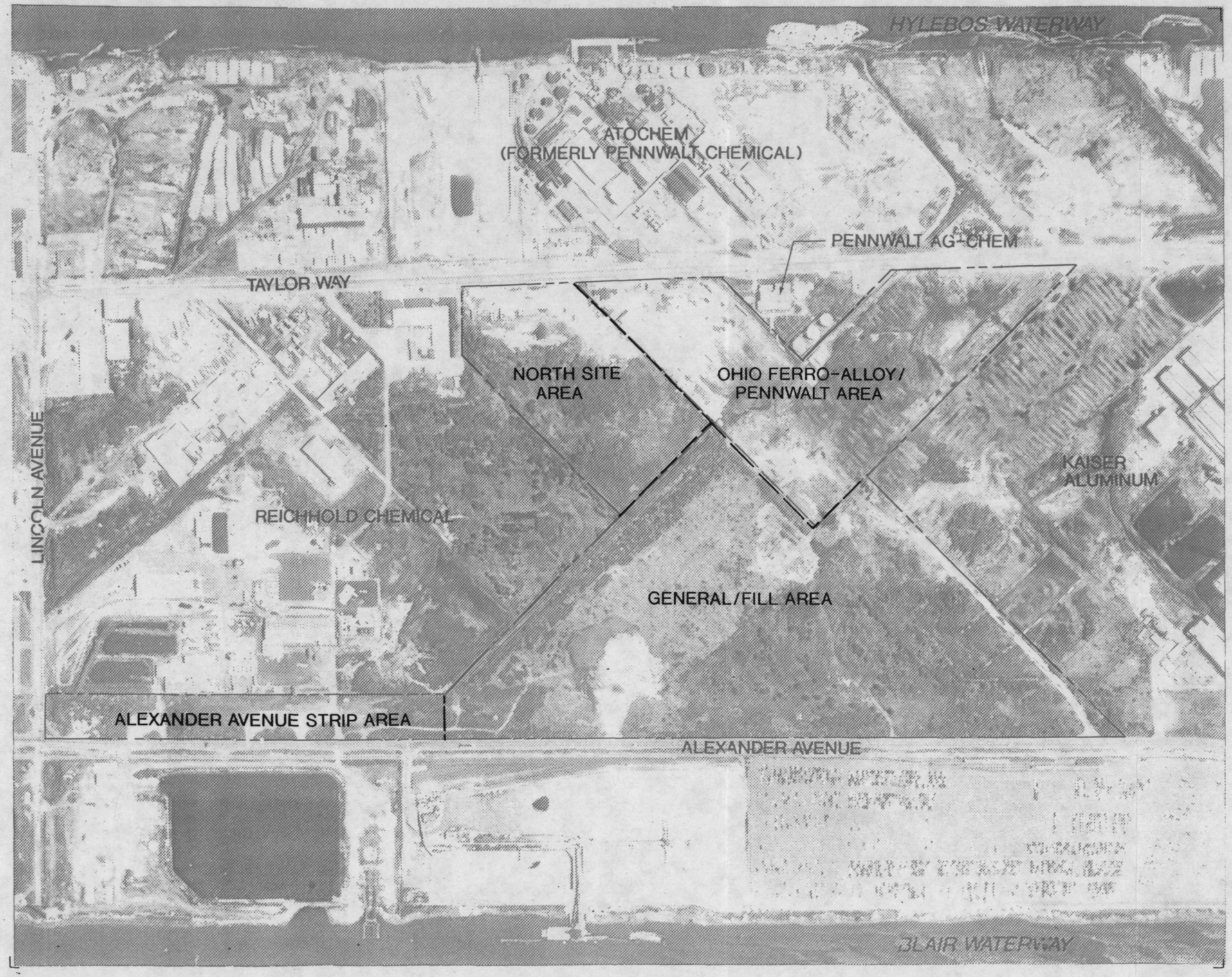
Tacoma, Port of, 1993. Blair Waterway and Backup Properties Cleanup - 1993: Plans and Specifications, Contract Number 710.

Vicinity Map



HARTCROWSER
J-2350-24 10/93
Figure 1

Property Areas Map



Note: Base map prepared from aerial photograph of the Port of Tacoma dated June 1, 1989.

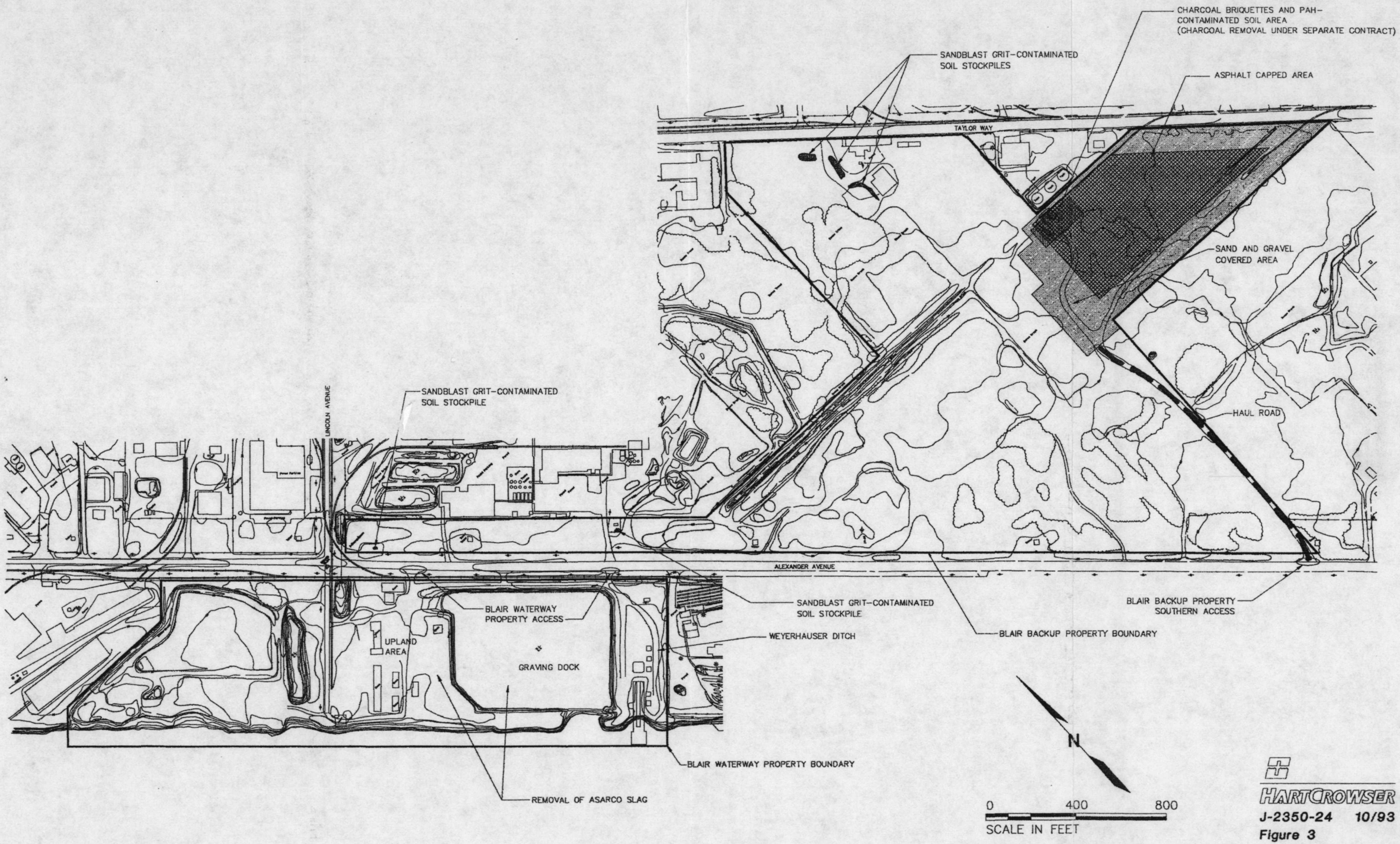
N

0 400 800

Approximate Scale in Feet

HARTCROWSER
J-2350-24 10/93
Figure 2

Remedial Action Location Plan

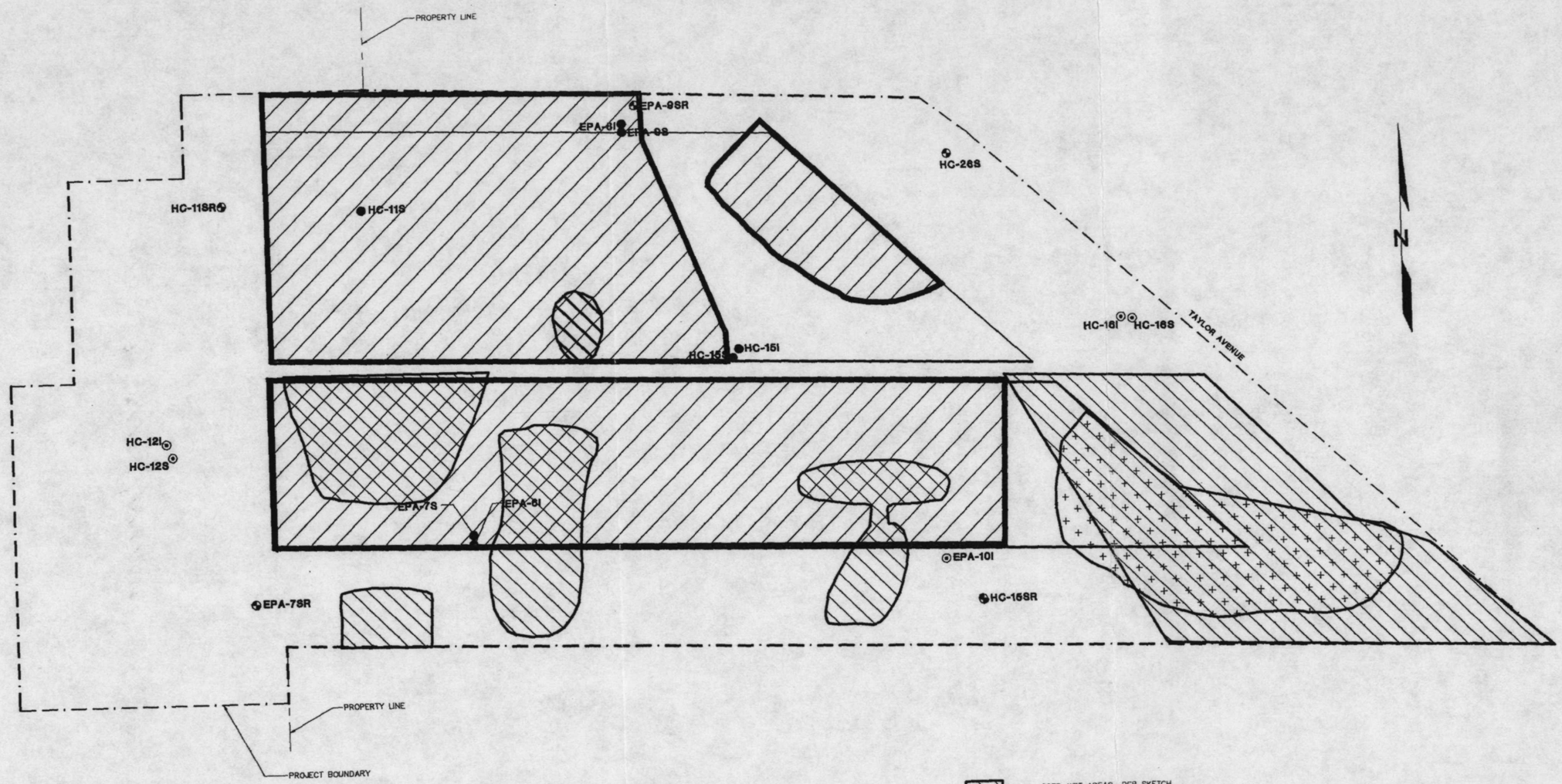


HARTCROWSER
J-2350-24 10/93
Figure 3

23502400 CVD 9/29/93 1=400

Generalized Soft Subgrade, Quarry Spalls, and Separation Geosynthetic Location Plan

OFA/Pennwalt Area



PROJECT BOUNDARY

ASPHALT CONCRETE CAP BOUNDARY

EPA-8I — MONITORING WELL LOCATION AND NUMBER (ABANDONED)

EPA-7SR — REPLACEMENT MONITORING WELL LOCATION AND NUMBER (INSTALLED)

HC-12I — EXISTING WELL LOCATION AND NUMBER (PROTECTED)

SOFT, WET AREAS PER SKETCH BY ED STEPHENS, MARCH 1993

AREA COVERED BY SEPARATION GEOSYNTHETIC

AREA OF QUARRY SPALLS

NOTE: THESE SOFT AREAS WERE OBSERVED PRIOR TO ANY FILL PLACEMENT. SOFT AREAS WERE STABILIZED WITH QUARRY SPALLS OR SEPARATION GEOSYNTHETIC PRIOR TO CAP AND COVER PLACEMENT.

0 120 240

SCALE IN FEET

HARTCROWSER

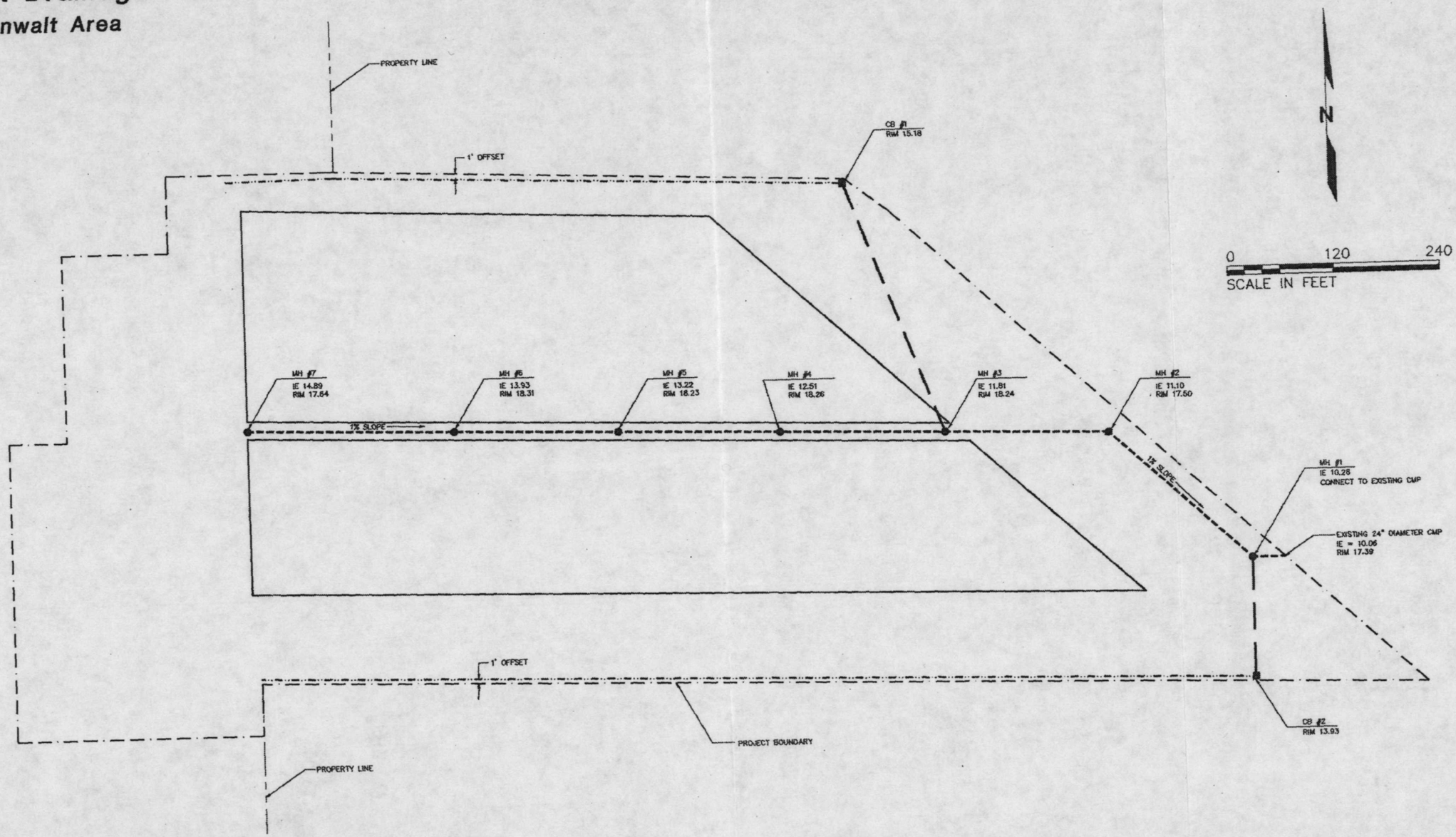
J-2350-24 11/93

Figure 4

23502407 CV 20/94 1=120 hc-pcp

As-Built Drainage Plan

OFA/Pennwalt Area



NOTES:

1. 6-INCH-DIAMETER PERFORATED PIPE WAS INSTALLED AT AN INVERT ELEVATION OF 14.5 FEET FROM MH#2 TO MH#3 AND UP TO MH#5, BUT NOT CONNECTED TO MH#4 OR MH#5.
2. 6-INCH-DIAMETER PERFORATED PIPE WAS INSTALLED AT AN INVERT ELEVATION OF 16.0. (ON THE ASPHALT CAP) FROM MH#3 TO MH#4 TO MH#5 AND UP TO MH#7, BUT NOT CONNECTED TO MH#6 OR MH#7.
3. CHECK VALUE TIDE GATES WERE INSTALLED ON MH#1 AND MH#2.

PROJECT BOUNDARY
ASPHALT CONCRETE CAP BOUNDARY
24-INCH-DIAMETER CORRUGATED METAL PIPE (CMP)
18-INCH-DIAMETER CMP
DRAINAGE DITCH
CB #1 CATCH BASIN LOCATION AND NUMBER
MH #1 MANHOLE LOCATION AND NUMBER

HARTCROWSER

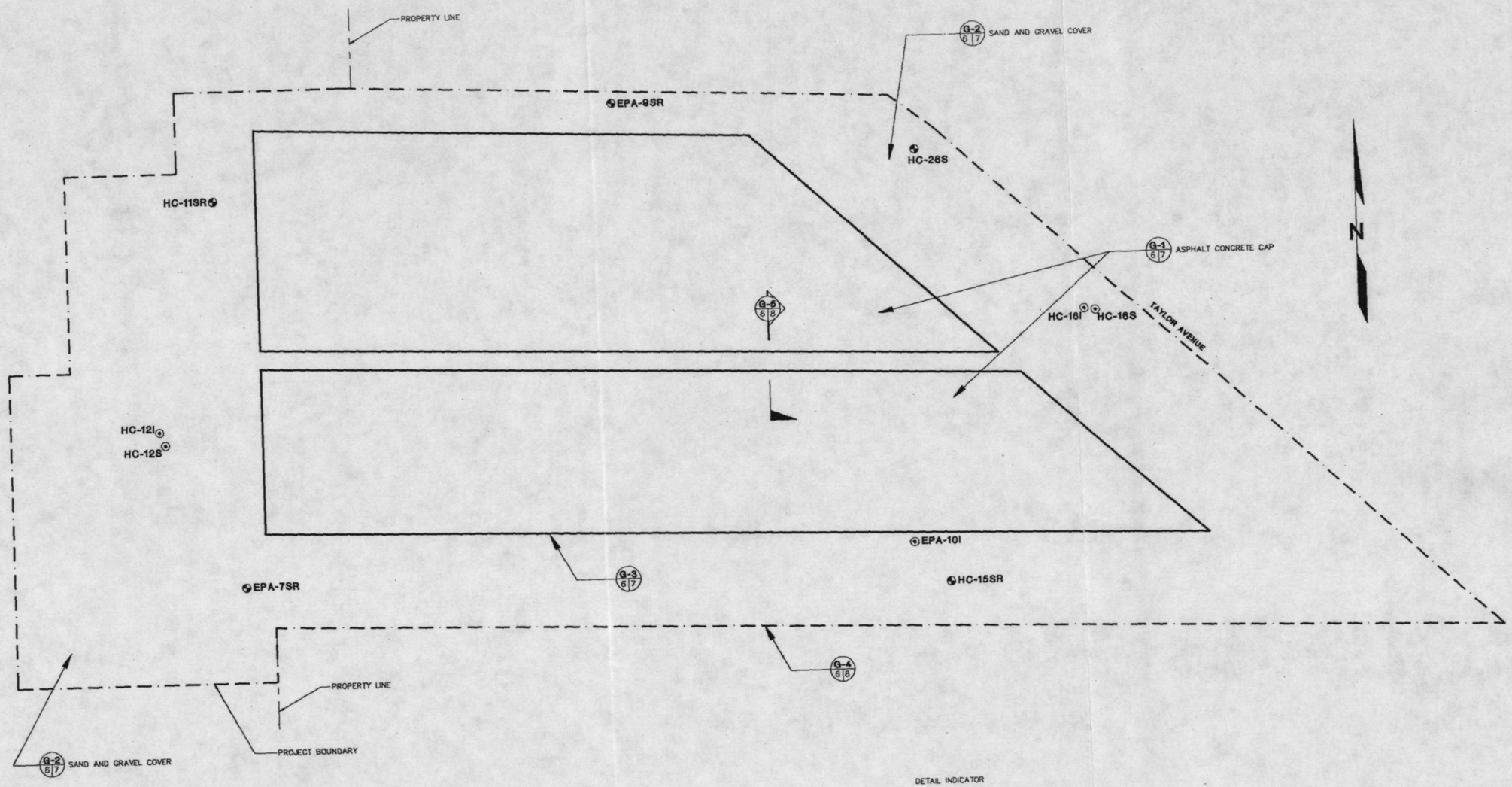
J-2350-24 11/93

Figure 5

23502402 CVD 11/17/93 1=120

Cap/Cover As-Built Plan

OFA Pennwalt Area



PROJECT BOUNDARY

ASPHALT CONCRETE CAP BOUNDARY

EPA-7SR — REPLACEMENT MONITORING WELL LOCATION AND NUMBER (INSTALLED)

HC-12I — EXISTING WELL LOCATION AND NUMBER (PROTECTED)

DETAIL INDICATOR

G-3 6/7

NUMBER INDICATES DETAIL CALLOUT

INDICATES FIGURE WHERE SHOWN

INDICATES FIGURE WHERE TAKEN

SECTION OR PROFILE INDICATOR

0 120 240

SCALE IN FEET

HARTCROWSER

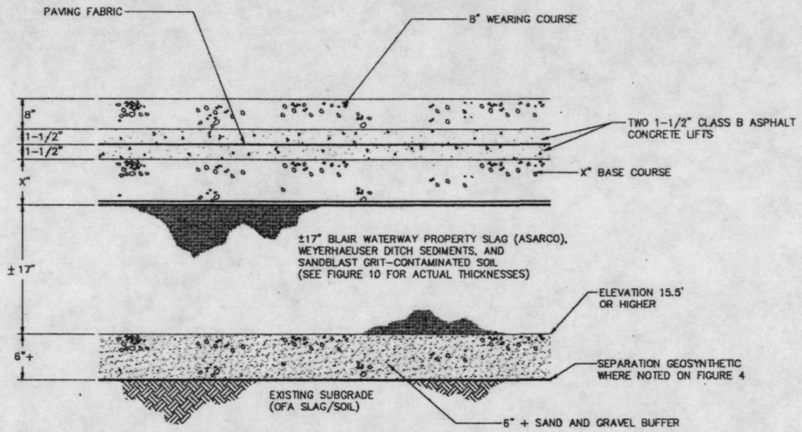
J-2350-24 1/94

Figure 6

23502405 CMD 1/7/94 1=120 default HC

As-Built Grading Details

OFA/ Pennwalt Area



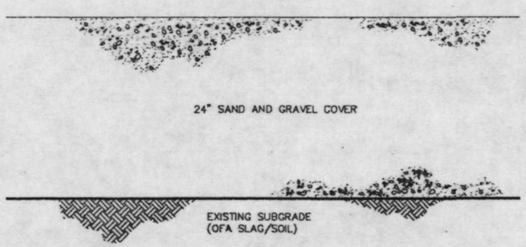
X = 1-1/2 INCHES OF 5/8-INCH MINUS CRUSHED ROCK OVER 6 INCHES OF 1-1/4-INCH MINUS CRUSHED ROCK ON THE SOUTH PAD.

X = 1-1/2 INCHES OF 5/8-INCH MINUS CRUSHED ROCK OVER 8 INCHES OF 1-1/4-INCH MINUS CRUSHED ROCK ON THE NORTH PAD.

ASPHALT CONCRETE CAP SECTION (TYP)

G-1 | 6 | 7

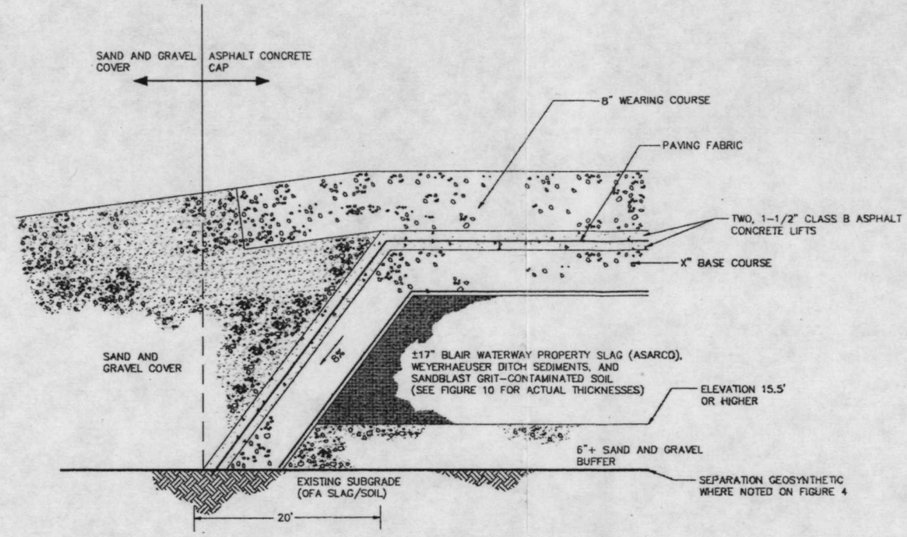
NOT TO SCALE



SAND AND GRAVEL COVER (TYP)

G-2 | 6 | 7

NOT TO SCALE



X = 1-1/2 INCHES OF 5/8-INCH MINUS CRUSHED ROCK OVER 6 INCHES OF 1-1/4-INCH MINUS CRUSHED ROCK ON THE SOUTH PAD.

X = 1-1/2 INCHES OF 5/8-INCH MINUS CRUSHED ROCK OVER 8 INCHES OF 1-1/4-INCH MINUS CRUSHED ROCK ON THE NORTH PAD.

ASPHALT CONCRETE CAP/SAND AND GRAVEL COVER BOUNDARY (TYP)

G-3 | 6 | 7

NOT TO SCALE

HARTCROWSER

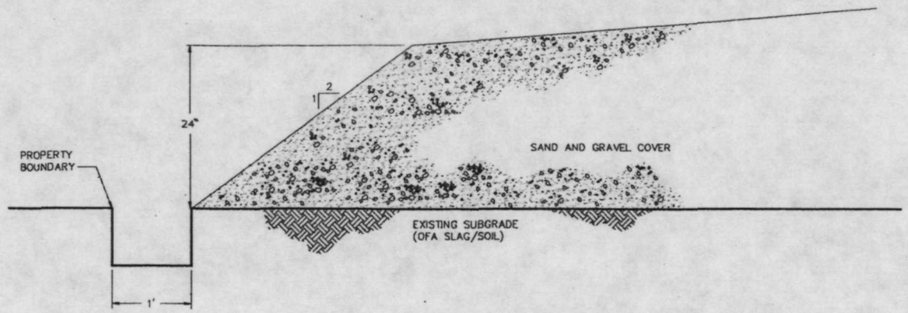
J-2350-24 1/94

Figure 7

23502403 CVR 1/20/94 1=2 DEFAULT HC

As-Built Grading Details

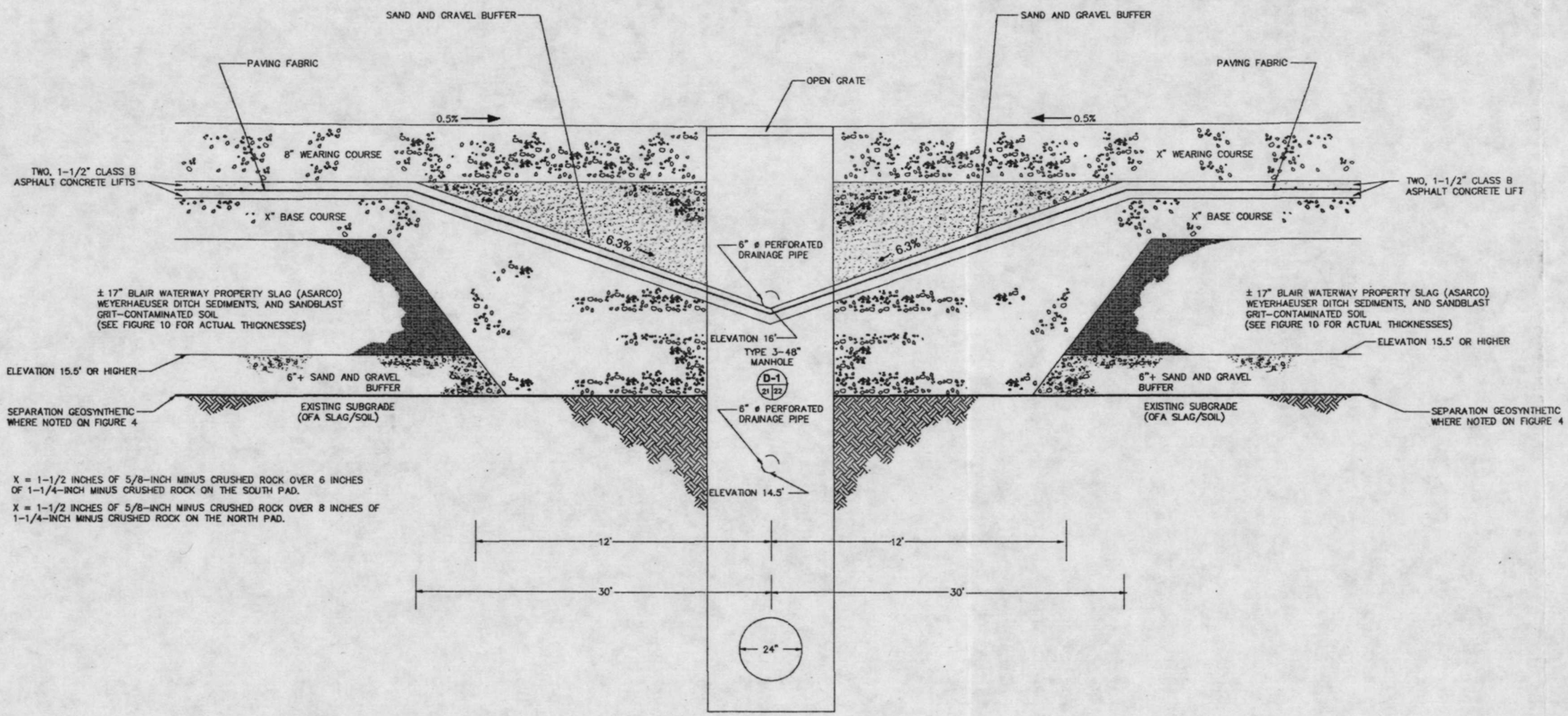
OFA/Pennwalt Area



* NOTE: ON NORTH AND SOUTH BOUNDARY EDGE ONLY.
ON THE EAST AND WEST EDGE THERE IS NO DITCH.

SAND AND GRAVEL COVER AT PROPERTY BOUNDARY (G-4 / 6 8)

NOT TO SCALE



X = 1-1/2 INCHES OF 5/8-INCH MINUS CRUSHED ROCK OVER 6 INCHES OF 1-1/4-INCH MINUS CRUSHED ROCK ON THE SOUTH PAD.

X = 1-1/2 INCHES OF 5/8-INCH MINUS CRUSHED ROCK OVER 8 INCHES OF 1-1/4-INCH MINUS CRUSHED ROCK ON THE NORTH PAD.

CENTRAL STRIP BETWEEN ASPHALT CONCRETE CAPS (G-5 / 6 8)

NOT TO SCALE

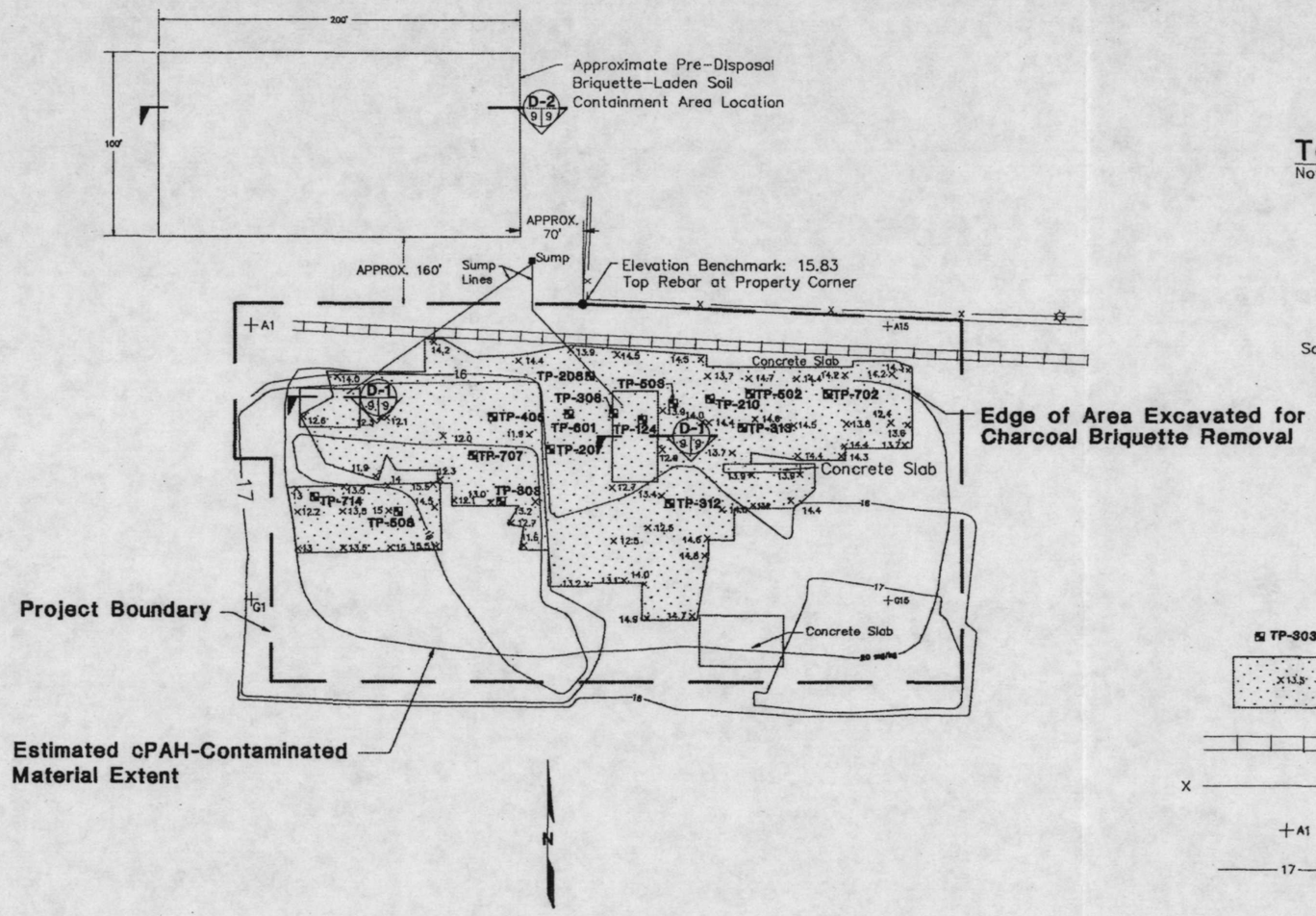
HARTCROWSER

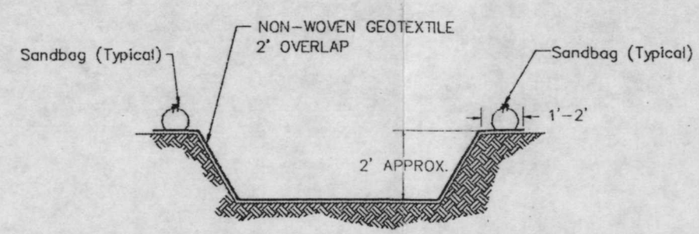
J-2350-24 1/94

Figure 8

23502404 CV 1/7/94 1=2 DEFAULT hc

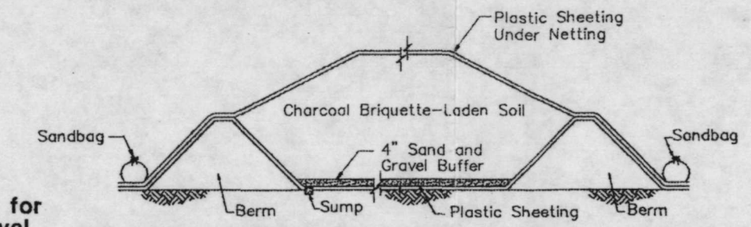
Charcoal Briquette Removal Plan





Temporary Fluid Containment/Infiltration Area (D-1 9 9)

Not to Scale



Note: Berm material for pre-disposal area to be constructed of sand and gravel cover per contract 710.

Temporary Pre-Disposal Containment Area (D-2 9 9)

Not to Scale

TP-303	Test Pit Location and Number
X13.5	Spot Elevation at Bottom of Excavation
	Railroad Tracks (Removed)
X — X	Fence
+A1	Corner of Gridline
17	Previous Existing Grade Contour in Feet

Test Pit Coordinates and Charcoal Briquette-Contaminated Soil Locations

Test Pit Number	Northerly	Easterly	Approx. Ground Elev. in Ft.	Approx. Charcoal Top Elev. in Ft.	Approx. Charcoal Bottom Elev. in Ft.
TP-124	709900	1534655	15-1/2	15-1/2	12-1/2
TP-207	709884	1534605	16	15	12-1/2
TP-208	709924	1534628	15-1/2	14-1/2	13-1/2
TP-210	709911	1534691	15-1/2	15	14
TP-303	709855	1534577	19	–	–
TP-306	709904	1534638	15-1/2	15	13
TP-312	709855	1534670	16	15	14
TP-313	709896	1534709	15-1/2	–	–
TP-406	709902	1534672	17-1/2	14	<12*
TP-502	709915	1534713	15-1/2	–	–
TP-503	709909	1534671	15-1/2	–	–
TP-506	709850	1534520	16	–	–
TP-601	709903	1534615	15-1/2	15-1/2	15
TP-702	709915	1534757	16	15-1/2	14-1/2
TP-707	709881	1534551	18-1/2	16	<12-1/2*
TP-714	709857	1534474	17-1/2	16	<13*

* Bottom of Charcoal Briquette Layer Not Encountered in Test Pit.
– Charcoal Briquette Layer Not Encountered in Test Pit.

Initial Gridline Excavation Depths in Feet

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
A	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
B	–	–	–	–	–	1	2	2	2	2	1	1	1	1	–
C	–	–	–	–	–	8	5	2	3	3	2	1	1	1	–
D	–	–	–	–	–	8	4	3	3	2	1	–	–	–	–
E	–	8	4	1	1	–	–	–	2	2	2	–	–	–	–
F	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
G	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

1) Endpoint coordinates: A-1 N709951, E1534439
O-15 N709801, E1534789

2) Gridlines on 25-foot centers.

Notes:

1. All containment areas except the Pre-Disposal area shall be within the Project Boundary.
2. Any groundwater collected during dewatering or from the pre-disposal containment area shall be pumped into the Settling Pond of the Temporary Fluid Containment Area. Any accumulated sediment in the Settling Pond shall be disposed of with the charcoal briquettes.
3. The table presenting Initial Gridline Excavation Depths in Feet is intended as an initial guide only. The Port will visually confirm the excavation limits.
4. The area outside of the Project Boundary has been graded at 0.5 percent slope toward a central ditch (southward). The area inside the Project Boundary shall be graded to match surrounding grade, i.e., 0.5 percent slope southward. If excess material exists during grading the excess material shall remain within the Project Boundary. The excess material shall be spread evenly within the Project Boundary.
5. The cover on the Pre-Disposal Containment Area shall be maintained until the briquette-laden soil is disposed of.

HARTCROWSER

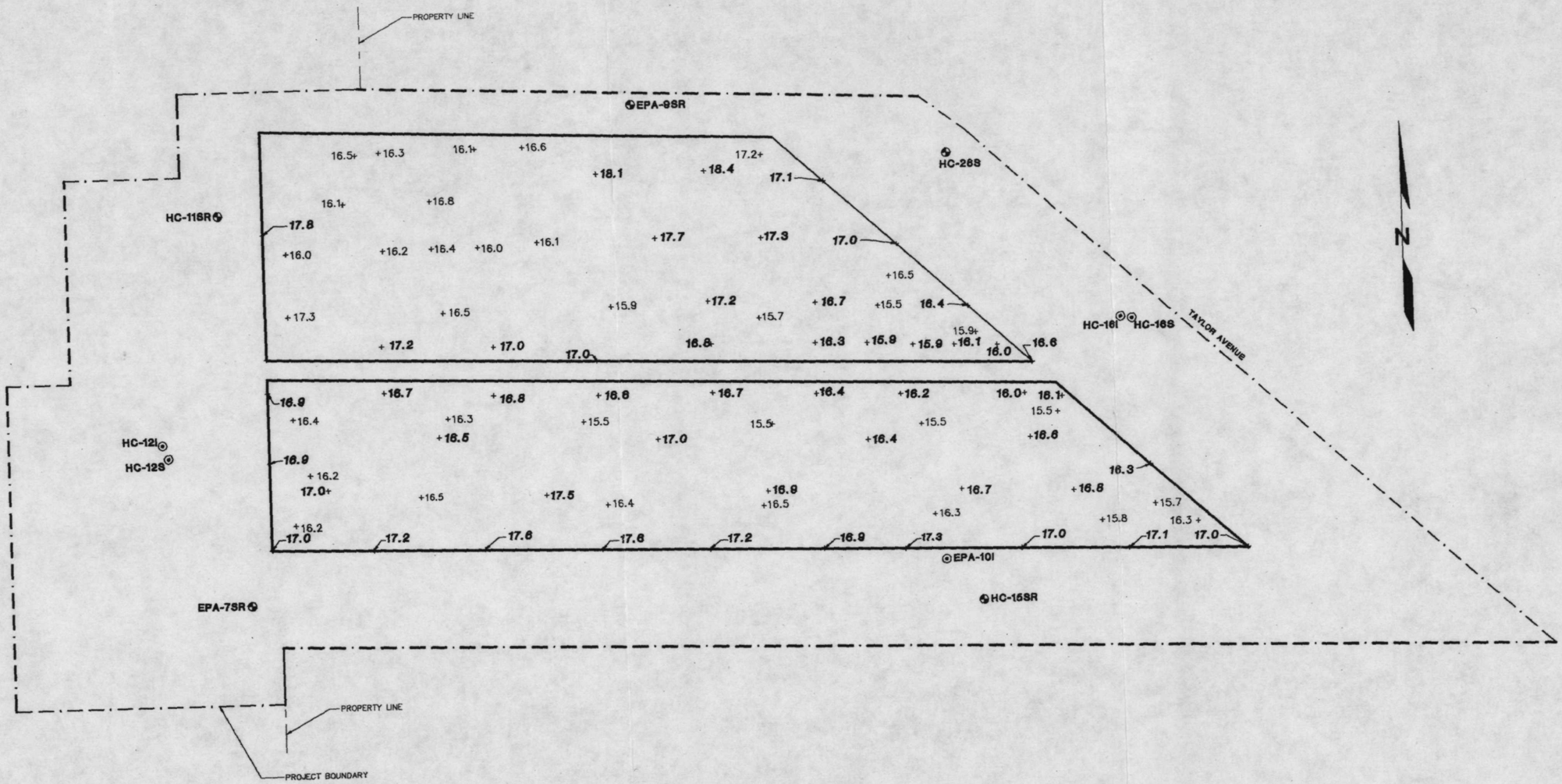
J-2350-24 11/93

Figure 9

cvd 11/17 1=80 (xref)XXXX0000/Default.pcp
23502411

Site Plan Showing Top and Bottom Elevations of Import (ASARCO) Slag

OFA/Pennwalt Area



17.8 TOP OF SLAG ELEVATION IN FEET

16.5 BOTTOM OF SLAG ELEVATION IN FEET

PROJECT BOUNDARY

ASPHALT CONCRETE CAP BOUNDARY

EPA-7SR REPLACEMENT MONITORING WELL LOCATION AND NUMBER (INSTALLED)

HC-12I EXISTING WELL LOCATION AND NUMBER (PROTECTED)

0 120 240

SCALE IN FEET

HARTCROWSER

J-2350-24 10/93

Figure 10

23502410 CV /20/94 1=120

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 SIXTH AVENUE
SEATTLE, WA 98101

TARGET SHEET

The following document was not imaged.
This is due to the Original being:

XX Oversized
____ CD Rom
____ Computer Disk
____ Video Tape
Other: _____

_____

**A copy of the document may be requested from the Superfund Records Center.

Document Information

Document ID #: 1266472

File #: **26.9.5.5**

Site Name: Commencement Bay CB/NT (CBNSF)

Blair Waterway and Back Up Properties Clean up 1993
Charcoal Briquette Removal Plan
Sheet 1 of 1

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 SIXTH AVENUE
SEATTLE, WA 98101

TARGET SHEET

The following document was not imaged.
This is due to the Original being:

XX	Oversized
	CD Rom
	Computer Disk
	Video Tape
	Other:

**A copy of the document may be requested from the Superfund Records Center.

Document Information

Document ID #:	1266472
File #:	**26.9.5.5**
Site Name:	Commencement Bay CB/NT (CBNSF)

Blair Waterway and Back Up Properties Clean up 1993
Areas Boundary Plan
Sheet 1 of 1

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 SIXTH AVENUE
SEATTLE, WA 98101

TARGET SHEET

The following document was not imaged.
This is due to the Original being:

XX	Oversized
	CD Rom
	Computer Disk
	Video Tape
	Other:

**A copy of the document may be requested from the Superfund Records Center.

Document Information

Document ID #:	1266472
File #:	**26.9.5.5**
Site Name:	Commencement Bay CB/NT (CBNSF)

Blair Waterway and Blair Backup Properties Clean up 1993
Blair Waterway Property
Drainage Plan
Sheet 21 of 22

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 SIXTH AVENUE
SEATTLE, WA 98101

TARGET SHEET

The following document was not imaged.
This is due to the Original being:

XX	Oversized
	CD Rom
	Computer Disk
	Video Tape
	Other:

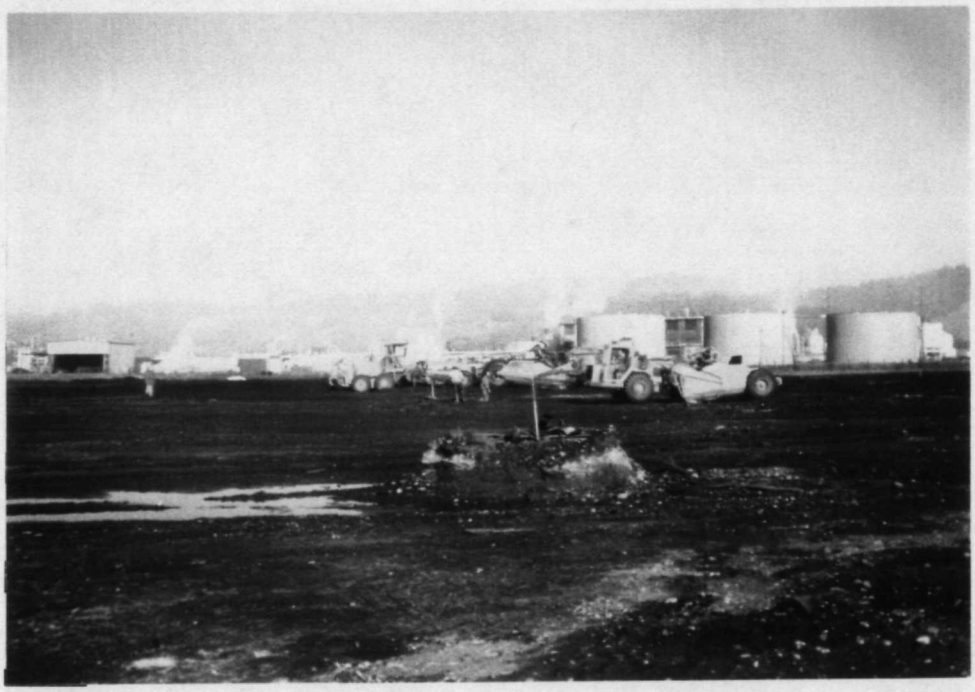
**A copy of the document may be requested from the Superfund Records Center.

Document Information

Document ID #:	1266472
File #:	**26.9.5.5**
Site Name:	Commencement Bay CB/NT (CBNSF)

Blair Waterway and Blair Backup Properties Clean up 1993
Blair Waterway Property
Grading Plan
Sheet 16 of 22

APPENDIX A
PHOTOGRAPHIC LOG OF THE CLEANUP



Photograph 1 - Site grading activities.

Photograph 2 - Setting 24-inch CMP west from MH2.

Photograph 3 - Tide Control Valve in MH1.

Photograph 4 - Spreading and compacting sand and gravel cover along north edge of site.

Photograph 5 - Placing and compacting sand and gravel cover near MH2.

Photograph 6 - Charcoal briquette-laden soil site preparation including staking and site clearing.

Photograph 7 - Placing plastic and drainage layer at temporary briquette-laden soil stockpile.

Photograph 8 - Covered and secured temporary briquette-laden soil stockpile.

Photograph 9 - Charcoal briquette-laden soil infiltration pond.

Photograph 10 - Charcoal briquette-laden soil excavation.

Photograph 11 - Charcoal briquette-laden soil excavation.

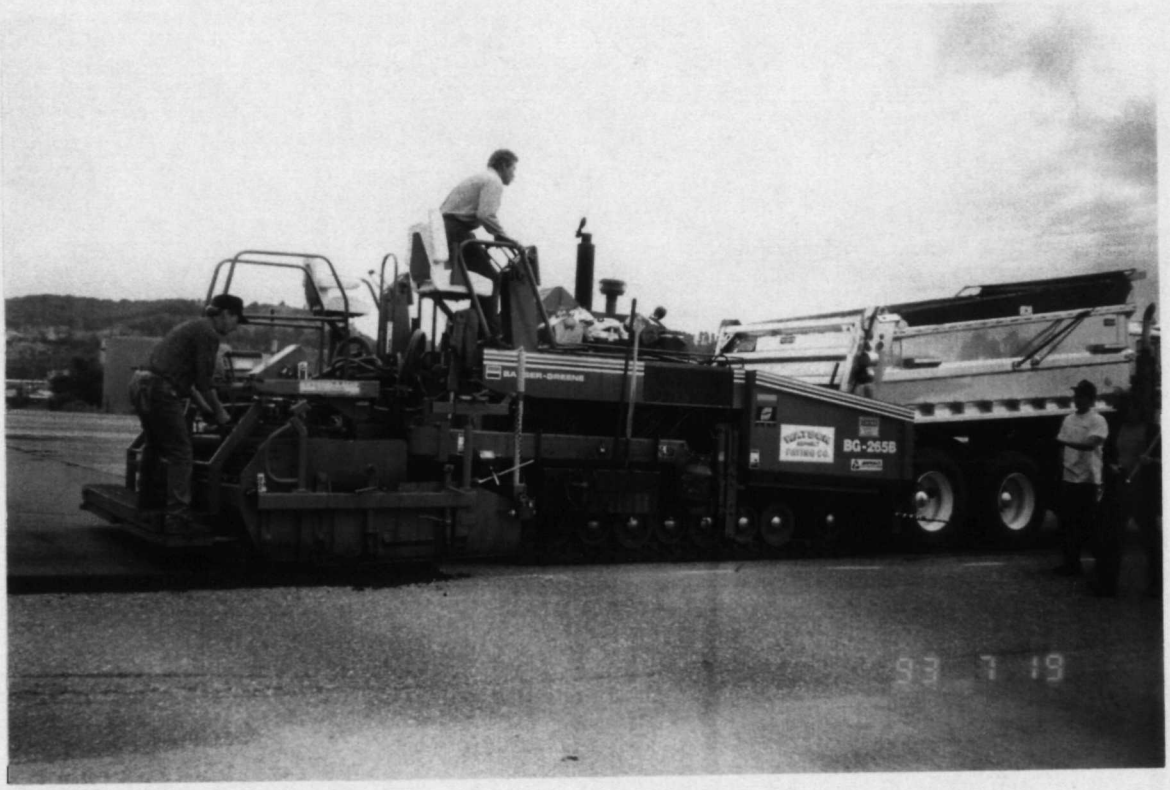
Photograph 12 - Railcars used for hauling briquette-laden soil being lined with plastic in preparation for use.

Photograph 13 - Loading plastic-lined railcars with briquette-laden soil.

Photograph 14 - Loaded railcar ready for covering.

Photograph 15 - Sand and gravel buffer placement and compaction over separation geosynthetic on south pad near MH3.

Photograph 16 - Base course placement and compaction.



Photograph 17 - Placement of the first lift of asphalt cap.

Photograph 18 - Compaction of first lift of asphalt cap.

Photograph 19 - Applying asphalt coating for paving fabric placement.

Photograph 20 - Placing paving fabric.

Photograph 21 - Excavating Area G for sandblast grit-contaminated soil.

Photograph 22 - Excavating visibly stained soil.

Photograph 23 - Loading sandblast grit-contaminated soil for hauling to OFA/Pennwalt Area.

Photograph 24 - Dumping sandblast grit-contaminated soil on sand and gravel buffer.

Photograph 25 - Dumping and spreading Asarco slag on sand and gravel buffer.

Photograph 26 - Placing and compacting Asarco slab on sand and gravel buffer.

Photograph 27 - Placing investigation-derived waste on north pad.

Appendix B

APPENDIX B
CONSTRUCTION OBSERVATION FIELD REPORTS

HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
206.324.9530

FIELD REPORT

Job No. 2350-08
Field Report No. 4
Page 1 of 1
DATE 12-17-91
S M (T) W Th F S

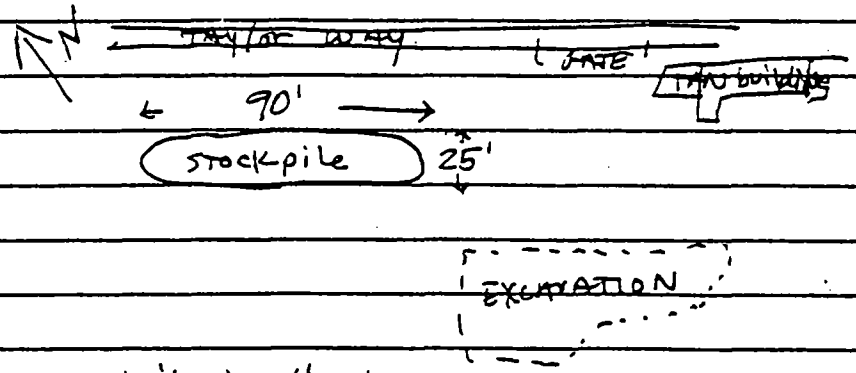
JOB P.O.T. -Tribal
ARRIVAL TIME: 9'15
LOCATION Fife, WA
DEPARTURE TIME: 400
CLIENT P.O.T.
WEATHER: Fog
PURPOSE OF OBSERVATIONS SAND BLAST grit removal
H-C REPRESENTATIVE D. McKenzie
H C PROJECT MANAGER J. Wessley
CONTRACTOR Dickson, Co.
PERMIT NO.
CONTRACTOR REP. Steve Jackson
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: 9'15 - Arrive on site, meet contractors + Arnie Rollins from P.O.T.

Arnie showed me areas to excavate. Also showed me new grit pile which was not shown on map. location is drawn in on map.

10'15 Start excavation of large, spread out grit pile - green staining seems to be quite spread out.
2'00 Arnie looks over excavation + OKs it to dig about 50' further SE than originally planned.



Sampled stockpile in 4 places

SP-1	0-12' SE END	SP-3	23'-33'
SP-2	12'-23'	SP-4	33'-44'

BY: 4'00 left site
REVIEWED BY:
I have read and understand the content of this Field Report.

Diana McKenzie
John R Vardiman

HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
206.324.9530

FIELD REPORT

Job No. 2350·08
Field Report No. B
Page 1 of 2
DATE 12·18·91
S M T (W) Th F S

JOB P.O.T. Tribal Transfer
ARRIVAL TIME: 8^10
LOCATION Fife, WA
DEPARTURE TIME: 4^30
CLIENT P.O.T.
WEATHER: rain then clearing
PURPOSE OF OBSERVATIONS Sand Blast Grit Stockpiling
H-C REPRESENTATIVE D. McKenzie
H C PROJECT MANAGER G. Horvitz
CONTRACTOR Dickson Co
PERMIT NO.
CONTRACTOR REP. Steve Jackson
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: 8^10 - Arrive on site - Decide to work on piles on ~~far~~ NW corner of property. Dig on smaller, newly discovered pile 1st. Since there are ~~3~~ 5 discrete areas, I called the largest A and composited the rest as sample B. The soil from A+B is stockpiled together.

I took 5 samples from this area,

A-bottom B-bottom (composite) SP-AB (stockpile)
A-side B-side (composite)

This stockpile (AB) is ~ 5 yds of soil.

11^00 - move to larger pile near end of property. Call this pile "C" I sampled 3 places.

C-bottom SP-C (stockpile)
C-side

Stockpile (C) is ~ 10 yds of soil.

2^45 - move to N corner of property to dig on oil spot "E".

I took 2 samples in area "D" which was dug on 12/17. This area will be divided into a NW area and a SE area. The samples today are from NW half of dig. ~~Ther~~ The SE half needs to be excavated still.

D-bottom-NW D-side-NW

BY: Diana McKenzie
HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verdin
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.

CONTRACTOR REPRESENTATIVE

HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
206.324.9530

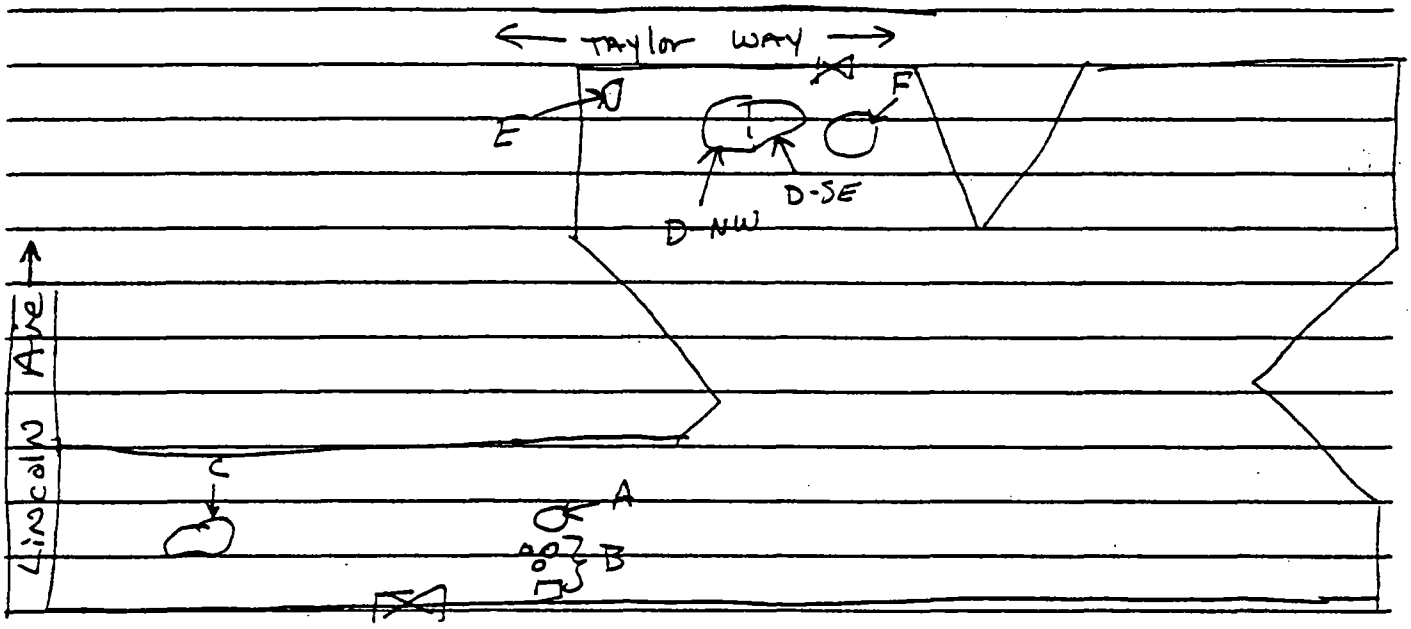
Job No. 2350-08

Field Report No. B

Job P.O.T. Tribal

Date 12/18/91

I sampled oil spot "E" in 2 areas:
E-bottom E-side
These are tested for TPH; I did not sample stockpile because testing hasn't been decided upon yet.
3^{30} - move to sand blast grit area "F" - south of "D".
3^{40} - lay visqueen + start digging.
4^{15} - cover pile 1
4^{30} - leave site



BY: Diana McKenzie
HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verdin
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.

CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
206.324.9530

Job No. 2350-08
Field Report No. ~~B~~ C
Page 1 of 1
DATE 12-19-91 (S M T W (Th) F S)

JOB P.O.T. Tribal Transfer
ARRIVAL TIME: 8:10
LOCATION Tacoma, WA
DEPARTURE TIME: 1:30
CLIENT P.O.T.
WEATHER: Cloudy
PURPOSE OF OBSERVATIONS Sand Blast Grit/oil removal
H-C REPRESENTATIVE D. McKenzie
H C PROJECT MANAGER G. Horvitz
CONTRACTOR Dickson Co
PERMIT NO.
CONTRACTOR REP. Steve Jackson
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: 8:10 - Arrive on site - Contractors are finishing digging on Grit area F.

I took 2 stockpile samples, one bottom, + one side sample.

F-bottom SP-F-N (North half of stockpile)
F-sides SP-F-S (South " " ")

9:10 - move to finish Grit area D.
10:00 - Chempro arrives to remove drums.
11:00 - Took 2 stockpile samples, a bottom, + a side from D area.

D-bottom-SE Sp-5 (at 60')
D-sides-SE Sp-6 (60'-95')

11:30-12:00 Lunch
12:00 - Start dig on oil area near small structure call this area "G."
1:00 - Sample bottom + sides of hole.

G-bottom
G-sides

- All holes are staked
1:30 - leave site

BY: Diana McKenzie
HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verduin
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.

CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
206.324.9530

Job No. 3350-10
Field Report No. 2D
Page 1 of 2
DATE 3/14/92
S M T W Th (F) S

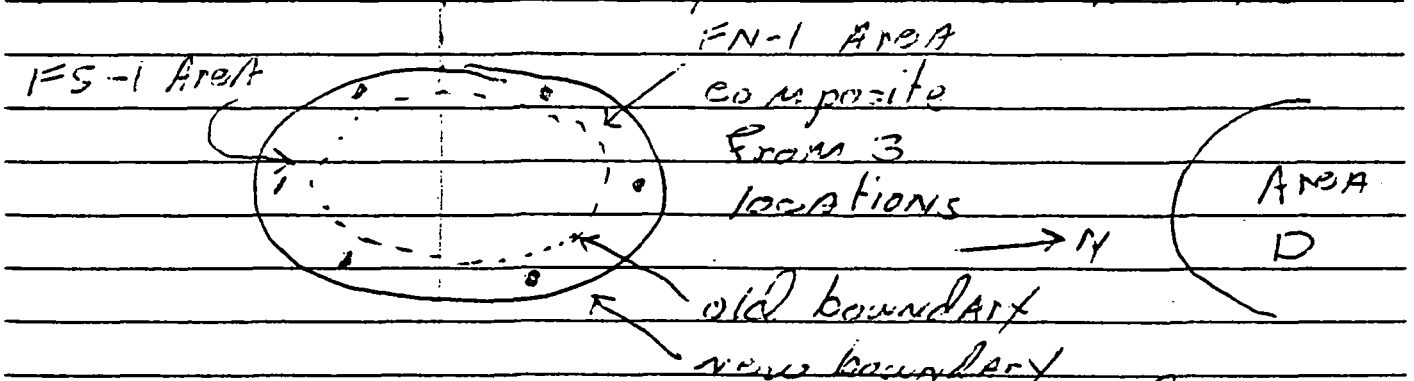
JOB P.O.T Tribal Property ARRIVAL TIME: 0845
LOCATION Tacoma, WA DEPARTURE TIME: 1445
CLIENT Port of Tacoma WEATHER: Sunny & warm
PURPOSE OF OBSERVATIONS Remove sand blast grit & stained soil
H-C REPRESENTATIVE George Lightner H C PROJECT MANAGER G.E. Horwitz
CONTRACTOR Dickson & Co. PERMIT NO.
CONTRACTOR REP. JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: Joe met with Arnie Rollins & Dickson Co. to discuss the extent of soil removal from sand blast grit area "D-NW" and "F" and for visibly stained soil in area G - see map attached.

Dickson Co began dewatering area "D" which is a small lake.

Moved perimeter stakes in area "F" about 5-7' farther out and soil material was removed by contractor. Soil was removed around perimeter of area F 8' wide & 6" deep. Collected two soil samples from sides of area "F" after soil was removed - see diagram below. About 10 cu yrds of soil was removed



from the perimeter of area "F" and stockpiled

BY: [signature]
HART CROWSER REPRESENTATIVE

REVIEWED BY: [signature]
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.

CONTRACTOR REPRESENTATIVE

HARTCROWSER
Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
206.324.9530

Job No. 23500-10
Field Report No. 8

Job P.O.T Tribal Property Date 2/14/92

separately. This stockpile is adjacent to and directly North of previously stockpiled Area "F" soil. Carl Waite collected sample of stockpile soil from Area "F"'s stockpile, FST0-1

Contractor removed soil around "G" Area 2' from the North, northeast and east - see diagram attached. Water with ~~sludge~~ oil - on top, was placed in barrels before excavation started, around Area "G". ~~sludge~~ oil returned as ground water filled the hole. The ~~sludge~~ oil is coming from under the small bldg.

Contractor stated that he did not have the equipment to remove 5' of soil around Area "D" down 6".

Called Joe and explained the problems in "D" and "G" Area, (1300hrs). Contractor can have necessary equipment on site tuesday to remove bldg at Area "G" and move soil around Area "D". Joe will call P.O.T. Okay to tell contractor to remove bldg and bring necessary equipment to clean up "D" Area.

Curtis Ratcliffe + Arnold Rollins was on site at 1400hrs. They will have Dickson Co. remove the bldg at Area "G". They viewed the ~~sludge~~ oil on top of the water at Area "G"

Spoke with contractor and he will remove building in G Area, and electricity, and bring bulldozer and front end loader for Area "D" tuesday.

Left Area at 1445

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.

CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

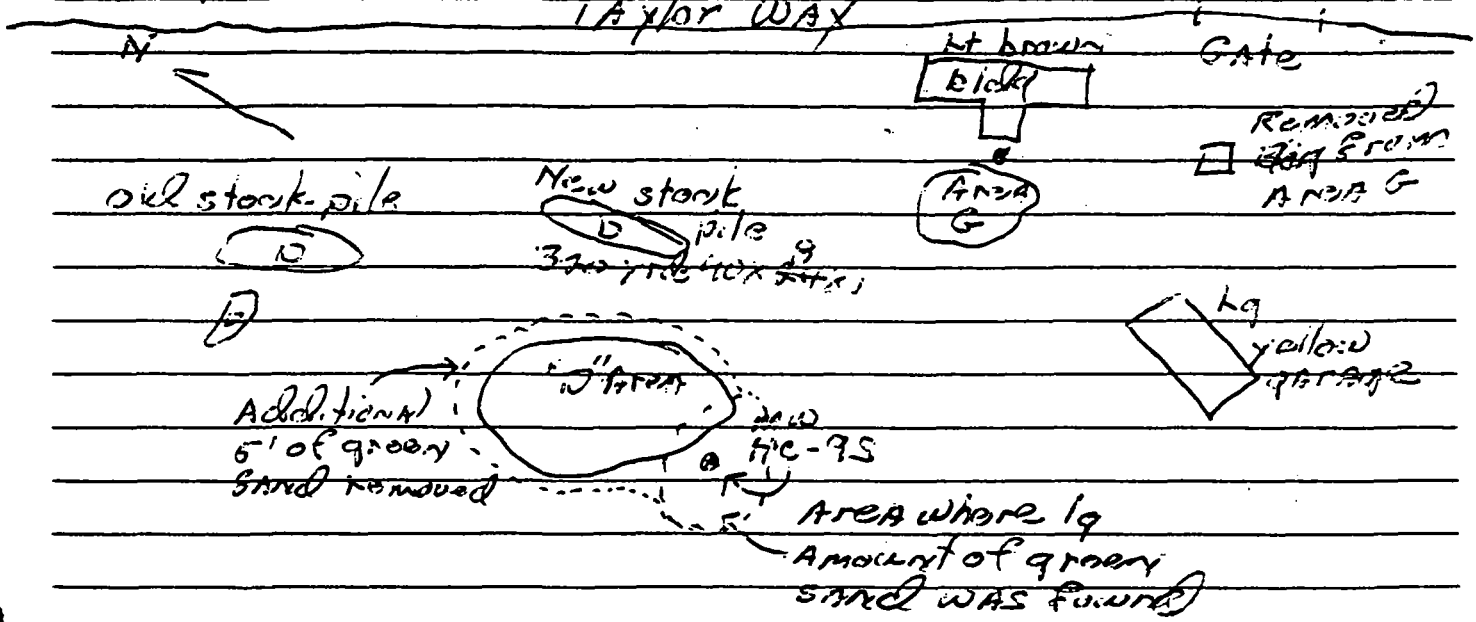
Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
206.324.9530

Job No 2350-10
Field Report No. E
Page 1 of 3
DATE 2/19/92
S M T (W) Th F S

JOB P.O.T., Tribal Property ARRIVAL TIME: 1050
LOCATION Tacoma WA DEPARTURE TIME: 1713
CLIENT Port of Tacoma WEATHER: Broken ☐
PURPOSE OF OBSERVATIONS Remove sand blast grit + stained soil
H-C REPRESENTATIVE George Lightner H C PROJECT MANAGER Gary Horvitz
CONTRACTOR W.M. Dickson Co. PERMIT NO.
CONTRACTOR REP. Ed Brown JOB PHONE 472-4489

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: 1050: Arrived on site. The utility building over area "G" was moved to the south. Equipment in use are Bulldozer, John Deere 650, + Frontend loader Dresser H90E. Three people with Dickson Co on site. Crew is working on North end of area "D" removing about 6" of soil - see diagram below:



Pictures taken 19, 20, 21 of equipment, Utility bldg.

BY: REVIEWED BY: I have read and understand the content of this Field Report.

HART CROWSER REPRESENTATIVE HART CROWSER PROJECT MANAGER CONTRACTOR REPRESENTATIVE

HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
206.324.9530

Job No. 3300-10
Field Report No. E

Job P.O.T. Tribal Property Date 2/19/92

"D" + "G" AREA sample codes:

"D" AREA: D-NW: Northwest composit sample
D-SE Southeast " "
D-NWB " " bottom "
D-SEB " " " "
D-SPN North stockpile
D-SPC Center "
D-SPS South "

1300: Large pocket of green sand found around HC-9S in the S.W. corner of AREA "D". The stratigraphy, starting from the surface is about 6" to 12" of gravely sandy fill, then 4" to 8" of green sand and last a hard brown silty fine sand. The area would pump as the equipment removed the first two layers. A dump area about 20'x10'x3' was cleaned out.
1315: One equipment operator left area
1410: Called Joe and explained progress and the area where the green sand was found.
1500: Arnold Rollins was on site. I showed Mr Rollins the green sand area around HC-9S and because of the sand's thickness, it required a large amount of soil to be removed. Took pictures of "D" area and stock piles
1530: The "D" area is complete. Sampled "D" area and stock piles, SP.: D-SP-N, D-SP-C, D-SP-S See diagram! The "D" area still had a green tinge in the soil and water, S.W. corner. See diagram on page 3 showing how the "D" area was sampled.

BY: REVIEWED BY: I have read and understand the content of this Field Report.

HART CROWSER REPRESENTATIVE HART CROWSER PROJECT MANAGER CONTRACTOR REPRESENTATIVE

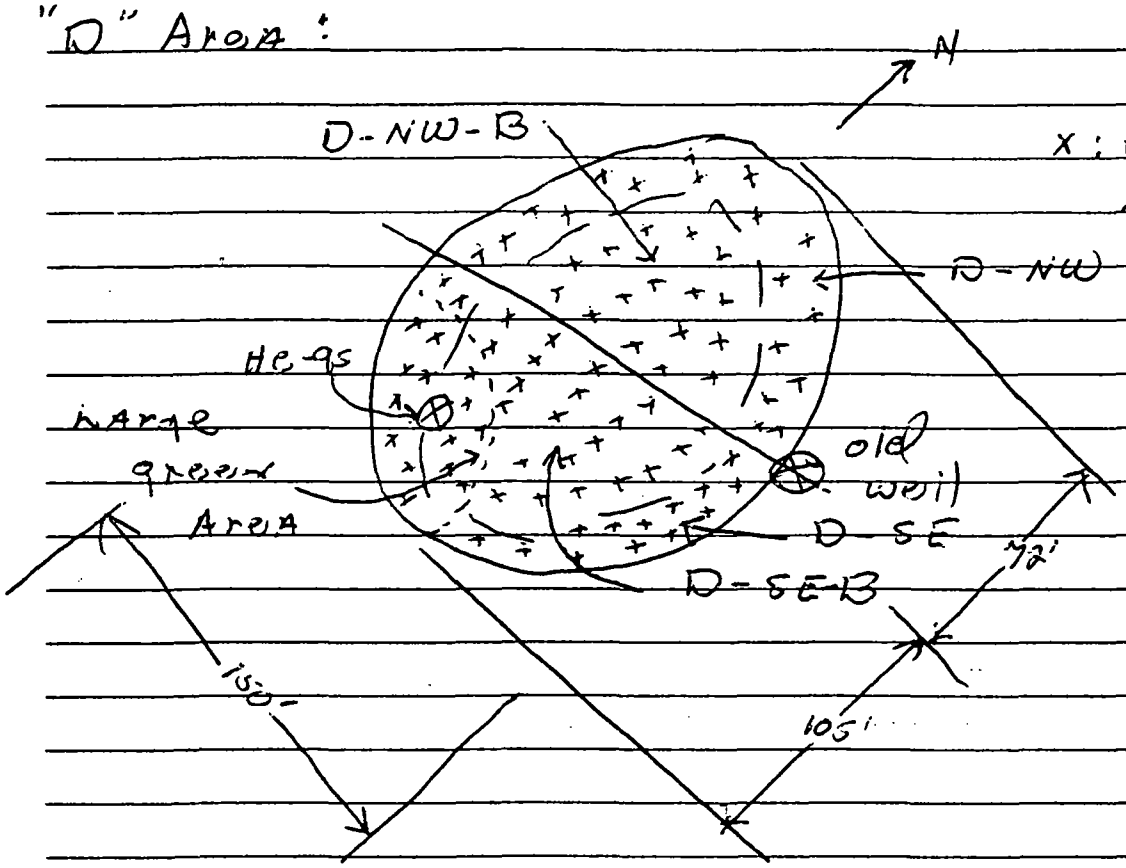
HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
206.324.9530

Job No. 2280-10
Field Report No. 5
Page 3 of 3

Job P.O.T Tribal Property Date 2/19/92

"D" Area:



The D Area is 2' to 3' deep on the south end and 1' to 2' deep at the North end. The new stock pile has 320 cu yrds of soil. The "G" Area was not sampled.

Left Area at 1713 hrs.

BY: REVIEWED BY: I have read and understand the content of this Field Report.

HART CROWSER REPRESENTATIVE HART CROWSER PROJECT MANAGER CONTRACTOR REPRESENTATIVE

HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
206.324.9530

FIELD REPORT

Job No. 2330-10
Field Report No. F
Page 1 of 3
DATE 2/20/92 (S M T W Th F S)

JOB P.O.T, Tribal Property — ARRIVAL TIME: 0750
LOCATION Tacoma, WA — DEPARTURE TIME:
CLIENT Port of Tacoma — WEATHER: Rain
PURPOSE OF OBSERVATIONS Remove and sample stained soil
H-C REPRESENTATIVE George Lightner — H C PROJECT MANAGER Gary Horvitz
CONTRACTOR W.M. Dickson Co — PERMIT NO.
CONTRACTOR REP. Ed Brown — JOB PHONE 472-4459

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: 0750 - on site. Ed Brown on site
0900: Started pumping water out of G area.
0830: Removing soil from "G" area.
0900: Stained soil is larger than anticipated. When large equipment run over ground around "G" area an oil ~~stock~~ sheen builds up on water. There are long, 3' to 4', dark areas behind bldg where G area soil is being removed, see diagram. Also took pictures of area, however, camera is not working very well.
0905: Called Joe Wessley and explained the above problem. Joe will call P.O.T and request a pump truck to remove water.
0915: Requested Ed to wait for P.O.T advise as how to handle the water and ~~sludge~~ oil problem.
0945: Arnold Rollins, P.O.T, on site. I showed Mr. Rollins the sludge on the water and the dark stained places around "G" area. He referred to the stained areas as an oil mats ~~as were~~ used on dirt country roads, a few years ago
1015: Curtis Ratcliffe on site. I showed him the

BY: REVIEWED BY: I have read and understand the content of this Field Report.

HART CROWSER REPRESENTATIVE — HART CROWSER PROJECT MANAGER — CONTRACTOR REPRESENTATIVE

HARTCROWSER
Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
206.324.9530

Job No. J-3530-C
Field Report No. 7
Page 2 of 3

Job P.O.T. Tribal Property Date 2/20/92

problem areas and advised obtaining a pump truck to contain the ~~sludge~~ oil and water. The water has a sheen on it 360° around "G" area Mr Ratcliffe requested water be pumped away from G area into a low area

[redacted]

1125: Large 300 shovel arrived.
1215: Shovel broke a ~~se~~ storm drain pipe (S.D). Water that was pumped ~~from~~ to the NE gate area is now coming back through the broken SD pipe. Water is now being pumped into the "D" area, see diagram.
1300 - Large truck on site to remove utility bldg. and foundation.
1305 - Water has been pumped out of "G" area into "D" area.
1320: Broke a SD pipe, plastic running N.-S. see diagram.
1340: Arnold Collins on site
1415: Contractor was not going to stock pile soil removed from area "G" because it was very wet. Advised contractor to stock pile "G" area soil on plastic and cover. It has been raining all day.
1420: called Joe and explain progress.
1430: Contractor is cementing SD holes.

BY: HART CROWSER REPRESENTATIVE
REVIEWED BY: HART CROWSER PROJECT MANAGER
I have read and understand the content of this Field Report.
CONTRACTOR REPRESENTATIVE

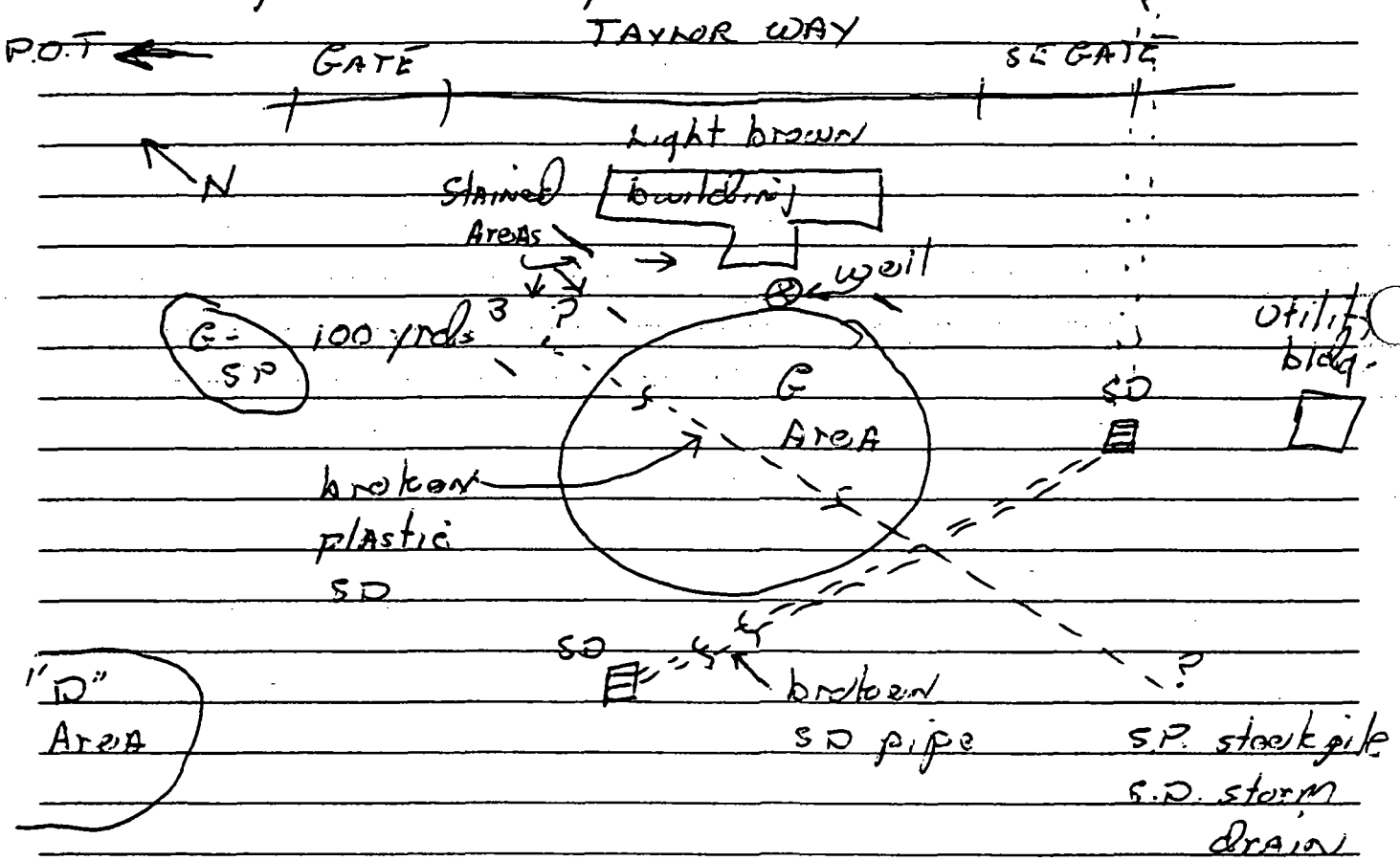
HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
206.324.9530

Job No. 2300-10
Field Report No. F
Page 3 of 3

Job P.O.T Tribal Property Date 2/20/92

Sampled G Area!
G-B, bottom 1415
G-S, side 1430
G-SP, stockpile 1445
1515: Took pictures of G Area with another camera. Contractor was covering G Area stockpile with plastic.



1515: left Area for inb.

BY: REVIEWED BY: I have read and understand the content of this Field Report.

HART CROWSER REPRESENTATIVE HART CROWSER PROJECT MANAGER CONTRACTOR REPRESENTATIVE

HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
206.324.9530

FIELD REPORT

Job No. 2350-10
Field Report No.
Page 1 of 2
DATE 4-24-92
S M T W Th (F) S

JOB Port of Tacoma - Tribal Property Transfer ARRIVAL TIME: 8:00 AM
LOCATION Blair Backup Property DEPARTURE TIME:
CLIENT Port of Tacoma WEATHER: Partly Sunny, 60°F
PURPOSE OF OBSERVATIONS Area "F" Excavation
H-C REPRESENTATIVE DJ Wessley / JR Verduin H C PROJECT MANAGER GE Moritz
CONTRACTOR Dickson PERMIT NO.
CONTRACTOR REP. Steve JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS:

(1) Dickson (2 people) arrived on site ~ 8:45am with small rubber tired front end loader / backhoe.

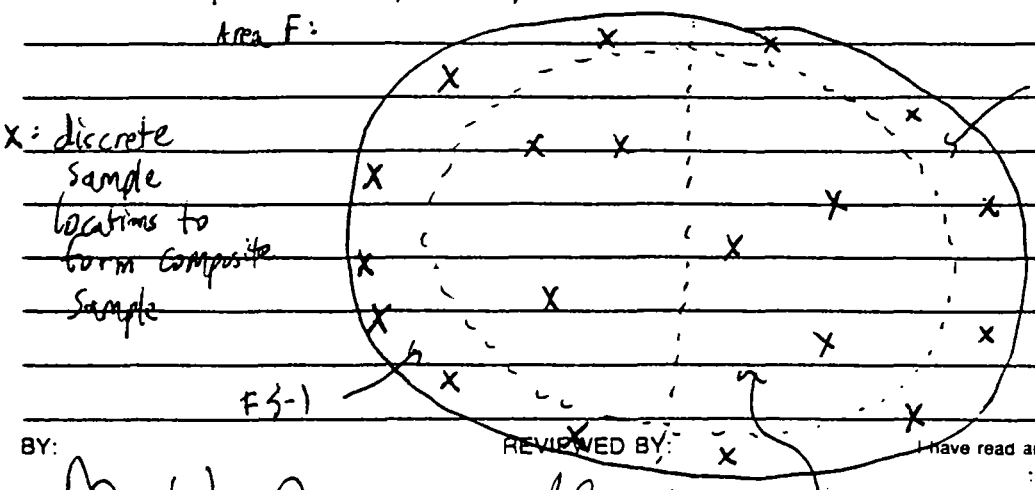
(2) Met w/ Arnie Rollins (Port of Tacoma) to discuss extent of sandblast grit removal work in Area F.

(3) Dickson removed sandblast grit from 7 individual areas within Area F using backhoe bucket. These six piles were then handshoveled into front end loader bucket and stockpiled south of Area F. Approximately 10-15 cubic yards of sandblast grit were excavated from Area F and stockpiled on site.

(4) Dickson placed sandblast grit onto visqueen sheet and covered pile with visqueen. Area F stockpile cover was secured with sandbags.

(5) Collected 3 verification samples from Area F bottom and perimeter. (Samples FN-1, FS-1, and FB-1) from locations as follows:

Area F:



X: discrete sample locations to form composite sample

BY: DJ Wessley — HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verduin — HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report. — CONTRACTOR REPRESENTATIVE

HARTCROWSER

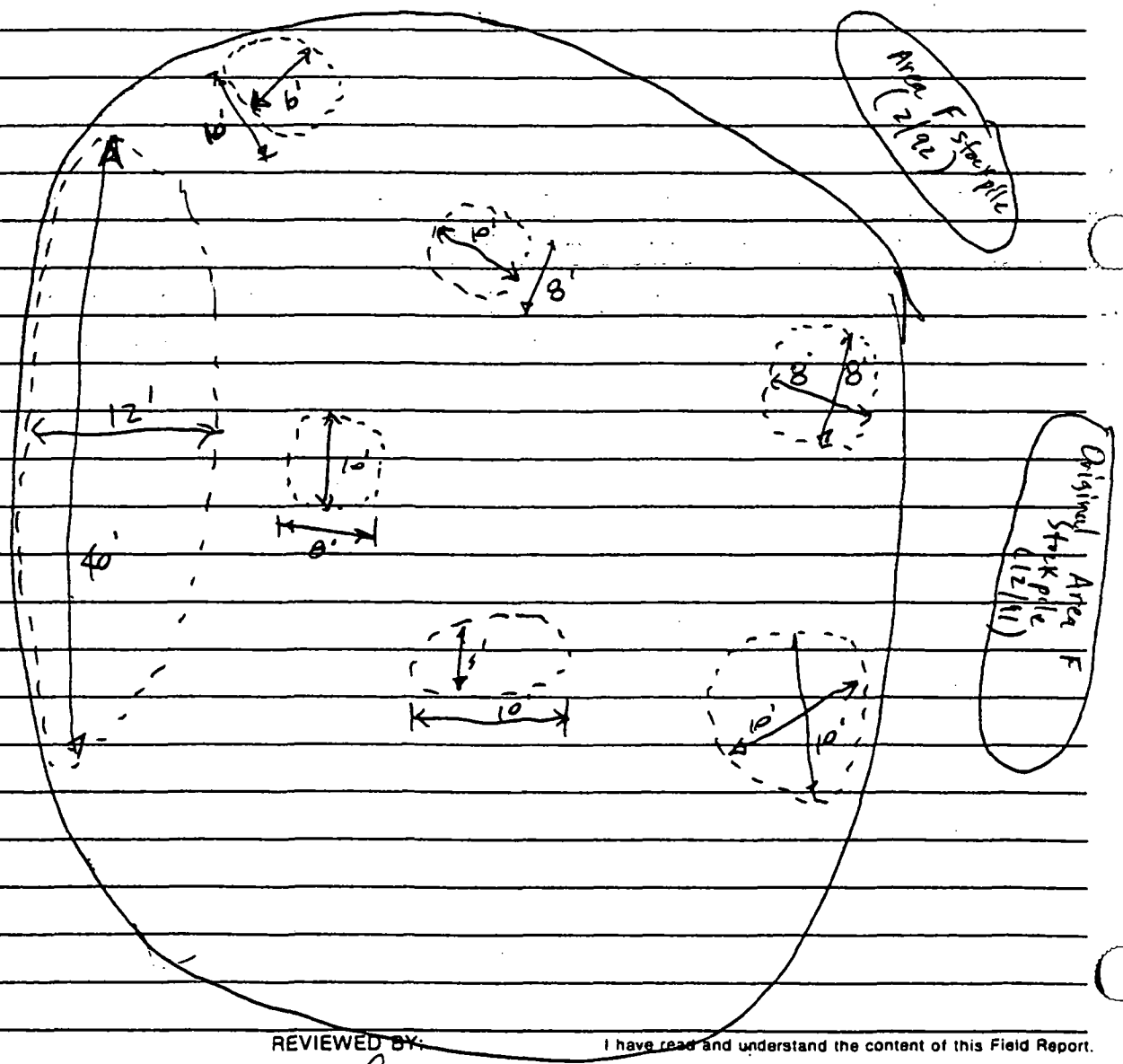
Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
206.324.9530

Job No. 2350-10
Field Report No. 6

Job Port of Tacoma - Tribal Property Transfer Date 4-24-92

7 Areas in Area F which were excavated and stockpiled on site - Approximately 3" to 12" were removed from each discrete area.

6 Left site ~11:15 am & dropped samples off at Lucks.



BY: D J Wessler — HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verduin — HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.

CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

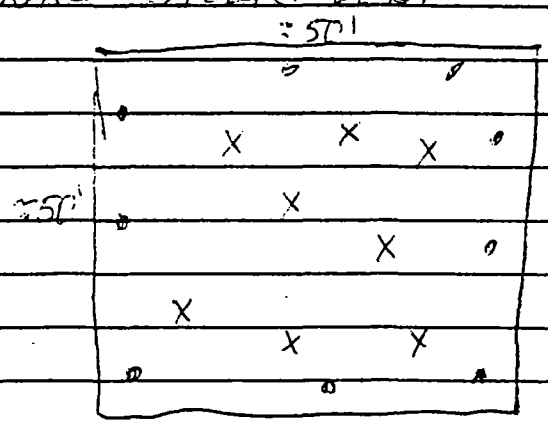
Job No. 23[illegible]-[illegible]
Field Report No. H
Page 1 of 1
DATE 6/5/92
S M T W Th F S

JOB BLAIR BACKUP ARRIVAL TIME: 8:00
LOCATION PORT OF TACOMA, WA DEPARTURE TIME:
CLIENT PORT OF TACOMA WEATHER: SUNNY ~65°
PURPOSE OF OBSERVATIONS AREA F SAND BLAST GRIT REMOVAL
H-C REPRESENTATIVE VERDUIN H C PROJECT MANAGER HORVITZ
CONTRACTOR WOODWORTH PERMIT NO. —
CONTRACTOR REP. JIM JOB PHONE —

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: HC REP ON SITE TO OVEREXCAVATE SAND BLAST GRIT IN AREA F. HC REP MET ARNIE ROLLINS OF PORT. WOODWORTH ARRIVED AT SITE ≈ 9 a.m.

WOODWORTH USED A GRADER TO SCRAPE APPROXIMATELY 1-3 INCHES OF SURFACE MAT'L FROM SITE. WOODWORTH USED GRADER TO SCRAPE MAT'L TO ONE SIDE AND THEN USED BACKHOE TO PLACE MAT'L IN PILE. UPON COMPLETION NO ~~[illegible]~~ EVIDENCE OF SAND BLAST GRIT WAS OBSERVED. APPROXIMATELY 6 CUBIC YARDS OF MAT'L WAS STOCKPILED.



N →

X - BOTTOM COMPOSITE SAMPLE
• - SIDEWALL COMPOSITE SAMPLE

TWO SAMPLES (F-BOTTOM & F-SIDES) WERE TAKEN TO CAUCKS FOR TOTAL METALS ANALYSIS

BY: John R Verduin
HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verduin
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. J-3390-22
Field Report No. 1
Page 1 of 1
DATE 11/12/92
S M T W (Th) F S

JOB BLAIR BACKUP PROPERTY - OFA GRADING ARRIVAL TIME: 0900
LOCATION PORT OF TACOMA - TAYLOR AVE. DEPARTURE TIME: 1430
CLIENT PORT OF TACOMA WEATHER: OVERCAST - COOL
PURPOSE OF OBSERVATIONS START OF PROPERTY CLEANUP AND GRADING
H-C REPRESENTATIVE FRED TUTTLE H C PROJECT MANAGER JOHN VERDUIN
CONTRACTOR WOODWORTH PERMIT NO. —
CONTRACTOR REP. JIM MCDANIEL JOB PHONE —

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: SITE WORK BEGAN TODAY TO PREPARE THE AREA FOR GRADING OPERATIONS. A DOZER (DH-4) WAS MOBILIZED TO SMOOTH THE SURFACE, EXCAVATE DRAINAGE DITCHES, AND PUSH SURFACE DEBRIS INTO PILES. ROADS WERE BUILT DURING GRADING TO PROVIDE ACCESS FOR OTHER EQUIPMENT. ABOUT HALF THE SITE WAS WORKED OVER USING THE DOZER.

TWO SCRAPERS, A CAT 623B AND 613B, WERE MOBILIZED TO THE SITE FOR LATER USE. ALSO A BACKHOE, JD 690D, WAS MOBILIZED TO THE SITE.

A QUESTION AROSE CONCERNING THE CONCRETE FOUNDATIONS AND SLABS EVIDENT ON THE EXISTING SURFACE. THE PORT REQUESTED THAT NO CONCRETE BE REMOVED EXCEPT THAT NECESSARY TO ACHIEVE FINAL SITE GRADES. CONCRETE EXCAVATED LESS THAN 18 INCHES IN LARGEST DIMENSION CAN BE USED AS FILL IN OTHER PORTIONS OF THE SITE. LARGER PIECES OF CONCRETE WHICH MUST BE MOVED TO ACHIEVE FINAL GRADES SHOULD BE LOADED AND HAULED OFF SITE.

BY: REVIEWED BY: I have read and understand the content of this Field Report.

HART CROWSER REPRESENTATIVE — HART CROWSER PROJECT MANAGER — CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. J-7[illegible]
Field Report No. 2
Page 1 of 1
DATE 11/13/92
S M T W Th (F) S

JOB BLAIR BACKUP PROPERTY - OFA GRADING ARRIVAL TIME: 0900

LOCATION PORT OF TACOMA - TAYLOR AVE. DEPARTURE TIME: 1630

CLIENT PORT OF TACOMA WEATHER: OVERCAST - COOL

PURPOSE OF OBSERVATIONS CLEANUP AND GRADING

H-C REPRESENTATIVE FRED TUTTLE H C PROJECT MANAGER JOHN VERDUIN

CONTRACTOR WORDINGTH PERMIT NO. —

CONTRACTOR REP. Jim McDANIEL JOB PHONE —

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: AFTER DISCUSSING A PLATE LOAD TEST AND PICKING UP EQUIPMENT AT HARTCROWSER, A SITE VISIT WAS MADE AT 0900. THE CONTRACTOR WAS LOADING LARGE TRUCKS (~20 yd³) WITH SITE WOOD DEBRIS. THE THIRD LOAD WAS RR TIES WHICH WERE LATER HAULED BACK TO THE SITE AS THE DUMP LOCATION WOULD NOT ACCEPT THEM. THE BACKHOE OPERATOR, WHO WAS LOADING THE TRUCKS USING A JD 690D, THEN MOVED THE LARGER SCRAPER (LOADED) ONTO THE TEST LOCATION.

A PLATE LOAD TEST WAS CONDUCTED FROM 1030 TO 1630 USING THE CAT 623B SCRAPER AS A REACTION. THE TEST WAS COMPLETED BY 1630 AND THE EQUIPMENT RETURNED TO HARTCROWSER OFFICE.

DURING THE DAY THE SMALL BUILDING NEAR TAYLOR WAY WAS DEMOLISHED USING THE BACKHOE AND MOST OF THE WOOD WAS LOADED ONTO TRUCKS AND HAULED OFF SITE. THE DOZER CONTINUED LEVELING LOCAL HIGH AREAS AND SMOOTHING THE SITE FOR LATER GRADING.

BY: [signature] HART CROWSER REPRESENTATIVE

REVIEWED BY: [signature] HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report. [signature] CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. J-3350-02
Field Report No. 3
Page 1 of 1
DATE 11/16/92
S (M) T W Th F S

JOB BLAIR BACKUP PROPERTY - OFF GRADING ARRIVAL TIME: 0930
LOCATION PORT OF TACOMA - TAYLOR AVE. DEPARTURE TIME: 1400
CLIENT PORT OF TACOMA WEATHER: LIGHT RAIN - PC, COOL
PURPOSE OF OBSERVATIONS GRADING SITE
H-C REPRESENTATIVE FRED TITTLE H C PROJECT MANAGER JOHN VERDUIN
CONTRACTOR WOODWORTH PERMIT NO. -
CONTRACTOR REP. JIM McDANIEL JOB PHONE -

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: A SITE VISIT WAS MADE TODAY TO OBSERVE THE GRADING PROGRESS AND DISCUSS CONDITIONS WITH JIM McDANIEL.

THE SITE OF THE PLATE LOAD TEST WAS EXCAVATED TODAY USING THE CONTRACTOR'S BACKHOE. A CONCRETE SLAB WAS PRESENT ABOUT 4 INCHES BELOW THE PLATE ACROSS THE ENTIRE TEST AREA. THIS WAS DISCUSSED WITH JOHN VERDUIN AND THE DECISION WAS MADE TO CONDUCT ANOTHER TEST. THE CONTRACTOR'S SCRAPER IS NOW BUSY, SO SPECIAL ARRANGEMENTS WILL BE NECESSARY TO USE THE EQUIPMENT AGAIN.

TODAY IS THE START OF MAJOR EARTH MOVING. BOTH SCRAPERS ARE MOVING MATERIAL AND A DOZER AND GRADER ARE ASSISTING. A RAYCO PASCAL COMPACTOR WAS USED ON THE AREA ALONG THE NORTH SIDE WHERE THE SURFACE IS NEAR FINAL GRADE. THE FILL AREAS ARE VERY WET AND SOFT DUE TO WET EXISTING SOIL CONDITIONS AND CURRENT RAIN.

THE VISIBLE CONCRETE SLABS AND FOOTINGS WERE GENERALLY LOCATED ON A PLAN FOR FUTURE USE. MUCH OF THIS AREA WILL BE IN FILL SO THE CONCRETE WILL REMAIN IN PLACE AND OUT OF SITE.

BY: [signature] HART CROWSER REPRESENTATIVE

REVIEWED BY: [signature] HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report. [signature] CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. J-2350-32
Field Report No. 4
Page 1 of 1
DATE 11/17/92
S M (T) W Th F S

JOB BLAIR BACKUP PROPERTY - OFA GRADING ARRIVAL TIME: 0800
LOCATION PORT OF TACOMA - TAYLOR AVE. DEPARTURE TIME: 1530
CLIENT PORT OF TACOMA WEATHER: OVERCAST - COOL
PURPOSE OF OBSERVATIONS CLEANUP AND GRADING
H-C REPRESENTATIVE FRED TUTTLE H C PROJECT MANAGER JOHN VERDUIN
CONTRACTOR WOODWORTH PERMIT NO. -
CONTRACTOR REP. JIM McDANIEL JOB PHONE -

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: GRADING CONTINUED TODAY USING TWO SCRAPERS, A DOZER AND A GRADER. THE GRADER ASSISTED IN CUT AREAS AND THE DOZER WAS USED TO LEVEL FILL AND PUSH SCRAPERS. SANDY GRAVEL WITH DEBRIS MIXED WAS LOADED AT THE WEST END OF THE PROPERTY AND HAULED TO MAKE A ROAD TO THE EAST. SOME FILL WAS THEN PLACED ON THE EASTERN PORTION OF THE SITE. THE COMPACTOR WAS OPERATED IN THE FILL AREA WHERE THE SOIL IS GENERALLY WET AND THE SURFACE PUMPING. COMPACTION UNDER THESE CONDITIONS WOULD BE POOR.

THE BACKHOE WAS USED TO EXCAVATE THE DRAINAGE DITCH FROM THE CULVERT UNDER TAYLOR AVE. ALONG TAYLOR AVE. TO THE CENTRAL PROPERTY DRAINAGE DITCH.

THE LARGER SCRAPER HAD A FLAT IN THE MORNING AND DID NOT OPERATE FOR A PERIOD OF TIME.

BY: Fred H. Tuttle
HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verduin
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. J-2350-32
Field Report No. 5
Page 1 of 1
DATE 11/18/92
S M T (W) Th F S

JOB BLAIR BACKUP PROPERTY - OFF GRADING ARRIVAL TIME: 0930
LOCATION PORT OF TACOMA - TAYLOR AVE. DEPARTURE TIME: 1400
CLIENT PORT OF TACOMA WEATHER: OVERCAST - COOL
PURPOSE OF OBSERVATIONS GRADING
H-C REPRESENTATIVE FRED TUTTLE H C PROJECT MANAGER JOHN VERDUIN
CONTRACTOR WOODWORTH PERMIT NO. -
CONTRACTOR REP. JIM McDANIEL JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: SITE GRADING CONTINUED TODAY AFTER HEAVY RAIN OVERNIGHT. THE SCRAPERS WERE UNABLE TO HAUL FROM WEST TO EAST WITHOUT BUILDING A HAUL ROAD. THIS ROAD WAS BUILT THE REMAINDER OF THE DAY ON THE SOUTH SIDE OF THE PROPERTY. SAND AND GRAVEL WAS CUT ON THE SOUTH WEST PORTION OF THE SITE AND SPREAD IN THE ROAD BED TO THE EAST. THE D-4 ASSISTED GRADING.

THE D-4 DOZER WAS NOT OPERATED FOR ABOUT 1 HOUR DUE TO A TRACK OFF A SPROCKET.

THE JD 960D HOE WAS USED TO COMPLETE DIGGING THE DRAINAGE DITCH THROUGH THE CENTRAL PORTION (E-W) OF THE PROPERTY.

NO COMPACTION WAS ACCOMPLISHED TODAY AS THERE WAS NO OPERATOR FOR THE RAYCO RASCAL.

BY: Fred H. Tuttle
HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verduin
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. J-2356-22
Field Report No. 6
Page 1 of 1
DATE 11/19/92
S M T W Th F S

JOB BLAIR BACKUP PROPERTY - OFA GRADING ARRIVAL TIME: 0930
LOCATION PORT OF TACOMA - TAYLOR AVE. DEPARTURE TIME: 1445
CLIENT PORT OF TACOMA WEATHER: OVERCAST - COOL
PURPOSE OF OBSERVATIONS PLATE LOAD TEST - SECOND ATTEMPT.
H-C REPRESENTATIVE FRED TUTTLE H C PROJECT MANAGER JOHN VERDUIN
CONTRACTOR WOODWORTH PERMIT NO. -
CONTRACTOR REP. JIM McDANIEL JOB PHONE -

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: THE CONTRACTOR WAS SHUT DOWN TODAY DUE TO RAIN EXCEPT FOR THE D-4 DOZER. THE DOZER WAS USED TO LEVEL AREAS AND PROVIDE DRAINAGE IN PONDED AREAS.

A PLATE LOAD TEST WAS CONDUCTED USING THE 623B SCRAPER AS A REACTION. THE LOCATION WAS AT 2+42 AND H+5'. THE TOTAL PLATE MOVEMENT AT 35 KIPS WAS ABOUT 0.7". THE TEST RESULTS WILL BE AVAILABLE LATER.

BY: Fred H. Tuttle
HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verduin
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
Jim McDaniel
CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. J-2750-22
Field Report No. 7
Page 1 of 1
DATE 11/20/92
S M T W Th (F) S

JOB BLAIR BACKUP PROPERTY - OFA GRADING ARRIVAL TIME: 1100
LOCATION PORT OF TACOMA - TAYLOR AVE. DEPARTURE TIME: 1330
CLIENT PORT OF TACOMA WEATHER: OVERCAST - COOL
PURPOSE OF OBSERVATIONS GRADING
H-C REPRESENTATIVE FRED TUTTLE H C PROJECT MANAGER JOHN VERDUIN
CONTRACTOR WOODWORTH PERMIT NO. -
CONTRACTOR REP. JIM McDANIEL JOB PHONE -

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: SITE GRADING CONTINUED TODAY USING TWO SCRAPERS TWO DOZERS, A JD 450 G AND D-4, AND A GRADER. THE COMPACTOR WAS USED WHEN THE GRADER HAD A FLAT TIRE. THE GRADER HAD A FLAT TIRE FOR OVER ONE HOUR.

GRADING CONSISTED OF CUTTING IN THE SOUTH WEST AREA OF THE PROPERTY AND BUILDING ROAD TO THE EAST, SOME FILL WAS ALSO PLACED IN THE EASTERN PORTION OF THE SOUTH SIDE OF THE PROPERTY. THE SURFACE OF THE FILL AREA IS VERY ~~[illegible]~~ WET AND PROBABLY NOT COMPACTABLE IF ROLLED. THE CUT SOIL IN GENERALLY FINNER GRAINED, A SILTY FINE TO MEDIUM SAND W/ SUBSTANTIAL DEBRIS CONSISTING OF SLAG, STEEL, RUBBER AND CLOTH.

BY: [signature]
HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verduin
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
[signature]
CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. J-7350-22
Field Report No. 8
Page 1 of 1
DATE 11/24/92
S M (T) W Th F S

JOB BLAIR BACKUP - OFA GRADING ARRIVAL TIME: 0905
LOCATION PORT OF TACOMA - TAYLOR AVE. DEPARTURE TIME: 1330
CLIENT PORT OF TACOMA WEATHER: CLEAR - COLD
PURPOSE OF OBSERVATIONS GRADING
H-C REPRESENTATIVE FRED TUTTLE H C PROJECT MANAGER JOHN VERDUIN
CONTRACTOR WOODWORTH PERMIT NO. —
CONTRACTOR REP. JIM McDANIEL JOB PHONE —

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: GRADING CONTINUED TODAY AFTER A WET WEEKEND AND ONLY A DOZER OPERATING ON THE SITE ON MONDAY. THE EQUIPMENT USED TODAY IS TWO SCRAPERS, 2 SMALL DOZERS AND A GRADER, ALL ON SITE AND USED PREVIOUSLY.

THE AREA CUT TODAY IS GENERALLY NORTH OF LINE 2+00 AND WEST OF "M" LINE. THE FILL SOIL, CONSISTING OF SLAG, SAND AND GRAVEL WITH SOME DEBRIS MIXED, WAS SPREAD TO THE EAST BETWEEN 2+00 AND 3+00. THE CUT AREA REMAINS DENSE AT THE SURFACE BUT THE FILL IS ~~[illegible]~~ WET AND RUTS DEEPLY UNDER THE SCRAPERS. MUCH OF THE TIME THE SCRAPERS ARE BEING PUSHED IN THE FILL AREA. NO COMPACTION WAS ATTEMPTED DUE TO THE WET SOIL CONDITIONS.

BY: Fred Tuttle
HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verduin
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
Jim McDaniel
CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 1350-22
Field Report No. 9
Page 1 of 1
DATE 11-25-92
S M T (W) Th F S

JOB BLAIR BACKUP PROP OFA GRADING
ARRIVAL TIME: 09:00
LOCATION PORT OF TACOMA - TAYLOR AVE
DEPARTURE TIME: 14:00
CLIENT PORT OF TACOMA
WEATHER: SUNNY COLD
PURPOSE OF OBSERVATIONS GRADING
H-C REPRESENTATIVE M. HETTINGA
H C PROJECT MANAGER J. VERDUIN
CONTRACTOR WOODWORTH
PERMIT NO. —
CONTRACTOR REP. JIM MCDANIEL
JOB PHONE —

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: GRADING CONTINUED TODAY. THE AREA BETWEEN THE 1+00 AND 3+00 LINE WAS TOO ~~MUCH~~ WET FOR FILLING OPERATIONS, SO THE CONTRACTOR IS CREATING A STOCKPILE / HAUL ROAD JUST SOUTH OF THE 1+00 LINE TRENDING EASTWARD FROM ~~A~~ THE L LINE TO PAST THE H LINE. THIS MATERIAL WILL THEN BE GRADED USING THE DOZERS.

THE MATERIAL IS COMING FROM THE WEST AND NORTHWEST PORTIONS OF THE SITE. THE MATERIAL IS A SILTY FINE SAND CONTAINING ABUNDANT DEBRIS INCLUDING FIRE BRICK, SLAG, HEMATITE BEARING VEIN QUARTZ ORE, WOOD AND RUBBER.

TWO SCRAPERS, TWO DOZERS AND A GRADER WERE THE EQUIPMENT RUNNING TODAY.

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2256-22
Field Report No. 10
Page 1 of 1
DATE 11-30-92
S (M) T W Th F S

JOB Blair Backup Ramp
ARRIVAL TIME: 8:00 a.m.
LOCATION Port of Tacoma - Taylor Ave.
DEPARTURE TIME: 9:00 a.m.
CLIENT Port of Tacoma
WEATHER: a.m. rain; p.m. clear
PURPOSE OF OBSERVATIONS Grading
H-C REPRESENTATIVE C. Holloway
H C PROJECT MANAGER J. Verduin
CONTRACTOR Woodworth
PERMIT NO. –
CONTRACTOR REP. Jim McDaniel
JOB PHONE –

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: On-site as scheduled to observe on-going grading operation. Contractor determined that weekend and this a.m.'s heavy rains had made lot too wet to work. There were numerous 1" deep pools of standing water in central portion of lot.

BY: Chris Holloway
HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verduin
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
Jim McDaniel
CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 11
Page 1 of 1
DATE 12-1-92
S M (T) W Th F S

JOB Blair Backup Prop.
ARRIVAL TIME: 9:00 a.m.
LOCATION Port of Tacoma - Taylor Ave.
DEPARTURE TIME: 12:00 p.m.
CLIENT Port of Tacoma
WEATHER Clear, windy, cool
PURPOSE OF OBSERVATIONS Grading
H-C REPRESENTATIVE C. Holloway
H C PROJECT MANAGER J. Verduin
CONTRACTOR Woodworth
PERMIT NO. —
CONTRACTOR REP. Jim McDaniel
JOB PHONE —

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: On-site as scheduled to observe ongoing grading operation. (1) John Deere 650 dozer worked central portion of lot to establish drainage to new and old channels to allow standing water to flow off. Cut and (mostly temporary) fills average .5' to 1' depth.

BY: Chris Holloway
HART CROWSER REPRESENTATIVE

REVIEWED BY: John R. Verduin
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
Jim McDaniel
CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2356-22
Field Report No. 12
Page 1 of 1
DATE 12-2-92
S M T (W) Th F S

JOB Blair Backup Prop
ARRIVAL TIME: 10:30 a.m.
LOCATION Port of Tacoma, Taylor Ave.
DEPARTURE TIME: 1:00 p.m.
CLIENT Port of Tacoma
WEATHER: Clear, breezy, cold
PURPOSE OF OBSERVATIONS Grading
H-C REPRESENTATIVE C. Holloway
H C PROJECT MANAGER J. Verduin
CONTRACTOR Woodworth
PERMIT NO. —
CONTRACTOR REP. Jim McDaniel
JOB PHONE —

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: On-site as scheduled to observe on-going grading operation: (1) John Deere 650 dozer continues establishing drainage and fine grade in central and north-east portion of lot. Cuts and fills irregularly distributed and average 0.5' to 1' depths.
(1) Cat D-4 dozer farthest north-west corner of site cutting small "knob" (see plan) and filling corner of lot. Cut up to 4' deep, fill ~ .5' to 1' deep.
Note that strong wind clean-up for last 2 days have dried lot considerably.

BY: Chris Holloway
HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verduin
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 13
Page 1 of 1
DATE 12-3-92 (S M T W Th F S)

JOB Blair Backup Prop.
ARRIVAL TIME: 10:00 a.m.
LOCATION Port of Tacoma - Taylor Ave
DEPARTURE TIME: 1:00 p.m.
CLIENT Port of Tacoma
WEATHER: Clear - cold (~36° max)
PURPOSE OF OBSERVATIONS Grading
H-C REPRESENTATIVE C. Holloway
H C PROJECT MANAGER J. Verduin
CONTRACTOR Woodworth
PERMIT NO. —
CONTRACTOR REP. Jim McDaniel
JOB PHONE —

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: On site as scheduled to observe on-going grading operation: (1) Cat 14-G motor grader establishes fine grade (all cut) in north-west portion of lot. (1) Cat 623 scraper loads from graders windrows and hauls material out previously established haul-road (see Field Report #9) to extend haul road / stock-pile into south-east corner of site to approx. Section 5 (see plan) line. (1) John Deere 650 dozer spreads, smooths and aerates haul-road / stockpile. (1) Cat D-4 dozer continues fine-grading north-east portion and into central portion of lot. (D-4 cuts / fills are irregularly scattered through area and approx. 0.5' to 1' depths)

Clear - cold weather and manual aeration of grading activity continues to dry material out.

BY: Chris Holloway
HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verduin
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
CONTRACTOR REPRESENTATIVE

HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

FIELD REPORT

Job No. 2350-22
Field Report No. 14
Page 1 of 1
DATE 12-4-92
S M T W Th F S

JOB Blair Backup Prop. ARRIVAL TIME: 10:00 a.m.
LOCATION Port of Tacoma - Taylor Ave. DEPARTURE TIME: 1:00 p.m.
CLIENT Port of Tacoma WEATHER: Clear-cold
PURPOSE OF OBSERVATIONS: Grading
H-C REPRESENTATIVE C. Holloway H C PROJECT MANAGER J. Verduin
CONTRACTOR Woodworth PERMIT NO.
CONTRACTOR REP. Jim McDaniel JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: On-site as scheduled to observe on-going grading activity. (1) Cat 14-G motor grader continues cut and fine-grade in north-west (~1/3) portion of lot. (1) Cat 613 scraper loads from wind-rows and hauls out haul-road/stock-pile to approx. Section 5 to 6 (of plan). (1) John Deere 650 dozer spreads, smooths, aerates haul road/stock pile. (1) Cat D-4 dozer works to establish drainage, aerate, and begin fine-grade between existing and new channels through central portion of lot.

BY: Chris Holloway
HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verduin
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
Jim McDaniel
CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
206.324.9530

Job No. 2350-22
Field Report No. 15
Page 1 of 1
DATE 12-5-92
S M T W Th F (S)

JOB Blair Backup Prop.
ARRIVAL TIME: 10:00am
LOCATION Port of Tacoma - Taylor Ave.
DEPARTURE TIME: 2:00pm
CLIENT Port of Tacoma
WEATHER: Sunny - mild
PURPOSE OF OBSERVATIONS, Grading
H-C REPRESENTATIVE C. Holloway
H C PROJECT MANAGER J. Verduin
CONTRACTOR Woodworth
PERMIT NO. —
CONTRACTOR REP. Jim McDaniel
JOB PHONE —

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: On-site as scheduled to observe on-going grading operation. (1) Cat 14-G motor-grader continues to cut and fine grade in west (~1/3) of lot. (1) Cat 613 scraper loads from wind-rows and hauls out haul road/stockpile to ~ Section 5 to 6 (see plan). (2) John Deere 650 dozers spread from end of haul road out to southwest south-east corner of lot (fill depth ~1' over-all). Spread material will require additional moisture conditioning (drying) before compactive effort is applied.

BY: Chris Holloway
HART CROWSER REPRESENTATIVE

REVIEWED BY: John R. Verduin
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.

CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
206.324.9530

Job No. 2350-22
Field Report No. 16
Page 1 of 1
DATE 12-7-92
S M T W Th F S

JOB Blair Bridge Prop.
ARRIVAL TIME: 10:00 am
LOCATION Port of Tacoma - Taylor Ave
DEPARTURE TIME: 2:00 p.m
CLIENT Port of Tacoma
WEATHER: Cldy - cool
PURPOSE OF OBSERVATIONS Grading
H-C REPRESENTATIVE C. Fellows
H C PROJECT MANAGER J. Verduin
CONTRACTOR Woodworth
PERMIT NO.
CONTRACTOR REP. Jim McDaniel
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: On-site as scheduled to observe on-going grading operations (1) John Deere 650 dozer pushes import washed sand into excavations previously made to remove sand-blast grit from site. (North end of site) Compactive effort applied to ~5' lifts by truck rolling w/ dozer. Also, dozer attempts to continue pushing material from stock-pile / hauled (see previous reports) into south end of site, but heavy a.m. rain has made material too wet to (productively) work. Discussed schedule w/ Jim D. of Woodworth who informed me that no more work would be performed if rain continued.

BY: Chris Fellows
HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verduin
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.

CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
206.324.9530

Job No. 2350-22
Field Report No. 17
Page 1 of 1
DATE 12-9-92
S M T (W) Th F S

JOB Blair Back-up Prop.
ARRIVAL TIME: 10:00am
LOCATION Port of Tacoma - Taylor Ave
DEPARTURE TIME: 12:00p.m.
CLIENT Port of Tacoma
WEATHER: Partly cldy-cool
PURPOSE OF OBSERVATIONS Grading
H-C REPRESENTATIVE C. Holloway
H C PROJECT MANAGER J. Verduin
CONTRACTOR Woodworth
PERMIT NO.
CONTRACTOR REP. Tim McDaniel
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: On-site to observe on-going grading operations. Material on-site is still severely wet for grading operations. Met w/ Tim McDaniel of Woodworth who informed me that no more grading will be performed on site until weather improves. He hopes to close out haul-road/stock-pile next week (12-14 to 12-18) if weather permits.

BY: Chris Holloway
HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verduin
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.

CONTRACTOR REPRESENTATIVE

HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

FIELD REPORT

Job No. [illegible]
Field Report No. [illegible]
Page 1 of 1
DATE 2-16-93
S M (T) W Th F S

JOB Blair Back-up Prop.
ARRIVAL TIME: 9:30
LOCATION Port of Tacoma, Taylor Ave.
DEPARTURE TIME: 11:00
CLIENT Port of Tacoma
WEATHER: Clear-cold-windy
PURPOSE OF OBSERVATIONS Grading
H-C REPRESENTATIVE C. Hallaway
H C PROJECT MANAGER J. Verduin
CONTRACTOR Wentworth
PERMIT NO.
CONTRACTOR REP. Tim McDonald
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: On-site to observe resumed grading operations (See Field Report #17 of 12-9-92). 1-Cat D-4 and 1-J.D. 650 dozer worked to establish finish grade (rough) while HC was on site. I walked the site and noted that site moisture conditions have greatly improved ~~from~~ since 12-9-92. Existing grade is firm under foot and supports wheel traffic well in most places. (a few puddled areas remain soft.) Contractor intends to finish lot by rolling w/ vibratory drum roller, finish grade should be established by 2-17-93.

BY: Chris Hallaway
HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verduin
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.

CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2340-32
Field Report No. 19
Page 1 of 1
DATE 10 March, 1993
S M T (W) Th F S

JOB Blair Backup
ARRIVAL TIME: 1215
LOCATION Taylor Ave, Tacoma, WA.
DEPARTURE TIME: 1715
CLIENT Port of Tacoma
WEATHER: clear, breezy
PURPOSE OF OBSERVATIONS grading
H-C REPRESENTATIVE Grant Kniechtel
H C PROJECT MANAGER John Verduin
CONTRACTOR RCI
PERMIT NO.
CONTRACTOR REP. John Kalkoven
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: contractor started placing pit run gravelly SAND from Lloyd's Milton pit @ entrance near mid-site along Taylor Ave. They spread the FILL apx 1' thick in a lobe extending NW and SE along the Taylor Ave. property boundary, to ±80 to 50' from the fence

Equipment on-site: JD 850 wide track dozer
JD 510 rubber-tired backhoe

Newly placed FILL appears reasonably stable: no compaction has been done yet

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report. CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2500 22
Field Report No. 20
Page 1 of 1
DATE 11 March, 1993
S M T W (Th) F S

JOB Blair Backup
ARRIVAL TIME: 0800
LOCATION Taylor Ave., Tacoma, WA
DEPARTURE TIME:
CLIENT Port of Tacoma
WEATHER: clear
PURPOSE OF OBSERVATIONS Grading
H-C REPRESENTATIVE Grant Kneeland
H C PROJECT MANAGER John Verduin
CONTRACTOR RCI
PERMIT NO.
CONTRACTOR REP. John Kalkoven
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: contractor continued placing pit run from Lloyd's Milton pit as SAND and GRAVEL COVER along west side of site next to Taylor Avenue. Pit run was placed in apx 1' thick lifts and compacted with a vibratory drum roller. PTL picked up a sample of material from truckload dumped at 11:30 AM for grain size and modified proctor analyses. Made in-place soil moisture-density tests using a Troxler nuclear gauge to measure in-place wet & dry density. When results of modified proctor are available, percent compaction will be calculated relative to the modified proctor maximum density. FILL placed today appeared stable and adequately compacted.

Equipment on site: JD 850 c dozer, JD 510 c rubber-tired hoe, Sakai SV61D self-propelled vibratory drum roller.

Contractor also placed steel plates over part of tracks @ NW site corner, to allow truck access to NW site corner.

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verduin
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 21
Page 1 of 1
DATE 12 March, 1993
S M T W Th (F) S

JOB Blair Backup ARRIVAL TIME: 0715
LOCATION Taylor Ave., Tacoma, WA. DEPARTURE TIME: 1615
CLIENT Port of Tacoma WEATHER: cloudy
PURPOSE OF OBSERVATIONS grading
H-C REPRESENTATIVE Grant Kuechtel H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE PERMIT NO.
CONTRACTOR REP. John Kalkoven JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: Contractor continued placing pit run from Lloyd's Milton pit as SAND and GRAVEL COVER along west side of site. Pit run was placed in apx. 1' thick lifts and compacted with a vibratory drum roller. Made 1 in-place soil moisture-density test with nuclear gauge to confirm compaction. Results of modified proctor test not yet available - results of density tests will be available when proctor is completed.

Contractor ~~continued~~ started to place quarry spalls (4 to 8") from Enumclaw and 410 pits and 2 to 4" crushed rubble from Ruhe at SW site corner. Spalls were placed 1 to 2' thick initially then spread out across soft, wet subgrade toward SW corner of planned cap area. Spalls in an apx 1' thick lift were initially stable under load from JD 850C cat but underlying wet material started to pump through when loaded trucks ran across the in-place mat. Curtis Ratcliffe (Port of Tacoma) was concerned that excessive quantities of spalls were being used ~~[illegible]~~ without achieving the goal of stabilizing the subgrade in the cap area. An attempt was made to place spalls apx. 8" thick over geotextile (Polyfelt TS 700), a moderately heavy non-woven fabric, within the cap area. This test area appeared no more stable than areas with more rock and no fabric. Curtis requested contractor stop hauling spalls & rubble to site until an agreement is reached as to how areas will be stabilized. Last truckload of "rock" on site ± 1600.

BY: REVIEWED BY: I have read and understand the content of this Field Report.

HART CROWSER REPRESENTATIVE — HART CROWSER PROJECT MANAGER — CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2580.22
Field Report No. 22
Page 1 of 1
DATE 15 March, 1993
S (M) T W Th F S

JOB Blair Backup
ARRIVAL TIME: 0710
LOCATION Taylor Ave., Tacoma, WA
DEPARTURE TIME:
CLIENT Port of Tacoma
WEATHER: clearing
PURPOSE OF OBSERVATIONS grading
H-C REPRESENTATIVE Grant Friechtel
H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE
PERMIT NO.
CONTRACTOR REP. John Kalkaven
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: Contractor started placing SAND & GRAVEL COVER near the southwest site corner. Results of sieve analysis done on sample of imported SAND & GRAVEL for cover, taken Friday apx. 2PM, showed minus #200 sieve fraction at over the 5% allowed by specs. Port-of-Tacoma (Ed Stephens) recommended RCIE stop importing cover material until it can be shown to meet specs. Ed had CMTL sample today's import, prior to noon, for results tomorrow.

RCIE started importing SAND & GRAVEL BUFFER and placing in NE corner of cap area, in an apx. 6" thick loose lift. Material appears stable under loading from the JD 650G dozer used to spread material

Performed 1 in-place soil moisture-density test with a nuclear gauge on S&G cover placed in the SW site corner. Compaction was 89% of 142 pcf modified proctor. Area was rerolled, compaction 92%.

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verduin
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2366 22
Field Report No. 23
Page 1 of 1
DATE 16 March, 1993
S M (T) W Th F S

JOB Blair Backup
ARRIVAL TIME: 0715
LOCATION Taylor Ave., Tacoma, WA.
DEPARTURE TIME: 1545
CLIENT Port of Tacoma
WEATHER: cloudy / rain start-1445
PURPOSE OF OBSERVATIONS grading
H-C REPRESENTATIVE Grant Kuechtel
H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE
PERMIT NO.
CONTRACTOR REP. John Kalkoven
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: Contractor continued placing STD & GRAVEL BUFFER in NE corner of planned cap area. Material imported from Lone Star's pit was placed apx. 6" thick then static-rolled with a large self-propelled (vibratory) drum roller. Most of area east of "charcoal" area, north of ditch was covered today. Made 3 in-place soil moisture-density tests with nuclear gauge to confirm compaction of buffer mat. Compaction was 95 to 99% of 132.6 modified proctor for this material. 1 1/2 roll (300 feet) of woven geotextile - Exxon chemical 63300, 180" wide was placed over soft, wet soils in the southeast corner of the area covered today, to assist in stabilizing the subgrade. An apx. 30' wide by 250' long area along the north side of the ditch will require (per RCI's survey) 3 to 9" more buffer material to reach the 15.5 elevation minimum for the bottom of slag - recommended to RCI they track actual measurements as to how much additional is required - as they are shown on stakes placed for grading.

Contractor cut apx 1' of site soil @ SW site corner which had not been cut to grade during earlier phase of work. Soil was stockpiled @ SW site corner for later use as backfill of charcoal soil area.

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350 32
Field Report No. 34
Page 1 of 1
DATE 17 March 1993
S M T (W) Th F S

JOB Blair Backup — ARRIVAL TIME: 0740
LOCATION Taylor Ave., Tacoma, WA — DEPARTURE TIME: 0840
CLIENT Port of Tacoma — WEATHER: partly cloudy
PURPOSE OF OBSERVATIONS grading
H-C REPRESENTATIVE Grant Kuechler — H C PROJECT MANAGER John Vandenin
CONTRACTOR RCIE — PERMIT NO.
CONTRACTOR REP. John Kalkoven — JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: contractor is planning no earthwork on site today. They plan to start moving "Sand Blast Grit" from area north of project area onto Buffer tomorrow.

BY: [signature] — HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Vandenin — HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report. — CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 25
Page 1 of 1
DATE 18 March, 1993
S M T W (Th) F S

JOB Blair Backup
ARRIVAL TIME: 0715
LOCATION Taylor Ave & Alexander Ave, Tacoma, WA
DEPARTURE TIME: 16-15
CLIENT Port of Tacoma
WEATHER: cloudy
PURPOSE OF OBSERVATIONS grading
H-C REPRESENTATIVE Grant Knechtel
H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE
PERMIT NO.
CONTRACTOR REP. John Kalkoven
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: contractor restarted placing SAND & GRAVEL COVER imported from Lloyd's Milton pit, in the SW site corner. Pit run was placed in apx. 1' thick loose lifts and compacted with a Sakai ~~[illegible]~~ 91D vibratory drum roller. Made in-place soil moisture-density tests with a Troxler nuclear gauge, to confirm compaction. CMTL sampled fill apx. 10 A.M today for sieve analysis and to rerun the modified proctor maximum density for this cleaner (less fines) material. Test results waiting for new max.

Current plans call for moving SAND BLAST GRIT tomorrow, placing on buffer already placed in NE site corner.

BY: [signature]
HART CROWSER REPRESENTATIVE

REVIEWED BY: [signature]
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 26
Page 1 of 2
DATE 19 March, 1993
S M T W Th (F) S

JOB Blair Backup — ARRIVAL TIME: 0715
LOCATION Taylor Ave., Tacoma, WA — DEPARTURE TIME: 1615
CLIENT Port of Tacoma — WEATHER: cloudy
PURPOSE OF OBSERVATIONS grading
H-C REPRESENTATIVE Grant Kaechtel — H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE — PERMIT NO.
CONTRACTOR REP. John Kalkaen — JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: contractor continued placing SAND & GRAVEL COVER @ SW site corner – methods were as outlined in yesterday's Field Report. Results of sieve analysis of cover material sampled yesterday ± 10 AM were communicated to Ed Stephens (Port of Tacoma) about 11 AM. Analysis showed fines (200 sieve minus) at 6.3% – well over 5% allowed per specifications. Mr. Stephens recommended RCIE stop importing material ~~from the source~~ until material meets specs. This was done. Made two in-place soil moisture-density tests with nuclear gauge, to confirm compaction. Compaction was 92 to 94% of 142.4 pcf proctor – acceptable for 1' or deeper, but less than the specified 95% for upper 1' of cover. This area, if cover remains, will need to be recompacted & retested at the surface.

Contractor started storm drain, by setting a temporary tide gate at the corrugated metal pipe (CMP) where storm water exits the project area near the SE site corner. Area was over excavated apx 1', quarry spalls stockpiled on site were set on the bottom, tamped w/ back of backhoe, then 1½" ballast rock was placed over the spalls to raise grade to support tide gate and manhole No. 1.

Karen Keely from the EPA visited site apx. 10 AM. She would

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verduin — HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report. — CONTRACTOR REPRESENTATIVE

HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
206.324.9530

Job No. 2350-22
Field Report No. 26
Page 2 of 2

Job Blair Backup
Date 19 March, 1993

like all site issues & resolutions documented in daily report: those issues not addressed by Hart Crowser field representative will be covered in minutes of weekly progress meeting, which will be appended to Thursday's Daily Field Report. She also enquired about marking the "Charcoal" area - this had been addressed 2 weeks ago in weekly meeting, but not yet marked in the field. RCIE marked boundary of this area prior to 4PM today.

CMTL sampled one load of apparently cleaner material from Lloyds Milton pit at about 2PM, for resubmittal as import SAND & GRAVEL COVER.

Ed Stephens sampled Milton Pit material on site at 0945, submitted sample to CMTL 1015 apx.

~~Total~~ Tons S&G Cover delivered to site yesterday 2432.35 per RCIE

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Vardin HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report. CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2360-22
Field Report No. 27
Page 1 of 2
DATE 22 March, 1993
S (M) T W Th F S

JOB Blair Backup ARRIVAL TIME: 0720
LOCATION Taylor Ave., Tacoma, WA. DEPARTURE TIME: 1550
CLIENT Port of Tacoma WEATHER: rain
PURPOSE OF OBSERVATIONS grading & storm drain
H-C REPRESENTATIVE Grant Knechtel H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE PERMIT NO.
CONTRACTOR REP. John Kalkoven JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: contractor continued placing storm drain along the ditch draining the center of the site. Line between manholes No. 1 & 2, and manhole No. 2 had been installed Saturday. Ed Stephens reported the asphalt coated CMP had been bedded in ~~peag~~ gravel to spring line of the pipe, covered with SAND & GRAVEL COVER to over the top of the pipe, then site soils excavated during pipe placement were levelled over the top of the cover material. Pipe placement continued in a similar fashion today - pipe was placed to Manhole 3 & MH3 set.

Contractor placed sand & Gravel COVER in the SW site corner after getting Port's approval to restart using cleaner Lloyd's Milton Pit material as delivered last on Friday (test results recieved today showed less than 1% fines passing the #200 sieve). Cover was placed in a single lobe across from access road at SW site corner to near Manhole 7 for storm drain, to allow access to upper end of planned storm drain for construction support. CMTL sampled imported cover material twice, once from 2 loads on site at 1030, once at apx. 12 noon, ~~for~~ for Modified Proctor & sieve analyses.

BY: [signature] HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verduin HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report. [signature] CONTRACTOR REPRESENTATIVE

HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
206.324.9530

Job No. 2350-22

Field Report No. 27

Page 2 of 2

Job Blair Backup

Date 22 March, 1993

Apx. 50 truck-trailer loads of COVER were delivered - apx. ~~12~~ 16 to ~~north~~ west end of site as noted above, apx. 4 to east end where the cover mat[1] was used as noted ~~also~~ for back-fill above storm drain. At apx 30 Tons/load, this means apx 1500 Tons of COVER were delivered today. Made two in-place soil moisture-density tests on cover placed at west end of site, after the material was rolled with the Sakai 91D self-propelled vibratory drum roller. A nuclear gauge was used to measure in-place soil moisture & dry density. When results of CMTL's modified proctor maximum are available, compaction ~~wit~~ results will be available.

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Vadeim
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
CONTRACTOR REPRESENTATIVE

HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

FIELD REPORT

Job No. 2340-22
Field Report No. 28
Page 1 of 2
DATE 23 March, 1993
S M (T) W Th F S

JOB Blair Backup ARRIVAL TIME: 0730
LOCATION Taylor Ave., Tacoma, WA. DEPARTURE TIME: 1600
CLIENT Port of Tacoma WEATHER: showers
PURPOSE OF OBSERVATIONS grading, storm drain installation
H-C REPRESENTATIVE Grant Knechtel H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE PERMIT NO.
CONTRACTOR REP. John Kalkoven JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: Contractor started moving Sand Blast Grit contaminated Stockpiles from north part of site (along Taylor Ave.) and stockpiling atop Sand & Gravel Buffer at NoAheast corner of Cap area. First load ~~arrived~~ dumped on Buffer 0915. Trucks hauled "Grit" to Cap area, then material was consolidated into 1 large pile. Apx. 1120 loader operator ~~ex~~ encountered the tops of what appeared to be buried drums, along with 5 gallon paint cans and 1 gallon paint cans, in one small pile located near NE corner of large metal building ~~at~~ behind 2902 Taylor Ave. Operator stopped loading out the affected pile. We consulted with Ed Stephens, who contacted Arnie Rollins (also with the Port of Tacoma). They observed the pile - Arnie said it was in a location where some refuse had been piled during cleaning of the building - he felt it was refuse which had been (inadvertantly) covered with stockpiled soil instead of hauled away. We donned appropriate PPE and investigated refuse in the pile. We found 2 ~~upwend~~ up-ended open-topped quarter drums, one ~~wh~~ with some metal debris (coat hangers) and paper, one empty, 6 empty 5 gallon plastic and metal paint buckets, and 2 part full one gallon latex paint cans. This refuse was set

BY: [signature] HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verduin HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report. [signature] CONTRACTOR REPRESENTATIVE

HARTCROWSER
Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
206.324.9530

Job No. 2350-22
Field Report No. 28

Job Blair Backup
Date 23 March, 1993

to the side of the stockpile for possible separate disposal. Communicated above events to John Verduin at Hart Crowser. He felt this pile and two others in the area may have been ~~hydrocarbon~~ TPH contaminated piles which were to have been moved earlier - they should not be moved to the Cap area. ~~until~~ It appears one pile, located northwest of the wood frame building at 2902 Taylor Ave. had already been moved by this time.

Contractor continued placing storm drain down the central ditch ~~area~~ at the Cap part of the site. Line was laid from manhole 3 to 5 and manhole 5 set today. Methods were as outlined in our 3/22/93 field report.

Soil Sampling Service (well drillers) as subcontractor to RCIE abandoned the following wells within the planned cap area, by tremying "Enviroplug Grout" slurry to the bottoms of the wells until casings were completely filled. E6I, E7S', E8I, ~~E9S~~ E9S', HC 11.5', HC 15.5' and 15I were abandoned today, completing abandonement of wells shown to be abandoned on sheet C16 of the plans. Protective monuments and bollards were also removed for HC 11.5', HC 15.5' and HC 15I.

1941.83 Tons of Sand and Gravel COVER are shown ~~of~~ on RCIE's load tickets as imported on 3/19/93 (Friday).

BY: [signature]
HART CROWSER REPRESENTATIVE

REVIEWED BY: [signature]
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
[signature]
CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2365-22
Field Report No. 29
Page 1 of 2
DATE 24 March, 1993
S M T (W) Th F S

JOB Blair Backup — ARRIVAL TIME: 0730
LOCATION Taylor Ave., Tacoma, WA. — DEPARTURE TIME: 1630
CLIENT Port of Tacoma — WEATHER: cloudy/clearing
PURPOSE OF OBSERVATIONS grading, storm drain installation
H-C REPRESENTATIVE Grant Kiechtel — H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE — PERMIT NO.
CONTRACTOR REP. John Kalkoven — JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: Contractor moved 2 Sand Blast Grit Contaminated soil piles from along Alexander Avenue to the Cap area and consolidated with the rest of the soil. Port reviewed the documents from earlier work done in the sandblast grit area near Taylor Avenue - piles of soil which had been from "visibly stained" area showed relatively low levels of hydrocarbons in tests - the remaining ~~so~~ 2 soil stockpiles from areas "G" and "E" were picked up and moved to the Cap area, then consolidated with the other "Grit" soils. Empty containers (referred to in yesterday's field report) were mashed flat with the loader and taken with the stockpiled soil.

Contractor continued to install CMP storm drain down the central ditch. Line was nearly complete to MH7 by end of day. Part of line had been backfilled with site soil over the pea gravel bedding (which had been placed to spring line of pipe). This does not meet requirement of specifications that pipe bedding and backfill meet WSDOT 9-03.12(3) (see section 02720-2.05). RCIE agreed they would ~~will~~ remove the site soil backfill - this was done by the end of the day.

Contractor restarted bringing Sand and Gravel COVER on site at SW site corner at 12:30. Sampled imported

BY: HART CROWSER REPRESENTATIVE — REVIEWED BY: HART CROWSER PROJECT MANAGER — I have read and understand the content of this Field Report. CONTRACTOR REPRESENTATIVE

HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
206.324.9530

Job No. 2310-22

Field Report No. 29

Job Blair Backup

Date 24 March, 1993

material from four truck-trailer loads on site at apx. 1320-1330, and delivered apx. 100# sample to CMTL for sieve analyses & possible modified Proctor.

Apx 1300 Tons of Sand & Gravel COVER were imported today

BY:

HART CROWSER REPRESENTATIVE

REVIEWED BY:

John R Verdin

HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.

CONTRACTOR REPRESENTATIVE

HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

FIELD REPORT

Job No. 2340-22
Field Report No. 30
Page 1 of 2
DATE 25 March, 1993
S M T W (Th) F S

JOB Blair Backup — ARRIVAL TIME: 0730
LOCATION Taylor Way, Tacoma, WA — DEPARTURE TIME: 1700
CLIENT Port of Tacoma — WEATHER: fog/clearing by 10AM
PURPOSE OF OBSERVATIONS grading, storm drain installing
H-C REPRESENTATIVE Grant Enechtel — H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE — PERMIT NO.
CONTRACTOR REP. John Kalkoven — JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: Contractor continued placing FILL imported from Lloyds Milton Pit as SAND and GRAVEL COVER in the SW part of the site. Fill was placed in an apx. 2' thick lift, moisture conditioned and compacted by rolling with the Sakai 91D self-propelled vibratory drum roller. Was able to perform one in-place soil moisture-density test with the nuclear gauge, near finish grade, to confirm compaction. Deeper compaction will need to be checked by digging down apx. 1'. CMTL sampled imported material ~~once~~ twice this AM and once while I was at location this PM. They sampled from each of ~~5~~ three truck-trailer loads arriving 1340 to 1355. RCIE had also experimented with blending some of the "unsuitable" (higher fines content than specified) Fill which had been removed from the fill and piled near the east side of current work area, with cleaner import coming on site at present. John K. reported they had blended apx. 2 trucks of new matl with 1 truck worth of older material. This material had been placed in a ~~rectangular~~ rectangular lobe SW of the SW corner of the planned ACC cap area. CMTL sampled this area for sieve analysis to see whether blending had brought

BY: HART CROWSER REPRESENTATIVE — REVIEWED BY: John R. Verduin HART CROWSER PROJECT MANAGER — I have read and understand the content of this Field Report. CONTRACTOR REPRESENTATIVE

HARTCROWSER
Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
206.324.9530

Job No. 2350-22
Field Report No. 30

Job Blair Backup
Date 25 March, 1993

material to within gradation specs. About 4100 tons of COVER were imported today.

Contractor started placing CMP storm drain between MH3 and CB1 this PM. About 165 feet of the planned apx. 305 feet were installed today.

Attended 8:30 AM construction progress meeting with Port of Tacoma, EPA, Hart Crowser and RCIE representatives. Minutes of the meeting will be appended to this report for informational purposes.

Sand and Gravel COVER imported 3/22/93 was 2270.30 ~~pe~~ Tons per RCIE load tickets.

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 31
Page 1 of 1
DATE 26 March, 1993
S M T W Th F S

JOB Blair Backup ARRIVAL TIME: 0710
LOCATION Taylor Way, Tacoma, WA. DEPARTURE TIME: 1640
CLIENT Port of Tacoma WEATHER: clear
PURPOSE OF OBSERVATIONS grading, installing storm drain
H-C REPRESENTATIVE Grant Kriechbaum H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE PERMIT NO.
CONTRACTOR REP. John Kalkoven JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: Contractor continued placing Sand and Gravel COVER from Lloyds Milton pit in the SW site corner. CMTL sampled material delivered to site three separate times for sieve analyses. Made in-place soil moisture-density tests with nuclear gauge, to confirm compaction. Compaction at surface was 95 to 99% of 130.4 modified proctor maximum.

Contractor stopped placing storm drain north from MH3 as they cannot complete under the railroad spur. Underground crew moved to MH1 and started placing CMP drain line south from there. Hoepack mounted on a track hoe was used to compact the apx. 1' of Sand and Gravel COVER which was placed above the pea gravel bedding the CMP (north of MH3). Made one in-place soil moisture-density test to confirm compaction. Results were 97% of the 130.4 PCF modified proctor maximum. Also tested compaction of back fill over the line to CB2, so. of MH 1. Compaction was 93% of the 130.4 pcf maximum.

About 4100 Tons of Sand and Gravel COVER were imported to the site today.

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 32
Page 1 of 1
DATE 29 March, 1993
S (M) T W Th F S

JOB Blair Backup
ARRIVAL TIME: 0630 / 0850
LOCATION Taylor Way, Tacoma, WA
DEPARTURE TIME: 0640 / 1600
CLIENT Port of Tacoma
WEATHER: showers / cloudy
PURPOSE OF OBSERVATIONS Grading
H-C REPRESENTATIVE Grant Fuechtel
H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE
PERMIT NO.
CONTRACTOR REP. John Kalkoven
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: Contractor continued placing SAND and GRAVEL COVER east along south side of planned CAP area. Material imported from Lloyd's Milton Pit was placed in an apx. 1 to 1½' thick loose lift, moisture conditioned and rolled with a Sakai ~~vibrato~~ 91D self-propelled vibratory drum roller. Truck, dozer and loader traffic crosses the newly placed fill. Made three in-place soil moisture-density tests with the nuclear gauge to confirm compaction of COVER placed Friday and today. Results were 96 to 97% of the 130.4 pcf Modified Proctor maximum. About 4500 Tons of COVER were brought on site today.

Contractor placed backfill over CMP storm drain installed earlier along the central ditch and compacted with a backhoe mounted vibratory plate compactor (hoepack). Lift thickness for the Sand & Gravel imported from Lloyd's Milton pit was apx. 1'. Made ~~one~~ two in-place soil density tests with the nuclear gauge, to confirm compaction, which was 93% of the 130.4 pcf maximum, for both tests.

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verduin
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
205.324.9530

Job No. 2350-22
Field Report No. 33
Page 1 of 1
DATE 30 March, 1993
S M (T) W Th F S

JOB Blair Backup
ARRIVAL TIME: 0720
LOCATION Taylor Way, Tacoma, WA
DEPARTURE TIME: 1600
CLIENT Port of Tacoma
WEATHER: Cloudy/rain/clearing
PURPOSE OF OBSERVATIONS Grading
H-C REPRESENTATIVE Grant Knechtel
H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE
PERMIT NO.
CONTRACTOR REP. John Kolkoven
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: Contractor continued placing Sand and Gravel COVER along the south side of the planned CAP area. Material imported from Lloyd's Milton pit was placed in a 1 to 1½' thick loose lift, moisture conditioned and compacted with two Sakai 91D self-propelled vibratory drum rollers. Made 4 in-place soil moisture-density tests with a nuclear gauge, to confirm compaction. Compaction was 95 to 97% for upper foot, 92 to 94% for lower foot, based on 130.4 pcf Modified Proctor maximum. About 4200 Tons of cover material was imported today.

Obtained tonnage figures for the following days from RCIE load tickets:

3/19/93 1941.83 Tons COVER
3/22/93 2270.30 Tons COVER
3/24/93 1428.65 Tons COVER
3/25/93 4618.30 Tons COVER

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verduin HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report. CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 34
Page 1 of 2
DATE 31 April, 1993
S M T (W) Th F S

JOB Blair Backup ARRIVAL TIME: 0730
LOCATION Taylor Way, Tacoma, WA. DEPARTURE TIME: 1600
CLIENT Port of Tacoma WEATHER: cloudy
PURPOSE OF OBSERVATIONS grading
H-C REPRESENTATIVE Grant Knechtel H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE PERMIT NO.
CONTRACTOR REP. John Kalkoven JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: Contractor continued placing Sand and Gravel COVER along the south side of the site, ~~completing~~ through from SW to SE corners of the site. Material imported from Lloyd's Milton pit was placed as outlined in yesterday's field report. Made two in-place soil moisture-density tests with the nuclear gauge to confirm compaction. Compaction was 95% at apx planned subgrade, 93% about 1' below planned final grade, of the 130.4 pcf Modified Proctor maximum. About 4800 Tons of COVER material were imported today.

Contractor also cut apx. 1' of previously placed cover from East side of site (along Taylor Way) which had failed to meet specified gradation (too much material passing #200 sieve) and blended it apx. ~~1 to 2~~ 1 part "old" material to 2 parts "new" material in an attempt to make material will meet specified gradation. This blend was placed in the area along the storm drain between manholes #1 & #2.

Contractor also blended material cut from area not meeting specs, near SW corner and stockpiled (see 3/25 field report), as noted above, and placed near SE site corner.

Attended weekly progress meeting with EPA Port, RCIE, Landau & Hart Crowser personnel. For informational purposes a copy of the

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verduin HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report. CONTRACTOR REPRESENTATIVE

HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
206.324.9530

Job No. 2350-22
Field Report No. 34

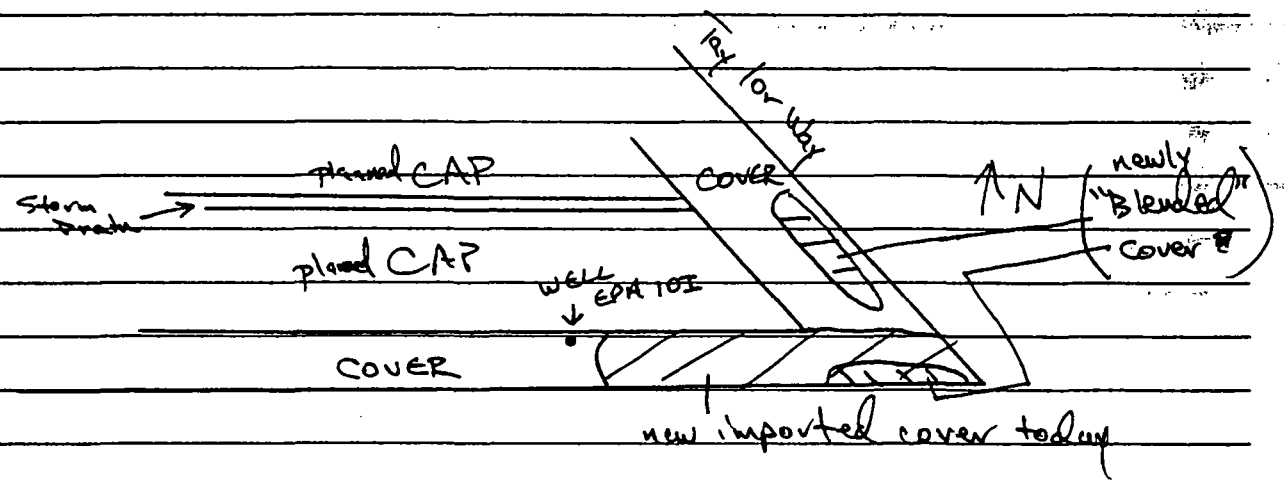
Job Blair Backup Date 31 April, 1993

meeting minutes is appended to this report.

RCIE and Port people met in PM on site and discussed use of geotextile over remaining buffer area. It was decided to place "separation geosynthetic" as specified in Specification section 02230 para. 2.02 over the entire CAP area, between the existing site soils and the Sand and Gravel BUFFER. Fabric and BUFFER placement will start tomorrow AM.

4974.11 Tons Sand & Gravel COVER 3/26/93
4309.07 Tons S&G COVER 3/29/93
4412.96 Tons S&G COVER 3/30/93

Above are quantities imported based on RCIE Load Tickets.



BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 35
Page 1 of 1
DATE 14 April, 1993
S M T W (Th) F S

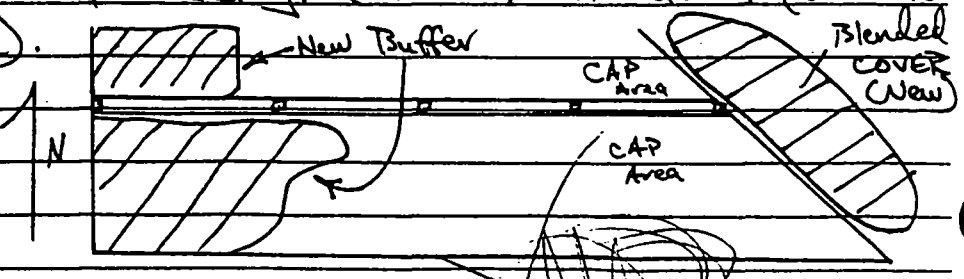
JOB Blair Backup
ARRIVAL TIME: 0720
LOCATION Taylor Way, Tacoma, WA
DEPARTURE TIME: 1645
CLIENT Port of Tacoma
WEATHER: clearing
PURPOSE OF OBSERVATIONS Grading
H-C REPRESENTATIVE Grant Knechtel
H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE
PERMIT NO.
CONTRACTOR REP. John Kalkoven
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: Contractor restarted placing Sand and Gravel BUFFER at west end of planned CAP area. Material was imported from Lonestar and was placed over Amoco Style 2006 woven "separation geosynthetic" in an apx. 6" thick lift, then static rolled with a Sakai 91D self propelled vibratory drum roller. About 2700 Tons of BUFFER material were brought on-site today, covering about ~~12000~~ 7000/square yards of planned cap area. Performed two in-place soil moisture-density tests to confirm compaction of BUFFER material - compaction for both was 95% of 133.9 pcf Modified Proctor maximum density. Made depth checks at both test locations to confirm BUFFER thickness - depth of BUFFER was 7¼" and 6¼" above the ~~geot~~ geosynthetic. Further density testing and thickness checks will be performed as preparation is completed.

Contractor also placed about 2400 Tons of Sand and Gravel COVER from Lloyds Pit at ~~west~~ East side of site, mixed with previously imported material which failed to meet gradation specifications (over 5% passing #200 sieve).

NTS



BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verduin HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report. CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

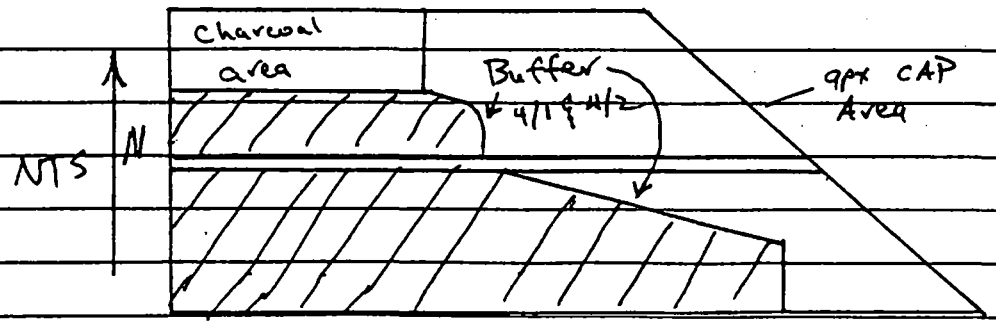
Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 36
Page 1 of 1
DATE 2 April, 1993
S M T W Th (F) S

JOB Blair Backup
ARRIVAL TIME: 0745
LOCATION Taylor Way, Tacoma, WA
DEPARTURE TIME: 1645
CLIENT Port of Tacoma
WEATHER: light rain
PURPOSE OF OBSERVATIONS Grading
H-C REPRESENTATIVE Grant Knechtel
H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE
PERMIT NO.
CONTRACTOR REP. John Kalkoven
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: Contractor continued placing woven "separation geosynthetic" over the planned CAP area, then placing apx. 6" of Sand and Gravel BUFFER over the fabric, then rolling with a self-propelled drum roller. Fabric was Amoco style 2006, BUFFER was imported from Lone Star. 3 rolls of fabric apparently similar to the style 2006 but marked style 9344 were delivered this AM. Pointed out to contractor we had approval only ~~the~~ only the style 2006 - they contacted vendor who informed them it was the same but with different numbers - they will send documentation. Recommended contractor wait to place this fabric until we have documentation and approval. About 2500 Tons of BUFFER were brought on site today, covering about 8000 square yards of planned CAP. Made three in-place soil density tests to confirm compaction - range was 96 to 99% of 133.9 pcf Modified Proctor. Also checked thickness of buffer - 6 to over 8¼ inches at the three locations.



BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report. CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 37
Page 1 of 1
DATE 5 April, 1993
S (M) T W Th F S

JOB Blair Backup
ARRIVAL TIME: ~~0845~~ 0745
LOCATION Taylor Way, Tacoma, WA
DEPARTURE TIME: 1550
CLIENT Port of Tacoma
WEATHER: showers
PURPOSE OF OBSERVATIONS grading
H-C REPRESENTATIVE Grant Kuechtel
H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE
PERMIT NO.
CONTRACTOR REP. John Kalkoven
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: Contractor imported and placed apx. 1100 Tons of SAND and GRAVEL BUFFER in the planned CAP area today, completing placement over the entire CAP except for the Charcoal area and the southeast corner, where quarry spalls had been placed. Made one in-place soil moisture-density test with the nuclear gauge, to confirm compaction (100% of the 133.9 pcf Modified Proctor). Also checked depth- which was 10". ~~Contractor imported~~

Contractor started ~~importing~~ hauling stockpiled slag soils to the CAP area from the Blair Waterway part of the property. Initial placement was an apx. 320' x 40' x 10" test area of silty SLAG soil excavated below the water line at the graving dock. Under our observation, this area was test rolled with a Sakai 91D self-propelled vibratory roller. We made in-place soil moisture-density tests with the nuclear gauge ~~after~~ at 4 places after each 2 passes with the roller running at about ~~2.3~~ 4.6 feet per second. Results of the 4 tests were averaged. Maximum density was obtained at about 6 passes, or just before the material started pumping. Next placement was an apx. 150' x 40' area of nearly pure SLAG excavated from hotspots at the Waterway area. About half was 10" thick and half 18" thick. This

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verduin HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report. CONTRACTOR REPRESENTATIVE

HARTCROWSER
Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
206.324.9530

Job No. 2350-22
Field Report No. 37

Job Blair Backup Date 5 April, 1993

area was rolled with the vibratory roller noted above until it was in a firm, non-yielding condition after 8 passes. Densities were checked at 4 points at 0, 4, and 8 passes. Near ~~max~~ maximum density was obtained at 6 to 8 passes. After the rolling was completed, the higher (18") area was cut down to about 10" thick and density checked at 4 locations. The average of these 4 densities was between that found at the rolled surface ~~but~~ at 0 and 4 passes.

Based on the two test areas, we make these recommendations for placement of slag soils:

1. Lift thickness should be 10" or less, per the plans and specifications
2. Roll the lift to a firm, non-yielding condition using the Sakai 91 D vibratory roller, with vibration, at a speed of 2.3 feet per second or less, for 6 or more passes.
3. Stop rolling earlier if excessive moisture causes the material to become unstable, i.e. "pump".

Also discussed with the Port & RCIE the need for "separation geotextile" in the 20' wide strip at the storm drain. Geotextile will be used below the base course planned in the area.

Recommended to RCIE they survey the top of the BUFFER prior to covering with SLAG, to confirm the area has been raised above elevation 15.5, per the ~~the~~ plans and specifications.

BY: REVIEWED BY: I have read and understand the content of this Field Report.

HART CROWSER REPRESENTATIVE HART CROWSER PROJECT MANAGER CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

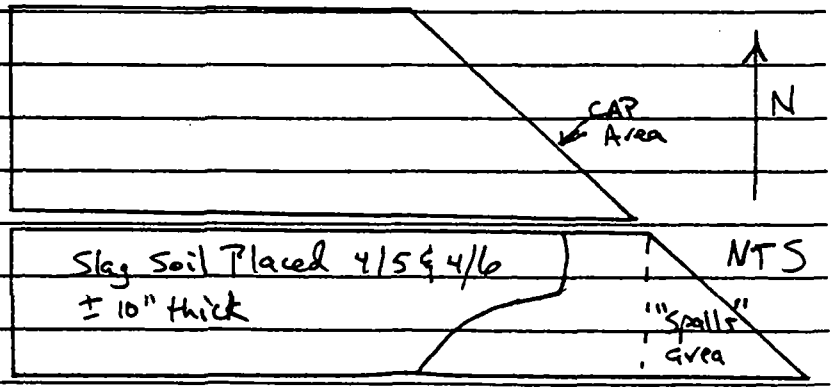
Job No. 2350-22
Field Report No. 38
Page 1 of 2
DATE 6 April, 1993
S M (T) W Th F S

JOB Blair Backup
ARRIVAL TIME: 0750
LOCATION Taylor Way, Tacoma, WA.
DEPARTURE TIME: 1650
CLIENT Port of Tacoma
WEATHER: rain
PURPOSE OF OBSERVATIONS grading
H-C REPRESENTATIVE Grant Kuechtel
H C PROJECT MANAGER Garry Horvitz / John Verduin
CONTRACTOR RCIE
PERMIT NO.
CONTRACTOR REP. John Kalkoven
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: Contractor continued placing SLAG Soil hauled from the Blair Waterway part of the site on the south part of the CAP area. Soil was placed in an ~~ap~~ about 10" thick loose lift and compacted with the Sakai 91D vibratory roller to a firm condition except where soil was silty and well over optimum - roughly 1/3 of the area covered, in random locations. Contractor ~~pla~~ plans to have any unstable "pumping" areas stabilized prior to placing pavement section, hopefully before placing next lift of SLAG SOIL.

Contractor completed ~~Buffer~~ placement of SAND and GRAVEL BUFFER over the south part of the CAP by placing a small quantity of BUFFER over the spalls placed in the east end, using a dozer to spread the Buffer filling the voids between spalls, then using the vibratory roller to roll the resulting subgrade to a firm, non-yielding condition. The resulting subgrade appears to be about 1/2 foot higher then top of adjacent buffer, reducing somewhat capacity for SLAG in this area, but otherwise



BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report. CONTRACTOR REPRESENTATIVE

HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
206.324.9530

Job No. 2350-22
Field Report No. 38

Job Blair Backup Date 6 April, 1993

suitable for placement of SLAG SOIL.

Contractor continued ~~pt~~ cutting marginal ditch along the south property line. About ~~400~~ 500 lineal feet were ~~co~~ dug west from CB#2 yesterday and about 500 feet today, leaving about 120 feet to complete the ditch. Ditch was dug ~~w~~ using a bucket wider than 12", leaving ditch slightly wider than the 1 foot shown on the plans, with bottom as close to flat as possible.

Made two in-place soil moisture-density tests with the nuclear gauge to confirm compaction of SAND & GRAVEL BUFFER placed yesterday. Compaction was 97 to 100% of the 133.9 pcf Modified Proctor maximum. Dug through the Buffer at the two locations to check thickness - measured 9" and 7¼", well over the 6" called for in the plans & specs.

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

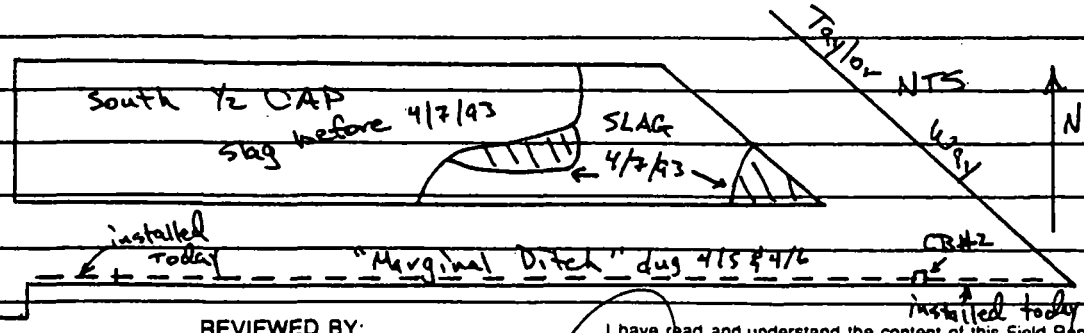
Job No. 2350-22
Field Report No. 39
Page 1 of 1
DATE 7 April, 1993
S M T (W) Th F S

JOB Blair Backup ARRIVAL TIME: 0730
LOCATION Taylor Way, Tacoma, WA DEPARTURE TIME: 1630
CLIENT Port of Tacoma WEATHER: cloudy
PURPOSE OF OBSERVATIONS placement & grading of SLAG soil, exc. ditch
H-C REPRESENTATIVE Grant Knechtel H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE PERMIT NO.
CONTRACTOR REP. John Kalkoven JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: Contractor continued hauling Asarco SLAG soil from the Waterway part of the property and placing in the south half of the planned CAP area, as sketched below. Due to equipment breakdowns ~~at~~ the loading operation progress was slower today. Lift thickness was about 10"- soil was rolled to a firm, non-yielding condition with the Sakai GD vibratory roller making 6 or more passes.

Contractor completed the marginal ditch along the south property boundary today. At the Port's request, marginal ditch was also dug east from CB #2 to near the SE property corner.



BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report. CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 40
Page 1 of 2
DATE 8 April, 1993
S M T W (Th) F S

JOB Blair Backup
ARRIVAL TIME: 0730
LOCATION Taylor Way, Tacoma, WA
DEPARTURE TIME: 1700
CLIENT Port of Tacoma
WEATHER: rain
PURPOSE OF OBSERVATIONS grading, remediation
H-C REPRESENTATIVE Grant Crechtel
H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE
PERMIT NO.
CONTRACTOR REP. John Kalkoven
JOB PHONE

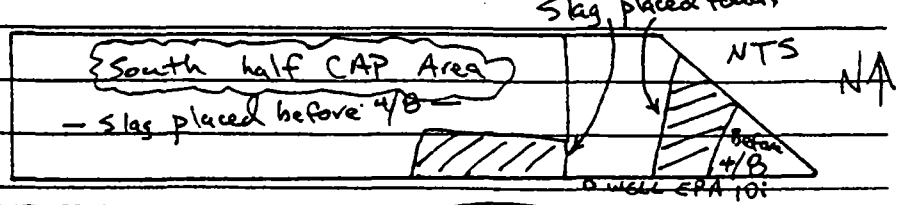
This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: Contractor continued placing SLAG soil from the Waterway part of the site in an apx. 10" lift ~~on~~ the CAP area (south half). Lift was placed over SAND & GRAVEL BUFFER already installed, spread with a small dozer then rolled to a firm, non-yielding condition with the Sakai 91D vibratory roller.

Contractor's surveyor (Coates) had completed laying out stakes on 25' grid in the planned excavation areas of the Charcoal remediation area. Under our observation, contractor excavated 13 test pits using a JD 490 trackhoe, in order to systematically define depth and extent of Charcoal Briquette laden soil.

Attended 8:30 AM weekly progress meeting with Port of Tacoma, RCIE, Landau and Hart Crowser representatives. Minutes of the meeting are appended to this field report for informational purposes. It is not planned to hold the regular progress meeting next week, as Curtis Ratcliffe will be out of town.

Contractors well abandonment subcontractor was on site today abandoning wells listed on RFP #8 - which are outside the 17 acre part of the Blair



BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report. CONTRACTOR REPRESENTATIVE

HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
206.324.9530

Job No. 2350-22
Field Report No. 40
Page 2 of 2

Job Blair Backup
Date 8 April, 1993

Backup Property. Wells abandoned today were Nos. HC-1S, 2S, 2I, 3S, 3I, 13S, 13I, 14S and 14I. Wells were abandoned by pumping Enviroplug grout to bottom w/ tremie from bottom to top. Obtained daily tonnage figures from RCIE tabulation of load tickets for import material.

3/31	4843.95	Tons	COVER
4/1	2250.21	Tons	COVER
	2737.83	Tons	BUFFER
4/2/93	3579.54	Tons	BUFFER
4/5/93	1194.88	Tons	BUFFER

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Vardiman
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
CONTRACTOR REPRESENTATIVE

HARTCROWSER

Hart Crowser, inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

FIELD REPORT

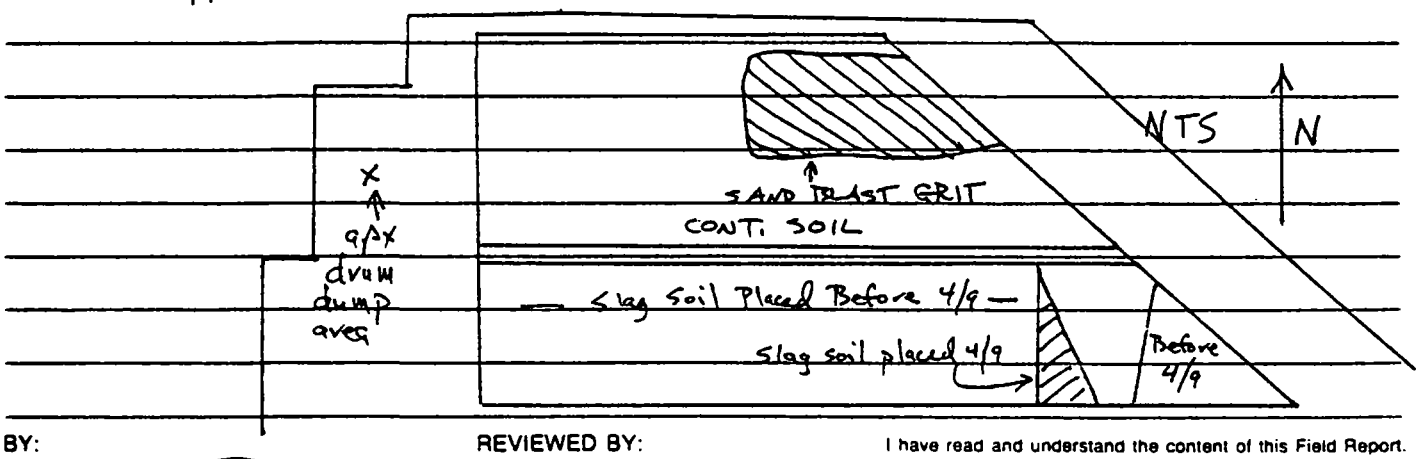
Job No. 2350-22
Field Report No. 41
Page 1 of 2
DATE 9 April, 1993
S M T W Th (F) S

JOB Blair Backup
ARRIVAL TIME: 0735
LOCATION Taylor Way, Tacoma, WA.
DEPARTURE TIME: 1645
CLIENT Port of Tacoma
WEATHER: showers
PURPOSE OF OBSERVATIONS grading
H-C REPRESENTATIVE Grant Kuechtel
H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE
PERMIT NO.
CONTRACTOR REP. John Kalkoven
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: Contractor continued placing soil hauled from Waterway part of site on Sand & Gravel Buffer in South part of CAP area. Methods were as outlined in yesterdays Field Report.

Sand Blast Grit Contaminated Soil stockpiled on Buffer on the north part of the CAP area was spread in a lift ± 10" high as sketched below, and rolled with the Sakai 91D vibratory roller. ~~Subgrade~~ surface was pumping slightly, with some water "boiling" through fill from underlying BUFFER. Contractor hauled drums of soil and water stored in the shed on the Waterway part of the site and dumped them on the ground surface, where SAND and GRAVEL COVER is planned but not yet installed. Drums Nos 12, 14, ~~18~~, 23, 24, 25, 26, 31, 33, 35, 39, 40, 41, 45, 49, 50, 51, 54, 55, 56, 69, 151 and 152 were dumped - 22 drums, 4 with appreciable soil, the rest water.



BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report. CONTRACTOR REPRESENTATIVE

HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
206.324.9530

Job No. 2350-22

Field Report No. 41

Job Blair Backup

Date 4/9/93

Contractor built bermed area for temporary storage of Charcoal Briquette soil today - apx 200' x 200' area was bermed apx. 3' high using Sand and Gravel COVER material imported from Lloyd's Milton pit. An area apx. 60' long on the north side was left open to allow placement of plastic liner and drainage layer inside, prior to completion.

BY:

HART CROWSER REPRESENTATIVE

REVIEWED BY:

HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.

CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 42
Page 1 of 1
DATE 12 April, 1993
S (M) T W Th F S

JOB Blair Backup
ARRIVAL TIME: 0730
LOCATION Taylor Way, Tacoma, WA
DEPARTURE TIME: 1500
CLIENT Port of Tacoma
WEATHER: cloudy
PURPOSE OF OBSERVATIONS
H-C REPRESENTATIVE Grant Fuechtel
H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE
PERMIT NO.
CONTRACTOR REP. John Falkoven
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: Contractor brought 35 more drums of soil and water to the site from storage at the Blair Waterway part of the site and placed contents on the ground where planned 2' of Sand & Gravel COVER had not yet been placed. Location was same as on Friday 4/9. Drums dumped today were numbered 1, 3, 8, 12, 13, 15, 16, 17, 18, 19, 21, 30, 32, 46, 57, 60, 67, 68, 98, 106, 109, 113, 153, 154, 158, 163, 178, 179, ~~18~~, 180, 181, 182, 188, 189, 198 and 201. Note that a drum numbered 12 was dumped both Friday and today. Fourteen drums, Numbered 2, 20, 70, 71, 95, 107, 159, 160, 161, 162, 164, 165, 167 and 168 had been inadvertantly contaminated with soil intended for under the asphalt CAP during consolidation at the Waterway part of the site - all this material was then placed within the stockpile for haul to the CAP area.

Contractor continued to place mixed soil containing SLAG from the waterway part of the propertly atop Sand and Gravel BUFFER in the south half of the planned CAP area. The initial apx. 10' thick lift was completed over the south half today.

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verduin
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. ~~46~~ 43
Page 1 of 2
DATE 13 April, 1993
S M (T) W Th F S

JOB Blair Backup ARRIVAL TIME: 0755
LOCATION Taylor Way, Tacoma, WA. DEPARTURE TIME: 1530
CLIENT Port of Tacoma WEATHER: rain
PURPOSE OF OBSERVATIONS remediation, grading
H-C REPRESENTATIVE Grant Knechtel H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE PERMIT NO.
CONTRACTOR REP. John Kalkoven JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: Contractor's subcontractor (Soil Sampling) was on site abandoning wells as listed in RFP No. 8. Wells were abandoned by ~~to~~ pumping Envirophlug grout slurry to the bottoms of the well casings by tremie pipe until grout filled the casings, then removing steel well monument, bollards and PVC well casing flush with the ground surface. Wells abandoned today were Nos. HC-6I, 6S, 7S, 8S, 9S, 10I, 17I, 17S, 18S, 21S, 24S, and 25S.

Contractor started laying drainage layer in the Charcoal stockpile area. 10 mil black ~~poly~~ plastic sheeting was laid over the bottom then covered apx 4" ~~thick~~ deep with Sand and Gravel from Lonestar (used as Buffer elsewhere on site). Contractor also excavated for the Infiltration Pond – apx. 50'X20' in the northwest corner of the PAH area. Pond was dug about 2' deep, and it is planned to line the pond with a filter geotextile, allowing direct infiltration of ~~was~~ water from the Charcoal excavations and stockpile but retaining soil particles for disposal with the charcoal.

Contractor also had CMTL sample blended Sand and Gravel COVER to show if blended material now ~~meeting~~ meets gradation specifications. Samples were taken at the following locations chosen at random over the blended areas along ~~the~~ Taylor Way:

C50: 56' SW of Fence, 160' NW of well HC-16i

BY: REVIEWED BY: I have read and understand the content of this Field Report.

HART CROWSER REPRESENTATIVE HART CROWSER PROJECT MANAGER ~~CONTRACTOR REPRESENTATIVE~~

HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
206.324.9530

Job No. 2350-22

Field Report No. 43

Page 2 of 2

Job Blair Backup

Date 13 April, 1993

C51: 100' SW of fence, 100' North of storm drain
C52: 35' SW of fence, 60' NW of well HC-16i
C53: 100' SW of fence, 40' North of stormdrain
C54: 35' SW of fence, 60' SE of MH2
C55: 100' SW of fence, 100' South of MH2
C56: 35' SW of fence, 80' ~~SE~~ WNW of MH1
C57: 100' SW of fence, 88' WSW of MH1

Samples were taken by removing 4" of fill from ~~3~~ three one foot squares at each location, then compositing ~~7~~ one 5gal. bucket of soil from ~~each~~ the three squares.

BY: [signature]
HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Vedrin
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
[signature]
CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 44
Page 1 of 1
DATE 14 April, 1993
S M T (W) Th F S

JOB Blair Backup
ARRIVAL TIME: 0745
LOCATION Taylor Way, Tacoma, WA
DEPARTURE TIME: 1545
CLIENT Port of Tacoma
WEATHER: clear / ptly cloudy
PURPOSE OF OBSERVATIONS
H-C REPRESENTATIVE Grant Kuechtel
H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE
PERMIT NO.
CONTRACTOR REP. John Kalkoven
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: Contractor completed hauling SLAG soil from the Waterway part of the site for the 1st apx. 10" thick lift over the CAP area, exclusive of the PAH area. Area was rolled with the vibratory drum roller to seal.

Contractor completed placing liner and drainage layer over apx. 2/3 of the charcoal stockpile area. This allows room for truck access and saves some material if the entire stockpile isn't needed. Infiltration pond was lined with ~~fabric~~ filter geotextile - Polyfelt TS 500 non-woven fabric. Apx 10" ~~of~~ overlying soil was stripped from an apx. 130' X 70' area of the ~~the~~ planned excavation in the northeast corner of the charcoal area, preparatory to starting charcoal excavation tomorrow.

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

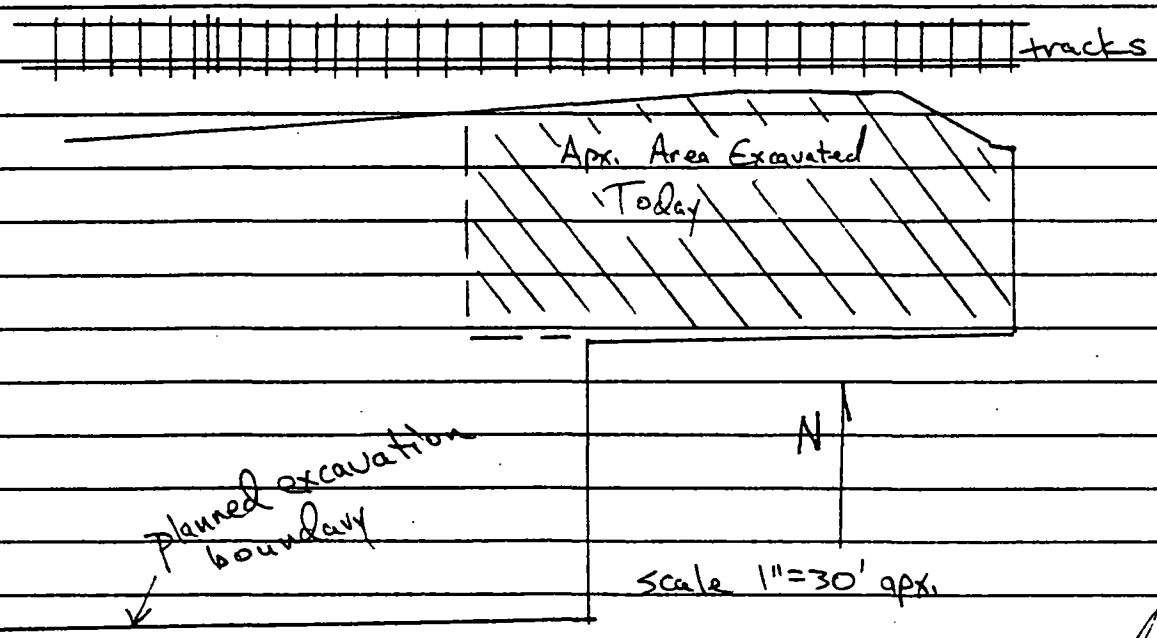
Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 45
Page 1 of 2
DATE 15 April, 1993
S M T W (Th) F S

JOB Blair Backup ARRIVAL TIME: 0730
LOCATION Taylor Way, Tacoma, WA DEPARTURE TIME: 1700
CLIENT Port of Tacoma WEATHER: showers
PURPOSE OF OBSERVATIONS remediation - Charcoal Briquette removal
H-C REPRESENTATIVE Grant Knechtel H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE PERMIT NO.
CONTRACTOR REP. John Kalkoven JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: Contractor started excavating in charcoal area as sketched below. 21 Solo truck loads of charcoal briquette laden soil were taken to the stockpile. No remaining Charcoal briquettes were noted within this area but still were noted in excavation sidewalls to the east, south and west, so excavation will continue east and south tomorrow. Coal was noted within soil in the north sidewall. Cleanup plan does not call for the removal of soil containing



BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verduin HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report. CONTRACTOR REPRESENTATIVE

HARTCROWSER
Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
206.324.9530

Job No. 2350
Field Report No. 45

Job Blair Backup
Date 15 April, 1993

coal (without charcoal briquettes), so this material will be left in place.

Contractor installed 6" ϕ perf pipe from manholes 2 to 3 and past 4 & 5 at apx. elev. 14. 1½' wide trench, bedding - pea gravel to 6" over pipe then backfilled w/ SAND & GRAVEL COVER.

Attended 0830 construction progress meeting with Port, RCIE, EPA, and Landau representatives. ~~A copy of the meeting minutes is appended to this report for informational purposes.~~ Yardage totals discussed at the meeting, of Waterway area slag soils were as follows:

Already on site	8288 yds.
to be exc. from upland	3600 yds
est. to come from graving dock	500 yds
total	12388 yds
Sand Blast grit already here	1000 yds.

Total to accomodate under CAP 13388 cy

These totals are based on RCIE truck counts.

BY: REVIEWED BY: I have read and understand the content of this Field Report.

HART CROWSER REPRESENTATIVE — HART CROWSER PROJECT MANAGER — CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

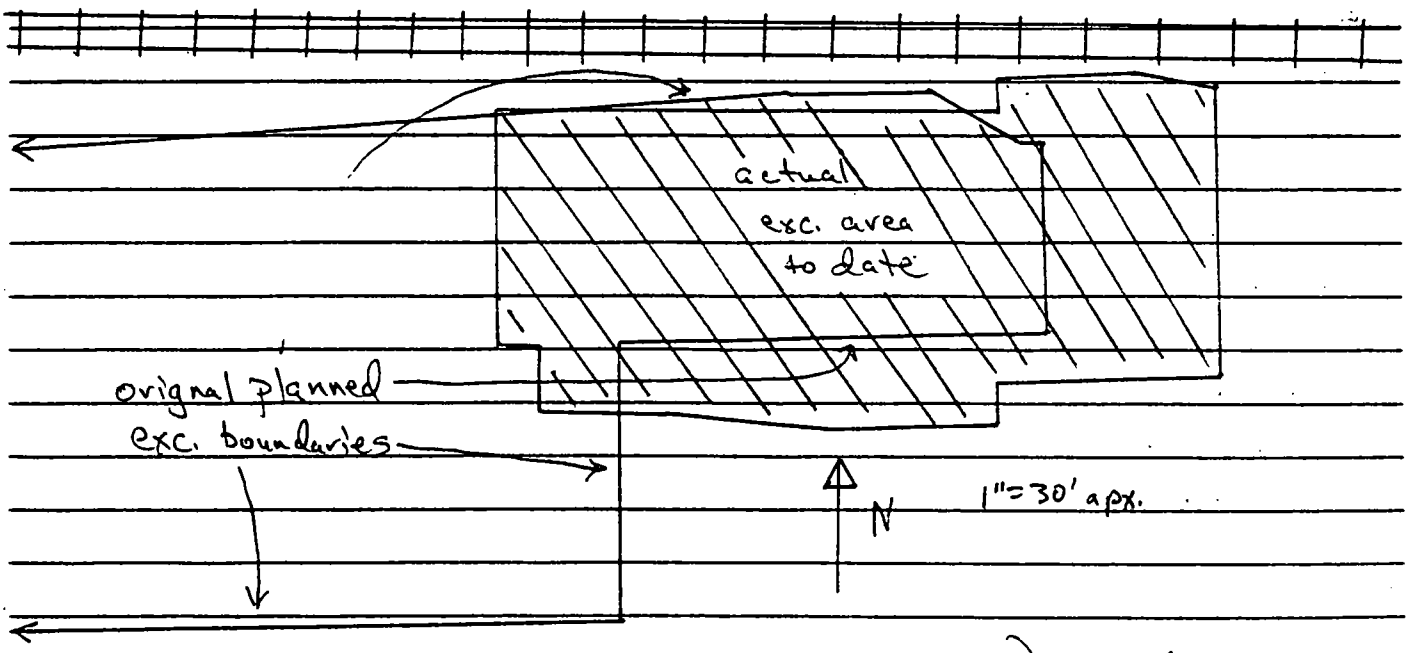
Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 46
Page 1 of 2
DATE 16 April, 1993
S M T W Th (F) S

JOB Blair Backup ARRIVAL TIME: 0730
LOCATION Taylor Way, Tacoma, WA. DEPARTURE TIME:
CLIENT Port of Tacoma WEATHER: cloudy, light showers
PURPOSE OF OBSERVATIONS remediation - charcoal area
H-C REPRESENTATIVE Grant Knechtel H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE PERMIT NO.
CONTRACTOR REP. John Kalkoven JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: Contractor continued removing charcoal briquette laden soil from the area sketched below. Area excavated today was along the east and south sidewalls of yesterday's excavation. No charcoal briquettes were noted in the remaining east or south sidewalls or bottom of today's excavation. Excavation will continue west on Monday. 17 truckloads of briquette laden soil were taken to the stockpile area today. Area of excavation



BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verduin HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report. CONTRACTOR REPRESENTATIVE

HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
206.324.9530

Job No. 2350-22

Field Report No. 46

Job Blair Backup

Date 4/16/93

was backfilled with soil stripped from above the briquette soil prior to excavation, and surface soil from elsewhere in the Charcoal area.

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Vedvin HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.

CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 47
Page 1 of 2
DATE 19 April, 1993
S (M) T W Th F S

JOB Blair Backup
ARRIVAL TIME: 0720
LOCATION Taylor Way, Tacoma, WA
DEPARTURE TIME: 1800
CLIENT Port of Tacoma
WEATHER: clear
PURPOSE OF OBSERVATIONS remediation- charcoal area
H-C REPRESENTATIVE Grant Knechtel
H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE
PERMIT NO.
CONTRACTOR REP. John Kalkoven
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: contractor continued excavating charcoal briquette-laden soil from the PAH area. Areas excavated today are as sketched on the attached. Two track-hoes were used to excavate today, the JD 490 D used last week and a larger Insley 2500-C. Planned excavation areas were stripped to near planned excavation with a cat and the two ~~plans~~ track-hoes, then briquette-laden soil was loaded into solo dump trucks and taken to the stockpile area. Before leaving the PAH area after loading, and the stockpile area after dumping, the trucks were "dry-decanned" by checking for and brushing off any briquette soil on the outside of the truck box. This method is as used throughout the project. 37 solo truck loads were removed to the stockpile today. The large area at the west end of the site along grid E from grids 2 to 5 was excavated to the planned outline and depth. Briquettes were encountered only in the apx. areas noted on the sketch, and no visible briquettes remained, after excavation, in the bottom or sidewalls.

Additional excavation was performed in the center of the large planned excavation area between apx. grids 10 and 11 from apx B to F. No visible briquettes remained in the east or south sidewalls- however, additional excavation to remove visible briquettes will be

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verduin HART CROWSER PROJECT MANAGER

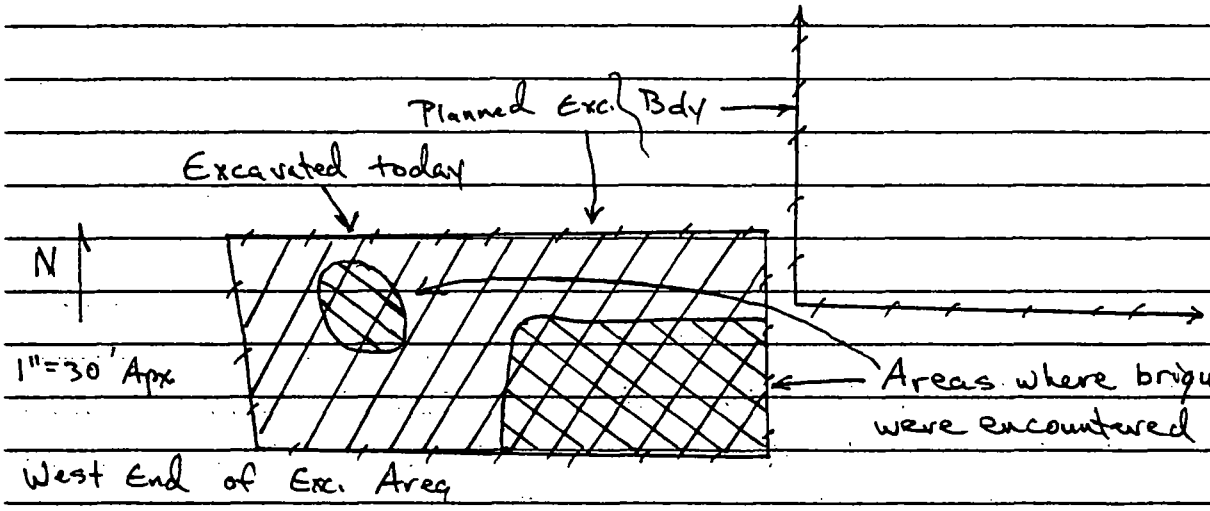
I have read and understand the content of this Field Report. CONTRACTOR REPRESENTATIVE

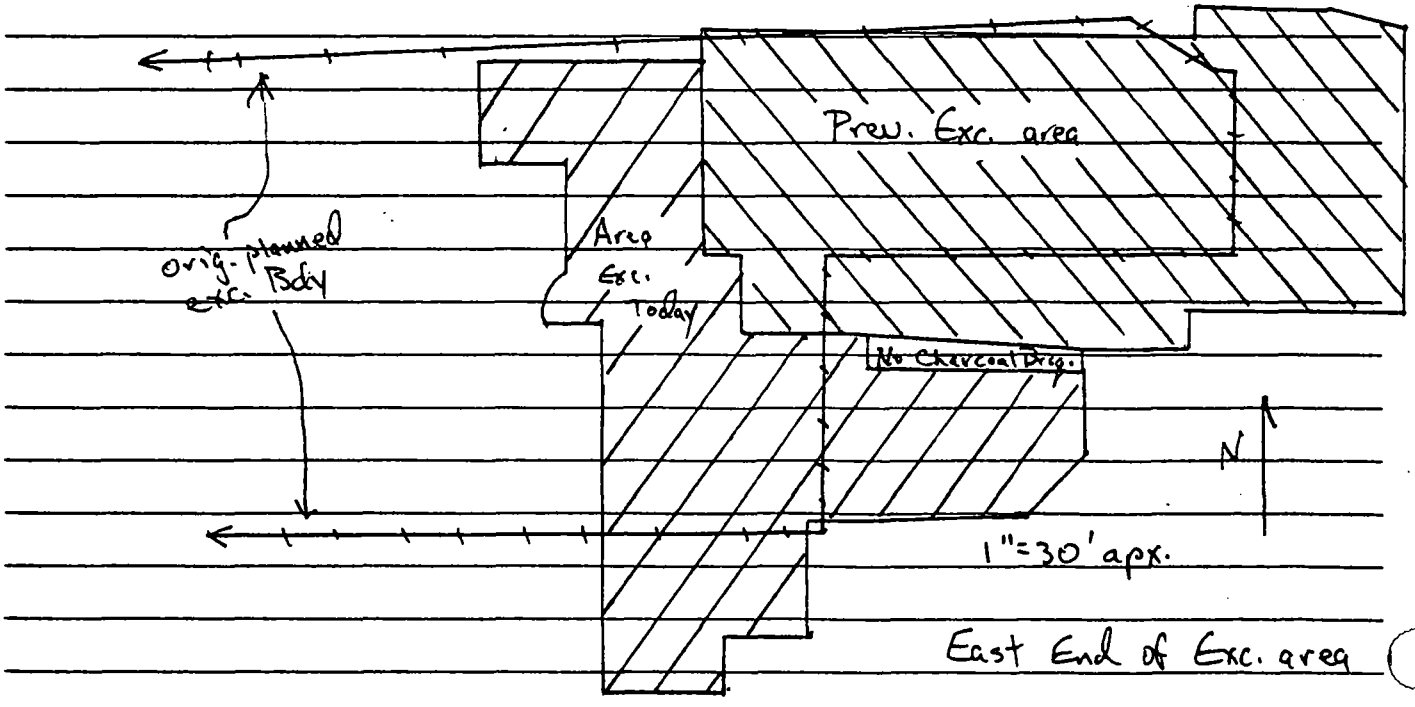
HARTCROWSER
Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
206.324.9530

Job No. 2350-22
Field Report No. 47

Job Blair Backup Date 4/19/93

needed along the north, west, and south of a small part of the south sidewalls.





BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verdieu HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report. CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 48
Page 1 of 2
DATE 20 April, 1993
S M (T) W Th F S

JOB Blair Backup ARRIVAL TIME: 0710
LOCATION Taylor Way, Tacoma, WA DEPARTURE TIME: 1800
CLIENT Port of Tacoma WEATHER: partly cloudy
PURPOSE OF OBSERVATIONS remediation- PAH (charcoal briquette) area
H-C REPRESENTATIVE Grant Kuechtel H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE PERMIT NO.
CONTRACTOR REP. John Kalkoven JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: Contractor continued excavating charcoal briquette laden soil in the PAH area. Two track ~~totes~~ hoes were used to excavate to the approximate outlines on the following sketch. Methods were as outlined in yesterday's field report. 81 solo truckloads were taken to the stockpile area today. During excavation some seepage was encountered. Water was collected in sumps and pumped to the infiltration pond in the NW corner of the PAH area. During excavation in the west area dug today, a floor of 4" x 15" planking was encountered running E-W at the bottom of the charcoal briquette laden soil. This floor dipped to a swale at apx. elev. 12, also running E-W at apx. grid line C. During excavation of this area, a pronounced "creosote" like odor was noted ~~and~~ with an oily sheen on seepage. ~~in the area.~~

Sidewall status: no visible briquettes on south walls excavated today. Where east walls were next to previous excavation areas, no visible briquettes, otherwise N, E & W walls showed visible briquettes & will require more excavation. Bottoms showed no visible briquettes.

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report. CONTRACTOR REPRESENTATIVE

HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
206.324.9530

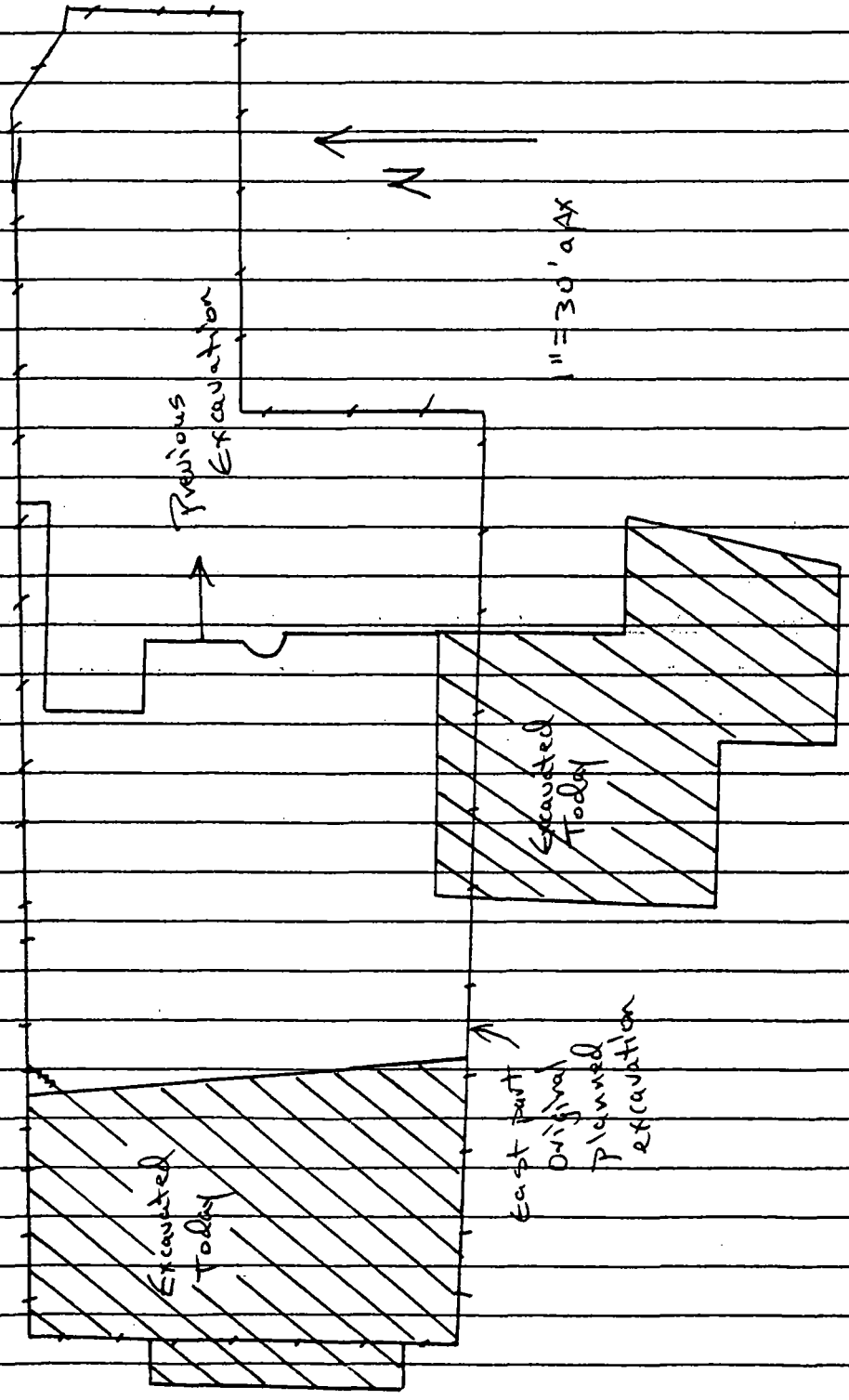
Job No. 2350-22

Field Report No. 48

Page 2 of 2

Job Blair Backup

Date 4/20/93



BY: Grant Knechtel

HART CROWSER REPRESENTATIVE

REVIEWED BY: John R. Vaden

HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.

CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 49
Page 1 of 2
DATE 21 April 1993
S M T (W) Th F S

JOB Blair Backup ARRIVAL TIME: 0705
LOCATION Taylor Way, Tacoma, WA. DEPARTURE TIME:
CLIENT Port of Tacoma WEATHER: showers
PURPOSE OF OBSERVATIONS remediation- PAH area
H-C REPRESENTATIVE Grant Enechted H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE PERMIT NO.
CONTRACTOR REP. John Kalkoven JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: Contractor continued digging charcoal briquette- laden soil in the PAH area today and hauling to the stockpile area. 68 solo dump truck loads were excavated & hauled today. Two track hoes were used - methods were as outlined in Monday's field report. It appears briquette soil extends under the infiltration ~~pond~~ pond in the NW corner - in order to exc. beneath the pond tomorrow, a 2nd pond was dug in backfilled excavation area between grids C&E and 10&11. Seepage pumped from excavations was sent to the new pond after noon today. Excavation today encountered timbered floor as noted in yesterday's report, running E-W at apx grid C at the west end and D at the east.

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
CONTRACTOR REPRESENTATIVE

HARTCROWSER

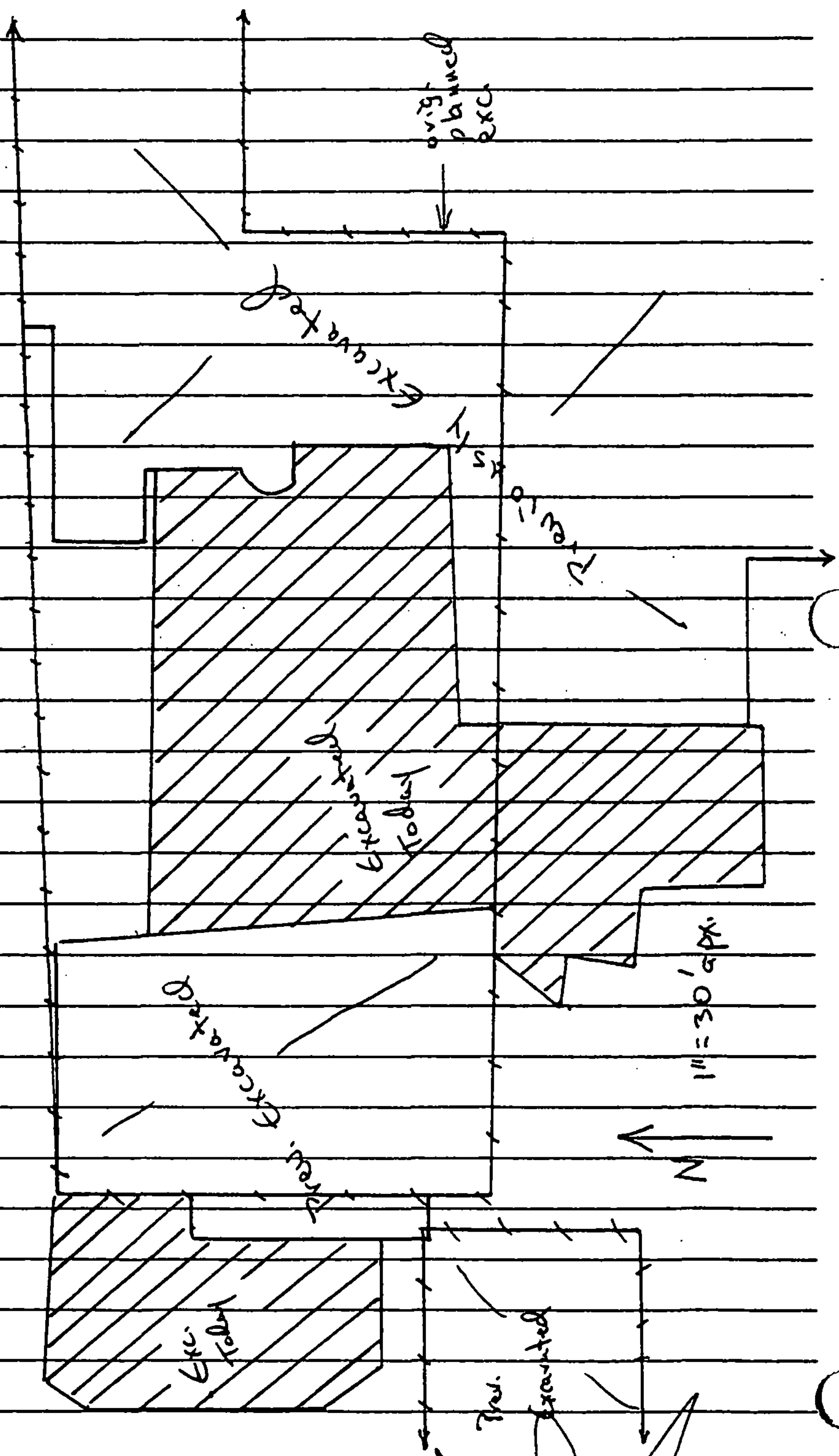
Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
206.324.9530

Job No. 2350-22

Field Report No. 49

Job Blair Backup

Date 4/21/93



BY: | REVIEWED BY: | I have read and understand the content of this Field Report.

HART CROWSER REPRESENTATIVE | HART CROWSER PROJECT MANAGER | CONTRACTOR REPRESENTATIVE

HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

FIELD REPORT

Job No. 2350-22
Field Report No. 50
Page 1 of 2
DATE 22 April 1993
S M T W (Th) F S

JOB Blair Backup ARRIVAL TIME: 0700
LOCATION Taylor Way, Tacoma, WA DEPARTURE TIME: 1630
CLIENT Port of Tacoma WEATHER: showers
PURPOSE OF OBSERVATIONS Remediation - PAH area
H-C REPRESENTATIVE Grant Knechtel H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE PERMIT NO.
CONTRACTOR REP. John Kalkoven JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: Contractor completed excavating charcoal-briquette laden soil in the PAH area today. Two track hoes were used to excavate and load into solo dump trucks, using methods as outlined in our previous field reports. 45 loads were taken to the stockpile area. Areas dug today are shown on the sketch following. No visible briquettes were noted in any of the remaining sidewalls or bottoms of excavations done today. Sidewalls of previous areas with visible briquettes have been excavated. Total Number of truckloads of briquette soil stockpiled was 269.

Attended 8:30 AM construction progress meeting with Port of Tacoma, EPA, Landau, RCIE and Hart Crowser representatives. ~~For Informational Purposes a copy minutes of the meeting are appended to this report.~~ JRV (Did not receive copy as of 4/26/93)

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
CONTRACTOR REPRESENTATIVE

HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
206.324.9530

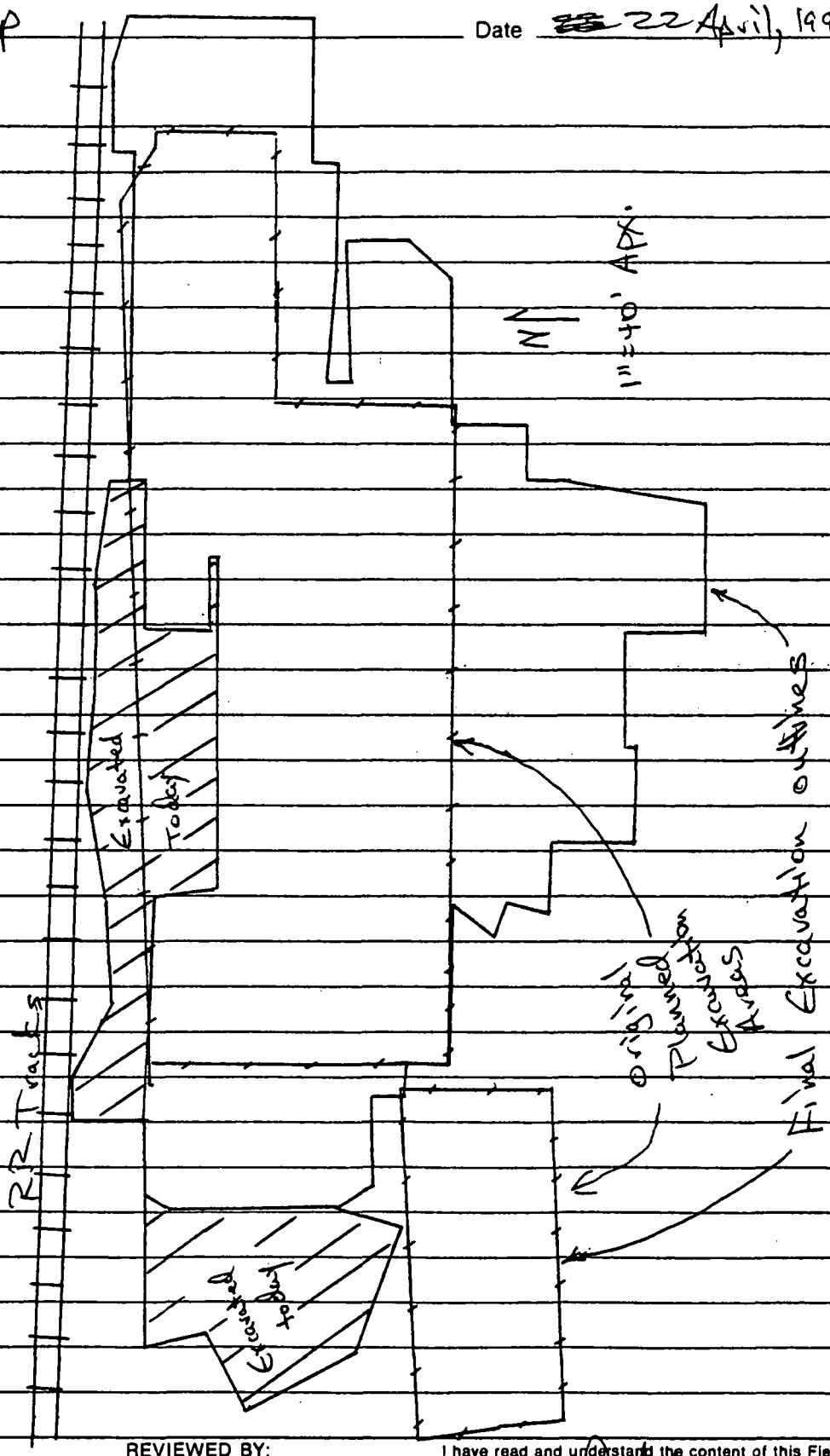
Job No. 2350-22

Field Report No. 50

Page 2 of 2

Job Blair Backup

Date 22 April, 1993



BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.

CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 51
Page 1 of 1
DATE 23 April, 1993
S M T W Th (F) S

JOB Blair Backup
ARRIVAL TIME: 0730 | 1400
LOCATION Taylor Way, Tacoma, WA
DEPARTURE TIME: 1100 | 1630
CLIENT Port of Tacoma
WEATHER: light rain
PURPOSE OF OBSERVATIONS grading, PAH area remediation
H-C REPRESENTATIVE Grant Kuechtel
H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE
PERMIT NO.
CONTRACTOR REP. John Kalkoven
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: contractor completed closing stockpile around charcoal-briquette laden soil by moving north berm in to contact soil, completing installation of cover, placing netting and sand bags. Contractor also graded soil from the PAH to complete backfilling of excavations from briquette soil removal. Dump trucks (yesterday) and equipment were deconned prior to removal from the area by pressure washing with a water stream, with water and soil contained within the PAH area boundaries.

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verduin HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report. CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 52
Page 1 of 1
DATE 26 April, 1993
S (M) T W Th F S

JOB Blair Backup
ARRIVAL TIME: 0700
LOCATION Taylor Way, Tacoma, WA
DEPARTURE TIME: 0845
CLIENT Port of Tacoma
WEATHER: showers & rain
PURPOSE OF OBSERVATIONS grading
H-C REPRESENTATIVE Grant Knechtel
H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE
PERMIT NO.
CONTRACTOR REP. John Kaltoven
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: Contractor picked up soil stockpiled from grading in SW site corner to allow placement of sand & Gravel Cover (see our 3/16/93 field report), and placed in PAH area. A solo dump truck was used to haul 32 loads (per RCIE truck count). The soil was graded along with site soil in the area to match existing site grades and slope upx 0.5% to central ditch area. Fine grading within the PAH will continue tomorrow.

Contractor covered more of the Charcoal soil stockpile with netting & sandbags, and fine tuned cover. More net has been ordered and pile cover should be in final shape tomorrow (pile is currently covered but net & bags are not yet in final configuration).

BY: [signature]
HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verduin
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report
[signature]
CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 53
Page 1 of 2
DATE 27 April, 1993
S M (T) W Th F S

JOB Blair Backup ARRIVAL TIME: 0740
LOCATION Taylor Way, Tacoma, WA DEPARTURE TIME: 1635
CLIENT Port of Tacoma WEATHER: partly cloudy
PURPOSE OF OBSERVATIONS grading
H-C REPRESENTATIVE Grant Knechtel H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE PERMIT NO.
CONTRACTOR REP. John Kalkoven JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: contractor completed grading PAH area to ~~match~~ roughly original planned grade - 1/2% down to south, ~~t~~ subgrade roughly matching top of adjacent SAND & GRAVEL BUFFER to east and south. Tasks left in the Charcoal Remediation: 1. complete netting over top of stockpile - large, 1-piece net is on order and RCIE thinks will be on site tomorrow. 2. continue to pump the sump in the Briquette Soil stockpile area - RCIE thinks apx. 1 hr by a laborer each day to accomplish this.

Also discussed with Karen Keely (EPA) and Curtis Ratcliffe (Port) excavation of apx. 67 cy of Asarco slag soil discovered during remediation at the Waterway part of the site, on the Blair Waterway bank. This area had been planned for excavation and placement under the CAP at the Backup part of the site, in accordance with the Cleanup Plan. Unfortunately, the NOSAC vessel Forrest spilled oil in the Blair Waterway on 4/21, and the planned excavation area received a coating of oil. Recommended to Curtis the Port get agreement from the EPA prior to removing this now oil-contaminated material. ~~to~~ Viewed the area where excavation is planned. Oil coating is very thin - appears to be about the thickness of a coat of paint, extends down one half inch or less into

BY: [signature] HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verduin HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report. [signature] CONTRACTOR REPRESENTATIVE

HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
206.324.9530

Job No. 2350-22
Field Report No. 53

Job Blair Backup Date 27 April, 1993

the sidewall soils, and visually covers less than a quarter of the 60' x 30' area. ~~[illegible]~~ The visual impression, conveyed to Karen Keeley and Curtis Ratcliffe, is ~~[illegible]~~ that the actual quantity of oil which would be excavated from this area and mixed with the remaining apx. 4000 cy of slag soils remaining to be brought to the Asphalt CAP area, is ~~very~~ small. They agreed the ~~[illegible]~~ area will be excavated as planned.

Also discussed preparation of the PAH area to receive Asarco slag soil and asphalt CAP, with Karen Keeley. She stated that as long as the slag soil remained above elevation 15.5, it was not necessary to provide physical separation (by sand and GRAVEL BUFFER or geotextile) between the site soils (which in this case contain some wood waste) and the slag soil.

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report. CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

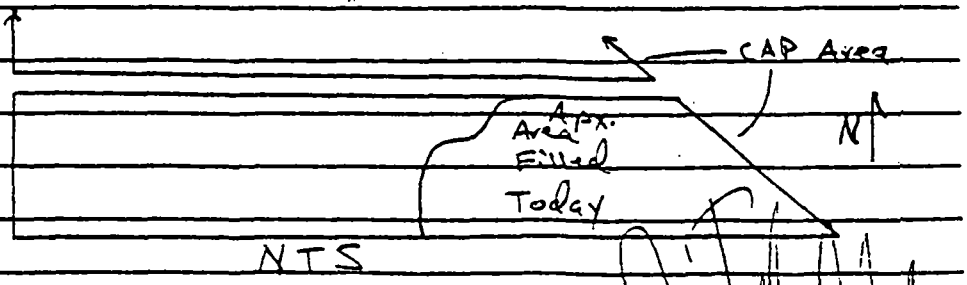
Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 54
Page 1 of 1
DATE 28 April 1993
S M T (W) Th F S

JOB Blair Backup
ARRIVAL TIME: 0715
LOCATION Taylor Way, Tacoma, WA
DEPARTURE TIME: 1635
CLIENT Port of Tacoma
WEATHER: light rain
PURPOSE OF OBSERVATIONS grading
H-C REPRESENTATIVE Grant Knechtel
H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE
PERMIT NO.
CONTRACTOR REP. John Kalkoven
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: Contractor restarted hauling Asarco slag soil from the waterway part of the site and placing it in the south part of the planned asphalt CAP area. Contractor placed the material using a laser device to control grade. They report they set up the laser to give final grade at 17.0 feet along the north edge of today's Fill area, and sloping up to the south at 0.5%. After placement and grading the surface was rolled with a Sakai 91D vibratory drum roller to compact the apx 6" thick lift. Most of the surface was firm and stable, with some areas of pumping. Loaded dump trucks were able to drive across the newly placed surface to dump their loads. 219 solo trucks loads were placed today (per RCIE truck count). ~~After~~ While leaving the CAP area trucks were decontaminated by brushing off ~~any~~ slag soil adhering to the outside of the truck box, wheels, flaps or elsewhere on the truck ("dry" decon).



NTS

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verduin
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
CONTRACTOR REPRESENTATIVE

HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
206.324.9530

Job No. 2350-22
Field Report No. 54

Job Blair Backup
Date 28 April, 1993

At our request, contractor used a cat to cut ~~37~~-1' deep holes in Sand and Gravel COVER on the west and south sides of the site, where COVER was placed in a lift thicker than the 1' specified. One hole was also cut in the SW site corner, where the initial lift had been covered prior to a second retest of the initial lift. Our nuclear gauge was then used to perform in-place soil moisture-density tests to confirm fill at 1' depth had been compacted to the minimum 92% of modified proctor. The retest (RT-160A) was 93% of the 142.1 pcf modified proctor which applied to material initially placed in this area. The other 7 tests were 94 to over 100% of the 130.4 pcf modified proctor maximum which applied to the fill placed in the relevant areas.

RCIE and Port representatives met informally and discussed final grades for the Slag soil in the asphalt CAP area. Examination of the plans shows the Slag top should be at 16.7 feet ±2" at the ~~ditch~~ central valley edge and slope up to 18.15' ±2" ~~and 17.75' ±2"~~ at the north edge of the north pad and 17.75' ±2" at the south edge of the south pad. This was communicated to RCIE by Curtis Ratcliffe.

BY: _____ HART CROWSER REPRESENTATIVE

REVIEWED BY: _____ HART CROWSER PROJECT MANAGER

I have read and understand the contents of this Field Report. _____ CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 55
Page 1 of 1
DATE 29 April 1992
S M T W Th F S

JOB Blair Backup
ARRIVAL TIME: 0705
LOCATION Taylor Way, Tacoma, WA
DEPARTURE TIME: 1035
CLIENT Port of Tacoma
WEATHER: rain
PURPOSE OF OBSERVATIONS grading
H-C REPRESENTATIVE Grant Knechtel
H C PROJECT MANAGER John Verduin
CONTRACTOR RCI
PERMIT NO.
CONTRACTOR REP. John Kalkoven
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: due to heavy rain early this morning, contractor elected to not haul Asarco slag bearing soil from the Waterway part of the site to the CAP area today.

Attended 0830 construction progress meeting. ~~A copy of the minutes is appended to this report for informational purposes~~ JRV to rec

Among other topics, we recommended that separation geotextile be placed over the subgrade in the PAH area prior to placing slag (i.e. in the CAP area) in order to help provide a more stable final surface atop the slag. This is as was done over the rest of the CAP.

We received copies of sieve analyses done on the SAND and GRAVEL COVER areas where COVER material which initially did not meet gradation specs, and was blended with material with less fines. The sieve analyses show material meets specs except for 1 test which had 92% passing the 3/4" sieve (90-60% was specified). As this analysis showed fine (passing #100) SAND as 2.5% and SILT as 0.8%, we feel the slight out-of-spec for the 3/4" sieve is not significant and is approved.

BY: [signature]
HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verduin
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
[signature]
PROJECT STAFF

HARTCROWSER

FIELD REPORT

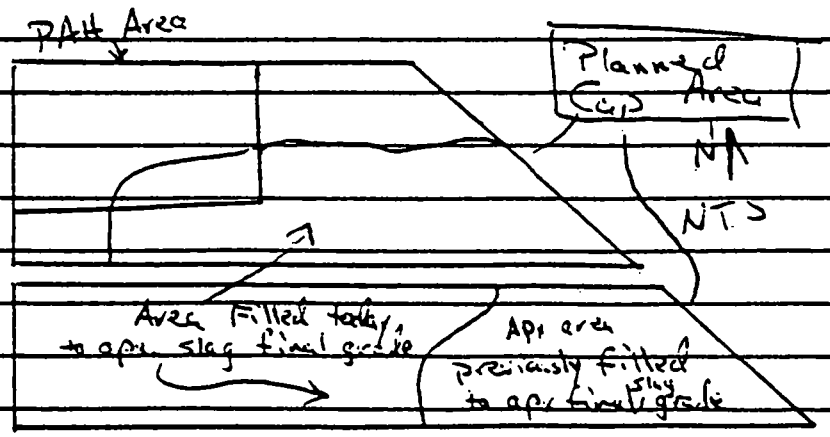
Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 56
Page 1 of 1
DATE 30 April, 1993
S M T W Th (F) S

JOB Blair Backup
ARRIVAL TIME: 0730
LOCATION Taylor Way, Tacoma, WA
DEPARTURE TIME: 1800
CLIENT Port of Tacoma
WEATHER: showers
PURPOSE OF OBSERVATIONS grading
H-C REPRESENTATIVE Grant Knechtel
H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE
PERMIT NO.
CONTRACTOR REP. John Kalkoven
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: contractor restarted hauling Asarco slag bearing soil from the waterway part of the property to the planned asphalt CAP area. South part of cap was filled to apx. finished grade before noon. Effort then shifted to north part of cap. Separation geotextile was placed across PAH area and initial ± 1' lift placed across area, as well as ± 6" lift across previously placed slag. Solo dump trucks were used to haul 385 loads. Placement, design and compaction methods were as outlined in our previous reports



BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report. CONTRACTOR REPRESENTATIVE

HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

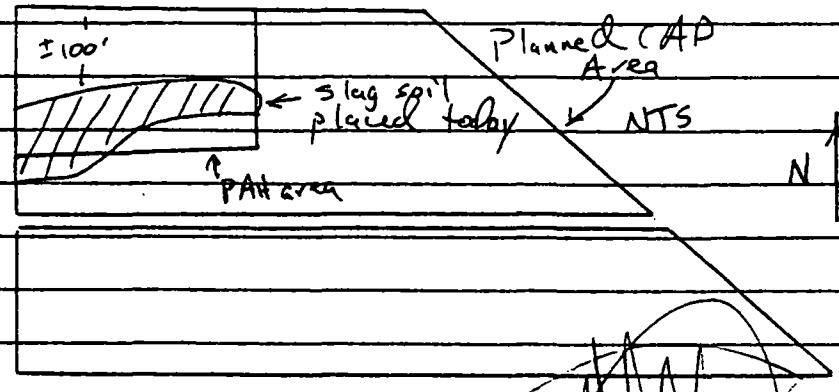
FIELD REPORT

Job No. 2350-22
Field Report No. 57
Page 1 of 1
DATE 3 May, 1993
S (M) T W Th F S

JOB Blair Backup ARRIVAL TIME: 0720
LOCATION Taylor Way, Tacoma, WA DEPARTURE TIME: 1600
CLIENT Port of Tacoma WEATHER: rain
PURPOSE OF OBSERVATIONS
H-C REPRESENTATIVE Grant Knechtel H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE PERMIT NO.
CONTRACTOR REP. John Kalkoven JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: contractor completed hauling Asarco slag bearing soil from the waterway part of the property to the planned CAP area. Solo dump trucks were used - about 170 loads were hauled today. Slag soil was placed on Amoco 2006 woven geotextile placed over the PAH-area subgrade with 3 to 5' lap, as was done also on Friday. After trucks dumped slag soil they were driven to a raised metal ramp where all slag bearing soil outside the truck box was removed by brushing with a broom. This included wheels, flaps, truck box, chassis, and axles. This procedure is contractor's 'dry decon'. Slag soil thus brushed off was consolidated periodically and removed to the CAP area. Slag soil was placed in an apx. 1' thick loose lift and compacted with a Sakai 91 D vibratory drum roller per procedures outlined in our previous field reports.



BY: [signature]
HART CROWSER REPRESENTATIVE

REVIEWED BY: [signature]
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
[signature]
CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 58
Page 1 of
DATE 5/4/93
S M (T) W Th F S

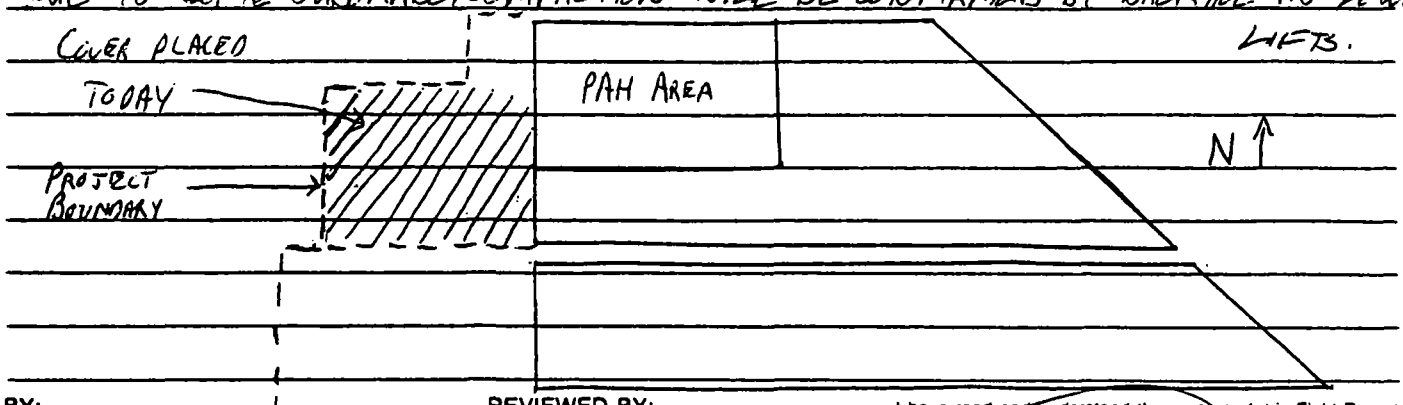
JOB BLAIR BACKUP
ARRIVAL TIME: 0715
LOCATION TAYLOR WAY, TACOMA WA
DEPARTURE TIME: 1630
CLIENT PORT OF TACOMA
WEATHER: PTY CLDY 55°
PURPOSE OF OBSERVATIONS GRADING
H-C REPRESENTATIVE C. WOLFE
H C PROJECT MANAGER J. VERDUIN
CONTRACTOR RCIE
PERMIT NO.
CONTRACTOR REP. JOHN KALKOVAN
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: CONTRACTOR COMPLETED PLACING GRAVELLY SAND COVER OVER NORTHWEST CORNER SECTION OF PROJECT COVER WAS PLACED IN APPROX 2' LIFTS AND COMPACTED WITH A SAKAI 910 VIBRATORY DRUM ROLLER PER PROCEDURES OUTLINED IN PREVIOUS FIELD REPORTS.* PIT RUN USED IS FROM THE LLOYD'S MILTON PIT. REPRESENTATIVE FROM CMTL LABORATORIES CAME BY IN AFTERNOON TO TAKE SAMPLE FOR SIEVE ANALYSIS. SAMPLE ALSO TAKEN OF 1 1/4" MINUS GRAVEL - TAKEN DIRECTLY FROM WOOLWORTH PIT.

TRUCK AND PUP TRUCKS USED TO HAUL gravelly sand PIT RUN - TOTAL OF 105 LOADS

*WATER ADDED TO GRAVELLY SAND TO AID IN COMPACTION. THICKER LIFT THAN SPECIFIED DUE TO SOFT SUBGRADE. COMPACTION WILL BE CONFIRMED BY BACKHOE IN LOWER LIFTS.



BY: Carl Wolfe
HART CROWSER REPRESENTATIVE

REVIEWED BY: John R. Verduin
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 59
Page 1 of 2
DATE 5 May, 1993
S M T (W) Th F S

JOB Blair Backup — ARRIVAL TIME: 0700
LOCATION Taylor Way, Tacoma, WA — DEPARTURE TIME:
CLIENT Port of Tacoma — WEATHER: partly cloudy
PURPOSE OF OBSERVATIONS grading
H-C REPRESENTATIVE Grant Fuechtel — H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE — PERMIT NO.
CONTRACTOR REP. John Kalkoven — JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: at Port's & our request RCIE used backhoe & loader to excavate site soil remaining around wells HC 12S and 12I to about 2' below top of adjacent sand and Gravel COVER, to allow placement of 2' minimum COVER over the wells area as well. Area cut was about 30' by 20' x 2½' deep, ~~with~~ leaving about 3' square columns of site soil left in place around wells, to avoid disturbing the surface seals for the wells. The soil was removed to the CAP area, and the resulting excavation backfilled with imported SAND & GRAVEL COVER. Time- apx. 1 hr cat 245 backhoe, 1¼ hr. Komatsu WA 450 loader. RCIE also cut stickup monument from well EPA 8I (part of abandonment of the well) and welded it to casing at well EPA 10I, so that ~~[illegible]~~ steel monument will stickup above SAND & GRAVEL COVER to be placed in the area. Prior to this, we installed a 2½' extension to the 2" PVC monitoring well. RCIE mechanic time- apx. 1 hr.

Contractor continued placing imported SAND & GRAVEL COVER from Lloyds Milton pit in the NW and north part of the site as shown on the following sketch. COVER was placed in a 1 to 2' lift over separation geotextile, moisture conditioned and rolled with a Sakai 910 vibratory drum roller. In the area where

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verduin — HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report. — CONTRACTOR REPRESENTATIVE

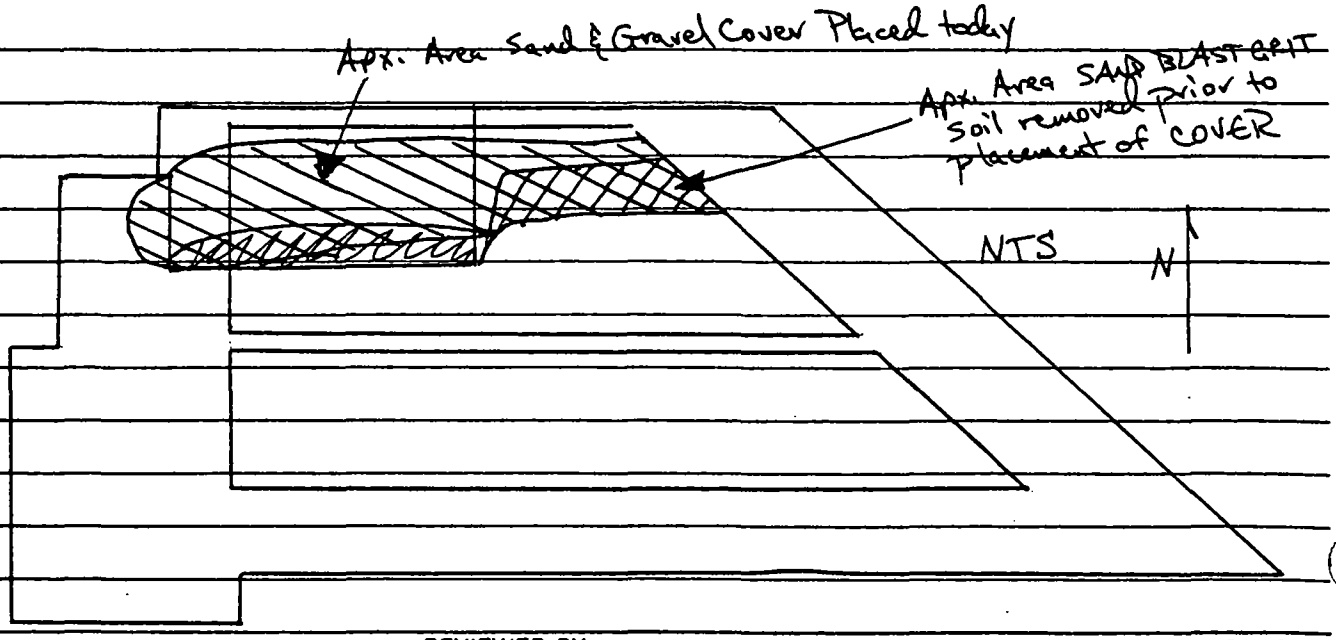
HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
206.324.9530

Job No. 2350-22
Field Report No. 59
Page 2 of 2

Job Blair Backup
Date 5 May, 1993

Sand Blast Grit Soil had been placed near the northeast corner of the originally planned asphalt CAP area, the Grit soil was completely removed down to the ~~the~~ SAND and GRAVEL BUFFER layer prior to placing SAND and GRAVEL COVER. The Cat 245 backhoe was used to move the Grit Soil. Backhoe - ½ day. 117 truck-trailer loads of COVER were delivered today - apx. 3500 Tons. Because of restricted area in which COVER placement occurred (with heavy equipment & truck traffic, no density tests to confirm compaction were performed today. These tests will be done tomorrow when traffic is lighter.



BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 60
Page 1 of 2
DATE 6 May, 1993
S M T W (Th) F S

JOB Blair Backup
ARRIVAL TIME: 0715
LOCATION Taylor Way, Tacoma, WA.
DEPARTURE TIME: 1615
CLIENT Port of Tacoma
WEATHER: light rain/AM, pt hyddy/PM
PURPOSE OF OBSERVATIONS grading
H-C REPRESENTATIVE Grant Kuechtel
H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE
PERMIT NO.
CONTRACTOR REP. John Kalkoven
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: attended 0830 meeting with Port of Tacoma, RCIE, Landau & HC representatives. At meeting RCIE proposed flattening slopes on edges of slag pads to allow paving with a paving machine instead of using hand operated machines to spread asphalt and compact. They propose flattening slopes to catch original planned 0.5% slope 20 feet from original planned edge of slag. This flattens slope to a max (maximum) 8% instead of the 33.3% shown on plans. John Verduin of HC saw no problem with this subject to approval by EPA, as this is a change from the approved plans.

Later in day discussed ramifications of slopes with Pat Gailey and John Kalkoven (RCI) and Ed Stephens (Port). PI Tribe has been told they will have a 100' utility corridor ~~along~~ between the south side of the site and the south pad. This means bottom of asphalt cap should not extend south past the edge of "Asphalt Concrete Cap" as shown on plan sheet C-16 and section E-3 on sheet C-19. This needs to be borne in mind as RCIE fine grades edges of the pads.

Contractor Activities: took Sand Blast Grit soil stockpiled on north pad near NE pad corner and placed along slopes of "central valley to match slopes as ~~proposed~~ proposed in meeting earlier today. Material was placed in a 10" or less thick loose lift and compacted.

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verduin HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report. CONTRACTOR REPRESENTATIVE

HARTCROWSER
Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
206.324.9530

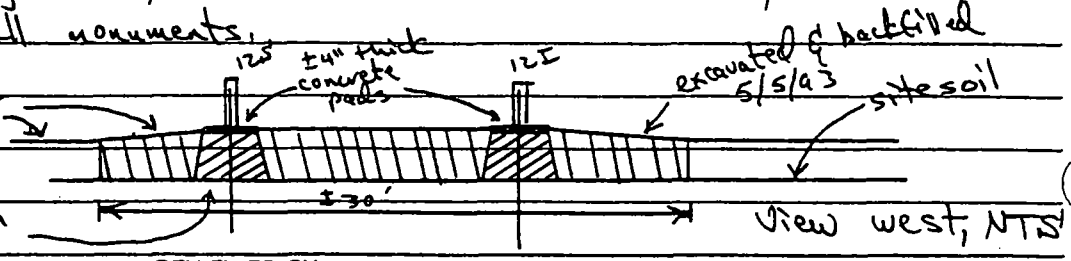
Job No. 2350-22
Field Report No. 6D

Job Blair Backup
Date 6 May, 1993

with the Sakai 91D vibratory drum roller to a firm condition. Trucks underwent "dry decon" ~~at~~ as follows; Trucks were loaded with Cat 245 backhoe. ~~Prior to leaving~~ As they left slag area, outside of truck box, tires and chassis of truck were checked for soil adhering, and loose soil was brushed off. Trucks then exited slag area and drove on clean Sand and Gravel (cover and buffer) to dump area. After dumping load on clean buffer outside of truck box and tires were checked for and cleaned of any adhering contaminated soil. This was brushed off in area where soil will later be placed. Periodically, contaminated soil which had been brushed off at the loading end was consolidated and loaded out.

Performed 4 in-place soil moisture-density tests with the nuclear gauge to confirm compaction of Sand & Gravel COVER placed along the north side of the project area yesterday. Two tests at the east end of yesterday's fill showed compaction less than the 95% of modified proctor maximum required. Moisture at these locations was well below optimum- recommend RCIE moisture condition (i.e. water) this area and recompact. Also will need to excavate ±3 locations and test & compaction 1' deep to confirm 92% compaction has been achieved for lower foot of 2' cover placed. These two recommendations were also verbally given to John Kalkoven.

Sketch below shows final conditions at wells HC 12S & 12I. Note that site soil within 1½-2' of the wells was not removed, to avoid disturbing wells, but ~~these~~ these areas ~~is~~ are covered by concrete pads around the well monuments.



BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-72
Field Report No. 61
Page 1 of 1
DATE 7 May, 1993
S M T W Th (F) S

JOB Blair Backup — ARRIVAL TIME: 0725
LOCATION Taylor Way, Tacoma, WA — DEPARTURE TIME: 1815
CLIENT Port of Tacoma — WEATHER: showers
PURPOSE OF OBSERVATIONS
H-C REPRESENTATIVE Grant Knechtel — H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE — PERMIT NO.
CONTRACTOR REP. John Kalkoven — JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: contractor activities: cut outside edges of slag pads to match proposed slopes as outlined in yesterday's field report except north side of north pad. Solo dump trucks were used to haul excess Asarco slag soil ~~the~~ to north side of north pad. Trucks were "dry deconned" as outlined in yesterday's field report.

About 3 truck-trailer loads of Sand & Gravel BUFFER were imported to replace material ~~used~~ borrowed yesterday from along northeast corner (where BUFFER was apx. 1½' thick) to square up buffer edge during placement along north side. An area about 130' long by 20' wide by 1' thick was replaced to raise grade to apx. elev. 15.5. Made 1 in-place soil moisture density test to confirm compaction after Buffer was replaced - compaction was 100% of 133.9 pcf modified proctor.

Made 1 in-place soil moisture-density test on Sand & Gravel COVER placed Tuesday and final compacted yesterday. Compaction was 95% of 130.4 pcf Modified Proctor maximum.

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report. CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 62
Page 1 of 1
DATE 10 May, 1993
S (M) T W Th F S

JOB Blair Backup
ARRIVAL TIME: 0730
LOCATION Taylor Way, Tacoma, WA
DEPARTURE TIME: 1630
CLIENT Port of Tacoma
WEATHER: partly cloudy, 70°F
PURPOSE OF OBSERVATIONS grading
H-C REPRESENTATIVE Grant Knechtel
H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE
PERMIT NO.
CONTRACTOR REP. John Kalkoven
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: contractor installed CMP and catch basin CBF to complete installing storm drains for the project. Apx. 50 lineal feet of CMP were installed per methods used for previous CMP's on the site- pea gravel bedding to the top of pipe, backfilled with Sand & Gravel COVER above the bedding.

Contractor fine graded south pad and completed dressing east slope of north pad. Material piled along north side of north pad (from cutting edges of south pad) was placed along north side to ~~EE~~ form slope.

BY: [signature]
HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verduin
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
[signature]
CONTRACTOR REPRESENTATIVE

HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

FIELD REPORT

Job No. 2350-22
Field Report No. 63
Page 1 of 1
DATE 11 May, 1993
S M (T) W Th F S

JOB Blair Backup ARRIVAL TIME: 0715
LOCATION Tacoma, WA DEPARTURE TIME: 1700
CLIENT Port of Tacoma WEATHER: overcast/clearing 70°F
PURPOSE OF OBSERVATIONS grading / dig storm drain ditch
H-C REPRESENTATIVE Grant Fuechtel H C PROJECT MANAGER John Verduin
CONTRACTOR RCI E PERMIT NO.
CONTRACTOR REP. John Kalkoven JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: contractor continued rough grading north pad to conform to planned 0.590 slope. Some areas are still wet and pumping but pad is drying/stabilizing with dry weather.

contractor dug marginal ditch along north side of planned Sand & Gravel COVER - Ditch is at same level as top of CB#1 in NE site corner - RCI reports ~~elev~~ elev. I 15.3. Ditch is rather shallow - 6" or less over most of the ≈580 lineal feet dug today.

Contractor removed temporary tide gate between MH1 and older existing 24" CMP which conveys storm water off site. New 24" CMP was installed to connect MH1 and older CMP, bedded in peagravel to above top ~~&~~ of pipe (apx. 1' below top of cover), then backfilled with Sand & Gravel COVER borrowed from north side of site (Lloyds Milton pit material).

Contractor started importing crushed rock base course from Woodworth's Hylebos pit. 10 belly dump truck loads were imported - 273.41 Tons per RCI load tickets. Material was placed along south slope of south pad to provide a clean running surface for full scale hauling planned to start tomorrow AM. Truck was deconned by cleaning wheels and chassis of loose adhering potentially slag contaminated soil as it left pad. As this area of pad was firm and dry to moist, very little soil from the pad was tracked to the decon area.

BY: REVIEWED BY: I have read and understand the content of this Field Report.

HART CROWSER REPRESENTATIVE HART CROWSER PROJECT MANAGER CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 64
Page 1 of 1
DATE 12 May, 1993
S M T (W) Th F S

JOB Blair Backup
ARRIVAL TIME: 0730
LOCATION Taylor Way, Tacoma, WA
DEPARTURE TIME: 1640
CLIENT Port of Tacoma
WEATHER: Clear
PURPOSE OF OBSERVATIONS grading
H-C REPRESENTATIVE Grant Knechtel
H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE
PERMIT NO.
CONTRACTOR REP. John Kalkoven
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: Contractor placed crushed rock BASE COURSE over most of south pad today. Belly dump trucks were used to haul ±3600 tons of crushed rock from Woolworth's Hylebos pit. Material was placed in a 5 to 6" thick lift (after compaction) and rolled with a self-propelled vibratory drum roller. Most of the pad (about ~~±~~ 75%) is firm and stable but some randomly distributed areas are rolling and pumping. Contractor anticipates these areas will stabilize, as drying occurs. We will perform in-place moisture-density tests and check depth of base course after fine grading and compaction is complete, prior to paving.

Contractor fine graded some on north pad today but the north slope and north ~~pad~~ part of the pad remain to be ~~com~~ graded. Much of the north pad is still wet, pumping and unstable but has showed marked improvement in the last 3 days due to drying.

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report. CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 65
Page 1 of 1
DATE 13 May, 1993
S M T W Th F S

JOB Blair Backup
ARRIVAL TIME: 0735
LOCATION Taylor Way, Tacoma, WA
DEPARTURE TIME: 1605
CLIENT Port of Tacoma
WEATHER: clouds/clear
PURPOSE OF OBSERVATIONS grading
H-C REPRESENTATIVE Grant Knechtel
H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE
PERMIT NO.
CONTRACTOR REP. John Kalkoven
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: contractor placed Sand & Gravel COVER from stockpile at north side of site, over storm drain down central valley between manholes 3, 4 and 5. The pit run material from Lloyd's ~~Hilton~~ Milton pit was placed in a 6" to 10" thick loose lift, moisture conditioned and compacted with the Sakai 91D vibratory drum roller. Made 1 in-place soil moisture-density test with the nuclear gauge, to confirm compaction. Compaction was 95.2 % of 130.4 pcf modified proctor maximum. Entire central valley area was then backfilled with Crushed Rock Base Course from Woodworth's Hylebos pit. Solo belly dumps hauled ± 1300 Tons of base course today. Trucks ran on clean crushed rock to eliminate need for decontamination of trucks prior to leaving site. Prior to backfill apx. 60' of CMP storm drain at the west end of the central valley, between manholes 6 and 7 were repaired - pipe had been installed with ~~to~~ cover only to spring line of pipe (equal to adjacent ground surface), and floated up 2-4" when heavy rains raised water level in ditch.

Attended 0830 construction progress meeting with Port of Tacoma, Hart Crowser, RCI and Watson (paving subcontractor). Among items discussed was that south pad has 5" of base course installed. RCI ~~will need~~ must ~~to~~ complete 6" base course section prior to paving.

At Port's request sampled base course mat't imported today for testing, Sample No. W3,

BY: REVIEWED BY: I have read and understand the content of this Field Report.

HART CROWSER REPRESENTATIVE — HART CROWSER PROJECT MANAGER — CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 66
Page 1 of 1
DATE 14 May, 1993
S M T W Th (F) S

JOB Blair Backup
ARRIVAL TIME: 0720
LOCATION Taylor Way, Tacoma, WA
DEPARTURE TIME: 1430
CLIENT Port of Tacoma
WEATHER: cloudy / clearing
PURPOSE OF OBSERVATIONS grading
H-C REPRESENTATIVE Grant Knechtel
H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE
PERMIT NO.
CONTRACTOR REP. John Kalkoven
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: ~~[illegible]~~ HART CROWSER WAS present at informal meeting yesterday with Curtis Ratcliffe, Ed Stephens and John Kalkoven on site. The Port would like to have full thickness (6") of base course on slag pads so that plate load tests can be performed on planned pavement subgrade prior to paving. This testing will take about 2 weeks - if RCI delays completing placement of 6" base course on south pad (which now has 5" over it) this could delay paving. Curtis Ratcliffe reported a conversation with Pat Gailey today in which he agreed to this.

contractor brought in 106 Tons crushed rock base course in belly dump, ~~to complete~~ and placed at far west end of central storm drain. Truck ran only on clean crushed rock surface, so no decon was needed. Contractor completed final grading of north pad and north slope of pad. Current plan is to place Base Course over north pad Monday. Reminded John Kalkoven as built plan of slag surface will be needed.

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verduin
HART CROWSER PROJECT MANAGER

I have read and understand the contents of this Field Report.
CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 67
Page 1 of 1
DATE 17 May, 1993
S (M) T W Th F S

JOB Blair Backup ARRIVAL TIME: 0720
LOCATION Taylor Way, Tacoma, WA DEPARTURE TIME: 1625
CLIENT Port of Tacoma WEATHER: clear
PURPOSE OF OBSERVATIONS grading
H-C REPRESENTATIVE Grant Krechtel H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE PERMIT NO.
CONTRACTOR REP. John Kalkoven JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: Contractor placed Crushed Rock BASE COURSE on north slag pad today. 4275 Tons of material were imported from Woodworth's Hylebos pit using Belly Dump trucks. Until a roadway of clean imported base course was established across the pad, truck wheels were brushed clean of all ~~the~~ adhering soil prior to leaving the pad. After roadway was established trucks ran only on clean imported material. Base course was spread in an apx. 8" thick loose lift, graded and compacted to apx. 6" thick compacted using caterpillar dozers, grader and vibratory drum roller. Made 4 in-place soil moisture-density tests with the nuclear gauge to confirm compaction - which ranged from 96 to 100% of 129.4 pcf modified proctor. Also dug through the base course at the four test locations to confirm thickness - which was 8", 5½", 5" and 6" at the four locations.

At Port's request contractor installed a 6" perf pipe drain along the northeast (diagonal) side of the south slag pad. Purpose is to convey water which has been seeping from quarry spalls layer below the slag pad since the slope was cut last week to planned outline. The 6" drain was installed just outside and just below the planned asphalt CAP, at apx. invert 14.5, and was "T"'d into the existing 6" perf pipe drain between manholes 2 and 3, apx. 35' east of MH3.

BY: [signature]
HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verduin
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
[signature] ESQ
CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 63
Page 1 of 1
DATE 18 May 1993
S M (T) W Th F S

JOB Blair Backup
ARRIVAL TIME: 0745
LOCATION Taylor Way, Tacoma, WA
DEPARTURE TIME: 1630
CLIENT Port of Tacoma
WEATHER: partly cloudy
PURPOSE OF OBSERVATIONS grading
H-C REPRESENTATIVE Grant Knechtel
H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE
PERMIT NO.
CONTRACTOR REP. John Kalkoven
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: Contractor continued fine grading crushed rock BASECOURSE over north pad and added 11" to south pad, completing majority of both pads. North slope of north pad is not yet complete, pending addition of drummed material currently stored at Waterway part of site. Single belly dump truck brought 307 Tons of Base Course from Woodworth's Hylebos pit on site.

Performed 4 in-place density tests on remainder of north pad to confirm compaction - results were 95 to 100% of 129.4 pcf modified proctor. Also checked depths of base course - 4½ to 8¼" at test locations on north pad.

Performed 7 in place density tests and checked depth of base course over south pad. Compaction was 96 to over 100% of 129.4 pcf modified proctor. Depths of base course were 4¼ to 7¼".

Due to lack of a full day's productive work for tomorrow - contractor plans to not work here tomorrow.

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 69
Page 1 of 1
DATE 20 May, 1993
S M T W (TH) F S

JOB Blair Backup
ARRIVAL TIME: 0715
LOCATION Taylor Way, Tacoma, WA.
DEPARTURE TIME: 1030
CLIENT Port of Tacoma
WEATHER: showers
PURPOSE OF OBSERVATIONS grading
H-C REPRESENTATIVE Grant Knechtel
H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE
PERMIT NO.
CONTRACTOR REP. John Kalkoven.
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: Attended 0830 construction progress meeting on site. It was agreed we will start plate load tests on pads tomorrow. RCIE will provide 245 backhoe for reaction mass - 2 hrs. for hoe, ~~10 hrs for loads wanted~~ 4 hrs minimum, for operator. Anticipate 2-3 days. Returned to Hart Crowser to pickup plate load testing equipment, for 0730 start

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verduin
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 70
Page 1 of 1
DATE 21 May, 1993
S M T W Th (F) S

JOB Blair Backup
ARRIVAL TIME: 0715
LOCATION Taylor Way, Tacoma, WA.
DEPARTURE TIME: 1700
CLIENT Port of Tacoma
WEATHER: showers
PURPOSE OF OBSERVATIONS plate load tests
H-C REPRESENTATIVE Grant Kuechtel
H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE
PERMIT NO.
CONTRACTOR REP. John Kalkoven
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: started plate load tests on south slag pad.
Operator Time - 8hrs. load tests, 0.5 hrs. pumping charcoal stockpile sump
Backhoe 2hrs (per minimum)
completed 2 tests & setup for 1st thing Monday AM.

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 71
Page 1 of 1
DATE 24 May, 1993
S (M) T W Th F S

JOB Blair Backup
ARRIVAL TIME: 0715
LOCATION Taylor Way, Tacoma, WA
DEPARTURE TIME: 1730
CLIENT Port of Tacoma
WEATHER: clear, 85°
PURPOSE OF OBSERVATIONS plate load tests
H-C REPRESENTATIVE Grant Knechtel
H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE
PERMIT NO.
CONTRACTOR REP. John Kalkoven
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: on site to run plate load tests at surface of crushed rock base course. A Cat 245 track hoe was used as reaction mass. 30" Plate was set between tracks (after preparing surface with fine SAND to fill voids) and hydraulic ram used to jack plate against undercarriage of hoe. Two nesting 1" thick plates were set above the 30"ϕx1" bottom plate. Dial gauges accurate to .001" were rigidly attached to two 10' instrumentation beams supported ± 5' from the 30" ϕ plate. The 3 dial gauges were used to measure deflection of the plate as loads were incrementally applied to the plate. Loads on the plate were monitored using calibrated pressure gauges in the hydraulic lines to the calibrated hydraulic ram. Maximum load applied to the plate was 60 kips (30 Tons).

RCI Backhoe equipment time - 2 hrs.
RCI Operator time 7 hrs. load tests
1 hrs. RCI equipment loading
½ hrs. pumping sump @ charcoal stockpile
3 tests completed today.

BY: Grant Knechtel
HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verduin
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
John Kalkoven
CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 72
Page 1 of 1
DATE 25 May, 1993
S M (T) W Th F S

JOB Blair Backup
ARRIVAL TIME: 0800
LOCATION Taylor Way, Tacoma, WA
DEPARTURE TIME: 1100
CLIENT Port of Tacoma
WEATHER: cloudy
PURPOSE OF OBSERVATIONS plate load tests
H-C REPRESENTATIVE Grant Knechtel
H C PROJECT MANAGER John Verduin
CONTRACTOR RCI
PERMIT NO.
CONTRACTOR REP. John Kalkoven
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: on site to run plate load test at surface of crushed rock base course. Methods were as outlined in yesterday's field report. Completed 1 test - total complete 6.

RCI Backhoe time - 1 hr

RCI Operator time - 3 hrs

Returned plate load test equipment to Hart Crowser, test data to John Verduin.

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
CONTRACTOR REPRESENTATIVE

HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

FIELD REPORT

Job No. 2350-22
Field Report No. 73
Page 1 of 1
DATE 26 May, 1993
S M T (W) Th F S

JOB Blair Backup
ARRIVAL TIME: 0715
LOCATION Taylor Way, Tacoma, WA
DEPARTURE TIME: 1600
CLIENT Port of Tacoma
WEATHER: clearing
PURPOSE OF OBSERVATIONS grading
H-C REPRESENTATIVE Grant Trechtel
H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE
PERMIT NO.
CONTRACTOR REP. John Kalkoven
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: contractor removed drums from storage shed at Waterway part of site per Port's instructions and disposed of as follows:

Drums numbered A, B, C, D, 5, 7, 8, 9, 27, 28, 37, 48, 52, 53, 58, 59, 61, 64, 66, 85, 88, 110, 122, 126, 131, 144, 146, 156, 157, 172, 174, 175, 176, 184, 203 and 204 were brought to the north edge of the north slag pad and emptied. Soil will be incorporated into slag to be capped.

Drums numbered 202 (2 ea.) were taken to the Murray Pacific property and emptied in the northwest corner of the yard, apx. 200 feet from the Lincoln Avenue ditch and 100 feet from Port of Tacoma Road.

The drum numbered 205 was taken to the Wasser Winters property and emptied about 200 feet from Marine View Dr., 300 feet from ~~the~~ Hylebos Creek.

All drums were returned to the Blair Backup site north slag pad where they will be triple rinsed with high pressure water and disposed of to a metals recycler.

18 Drums remain at the Waterway site to be disposed of tomorrow.

BY: [signature]
HART CROWSER REPRESENTATIVE

REVIEWED BY: [signature]
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
[signature]
CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 74
Page 1 of 1
DATE 27 May, 1993
S M T W (Th) F S

JOB Blair Backup
ARRIVAL TIME: 0730
LOCATION Taylor Way, Tacoma, WA
DEPARTURE TIME: 1030
CLIENT Port of Tacoma
WEATHER: cloudy
PURPOSE OF OBSERVATIONS grading
H-C REPRESENTATIVE Grant Fuechtel
H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE
PERMIT NO.
CONTRACTOR REP. John Kalkoven
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: contractor brought remaining drums from storage shed at Waterway part of site and emptied on north side of north slag pad, as outlined in yesterday's field report. Drums emptied today were Nos. 29, 38, 42, 43, 44, 47, 72, 87, 92, 102, 147, 148, 149, 150, 155, 195, 196, 197. Total Drums disposed yesterday & today - 57, 54 @ Backup, 2 @ Murray Pacific, 1 @ Wasser Winters. Drums will be triple rinsed & recycled.

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 75
Page 1 of 1
DATE 10 June, 1993
S M T W (Th) F S

JOB Blair Backup
ARRIVAL TIME: 0815
LOCATION Taylor Way, Tacoma, WA
DEPARTURE TIME: 1000
CLIENT Port of Tacoma
WEATHER: cloudy
PURPOSE OF OBSERVATIONS site status
H-C REPRESENTATIVE Grant Kuechtel
H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE
PERMIT NO.
CONTRACTOR REP. Pat Gailey / Greg Bennet
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: after attending 0830 site progress meeting observed surface of two crushed rock covered slag pads, stability of crushed rock surface has improved ~~condi~~ considerably in two weeks. Feel that south pad is probably suitable to pave and 90% of north pad is sufficiently stable to pave.

Contractor pumped sump at charcoal stockpile - apx. 1½ hrs on site contractor time.

BY: [signature]
HART CROWSER REPRESENTATIVE

REVIEWED BY: [signature]
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.

CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 76
Page 1 of 1
DATE 16 June, 1993
S M T (W) Th F S

JOB Blair Backup
ARRIVAL TIME: 0730
LOCATION Taylor Way, Tacoma, WA
DEPARTURE TIME: 1700
CLIENT Port of Tacoma
WEATHER: cloudy/clearing
PURPOSE OF OBSERVATIONS charcoal briquette soil
H-C REPRESENTATIVE Grant Guechtel
H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE
PERMIT NO.
CONTRACTOR REP. Pat Gailey
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: on site to observe loadout of charcoal briquette laden soil stockpiled after removal from the PAH area. Rabanco had delivered 5 rail cars with 15 containers, 3 containers each. 10 containers were full height 8', 5 were half height 4', x 20' x 8'. RCIE lined the containers with 6 mil visqueen, then used Komatsu KL 451 loader, starting 1315, to load briquette soil into containers. 5 short containers were loaded by end of day, with visqueen covering soil in containers. Stockpile was recovered and sandbagged for the night. RCIE plans to use two loaders tomorrow ~~to~~ to speed up the process.

Container Nos loaded today: EASU 420002, EASU 420034, EASU 420009 on car No. TTWX 973569, and Nos. EASU 1420012 and EASU 1420004 on car TTWX 978862.

Decon methods: Loader picks up briquette soil down to clean original ground, driving only on original ground, so bucket is only part which contacts briquette soil, then drives to loading area. Before leaving stockpile area loose briquette soil is shaken off the bucket. Briquette soil is removed from outside of containers and from cars and loading area prior to covering soil in containers and returned to container.

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 77
Page 1 of 1
DATE 17 June, 1993
S M T W (Th) F S

JOB Blair Backup — ARRIVAL TIME: 0715
LOCATION Taylor Way, Tacoma, WA — DEPARTURE TIME: 1415
CLIENT Port of Tacoma — WEATHER: cloudy/clear
PURPOSE OF OBSERVATIONS charcoal briquette soil
H-C REPRESENTATIVE Grant Knechtel — H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE — PERMIT NO.
CONTRACTOR REP. Pat Gailey — JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: onsite to observe load out of charcoal briquette laden soil as outlined in yesterday's field report. 2 Komatsu loaders were used today, with loading completed by 11 AM. 6 mil visqueen used to line the containers was overlapped then held down with sand bags tied together with heavy twine.

Containers Loaded today:

No. XCLU 211176 completing car no. TTWX 978862

No. CONU 295287, XCLU 212048 and UFCU 460122 on car TTWX 971220

No. XTRU 611145, CONU 294181 and TTEU ~~133054~~ 133054 on car TTWX 991197

No. XCLU 207119, XTRU 611882 and XCLU 294627 on car TTWX 981648

RCI called Rabanco to arrange pickup of cars; it is planned to have 5 more cars in for tomorrow's loading.

Personally ~~checked~~ observed outside of all containers for spilled briquette soil: none was noted.

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report. CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 78
Page 1 of 1
DATE 18 June, 1993
S M T W Th (F) S

JOB Blair Backup
ARRIVAL TIME: 0715
LOCATION Taylor Way, Tacoma, WA
DEPARTURE TIME: 1500
CLIENT Port of Tacoma
WEATHER: cloudy/clearing
PURPOSE OF OBSERVATIONS charcoal briquette soil
H-C REPRESENTATIVE Grant Knechtel
H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE
PERMIT NO.
CONTRACTOR REP. Pat Gailey/Gator Barrett
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: observed load out of charcoal briquette laden soil from the stockpile at the north part of the site. Methods were as outlined in our 6/16 Field report. Containers were all short (4' high) containers.

Container No.	Car No.	Container No.	Car No.
EASU 420010	TTWX993439	EASU 420006	TTWX 970603
" 420017		" 420029	
" 420024		" 420031	
EASU 420022	TTWX ~~99343~~ 980050	EASU 420016	TTWX 991438
" 420007		" 420019	
" 420032		" 420003	
EASU 420028	TTWX 980804		
" 420021			
" 420001			

~~Checked~~ observed outside of cars for spilled charcoal briquette soil - none was noted.

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report. CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 79
Page 1 of 1
DATE 21 June, 1993
S (M) T W Th F S

JOB Blair Backup
ARRIVAL TIME: 0715
LOCATION Taylor Way, Tacoma, WA
DEPARTURE TIME: 1600
CLIENT Port of Tacoma
WEATHER: cloudy/showers
PURPOSE OF OBSERVATIONS Briquette Soil
H-C REPRESENTATIVE Grant Enechtel
H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE
PERMIT NO.
CONTRACTOR REP. "Gator" Barrett
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: observed load out of charcoal briquette laden soil into ~~rai~~ containers on rail cars as noted in our 6/16/93 Field Report. Methods were as outlined. Two loaders were used. Rabanco provided 5 rail cars but one car had no containers on it today. Containers were all 8' high units today.

Container No.	Car No.	Container No.	Car No.
XTRU 611335	LPN 61048	CONU 295186	LPN 61025
CONU 295312		XCLU 210916	
ACLU 461116		SCXX 267404	
ITLU 760733	LPN 61056	460325	LPN 61055
UFCU 460258		XCLU 218047	
XTRU 2924080		CONU 294797	

Car No LPN 61058 - no containers.

RCI Got report of weights loaded onto first set of rail cars/containers - they average 18,~~000#~~ Tons per container, we are allowed 23,~~000#~~ Tons according to Gary Schulze. We ~~#~~ increased amount loaded into each container from 4 buckets (apx 4 cy ea.) to 5 buckets - should be closer to 23 ~~K~~ Tons allowed.

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 80
Page 1 of 1
DATE 22 June, 1993
S M (T) W Th F S

JOB Blair Backup
ARRIVAL TIME: 0715
LOCATION Taylor Way, Tacoma, WA
DEPARTURE TIME: ~~0745~~ 0900
CLIENT Port of Tacoma
WEATHER: rain
PURPOSE OF OBSERVATIONS Briquette Soil
H-C REPRESENTATIVE Grant Knechtel
H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE
PERMIT NO.
CONTRACTOR REP. Gator Barrett
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: on site to observe loadout of charcoal briquette laden soil. Failed to get rail cars w/ containers on site from Rabanco last night. Contractor doing some maintenance to loading area, while waiting to find out if cars will be available today.

BY: [signature]
HART CROWSER REPRESENTATIVE

REVIEWED BY: [signature]
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
[signature]
CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 81
Page 1 of 1
DATE 23 June 1993
S M T (W) Th F S

JOB Blair Backup
ARRIVAL TIME: 0715
LOCATION Taylor Way, Tacoma, WA
DEPARTURE TIME: 1600
CLIENT Port of Tacoma
WEATHER: partly sunny
PURPOSE OF OBSERVATIONS Charcoal
H-C REPRESENTATIVE Grant Knechtel
H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE
PERMIT NO.
CONTRACTOR REP. Gator Barrett
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: on site to observe loading of charcoal briquette soil into containers on rail cars as outlined in our 6/16/93 field report. Methods and decontamination procedures were as previously outlined. One loader was used until 1230, then job finished out with two.

Container No.	Rail Car No.	Container No.	Rail Car No.
EASU 420002	TTWX 973569	XTRU 611145	TTWX 991197
" 420034		ITEU 133054	
" 420009		CONU 294181	
EASU 420012	TTWX 978862	XCLU 210719	TTWX 981648
XCLU 211176		XTRU 611882	
EASU 420004		XCLU 294627	
XCLU 212048	TTWX 971220		
UFCU 460122			
CONU 295287			

Examined outside of containers and rail cars for spilled soil at completion of loading: none was noted.

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report. CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 82
Page 1 of 1
DATE 24 June, 1993
S M T W (Th) F S

JOB Blair Backup
ARRIVAL TIME: 0720
LOCATION Taylor Way, Tacoma, WA
DEPARTURE TIME: 1500
CLIENT Port of Tacoma
WEATHER: partly cloudy
PURPOSE OF OBSERVATIONS Briquette laden soil
H-C REPRESENTATIVE Grant Knechtel
H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE
PERMIT NO.
CONTRACTOR REP. Gator Barrett
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: observed load out of charcoal briquette laden soil from stockpile into containers on rail cars. Methods including cleanup/decontamination were as noted in our 6/16/93 field report. Two loaders were used.

Container No.	Car No.	Container No.	Car No.
EASU 420003	TTWX 991438	EASU 420032	TTWX 980050
" 420019		" 420007	
" 420016		" 420022	
EASU 420031	TTWX 970603	EASU 420027	TTWX 993439
" 420029		" 420010	
" 420006		" 420017	
EASU 420001	TTWX 980804		
" 420021			
" 420028			

~~EASU 420032~~ In conversation with Gary Schulze (Regional Disposal Co.) discussed: cars are arriving back from landfill with containers not swept - this must be done per plans. Also, LPN cars (loaded Monday, back on site tomorrow, ~~may~~ are allowed 28 Tons per container, total 84 Tons per car. We will increase to 6 loader buckets per container for these cars - about 27 Tons per container

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report. CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 83
Page 1 of 1
DATE 25 June, 1993
S M T W Th (F) S

JOB Blair Backup
ARRIVAL TIME: 0720
LOCATION Taylor Way, Tacoma, WA
DEPARTURE TIME: 1500
CLIENT Port of Tacoma
WEATHER: clear
PURPOSE OF OBSERVATIONS Briquette Soil
H-C REPRESENTATIVE Grant Knichtel
H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE
PERMIT NO.
CONTRACTOR REP. Gator Barrett
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: on site to observe load out of stockpiled charcoal briquette laden soil. Load out and decon methods were as outlined in our previous field reports. Two loaders were used today. Apx. 6 loader buckets were placed in each container today.

Container No.	Car No.	Container No.	Car No.
ACLU 461116	LPN 61048	CONU 295186	LPN 61025
CONU 295312		XCLU 210916	
XTRU 292408		SCXU 267404	
UFCU 460258	LPN 61056	460325	LPN 61055
ITLU 760733		XCLU 218047	
		CONU 294797	

Note that car LPN 61056 bore only 2 containers - it appears attachment for 1 container had been damaged.

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verduin HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report. CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 84
Page 1 of 2
DATE 28 June, 1993
S (M) T W Th F S

JOB Blair Backup ARRIVAL TIME: 0730
LOCATION Taylor Way, Tacoma, WA DEPARTURE TIME: 1030
CLIENT Port of Tacoma WEATHER: showers
PURPOSE OF OBSERVATIONS charcoal briquette soil, slag pads
H-C REPRESENTATIVE Grant Knechtel H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE PERMIT NO.
CONTRACTOR REP. Vernon Owens JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: on site to observe load out of stockpiled charcoal briquette soil. Rail cars loaded out 6/23 and removed that P.M. had not returned. Contractor sent crew home, but will need to pay 2 Hr. minimum.

Attended 0830 meeting with HC, Port, RCI, Watson (pavers), Pacific Testing & Asphalt Institute r.e. planned asphalt cap over slag pads. RCI provided a twin-dual axle dump truck, gross weight 30 Tons, for proof rolling sub grade of both north & south pads.

South pad- most of pad, only deflection was 1/4" or less compaction of crushed rock base under wheel loads. An apx. 150' x 50' wide area near the west end deflected apx 1/2" then rebounded after proof rolling.

North Pad- crushed rock base compacted apx 1/4" or less as observed on south pad. Most of west half of pad deflected apx 1/2" and rebounded, as noted over part of south pad. About 1/3 of the middle of the pad deflected 1 to 2" under wheel loading, and did not rebound. These conditions appear to preclude placing the planned asphalt concrete cap material in 1 1/2" lifts and compacting to 98% Marshall as required to meet specified permeabilities. RCI is developing proposals for placing additional subgrade material, and will present to the Port. The 17.28 Tons of

BY: REVIEWED BY: I have read and understand the content of this Field Report.

HART CROWSER REPRESENTATIVE HART CROWSER PROJECT MANAGER CONTRACTOR REPRESENTATIVE

HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
206.324.9530

Job No. 2350-22

Field Report No. 84

Job Blair Backup

Date 28 June, 1993

crushed rock base course material from Woodworth's Hylebos pit, used to load the dump truck, was stockpiled on site for later use as paving Base Course or Wearing Course.

BY:

HART CROWSER REPRESENTATIVE

REVIEWED BY:

HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.

CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 85
Page 1 of 1
DATE 29 June, 1993
S M (T) W Th F S

JOB Blair Backup ARRIVAL TIME: 0720
LOCATION Taylor Way, Tacoma, WA DEPARTURE TIME: 1500
CLIENT Port of Tacoma WEATHER:
PURPOSE OF OBSERVATIONS Charcoal Briquette Soil
H-C REPRESENTATIVE Grant Knechtel H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE PERMIT NO.
CONTRACTOR REP. Vernon Owens JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: on site to observe loading of stockpiled charcoal briquette laden soil into containers on rail cars. Loading and decon methods were as outlined in previous field reports

Container No.	Car No.	Container No.	Car No.
XCLU 294627	TTWX 981648	EASU 420004	TTWX 978862
XTRU 611882		XCLU 211179	
XCLU 210719		EASU 420034	
CONU 294181	TTWX 991197	EASU 420012	TTWX 973569
ITEU 133054		EASU 420009	
XTRU 611145		EASU 420002	
CONU 295287	TTWX 971220		
UFCU 460122			
XCLU 212048			

Checked outside of containers and on cars for spilled briquette soil - none was noted.

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
CONTRACTOR REPRESENTATIVE

HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

FIELD REPORT

Job No. 2350-22
Field Report No. 86
Page 1 of 1
DATE 30 June, 1993
S M T (W) Th F S

JOB Blair Backup ARRIVAL TIME: 0710
LOCATION Taylor Way, Tacoma, WA DEPARTURE TIME: 1540
CLIENT Port of Tacoma WEATHER: partly cloudy 70°
PURPOSE OF OBSERVATIONS charcoal briquette soil
H-C REPRESENTATIVE Grant Cuechtel H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE PERMIT NO.
CONTRACTOR REP. Gator Barnett JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: on site to observe load out of stockpiled charcoal briquette laden soil into containers on rail cars. Methods and decon were as outlined in our previous field reports.

Container No.		Car No.	Container No.		Car No.
EASU	420017	TTWX 993439	EASU	420006	TTWX 970603
"	420010		"	420029	
"	420027		"	420031	
"	420022	TTWX 980050	"	420016	TTWX 991438
"	420007		"	420019	
"	420032		"	420003	
"	420028	TTWX980804			
"	420021				
"	420001				

Checked outside of cars and containers for spilled briquette soil: none was noted.

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report. CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 87
Page 1 of
DATE 2 July, 1993
S M T W Th (F) S

JOB Blair Backup ARRIVAL TIME: 0715
LOCATION Taylor Way, Tacoma, WA DEPARTURE TIME:
CLIENT Port of Tacoma WEATHER: cloudy
PURPOSE OF OBSERVATIONS charcoal briquette soil
H-C REPRESENTATIVE Grant Knechtel H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE PERMIT NO.
CONTRACTOR REP. Gator Barrett JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: on site to observe charcoal loadout to containers on rail cars per usual procedure. Cars had not been delivered so were unable to load.

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 88
Page 1 of 1
DATE 7/1/93 (S M T W Th F S)

JOB BLAIR WATERWAY & BACKUP PROPERTIES CLEANUP-1993 ARRIVAL TIME: 7:45 / 1140
LOCATION PORT OF TACOMA, WASHINGTON DEPARTURE TIME: 1130 / 1500
CLIENT PORT OF TACOMA WEATHER: O/C ~65°
PURPOSE OF OBSERVATIONS CHARCOAL BRIQUETTE-CONTAMINATED SOIL REMOVAL
H-C REPRESENTATIVE VERDUIN/KNEUHTEL H C PROJECT MANAGER VERDUIN
CONTRACTOR RCIE PERMIT NO. —
CONTRACTOR REP. Gator Barrett JOB PHONE —

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: onsite to observe load out of stockpiled charcoal briquette laden soil as outlined in previous field reports. Decon methods were also as previously outlined.

Container No.	Car No.	Container No.	Car No.
CONU ~~[illegible]~~ 294797	LPN 61055	ITLU 760733	LPN 61056
XCLU 28047		UFCU 460258	
46325		XTRU 292408	
CONU 295186	LPN 61025	CONU 295312	LPN 61048
SCXU 267404		ACLU 461116	
XCLU 20916			

Note that car LPN 61048 carried only 2 containers although there was space for 3.

Checked outside of containers and ~~[illegible]~~ on rail cars for spilled briquette soil- none was noted.

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 89
Page 1 of 1
DATE 6 July, 1993
S M (T) W Th F S

JOB Blair Backup ARRIVAL TIME: 0725
LOCATION Taylor Way, Tacoma, WA DEPARTURE TIME: 1530
CLIENT Port of Tacoma WEATHER: partly cloudy
PURPOSE OF OBSERVATIONS charcoal briquette soil
H-C REPRESENTATIVE Grant Kuechtel H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE PERMIT NO.
CONTRACTOR REP. Gator Barnett JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: on site to observe loading of charcoal briquette laden soil from stockpile to containers on rail cars. Loading and decon methods were as outlined in our previous field reports.

Container No.	Car No.	Container No.	Car No.
CONU 294181	TTWX 981648	XCLU 211176	TTWX 978862
XCLU 294627		EASU 420004	
XTRU 611882		" 420034	
XCLU 210719	TTWX 991197	" 420012	TTWX 973569
ITEU 133054		" 420009	
XTRU 611145		" 420002	
CONU 295287	TTWX 971220		
XCLU 212048			
UFCU 460122			

Checked outside of cars and containers for spilled charcoal briquette soil - none was observed.

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verduin HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report. 7-26-93 CONTRACTOR REPRESENTATIVE

HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

FIELD REPORT

Job No. 2350-12
Field Report No. 90
Page 1 of 1
DATE 7/7/95 (W)
S M T W Th F S

JOB BLAIR BACKUP
ARRIVAL TIME: 7:00
LOCATION TAYLOR WAY, TACOMA WA
DEPARTURE TIME: 3:00
CLIENT PORT OF TACOMA
WEATHER: SUNNY 70'S
PURPOSE OF OBSERVATIONS CHARCOAL BRIQUETTE SOIL TRANSPORT
H-C REPRESENTATIVE P. ESTERNELL
H C PROJECT MANAGER J VERDUIN
CONTRACTOR RCIE
PERMIT NO.
CONTRACTOR REP. PAT GAILEY
JOB PHONE 627 4026

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: HC REP ON SITE TO OBSERVE LOADOUT OF CHARCOAL BRIQUETTE LADEN SOIL STOCKPILED AFTER REMOVAL FROM THE PAH AREA. RABANCO HAD DELIVERED 5 RAIL CARS WITH 3 CONTAINERS PER CAR APPROXIMATELY 4' x 20' x 8' IN SIZE. RCIE LINED THE CONTAINERS WITH 6 MIL VISQUEEN AND USED TWO KOMATSU LOADERS TO LOAD THE BRIQUETTE LADEN SOIL INTO THE LINED CONTAINERS. AFTER THE 15 CONTAINERS WERE FULL, CONTRACTOR COVERED THE MATERIAL WITH VISQUEEN WEIGHED DOWN WITH SANDBAGS. CONTRACTOR COVERED THE CHARCOAL AND SOIL STOCKPILE WITH HEAVY PLASTIC THEN WEIGHED DOWN THE PLASTIC WITH SANDBAGS

CONTAINERS LOADED TODAY EASU 420014-5, EASU420017-1, EASU420027-4 ON CAR TTWX993439; EASU420022-7, EASU420007-9, EASU420032-0 ON CAR TTW 960050; EASU420028-01, EASU420021-1, EASU420001-6 ON CAR TTWX 993804; EASU420029-5, EASU420006-3, EASU420031-4 ON CAR TTWX 970603; EASU420016-6, EASU420003-7, EASU420019-2 ON CAR TTW 991438.

HC REP CHECKED AREA AROUND OUTSIDE OF CARS FOR SPILLED CHARCOAL BRIQUETTE SOIL. MINOR SPILL NOTED. HC REP RECOMMENDED CONTRACTOR REMOVE SPILLED MATERIAL & LOAD IN CONTAINER. CONTRACTOR COMPLIED

BY: Paul Esternell
HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verduin
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 91
Page 1 of 1
DATE 7/8/93
S M T W (Th) F S

JOB BLAIR BACKUP ARRIVAL TIME: 7:40
LOCATION TAYLOR WAY, TACOMA, WA DEPARTURE TIME: 2:50
CLIENT PORT OF TACOMA WEATHER: SUNNY 70's
PURPOSE OF OBSERVATIONS CHARCOAL BRIQUETTE ~~[illegible]~~ LOADING
H-C REPRESENTATIVE VERDUIN/ESTORNELL H C PROJECT MANAGER VERDUIN
CONTRACTOR RCIE PERMIT NO.
CONTRACTOR REP. VERNON OWENS JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: HC REP J. VERDUIN ON SITE UNTIL 11:30 TO OBSERVE CONTRACTOR LOADOUT OF CHARCOAL BRIQUETTE LADEN SOIL STOCKPILE. HC REP P ESTORNELL ARRIVE ON SITE AT 12:00 TO CONTINUE OBSERVATIONS

RABANCO HAD DELIVERED 4 RAIL CARS WITH 11 CONTAINERS TOTAL THE PREVIOUS EVENING. CONTAINERS ARE APPROXIMATELY 8'x20'x8'. RCIE LINED THE CONTAINERS WITH 6MIL VISQUEEN THEN LOADED THE CONTAINERS WITH BRIQUETTE LADEN SOIL USING ONE KOMATSU LOADER. AFTER LOADING THE CONTAINERS, RCIE COVERED THE MATERIAL WITH VISQUEEN THEN WEIGHED DOWN THE VISQUEEN WITH SANDBAGS. RCIE ~~[illegible]~~ COVERED THE CHARCOAL BRIQUETTE LADEN SOIL STOCKPILE WITH HEAVY PLASTIC THEN WEIGHED DOWN THE PLASTIC WITH SANDBAGS.

CONTAINERS LOADED TODAY: ACLU 461162, CONU 2953128 AND XTRU 2924080 ON CAR LPN 61048; UFCU 4602581 AND ITLU 7607336 ON CAR LPN 61056; XCLU 2109164, CONU 2951866, AND SCXU 2674043 ON CAR LPN 61025; 4603253, XCLU 2180476, AND CONU 2947974 ON CAR LPN 61055

HC REP CHECKED AREA AROUND OUTSIDE OF CONTAINERS AND ~~[illegible]~~ ALONG ROAD FROM SOIL STOCKPILE TO RAIL CARS FOR SPILLED CHARCOAL BRIQUETTE SOIL. MINOR SPILLS NOTED. HC REP RECOMMENDED CONTRACTOR REMOVE SPILLED MATERIAL AND LOAD IN CONTAINER. CONTRACTOR COMPLIED. NO RAIL CARS SCHEDULED FOR TOMORROW ACCORDING TO CONTRACTOR'S REP

BY: Paula [illegible]
HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verduin
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
Vernon Owens
CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 92
Page 1 of 1
DATE 12 ~~[illegible]~~ July, 1993
S (M) T W Th F S

JOB Blair Backup
ARRIVAL TIME: 0710
LOCATION Taylor Way, Tacoma, WA
DEPARTURE TIME: 1515 1530
CLIENT Port of Tacoma
WEATHER: cloudy
PURPOSE OF OBSERVATIONS charcoal briquette soil
H-C REPRESENTATIVE Grant Knechtel
H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE
PERMIT NO.
CONTRACTOR REP. Gator Barrett
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: on site to observe loading of stockpiled charcoal briquette laden soil as outlined in previous field reports. Decon methods were also as previously outlined.

Container No.	Car No.	Container No.	Car No.
EASU 420002	TTWX 973569	XTRU 611145	TTWX 991197
" 420009		ITEU 133054	
" 420012		XCLU 210719	
EASU 420034	TTWX 978862	XTRU 611882	TTWX 981648
" 420004		XCLU 294627	
XCLU 211176		CONU 294181	
UFCU 460112	TTWX 971220		
XCLU 212048			
CONU 295287			

checked outside of containers and cars for spilled briquette soil - none was noted.

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verduin HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report. CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 93
Page 1 of 2
DATE 13 July, 1993
S M (T) W Th F S

JOB Blair Backup ARRIVAL TIME: 0720
LOCATION Taylor Way, Tacoma, WA DEPARTURE TIME: 1610
CLIENT Port of Tacoma WEATHER: cloudy
PURPOSE OF OBSERVATIONS charcoal briquette soil, asphalt CAP area
H-C REPRESENTATIVE Grant Knechtel H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE PERMIT NO.
CONTRACTOR REP. Gator Barrett JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: Observed load out of last ~~of~~ stockpiled charcoal briquette laden soil into containers on rail cars. Methods were as outlined in our previous field reports.

Container No.	Car No.	Container No.	Car No.
EASU 420019	TTWX 991438	EASU 420032	TTWX 980050
" 420008		" 420007	
" 420016		" 420022	
EASU 420001	TTWX 980804	EASU 420027	TTWX 993439
" 420021		" 420014	
" 420028		" 420017	

Outside of containers, cars and adjacent ground was checked for spilled charcoal soil before closing last container - none was noted. Loader bucket was deconned by dry brushing all adhering briquette soil into last open container. Before loader decon 1 to 2" of soil inside stockpile area and ½ to 1" soil along haul road was scraped up and loaded out, to reduce chance of charcoal contaminated soil remaining in stockpile area and along haul route. After loader decon remaining berm material was spread over stockpile area to refill it to apx. previous grade. Fabric from infiltration pond was also loaded into container.

Contractor started placing 1½" of 5/8" minus top course

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report. CONTRACTOR REPRESENTATIVE

HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
206.324.9530

Job No. 2350-22

Field Report No. 93

Job Blair Backup

Date 13 July, 1993

over south slag pad today. Material was hauled in Truck/trailer combinations from CTI's summer area pit. 55 truck trailer loads were imported, ~~for~~ 1762.82 ~~apx 1800~~ Tons.

RCI's subcontractor, Salm Const. Co. was on-site today and started removal of tracks along north site edge. Apx ½ of the track was removed from W. end of tracks today, along with ties.

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Vardiman HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report. CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 94
Page 1 of 1
DATE 14 July, 1993
S M T (W) Th F S

JOB Blair Backup ARRIVAL TIME: 0715
LOCATION Taylor Way, Tacoma, WA DEPARTURE TIME: 1645
CLIENT Port of Tacoma WEATHER: cloudy
PURPOSE OF OBSERVATIONS grading
H-C REPRESENTATIVE Grant Knechtel H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE PERMIT NO.
CONTRACTOR REP. Gator Barrett JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: contractor continued to place 5/8" minus crushed rock top course from CTI Summer area pit on south pad. 2 belly dump trucks ~~use~~ and one truck-trailer combination were used to import 13 loads, 486.78 Tons. After lunch trucks were switched to importing crushed rock base course from Woodworth's Hylebos pit, placed on the North slag pad. 11 loads were imported, 268.81 Tons.

Contractor recut cover material from over the north slope of the north slag pad, to allow placement of planned 8½" of crushed rock base course and rest of paving section - this slope had originally been covered to allow traffic during loading of charcoal briquette soil into rail cars, completed yesterday.

Salm Const. Co. Completed removal of tracks (rail and ties) from north side of site. Steel has been removed from site. Ties are stacked, bundled and stored near NE site corner preparatory to shipping out.

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verduin HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report. CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 95
Page 1 of 1
DATE 15 July, 1993
S M T W (Th) F S

JOB Blair Backup ARRIVAL TIME: 0710
LOCATION Taylor Way, Tacoma, WA DEPARTURE TIME:
CLIENT Port of Tacoma WEATHER: cloudy
PURPOSE OF OBSERVATIONS grading
H-C REPRESENTATIVE Grant Kneckter H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE PERMIT NO.
CONTRACTOR REP. Gator Barrett JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: contractor graded & rolled TOP COURSE placed over south slag pad. We performed in-place soil density tests to confirm compaction of the TOP COURSE. 6 in-place soil moisture-density tests were performed with a Troxler nuclear densometer in backscatter mode. Compaction ranged from 96 to 99.9% of the 136.4 pcf modified proctor maximum density.

Contractor imported 407.94 Tons of -1¼" BASE COURSE from Woodworth's Hylebos pit and placed it on the North slag pad to raise and stabilize grade. After placement and rolling performed 3 in-place soil moisture-density tests with the nuclear gauge to confirm compaction. Compaction measured in the 6" direct transmission mode was 95 to 98% of the 129.4 pcf Modified Proctor Maximum density.

Contractor imported 242.05 Tons of -1¼" Base Course and placed along north slope of north slag pad. This was part of earlier lump sum portion of bid- placement of 6" Base course under Asphalt CAP.

After placement of base course, subgrade of north pad ~~as~~ appeared suitable for placement of -5/8" TOP COURSE material, based on behavior under large vibratory drum roller (Sakai SV91TF). This is planned for tomorrow.

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verduin HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report. CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 96
Page 1 of 1
DATE 16 July, 1993
S M T W Th (F) S

JOB Blair Backup
ARRIVAL TIME: 0705
LOCATION Taylor Way, Tacoma, WA
DEPARTURE TIME: 1440
CLIENT Port of Tacoma
WEATHER: showers
PURPOSE OF OBSERVATIONS grading asphalt cap subgrade
H-C REPRESENTATIVE Grant Kuechtel
H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE
PERMIT NO.
CONTRACTOR REP. Gator Barrett
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: contractor placed -5/8" crushed rock TOP COURSE on north pad today. Material was imported from CTI's Summer area pit using Truck-Trailer combinations and Belly Dump Trucks. 1082.57 Tons were imported today. Fine grading & compaction will continue tomorrow.

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
CONTRACTOR REPRESENTATIVE

HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

FIELD REPORT

Job No. 2350-22
Field Report No. 97
Page 1 of 1
DATE 19 July, 1993
S (M) T W Th F S

JOB Blair Backup
ARRIVAL TIME: 0650
LOCATION Taylor Way, Tacoma, WA
DEPARTURE TIME: 1630
CLIENT Port of Tacoma
WEATHER: showers
PURPOSE OF OBSERVATIONS asphalt cap, grading
H-C REPRESENTATIVE Grant Fuechtel
H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE
PERMIT NO.
CONTRACTOR REP. Gator Barrett
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: contractor completed fine grading slag pads Saturday, completed rolling north pad this AM. HC performed 7 in-place soil moisture-density tests on the pavement subgrade of north pad to confirm compaction. As lift was 1½ to 1" thick, tests were performed in backscatter mode with the Troxler nuclear densometer. Compaction ranged from 95 to 98% of the 136.4 pcf modified proctor maximum density.

Contractor's Paving subcontractor, Watson Asphalt Paving Co. started placing first lift of asphalt cap over south slag pad today. Asphalt was batched at their Palmer plant and brought to the site in trucks with pup trailers. About 1515 Tons were placed today. About 160850 square feet were covered, roughly 45 percent of the total pad area. Average lift thickness was 1½ inches, based on density, Tons placed and area covered.

Although not required, the Port had Pacific Testing perform density tests on asphalt placed as ~~over~~ the 1st lift. 29 tests were performed using a Troxler 4640 B thin lift nuclear gauge. Densities ranged from 144.3 to 150.0 pcf, 97.9 to 101.8 % of the 147.4 Marshall density. Average of the 29 density tests was 146.4 pcf.

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verduin HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report. CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 98
Page 1 of 1
DATE 20 July 1993
S M (T) W Th F S

JOB Blair Backup
ARRIVAL TIME: 0700
LOCATION Taylor Way, Tacoma, WA
DEPARTURE TIME: 1000
CLIENT Port of Tacoma
WEATHER: rain
PURPOSE OF OBSERVATIONS asphalt cap
H-C REPRESENTATIVE Grant Fuechtel
H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE
PERMIT NO.
CONTRACTOR REP. Gator Barrett
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: Watson Paving on site to place 1st lift asphalt cap on north pad. Heavy rain overnight had caused crushed rock on north pad to become very wet. ~~Action of~~ paving machine "pushes into" subgrade causing apparent (at outside edge) thickness of lift less than 1½". In addition, water comes through paving during rolling, from subgrade, causing permeable channels through the asphalt. Recommended paving be stopped until subgrade can dry sufficiently to allow placement of stable, cohesive first lift. This was done about 0800.

Pacific Testing performed ~~6~~ 6 density tests using the methods outlined in yesterday's report to confirm compaction of asphalt placed late yesterday. ~~and before work stopped today.~~ Cores were taken at the six locations to check compacted lift thickness and to correlate gauge density to density of the core. Densities ranged from 143.4 to 148.2 pcf, 97.3 to 100.5% of the 147.4 pcf Marshall value.

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report. CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 99
Page 1 of 1
DATE 21 July, 1993
S M T (W) Th F S

JOB Blair Backup
ARRIVAL TIME: 0700
LOCATION Taylor Way, Tacoma, WA
DEPARTURE TIME: 1000
CLIENT Port of Tacoma
WEATHER: cloudy
PURPOSE OF OBSERVATIONS Asphalt Cap
H-C REPRESENTATIVE Grant Knechtel
H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE
PERMIT NO.
CONTRACTOR REP. —
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: No contractor representatives on site. Tom Kendle of PTL (test labs) on site. Results (densities) of cores taken yesterday had been obtained. densities were considerably lower than those shown by thin lift nuclear gauge tests, taken prior to coring, at the core locations. Returned to each ~~tes~~ core location at took 4 tests at 90° to each other at each core location. Results were still consistently higher than core densities but ~~generally~~ within 1% of the core density.

Also returned to area where AC had been placed during wet conditions yesterday. Using a slide hammer, punched a ± 4" square hole in the asphalt, to check thickness. Asphalt was 1½" thick but appeared cohesive only in the upper ± ½" of the lift. Mr. Kendle performed a density test, averaging 4 readings around this location, as had been done at the core locations. Density was 134.2 pcf, 91% of the 147.4 pcf Marshall density. Actual density may be lower, apx. 90% of ~~March~~ Marshall.

BY: [signature]
HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verduin
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 100
Page 1 of 1
DATE 27 July, 1993
S M (T) W Th F S

JOB Blair Backup
ARRIVAL TIME: 0900
LOCATION Taylor Way, Tacoma, WA
DEPARTURE TIME: 0915
CLIENT Port of Tacoma
WEATHER: fog
PURPOSE OF OBSERVATIONS AC Cap subgrade
H-C REPRESENTATIVE Grant Knechtel
H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE
PERMIT NO.
CONTRACTOR REP. Gator Barrett
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: On site to pickup some paperwork from to site office trailer. Gator was rolling the crushed rock subgrade on the unpaved part of the north pad. Deflection under the large vibratory drum roller was less than 1/4". - ~~Cont~~ much more stable than 1 week ago. Surface of subgrade is damp in spots from dew. Subgrade appears ready to pave in its current condition. Recommended Gator not over-roll the subgrade as it dries in the sun, to avoid fluffing the upper 1" or so of the rock, when it is way dry of optimum.

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.

CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 101
Page 1 of
DATE 5 August, 1993
S M T W (Th) F S

JOB Blair Backup
ARRIVAL TIME: 0630
LOCATION Taylor Way, Tacoma, WA
DEPARTURE TIME: 1400
CLIENT Port of Tacoma
WEATHER: clear, 80°
PURPOSE OF OBSERVATIONS asphalt concrete cap
H-C REPRESENTATIVE Grant Kuechler
H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE
PERMIT NO.
CONTRACTOR REP. Gator Barrett
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: Watson paving on site to complete 1st lift asphalt concrete paving for cap. Methods were as outlined in our July 19 field report except a slightly smaller BG 245B paver was used. While paving side slopes, asphalt was off-loaded from truck-trailer combinations into a single truck for paving. Apx. 1300 Tons were delivered today.

The Port had Pacific Test Labs perform in-place density tests with a Troxler Thin Lift Gauge on asphalt placed today. Densities, taken from a 4-point average at each test location, were 95 to 98% of the 147.4 pcf Marshall. PTL also sampled asphalt as it was placed ~~to~~ for testing to confirm compliance with the mix design, and to confirm Marshall density.

BY: [signature]
REVIEWED BY: John R Verduin
I have read and understand the content of this Field Report [signature]

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 102
Page 1 of 1
DATE 9 August, 1993
S (M) T W Th F S

JOB Blair Backup
ARRIVAL TIME: 0700
LOCATION Taylor Way, Tacoma, WA
DEPARTURE TIME: 0735
CLIENT Port of Tacoma
WEATHER: cloudy
PURPOSE OF OBSERVATIONS asphalt cap
H-C REPRESENTATIVE Grant Fuechtel
H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE
PERMIT NO.
CONTRACTOR REP. Gator Barrett
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: on site observe installation of petromat membrane. Watson Paving not on site to do installation, as they felt there was too high a risk of wet weather. 1st lift asphalt placed before appears dry and ready for petromat.

BY: [signature]
HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verduin
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
[signature]
CONTRACTOR REPRESENTATIVE

HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

FIELD REPORT

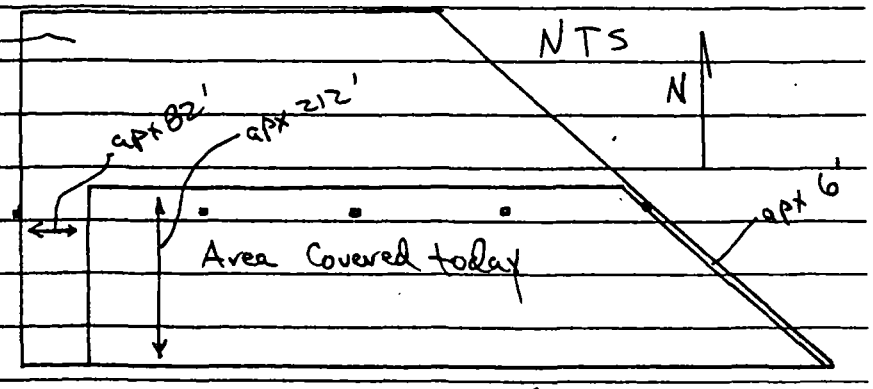
Job No. 2350-22
Field Report No. 103
Page 1 of 1
DATE 10 August, 1993
S M (T) W Th F S

JOB Blair Backup
ARRIVAL TIME: 0700 / 1000
LOCATION Taylor Way, Tacoma, WA
DEPARTURE TIME: 0800 / 1930
CLIENT Port of Tacoma
WEATHER: partly cloudy
PURPOSE OF OBSERVATIONS Paving Fabric
H-C REPRESENTATIVE Grant Enechtel
H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE / Watson
PERMIT NO.
CONTRACTOR REP. Gator Barrett
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: Watson Paving on site placing Amopave 4599 Paving Fabric and AR 4000 paving asphalt, forming the membrane system over the first asphalt lift. Asphalt was placed by spraying from a tank truck equipped with a CRC "Computerized Rate Control" asphalt distributor. Paving fabric was placed ~~by rolling~~ from a small tractor equipped with a roller carrier and brooms to smooth and tension the fabric as it was placed over the hot asphalt. Rolls and joints were lapped a minimum 3". After placing the fabric, the surface was lightly rolled with a medium sized ~~small~~ drum roller to set the fabric into the asphalt.

Apx. 18,500 square yards were covered today, using 29 rolls of paving fabric (12.5 x 450 feet minimum) and apx. 4900 gallons of asphalt. Based on the above, average application rate was 0.26 gal./square yard.



BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verduin HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report. CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

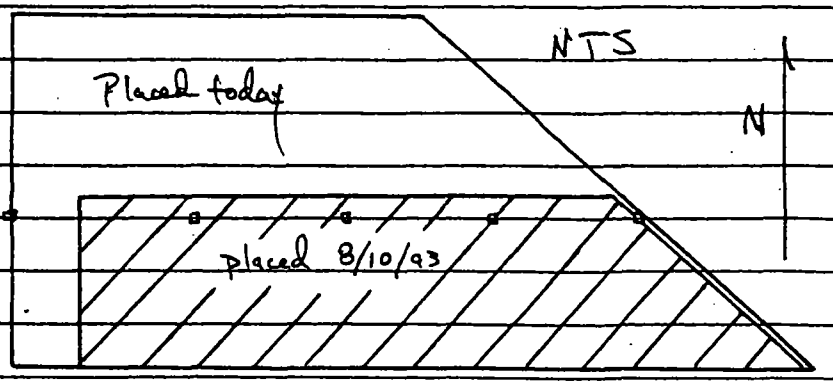
Job No. 2350-22
Field Report No. 104
Page 1 of 1
DATE 11 August 1993
S M T (W) Th F S

JOB Blair Backup
ARRIVAL TIME: 0630
LOCATION Taylor Way, Tacoma, WA
DEPARTURE TIME: 1930
CLIENT Port of Tacoma
WEATHER: partly cloudy
PURPOSE OF OBSERVATIONS asphalt cap membrane
H-C REPRESENTATIVE Grant Knechtel
H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE/Watson Paving
PERMIT NO.
CONTRACTOR REP. Gator Barrett
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: Watson Paving continued placing Amopave 4599 paving fabric over AR4000W asphalt. Asphalt was spread with a tank truck mounted "Bearcat CRC" computerized rate control asphalt distributor. Fabric was rolled ahead of a tractor equipped with roller holder and brooms to ~~spread~~ smooth and tension fabric. A medium sized drum roller was used to "set" the fabric into the asphalt. Apx. 17822 sy were covered, completing cover of the asphalt cap. Apx. 5000 gallons of AR4000W were used and 32 rolls of fabric - several of the rolls were 12' wide or 10' wide today. Asphalt application rate based on the above is 0.28 gallons/square yard.

Membrane is complete except for around manholes 3, 4, 5 and 6, and patching/tacking joints and flaws.



BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report. CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 105
Page 1 of 2
DATE 13 August, 1993
S M T W Th (F) S

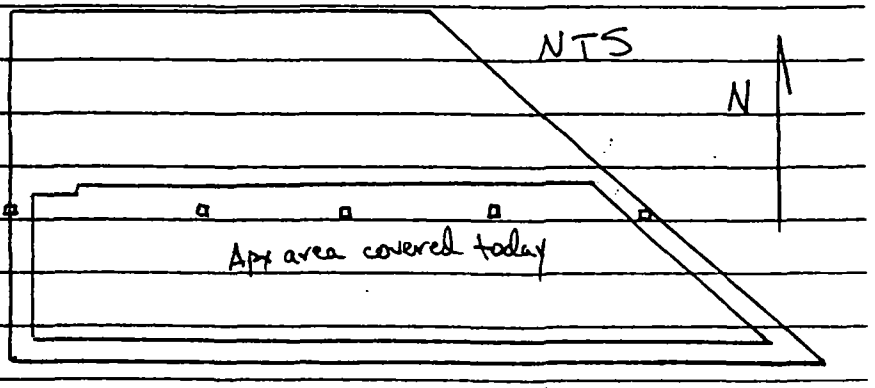
JOB Blair Backup
ARRIVAL TIME: 0630
LOCATION Taylor Way, Tacoma, WA
DEPARTURE TIME: 1800
CLIENT Port of Tacoma
WEATHER: cloudy
PURPOSE OF OBSERVATIONS asphalt cap
H-C REPRESENTATIVE Grant Guechtel
H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE / Watson Paving
PERMIT NO.
CONTRACTOR REP. Gator Barrett
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: on site to observe placement of top lift asphalt cap. Patches and joint tacking of asphalt membrane had been completed yesterday and asphalt membrane appears suitable for covering with 2nd lift.

PTL sampled asphalt being placed 0705 for Marshall using 75 blows. Previous PTL Marshall value was from 50 blows test. Value from today's sample was 144.8 pcf, verbal from lab at 0930.

Tests taken in center area of south pad 10-11 AM were less than 98% of the 144.8 pcf ~~marsh~~ marshall - a second sample was taken and returned to PTL for testing. Value was 147.2 pcf - verbal at about 1600. This value would indicate ~~the~~ in-place density tests taken by PTL were consistently 98% or less after initial 24" width were placed. We recommended contractor stop placing ~~a~~ cap not meeting 98% required by specifications. Port ordered contractor to stop work about 1630.



BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verduin HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report. CONTRACTOR REPRESENTATIVE

HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
206.324.9530

Job No. 2350-22

Field Report No. 105

Page 2 of 2

Job Blair Backup

Date 13 August, 1993

Contractor completed placing material already on site. Apx. 1600 Tons asphalt were placed today. Average density per PTL tests was 140.7 pcf. About 113260 square feet were covered. Average ~~thickness~~ yield based on the above figures was apx .20 feet.

RCI also imported 203.13 Tons of Sand and Gravel BUFFER from Lonestar for use in backfilling the central valley after cap is complete and 6" perf pipe drain is installed. Material was stockpiled east of the north.

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report. CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 106
Page 1 of 1
DATE 17 August 1993
S M (T) W Th F S

JOB Blair Backup ARRIVAL TIME: 0730
LOCATION Taylor Way, Tacoma, WA DEPARTURE TIME: 1100
CLIENT Port of Tacoma WEATHER: cloudy / light drizzle
PURPOSE OF OBSERVATIONS asphalt cap
H-C REPRESENTATIVE Grant Enechtel H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE / Watson PERMIT NO.
CONTRACTOR REP. JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: on site to observe / assist PTL in coring asphalt cap in area where top lift was placed Friday. PTL took cores at 8 locations where IPD's had been performed Friday. Cores were drilled with a 4" OD drill yielding cores apx. 3 3/4" ϕ. Prior to coring the locations were retested with the thin lift nuclear gauge to confirm measured density, as Watson stated they had rerolled the entire pad late Friday. Densities as measured were within less than 1% of Friday's density except for 1 location which was 1 1/2% less than measured before. Cores 1 through 4 were planned for permeability testing, cores 5 through ~~8~~ 8 will be cut at 1" depth and density measured for the upper 1", to correllate thin lift nuclear densometer density to actual bulk density as measured for the cores.

Core No.	8/13 test No.	8/13 density	8/17 density	% Marshall (147.4 max.)
1	14	132.2	132.9	90.2
~~2~~	~~15~~	~~141.4~~	~~142.7~~	~~96.8~~
3	17	136.5	136.3	92.5
4	18	136.0	134.8	91.5
5	5	137.5	138.4	93.9
6	6	136.0	135.3	91.8
~~7~~	~~[illegible]~~	~~[illegible]~~ 144.1	141.9	96.3
8	7	144.3	144.1	97.8

BY: REVIEWED BY: I have read and understand the content of this Field Report.

HART CROWSER REPRESENTATIVE HART CROWSER PROJECT MANAGER CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-22
Field Report No. 107
Page 1 of 1
DATE 8-21-93
S M T W Th F (S)

JOB Blair Backup ARRIVAL TIME: 7:15
LOCATION Taylor Ave, Tacoma, WA DEPARTURE TIME: 12:30
CLIENT Port of Tacoma WEATHER:
PURPOSE OF OBSERVATIONS Asphalt concrete cap
H-C REPRESENTATIVE C. Holloway H C PROJECT MANAGER J. Verduin
CONTRACTOR RCIE PERMIT NO.
CONTRACTOR REP. Gator Barrett JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: On-site as scheduled to observe finish course asphalt placement. Asphalt is delivered to site by truck + trailer then tranferred to 10 wheel end-dumps (solo) for transport across existing A.C. to Barber Green(s) 4 - compactors provide compactive effort; 2 - double drum vibratory; 1 - drum/pneumatic (used static mostly) 1 - pneumatic. Vibratory compactors follow Barber Green(s) immediatly, followed by static/pneumatic. PTL representative on site full-time to obtain nuclear density tests w/ Troxler Gauge Type 4640-B (Thin Layer Gauge) All tests or re-tests taken while I was on site obtained values equal or greater than 98% of Marshall value.
Paved N end of lot, 240' wide section north of east-west storm and surface drain. (~200' completed, from north edge when I left site)

Barber Green	Compactors
BG 225B	Hyster C76A
BG 265B	" " C625B
	" " C550A
	Dynapac CC501

BY: Chris Holloway
HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verduin
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
[signature]
CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-24
Field Report No. ~~109~~ 108
Page 1 of 2
DATE 6 October, 1993
S M T (W) Th F S

JOB Blair Backup ARRIVAL TIME: 0655
LOCATION Taylor Way, Tacoma, WA DEPARTURE TIME: 1400
CLIENT Port of Tacoma WEATHER: cloudy
PURPOSE OF OBSERVATIONS grading, monitoring wells
H-C REPRESENTATIVE Grant Frechtel H C PROJECT MANAGER John Verduin
CONTRACTOR RCI PERMIT NO.
CONTRACTOR REP. Gator Barrett JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: RCI is placing wearing course across south pad. Non-complying part of asphalt cap over south pad was removed and replaced over the weekend. Results of in-place density tests taken by PTL using a thin-lift nuclear gauge showed compaction throughout the newly placed upper lift to have been 98% or better of the 147.4 pcf Marshall maximum. Wearing course is imported from Woodworth's Hylebos pit using belly dump trucks and a truck-trailer combo. 3368.85 tons were imported today, based on Woodworth's load tickets. The ~~base~~ wearing course is spread over the pad by the dump trucks, graded with a grader, moisture conditioned by watering with a water truck, they compacted with a vibratory drum roller.

As of today, placement of SAND & GRAVEL COVER appears to be largely complete. Retested 4 areas where previous in-place densities were below specified compaction at tests DT 8, DT9, DT54 and DT55. All showed compaction 95% or higher over modified proctor maximum.

Checked water levels in 5 wells (4 replacement and one new monitoring well) installed by soil sampling as subcontractor to RCI. HC-26S, EPA-9SR, HC-11SR, EPA-7SR

BY: REVIEWED BY: I have read and understand the content of this Field Report.

HART CROWSER REPRESENTATIVE — HART CROWSER PROJECT MANAGER — CONTRACTOR REPRESENTATIVE

HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
206.324.9530

Job No. 2350-24
Field Report No. ~~107~~ 108
Page 2 of 2

Job Blair Backup
Date 6 October, 1993

all showed measurable water levels and appear to be adequately constructed. Well HC-155R had no measurable water and may not be adequate. Construction information about this well will be referred to Hart Crowser's hydrogeologist for this project, Mike Ehlebracht, for evaluation of well's adequacy.

Sampled wearing course imported today at apx. 1130; returned apx. 75 lbs. of material to CMTL for seive analysis to confirm compliance with gradation spec. Lift placed today is apx. 4 to 6" thickness. RCI plans to complete lift across south pad tomorrow.

10-29-93
Lori Hermon + Mike Ehlbrecht
said all is OKAY per
John Verdrin KKelley 10.29.93

BY: [signature]
HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verdrin
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
[signature]
CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-24
Field Report No. ~~110~~ 109
Page 1 of 1
DATE 7 October, 1993
S M T W (Th) F S

JOB Blair Backup ARRIVAL TIME: 0715
LOCATION Taylor Way, Tacoma, WA. DEPARTURE TIME: 1515
CLIENT Port of Tacoma WEATHER: cloudy / clearing
PURPOSE OF OBSERVATIONS grading
H-C REPRESENTATIVE Grant Knechtel H C PROJECT MANAGER John Verduin
CONTRACTOR RCIE PERMIT NO.
CONTRACTOR REP. Gator Barrett JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: RCIE completed importing crushed rock Wearing Course and placing on south pad of asphalt cap area. 2295.96 tons of Wearing Course were imported from Woodworth's Hylebos pit, per Woodworths load tickets. Material was placed on south pad, fine graded with a grader, ~~com~~ moisture conditioned with a water truck and rolled with a Sakai 91 D vibratory drum roller. Performed six in-place soil moisture-density tests with a troxler nuclear moisture-density ~~test~~ gauge. Compaction was 95 to 97% of the 132.1 modified proctor maximum density. Thickness of the Wearing course at the six test locations was 8 to 8½ inches.

BY: [signature]
HART CROWSER REPRESENTATIVE

REVIEWED BY: [signature]
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
[signature]
CONTRACTOR REPRESENTATIVE

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-24
Field Report No. HT 110
Page 1 of 1
DATE 8 October, 1993
S M T W Th (F) S

JOB Blair Backup
ARRIVAL TIME: 0730
LOCATION Taylor Way, Tacoma, WA
DEPARTURE TIME: 1400
CLIENT Port of Tacoma
WEATHER: fog / clearing
PURPOSE OF OBSERVATIONS Cover completion, plate load tests
H-C REPRESENTATIVE Grant Gnechtel
H C PROJECT MANAGER John Verduin
CONTRACTOR RCI E
PERMIT NO.
CONTRACTOR REP. Gator Barrett
JOB PHONE

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: RCI dug down apx. 1' below grade at 2 points in SAND & GRAVEL COVER along north side of asphalt cap. Made two in-place soil moisture-density tests to confirm this area was compacted to 92% minimum 1' below surface. Test made with Troxler nuclear gauge showed compaction 92 to 93% of 130.4 modified proctor maximum density.

RCI provided a loaded water truck for use as reaction mass for 2 plate load tests performed by ~~us~~ Hart Crowser. Tests were made on SAND & GRAVEL COVER in NE part of site and on top of WEARING COURSE in north half of ~~site~~ asphalt CAP area, at apx. location of previous plate load test No. 5. Truck time - 3 hrs.

BY: HART CROWSER REPRESENTATIVE

REVIEWED BY: HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
CONTRACTOR REPRESENTATIVE

Appendix C

APPENDIX C
WELL ABANDONMENT LOGS

File Original and First Copy with Department of Ecology
Second Copy—Owner's Copy
Third Copy—Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Start Card No. 049330
UNIQUE WELL I.D. # EAA 6I
Water Right Permit No. _____

(1) OWNER: Name PORT OF TACOMA Address _____

(2) LOCATION OF WELL: County PIERCE SW ¼ NW ¼ Sec 36 T. 21 N., R. 3E W.M.

(2a) STREET ADDDRESS OF WELL (or nearest address) 3100 ALEXANDER AVE

(3) PROPOSED USE: ☐ Domestic ☐ Irrigation ☐ DeWater Industrial ☐ Test Well ☑ Municipal ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) _____
Abandoned ☑ New well ☐ Deepened ☐ Reconditioned ☐
Method: Dug ☐ Cable ☐ Rotary ☐ Bored ☐ Driven ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 2 inches.
Drilled _____ feet. Depth of completed well 23 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: _____ " Diam. from _____ ft. to _____ ft.
Welded ☐ _____ " Diam. from _____ ft. to _____ ft.
Liner installed ☐
Threaded ☑ 2 " Diam. from 23 ft. to 18 ft.

Perforations: Yes ☐ No ☐
Type of perforator used _____
SIZE of perforations _____ in. by _____ in.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.

Screens: Yes ☐ No ☐
Manufacturer's Name _____
Type _____ Model No. _____
Diam. _____ Slot size _____ from _____ ft. to _____ ft.
Diam. _____ Slot size _____ from _____ ft. to _____ ft.

Gravel packed: Yes ☐ No ☐ Size of gravel _____
Gravel placed from _____ ft. to _____ ft.

Surface seal: Yes ☐ No ☐ To what depth? _____ ft.
Material used in seal _____
Did any strata contain unusable water? Yes ☐ No ☐
Type of water? _____ Depth of strata _____
Method of sealing strata off _____

(7) PUMP: Manufacturer's Name _____
Type: _____ H.P. _____

(8) WATER LEVELS: Land-surface elevation above mean sea level _____ ft.
Static level _____ ft. below top of well Date _____
Artesian pressure _____ lbs. per square inch Date _____
Artesian water is controlled by _____ (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☐ If yes, by whom? _____
Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test _____
Bailer test _____ gal./min. with _____ ft. drawdown after _____ hrs.
Airtest _____ gal./min. with stem set at _____ ft. for _____ hrs.
Artesian flow _____ g.p.m. Date _____
Temperature of water _____ Was a chemical analysis made? Yes ☐ No ☐

(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information.

MATERIAL	FROM	TO
PUMPED EVER GROUT FROM BOTTOM WELL TO TOP		

Work started _____, 19. Completed 3/24, 1993

WELL CONSTRUCTOR CERTIFICATION:
I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

NAME SOIL SAMPLING SERVICE (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)
Address 1415 MERIDIAN E PUYALLUP
(Signed) [signature] (WELL DRILLER) License No. 1611
Contractor's Registration No. _____ Date 3/31, 1993

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20 (10/87) -1329- 18

FROM ENGRG. P.O.T. 02/04/94 08:39 P. 3 TOTAL P. 3

File Original and First Copy with Department of Ecology
Second Copy—Owner's Copy
Third Copy—Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Start Card No. 049330
UNIQUE WELL I.D. # HC 155
Water Right Permit No. _____

(1) OWNER: Name PORT OF TACOMA Address _____

(2) LOCATION OF WELL: County PIERCE SW ¼ SW ¼ Sec 36 T 21 N, R 3 E W.M.

(2a) STREET ADDRESS OF WELL (or nearest address) 3100 ALEXANDER AVE

(3) PROPOSED USE: ☐ Domestic ☐ Irrigation ☐ DeWater Industrial ☐ Test Well ☑ Municipal ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) _____
Abandoned ☑ New well ☐ Deepened ☐ Reconditioned ☐
Method: Dug ☐ Cable ☐ Rotary ☐ Bored ☐ Driven ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 2 inches.
Drilled _____ feet. Depth of completed well 25 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: _____ " Diam. from _____ ft. to _____ ft.
Welded ☐ _____ " Diam. from _____ ft. to _____ ft.
Liner installed ☐
Threaded ☑ 2 " Diam. from 2.5 ft. to 2.5 ft.

Perforations: Yes ☐ No ☐
Type of perforator used _____
SIZE of perforations _____ in. by _____ in.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.

Screens: Yes ☐ No ☐
Manufacturer's Name _____
Type _____ Model No. _____
Diam. _____ Slot size _____ from _____ ft. to _____ ft.
Diam. _____ Slot size _____ from _____ ft. to _____ ft.

Gravel packed: Yes ☐ No ☐ Size of gravel _____
Gravel placed from _____ ft. to _____ ft.

Surface seal: Yes ☐ No ☐ To what depth? _____ ft.
Material used in seal _____
Did any strata contain unusable water? Yes ☐ No ☐
Type of water? _____ Depth of strata _____
Method of sealing strata off _____

(7) PUMP: Manufacturer's Name _____
Type: _____ H.P. _____

(8) WATER LEVELS: Land-surface elevation above mean sea level _____ ft.
Static level _____ ft. below top of well Date _____
Artesian pressure _____ lbs. per square inch Date _____
Artesian water is controlled by _____ (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☐ If yes, by whom? _____
Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test _____
Bailer test _____ gal./min. with _____ ft. drawdown after _____ hrs.
Airtest _____ gal./min. with stem set at _____ ft. for _____ hrs.
Artesian flow _____ g.p.m. Date _____
Temperature of water _____ Was a chemical analysis made? Yes ☐ No ☐

(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information.

MATERIAL	FROM	TO
PUMPED EWER GROUT FROM BOTTOM WELL TO TOP		

Work started _____, 19. Completed 3/24, 19 93

WELL CONSTRUCTOR CERTIFICATION:

I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

NAME SOIL SAMPLING SERVICE (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)
Address 1415 MERIDIAN E PUYALLUP
(Signed) [signature] (WELL DRILLER) License No. 561
Contractor's Registration No. _____ Date 3/31, 19 93

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20 (10/87) -1329- © [illegible] 18

File Original and First Copy with Department of Ecology
Second Copy—Owner's Copy
Third Copy—Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

Start Card No. 014330
UNIQUE WELL I.D. # HC 15 I
Water Right Permit No. HC 15 I

(1) OWNER: Name PORT OF TACOMA Address

(2) LOCATION OF WELL: County PIERCE SW ¼ SW ¼ Sec 36 T. 21 N., R. 3E W.M.

(2a) STREET ADDRESS OF WELL (or nearest address) 2400 ALEXANDER AVE

(3) PROPOSED USE: ☐ Domestic ☐ Irrigation ☐ DeWater Industrial ☐ Test Well ☑ Municipal ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one)
Abandoned ☑ New well ☐ Deepened ☐ Reconditioned ☐
Method: Dug ☐ Cable ☐ Rotary ☐ Bored ☐ Driven ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 2 inches.
Drilled feet. Depth of completed well 22.5 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: " Diam. from ft. to ft.
Welded ☐ " Diam. from ft. to ft.
Liner installed ☐
Threaded ☑ 2 " Diam. from 22.5 ft. to 17.5 ft.

Perforations: Yes ☐ No ☐
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☐ No ☐
Manufacturer's Name
Type Model No.
Diam. Slot size from ft. to ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☐ Size of gravel
Gravel placed from ft. to ft.

Surface seal: Yes ☐ No ☐ To what depth? ft.
Material used in seal
Did any strata contain unusable water? Yes ☐ No ☐
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level ft.
Static level ft. below top of well Date
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☐ If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
Bailer test gal./min. with ft. drawdown after hrs.
Airtest gal./min. with stem set at ft. for hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes ☐ No ☐

(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information.

MATERIAL	FROM	TO
PUMPED BENTONITE GROUT FROM BOTTOM OF WELL TO TOP		

Work started 19. Completed 3/31 1993

WELL CONSTRUCTOR CERTIFICATION:

I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

NAME SOIL SAMPLING SERVICE (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)
Address 1415 MERIDIAN E PUYALLUP
(Signed) [signature] (WELL DRILLER) License No. 161
Contractor's Registration No. Date 3/31 1993

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20 (10/87) -1329- 18

File Original and First Copy with Department of Ecology
Second Copy—Owner's Copy
Third Copy—Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Start Card No. 049330
UNIQUE WELL I.D. # HC 115
Water Right Permit No. HC 115

(1) OWNER: Name PORT OF TACOMA Address

(2) LOCATION OF WELL: County PIERCE SW ¼ NW ¼ Sec 36 T 21 N., R 3E W.M.

(2a) STREET ADDDRESS OF WELL (or nearest address)

(3) PROPOSED USE: ☐ Domestic ☐ Irrigation ☐ DeWater Industrial ☐ Test Well ☑ Municipal ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one)
Abandoned ☑ New well ☐ Deepened ☐ Reconditioned ☐
Method: Dug ☐ Cable ☐ Rotary ☐ Bored ☐ Driven ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 2" inches.
Drilled feet. Depth of completed well 12 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: " Diam. from ft. to ft.
Welded ☐ " Diam. from ft. to ft.
Liner installed ☐
Threaded ☑ 2 " Diam. from ~~12~~ 7.5 ft. to 7 5 ft.

Perforations: Yes ☐ No ☐
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☐ No ☐
Manufacturer's Name
Type Model No.
Diam. Slot size from ft. to ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☐ Size of gravel
Gravel placed from ft. to ft.

Surface seal: Yes ☐ No ☐ To what depth? ft.
Material used in seal
Did any strata contain unusable water? Yes ☐ No ☐
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level ft.
Static level ft. below top of well Date
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☐ If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
Bailer test gal./min. with ft. drawdown after hrs.
Airtest gal./min. with stem set at ft. for hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes ☐ No ☐

(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information.

MATERIAL	FROM	TO
PUMPED EVIDR GROUT FROM BOTTOM OF WELL TOP		

Work started , 19. Completed 3/24, 1993

WELL CONSTRUCTOR CERTIFICATION:
I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

NAME SOIL SAMPLING SERVICE (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)
Address 4115 MERIDIAN E PUYALLUP
(Signed) [signature] (WELL DRILLER) License No. 1611
Contractor's Registration No. Date 3/31, 1993

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20 (10/87) -1329- 18

File Original and First Copy with Department of Ecology
Second Copy—Owner's Copy
Third Copy—Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Start Card No. 049330
UNIQUE WELL I.D. # EPA 93
Water Right Permit No. EPA-95

(1) OWNER: Name PORT OF TACOMA Address

(2) LOCATION OF WELL: County PIERCE SW ¼ NW ¼ Sec 36 T 21 N., R 3E W.M.

(2a) STREET ADDDRESS OF WELL (or nearest address) 3100 ALEXANDER AVE

(3) PROPOSED USE: ☐ Domestic ☐ Irrigation ☐ DeWater Industrial ☐ Test Well ☑ Municipal ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one)
Abandoned ☑ New well ☐ Deepened ☐ Reconditioned ☐
Method: Dug ☐ Cable ☐ Rotary ☐ Bored ☐ Driven ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 2 inches.
Drilled ____ feet. Depth of completed well 11 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: ____ " Diam. from ____ ft. to ____ ft.
Welded ☐ ____ " Diam. from ____ ft. to ____ ft.
Liner installed ☐
Threaded ☑ 2 " Diam. from 11 ft. to 6 ft.

Perforations: Yes ☐ No ☐
Type of perforator used
SIZE of perforations ____ in. by ____ in.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.

Screens: Yes ☐ No ☐
Manufacturer's Name
Type ____ Model No.
Diam. ____ Slot size ____ from ____ ft. to ____ ft.
Diam. ____ Slot size ____ from ____ ft. to ____ ft.

Gravel packed: Yes ☐ No ☐ Size of gravel
Gravel placed from ____ ft. to ____ ft.

Surface seal: Yes ☐ No ☐ To what depth? ____ ft.
Material used in seal
Did any strata contain unusable water? Yes ☐ No ☐
Type of water? ____ Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: ____ H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level ____ ft.
Static level ____ ft. below top of well Date
Artesian pressure ____ lbs. per square inch Date
Artesian water is controlled by ____ (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☐ If yes, by whom?
Yield: ____ gal./min. with ____ ft. drawdown after ____ hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
Bailer test ____ gal./min. with ____ ft. drawdown after ____ hrs.
Airtest ____ gal./min. with stem set at ____ ft. for ____ hrs.
Artesian flow ____ g.p.m. Date
Temperature of water ____ Was a chemical analysis made? Yes ☐ No ☐

(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information.

MATERIAL	FROM	TO
PUMPED EVER GROUT FROM BOTTOM OF WELL TO TOP		

Work started ____, 19. Completed 3/24, 1993

WELL CONSTRUCTOR CERTIFICATION:

I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

NAME SOIL SAMPLING SERVICE (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)
Address 415 MERIDIAN E PUYALLUP
(Signed) [signature] (WELL DRILLER) License No. 1611
Contractor's Registration No. ____ Date 3/31, 1993

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20 (10/87) -1329- 18

File Original and First Copy with Department of Ecology
Second Copy—Owner's Copy
Third Copy—Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

Start Card No. 049330
UNIQUE WELL I.D. # GAA 81
Water Right Permit No.

(1) OWNER: Name PORT OF TACOMA Address

(2) LOCATION OF WELL: County PIERCE SW ¼ SW ¼ Sec 36 T 21 N., R 3E W.M.

(2a) STREET ADDRESS OF WELL (or nearest address) 3100 ALEXANDER AVE

(3) PROPOSED USE: ☐ Domestic ☐ Irrigation ☐ DeWater Industrial ☐ Test Well ☑ Municipal ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one)
Abandoned ☑ New well ☐ Deepened ☐ Reconditioned ☐
Method: Dug ☐ Cable ☐ Rotary ☐ Bored ☐ Driven ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 2 inches.
Drilled feet. Depth of completed well 21 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: " Diam. from ft. to ft.
Welded ☐ " Diam. from ft. to ft.
Liner installed ☐
Threaded ☑ 2 " Diam. from 21 ft. to 16 ft.

Perforations: Yes ☐ No ☐
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☐ No ☐
Manufacturer's Name
Type Model No.
Diam. Slot size from ft. to ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☐ Size of gravel
Gravel placed from ft. to ft.

Surface seal: Yes ☐ No ☐ To what depth? ft.
Material used in seal
Did any strata contain unusable water? Yes ☐ No ☐
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level ft.
Static level ft. below top of well Date
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☐ If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
Bailer test gal./min. with ft. drawdown after hrs.
Airlift gal./min. with stem set at ft. for hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes ☐ No ☐

(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information.

MATERIAL	FROM	TO
PUMPED BLIND GROUT FROM BOTTOM HOLE TO TOP		

Work started , 19. Completed 3/31, 1993

WELL CONSTRUCTOR CERTIFICATION:

I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

NAME SOIL SAMPLING SERVICE (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)
Address 415 MERIDIAN E PUYALLUP
(Signed) [signature] (WELL DRILLER) License No. 16N
Contractor's Registration No. Date 3/31, 1993

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20 (10/87) -1329- 19

File Original and First Copy with Department of Ecology
Second Copy—Owner's Copy
Third Copy—Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

Start Card No. 049330
UNIQUE WELL I.D. EPA 2
Water Right Permit No. EPA 75 EPA 75

(1) OWNER: Name Port of Tacoma Address

(2) LOCATION OF WELL: County Pierce SW ¼ NW ¼ Sec. 36 T. 21 N., R. 3E W.M.

(2a) STREET ADDDRESS OF WELL (or nearest address) 3100 Alexander Ave

(3) PROPOSED USE: ☐ Domestic ☐ Irrigation ☐ DeWater Industrial ☐ Test Well ☑ Municipal ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one)
Abandoned ☑ New well ☐ Deepened ☐ Reconditioned ☐
Method: Dug ☐ Cable ☐ Rotary ☐ Bored ☐ Driven ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 2" inches.
Drilled ____ feet. Depth of completed well 12 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: ____ " Diam. from ____ ft. to ____ ft.
Welded ☐ ____ " Diam. from ____ ft. to ____ ft.
Liner installed ☐
Threaded ☑ 2 " Diam. from 12 ft. to 7 ft.

Perforations: Yes ☐ No ☐
Type of perforator used
SIZE of perforations ____ in. by ____ in.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.

Screens: Yes ☐ No ☐
Manufacturer's Name
Type Model No.
Diam. ____ Slot size ____ from ____ ft. to ____ ft.
Diam. ____ Slot size ____ from ____ ft. to ____ ft.

Gravel packed: Yes ☐ No ☐ Size of gravel
Gravel placed from ____ ft. to ____ ft.

Surface seal: Yes ☐ No ☐ To what depth? ____ ft.
Material used in seal
Did any strata contain unusable water? Yes ☐ No ☐
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level ____ ft.
Static level ____ ft. below top of well Date
Artesian pressure ____ lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☐ If yes, by whom?
Yield: ____ gal./min. with ____ ft. drawdown after ____ hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
Bailer test ____ gal./min. with ____ ft. drawdown after ____ hrs.
Airtest ____ gal./min. with stem set at ____ ft. for ____ hrs.
Artesian flow ____ g.p.m. Date
Temperature of water ____ Was a chemical analysis made? Yes ☐ No ☐

(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information.

MATERIAL	FROM	TO

Work started ____, 19. Completed 3/24, 1993

WELL CONSTRUCTOR CERTIFICATION:
I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

NAME Soil Sampling Service (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)
Address 415 Meridian E / Puyallup
(Signed) [signature] (WELL DRILLER) License No. Null
Contractor's Registration No. Date 3/31, 1993

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20 (10/87) -1229- 18

SOIL SAMPLING SERVICE, INC.

1415 MERIDIAN EAST, PUYALLUP, WA 98371-1399

FEDERAL ID #: 91-0762274 WA CONT. #SOIL SS*344LO

(206) 927-3173
TELEX: 466762
FAX: (206) 927-3478

Geotechnical, Engineering & Mineral Exploration Drilling • Instrumentation • Horizontal Drains
Ground Water Monitoring • Hazardous Waste Identification • Well Abandonments

RESOURCE PROTECTION WELL REPORT

HC-19I + HC-19S

PROJECT NAME: BLAIR WATERWAY
WELL IDENTIFICATION NO.: HC-19I + HC-19S
DRILLING METHOD: Decommission
DRILLER: [illegible] 1016
SIGNATURE: [illegible]
CONSULTING FIRM: [illegible]
REPRESENTATIVE:

JOB #: [illegible] START CARD NO.: 209796
COUNTY: [illegible] CITY: [illegible]
LOCATION: 1/4 NE 1/4 SE 1/4
SEC.: 3[illegible] TOWN: 21N RANGE: 3E
DATUM:
WATER LEVEL ELEVATION:
INSTALLED:
DEVELOPED:

WELL DATA	AS BUILT	FORMATION DESCRIPTION
0' Pressure grouts	HC-19S 6" sch 40 PVC	
12' Pressure grouts	HC-19I 6" sch 40 PVC	
38'		

SCALE: 1" = 5'

PAGE 1 OF 1

This side Blank

SOIL SAMPLING SERVICE, INC.

1415 MERIDIAN EAST, PUYALLUP, WA 98371-1399

FEDERAL ID #: 91-0762274 WA CONT. #SOIL SS*344LO

(206) 927-3173
TELEX: 466762
FAX: (206) 927-3478

Geotechnical, Engineering & Mineral Exploration Drilling • Instrumentation • Horizontal Drains
Ground Water Monitoring • Hazardous Waste Identification • Well Abandonments

RESOURCE PROTECTION WELL REPORT

PROJECT NAME: BLATA WATERWAY
WELL IDENTIFICATION NO.: HC-95
DRILLING METHOD: Decommission
DRILLER: TERRY ASGELDI
SIGNATURE: [illegible]
CONSULTING FIRM: URS
REPRESENTATIVE:

JOB #: [illegible] START CARD NO.: 209295
COUNTY: [illegible] CITY: PORT OF TACOMA
LOCATION: 1/4 SE 1/4 NE 1/4
SEC.: 35 TOWN: 21N RANGE: 3E
DATUM:
WATER LEVEL ELEVATION:
INSTALLED:
DEVELOPED:

WELL DATA	AS BUILT	FORMATION DESCRIPTION
0'		
Pressure grout	4" Sch 40 PVC	
9'		

SCALE: 1" = 2.5'

PAGE 1 OF 1

SOIL SAMPLING SERVICE, INC.

1415 MERIDIAN EAST, PUYALLUP, WA 98371-1399

FEDERAL ID #: 91-0762274 WA CONT. #SOIL SS*344LO

(206) 927-3173
TELEX: 466762
FAX: (206) 927-3478

Geotechnical, Engineering & Mineral Exploration Drilling • Instrumentation • Horizontal Drains

Ground Water Monitoring • Hazardous Waste Identification • Well Abandonments

RESOURCE PROTECTION WELL REPORT

PROJECT NAME: BLATT WATERWAY
WELL IDENTIFICATION NO.: HC-75
DRILLING METHOD: [illegible]
DRILLER: TEDDY A. [illegible]
SIGNATURE: [illegible]
CONSULTING FIRM: URCI
REPRESENTATIVE:

JOB #: [illegible] START CARD NO.: 209795
COUNTY: [illegible] CITY: [illegible]
LOCATION: ____ 1/4 SE 1/4 NE 1/4
SEC.: 35 TOWN: 21N RANGE: 3E
DATUM:
WATER LEVEL ELEVATION:
INSTALLED:
DEVELOPED:

WELL DATA	AS BUILT	FORMATION DESCRIPTION
0'		
10' [illegible]	4" SCH 40 PVC	

SCALE: 1" = [illegible]

PAGE 1 OF 1

SOIL SAMPLING SERVICE, INC.

1415 MERIDIAN EAST, PUYALLUP, WA 98371-1399

FEDERAL ID #: 91-0762274 WA CONT. #SOIL SS*344LO

(206) 927-3173
TELEX: 466762
FAX: (206) 927-3478

Geotechnical, Engineering & Mineral Exploration Drilling • Instrumentation • Horizontal Drains
Ground Water Monitoring • Hazardous Waste Identification • Well Abandonments

RESOURCE PROTECTION WELL REPORT

PROJECT NAME: BLAIR WATERWAY
WELL IDENTIFICATION NO.: HC-9S
DRILLING METHOD: Decommission
DRILLER: Terry [illegible]
SIGNATURE: Terry [illegible]
CONSULTING FIRM: RCI
REPRESENTATIVE:

JOB #: [illegible] START CARD NO.: 209795
COUNTY: [illegible] CITY: [illegible]
LOCATION: 1/4 SE 1/4 NE 1/4
SEC.: 35 TOWN: 21N RANGE: 3E
DATUM:
WATER LEVEL ELEVATION:
INSTALLED:
DEVELOPED:

WELL DATA	AS BUILT	FORMATION DESCRIPTION
0'		
Pressure Grout	[illegible]	
9'		

SCALE: 1" = 2.5'

PAGE 1 OF 1

SOIL SAMPLING SERVICE, INC.

1415 MERIDIAN EAST, PUYALLUP, WA 98371-1399

FEDERAL ID #: 91-0762274 WA CONT. #SOIL SS*344LO

(206) 927-3173
TELEX: 466762
FAX: (206) 927-3478

Geotechnical, Engineering & Mineral Exploration Drilling • Instrumentation • Horizontal Drains
Ground Water Monitoring • Hazardous Waste Identification • Well Abandonments

RESOURCE PROTECTION WELL REPORT

PROJECT NAME: Blata Waterway
WELL IDENTIFICATION NO.: HC-10I
DRILLING METHOD: Decommission
DRILLER: Terry Asherry 1616
SIGNATURE: Terry Asherry
CONSULTING FIRM: RCI
REPRESENTATIVE:

JOB #: 11-3053 START CARD NO.: 209795
COUNTY: Pierce CITY: Port of Tacoma
LOCATION: 1/4 SE 1/4 NE 1/4
SEC.: 35 TOWN: 21N RANGE: 3E
DATUM:
WATER LEVEL ELEVATION:
INSTALLED:
DEVELOPED:

WELL DATA	AS BUILT	FORMATION DESCRIPTION
0'		
Pressure grouts	8" sch 40 PVC	
24'		

SCALE: 1" = 5'

PAGE 1 OF 1

SOIL SAMPLING SERVICE, INC.

1415 MERIDIAN EAST, PUYALLUP, WA 98371-1399

FEDERAL ID #: 91-0762274 WA CONT. #SOIL SS*344LO

(206) 927-3173
TELEX: 466762
FAX: (206) 927-3478

Geotechnical, Engineering & Mineral Exploration Drilling • Instrumentation • Horizontal Drains
Ground Water Monitoring • Hazardous Waste Identification • Well Abandonments

RESOURCE PROTECTION WELL REPORT

PROJECT NAME: BLAIN WATERWAY
WELL IDENTIFICATION NO.: HC-13I - HC-13S
DRILLING METHOD: [illegible]
DRILLER: [illegible]

SIGNATURE: [illegible]
CONSULTING FIRM: RCI
REPRESENTATIVE:

JOB #: 11-3853 START CARD NO.: [illegible]
COUNTY: [illegible] CITY: [illegible]
LOCATION: 1/4 [illegible] 1/4 [illegible] 1/4
SEC.: [illegible] TOWN: [illegible] RANGE: [illegible]
DATUM:
WATER LEVEL ELEVATION:
INSTALLED:
DEVELOPED:

WELL DATA	AS BUILT	FORMATION DESCRIPTION
0'		
Cascade grout	4" sch 40 PVC	
19'	HC-13S	
Cascade grout	2" sch 40 PVC	
33'	HC-13I	

SCALE: 1" = [illegible]

PAGE 1 OF 1

SOIL SAMPLING SERVICE, INC.

1415 MERIDIAN EAST, PUYALLUP, WA 98371-1399

FEDERAL ID #: 91-0762274 WA CONT. #SOIL SS*344LO

(206) 927-3173
TELEX: 466762
FAX: (206) 927-3478

Geotechnical, Engineering & Mineral Exploration Drilling • Instrumentation • Horizontal Drains
Ground Water Monitoring • Hazardous Waste Identification • Well Abandonments

RESOURCE PROTECTION WELL REPORT

PROJECT NAME: BLAIR WATERWAY
WELL IDENTIFICATION NO.: HC-1S
DRILLING METHOD: Decommission
DRILLER: Terry Asherry [illegible]

SIGNATURE: Terry Asherry
CONSULTING FIRM: RCI
REPRESENTATIVE:

JOB #: W-3252 START CARD NO.: 209795
COUNTY: Pierce CITY: Port of Tacoma
LOCATION: 1/4 SE 1/4 NE 1/4
SEC.: 35 TOWN: 21N RANGE: 3E
DATUM:
WATER LEVEL ELEVATION:
INSTALLED:
DEVELOPED:

WELL DATA	AS BUILT	FORMATION DESCRIPTION
0'		
Pressure grouts	Pitcher PVC	
-14'		

SCALE: 1" = 2.5'

PAGE 1 OF 1

SOIL SAMPLING SERVICE, INC.

1415 MERIDIAN EAST, PUYALLUP, WA 98371-1399

FEDERAL ID #: 91-0762274 WA CONT. #SOIL SS*344LO

(206) 927-3173
TELEX: 466762
FAX: (206) 927-3478

Geotechnical, Engineering & Mineral Exploration Drilling • Instrumentation • Horizontal Drains
Ground Water Monitoring • Hazardous Waste Identification • Well Abandonments

RESOURCE PROTECTION WELL REPORT

PROJECT NAME: BLATO WATERWAY
WELL IDENTIFICATION NO.: HC-2I + HC-2S
DRILLING METHOD: [illegible]
DRILLER: [illegible]
SIGNATURE: [illegible]
CONSULTING FIRM: RCI
REPRESENTATIVE:

JOB #: [illegible] START CARD NO.: 209796
COUNTY: [illegible] CITY: [illegible]
LOCATION: 1/4 NE 1/4 SE 1/4
SEC.: 35 TOWN: 2[illegible] RANGE: 3E
DATUM:
WATER LEVEL ELEVATION:
INSTALLED:
DEVELOPED:

WELL DATA	AS BUILT	FORMATION DESCRIPTION
0'		0
[illegible] Pressure grouts	[illegible] PVC [illegible] HC-2S	
17'		
[illegible] Pressure grouts	[illegible] PVC [illegible] HC-2I	
43'		

SCALE: 1" = [illegible]

PAGE 1 OF 1

SOIL SAMPLING SERVICE, INC.

1415 MERIDIAN EAST, PUYALLUP, WA 98371-1399

FEDERAL ID #: 91-0762274 WA CONT. #SOIL SS*344LO

(206) 927-3173
TELEX: 466762
FAX: (206) 927-3478

Geotechnical, Engineering & Mineral Exploration Drilling • Instrumentation • Horizontal Drains
Ground Water Monitoring • Hazardous Waste Identification • Well Abandonments

RESOURCE PROTECTION WELL REPORT

PROJECT NAME: BLAIR WATERWAY
WELL IDENTIFICATION NO.: HC-3I + HC-3S
DRILLING METHOD: Decommission
DRILLER: [illegible]
SIGNATURE: Terry [illegible]
CONSULTING FIRM: RCI
REPRESENTATIVE:

JOB #: [illegible] START CARD NO.: 209795
COUNTY: [illegible] CITY: [illegible]
LOCATION: 1/4 SE 1/4 NE 1/4
SEC.: 35 TOWN: 21N RANGE: 3E
DATUM:
WATER LEVEL ELEVATION:
INSTALLED:
DEVELOPED:

WELL DATA	AS BUILT	FORMATION DESCRIPTION
0'		0
Pressure grouts	2" sch 40 PVC	
14'	HC-3S	
Pressure grouts	2" sch 40 PVC	
30'	HC-3I	

SCALE: 1" = Approx 25'

PAGE 1 OF 1

SOIL SAMPLING SERVICE, INC.

1415 MERIDIAN EAST, PUYALLUP, WA 98371-1399

FEDERAL ID #: 91-0762274 WA CONT. #SOIL SS*344LO

(206) 927-3173
TELEX: 466762
FAX: (206) 927-3478

Geotechnical, Engineering & Mineral Exploration Drilling • Instrumentation • Horizontal Drains
Ground Water Monitoring • Hazardous Waste Identification • Well Abandonments

RESOURCE PROTECTION WELL REPORT

PROJECT NAME: BLAIR WATERWAY
WELL IDENTIFICATION NO.: HC-141 + HC-145
DRILLING METHOD: Decommission
DRILLER: Terry Asberry 1616
SIGNATURE: Terry Asberry
CONSULTING FIRM: RCI
REPRESENTATIVE:

JOB #: W-3253 START CARD NO.: 209796
COUNTY: Pierce CITY: Port of Tacoma
LOCATION: 1/4 NE 1/4 SE 1/4
SEC.: 35 TOWN: 21N RANGE: 3E
DATUM:
WATER LEVEL ELEVATION:
INSTALLED:
DEVELOPED:

WELL DATA	AS BUILT	FORMATION DESCRIPTION
0' Pressure grout	4" sch 40 PVC	
	HC-145	
14' Pressure grout	4" sch 40 PVC	
	HC-141	
29'		

SCALE: 1" = approx 25'

PAGE 1 OF 1

SOIL SAMPLING SERVICE, INC.

1415 MERIDIAN EAST, PUYALLUP, WA 98371-1399

FEDERAL ID #: 91-0762274 WA CONT. #SOIL SS*344LO

(206) 927-3173
TELEX: 466762
FAX: (206) 927-3478

Geotechnical, Engineering & Mineral Exploration Drilling • Instrumentation • Horizontal Drains
Ground Water Monitoring • Hazardous Waste Identification • Well Abandonments

RESOURCE PROTECTION WELL REPORT

PROJECT NAME: BLAIR WATERWAY
WELL IDENTIFICATION NO.: HC-18S
DRILLING METHOD: Decommission
DRILLER: TERRY ASBERRY 11.16
SIGNATURE: Terry Asberry
CONSULTING FIRM: RCI
REPRESENTATIVE:

JOB #: W-3853 START CARD NO.: 209796
COUNTY: Pierce CITY: Port of Tacoma
LOCATION: 1/4 NE 1/4 SE 1/4
SEC.: 35 TOWN: 21N RANGE: 3E
DATUM:
WATER LEVEL ELEVATION:
INSTALLED:
DEVELOPED:

WELL DATA	AS BUILT	FORMATION DESCRIPTION
-0'	HC-18S	
Pressure grouts	4" Schedule PVC	
14'		

SCALE: 1" = APPROX 2.5'

PAGE 1 OF 1

SOIL SAMPLING SERVICE, INC.

1415 MERIDIAN EAST, PUYALLUP, WA 98371-1399

FEDERAL ID #: 91-0762274 WA CONT. #SOIL SS*344LO

(206) 927-3173
TELEX: 466762
FAX: (206) 927-3478

Geotechnical, Engineering & Mineral Exploration Drilling • Instrumentation • Horizontal Drains
Ground Water Monitoring • Hazardous Waste Identification • Well Abandonments

RESOURCE PROTECTION WELL REPORT

PROJECT NAME: Blair Waterway
WELL IDENTIFICATION NO.: HC-21S
DRILLING METHOD: Decommission
DRILLER: Terry Asherry 1616
SIGNATURE: Terry Asherry
CONSULTING FIRM: RCI
REPRESENTATIVE:

JOB #: 10-3853 START CARD NO.: 209795
COUNTY: Pierce CITY: Port of Tacoma
LOCATION: 1/4 SE 1/4 NE 1/4
SEC.: 35 TOWN: 21N RANGE: 3E
DATUM:
WATER LEVEL ELEVATION:
INSTALLED:
DEVELOPED:

WELL DATA	AS BUILT	FORMATION DESCRIPTION
0'	HC-21S	
Pressure grouts	4" sch 40 PVC	
-5'		

SCALE: 1" = approx 2.5'

PAGE 1 OF 1

SOIL SAMPLING SERVICE, INC.

1415 MERIDIAN EAST, PUYALLUP, WA 98371-1399

FEDERAL ID #: 91-0762274 WA CONT. #SOIL SS*344LO

(206) 927-3173
TELEX: 466762
FAX: (206) 927-3478

Geotechnical, Engineering & Mineral Exploration Drilling • Instrumentation • Horizontal Drains
Ground Water Monitoring • Hazardous Waste Identification • Well Abandonments

RESOURCE PROTECTION WELL REPORT

PROJECT NAME: Blair Way
WELL IDENTIFICATION NO.: HC-24S
DRILLING METHOD: Decommission
DRILLER: Terry Asberry 1616
SIGNATURE: Terry Asberry
CONSULTING FIRM: RCI
REPRESENTATIVE:

JOB #: W-3853 START CARD NO.: 209795
COUNTY: Pierce CITY: Port of Tacoma
LOCATION: 1/4 SE 1/4 NE 1/4
SEC.: 35 TOWN: 21N RANGE: 3E
DATUM:
WATER LEVEL ELEVATION:
INSTALLED:
DEVELOPED:

WELL DATA	AS BUILT	FORMATION DESCRIPTION
0'	HC-24S	
Pressure Grout	2" sch 40 PVC	
8'		

SCALE: 1" = approx 2.5'

PAGE 1 OF 1

SOIL SAMPLING SERVICE, INC.

1415 MERIDIAN EAST, PUYALLUP, WA 98371-1399

FEDERAL ID #: 91-0762274 WA CONT. #SOIL SS*344LO

(206) 927-3173
TELEX: 466762
FAX: (206) 927-3478

Geotechnical, Engineering & Mineral Exploration Drilling • Instrumentation • Horizontal Drains
Ground Water Monitoring • Hazardous Waste Identification • Well Abandonments

RESOURCE PROTECTION WELL REPORT

PROJECT NAME: Blair Waterway
WELL IDENTIFICATION NO.: HC-25S
DRILLING METHOD: Decommission
DRILLER: Terry Asberry 1616
SIGNATURE: [signature]
CONSULTING FIRM: URCI
REPRESENTATIVE:

JOB #: W-3253 START CARD NO.: 209795
COUNTY: Pierce CITY: Port of Tacoma
LOCATION: 1/4 SE 1/4 NE 1/4
SEC.: 35 TOWN: 21N RANGE: 3E
DATUM:
WATER LEVEL ELEVATION:
INSTALLED:
DEVELOPED:

WELL DATA	AS BUILT	FORMATION DESCRIPTION
0'	HC-25S	
Pressure grouts	2" sch 40 PVC	
8'		

SCALE: 1" = approx 2.5'

PAGE 1 OF 1

SOIL SAMPLING SERVICE, INC.

1415 MERIDIAN EAST, PUYALLUP, WA 98371-1399

FEDERAL ID #: 91-0762274 WA CONT. #SOIL SS*344LO

(206) 927-3173
TELEX: 466762
FAX: (206) 927-3478

Geotechnical, Engineering & Mineral Exploration Drilling • Instrumentation • Horizontal Drains
Ground Water Monitoring • Hazardous Waste Identification • Well Abandonments

RESOURCE PROTECTION WELL REPORT

PROJECT NAME: Blair Waterway
WELL IDENTIFICATION NO.: HC-6I + HC-6S
DRILLING METHOD: Decommission
DRILLER: Terry Asberry 1616
SIGNATURE: Terry Asberry
CONSULTING FIRM: RGI
REPRESENTATIVE:

JOB #: 11-3253 START CARD NO.: 209795
COUNTY: King CITY: Orchard Farm
LOCATION: 1/4 SE 1/4 NE 1/4
SEC.: 35 TOWN: 21N RANGE: 3E
DATUM:
WATER LEVEL ELEVATION:
INSTALLED:
DEVELOPED:

WELL DATA	AS BUILT	FORMATION DESCRIPTION
0'	HC-6S HC-6I	
18' Pressure grout	2" Sch 40 PVC	
27' Pressure grout	2" Sch 40 PVC	

SCALE: 1" = [illegible]

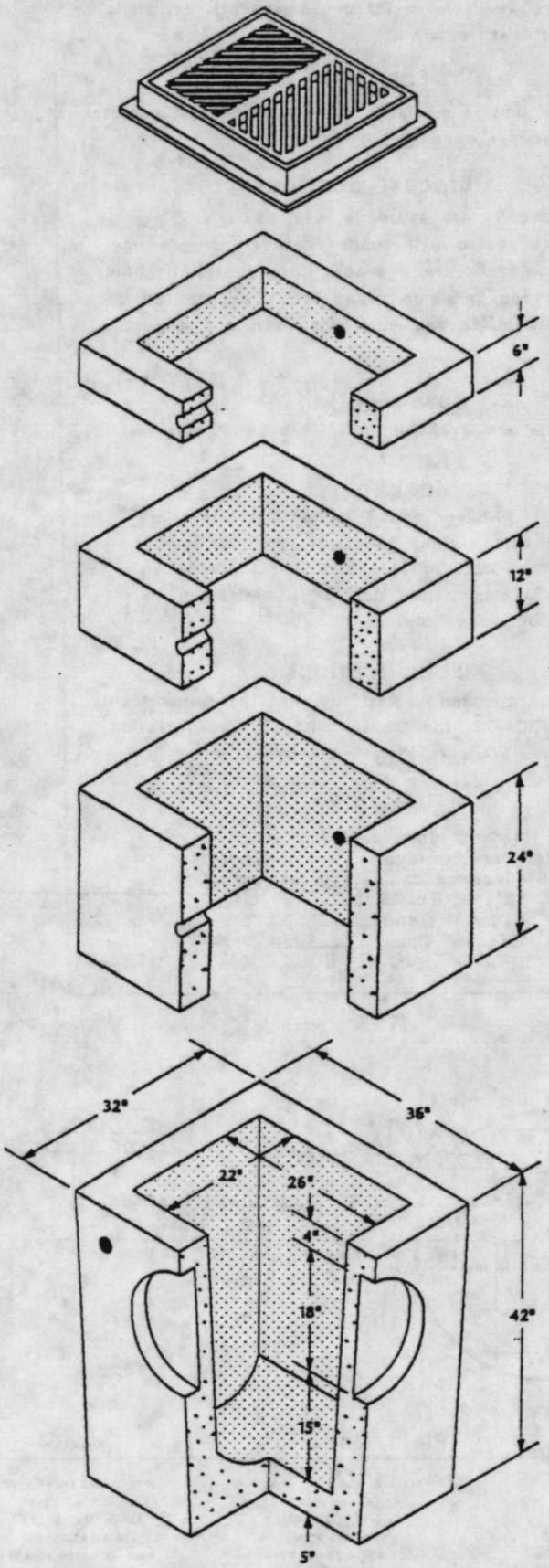
PAGE 1 OF 1

APPENDIX D
DRAINAGE SYSTEM MATERIALS

Pipe INC.

Pacific International Pipe Enterprises, Inc.

TYPE 1 CATCH BASIN



Riser Sections

Available in 6", 12" and 24" heights to be used to adjust to the maximum allowable depth of 5'- 0" from finished grade to pipe invert. Lift holes are provided in all risers and MUST be grouted up from both inside and outside to assure a watertight structure.

Base Sections

This unit is provided with 18" diameter knockouts on all four sides leaving a minimum wall thickness of 2". Lift holes are provided in all units and MUST be grouted up from both inside and outside to assure a watertight structure.

Specifications

All units are manufactured to the specifications of the Department of Transportation and the APWA Standard Plan B-1

Weights

Base Section .....2,120 lbs.
24" Riser Section ... 1,638 lbs.
12" Riser Section ..... 830 lbs.
6" Riser Section .... 415 lbs.

☑ CONFORMS TO DESIGN CONCEPT
☐ CONFORMS TO DESIGN CONCEPT WITH REVISIONS SHOWN
☐ NON-CONFORMING - REVISE AND RESUBMIT

This submittal has been reviewed for general conformance to design concept only. This review does not relieve the contractor or supplier of full responsibility for adhering to the contract documents and submitted conjunction of all work.

By: John Vadim Date: 4/3/93

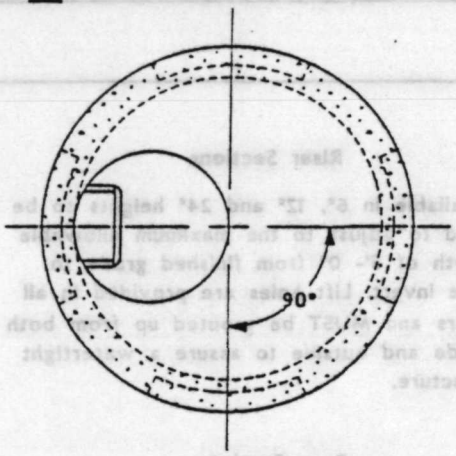
HART CROWSER, INC

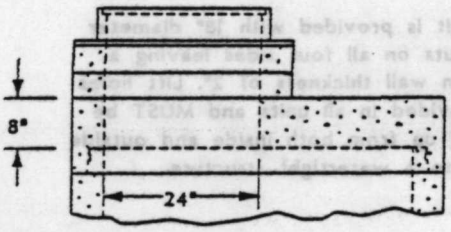
Plant Locations

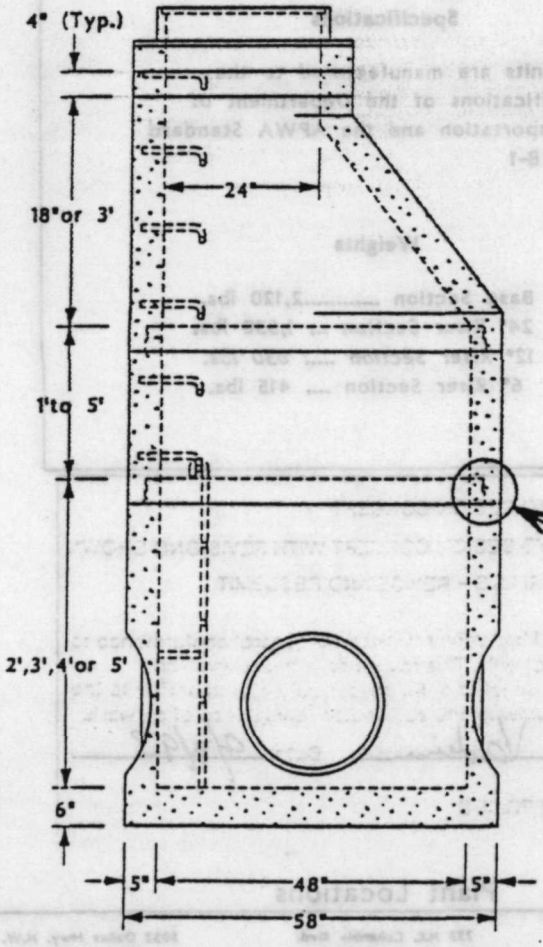
4601 So. Orchard	755 N.E. Columbia Blvd.	5032 Dallas Hwy. N.W.
P.O. Box 9156	P.O. Box 11305	P.O. Box 5249
Tacoma, WA, 98409	Portland, OR, 97211	Salem, OR, 97304
(206) 475-8888 (TAC)	(503) 285-8391	(503) 585-7350
(206) 623-7772 (SEA)	(800) 634-0139 (WATS)	(800) 452-0339 (WATS)
(800) 922-5338 (WATS)	(503) 286-0603 (FAX)	(503) 362-8526 (FAX)
(206) 474-7631 (FAX)		

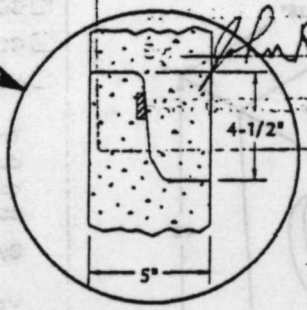
Pacific International Pipe Enterprises, Inc.

48" MANHOLE









Top Cone

Units are available in 18" or 36" heights. Eccentric or concentric as required.

Top Slab

Standard unit is available 8" thick with 24" diameter offset access opening

Precast Sections

Standard units are available in 1' through 5' heights. Joints are sealed with rubber gaskets provided by PIPE, Inc.. Steps are available on request. Lift holes are provided in all units and MUST be grouted up from both inside and outside to assure a watertight structure.

Base Sections

Base units are available in 2' through 5' heights.

Knockouts

2' through 5' bases and 3', 4' & 5' sections are available with various knockout configurations. Special knockouts or blockouts are available on request. Maximum hole size is 36". Minimum distance between holes is 8".

Specifications

All units are manufactured to meet the requirements of ASTM C-478, the Department of Transportation and APWA Standard Plan B-23a or B-23c

Weights

48"x 2' Base .....3,200 lbs.
Additional Footage .....920 lbs. per ft.
48" Sections .....920 lbs. per ft.
48"x 8" Top Slab ....1,900 lbs.
48"x 18" Cone .....1,580 lbs.
48"x 36" Cone .....3,180 lbs.

All joints use a confined round rubber gasket meeting ASTM C-443 specifications.

Plant Locations

4601 So. Orchard
P.O. Box 9156
Tacoma, WA, 98409
(206) 475-8888 (TAC)
(206) 623-7772 (SEA)
(800) 922-5338 (WATS)
(206) 474-7631 (FAX)

755 N.E. Columbia Blvd.
P.O. Box 11305
Portland, OR, 97211
(503) 285-8391
(800) 634-0139 (WATS)
(503) 286-0603 (FAX)

5032 Dallas Hwy. N.W.
P.O. Box 5249
Salem, OR, 97304
(503) 585-7350
(800) 452-0339 (WATS)
(503) 362-8526 (FAX)

Pacific International Pipe Enterprises, Inc.
P.O. Box 9156 Tacoma, WA 98409
(206) 475-8888
RENTON (206) 255-1521
SEATTLE (206) 623-7772
FAX (206) 474-7631
WA WATS (800) 922-6338

Manufacturers of
Concrete Sewer and
Culvert Pipe —
Precast Manholes —
Low Head Pressure Pipe —
Transformer Vaults —
Specialty Items —
Precast and
Prestressed Concrete

MATERIAL SOURCES

PLANT DRYCAST:	CONFORMING ASTM STD.	SUPPLIER
Cement-Type II	C 150	Tillbury Cement, Seattle
Flyash	C 618	Pozzolanic NW, Centralia
3/8" Washed Rock	C 33	Lonestar Northwest #B-58 Steilacoom
Pipe Sand	C 33	Lonestar Northwest #B-58 Steilacoom
Reinforcing Wire	A 496	Davis Walker, Kent, Wash.
Rubber Gaskets	C 443 & C 361 & AASHTO M198-79 (1986)	Best Fitt Co. Sumner, Wash.

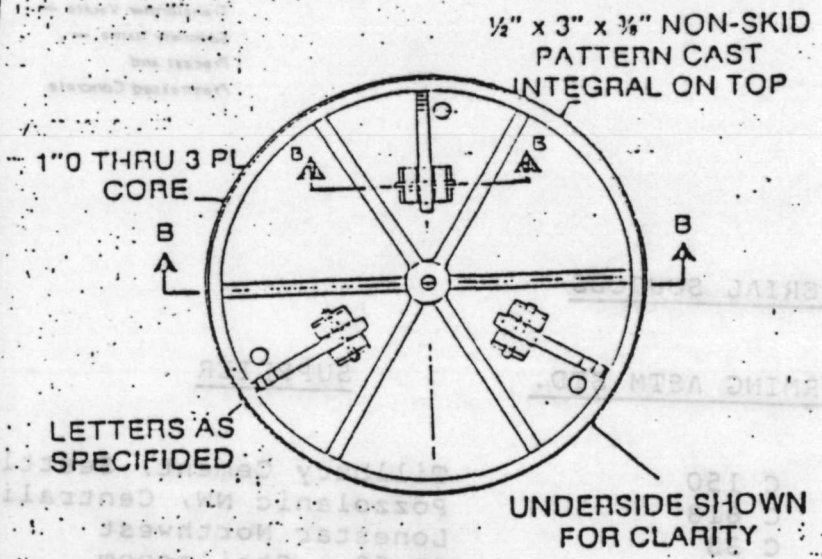
PRECAST:		
Cement-Type II	C 150	Tillbury, Seattle, Wa.
3/4" Washed Rock	C 33	Lonestar Northwest #B-58 Steilacoom
Building Sand	C 33	NW Aggregates #B-58 Steilacoom
WRDA 19 (Super Plasticizer)	C 494	W. R. Grace Co. Redmond
Daravair (Air Entraining)	C 260	W. R. Grace Co. Redmond
Reinforcing Mesh	A 185	Davis Walker, Seattle, WA.
Reinforcing Rebar	A 615 GR 60	Nucor Steel, Plymouth, Utah
Rubber Gaskets	C 443 & C 361	Best Fitt Co. Everett

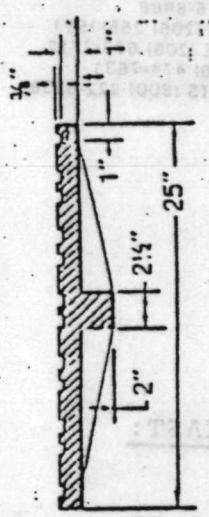
Sincerely yours,

Ben Wabnitz,
Engineering

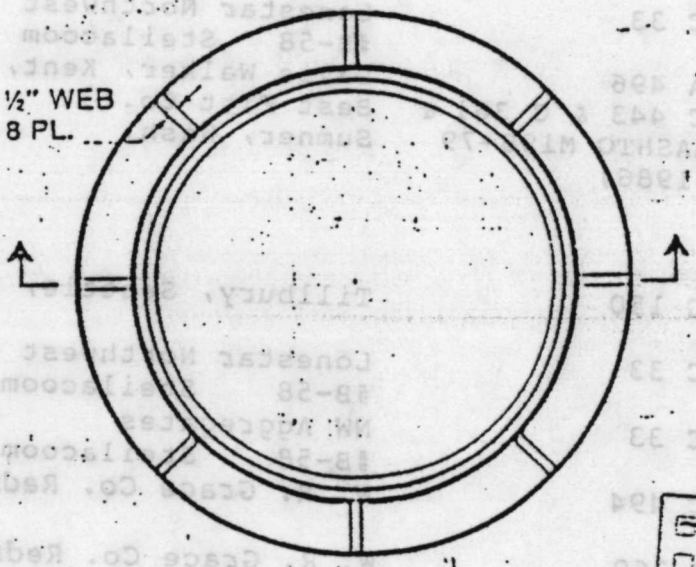
[illegible] 3/5/93

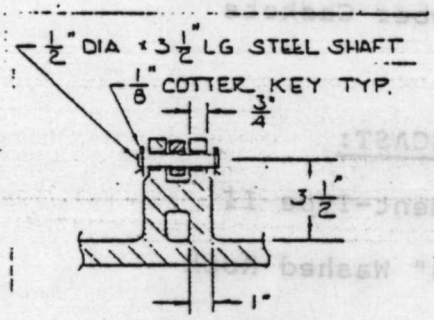
Plant Locations: 4601 South Orchard, Tacoma, WA
755 N.E. Columbia Blvd., Portland, OR
Member: Pacific Northwest Concrete Pipe Association / American Concrete Pipe Association



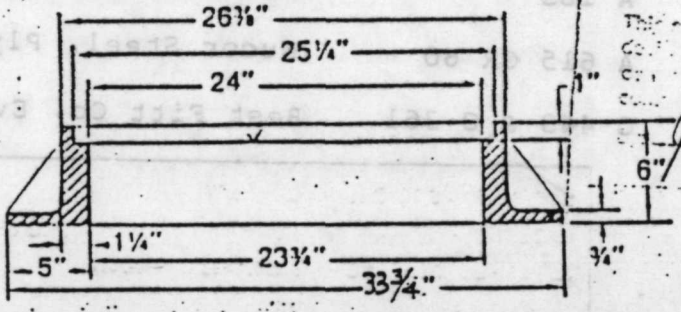


SECTION B-B





SECTION B-B



APPROX. WEIGHT

FRAME - 210 LBS.
COVER - 150 LBS.

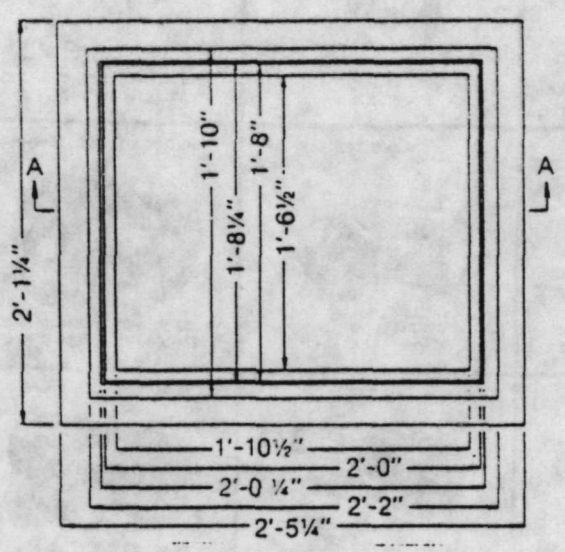
OLYMPIC FOUNDRY (1984) INC.
SEATTLE, WASH.

24" x 6" FRAME & COVER CAM LOCK
APWA STD. 42

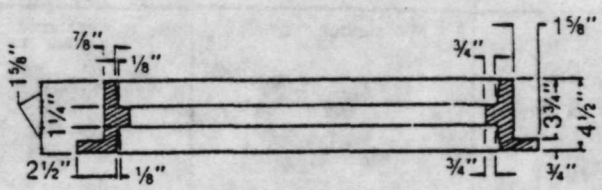
A.P.W.A.-42

RATING — H-20 | PART NO. MH303CL

4



FRAME



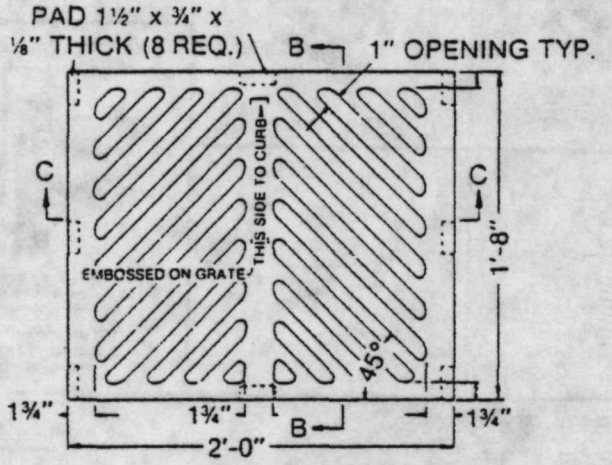
SECTION A-A

☑ CONFORMS TO DESIGN CONCEPT
☐ CONFORMS TO DESIGN CONCEPT WITH REVISIONS SHOWN
☐ NON-CONFORMING - REVISE AND RESUBMIT

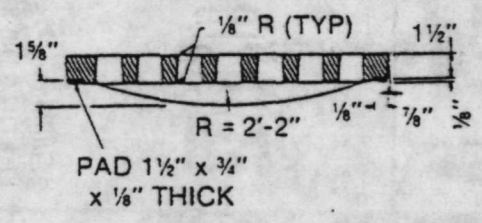
This submittal has been reviewed for general conformance to design concept only. This review does not relieve the contractor or supplier of full responsibility for adhering to the contract documents and satisfactory completion of all work.

By: John Verdrim Date: 3/5/93

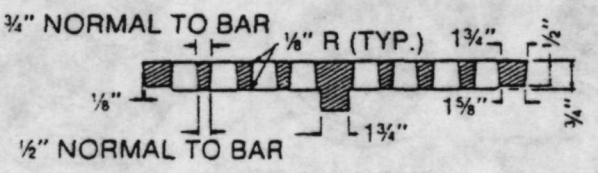
HART CROWSER, INC.



GRATE



SECTION B-B



SECTION C-C

NOTES:

1. W.S.D.O.T. PART NO. B2A & A.P.W.A. NO. 49 COME WITH DUCTILE IRON GRATE BOTH FRAME AND GRATE ARE MACHINED.

2⅛" RISER FRAME ALSO AVAILABLE PART NO. CB60R

APPROX. WEIGHT

FRAME	170 LBS.
GRATE	110 LBS.
	280 LBS.

OLYMPIC FOUNDRY SEATTLE, WASH.	
18½" x 22½" x 4" REVERSIBLE FRAME AND GRATE	
RATING — H-20	PART NO. SM60

SPLIT COUPLING

3"-311 8"- 811
4"-411 10"-1011
5"-511 12"-1211
6"-611 15"-1511

SNAP COUPLING

3"-312 6"- 612
4"-412 8"- 812
5"-512 10"-1012

INTERNAL COUPLER

4"-415
5"-515
6"-615

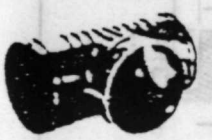
INTERNAL REDUCING COUPLER

5"-4"-425
6"-5"-526

REDUCING COUPLER

4"x3"—314 8"x6"—816
5"x4"—514 10"x8"—1018
6"x4"—614 12"x10"—1210
6"x5"—516 15"x12"—1512

SNAP TEE



3"-321 5"-525
4"-421 6"-626

SADDLE TEE

4"-443 5"-646
5"-545 8"-843

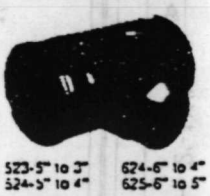
REDUCING SADDLE TEE

543-5" to 3" 643-6" to 4"
547-5" to 4" 647-6" to 5"

BLIND TEE

3"-341 5"-541
4"-441 6"-641

REDUCING TEE (Single)



523-5" to 3" 624-6" to 4"
524-5" to 4" 625-6" to 5"

SNAP END CAP

3"-332
4"-432

SPLIT END CAP

3"-331 8"- 831
4"-431 10"-1031
5"-531 12"-1231
6"-631 15"-1531

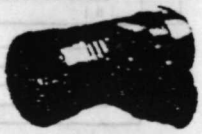
END PLUGS

Perforated	Non-Perforated
4"-434	3"-333
	4"-433
	5"-533
	6"-633

45° "Y"

3"-322 5"-522
4"-422 6"-622

REDUCING TEE (Multiple)



644- 6" to 6" 6" to 5"
6" to 4" 6" to 3"
844- 8" to 8" 8" to 6"
8" to 5" 8" to 4"
1044-10" to 10" 10" to 8"
10" to 6"
1244-12" to 12" 12" to 10"
12" to 8"
1544-15" to 15" 15" to 12"
15" to 10"

90° ELL / 45° ELL

4"-445 3"-390
4"-490

DOWNSPOUT ADAPTER

3"-364 (3¼x2½)
4"-464 (3½x2½)
4"-465 (3x4¼)

SNAP ADAPTER

3"-362 5"-562
4"-462 6"-662
8"-862

SEPTIC TANK ADAPTER

4"-463

SUMP LINERS & LIDS FOR BASEMENT

1524 24" Liner
1530 30" Liner

1537 Heavy Duty Lid
1536 Regular Lid

SEPTIC TEES AND ELLS

No. 494

No. 494* — For smooth wall
No. 495 — Cast iron No. 496 — Clay
No. 497 — Vented Ell

*4" straight end fits ADS adapter 463 for ADS Plastic Tubing

DISTRIBUTION BOXES

1369 — Regular

1370 — Midside

Perforated Tubing
3"-301-300' Coils
4"-401-250' Coils
5"-501-165' Coils
6"-601-100' Coils
8"-801-20' Lengths
10"-1001-20' Lengths
12"-1201-20' Lengths
15"-1501-20' Lengths
18"—1801—20' Lengths
24"—2401—20' Lengths
(301 and 401 also available in bundles of ten 10' lengths.)

Non-Perforated Tubing
3"-351-300' Coils
4"-451-250' Coils
5"-551-165' Coils
6"-651-100' Coils
8"-851-20' Lengths
10"-1051-20' Lengths
12"-1251-20' Lengths
15"-1551-20' Lengths
18"—1851—20' Lengths
24"—2451—20' Lengths
(351 and 451 also available in bundles of ten 10' lengths.)

Septic/Leach Field Tubing
4"-402-10' Lengths
With Bell End
(also available in coils.)
(½" to ¾" dia. holes)
(Perforated to comply with state, county and municipal sanitation codes.)

Protective Wrap (Drain Guard® Protective Wrap Shown)

D/G	Sock
3"- 372	373-300' Coils
4"- 472	473-250' Coils
5"- 572	573-165' Coils
6"- 672	673-100' Coils
8"- 872	873-20' Lengths
10"-1072	1073-20' Lengths
12"-1272	1273-20' Lengths
15"-1572	1573-20' Lengths

Heavy Duty Perforated and Non-Perforated Tubing

Perf.	Non-Perf.
8"- 801	851-20' Lengths
10"-1001	1051-20' Lengths
12"-1201	1251-20' Lengths
15"-1501	1551-20' Lengths
18"—1801	1851—20' Lengths
24"—2401	2451—20' Lengths

SB2 Leach Field Tubing Filter Wrap (Drain Guard®) (½" holes).
8"—871—20' Lengths
10"-1071-20' Lengths

Nationwide Sales and Manufacturing Network

ADS

ADVANCED DRAINAGE SYSTEMS, INC.

CALIFORNIA
Madera (209) 674-0054
(209) 674-0903*

GEORGIA
Atlanta (404) 383-0602*
Montezuma (912) 472-7356

ILLINOIS
Harvard (815) 943-5477
Monticello (217) 762-9448

IOWA
Greene (319) 547-3105
Creston (515) 782-6565
Eagle Grove (515) 448-5101
Iowa City (319) 338-9448
(319) 338-3689*

KENTUCKY
Livermore (502) 733-4324
Versailles (606) 873-8046

MASSACHUSETTS
Palmer (413) 283-9797

MICHIGAN
Bad Axe (517) 269-9506
Owosso (517) 723-5208

NORTH CAROLINA
Rowland (919) 422-3333

OHIO
London (614) 852-9564
Napoleon (419) 599-9565
(419) 599-0585*
Wooster (216) 264-[illegible]

TEXAS
Ennis (214) 875-6591

VIRGINIA
Buena Vista (703) 261-6131

WASHINGTON
Bellevue (206) 643-2777*
Woodinville (206) 835-8522

*Sales Office Only

CULVERT INSTALLATION GUIDE

ADS culvert pipe is recommended for residential driveway culverts and field crossings. Because these installations are not subject to repeated heavy truck traffic, the recommended compaction level is 80%. This compaction typically can be achieved by hand tamping the backfill material around the pipe. The minimum heights of cover for these installations are as listed in the table to the right.

Trench Installation **Open Ditch Installation**

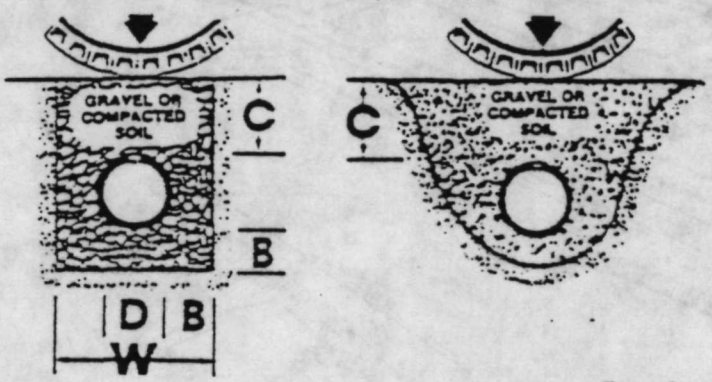


Figure 3

Minimum Dimensions — Trench or Open Ditch Installations

Nominal Diameter	Minimum Thickness	Miminum Cover	Min. Trench Width
D	B	C	W
10"	4"	12"	20"
12"	5"	12"	24"
15"	5"	12"	28"
18"	6"	12"	36"
24"	6"	12"	42"

Product Specifications and Installation Procedures for Corrugated Polyethylene Tubing and Fittings.

To facilitate the design and installation of drainage systems using corrugated polyethylene tubing and fittings, a list of the applicable product specifications and recommended installation procedures has been developed for various end-use applications shown below:

END-USE APPLICATIONS	PRODUCT SPECIFICATION	RECOMMENDED INSTALLATION PRACTICE
AGRICULTURAL DRAINAGE	ASTM F 405 ASTM F 667 SCS Code 606 Bureau of Reclamation. (where applicable)	ASTM F 499 ASTM F 449 ASTM F 449 Bureau of Reclamation (where applicable)
RESIDENTIAL & COMMERCIAL CONSTRUCTION		
Foundation Drains (exterior & interior)	ASTM F 405 ASTM F 667	ASTM F 449 ASTM F 449
Downspout Runoff	ASTM F 405 ASTM F 667	ASTM F 499 ASTM F 449
Basement Window Wells	ASTM F 405 ASTM F 667	ASTM F 449 ASTM F 449
Driveways & Sidewalks	ASTM F 405 ASTM F 667	ASTM F 449 ASTM F 449
Septic Tank Leach Fields	ASTM F 405	ASTM F 481 or Local Health Department
SB2 Leach Fields	ASTM F 667	Local Health Dept. or Mfg. Recommendation
HIGHWAY BERM & UNDERDRAINS	AASHTO M 252	State Hwy. Dept.
GOLF COURSES & ATHLETIC FIELDS	ASTM F 405 ASTM F 667	ASTM F 449 or Mfg. Recommendation

Other Applicable Product Listings:
BOCA #80-94: Building Officials and Code Administrators, Intl.
IAMPO #1549: International Association of Plumbing and Mechanical Officials
SBCC #7440: Southern Building Code Congress International

RESIDENTIAL & CONSTRUCTION APPLICATIONS

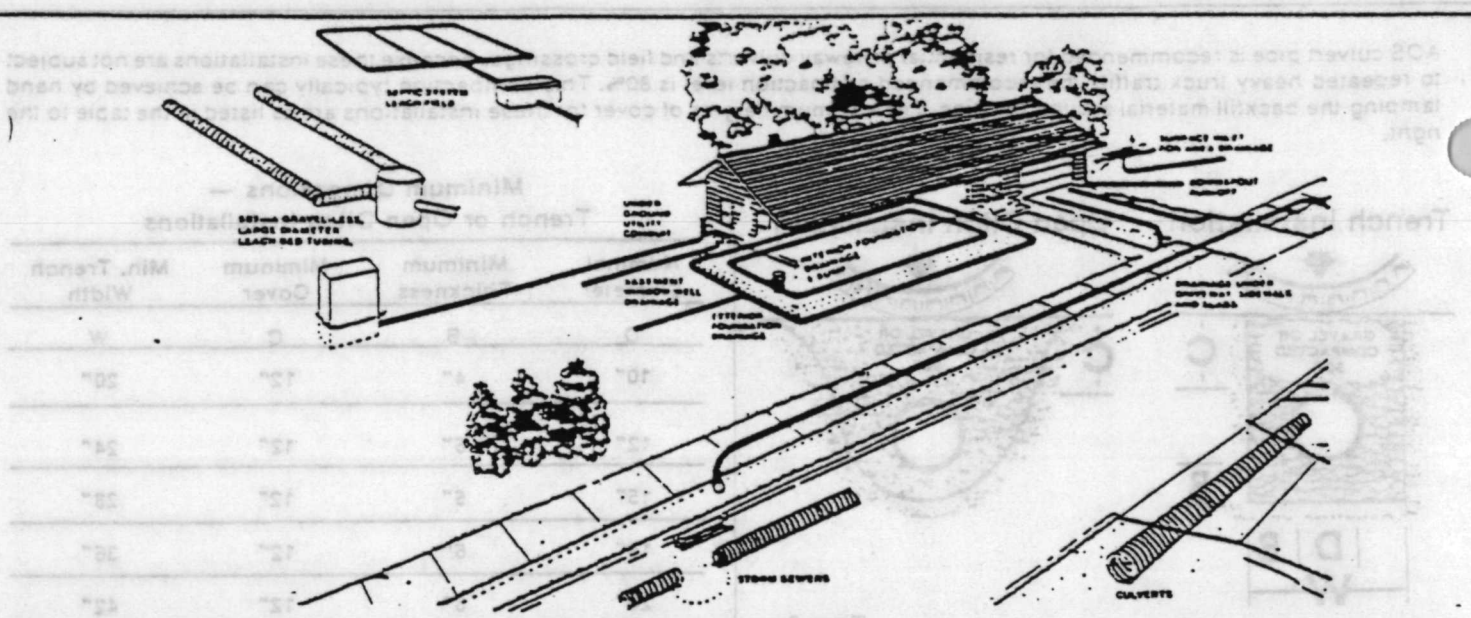


Fig. 1 Home and construction uses for corrugated plastic tubing.

ADS TUBING INSTALLATION GUIDELINES

CARE DURING INSTALLATION

Care should be taken to prevent damage to the tubing during the backfilling operation. Avoid dropping large clods or rocks directly on tubing. Impact loads of all types should be avoided until tubing is properly bedded.

BEDDING

It is preferred that tubing be bedded in a gravel envelope. However, selected soil backfill material may also be used with satisfactory results. The bedding material should be placed around the tubing to a depth at least 2" over the top of tubing. When selected soil bedding material from the trench excavation is used, small loose particles of soil that will flow around the tubing and minimize soil settling should be chosen. Avoid large rocks that may damage the tubing or large clods of soil that cause voids and subsequent excessive settling.

DEPTH OF COVER

If vehicular traffic is expected over tubing, there should be a minimum of 12" of cover over tubing if gravel bedding material is used. Typical recommended gravel envelope materials would be pea gravel, 6A stone or pit run coarse sand and gravel mixes.

PROPER GRADE

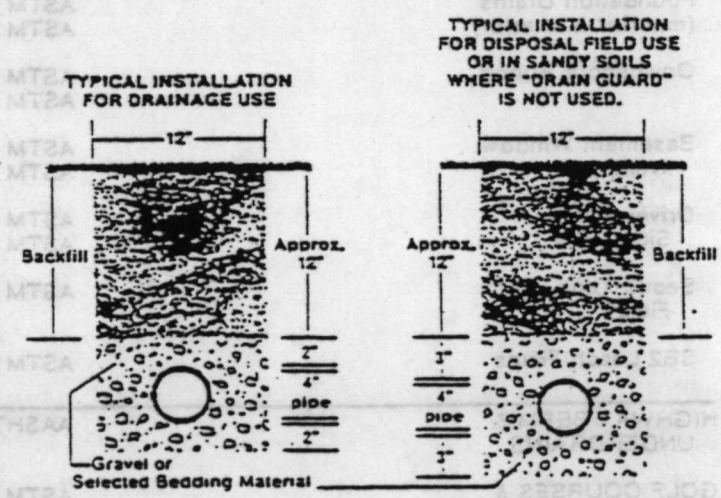
The grade or fall on which tubing is laid is important in that reversals in grade will reduce the effectiveness of the system. Best drainage practice calls for a continuous downhill fall, or grade, over the entire length of the drain line. A fall of 0.2 inches per 10 feet of length is generally considered adequate. Greater amounts of fall will promote more rapid drainage.

PROPER SELECTION OF MATERIALS

Proper selection of materials is determined by the application. If the line is to serve as a drainage line, Perforated Tubing should be used. If the line serves only to convey water away from an area (such as downsoout runoffs, etc.) Non-Perforated Tubing is best, as it will not dissipate water into the surrounding area.

Non-Perforated Tubing should also be used if the line runs close to trees where root penetration may be a problem. If the soil being drained is sandy or silty, then either "Drain-Guard"® or a gravel envelope should be used to prevent fine soils from entering and blocking the line. If the above recommended practices are given due consideration when installing a drainage system, ADS tubing will provide an easy to install, safe, permanent and efficient drainage system.

Figure 2



NOTE: 12" width is suggested to allow easy access for proper bedding. Other widths may be used if good bedding practices can be obtained.

®Registered Trademarks

ADVANCED DRAINAGE SYSTEMS, INC.

PRODUCT INFORMATION SHEET

Advanced Drainage Systems, Inc. is America's leading manufacturer of quality corrugated polyethylene pipe.

ADS pipe is manufactured of selected polyethylene resins to meet the strictest product quality standards and industry specifications.

ADS manufactures a complete line of corrugated pipe, from 3-inch through 24-inch diameters for various drainage applications around the home, farm or construction site. From coast to coast, ADS pipe is available through the industry's most extensive distribution network. A commitment to quality and innovation combine to make ADS synonymous with state of the art drainage and drainage products.

By: John Verdieu Date: 3/5/93

APPLICATIONS

The principal applications for corrugated polyethylene are in agriculture, in the construction industry and for highways and roads. Its wide acceptance in these varied applications is due primarily to:

1 ease of installation
2 lightweight
3 resistance to corrosion
4 unique structural properties
5 resistance to abrasion
6 flexibility
7 low cost

There are many applications for corrugated polyethylene tubing, but the following is representative of its widely varied uses:

Farm Drainage, Residential and Commercial Buildings, Exterior Foundation Drains, Interior Foundation Drains, Downspout Runoff Drains, Low-Spot Drainage, Basement Window Well Drainage, Driveway and Sidewalk Underdrainage, Septic Tank Leach Fields, Gravel-less Septic System, Corrugated Polyethylene Culvert Pipe, Golf Course and Athletic Fields.

Below is a detailed look at each of these uses:

FARM DRAINAGE. Subsurface drainage of farmland is the key to successful farming. In many cases it allows for reclamation of land once considered to be unfit or unprofitable for farming. In addition, subsurface drainage results in increased yields and improved farming operations.

The introduction of corrugated polyethylene tubing and improved installation techniques has resulted in a lower installed cost for agricultural drainage systems, than for other materials used in the past. This has led to an increase in farm drainage and has contributed to the ever increasing productivity in American agriculture.

RESIDENTIAL AND COMMERCIAL BUILDINGS. Early in the history of corrugated polyethylene tubing in this country, architects and engineers recognized its value for many applications around residential and commercial buildings. These various applications are illustrated in Figure 1.

EXTERIOR FOUNDATION DRAINS are necessary for both residential and industrial buildings, below the level of the lowest floor, where high water tables and rainwater result in wet basements. These drains are placed to collect and channel water away from footers and basement walls to a suitable outlet.

INTERIOR FOUNDATION DRAINS are often necessary in areas where ground water is a problem. These drains intercept water that otherwise would gain entry through the basement walls or floor.

DOWNSPOUT RUNOFF DRAINS using corrugated plastic pipe channel water collected in the roof gutters to areas away from the building. These can be discharged into storm sewers, into the curb at the edge of the street, or into other suitable outlets.

LOW-SPOT DRAINAGE in lawns or yards can be accomplished using surface inlets and corrugated polyethylene tubing to collect and carry the water to a storm sewer or other disposal area.

BASEMENT WINDOW WELL DRAINAGE will prevent rain water from seeping down the foundation wall and entering the basement. This is accomplished by running a length of non-perforated tubing from the drain in the bottom of the well to the disposal area.

DRIVEWAY AND SIDEWALK UNDERDRAINAGE is used to prevent frost damage or pavement deterioration due to unstable bases. Installation of perforated drainage tubing in a bed of gravel allows the water to drain out of the base course and be channeled away from the pavement.

SEPTIC TANK LEACH FIELDS, utilizing 4-inch corrugated polyethylene tubing is one of the most common methods for home wastewater disposal. Polyethylene plastic tubing is used because of its light weight, ease of installation, and its virtual immunity to the corrosive environment found in septic tank leach fields.

GRAVEL-LESS SEPTIC SYSTEM called SB2®, a recent innovation in on-site waste water disposal technology, is constructed of 8" and 10" tubing encased in a spun bonded mesh material, Drain Guard® protective wrap and eliminates the need for gravel.

CORRUGATED POLYETHYLENE CULVERT PIPE is also available in larger sizes (up to 24-inch diameter) for culvert applications including use around commercial and residential buildings. The load bearing capability in combination with a "select" envelope and the resistance of polyethylene pipe to chemical attack and abrasion have led to its widespread use in this application. See Fig. 3 for installation guidelines.

GOLF COURSES AND ATHLETIC FIELDS. Golf courses and landscape architects have long understood the benefits of proper drainage for heavily used turf. A well designed drainage system provides for the rapid removal of excess water to maximize playing time and minimize damage to tees, greens and fairways. Corrugated polyethylene tubing has become the predominate drainage material used for golf courses, athletic fields and other high-use turf areas.

CONTECH
CONSTRUCTION PRODUCTS INC.

2207 N.E. Cornell Rd
Hillsboro, Oregon 97124
(503) 648-1122

February 22, 1993

RCI Environmental
P. O. Box 5789
Kent, Washington 98064

Re: Port of Tacoma
Blair Waterway Cleanup
Contract 710

Dear Sirs:

The 18" and 24" diameter cmp for the above-referenced project will be 16 gage (.064) Galvanized Corrugated Steel Pipe with Asphalt Treatment Number 1. The connecting bands will be Hugger Bands with O-Ring Gaskets.

The pipe and bands will meet AASHTO M-36 and M-190, as well as all applicable WSDOT specifications.

Sincerely yours,

Doug Maxwell

Doug Maxwell
Regional Sales Engineer

DM:plm

☑ CONFORMS TO DESIGN CONCEPT
☐ CONFORMS TO DESIGN CONCEPT WITH REVISIONS SHOWN
☐ NON-CONFORMING - REVISE AND RESUBMIT

This submittal has been reviewed for general conformance to design concept only. This review does not relieve the contractor of sole responsibility for adherence to the contract documents and satisfactory completion of all work.

By: John Verdun Date: 3/4/93

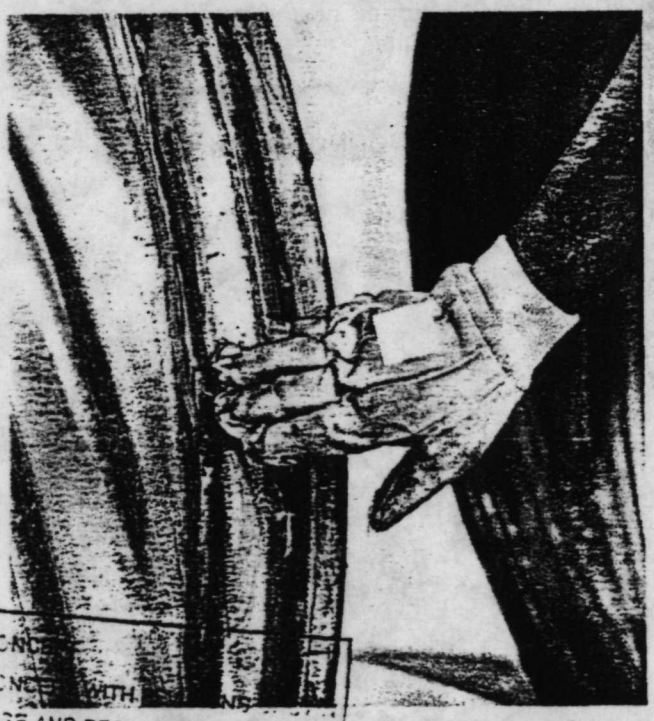
HART CROWSER, INC.

6

CONTECH
CONSTRUCTION PRODUCTS INC.

Installation Instructions
HUGGER Band with Gaskets

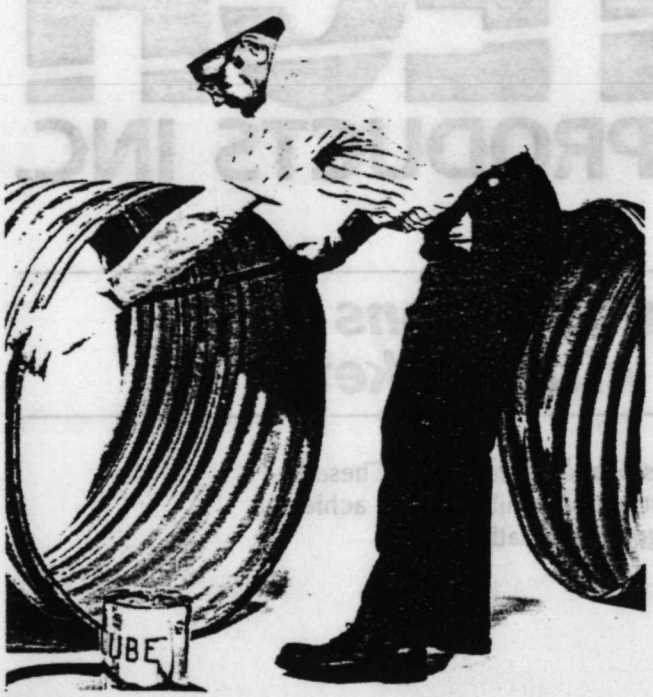
HUGGER Bands with gaskets have been used in thousands of successful installations. The key to success is *proper installation.* These instructions will help you achieve a good installation.



1 Liberally lubricate gaskets with either a soap base lubricant such as Tylox #7 or a vegetable base lubricant such as Crisco.

2 Applying additional lubricant to outside pipe ends is not mandatory, but is recommended to produce optimum results with larger diameters or asphalt-coated pipe in cold weather. Remove any foreign matter that might become lodged between the pipe and the band.

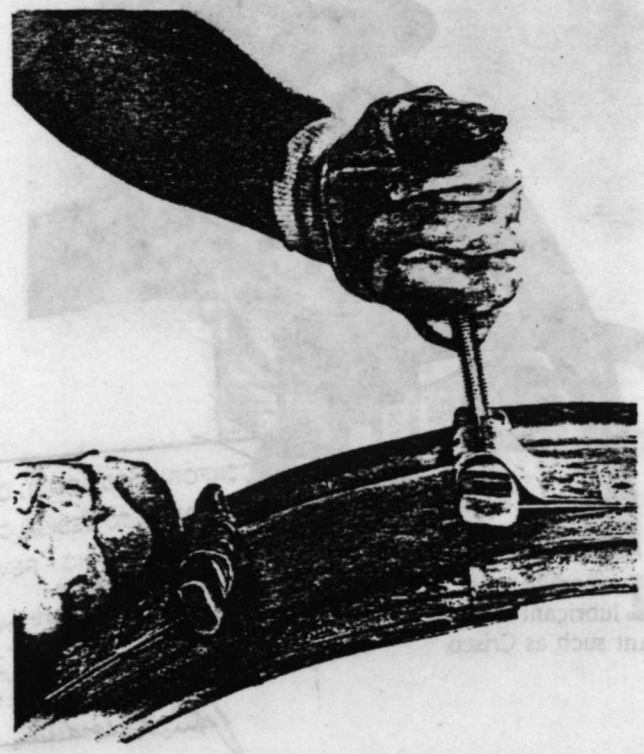
CONFORMS TO DESIGN CONC
CONFORMS TO DESIGN CONC
NON-CONFORMING - REVISE AND
Date: 3/4/93



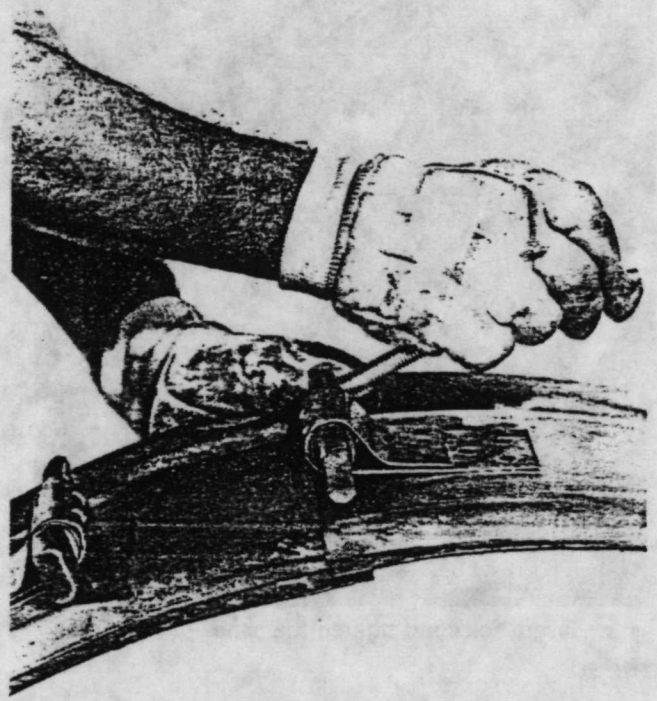
3 Snap gaskets around and into the first annular corrugation of each pipe end.

4 Snap the gasket several times to allow for final seating.

5 Lubricate the entire inner surface of the band between the corrugations with the same lubricant.

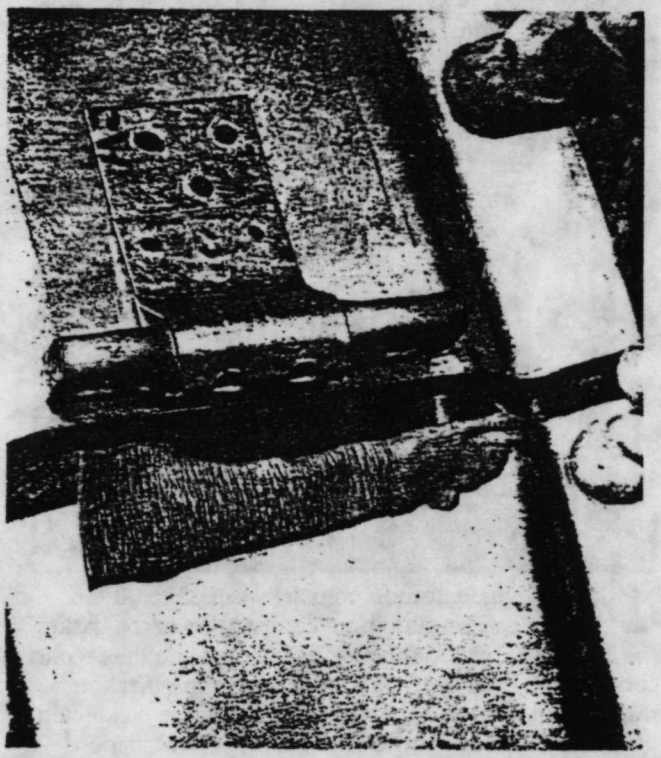


6 Check bars for proper position.

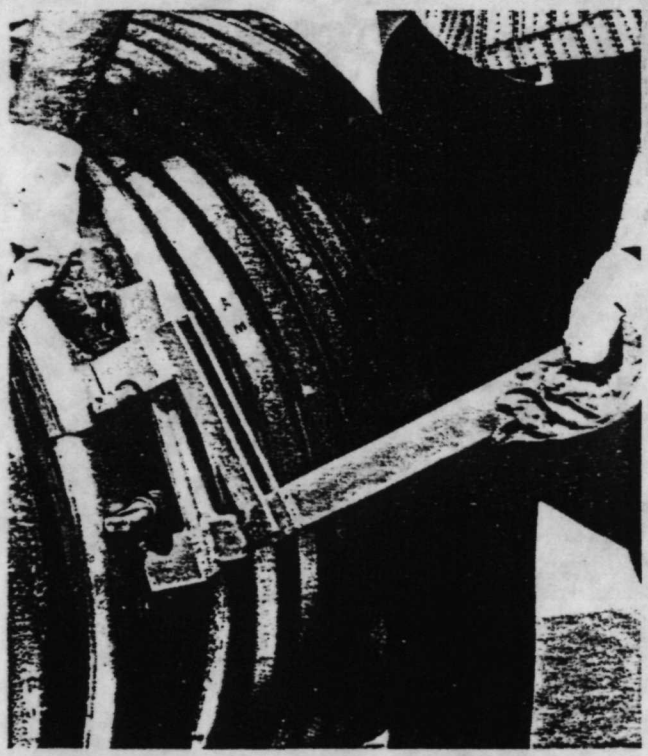


7 If necessary, use the bolt to turn the bar so that the holes are in alignment.

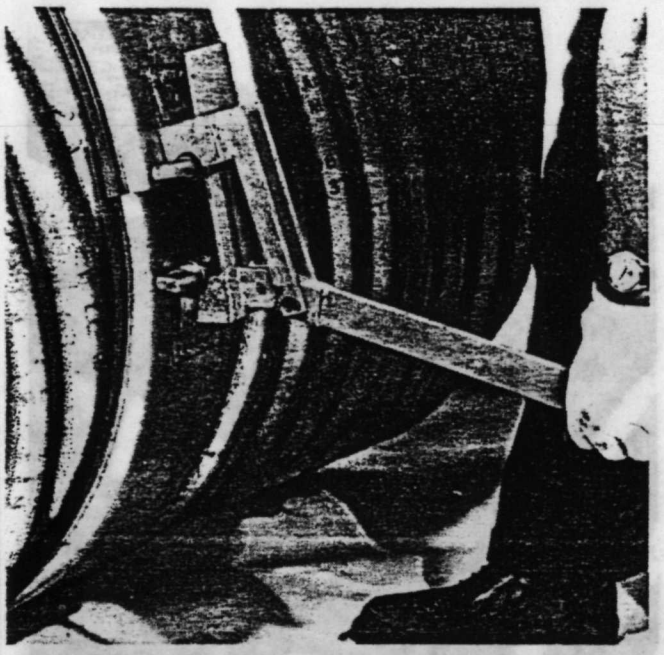
8 Tear off enough TC-40 to reach between the corrugations at the end of the band.



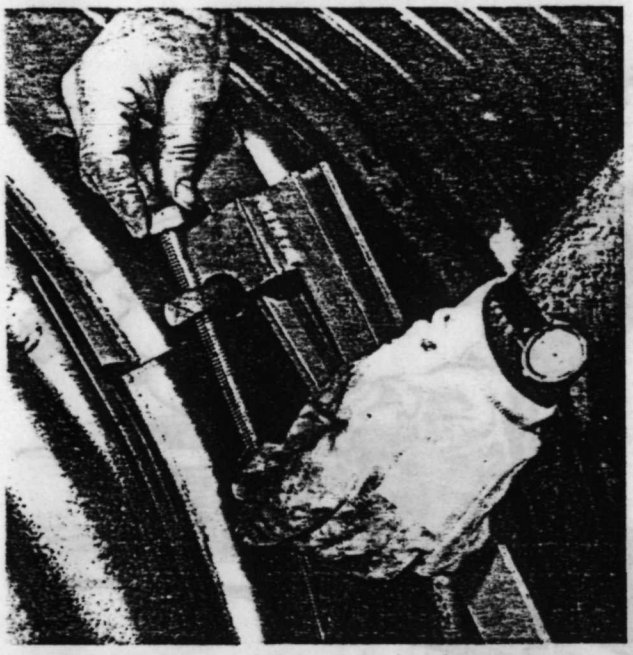
9 Tuck TC-40 over the lip of the band. NOTE: With double asphalt-coated bands in warm weather (warm enough to cause the asphalt to flow), TC-40 may not be necessary. For final determination, use a joint tester to evaluate performance.



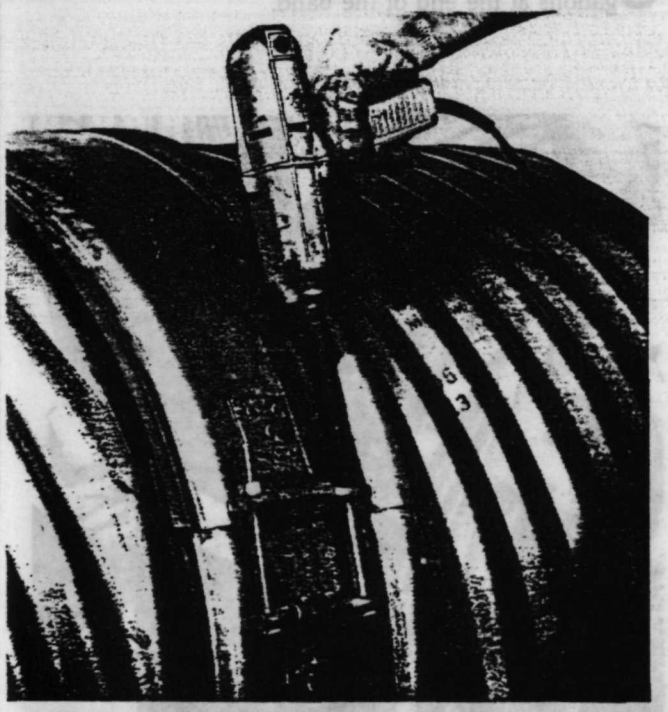
10 With the necessary parts lubricated and all foreign matter between pipe and band removed, use a Felton Puller or long bolt to start the band lap.



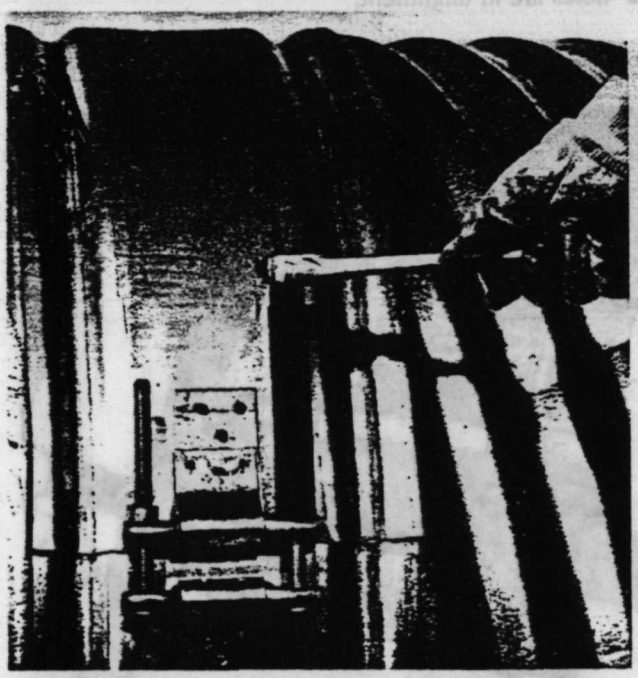
11 Pull the band into position. For maximum compression of the gasket, the band corrugation must be fully seated into the second corrugation from each pipe end.



12 Insert bolts and tighten the band.



13 Use a "deep well socket" and power wrench for rapid assembly. Tap the band during tightening with a rubber mallet to ensure uniform seating of the gasket.



14 As a guide, torque bolts between 25 to 30 foot-pounds. For maximum compression of the gasket, the band corrugation must be fully seated into the second corrugation from each pipe end. Where specifications restrict infiltration/exfiltration, a test must be conducted on the assembled joint to confirm proper installation.

Contech and HUGGER are registered trademarks of Contech Construction Products Inc. Crisco is a trademark of Procter and Gamble Co.

Specification data referring to mechanical and physical properties and chemical analyses relate solely to tests performed at the time of manufacture on specimens obtained from specific locations of the products in accordance with prescribed sampling procedures.

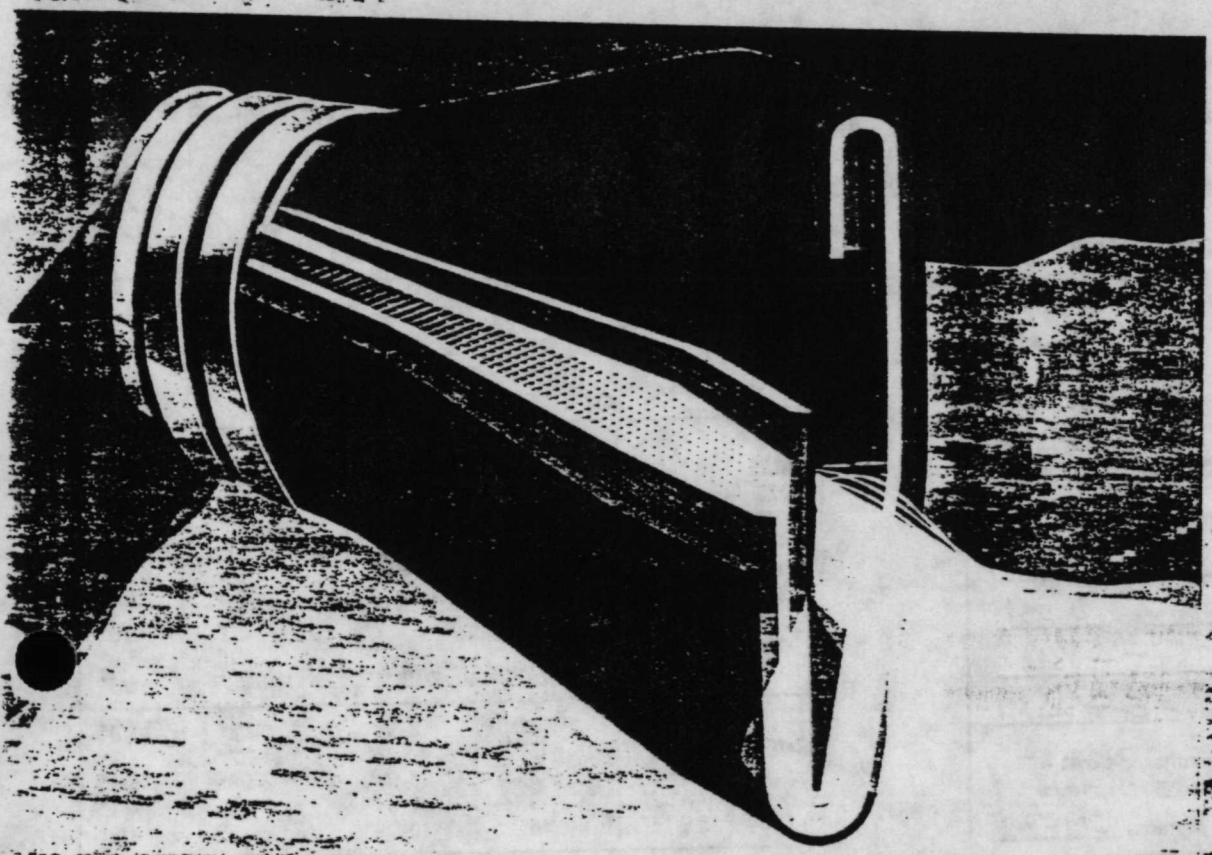
No express warranty or implied warranties of merchantability or fitness are created or intended by this document or its illustrative text.

Copyright 1989, Contech Construction Products Inc., Middletown, Ohio

CONTECH
CONSTRUCTION PRODUCTS INC.

LCP-3019 5M KM 6/89

Litho in U.S.A.



Tideflex™

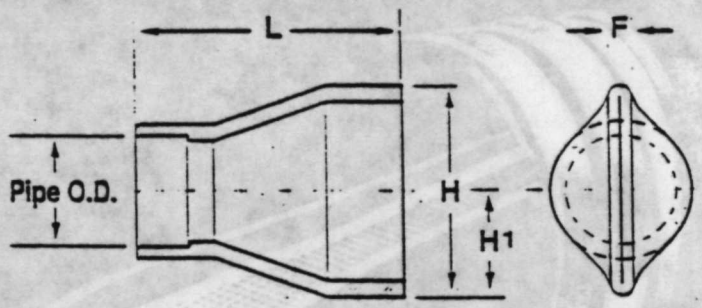
ANTEC CORPORATION
P.O. Box 307
10620 N.E. 8th St., Suite 202
Bellevue, WA 98009
(206) 454-2442

RFORMANCE

Ordering Information

Specifying information required to custom-build a Tideflex™ Valve for your exact application includes line pressure, back pressure, flow rate and velocity and O.D. of pipeline.

Red Valve manufactures Tideflex™ Valves to special O.D. dimensions and can also provide a mounting thimble.



Ordering a Tideflex™ Valve is as easy as completing this chart!

	Minimum	Maximum
Back Pressure	0 psi	4 psi
Line Pressure	0 psi	6 psi
Maximum Flow Rate	14 ft³/sec	
Maximum Flow Velocity	4.5 ft/sec	

Discharge To: ☒ Atmosphere ☒ Under Water } Both at times

Pipe O.D. 24" Pipe Material CMP

VALVE SIZE (NOM.)	STEEL PIPE O.D.*	MAXIMUM LENGTH L	MAXIMUM HEIGHT H**	CENTERLINE TO BASE HEIGHT H1	WIDTH F
1/2"	.840	2-1/2"	1-3/16"	19/32"	1/2"
3/4"	1.050	2-3/4"	1-15/16"	31/32"	1/2"
1"	1.315	3"	2"	1"	5/8"
1-1/4"	1.660	3"	2"	1"	5/8"
1-1/2"	1.900	6-1/4"	2-13/16"	1-13/32"	5/8"
2"	2-3/8"	6"	3-3/4"	1-7/8"	5/8"
2-1/2"	2-7/8"	7"	4-9/16"	2-9/32"	5/8"
3"	3-1/2"	8"	5-1/4"	2-5/8"	5/8"
4"	4-1/2"	9"	7-1/4"	3-5/8"	1"
5"	5-9/16"	16"	10-5/8"	5-5/16"	1-1/8"
6"	6-5/8"	13"	10-3/8"	5-3/16"	7/8"
8"	8-5/8"	16"	13-1/16"	6-17/32"	15/16"
10"	10-3/4"	19"	15-3/8"	7-11/16"	7/8"
12"	12-3/4"	22"	17-13/16"	8-29/32"	1"
14"	14"	22"	21-1/2"	10-3/4"	1-1/4"
16"	16"	24"	22-1/4"	11-1/8"	1-1/4"
18"	18"	26"	26-3/4"	13-3/8"	1-1/4"
20"	20"	27"	29-3/4"	14-7/8"	1-1/4"
24"	24"	36"	37-1/4"	18-5/8"	1-3/4"
30"	30"	38"	43-3/4"	21-7/8"	2"
32"	29-1/4"	46"	46-1/2"	23-1/4"	2"
36"	36"	50"	51-3/8"	25-11/16"	2-3/8"
42"	42"	64"	61-1/2"	30-3/4"	2-1/2"
48"	48"	65"	61-1/2"	30-3/4"	2-1/2"
51"	50-3/4"	74"	64-1/2"	32-1/4"	2-3/4"
60"	60"	78"	80-3/4"	40-3/8"	2-3/4"
72"	72"	95"	103"	51-1/2"	3"
78"	78"	92"	111"	55-1/2"	3"
84"	84"	88"	111"	55-1/2"	3"
90"	90"	98"	119-1/2"	59-3/4"	3-1/2"

*Steel, Concrete, and Ductile Iron pipe O.D.s vary. It is important to verify pipe O.D. for proper sizing.

**Height may vary slightly due to customized construction.

© Red Valve Company, 1992. All Rights Reserved. Red Valve is a registered trademark of Red Valve Company, Inc.

Appendix E

APPENDIX E
HEALTH AND SAFETY PLAN AND DAILY LOGS

HEALTH AND SAFETY PLAN
BLAIR BACKUP PROPERTY
PORT OF TACOMA, WASHINGTON
REVISED FEBRUARY 16, 1993

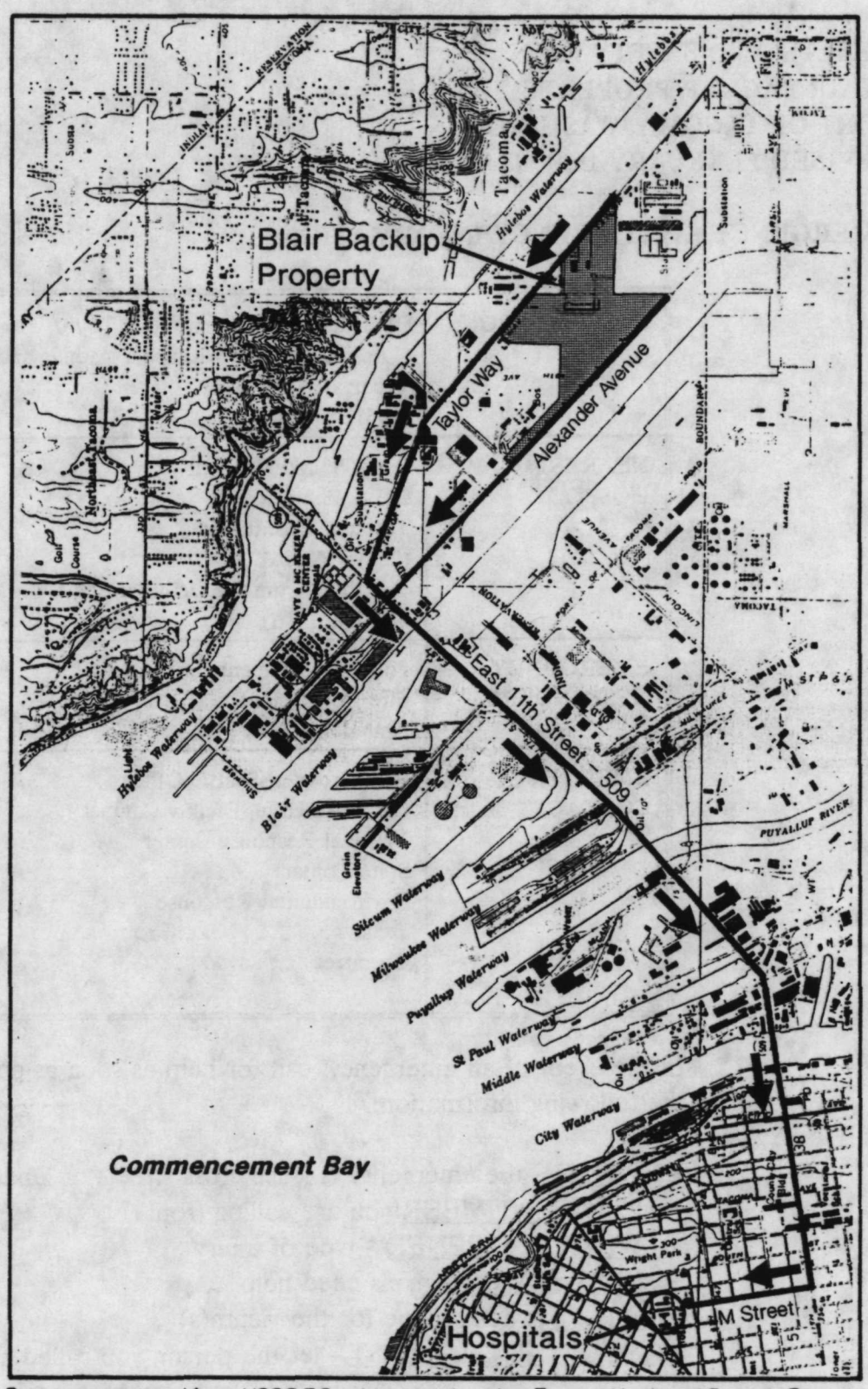
EMERGENCY CONTINGENCY INFORMATION

SITE LOCATION	Blair Backup Property, 3002 Taylor Way (Located between Alexander Avenue and Taylor Way) Tacoma, Washington (206) 383-5841
NEAREST HOSPITAL	Puget Sound Hospital 215 S 36th Street Tacoma, Washington (206) 474-0561 The route from the facility to the hospital is depicted on Figure E-1.
EMERGENCY RESPONDERS	Police Department ..... 911 Fire Department ..... 911 Ambulance 911
EMERGENCY CONTACTS	Hart Crowser, Seattle Office ..... (206) 324-9530 Curtis Ratcliffe, Facility Contact ..... (206) 383-5841 National Response Center ..... (800) 424-8802 State Contact ..... (206) 553-1263 Environmental Response Team ..... (908) 321-6660 Chemtrec ..... (800) 424-9300

In the event of an emergency, call for help as soon as possible. Give the following information:

- WHERE the emergency is - use cross streets or landmarks
- PHONE NUMBER you are calling from
- WHAT HAPPENED - type of injury
- HOW MANY persons need help
- WHAT is being done for the victim(s)
- YOU HANG UP LAST - let the person you called hang up first

Route to Hospital Map



Base map prepared from USGS 7.5-minute quadrangles, Tacoma North and Proverty Bay, Washington, photorevised 1981.

0 3200 6400

Scale in Feet

N

HARTCROWSER

J-2350-24 11/93

Figure E-1 Page E-2

SITE HEALTH AND SAFETY PLAN SUMMARY

LOCATION: Blair Backup Property, 3002 Taylor Way, Tacoma, Washington.

PROPOSED DATES OF ACTIVITIES: February-June, 1993.

TYPE OF FACILITY: Shore-side properties adjacent to port facilities.

LAND USE OF AREA SURROUNDING FACILITY: Port facility.

IDENTIFIED SITE CONTAMINANTS: Arsenic, chromium, and PAHs.

ROUTES OF ENTRY: Airborne dust, skin contact with soil and groundwater, and incidental ingestion of soil.

PROTECTIVE MEASURES: Engineering controls, safety glasses, safety boots, hard hat, gloves, protective clothing, and respirators.

MONITORING EQUIPMENT: None required.

FACTORS PROMPTING SITE ACTIVITIES: Construction oversight.

1.0 INTRODUCTION

1.1 Purpose and Regulatory Compliance

This site-specific Health and Safety Plan (H&S Plan) addresses procedures to minimize the risk of chemical exposures, physical accidents to on-site workers, and environmental contamination at the Blair Backup Property in Tacoma, Washington. The H&S Plan covers each of the 11 required plan elements as specified in WAC 296-62-3010 (4)(b). To help the reader find this required information, Table E-1 shows the major sections where each of these elements is discussed. Additional supporting information is presented throughout this plan, and the reader is advised to thoroughly review the entire plan. When used together with the Hart Crowser General H&S Plan, this site-specific plan meets all applicable regulatory requirements.

Table E-1 - Location of Required Health and Safety Plan Elements in This Site-Specific H&S Plan

Required Health and Safety Plan Elements*		Location in this Health and Safety Plan (Section number shown)
(i)	Names of key personnel	1.3 Chain of Command
(ii)	Safety and hazard analysis	2.0 Hazard Evaluation and Control Measures
(iii)	Training	12.0 Training Requirements
(iv)	Personal protective equipment	3.0 Protective Equipment
(v)	Medical surveillance	11.0 Medical Surveillance
(vi)	Monitoring program	2.3 Air Monitoring and Action Levels
(vii)	Site control	4.0 Exclusion Areas, 8.0 Site Security and Control
(viii)	Decontamination	6.0 Decontamination
(ix)	Emergency response plan	10.0 Emergency Response Plan
(x)	Confined space entry	2.6 Confined Spaces
(xi)	Spill containment	9.0 Spill Containment

* Required H&S Plan elements are numbered according to their listing in WAC 296-62-3010 (4)(b)

1.2 Distribution and Approval

This H&S Plan will be made available to all Port of Tacoma and Hart Crowser personnel involved in field work on this project. This Plan represents minimum safety procedures. Contractor is responsible for their own safety while present on site. The plan has been approved by the Hart Crowser Corporate H&S Manager. By signing the

documentation form provided with this plan, project workers also certify their approval and agreement to comply with the plan.

1.3 Chain of Command

The chain of command for Health and Safety in Hart Crowser projects involves the following individuals: the Corporate H&S Manager, the Project Manager, the Project H&S Manager, and the Field H&S Manager.

Project Manager: Garry Horvitz, P.E. The Project Manager is charged with overall responsibility for the successful outcome of the project. The Project Manager, in consultation with the Corporate H&S Manager, makes final decisions regarding questions concerning the implementation of the Site H&S Plan. The Project Manager may delegate this authority and responsibility to the Project and/or Field H&S Managers.

Corporate H&S Manager: David Chawes, C.I.H. The Hart Crowser Corporate H&S Manager has overall responsibility for preparation and modification of this H&S Plan. In the event that health and safety issues arise during site operations, he will attempt to resolve them in discussion with the appropriate members of the project team.

Project H&S Officer: John R. Verduin III, P.E. The Project H&S Manager has overall responsibility for health and safety on this project. This individual ensures that everyone working on this project understands this H&S Plan. He will maintain liaison with the Hart Crowser Project Manager so that all relevant safety and health issues are communicated effectively to project workers.

Field H&S Manager: Grant Knechtel. The Field H&S Manager is responsible for implementing this H&S Plan in the field. The Field H&S Manager will also assure that proper protective equipment is available and used in the correct manner, decontamination activities are carried out properly, and that employees have knowledge of the local emergency medical system should it be necessary.

1.4 Work Activities

Hart Crowser project activities will include observation of demolition, excavating, and smoothing activities, and collection of soil samples.

1.5 Site Locations and Descriptions

The sites are located adjacent to active port areas and have a long history of industrial use. During that time, chemicals may have been used, disposed, spilled, or otherwise migrated into the subject properties.

2.0 HAZARD EVALUATION AND CONTROL MEASURES

2.1 Toxicity of Chemicals of Concern

Based on previous site investigations, the following chemicals are known to be present at this site: arsenic, chromium, and polycyclic aromatic hydrocarbons (PAHs). Pertinent toxicological properties of these chemicals are discussed below.

This information generally covers potential toxic effects which may occur from relatively significant acute and/or chronic exposures, and is not meant to indicate that such effects will occur from the planned site activities. In general, the chemicals which may be encountered at this site are not expected to be present at concentrations which could produce significant exposures. The types of planned work activities should also limit potential exposures at this site. Furthermore, appropriate protective and monitoring equipment will be used as discussed below to further minimize any exposures which might occur.

As a point of reference, standards for occupational exposures to these chemicals are included where available. Site exposures are generally expected to be well below the level of any of these exposure limits. These standards are presented using the terminology defined by the Washington State General Occupational Health Standards (WAC 296-62, Part H) as follows:

PEL	Permissible exposure limit.
TWA	Time-weighted average exposure limit for any 8-hour work shift of a 40-hour work week.
STEL	Short term exposure limit expressed as a 15-minute time-weighted average and not to be exceeded at any time during a work day.

Arsenic

Arsenic is toxic by inhalation and ingestion of dusts and fumes or by inhalation of arsine gas. Trivalent arsenic compounds are the most toxic to humans, with significant corrosive effects on the skin, eyes, and mucous membranes. Dermatitis also frequently occurs, and skin sensitization and contact dermatitis may result from arsenic trioxide or pentoxide. Trivalent arsenic interacts with a number of sulfhydryl proteins and enzymes, altering their normal biological function. Ingestion of arsenic can result in fever, anorexia, cardiac abnormalities, and neurological damage. Liver injury can accompany chronic exposure. Skin and inhalation exposure to arsenic has been associated with cancer in humans, particularly among workers in the arsenical-pesticide industry or copper smelters. Arsine is a highly toxic gaseous arsenical, causing nausea, vomiting, and hemolysis. The current PEL-TWA for organic and inorganic forms of arsenic is 0.01 mg/m^3.

Chromium

Chromium metal and insoluble chromium salts can affect the body if inhaled or swallowed. Ferrochrome alloys have been associated with lung disease in humans. Certain forms of chromium (VI) compounds have been found to cause increased respiratory cancer among workers. Unless it can be demonstrated that no chromium (VI) compounds are present, chromium should be treated as a carcinogen. The PEL-TWA for chromium (III) compounds is 0.5 mg/m^3, and for chromium VI the PEL-TWA is 0.05 mg/m^3.

Polynuclear Aromatic Hydrocarbons (PAHs)

Exposure to polynuclear aromatic hydrocarbons (PAHs) can occur via inhalation of vapors, ingestion, and skin and eye contact. Skin contact can result in reddening or corrosion. Ingestion can cause nausea, vomiting, blood pressure fall, abdominal pain, convulsions, and coma.

Damage to the central nervous system can also occur. The U.S. Department of Health and Human Services (1989) has classified 15 PAHs compounds as having sufficient evidence for carcinogenicity, while the U.S. EPA (1990) has classified at least 5 of the identified PAHs as human carcinogens. There are no currently assigned PEL-TWA for PAHs, but the closely related material coal tar is listed as coal tar pitch volatiles with a PEL-TWA of 0.2 mg/m^3.

2.2 Potential Exposure Routes

Inhalation. This route of entry could occur if dusts become airborne during site activities. Inhalation of dusts contaminated with site chemicals is also a possibility. Air monitoring and control measures specified in this plan will minimize the possibility for inhalation of site contaminants.

Skin Contact. This route of entry could occur if contaminated soil, water or product contacts the skin or clothing. Dusts generated during soil movement may also settle on exposed skin and clothing of site workers. Protective clothing and decontamination activities specified in this plan will minimize the potential for skin contact with the contaminants.

Ingestion. This route of entry could occur if individuals eat, drink or perform other hand-to-mouth contact in the contaminated (exclusion) zones. Decontamination procedures established in this plan will minimize the inadvertent ingestion of contaminants.

2.3 Air Monitoring and Action Levels

Air monitoring for total dusts will not be conducted by Hart Crowser. Rather, observation of visible dust during construction activities will be the criteria for action. Visible dust must be reduced immediately by application of water or modification of construction activities.

2.4 Fire and Explosion Hazard

Care will be exercised at all times during field activities where flammables are known or suspected to be present.

An ABC dry chemical fire extinguisher with a minimum charge of 10 pounds shall be available at the site. Observe basic precautions such as no smoking or creation of sparks or open flames.

2.5 Heat and Cold Stress

Heat Stress

Use of impermeable clothing reduces the cooling ability of the body due to evaporation reduction. This may lead to heat stress. If such conditions occur during site activities, we will maintain appropriate work-rest cycles and drink water of electrolyte-rich fluids (Gatorade® or equivalent) to minimize heat stress effects. Also, when ambient temperatures exceed 70 °F, we will conduct monitoring of employee pulse rates.

Each employee will check his or her own pulse rate at the beginning of each break period. Take the pulse at the wrist for 6 seconds, and multiply by 10. If the pulse rate exceeds 110 beats per minute, then reduce the length of the next work period by one-third.

Example: After a one-hour work period at 80 degrees, a worker has a pulse rate of 120 beats per minute. The worker must therefore shorten the next work period by one-third, resulting in a work period of 40 minutes until the next break.

Hypothermia

Hypothermia can result from abnormal cooling of the core body temperature. It is caused by exposure to a cold environment, and wind-chill as well as wetness or water immersion can play a significant role. The following section discuss signs and symptoms as well as treatment for hypothermia.

Signs of Hypothermia. Typical warning signs of hypothermia include fatigue, weakness, incoordination, apathy, and drowsiness. A confused state is a key symptom of hypothermia. Shivering and pallor are usually absent, and the face may appear puffy and pink. Body temperatures below 90° F require immediate treatment to restore temperature to normal.

Treatment of Hypothermia. Current medical practice recommends slow rewarming as treatment for hypothermia, followed by professional medical care. This can be accomplished by moving the person into a sheltered area and wrapping with blankets in a warm room. In emergency situations where body temperature falls below 90° F and heated shelter is not available, use a sleeping bag, blankets and/or body heat from another individual to help restore normal body temperature.

2.6 Other Physical Hazards

Trips/Falls

As with all field work sites, caution will be exercised to prevent slips on rain slick surfaces, etc. Work will not be performed on elevated platforms without fall protection. All excavations will be enclosed with barrier tape or similar measures will be used to prevent workers from accidentally falling into an excavation.

Confined Spaces

Confined space entry is not anticipated for this project. Personnel will not enter any confined space without specific approval of the Project Manager and H&S Manager.

Noise

Appropriate hearing protection (ear muffs or ear plugs) shall be used in the vicinity of excavators or other noise sources if high noise levels (greater than 85 dBA as an 8-hour TWA, 115 dB for any continuous noise, or 140 dB peak as impulse or impact noise) are generated.

2.7 Hazard Analysis by Task

The Hart Crowser work tasks and associated hazards which may be anticipated during the operations described include the following:

Observation of Excavation and Earthwork

Project earthwork will be accomplished by a Port of Tacoma contractor. Hart Crowser personnel observing this activity will use appropriate personal protection as necessary (see personnel protective equipment requirements). Noise protection must also be available and used as

necessary. In addition, any exclusion zone requirements established by the Contractor for worker protection will be observed by the Hart Crowser site representative. Employees will be cautioned to stand clear of all equipment and open excavations. Employees will not enter any excavations greater than 4 feet in depth without proper shoring or sloping.

Soil Samples

All soil sampling activities will be conducted under the assumption that the media is contaminated and appropriate personnel protection will be required.

3.0 PROTECTIVE EQUIPMENT

For most activities at this site, construction observation will require Level C as a modified protection level, incorporating respiratory protection only where required by site conditions.

3.1 Level D Activities

Workers performing general site activities where skin contact with free product or contaminated materials is not likely and inhalation risks are not expected will wear regular work clothes or regular or polyethylene coated Tyvek®, eye protection, hard hat (as required), nitrile or neoprene coated work gloves (as required), and safety boots.

3.2 Level C Activities

Workers performing site activities where skin contact with or contaminated materials is possible will wear chemically-resistant gloves (nitrile or neoprene outer gloves, surgical inner gloves) during all activities with potential for skin contact with contaminated media. Use face shields or goggles as necessary to avoid splashes in the eyes or face. When performing any activities where skin exposure from splashing is possible, use polyethylene-coated Tyvek®.

When performing activities in which inhalation of dusts is a concern, wear half-mask or full-face air-purifying respirators with HEPA filter cartridges. If respirators are used, cartridges should be changed on a

daily basis, at minimum. They should be changed more frequently if breathing becomes difficult due to overloaded filters.

3.3 Safety Equipment List

The following Safety Equipment must be available on site:

- Fire Extinguisher - 10 lb ABC
- First Aid Kit
- Eye Wash Kit
- Half-face APR - Organic Vapor/HEPA Cartridge
- Hard Hat
- Tyvek Coveralls/Polycoated Tyvek® Coveralls
- Neoprene Steel-Toed Boots
- Latex Boot Covers
- Nitrile Outer Gloves/Latex Inner Gloves
- Neoprene Outer Gloves/Latex Inner Gloves

4.0 EXCLUSION AREAS

Hart Crowser personnel will obey all requirements specified by Contractor's Health and Safety Plan regarding areas designated as exclusion zones, contaminant reduction zones, and support zones, as discussed below.

4.1 Exclusion Zone

Exclusion zones are established around each hazardous waste activity location. Only persons with appropriate training and authorization will enter this perimeter while work is being conducted there. Traffic cones, barrier tapes, and warning signs will be used as necessary to establish the zone boundary. Plastic stanchions will be placed as required to prevent unauthorized access to within 10 feet from the side and a minimum of 25 feet behind the rear of any vehicles or open excavations. Danger signs will be posted in plain view of approach from either direction.

4.2 Contamination Reduction Zone

Contamination reduction zones are established just outside each temporary exclusion zone to decontaminate equipment and personnel as

discussed below. This zone will be clearly delineated from the exclusion zone and support zone using the means noted above. Care will be taken to prevent the spread of contamination from this area. Drums will be filled with spent decontamination fluids and used protective clothing on a daily basis.

4.3 Support Zone

A support zone is established outside the contamination reduction area to stage clean equipment, don protective clothing, take rest breaks, etc. This zone will be clearly delineated from the contaminant reduction zone using the means noted above.

5.0 MINIMIZATION OF CONTAMINATION

In order to make the work zone procedure function effectively, the amount of equipment and number of personnel allowed in contaminated areas must be minimized. In addition, the amounts of soil, water, or other media collected should not exceed what is needed for laboratory analysis and record samples. Do not kneel on contaminated ground, stir up unnecessary dust, or perform any practice that increases the probability of hand-to-mouth transfer of contaminated materials. Use plastic drop cloths and equipment covers where appropriate. Eating, drinking, chewing gum, smoking or using smokeless tobacco are forbidden in the exclusion zone.

6.0 DECONTAMINATION

Decontamination is necessary to limit the migration of contaminants from the work zone(s) onto the site or from the site into the surrounding environment. Equipment and personnel decontamination will be performed by Hart Crowser personnel according to the procedures specified by the Contractor's Health and Safety Plan.

Proper decontamination (decon) procedures will be employed to ensure that contaminated materials do not contact individuals and are not spread from the site. These procedures will also ensure that contaminated materials generated during site operations and during decontamination are managed appropriately.

All non-disposable equipment will be decontaminated in the contamination reduction zone. Soil and water sampling instruments should be cleaned with detergent solutions in portable buckets.

7.0 DISPOSAL OF CONTAMINATED MATERIALS

All disposable sampling equipment and materials will be placed inside of two 10 mil polyurethane bags or other appropriate containers and placed in storage as directed by the client. If storage is unavailable on site, or if other hazardous wastes will not be gathered and collected as part of this effort, then disposable supplies will be removed from the site with the personnel.

8.0 SITE SECURITY AND CONTROL

Site security and control will be the responsibility of the Contractor. Any security or control problems will be reported to appropriate authorities.

9.0 SPILL CONTAINMENT

Hart Crowser activities will not require use of any bulk liquids which might require a spill containment program.

10.0 EMERGENCY RESPONSE PLAN

The Hart Crowser Emergency Response Plan outlines the steps necessary for appropriate response to emergency situations. The following paragraphs summarize the key Emergency Response Plan procedures for Hart Crowser projects.

10.1 Plan Content and Review

The principal hazards addressed by the Emergency Response Plan include the following: fire or explosion, medical emergencies, uncontrolled contaminant release, and situations such as the presence of chemicals above exposure guidelines or inadequate protective equipment for the hazards present. However, in order to help

anticipate potential emergency situations, field personnel shall always exercise caution and look for signs of potentially hazardous situations, including the following as examples:

- Visible or odorous chemical contaminants;
- Drums or other containers;
- General physical hazards (traffic, moving equipment, sharp or hot surfaces, slippery or uneven surfaces, etc.);
- Possible sources of radiation;
- Live electrical wires or equipment;
- Underground pipelines or cables; and
- Poisonous plants or dangerous animals.

These and other potential problems should be anticipated and steps taken to avert problems before they occur.

The Emergency Response Plan shall be reviewed and rehearsed, as necessary, during the on-site health and safety briefing. This ensures that all personnel will know what their duties shall be if an actual emergency occurs.

10.2 Plan Implementation

The Field H&S Manager will determine the need to implement the emergency procedures, in concert with other resource personnel including client and Contractor representatives, the Project Manager, and the Corporate H&S Manager. Other on-site field personnel will assist the Manager as required during the emergency.

In the event that the Emergency Response Plan is implemented, the Contractor is responsible for alerting all personnel at the affected area by use of a signal device (such as a hand-held air horn) or visual or shouted instructions, as appropriate.

Emergency evacuation routes and safe assembly areas shall be identified and discussed in the on-site health and safety briefing, as appropriate. The buddy-system will be employed during evacuation to ensure safe escape.

10.3 Emergency Response Contacts

Site personnel must know whom to notify in the event of Emergency Response Plan implementation. The information presented on the first page of this Plan will be readily available at the site in a location known to all workers.

In the event of an emergency situation requiring implementation of the Emergency Response Plan (fire or explosion, serious injury, presence of chemicals above exposure guidelines, inadequate personnel protection equipment for the hazards present, etc.), cease all work immediately. Offer whatever assistance is required, but do not enter work areas without proper protective equipment. Workers not needed for immediate assistance will decontaminate per normal procedures (if possible) and leave the work area, pending approval by the Field Safety Manager for re-start of work. The following general emergency response safety procedures should be followed.

10.4 Fires

Hart Crowser, Inc., personnel will attempt to control only very small fires. If an explosion appears likely, evacuate the area immediately. If a fire occurs which cannot be controlled with the 10-pound ABC fire extinguisher located in the field equipment, then immediate intervention by the local fire department or other appropriate agency is imperative. Use these steps:

- Evacuate the area to a previously agreed upon, upwind location;
- Contact fire agency identified in the site specific plan; and
- Inform Project Manager or Field H&S Manager of the situation.

10.5 Medical Emergencies

If a worker leaves the site to seek medical attention, another worker should accompany the patient. When in doubt about the severity of an accident or exposure, always seek medical attention as a conservative approach. Notify the Project Manager of the outcome of the medical evaluation as soon as possible. For minor cuts and bruises, an on-site first aid kit will be available.

- If a worker is seriously injured or becomes ill or unconscious, immediately request assistance from the emergency contact sources

noted in the site-specific plan. Do not attempt to assist an unconscious worker in an untested or known dangerous confined space without applying confined space entry procedures or without using proper respiratory protection, such as a self contained breathing apparatus (SCBA).

- In the event that a seriously injured person is also heavily contaminated, use clean plastic sheeting to prevent contamination of the inside of the emergency vehicle. Less severely injured individuals may also have their protective clothing carefully removed or cut off before transport to the hospital.

10.6 Potentially High Chemical Exposure Situations/Inadequate Protective Equipment

In some emergency situations, workers may encounter localized work areas where exposure to previously unidentified chemicals could occur. A similar hazard includes the situation where chemicals are present above permissible exposure levels and/or above the levels suitable for the personnel protective equipment at hand on-site. If these situations occur, immediately stop work and evacuate the work area. Do not reenter the area until appropriate help is available and/or appropriate personnel protective equipment is obtained. Do not attempt to rescue a downed worker from such areas without employing confined space entry procedures. Professional emergency response assistance (fire department, HAZMAT team, etc.) may be necessary to deal with this type of situation.

10.7 Other Emergencies

Depending on the type of project, other emergency scenarios may be important at a specific work site. These scenarios will be considered as part of the site-specific plan and will be discussed during the on-site safety briefing, as required.

10.8 Emergency Documentation and Review

The Field H&S Manager will notify the Project H&S Manager as soon as possible after the emergency situation has been stabilized. The Project Manager or H&S Manager will notify the appropriate client contacts, and regulatory agencies, if applicable. If an individual is injured, the Field H&S Manager or designate will file a detailed Accident Report with the Corporate H&S Manager within 24 hours.

The Project Manager and the Field, Project, and Corporate H&S Managers will critique the emergency response action following the event. The results of the critique will be used in follow-up training exercises to improve the Emergency Response Plan.

11.0 MEDICAL SURVEILLANCE

A medical surveillance program has been instituted for Hart Crowser employees having exposure to hazardous substances. Exams are given before assignment, annually thereafter, and upon termination. Content of exams is determined by the Occupational Medicine physician in compliance with applicable regulations and is detailed in the General H&S Plan.

Each team member will have undergone a physical examination as noted above in order to verify that he/she is physically able to use protective equipment, work in hot environments, and not be predisposed to occupationally-induced disease. Additional exams may be needed to evaluate specific exposures or unexplainable illness.

12.0 TRAINING REQUIREMENTS

Hart Crowser employees who perform site work must understand potential health and safety hazards. All employees potentially exposed to hazardous substances, health hazards, or safety hazards will have completed 40 hours of off-site initial hazardous materials health and safety training or will possess equivalent training by past experience. They will also have a minimum of three days of actual field experience under the direct supervision of a trained supervisor. All employees will have in their possession evidence of completing this training. Employees will also complete annual refresher, supervisor, and other training as required by applicable regulations.

Prior to the start of each work day, the Field H&S Manager will be included in Contractor's review of applicable health and safety issues. These briefings will also review the work to be accomplished, with an opportunity for questions to be asked.

13.0 REPORTING, REPORTS, AND DOCUMENTATION

A Field Health and Safety Report (Figure E-2) will be completed daily by the Hart Crowser Field Representative. Port of Tacoma and Hart Crowser staff on this site will sign the Record of H&S Communication document (Figure E-3), which will be kept on site during work activities and recorded in the project files.

H&SPLAN.fr

Field Health & Safety Report

HARTCROWSER

FIELD HEALTH & SAFETY REPORT

JOB NO. _____

DATE _____
S M T W Th F S

ARRIVAL TIME: _____

DEPARTURE TIME: _____

JOB _____

LOCATION _____

CLIENT _____

FIELD REPRESENTATIVE _____ PROJECT MANAGER _____

FIELD H&S MANAGER _____ PROJECT H&S MANAGER _____

NAMES OF PERSONNEL ON SITE _____

SITE ACTIVITIES _____

POTENTIAL HAZARDS _____

HAZARD CONTROL USED _____

PROTECTIVE MEASURES TAKEN _____

COMMENTS OR OBSERVATIONS _____

SKETCH POSITION OF EQUIPMENT RELATIVE TO EXPLORATION
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION

EXPLORATION NO. _____

AIR MONITORING LOG

METER NUMBER 1, TYPE _____ CALIBRATED _____ CHECKED _____

METER NUMBER 2, TYPE _____ CALIBRATED _____ CHECKED _____

BACKGROUND READINGS: METER 1 _____ METER 2 _____

TIME	METER 1	METER 2	COMMENTS

FIGURE 3 - RECORD OF HEALTH AND SAFETY COMMUNICATION*

PROJECT NAME: Blair Backup	PROJECT NUMBER: 2350-22
SITE CONTAMINANTS: As, Cr, PAH	

PPE REQUIREMENTS (check all that apply):

- ✓ Safety glasses
- ✓ Safety boots
- ✓ Hard hat
- __ Gloves (specify) _____
- __ Clothing (specify) _____
- __ Respirator (specify) _____
- __ Other (specify) _____

The following personnel have reviewed a copy of the Site-specific Health and Safety Plan. By signing below, these personnel indicate that they have read the plan, including all referenced information, and that they understand the requirements which are detailed for this project.

PRINTED NAME	SIGNATURE	PROJECT DUTIES	DATE
Grant W. Knechtel	[signature]	Construction Observation Site H&S Mgr. for HC	3/10/93
Carl Wolfe	Carl Wolfe	" "	5/3/93
[signature]	PAUL ESTERNEZ	CHARCOAL REMOVAL	7/7/93

*PROJECT MANAGER: PLEASE ROUTE A COPY OF THIS FORM TO THE H&S MANAGER WHEN COMPLETED.

H&SPLAN.fr

HARTCROWSER

JOB NO. 2350-22

DATE 14 July 1993

S M T (W) Th F S

ARRIVAL TIME: 0715

DEPARTURE TIME:

FIELD HEALTH & SAFETY REPORT

JOB Blair Backup

LOCATION Taylor Way, Tacoma, WA

CLIENT Port of Tacoma

FIELD REPRESENTATIVE Grant Guechtel PROJECT MANAGER Gary Horvitz

FIELD H&S MANAGER Grant Guechtel PROJECT H&S MANAGER John Verduin

NAMES OF PERSONNEL ON SITE Grant Guechtel

SITE ACTIVITIES observe Port's contractor. grade N. slope of N. slag pad, placed crushed rock surfacing

POTENTIAL HAZARDS PAH, Arsenic, Chromium - all are dust inhalation, ingestion or direct contact hazards

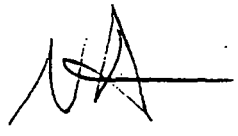
HAZARD CONTROL USED Eng. controls - no visible dust, physical separation by clean imported material

PROTECTIVE MEASURES TAKEN Std. work uniform - hard hat, rubber safety boots

COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT RELATIVE TO EXPLORATION
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION West

EXPLORATION NO.



HARTCROWSER

JOB NO. 2350-22
DATE 13 July, 1993
S M (T) W Th F S
ARRIVAL TIME: 0720
DEPARTURE TIME: 1600

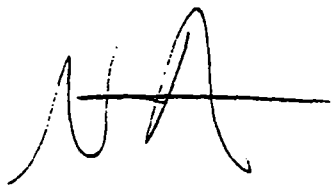
FIELD HEALTH & SAFETY REPORT

JOB Blair Backup
LOCATION Taylor Way, Tacoma, WA
CLIENT Port of Tacoma
FIELD REPRESENTATIVE Grant Knechtel PROJECT MANAGER Gerry Horvitz
FIELD H&S MANAGER Grant Knechtel PROJECT H&S MANAGER John Verduin
NAMES OF PERSONNEL ON SITE Grant Knechtel

SITE ACTIVITIES observe Port's contractor - load charcoal briquette soil into containers on rail cars, remove rails, place crushed rock in staging area
POTENTIAL HAZARDS cPAH, Chromium, Arsenic - all are dust inhalation, direct contact or ingestion hazards
HAZARD CONTROL USED Eng. controls - no visible dust, physical separation by clean materials → PPE worn when direct contact is possible
PROTECTIVE MEASURES TAKEN PPE - tyvek coveralls, scorpio gloves, w/ std. work uniform - rubber safety boots, hard hat, safety glasses
COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT RELATIVE TO ~~EXPLORATION~~
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION WSW

EXPLORATION NO.



HARTCROWSER

JOB NO. 2350-22

DATE 12 July, 1993

S (M) T W Th F S

ARRIVAL TIME: 0710

FIELD HEALTH & SAFETY REPORT

DEPARTURE TIME: ~~1515~~ 1530

JOB Blair Backup

LOCATION Taylor Way, Tacoma, WA

CLIENT Port of Tacoma

FIELD REPRESENTATIVE Grant Knechtel PROJECT MANAGER Garry Horvitz

FIELD H&S MANAGER Grant Knechtel PROJECT H&S MANAGER John Verduin

NAMES OF PERSONNEL ON SITE Grant Knechtel

SITE ACTIVITIES observe Port's contractor load stockpiled charcoal briquette laden soil into containers on rail cars

POTENTIAL HAZARDS cPAH, Arsenic, Chromium - all are dust inhalation, direct contact or ingestion hazards

HAZARD CONTROL USED Eng. Controls - no visible dust, separation by clean materials ; PPE when contact possible

PROTECTIVE MEASURES TAKEN PPE - tyvek coveralls, skorpio gloves ; std work uniform - rubber safety boots, hard hat, safety glasses

COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT RELATIVE TO EXPLORATION
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION SW

EXPLORATION NO.

NA

HARTCROWSER

JOB NO. 2350-22

DATE 7/8/93

S M T W (Th) F S

ARRIVAL TIME: 12:00

DEPARTURE TIME:

FIELD HEALTH & SAFETY REPORT

JOB BLAIR BACKUP

LOCATION TAYLOR WAY, TACOMA

CLIENT PORT OF TACOMA

FIELD REPRESENTATIVE P. ESTORNELL PROJECT MANAGER J VERDUIN

FIELD H&S MANAGER GRANT KNECHTEL PROJECT H&S MANAGER JOHN VERDUIN

NAMES OF PERSONNEL ON SITE P. ESTORNELL (PM) J. VERDUIN (AM), AND 4 LABORERS AND 1 FOREMAN FROM RCIE

SITE ACTIVITIES LOAD STOCKPILE OF CHARCOAL BRIQUETTE LADEN SOIL INTO CONTAINERS ON RAIL CARS

POTENTIAL HAZARDS c PAH, CHROMIUM, ARSENIC VIA DUST INHALATION, DIRECT CONTACT OR INGESTION

HAZARD CONTROL USED PPE AS APPROPRIATE TO PREVENT DIRECT CONTACT WATER TRUCK TO SPRAY GROUND AND REDUCE DUST

PROTECTIVE MEASURES TAKEN PPE - TYVEK, SCORPIO GLOVES, STEEL TOE BOOTS, HARD HAT, SAFETY GLASSES

COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT RELATIVE TO EXPLORATION
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION SE

EXPLORATION NO. NA

HARTCROWSER

JOB NO. 2350-22

DATE 7/7/93

S M T (W) Th F S

ARRIVAL TIME: 7:00

DEPARTURE TIME: 3:00

FIELD HEALTH & SAFETY REPORT

JOB BLAIR BACKUP

LOCATION TAYLOR WAY, TACOMA WA

CLIENT PORT OF TACOMA

FIELD REPRESENTATIVE P. ESTORNELL PROJECT MANAGER J. VERDUIN

FIELD H&S MANAGER GRANT KNECHTEL PROJECT H&S MANAGER JOHN VERDUIN

NAMES OF PERSONNEL ON SITE P. ESTORNELL AND 4 LABORERS AND A FORMAN FROM RCIE

SITE ACTIVITIES LOAD STOCKPILE OF CHARCOAL BRIQUETTE LADEN SOIL INTO CONTAINERS ON RAIL CARS

POTENTIAL HAZARDS CPAH, CHROMIUM, ARSENIC VIA DUST INHALATION, INJESTION, OR DIRECT CONTACT

HAZARD CONTROL USED PPE AS APPROPRIATE TO PREVENT DIRECT CONTACT, WATER TRUCK TO SPRAY GROUND AND REDUCE DUST

PROTECTIVE MEASURES TAKEN PPE - TYVEK, SCORPIO GLOVES, STEEL TOE BOOTS HARD HAT SAFETY GLASSES

COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT RELATIVE TO EXPLORATION
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION SW

EXPLORATION NO. NA

HARTCROWSER

JOB NO. 2350-22

DATE 6 July, 1993

S M (T) W Th F S

ARRIVAL TIME: 0725

DEPARTURE TIME:

FIELD HEALTH & SAFETY REPORT

JOB Blair Backup

LOCATION Taylor Way, Tacoma, WA

CLIENT Port of Tacoma

FIELD REPRESENTATIVE Grant Crechtel PROJECT MANAGER Garry Horvitz

FIELD H&S MANAGER Grant Crechtel PROJECT H&S MANAGER John Verduin

NAMES OF PERSONNEL ON SITE Grant Crechtel

SITE ACTIVITIES observe port's contractor load charcoal briquette laden soil into containers on rail cars

POTENTIAL HAZARDS cPAH, arsenic, chromium - all are dust inhalation, direct contact or ingestion hazards

HAZARD CONTROL USED eng. controls - no visible dust, physical separation by clean materials PPE as appropriate

PROTECTIVE MEASURES TAKEN PPE - tyvek coveralls, scorpio gloves. Std. work uniform - hard hat, safety glasses, rubber safety boots

COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT RELATIVE TO ~~EXPLORATION~~
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION NW

EXPLORATION NO.

NA

HARTCROWSER

JOB NO. 2350-22

DATE 1 July, 1993

S M T W Th F S

ARRIVAL TIME: 0245 / 1140

DEPARTURE TIME: 1130

FIELD HEALTH & SAFETY REPORT

JOB Blair Backup

LOCATION Port of Tacoma, WA

CLIENT Port of Tacoma

FIELD REPRESENTATIVE Grant Kruckeberg PROJECT MANAGER Gerry Horvitz

FIELD H&S MANAGER Grant Kruckeberg PROJECT H&S MANAGER John Verduin

NAMES OF PERSONNel ON SITE John Verduin, Grant Kruckeberg

SITE ACTIVITIES observe Port's Contractor load charcoal briquettes taken soil into containers on rail cars.

POTENTIAL HAZARDS cPAH, Chromium, Arsenic - all are dust inhalation, direct contact or ingestion hazards

HAZARD CONTROL USED engineering controls - no visible dust, physical separation by clean materials, PPE as appropriate

PROTECTIVE MEASURES TAKEN PPE - tyvek coveralls, scorpio gloves Std. work uniform - hard hat, safety glasses, rubber safety boots

COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT RELATIVE TO EXPLORATION
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION SW

EXPLORATION NO.

HARTCROWSER

JOB NO. 2350-22

DATE 30 June, 1993

S M T (W) Th F S

ARRIVAL TIME: 0710

DEPARTURE TIME: 1540

FIELD HEALTH & SAFETY REPORT

JOB Blair Backup

LOCATION Taylor Way, Tacoma, WA

CLIENT Port of Tacoma

FIELD REPRESENTATIVE Grant Guechtel PROJECT MANAGER Garry Horvitz

FIELD H&S MANAGER Grant Guechtel PROJECT H&S MANAGER John Verduin

NAMES OF PERSONNEL ON SITE Grant Guechtel

SITE ACTIVITIES observe Port's contractor load stockpiled charcoal briquette laden soil into containers on rail cars

POTENTIAL HAZARDS PAH, Chromium, Arsenic - all are dust inhalation, ingestion or direct contact hazards

HAZARD CONTROL USED eng. controls - no visible dust, separation by clean materials, PPE as appropriate - when direct contact possible

PROTECTIVE MEASURES TAKEN PPE - tyvek coveralls, scorpio gloves std. work ~~uniform~~ uniform w/ hard hat, rubber safety boots, safety glasses

COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT RELATIVE TO EXPLORATION
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION West

EXPLORATION NO.

NA

HARTCROWSER

JOB NO. 2350-22

DATE 29 June 1993

S M T W Th F S

ARRIVAL TIME: 0720

DEPARTURE TIME: 1500

FIELD HEALTH & SAFETY REPORT

JOB Blair Backup

LOCATION Taylor Way, Tacoma, WA

CLIENT Port of Tacoma

FIELD REPRESENTATIVE Grant Knechtel PROJECT MANAGER Garry Horvitz

FIELD H&S MANAGER Grant Knechtel PROJECT H&S MANAGER John Verduin

NAMES OF PERSONNEL ON SITE Grant Knechtel

SITE ACTIVITIES observe Port's Contractor load out charcoal briquette soil into containers on rail cars

POTENTIAL HAZARDS cPAH, chromium, arsenic - all are dust inhalation, ingestion or direct contact hazards

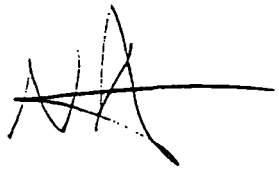
HAZARD CONTROL USED eng controls - no visible dust, separation by clean imported mat'l - PPE as appropriate when contact is possible

PROTECTIVE MEASURES TAKEN PPE - tyvek coveralls, scorpio gloves, std work uniform w/ rubber safety boots, hard hat, safety glasses

COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT RELATIVE ~~TO EXPLORATION~~
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION SW

EXPLORATION NO.



HARTCROWSER

JOB NO. 2350-32

DATE 25 June, 1993

S M T W Th F S

ARRIVAL TIME: 0720

FIELD HEALTH & SAFETY REPORT

DEPARTURE TIME: 1500

JOB Blair Backup

LOCATION Taylor Way, Tacoma, WA

CLIENT Port of Tacoma

FIELD REPRESENTATIVE Grant Cuechtel PROJECT MANAGER Gary Horwitz

FIELD H&S MANAGER Grant Cuechtel PROJECT H&S MANAGER John Verduin

NAMES OF PERSONNEL ON SITE Grant Cuechtel

SITE ACTIVITIES observe Port's contractor load out stockpiled charcoal briquette laden soil into containers on rail cars

POTENTIAL HAZARDS cPAH, Arsenic, Chromium. All are dust inhalation, direct contact or ingestion hazard

HAZARD CONTROL USED Eng. Controls - no visible dust
PPE - tyvek coveralls, scorpio gloves

PROTECTIVE MEASURES TAKEN PPE when direct contact possible - std. work uniform - rubber safety boots, hard hat, safety glasses

COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT RELATIVE TO EXPLORATION
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION NW

EXPLORATION NO.

HARTCROWSER

JOB NO. 2350-22

DATE 24 June, 1993

S M T W (Th) F S

ARRIVAL TIME: 0720

DEPARTURE TIME: 1500

FIELD HEALTH & SAFETY REPORT

JOB Blair Backup

LOCATION Taylor Way, Tacoma, WA

CLIENT Port of Tacoma

FIELD REPRESENTATIVE Grant Cuechtel PROJECT MANAGER Gavvy Horvitz

FIELD H&S MANAGER Grant Cuechtel PROJECT H&S MANAGER John Verduin

NAMES OF PERSONNEL ON SITE Grant Cuechtel

SITE ACTIVITIES observe Port's contractor load out charcoal briquette laden soil into containers on rail cars

POTENTIAL HAZARDS cPAH, Arsenic, Chromium - all are dust inhalation, direct contact or ingestion hazards

HAZARD CONTROL USED Eng. Controls - no visible dust, separation by "clean" imported material; PPE when contact is possible

PROTECTIVE MEASURES TAKEN PPE - tyvek coveralls, scorpio gloves Std. Work uniform includes hard hat, steel ~~toed~~ toed rubber safety boots, safety glasses

COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT RELATIVE TO EXPLORATION
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION NW

EXPLORATION NO.

NA

HARTCROWSER

JOB NO. 2350-22

DATE 23 June, 1993

S M T (W) Th F S

ARRIVAL TIME: 0715

DEPARTURE TIME: 1600

FIELD HEALTH & SAFETY REPORT

JOB Blair Backup

LOCATION Taylor Way, Tacoma, WA

CLIENT Port of Tacoma

FIELD REPRESENTATIVE Grant Knechtel PROJECT MANAGER Garry Horvitz

FIELD H&S MANAGER Grant Knechtel PROJECT H&S MANAGER John Verduin

NAMES OF PERSONNEL ON SITE Grant Knechtel

SITE ACTIVITIES observe Port's contractor load out charcoal briquette soil into containers on rail cars

POTENTIAL HAZARDS cPAH, Arsenic, Chromium - all are dust inhalation, ingestion and direct contact hazards

HAZARD CONTROL USED engineering controls - no visible dust, physical separation by clean materials, PPE when direct contact possible

PROTECTIVE MEASURES TAKEN PPE - tyvek coveralls, scorpio gloves; std. work uniform includes rubber safety boots, hard hat, safety glasses

COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT RELATIVE TO EXPLORATION
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION

EXPLORATION NO.

HARTCROWSER

JOB NO. 2350-22

DATE 21 June, 1993

S (M) T W Th F S

ARRIVAL TIME: 0215

DEPARTURE TIME: 1600

FIELD HEALTH & SAFETY REPORT

JOB Blair Backup

LOCATION Taylor Way, Tacoma, WA

CLIENT Port of Tacoma

FIELD REPRESENTATIVE Grant Guechtel PROJECT MANAGER Garry Horvitz

FIELD H&S MANAGER Grant Guechtel PROJECT H&S MANAGER John Verduin

NAMES OF PERSONNEL ON SITE Grant Guechtel

SITE ACTIVITIES observe Port's contractor load out charcoal briquette laden soil into rail cars

POTENTIAL HAZARDS cPAH, Arsenic, Chromium - all are dust inhalation, ingestion or direct contact hazards

HAZARD CONTROL USED engineering controls - no visible dust, separation from cont. matl by clean matl PPE as appropriate - when direct contact possible

PROTECTIVE MEASURES TAKEN PPE - Tyvek coveralls, scorpio gloves std work uniform - rubber safety boots, hard hats, safety glasses

COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT RELATIVE TO ~~EXPLORATION~~
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION SW

EXPLORATION NO.

NA

HARTCROWSER

JOB NO. 2350-22

DATE 18 June, 1993

S M T W Th F S

ARRIVAL TIME: 0715

FIELD HEALTH & SAFETY REPORT

DEPARTURE TIME: 1700

JOB Blair Backup

LOCATION Taylor Way, Tacoma, WA

CLIENT Port of Tacoma

FIELD REPRESENTATIVE Grant Knechtel PROJECT MANAGER Garry Horvitz

FIELD H&S MANAGER Grant Knechtel PROJECT H&S MANAGER John Verduin

NAMES OF PERSONNEL ON SITE Grant Knechtel

SITE ACTIVITIES observe port's contractor load out charcoal briquette (clean soil from stockpile

POTENTIAL HAZARDS cPAH, arsenic, chromium - all are dust inhalation, ingestion or direct contact

HAZARD CONTROL USED PPE when direct contact possible, eng. controls - no visible dust, separation from cont. materials by "clean mat'ls

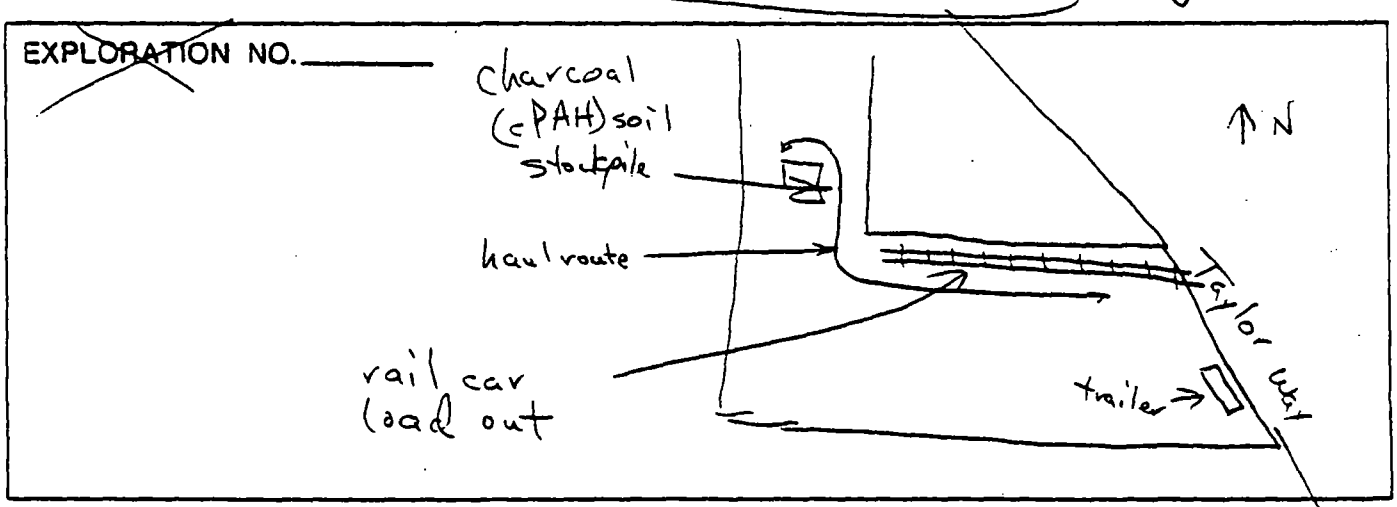
PROTECTIVE MEASURES TAKEN PPE - tyvek overalls, scorpio gloves; std. work uniform w/ rubber safety boots, hardhat, safety glasses

COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT RELATIVE TO ~~EXPLORATION~~
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION

N

~~EXPLORATION~~ NO. _____



HARTCROWSER

JOB NO. 2350-22

DATE 12 June, 1993

S M T W (Th) F S

ARRIVAL TIME: 0715

DEPARTURE TIME: 1415

FIELD HEALTH & SAFETY REPORT

JOB Blair Backup

LOCATION Taylor Way, Tacoma, WA.

CLIENT Port of Tacoma

FIELD REPRESENTATIVE Grant Knechtel PROJECT MANAGER John Verduin

FIELD H&S MANAGER Grant Knechtel PROJECT H&S MANAGER John Verduin

NAMES OF PERSONNEL ON SITE ~~Grant~~ Knechtel

SITE ACTIVITIES observe Port's contractor load out charcoal briquette laden soil from stockpile

POTENTIAL HAZARDS cPAH, Arsenic, Chromium - all are dust inhalation, ingestion or direct contact hazards

HAZARD CONTROL USED engineering controls - no visible dust, separation of "clean" material, ppe used when direct contact possible

PROTECTIVE MEASURES TAKEN PPE - tyvek, impermeable gloves (scompios), std. work uniform - rubber safety boots, hard hat, safety glasses

COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT RELATIVE TO EXPLORATION
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION North

EXPLORATION NO.

NA

HARTCROWSER

JOB NO. 2350-22

DATE 16 June, 1993

S M T (W) Th F S

ARRIVAL TIME: 0730

DEPARTURE TIME:

FIELD HEALTH & SAFETY REPORT

JOB Blair Backup

LOCATION Taylor Way, Tacoma, WA.

CLIENT Port of Tacoma

FIELD REPRESENTATIVE Grant Guechtel PROJECT MANAGER John Verduin

FIELD H&S MANAGER Grant Guechtel PROJECT H&S MANAGER John Verduin

NAMES OF PERSONNEL ON SITE Grant Guechtel

SITE ACTIVITIES loadout of charcoal briquette (cPAH) soil by Port's contractor

POTENTIAL HAZARDS cPAH, Arsenic, chromium - all are direct contact, dust inhalation or splash hazards, ingestion hazard

HAZARD CONTROL USED engineering controls - no visible dust, physical separation by clean imported material

PROTECTIVE MEASURES TAKEN std. work uniform - steel toed rubber boots, safety glasses, hard hat

COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT RELATIVE TO ~~EXPLORATION~~
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION NW

EXPLORATION NO.

NA

HARTCROWSER

JOB NO. 2350-22

DATE 18 May 1993

S M (T) W Th F S

ARRIVAL TIME: 0745

DEPARTURE TIME: 1630

FIELD HEALTH & SAFETY REPORT

JOB Blair Backup

LOCATION Taylor Way, Tacoma, WA

CLIENT Port of Tacoma

FIELD REPRESENTATIVE Grant Kuechtel PROJECT MANAGER Garry Horvitz

FIELD H&S MANAGER Grant Kuechtel PROJECT H&S MANAGER John Verduin

NAMES OF PERSONNEL ON SITE Grant Kuechtel

SITE ACTIVITIES grading (clean material only)

POTENTIAL HAZARDS Arsenic, Chromium, PAH's

HAZARD CONTROL USED eng. controls - no visible dust

PROTECTIVE MEASURES TAKEN rubber safety boots, safety glasses, std. work uniform

COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT RELATIVE TO EXPLORATION
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION NW

EXPLORATION NO.

NA

HARTCROWSER

JOB NO. [illegible]-22

DATE 12 Nov. 1992

S M T W Th F S

ARRIVAL TIME: 0730

DEPARTURE TIME: 1625

FIELD HEALTH & SAFETY REPORT

JOB Blair Backup

LOCATION Taylor Way, Tacoma, WA

CLIENT Port of Tacoma

FIELD REPRESENTATIVE Grant Knechtel PROJECT MANAGER Gary Howitz

FIELD H&S MANAGER Grant Knechtel PROJECT H&S MANAGER John Verduin

NAMES OF PERSONNEL ON SITE Grant Knechtel

SITE ACTIVITIES observe Port's contractor - grading (placement of cover material)

POTENTIAL HAZARDS Arsenic, Chromium, PAH's

HAZARD CONTROL USED Eng. Controls - no visible dust

PROTECTIVE MEASURES TAKEN Rubber safety boots, safety glasses, std. work uniform

COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT RELATIVE TO EXPLORATION
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION NW

EXPLORATION NO.

NA

HARTCROWSER

JOB NO. 2350-22

DATE 14 Nov. 1993

S M T W Th F S

ARRIVAL TIME: 0720

DEPARTURE TIME: 1430

FIELD HEALTH & SAFETY REPORT

JOB Blair Backup

LOCATION Taylor Way, Tacoma, WA

CLIENT Port of Tacoma

FIELD REPRESENTATIVE Grant Knechtel PROJECT MANAGER Garry Horvitz

FIELD H&S MANAGER Grant Knechtel PROJECT H&S MANAGER John Verduin

NAMES OF PERSONNEL ON SITE Grant Knechtel

SITE ACTIVITIES observe port's contractor - grading

POTENTIAL HAZARDS Arsenic, Chromium, PAH's - all are dust inhalation, direct contact or ingestion hazards

HAZARD CONTROL USED engineering controls - no visible dust, HC representative separated from cont. site soil by clean imported mat'l

PROTECTIVE MEASURES TAKEN rubber safety boots, safety glasses, std work uniform

COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT RELATIVE TO EXPLORATION
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION

EXPLORATION NO.

HARTCROWSER

JOB NO. 2350-22

DATE 13 May, 1993

S M T W (Th) F S

ARRIVAL TIME: 0735

FIELD HEALTH & SAFETY REPORT

DEPARTURE TIME: 1605

JOB Blair Backup

LOCATION Taylor Way, Tacoma, WA.

CLIENT Port of Tacoma

FIELD REPRESENTATIVE Grant Knechtel PROJECT MANAGER Garry Horvitz

FIELD H&S MANAGER Grant Knechtel PROJECT H&S MANAGER John Verduin

NAMES OF PERSONNEL ON SITE Grant Knechtel, John Verduin (site visit)

SITE ACTIVITIES grading

POTENTIAL HAZARDS Arsenic, Chromium, PAH's - all are dust inhalation, direct contact or ingestion hazards

HAZARD CONTROL USED Engineering Controls - no visible dust, HC personnel separated from site soil by clean imported material

PROTECTIVE MEASURES TAKEN rubber safety boots, safety glasses, std. work uniform

COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT RELATIVE TO EXPLORATION
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION NW

EXPLORATION NO.

NA

HARTCROWSER

JOB NO. 2350-22

DATE 12 Nov 1993

S M T (W) Th F S

ARRIVAL TIME: 0730

DEPARTURE TIME: 1600

FIELD HEALTH & SAFETY REPORT

JOB Blair Backup

LOCATION Taylor Way, Tacoma, WA

CLIENT Port of Tacoma

FIELD REPRESENTATIVE Grant Enechtel PROJECT MANAGER Garry Horvitz

FIELD H&S MANAGER Grant Enechtel PROJECT H&S MANAGER John Verduin

NAMES OF PERSONNEL ON SITE Grant Enechtel

SITE ACTIVITIES observe Port's contractor - grading

POTENTIAL HAZARDS Arsenic, Chromium, PAH's - all are dust inhalation, direct contact or ingestion hazards

HAZARD CONTROL USED Engineering controls - no visible dust, separation from potentially contaminated material by ~~[illegible]~~ imported clean material

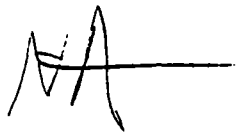
PROTECTIVE MEASURES TAKEN rubber safety boots, safety glasses, std work uniform

COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT RELATIVE TO EXPLORATION
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION

N

EXPLORATION NO.



HARTCROWSER

JOB NO. 2350-22

DATE 11 May 1993

S M (T) W Th F S

ARRIVAL TIME: 0715

DEPARTURE TIME: 1700

FIELD HEALTH & SAFETY REPORT

JOB Blair Backup

LOCATION Tacoma, WA

CLIENT Port of Tacoma

FIELD REPRESENTATIVE Grant Cuechtel PROJECT MANAGER Garry Horwitz

FIELD H&S MANAGER Grant Cuechtel PROJECT H&S MANAGER John Verduin

NAMES OF PERSONNEL ON SITE Grant Cuechtel

SITE ACTIVITIES fine grading Asarco slag soil, storm drain ditch No. side

POTENTIAL HAZARDS Arsenic, Chromium, PAH's - all are dust inhalation, direct contact & ingestion hazards

HAZARD CONTROL USED engineering controls - no visible dust, physical separation from site soils by clean materials

PROTECTIVE MEASURES TAKEN rubber safety boots, std. work uniform

COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT RELATIVE TO EXPLORATION
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION

EXPLORATION NO.

HARTCROWSER

JOB NO. 2350-22

DATE 10 May, 1993

S (M) T W Th F S

ARRIVAL TIME: 0730

DEPARTURE TIME:

FIELD HEALTH & SAFETY REPORT

JOB Blair Backup

LOCATION Taylor Way, Tacoma, WA

CLIENT Port of Tacoma

FIELD REPRESENTATIVE Grant Guechtel PROJECT MANAGER Gary Horvitz

FIELD H&S MANAGER Grant Guechtel PROJECT H&S MANAGER John Verduin

NAMES OF PERSONNEL ON SITE Grant Guechtel

SITE ACTIVITIES observe Port's contractor - grading Asarco slag soil, installing CMP storm drain

POTENTIAL HAZARDS Arsenic, Chromium, PAH's - all are dust inhalation, ingestion or direct contact hazards

HAZARD CONTROL USED Eng. Controls i.e. no visible dust, remain separated from cont. soil by clean fill

PROTECTIVE MEASURES TAKEN rubber safety boots, safety glasses, std. work uniform

COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT RELATIVE TO EXPLORATION
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION NW

EXPLORATION NO.

NA

HARTCROWSER

JOB NO. 2350-22

DATE 7 May, 1993

S M T W Th (F) S

ARRIVAL TIME: 0725

DEPARTURE TIME:

FIELD HEALTH & SAFETY REPORT

JOB Blair Backup

LOCATION Taylor Way, Tacoma, WA.

CLIENT Port of Tacoma

FIELD REPRESENTATIVE Grant Knechtel PROJECT MANAGER Gary Hovvitz

FIELD H&S MANAGER Grant Knechtel PROJECT H&S MANAGER John Verduin

NAMES OF PERSONNEL ON SITE Grant Knechtel

SITE ACTIVITIES observe Port's contractor moving Asarco slag bearing soil from 1 pad to another

POTENTIAL HAZARDS Arsenic, Chromium, PAH's

HAZARD CONTROL USED Eng. Controls - No visible dust

PROTECTIVE MEASURES TAKEN Engineering Controls - no visible dust, PPE - rubber safety boots, safety glasses, std. work uniform

COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT RELATIVE TO EXPLORATION
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION South

EXPLORATION NO.

NA

HARTCROWSER

JOB NO. 2350-22

DATE 6 May, 1993

S M T W (Th) F S

ARRIVAL TIME: 0715

DEPARTURE TIME: 1615

FIELD HEALTH & SAFETY REPORT

JOB Blair Backup

LOCATION Taylor Way, Tacoma, WA.

CLIENT Port of Tacoma

FIELD REPRESENTATIVE Grant Guechtel PROJECT MANAGER Gary Horvitz

FIELD H&S MANAGER Grant Guechtel PROJECT H&S MANAGER John Verduin

NAMES OF PERSONNEL ON SITE Grant Guechtel

SITE ACTIVITIES observe port's contractor - moving contaminated soil on site

POTENTIAL HAZARDS Arsenic, Chromium, PAH's

HAZARD CONTROL USED No visible dust, Hart Crowser representative on clean imported mat'l @ all times

PROTECTIVE MEASURES TAKEN Std. work uniform, safety boots (rubber), safety glasses

COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT RELATIVE TO EXPLORATION
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION SW

EXPLORATION NO.

NA

HARTCROWSER

JOB NO. 2350-22

DATE 5 May, 1993

S M T (W) Th F S

ARRIVAL TIME: 0700

DEPARTURE TIME: 1630

FIELD HEALTH & SAFETY REPORT

JOB Blair Backup

LOCATION Taylor Way, Tacoma, WA

CLIENT Port of Tacoma

FIELD REPRESENTATIVE Grant Guechtel PROJECT MANAGER Garry Horvitz

FIELD H&S MANAGER Grant Guechtel PROJECT H&S MANAGER John Verduin

NAMES OF PERSONNEL ON SITE Grant Guechtel

SITE ACTIVITIES observe port's contractor 1. place clean imported S&G cover 2. remove small area of site soil & replace w/ S&G cover

POTENTIAL HAZARDS PAH's, Arsenic, Chromium - all are dust inhalation, direct contact or ingestion hazards

HAZARD CONTROL USED Engineering controls - no visible dust, HC representative remained on clean fill surface at all times

PROTECTIVE MEASURES TAKEN rubber safety boots, safety glasses, std. work uniform (hard hat, hearing protection when appropriate, long pants & shirt, etc.

COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT RELATIVE TO EXPLORATION
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION West

EXPLORATION NO.

NA

HARTCROWSER

JOB NO. 2350-22
DATE 5/4/93
S M T W Th F S
ARRIVAL TIME: 0715
DEPARTURE TIME: 1630

FIELD HEALTH & SAFETY REPORT

JOB BLAIR BACKUP
LOCATION TAYLOR WAY, TACOMA, WA
CLIENT PORT OF TACOMA
FIELD REPRESENTATIVE CARL WOLFE PROJECT MANAGER GARY HORVITZ
FIELD H&S MANAGER CARL WOLFE PROJECT H&S MANAGER JOHN VERDUIN

NAMES OF PERSONNEL ON SITE CARL WOLFE

SITE ACTIVITIES GRADING - PLACEMENT OF LLOYDS MILLTON PIT RUN

POTENTIAL HAZARDS PAH'S, ARSENIC, CHROMIUM

HAZARD CONTROL USED ENG. CONTROLS - NO VISIBLE DUST

PROTECTIVE MEASURES TAKEN HARD HAT, STEEL-TOED RUBBER BOOTS, SAFETY GLASSES, TYVEK

COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT RELATIVE TO EXPLORATION
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION SW

EXPLORATION NO.

N/A

HARTCROWSER

JOB NO. 2350-22

DATE 3 May, 1993

S (M) T W Th F S

ARRIVAL TIME: 0720

FIELD HEALTH & SAFETY REPORT

DEPARTURE TIME: 1600

JOB Blair Backup

LOCATION Taylor Way, Tacoma, WA

CLIENT Port of Tacoma

FIELD REPRESENTATIVE Grant Knechtel PROJECT MANAGER Gerry Horvitz

FIELD H&S MANAGER Grant Knechtel PROJECT H&S MANAGER John Verduin

NAMES OF PERSONNEL ON SITE Grant Knechtel

SITE ACTIVITIES grading (placement of ~~Asarco~~ Asarco slag bearing soil in CAP area)

POTENTIAL HAZARDS Arsenic, Chromium, PAH's - all area dust inhalation, direct contact or ingestion hazards

HAZARD CONTROL USED No Visible Dust

PROTECTIVE MEASURES TAKEN Rubber Safety Boots, Safety glasses, std. work uniform

COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT RELATIVE TO EXPLORATION
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION SW

EXPLORATION NO.

NA

HARTCROWSER

JOB NO. 2350-22

DATE 30 April, 1993

S M T W Th (F) S

ARRIVAL TIME: 0720

DEPARTURE TIME: 1800

FIELD HEALTH & SAFETY REPORT

JOB Blair Backup

LOCATION Taylor Way, Tacoma, WA

CLIENT Port of Tacoma

FIELD REPRESENTATIVE Grant Knechtel PROJECT MANAGER Gary Horvitz

FIELD H&S MANAGER Grant Knechtel PROJECT H&S MANAGER John Verduin

NAMES OF PERSONNEL ON SITE Grant Knechtel

SITE ACTIVITIES Observe contractor's activities

POTENTIAL HAZARDS PAH's, Arsenic, Chromium

HAZARD CONTROL USED Eng. Controls - no visible dust

PROTECTIVE MEASURES TAKEN Rubber safety boots, std. work uniform, safety glasses

COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT RELATIVE TO EXPLORATION
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION SW

EXPLORATION NO.

NA

HARTCROWSER

JOB NO. 2350-22

DATE 29 April 1993

S M T W (Th) F S

ARRIVAL TIME: 0705

DEPARTURE TIME: 1035

FIELD HEALTH & SAFETY REPORT

JOB Blair Backup

LOCATION Taylor Way, Tacoma, WA

CLIENT Port of Tacoma

FIELD REPRESENTATIVE Grant Knechtel PROJECT MANAGER Gerry Horvitz

FIELD H&S MANAGER Grant Knechtel PROJECT H&S MANAGER John Verduin

NAMES OF PERSONNEL ON SITE Grant Knechtel, John Verduin

SITE ACTIVITIES No contractor activities - walk through on 'clean' materials

POTENTIAL HAZARDS PAH's, Chromium, Arsenic

HAZARD CONTROL USED Rubber Safety Boots, Std work uniform (PPE)

PROTECTIVE MEASURES TAKEN

COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT RELATIVE TO EXPLORATION
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION

EXPLORATION NO.

NA

HARTCROWSER

JOB NO. 2350-22

DATE 28 April, 1993

S M T (W) Th F S

ARRIVAL TIME: 0715

DEPARTURE TIME: 1635

FIELD HEALTH & SAFETY REPORT

JOB Blair Backup

LOCATION Taylor Way, Tacoma, WA

CLIENT Port of Tacoma

FIELD REPRESENTATIVE Grant Knechtel PROJECT MANAGER Garry Horvitz

FIELD H&S MANAGER Grant Knechtel PROJECT H&S MANAGER John Verduin

NAMES OF PERSONNEL ON SITE Grant Knechtel

SITE ACTIVITIES observe Port's contractor placing Asarco slag soil on cap area

POTENTIAL HAZARDS Arsenic - dust inhalation, direct contact or ingestion

HAZARD CONTROL USED Engineering Controls - No visible dust

PROTECTIVE MEASURES TAKEN rubber safety boots, std. work uniform

COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT RELATIVE TO EXPLORATION
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION WSW

EXPLORATION NO.

NA

HARTCROWSER

JOB NO. 2350-22
DATE 27 April, 1993
S M (T) W Th F S
ARRIVAL TIME: 0740
DEPARTURE TIME: 1635

FIELD HEALTH & SAFETY REPORT

JOB Blair Backup
LOCATION Taylor Way, Tacoma, WA
CLIENT Port of Tacoma
FIELD REPRESENTATIVE Grant Knechtel PROJECT MANAGER Garry Horvitz
FIELD H&S MANAGER Grant Knechtel PROJECT H&S MANAGER John Verduin

NAMES OF PERSONNEL ON SITE Grant Knechtel

SITE ACTIVITIES Port's contractor fine grading in PAH area

POTENTIAL HAZARDS PAH's, Arsenic, Chromium - All are dust inhalation, direct contact or ingestion hazard

HAZARD CONTROL USED No visible dust (engineering controls). Separation by "clean" FILL.

PROTECTIVE MEASURES TAKEN Std. work uniform w/ rubber safety boots

COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT RELATIVE TO EXPLORATION
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION W

EXPLORATION NO.

NA

HARTCROWSER

JOB NO. 2350-22

DATE 26 April, 1993

S (M) T W Th F S

ARRIVAL TIME: 0700

DEPARTURE TIME: 0845

FIELD HEALTH & SAFETY REPORT

JOB Blair Backup

LOCATION Taylor Way, Tacoma, WA

CLIENT Port of Tacoma

FIELD REPRESENTATIVE Grant Kuechtel PROJECT MANAGER Garry Horvitz

FIELD H&S MANAGER Grant Kuechtel PROJECT H&S MANAGER John Verduin

NAMES OF PERSONNEL ON SITE Grant Kuechtel

SITE ACTIVITIES grading by Port's contractor in PAH area

POTENTIAL HAZARDS PAH's, Chromium, Arsenic

HAZARD CONTROL USED Eng. Controls- No visible dust, separation by "clean" FILL

PROTECTIVE MEASURES TAKEN Std. Work uniform w/ rubber safety boots

COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT RELATIVE TO EXPLORATION
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION SW

EXPLORATION NO.

HARTCROWSER

JOB NO. 2350-22

DATE 23 April, 1993

S M T W Th (F) S

ARRIVAL TIME: 0730 / 1400

DEPARTURE TIME: 1100 / 1630

FIELD HEALTH & SAFETY REPORT

JOB Blair Backup

LOCATION Taylor Way, Tacoma, WA

CLIENT Port of Tacoma

FIELD REPRESENTATIVE Grant Knechtel PROJECT MANAGER Garry Horvitz

FIELD H&S MANAGER Grant Knechtel PROJECT H&S MANAGER John Verduin

NAMES OF PERSONNEL ON SITE Grant Knechtel

SITE ACTIVITIES observe contractor grading & decon in PAH area

POTENTIAL HAZARDS PAH's, Chromium & Arsenic - inhalation of dust, direct contact, ingestion

HAZARD CONTROL USED Eng. Controls - No visible dust. HC representative remained on "clean" Fill away from site soils

PROTECTIVE MEASURES TAKEN Rubber safety boots, safety glasses, std. work uniform

COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT RELATIVE TO EXPLORATION
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION

EXPLORATION NO.

NA

HARTCROWSER

JOB NO. 2350-22

DATE 22 April, 1993

S M T W (Th) F S

ARRIVAL TIME: 0730

DEPARTURE TIME: 1630

FIELD HEALTH & SAFETY REPORT

JOB Blair Backup

LOCATION Taylor Way, Tacoma, WA

CLIENT Port of Tacoma

FIELD REPRESENTATIVE Grant Enechtel PROJECT MANAGER Gavvy Horvitz

FIELD H&S MANAGER Grant Enechtel PROJECT H&S MANAGER John Verduin

NAMES OF PERSONNEL ON SITE Grant Enechtel

SITE ACTIVITIES observe Port's contractor removing charcoal briquette laden soil

POTENTIAL HAZARDS PAH's, Chromium, Arsenic - contact, breathing & ingestion hazard

HAZARD CONTROL USED Eng. Controls - No visible dust, std. Pers. decon, PPE

PROTECTIVE MEASURES TAKEN PPE - Poly tyvek, rubber safety boots, scorpio gloves w/acrylonitrile inner gloves, safety glasses, std. work uniform

COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT RELATIVE TO EXPLORATION
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION

EXPLORATION NO.

NA

HARTCROWSER

JOB NO. 2350-22

DATE 21 April, 1993

S M T (W) Th F S

ARRIVAL TIME: 0705

DEPARTURE TIME: 1800

FIELD HEALTH & SAFETY REPORT

JOB Blair Backup

LOCATION Taylor Way, Tacoma, WA.

CLIENT Port of Tacoma

FIELD REPRESENTATIVE Grant Knechtel PROJECT MANAGER Garry Horvitz

FIELD H&S MANAGER Grant Knechtel PROJECT H&S MANAGER John Verduin

NAMES OF PERSONNEL ON SITE Grant Knechtel

SITE ACTIVITIES observe port's contractor removing charcoal briquette laden soil

POTENTIAL HAZARDS PAH's, Chromium, Arsenic - Contact & ingestion hazards

HAZARD CONTROL USED Engineering Control (No visible Dust) PPE & std. decontamination when leaving area

PROTECTIVE MEASURES TAKEN PPE - poly tyvek, rubber safety boots, scorpio gloves w/acrylonitrile inner gloves, safety glasses, std. work uniform

COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT RELATIVE TO EXPLORATION
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION

EXPLORATION NO.

NA

HARTCROWSER

JOB NO. 7350-22

DATE 20th April, 1993

S M (T) W Th F S

ARRIVAL TIME: 0710

DEPARTURE TIME: 1200

FIELD HEALTH & SAFETY REPORT

JOB Blair Backup

LOCATION Taylor Way, Tacoma, WA

CLIENT Port of Tacoma

FIELD REPRESENTATIVE Grant Knechtel PROJECT MANAGER Gerry Horvitz

FIELD H&S MANAGER Grant Knechtel PROJECT H&S MANAGER John Verduin

NAMES OF PERSONNEL ON SITE Grant Knechtel

SITE ACTIVITIES observe Port's contractor removal of charcoal briquette laden soil

POTENTIAL HAZARDS PAH's, Chromium, Arsenic - all contact or ingestion hazards

HAZARD CONTROL USED Eng. Controls - no visible dust, PPE, Std. decontamination when leaving work area

PROTECTIVE MEASURES TAKEN PPE - poly tyvek, rubber safety boots, scorpio gloves w/ acrylonitrile inner gloves, safety glasses, std. work uniform

COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT RELATIVE TO EXPLORATION
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION

EXPLORATION NO.

HARTCROWSER

JOB NO. 2350-22
DATE 19 April, 1993
S (M) T W Th F S
ARRIVAL TIME: 0730
DEPARTURE TIME: 1800

FIELD HEALTH & SAFETY REPORT

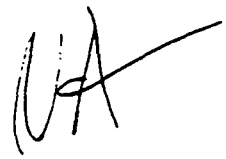
JOB Blair Backup
LOCATION Taylor Way, Tacoma WA
CLIENT Port of Tacoma
FIELD REPRESENTATIVE Grant Knechtel PROJECT MANAGER Gavoy Horwitz
FIELD H&S MANAGER Grant Knechtel PROJECT H&S MANAGER John Verduin
NAMES OF PERSONNEL ON SITE Grant Knechtel

SITE ACTIVITIES observe contractor's removal of charcoal briquette laden soil
POTENTIAL HAZARDS PAH's, Chromium, Arsenic - contact or ingestion hazard
HAZARD CONTROL USED Eng. Controls - No visible dust PPE -

PROTECTIVE MEASURES TAKEN PPE - poly tyvek, rubber safety boots, scorpio gloves w/ acrylonitrile liners, safety glasses, std. work uniform
COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT RELATIVE TO EXPLORATION
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION

EXPLORATION NO.



HARTCROWSER

JOB NO. 2350-22
DATE 16 April, 1993
S M T W Th F S
ARRIVAL TIME: 0730
DEPARTURE TIME: 1700

FIELD HEALTH & SAFETY REPORT

JOB Blair Backup
LOCATION Taylor Way, Tacoma, WA
CLIENT Port of Tacoma
FIELD REPRESENTATIVE Grant Knechtel PROJECT MANAGER Garry Horvitz
FIELD H&S MANAGER Grant Knechtel PROJECT H&S MANAGER John Verduin

NAMES OF PERSONNEL ON SITE Grant Knechtel

SITE ACTIVITIES observe contractor's excavation of charcoal briquette laden soil

POTENTIAL HAZARDS PAH, Arsenic, Chromium

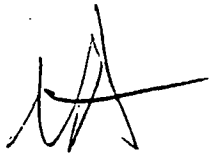
HAZARD CONTROL USED PPE, engineering controls (no visible dust)

PROTECTIVE MEASURES TAKEN PPE- poly tyvek, rubber safety shoes, ~~skorpio~~ skorpio gloves w/ acrylonitrile inners, safety glasses, std. work uniform

COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT RELATIVE TO ~~EXPLORATION~~
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION West

EXPLORATION NO.



HARTCROWSER

JOB NO. 2350-22

DATE 15 April, 1993

S M T W (Th) F S

ARRIVAL TIME: 0730

DEPARTURE TIME: 1500

FIELD HEALTH & SAFETY REPORT

JOB Blair Backup

LOCATION Taylor Way, Tacoma, WA

CLIENT Port of Tacoma

FIELD REPRESENTATIVE Grant Enechitel PROJECT MANAGER Gavry Horvitz

FIELD H&S MANAGER Grant Enechitel PROJECT H&S MANAGER John Verduin

NAMES OF PERSONNEL ON SITE Grant Enechitel

SITE ACTIVITIES observe contractor excavating ~~stockpiled~~ charcoal briquette laden soil

POTENTIAL HAZARDS Arsenic, Chromium, DAH (in Briquettes)

HAZARD CONTROL USED PPE, no visible dust

PROTECTIVE MEASURES TAKEN Poly Tyvek, Scorpio gloves, safety glasses, std. work uniform, rubber safety boots

COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT RELATIVE TO EXPLORATION
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION SW

EXPLORATION NO.

HARTCROWSER

JOB NO. 2350-22

DATE 14 April 1993

S M T (W) Th F S

ARRIVAL TIME: 0745

DEPARTURE TIME: 1545

FIELD HEALTH & SAFETY REPORT

JOB Blair Backup

LOCATION Taylor Way, Tacoma, WA

CLIENT Port of Tacoma

FIELD REPRESENTATIVE Grant Knechtel PROJECT MANAGER Garry Horvitz

FIELD H&S MANAGER Grant Knechtel PROJECT H&S MANAGER John Verduin

NAMES OF PERSONNEL ON SITE Grant Knechtel

SITE ACTIVITIES observe Port's contractor:

POTENTIAL HAZARDS Arsenic, Chromium, PAH

HAZARD CONTROL USED Engineering Controls

PROTECTIVE MEASURES TAKEN Safety Boots (rubber) & Std. Work Uniform

COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT RELATIVE TO EXPLORATION
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION SW

EXPLORATION NO.

HARTCROWSER

JOB NO. 2350-22

DATE 13 April, 1993

S M (T) W Th F S

ARRIVAL TIME: 0800

DEPARTURE TIME: 1930

FIELD HEALTH & SAFETY REPORT

JOB Blair Backup

LOCATION Taylor Way, Tacoma, WA

CLIENT Port of Tacoma

FIELD REPRESENTATIVE Grant Knechtel PROJECT MANAGER Gary Horvitz

FIELD H&S MANAGER Grant Knechtel PROJECT H&S MANAGER John Verduin

NAMES OF PERSONNEL ON SITE Grant Knechtel

SITE ACTIVITIES observe Port's contractor - build stockpile in "Clean" area, exc. Pond in PAH area, abandon ~~the~~ wells

POTENTIAL HAZARDS Arsenic, Chromium, PAH

HAZARD CONTROL USED engineering controls - separation from cont. matl by clean matl, no visible dust

PROTECTIVE MEASURES TAKEN Std. work uniform w/ rubber safety boots

COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT RELATIVE TO ~~EXPLORATION~~
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION SW

EXPLORATION NO. _____

NA

HARTCROWSER

JOB NO. 2350-22

DATE 12 April, 1993

S (M) T W Th F S

ARRIVAL TIME: 0730

DEPARTURE TIME: 1500

FIELD HEALTH & SAFETY REPORT

JOB Blair Backup

LOCATION Taylor Way, Tacoma, WA

CLIENT Port of Tacoma

FIELD REPRESENTATIVE Grant Knechtel PROJECT MANAGER Garry Horvitz

FIELD H&S MANAGER Grant Knechtel PROJECT H&S MANAGER John Verduin

NAMES OF PERSONNEL ON SITE Grant Knechtel

SITE ACTIVITIES observe contractor's activities - placement of slag soils

POTENTIAL HAZARDS arsenic, chromium, PAH - dust is inhalation, direct contact or ingestion hazard

HAZARD CONTROL USED engineering controls - separation by clean matl from cont. matl, no visible dust

PROTECTIVE MEASURES TAKEN rubber boots, std. work uniform

COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT RELATIVE TO EXPLORATION
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION SW

EXPLORATION NO.

HARTCROWSER

JOB NO. 2350-22
DATE 9 April, 1993
S M T W Th F S
ARRIVAL TIME: 0735
DEPARTURE TIME: 1645

FIELD HEALTH & SAFETY REPORT

JOB Blair Backup
LOCATION Taylor Way, Tacoma, WA
CLIENT PoA of Tacoma
FIELD REPRESENTATIVE Grant Fuechtel PROJECT MANAGER Gary Horvitz
FIELD H&S MANAGER Grant Fuechtel PROJECT H&S MANAGER John Verduin
NAMES OF PERSONNEL ON SITE Grant Fuechtel

SITE ACTIVITIES observe contractor's activities including placement of Asarco slag/soil, sand blast grit
POTENTIAL HAZARDS Arsenic, Chromium, PAH - inhalation direct contact or ingestion of dust
HAZARD CONTROL USED eng. controls - no visible dust

PROTECTIVE MEASURES TAKEN Std. work uniform, rubber boots

COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT RELATIVE TO EXPLORATION
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION SW

EXPLORATION NO.

HARTCROWSER

JOB NO. 2350-22

DATE 2 April, 1993

S M T W (Th) F S

ARRIVAL TIME: 0730

DEPARTURE TIME: 1200

FIELD HEALTH & SAFETY REPORT

JOB Blair Backup

LOCATION Taylor Way, Tacoma, WA

CLIENT Port of Tacoma

FIELD REPRESENTATIVE Grant Knechtel PROJECT MANAGER Garry Horwitz

FIELD H&S MANAGER Grant Knechtel PROJECT H&S MANAGER John Verduin

NAMES OF PERSONNEL ON SITE Grant Knechtel

SITE ACTIVITIES observe: grading (placement of Asarco Slag/Soil), test pits in PAH area

POTENTIAL HAZARDS Arsenic, PAH - inhalation of dust, direct contact or ~~ingest~~ ingestion of dust

HAZARD CONTROL USED engineering controls - no visible dust

PROTECTIVE MEASURES TAKEN PPE - impermeable clothing (rain gear & scorpio gloves, rubber boots, hard hat, safety glasses

COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT RELATIVE TO EXPLORATION
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION SW

EXPLORATION NO.

HARTCROWSER

JOB NO. 2350-22

DATE 7 April, 1993

S M T (W) Th F S

ARRIVAL TIME: 0730

DEPARTURE TIME: 1630

FIELD HEALTH & SAFETY REPORT

JOB Blair Backup

LOCATION Taylor Way, Tacoma, WA.

CLIENT Port of Tacoma

FIELD REPRESENTATIVE Grant Knechtel PROJECT MANAGER Garry Horvitz

FIELD H&S MANAGER Grant Knechtel PROJECT H&S MANAGER John Verduin

NAMES OF PERSONNEL ON SITE Grant Knechtel

SITE ACTIVITIES observe contractors work - placement of SLAG SOIL in cap area, excavate marginal ditch in site soil

POTENTIAL HAZARDS Arsenic, Chromium, PAH - inhalation (dust), direct contact or ingestion

HAZARD CONTROL USED engineering controls - separation by clean matl, no visible dust

PROTECTIVE MEASURES TAKEN rubber safety boots, std. work uniform

COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT RELATIVE TO EXPLORATION
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION

EXPLORATION NO.

NA

HARTCROWSER

JOB NO. 2350-22

DATE 6 April, 1993

S M (T) W Th F S

ARRIVAL TIME: 0750

DEPARTURE TIME: 1650

FIELD HEALTH & SAFETY REPORT

JOB Blair Backup

LOCATION Taylor Way, Tacoma, WA

CLIENT Port of Tacoma

FIELD REPRESENTATIVE Grant Knechtel PROJECT MANAGER Garry Horvitz

FIELD H&S MANAGER Grant Knechtel PROJECT H&S MANAGER John Verduin

NAMES OF PERSONNEL ON SITE Grant Knechtel

SITE ACTIVITIES observe contractor's activities including

POTENTIAL HAZARDS Arsenic, Chromium, PAH

HAZARD CONTROL USED engineering controls - separation by clean material, no visible dust, no direct contact w/ SLAG SOIL

PROTECTIVE MEASURES TAKEN rubber safety boots, std. work uniform

COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT RELATIVE TO EXPLORATION
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION SSW

EXPLORATION NO.

HARTCROWSER

JOB NO. 2350-22

DATE 5 April, 1993

S (M) T W Th F S

ARRIVAL TIME: 0745

DEPARTURE TIME: 1750

FIELD HEALTH & SAFETY REPORT

JOB Blair Backup

LOCATION Taylor Way, Tacoma, WA

CLIENT Port of Tacoma

FIELD REPRESENTATIVE Grant Knechtel PROJECT MANAGER Garry Horvitz

FIELD H&S MANAGER Grant Knecht PROJECT H&S MANAGER John Verduin

NAMES OF PERSONNEL ON SITE Grant Knechtel

SITE ACTIVITIES grading - place S&G BUFFER, Haul & Place SLAG SOIL From Waterway site

POTENTIAL HAZARDS Arsenic, Chromium, PAH in site soil, Arsenic in incoming soil

HAZARD CONTROL USED engineering controls - no visible dust, separation by clean matl

PROTECTIVE MEASURES TAKEN rubber boots, tyvek coveralls, safety glasses, ~~rubber~~ Storipio gloves & acrylonitrile inner gloves, hard hat

COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT RELATIVE TO ~~EXPLORATION~~
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION SW

EXPLORATION NO.

NA

HARTCROWSER

JOB NO. 2350-22

DATE 2 April, 1993

S M T W Th (F) S

ARRIVAL TIME: 0745

DEPARTURE TIME: 1645

FIELD HEALTH & SAFETY REPORT

JOB Blair Backup

LOCATION Taylor Way, Tacoma, WA

CLIENT Port of Tacoma

FIELD REPRESENTATIVE Grant Euchtel PROJECT MANAGER Gerry Horvitz

FIELD H&S MANAGER Grant Euchtel PROJECT H&S MANAGER John Verduin

NAMES OF PERSONNEL ON SITE Grant Euchtel

SITE ACTIVITIES observe Port's contractor activities including - installing SAND & GRAVEL BUFFER

POTENTIAL HAZARDS site soils contain Arsenic, Chromium & PAH - dust inhalation, contact or ingestion hazards

HAZARD CONTROL USED engineering controls - separation by clean matt, no visible dust

PROTECTIVE MEASURES TAKEN rubber boots, std work uniform

COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT RELATIVE TO EXPLORATION
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION

EXPLORATION NO.

HARTCROWSER

JOB NO. 2350-22

DATE 1 April, 1993

S M T W (Th) F S

ARRIVAL TIME: 0720

DEPARTURE TIME: 1645

FIELD HEALTH & SAFETY REPORT

JOB Blair Backup.

LOCATION Taylor Way, Tacoma, WA

CLIENT Port of Tacoma

FIELD REPRESENTATIVE Grant Knechtel PROJECT MANAGER ~~John Verduin~~ Gary Horvitz

FIELD H&S MANAGER Grant Knechtel PROJECT H&S MANAGER John Verduin

NAMES OF PERSONNEL ON SITE Grant Knechtel

SITE ACTIVITIES observe contractors activities including laying geotextile, placing BUFFER & COVER

POTENTIAL HAZARDS Arsenic, & Chromium & cPAH in site soils - hazard by breathing dust, ingestion or direct contact

HAZARD CONTROL USED Engineering controls - separation by clean material, no visible dust

PROTECTIVE MEASURES TAKEN rubber boots, std. work uniform

COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT RELATIVE TO EXPLORATION INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION SW

EXPLORATION NO.

NA

HARTCROWSER

JOB NO. 2350-22

DATE 31 March, 1993

S M T (W) Th F S

ARRIVAL TIME: 0730

DEPARTURE TIME: 1600

FIELD HEALTH & SAFETY REPORT

JOB Blair Backup

LOCATION Taylor Way, Tacoma, WA

CLIENT Port of Tacoma

FIELD REPRESENTATIVE Grant Kuechtel PROJECT MANAGER Garry Howitz

FIELD H&S MANAGER Grant Kuechtel PROJECT H&S MANAGER John Verduin

NAMES OF PERSONNEL ON SITE Grant Kuechtel

SITE ACTIVITIES observe Port's contractor's work including placement of imported Sand & Gravel cover

POTENTIAL HAZARDS Arsenic, Chromium & PAH's in site soil - dust inhalation, direct contact and/or ingestion hazard

HAZARD CONTROL USED engineering controls - work done on clean cover with no visible dust

PROTECTIVE MEASURES TAKEN rubber boots, std. work uniform

COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT RELATIVE TO EXPLORATION
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION

EXPLORATION NO.

HARTCROWSER

JOB NO. 2350-22

DATE 30 March, 1993

S M (T) W Th F S

ARRIVAL TIME: 0720

DEPARTURE TIME: 1600

FIELD HEALTH & SAFETY REPORT

JOB Blair Backup

LOCATION Taylor Way, Tacoma, WA

CLIENT Port of Tacoma

FIELD REPRESENTATIVE Grant Fuechtel PROJECT MANAGER Gerry Horvitz

FIELD H&S MANAGER Grant Fuechtel PROJECT H&S MANAGER John Verduin

NAMES OF PERSONNEL ON SITE Grant Fuechtel

SITE ACTIVITIES Observe Port's contractor placing clean S&G cover over site soils

POTENTIAL HAZARDS Chromium, Arsenic & cPAH in site soils - dust inhalation and direct contact hazard

HAZARD CONTROL USED Engineering controls - separation from site soils, no visible dust

PROTECTIVE MEASURES TAKEN rubber boots, std. work uniform

COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT RELATIVE TO EXPLORATION
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION

EXPLORATION NO.

HARTCROWSER

JOB NO. 2350-22

DATE 29 March, 1993

S (M) T W Th F S

ARRIVAL TIME: 0630

DEPARTURE TIME: 1600

FIELD HEALTH & SAFETY REPORT

JOB Blair Backup

LOCATION Taylor Way, Tacoma, WA

CLIENT Port of Tacoma

FIELD REPRESENTATIVE Grant Enechted PROJECT MANAGER Garry Horvitz

FIELD H&S MANAGER Grant Enechted PROJECT H&S MANAGER John Verduin

NAMES OF PERSONNEL ON SITE Grant Enechted

SITE ACTIVITIES Observe Port's contractor's work including - placement of imported cover material over site soils

POTENTIAL HAZARDS Arsenic, Chromium, cPAH in site soils - dust inhalation and direct contact hazards

HAZARD CONTROL USED eng. controls - no visible dust, physical separation by clean cover

PROTECTIVE MEASURES TAKEN rubber boots, standard work uniform

COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT RELATIVE TO EXPLORATION
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION SW

EXPLORATION NO.

NA

HARTCROWSER

JOB NO. 2350-22

DATE 26 March, 1993

S M T W Th (F) S

ARRIVAL TIME: 0710

DEPARTURE TIME: 1640

FIELD HEALTH & SAFETY REPORT

JOB Blair Backup

LOCATION Taylor Way, Tacoma, WA.

CLIENT Port of Tacoma

FIELD REPRESENTATIVE Grant Knechtel PROJECT MANAGER Gary Horwitz

FIELD H&S MANAGER Grant Knechtel PROJECT H&S MANAGER John Verduin

NAMES OF PERSONNEL ON SITE Grant Knechtel

SITE ACTIVITIES observe Port's contractor's work - installing storm drain, placing Sand & Gravel COVER

POTENTIAL HAZARDS Arsenic, Chromium, cPAH (dust inhalation & direct contact)

HAZARD CONTROL USED Engineering controls - physical separation by clean FILL, no visible dust

PROTECTIVE MEASURES TAKEN rubber boots & std. work uniform

COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT RELATIVE TO EXPLORATION
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION

EXPLORATION NO.

NA

HARTCROWSER

JOB NO. 2350-22

DATE 25 March, 1993

S M T W (Th) F S

ARRIVAL TIME: 0730

DEPARTURE TIME: 1300

FIELD HEALTH & SAFETY REPORT

JOB Blair Backup

LOCATION Taylor Way, Tacoma, WA.

CLIENT Port of Tacoma

FIELD REPRESENTATIVE Grant Knechtel PROJECT MANAGER Garry Horvitz

FIELD H&S MANAGER Grant Knechtel PROJECT H&S MANAGER John Verduin

NAMES OF PERSONNEL ON SITE Grant Knechtel

SITE ACTIVITIES observe work of Port's contractor - grading (cover placement) and installing storm drain

POTENTIAL HAZARDS Chromium, Arsenic, CPAH (dust in halation & direct contact)

HAZARD CONTROL USED engineering controls i.e. separation by clean FILL, no visible dust

PROTECTIVE MEASURES TAKEN rubber boots & std. work uniform

COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT RELATIVE TO EXPLORATION
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION NW

EXPLORATION NO.

NA

HARTCROWSER

JOB NO. 2365-22

DATE 24 March, 1993

S M T (W) Th F S

ARRIVAL TIME: 0730

DEPARTURE TIME: 1630

FIELD HEALTH & SAFETY REPORT

JOB Blair Backup

LOCATION Taylor Ave, Tacoma, WA.

CLIENT Port of Tacoma

FIELD REPRESENTATIVE Grant Knechtel PROJECT MANAGER John Verduin

FIELD H&S MANAGER Grant Knechtel PROJECT H&S MANAGER Gerry Hornitz

NAMES OF PERSONNEL ON SITE Grant Knechtel

SITE ACTIVITIES observe contractor's work: install storm drain, move stockpiled soil, import clean SAND & GRAVEL

POTENTIAL HAZARDS Arsenic, Chromium, cPAH (all inhalation (dust) hazard or contact hazard

HAZARD CONTROL USED engineering controls- no visible dust, separation by clean Fill

PROTECTIVE MEASURES TAKEN rubber boots, std. work uniform

COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT RELATIVE TO EXPLORATION INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION variable SW - NW

EXPLORATION NO.

NA

HARTCROWSER

JOB NO. 2350-22

DATE 23 March, 1993

S M (T) W Th F S

ARRIVAL TIME: 0730

DEPARTURE TIME: 1600

FIELD HEALTH & SAFETY REPORT

JOB Blair Backup

LOCATION Taylor Ave., Tacoma, WA.

CLIENT Port of Tacoma

FIELD REPRESENTATIVE Grant Knechtel PROJECT MANAGER Garry Horvitz

FIELD H&S MANAGER Grant Knechtel PROJECT H&S MANAGER John Verduin

NAMES OF PERSONNEL ON SITE Grant Knechtel

SITE ACTIVITIES observe contractor's work as on previous reports, sample stockpiled material in sandblast Grit Area

POTENTIAL HAZARDS Arsenic, Chromium, CPAH, Hydrocarbons (stockpile sampling only)

HAZARD CONTROL USED stockpile sampling - enhanced level D PPE, rest of day - engineering controls (separation by clean Fill, no visible dust)

PROTECTIVE MEASURES TAKEN PPE for stockpile sampling - Tyvek, scorpio gloves taped @ wrist, rubber boots, eye protection, ½ face resp. w/combo carts.

COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT RELATIVE TO EXPLORATION
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION S - SW variable

EXPLORATION NO.

NA

HARTCROWSER

JOB NO. 2550-22

DATE 22 Mar Ch, 1993

S (M) T W Th F S

ARRIVAL TIME: 0720

DEPARTURE TIME: 1550

FIELD HEALTH & SAFETY REPORT

JOB Blair Backup

LOCATION Taylor Ave., Tacoma, WA.

CLIENT Port of Tacoma

FIELD REPRESENTATIVE Grant Knechtel PROJECT MANAGER Gary Horvitz

FIELD H&S MANAGER Grant Knechtel PROJECT H&S MANAGER John Verduin

NAMES OF PERSONNEL ON SITE Grant Knechtel

SITE ACTIVITIES observation of Port's contractor activities. Placement of S&G COVER, INSTALLING Storm Drain

POTENTIAL HAZARDS Arsenic, Chromium, CPAH — all contact & dust inhalation hazards

HAZARD CONTROL USED heavy rain - no dust - HC personnel always on clean FILL placed over site soils

PROTECTIVE MEASURES TAKEN Rubber Boots, Std. Work Uniform

COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT ~~RELATIVE TO EXPLORATION~~
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION South

EXPLORATION NO.

NA

HARTCROWSER

JOB NO. 2350-22

DATE 19 March, 1993

S M T W Th (F) S

ARRIVAL TIME: 0715

DEPARTURE TIME: 1615

FIELD HEALTH & SAFETY REPORT

JOB Blair Backup

LOCATION Taylor Ave., Tacoma, WA.

CLIENT Port of Tacoma

FIELD REPRESENTATIVE Grant Knechtel PROJECT MANAGER Garry Howitz

FIELD H&S MANAGER Grant Knechtel PROJECT H&S MANAGER John Verduin

NAMES OF PERSONNEL ON SITE Grant Knechtel

SITE ACTIVITIES observe Port's contractor's work including grading & storm drain installation

POTENTIAL HAZARDS Chromium, Arsenic & CPAH - inhalation (dust) & contact

HAZARD CONTROL USED engineering controls - separation from site soils by clean imported fill - no dust (wet conditions)

PROTECTIVE MEASURES TAKEN rubber boots, std. work uniform

COMMENTS OR OBSERVATIONS contractor placed s/f cover SW site corner, started storm drain near SE site corner

SKETCH POSITION OF EQUIPMENT RELATIVE TO EXPLORATION
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION South

EXPLORATION NO._____

NA

HARTCROWSER

JOB NO. 2350-22

DATE 18 March 1993

S M T W (Th) F S

ARRIVAL TIME: 0715

DEPARTURE TIME: 1615

FIELD HEALTH & SAFETY REPORT

JOB Blair Backup

LOCATION Taylor Ave, Tacoma, WA.

CLIENT Port of Tacoma

FIELD REPRESENTATIVE Grant Knechtel PROJECT MANAGER Garry Horvitz

FIELD H&S MANAGER Grant Knechtel PROJECT H&S MANAGER John Verduin

NAMES OF PERSONNEL ON SITE Grant Knechtel

SITE ACTIVITIES observation of grading by Port's contractor

POTENTIAL HAZARDS site soils - Chromium & Arsenic, CPAH - inhalation & skin contact

HAZARD CONTROL USED engineering controls - work performed on top of clean fill placed over site soils

PROTECTIVE MEASURES TAKEN rubber boots, standard work uniform

COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT RELATIVE TO EXPLORATION INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION South

EXPLORATION NO.

HARTCROWSER

JOB NO. 3350-12

DATE 17 March 1993

S M T W Th F S

ARRIVAL TIME: 0740

DEPARTURE TIME: 0840

FIELD HEALTH & SAFETY REPORT

JOB Blair Backup

LOCATION Taylor Ave, Tacoma WA.

CLIENT Port of Tacoma

FIELD REPRESENTATIVE Grant Guechtel PROJECT MANAGER Garry Horvitz

FIELD H&S MANAGER Grant Guechtel PROJECT H&S MANAGER John Verduin

NAMES OF PERSONNEL ON SITE Grant Guechtel

SITE ACTIVITIES No site activities today

POTENTIAL HAZARDS

HAZARD CONTROL USED

PROTECTIVE MEASURES TAKEN

COMMENTS OR OBSERVATIONS

SKETCH POSITION OF EQUIPMENT RELATIVE TO EXPLORATION
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION South

EXPLORATION NO.

HARTCROWSER

JOB NO. 2340-22

DATE 16 March, 1993

S M T W Th F S

ARRIVAL TIME: 0715

FIELD HEALTH & SAFETY REPORT

DEPARTURE TIME: 1645

JOB Blair Backup

LOCATION Tacoma, WA

CLIENT Port of Tacoma

FIELD REPRESENTATIVE Grant Kuechtel PROJECT MANAGER Gary Horwitz

FIELD H&S MANAGER Grant Kuechtel PROJECT H&S MANAGER John Verduin

NAMES OF PERSONNEL ON SITE Grant Kuechtel

SITE ACTIVITIES grading (placement of sand & gravel Buffer)

POTENTIAL HAZARDS Site soils - Chromium & Arsenic - inhalation & skin contact

HAZARD CONTROL USED engineering controls - all work done on top of clean Buffer material

PROTECTIVE MEASURES TAKEN Rubber boots & std. work uniform

COMMENTS OR OBSERVATIONS HC work involves observation of Port's contractor doing grading work

SKETCH POSITION OF EQUIPMENT RELATIVE TO EXPLORATION
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION South

EXPLORATION NO.

NA

HARTCROWSER

JOB NO. [illegible]

DATE 15 March 1993

S (M) T W Th F S

ARRIVAL TIME: 0710

DEPARTURE TIME: 1640

FIELD HEALTH & SAFETY REPORT

JOB Blair Backup

LOCATION Taylor Ave, Tacoma, WA

CLIENT Port of Tacoma

FIELD REPRESENTATIVE GWK PROJECT MANAGER JRV

FIELD H&S MANAGER GWK PROJECT H&S MANAGER JRV

NAMES OF PERSONNEL ON SITE GWK

SITE ACTIVITIES observe contractor's grading activities

POTENTIAL HAZARDS As, Cr in covered FILL (inhalation)

HAZARD CONTROL USED Engineering Controls (no direct contact, no dust)

PROTECTIVE MEASURES TAKEN Rubber boots & std. work uniform

COMMENTS OR OBSERVATIONS contractor placing clean cover & buffer atop site soils. no equipment or personnel contact w/ soils

SKETCH POSITION OF EQUIPMENT RELATIVE TO EXPLORATION
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION

EXPLORATION NO.

HARTCROWSER

JOB NO. 3350-22

DATE 12 March, 1993

S M T W Th (F) S

ARRIVAL TIME: 0715

DEPARTURE TIME: 1625

FIELD HEALTH & SAFETY REPORT

JOB Blair Backup

LOCATION Taylor Ave, Tacoma, WA

CLIENT Port of Tacoma

FIELD REPRESENTATIVE GWK PROJECT MANAGER JRV

FIELD H&S MANAGER GWK PROJECT H&S MANAGER JRV

NAMES OF PERSONNEL ON SITE ~~Grant Buechtel~~

SITE ACTIVITIES grading by port's contractor - observation of

POTENTIAL HAZARDS As & Cr in covered soil (inhalation)

HAZARD CONTROL USED eng. controls. no contact

PROTECTIVE MEASURES TAKEN rubber boots, std. work uniform

COMMENTS OR OBSERVATIONS contractor's work atop imported "clean" FILL

SKETCH POSITION OF EQUIPMENT RELATIVE TO EXPLORATION
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION

North, shifted south in late A.M.

EXPLORATION NO.

HARTCROWSER

JOB NO. 2350-222

DATE 11 March, 1993

S M T W Th F S

ARRIVAL TIME: 0800

FIELD HEALTH & SAFETY REPORT

DEPARTURE TIME: 1710

JOB Blair Backup

LOCATION Taylor Ave., Tacoma, WA

CLIENT Port of Tacoma

FIELD REPRESENTATIVE Grant Knechtel PROJECT MANAGER

FIELD H&S MANAGER Grant Knechtel PROJECT H&S MANAGER

NAMES OF PERSONNEL ON SITE Grant Knechtel

SITE ACTIVITIES observe placement of S&G cover by Port's contractor, perform IPD's as needed

POTENTIAL HAZARDS As & Chromium in covered soil (inhalation hazard)

HAZARD CONTROL USED engineering controls - no exposure as no contact

PROTECTIVE MEASURES TAKEN rubber boots, work uniform

COMMENTS OR OBSERVATIONS contractors work entirely atop imported "clean" FILL

SKETCH POSITION OF EQUIPMENT RELATIVE TO EXPLORATION
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION

North

EXPLORATION NO.

HARTCROWSER

JOB NO. 2356-22

DATE 10 March, 1993

S M T (W) Th F S

ARRIVAL TIME: 1215

DEPARTURE TIME: 1715

FIELD HEALTH & SAFETY REPORT

JOB Blair Backup

LOCATION Taylor Ave, Tacoma, WA

CLIENT Port of Tacoma

FIELD REPRESENTATIVE Grant Knechtel PROJECT MANAGER John Veidnin

FIELD H&S MANAGER Grant Knechtel PROJECT H&S MANAGER

NAMES OF PERSONNEL ON SITE Grant Knechtel

SITE ACTIVITIES observe placement of sand & gravel cover by Port's contractor (RCI)

POTENTIAL HAZARDS Arsenic & Chromium (in soil) PAH in soil (limited area)

HAZARD CONTROL USED engineering controls

PROTECTIVE MEASURES TAKEN rubber boots, work uniform

COMMENTS OR OBSERVATIONS contractors work done entirely on top of "clean" imported Fill placed as COVER

SKETCH POSITION OF EQUIPMENT RELATIVE TO EXPLORATION
INDICATE MONITORING POINT(S) AND PREVAILING WIND DIRECTION

wind = North

EXPLORATION NO.

NA

Appendix F

APPENDIX F
NEW MONITORING WELL LOGS

SOIL SAMPLING SERVICE, INC.

E 4-23-93
OF BORING NO. HC-15-SR WELL ID # START CARD # 042331
RCE Environmental CLIENT JOB # 9335 S.S.S. JOB # W32532A
ATION SE 1/4 NE 1/4 SEC. 35 TOWNSHIP 21N RANGE 3E
Y Tacoma STATE Wash COUNTY Pierce
LLING METHOD 4" Auger DATUM WATER ELEVATION 5'
23 TRUCK # 3 OTHER DATE INSTALLED 4-23-93

IME & CHARGE DISTRIBUTION	TOTAL TIME
LLING	
EWED STANDBY	
N-CREWED STANDBY	
VING	
TALLATION	
ATER	
EAN + PATCH	
DRILL	
AVEL	
OB-DEMOB	
E METHOD	ATTEMPTS
RIVE SAMPLES	
STERBURG	

DRILLER Norman Paulson HOURS 2
HELPER Harold Nisswander 2
HELPER
DRILLER'S SIGNATURE Norman Paulson
The figures hereon agree with my records.
BY
Inspector or Client's Representative

TOTAL FOOTAGE: 8'

SCALE 1"= FEET
PAGE OF

PVC BLANK 1-2"x5'sch.40
PVC SCREEN 1-2"x5'sch 40 .020 slot
MONUMENT TYPE Flush
1-2"x4" Threaded End Cap
1-2" Easy Seal
1- Sand
1- Concrete
1- Bentonite Chips

ANNULUS MATERIAL	AS BUILT	FORMATION DESCRIPTION
Concrete	0	Some Gravel Fill
Bentonite	2	Wood chips Brown Silt
SAND PACK	4	Interbedded Silts
	6	Sands
	8	

COMMENTS

HC-15-SR
8:00-8:15 Having & Set up
8:15-8:30 Drill to 4' No Samples
8:30-8:45 Install
8:45-9:00 Clean + Patch

2:00-2:30 Loading
2:30-3:00 Mob

SOIL SAMPLING SERVICE, INC.

TE 4-23-93
G OF BORING NO. EPA-75R WELL ID # _____ START CARD # 045332
RCI Environmental CLIENT JOB # 9335 S.S.S. JOB # W3253A
CATION SW 1/4 NW 1/4 _____ SEC. 36 TOWNSHIP 21N RANGE 3E
Y Tacoma STATE Wash. COUNTY Pierce
ILLING METHOD 4" Auger DATUM _____ WATER ELEVATION 8'
G # 23 TRUCK # 3 OTHER _____ DATE INSTALLED 4-23-93

TIME & CHARGE DISTRIBUTION	TOTAL TIME
ILLING	
IEWED STANDBY	
ON-CREWED STANDBY	
OVING	
STALLATION	
ATER	
LEAN + PATCH	
EDRILL	
RAVEL	
OB-DEMOB	
LE METHOD	ATTEMPTS
RIVE SAMPLES	
OSTERBURG	

DRILLER Norman Paulson HOURS .75
HELPER Harold Niswander .75
HELPER _____
DRILLER'S SIGNATURE [signature]
The figures hereon agree with my records.
BY _____
Inspector or Client's Representative

TOTAL FOOTAGE: 12

SCALE 1"= _____ FEET
PAGE _____ OF _____

PVC BLANK 1-10'x2" sch.40
PVC SCREEN 1-5'x2" sch.40 .020 slot
MONUMENT TYPE Flush
1-2"x4" Threaded End Cap
1-2" Easy Seal
1- Sand
1- Concrete
2- Bentonite Chips

ANNULUS MATERIAL	AS BUILT	FORMATION DESCRIPTION
Concrete	0	Sand + Gravel Fill
Bentonite	2	Wood Chips Brown Fill
SAND PACK	4	Interbedded Silts + SAND
	6	
	8	
	10	
	12	

COMMENTS

EPA-75R

9:00-9:15 Drill to 12' No Samples
9:15-9:30 Install
9:30-9:45 Clean + Patch

SOIL SAMPLING SERVICE, INC.

TE 9-23-93

G OF BORING NO. HC-11SR WELL ID # START CARD # 049332

RCI Environmental CLIENT JOB # 9335 S.S.S. JOB # W3253A

CATION SW 1/4 NW 1/4 SEC. 36 TOWNSHIP 21N RANGE 3E

Y Tacoma STATE Wash COUNTY Pierce

ILLING METHOD 4" Auger DATUM WATER ELEVATION 5'

G # 23 TRUCK # 3 OTHER DATE INSTALLED 9-23-93

TIME & CHARGE DISTRIBUTION	TOTAL TIME
RILLING	
REWED STANDBY	
ON-CREWED STANDBY	
OVING	
STALLATION	
'ATER	
LEAN + PATCH	
EDRILL	
RAVEL	
MOB-DEMOB	
S LE METHOD	ATTEMPTS
DRIVE SAMPLES	
OSTERBURG	

DRILLER Norman Paulson HOURS .75

HELPER Harold Niswander .75

HELPER

DRILLER'S SIGNATURE [signature]

The figures hereon agree with my records.

BY

Inspector or Client's Representative

TOTAL FOOTAGE 8'

SCALE 1"= FEET

PAGE OF

PVC BLANK 1-5'x2" sch. 40

PVC SCREEN 1-5'x2" sch 40 .020 slot

MONUMENT TYPE Flush

1-2"x4" Threaded End Cap

1-2" Easy Seal

1-Sand

1-Concrete

1-Bentonite Chips

ANNULUS MATERIAL	AS BUILT	FORMATION DESCRIPTION
Concrete	0	Sand + Gravel Fill
Bentonite	2	
SAND PACK	4	Interbedded Silts + SAND
	6	
	8	

COMMENTS

HC-11SR

9:45-10:00 Drill to 8' No Samples

10:00-10:15 Install

10:15-10:30 Clean & Patch

SOIL SAMPLING SERVICE, INC.

DATE 8-23-93
LOG OF BORING NO. EPA-9SR WELL ID # _____ START CARD # 647332
CLIENT RCI Environmental CLIENT JOB # 9335 S.S.S. JOB # W3253A
LOCATION SW 1/4 NW 1/4 _____ SEC. 36 TOWNSHIP 21N RANGE 3E
CITY Tacoma STATE Wash COUNTY Pierce
DRILLING METHOD 4" Auger DATUM _____ WATER ELEVATION 8'
RIG # 23 TRUCK # 3 OTHER _____ DATE INSTALLED 8-23-93

TIME & CHARGE DISTRIBUTION	TOTAL TIME
DRILLING	
CREWED STANDBY	
NON-CREWED STANDBY	
MOVING	
INSTALLATION	
WATER	
CLEAN + PATCH	
REDRILL	
TRAVEL	
MOB-DEMOB	
SAMPLE METHOD	ATTEMPTS
DRIVE SAMPLES	
OSTERBURG	

DRILLER Norman Paulson HOURS .75
HELPER Harold Niswander .75
HELPER _____
DRILLER'S SIGNATURE Norman L. Paulson
The figures hereon agree with my records.
BY _____
Inspector or Client's Representative

TOTAL FOOTAGE: 12

SCALE 1"= _____ FEET
PAGE _____ OF _____

PVC BLANK 1-10'x2" sch. 40
PVC SCREEN 1-5'x2" sch. 40 .020 slot
MONUMENT TYPE Flush
1-2"x4" Threaded End Cap
1-2" Easy Seal
1- Sand
1- Concrete
3- Bentonite Chips

ANNULUS MATERIAL	AS BUILT	FORMATION DESCRIPTION
Concrete	0	Sand & Gravel Fill
Bentonite	2	Wood Chips Brown Silt
	4	Interbedded
SAND	6	Silts
PACK	8	+
	10	Sand
	12	

COMMENTS

EPA-9SR 9SR

10:30-10:45 Drill to 11' No Samples
10:45-11:00 Install
11:00-11:15 Clean & Patch

SOIL SAMPLING SERVICE, INC.

SEP 14 1993

TE 8-23-93

G OF BORING NO. HC-26S WELL ID # START CARD # 045332

T RCI Environmental CLIENT JOB # 9335 S.S.S. JOB # W3253A

CATION SW 1/4 NW 1/4 SEC. 36 TOWNSHIP 21N RANGE 3E

Y Tacoma STATE Wash. COUNTY Pierce

ILLING METHOD 4" Auger DATUM WATER ELEVATION 5'

G # 23 TRUCK # 3 OTHER DATE INSTALLED 8-23-93

TIME & CHARGE DISTRIBUTION	TOTAL TIME
RILLING	
REWED STANDBY	
ON-CREWED STANDBY	
OVING	
ISTALLATION	
ATER	
LEAN + PATCH	
EDRILL	
RAVEL	
MOB DEMOB	
S LE METHOD	ATTEMPTS
DRIVE SAMPLES	
OSTERBURG	

DRILLER Norman Paulson HOURS 3.25

HELPER Harold Niswander 3.25

HELPER

DRILLER'S SIGNATURE Norman L. Paulson

The figures hereon agree with my records.

BY

Inspector or Client's Representative

TOTAL FOOTAGE 8'

SCALE 1"= FEET

PAGE OF

PVC BLANK 1-5'x2" sch. 40

PVC SCREEN 1-5'x2" sch 40 .020 Slot

MONUMENT TYPE Flush

1-2"x4" Threaded End Cap

1-2" Easy Seal

1- Sand

1- Concrete

1- Bentonite Chips

ANNULUS MATERIAL	AS BUILT	FORMATION DESCRIPTION
Concrete	0	Sand + Gravel Fill
Bentonite	2	
SAND PACK	4	Interbedded Silts + Sand
	6	
	8	

COMMENTS

HC-26S

11:15-11:30 Drill to 8'

11:30-11:45 Install

11:45-12:00 Clean + Patch

12:00-1:00 Demob

1:00-2:30 Unload

900

APPENDIX G
GRAIN SIZE, PROCTOR, AND FIELD DENSITY TEST RESULTS OF IMPORT SOIL MATERIAL

APPENDIX G
GRAIN SIZE, PROCTOR, AND FIELD DENSITY TEST RESULTS OF IMPORT SOIL MATERIAL

This appendix presents the results of conformance testing on import soil materials. This appendix specifically addresses the following import soil types:

- Sand and Gravel Cover;
- Sand and Gravel Buffer;
- Base Course; and
- Wearing Course.

The following tests were completed on all or some of the above soil materials:

- Proctor Analysis per ASTM D 1557;
- Sieve Analysis per ASTM D 422; and
- In-place density using nuclear densometer per ASTM D 2922.

Frequency of testing was dictated by the Construction Quality Assurance Plan as presented in Appendix B of the Cleanup Report. Tables within each of the four subsections outline the tests completed, when they were completed, and their identification number. After the table are the test data.

ATTACHMENT G-1
SAND AND GRAVEL COVER MATERIAL

Sand and Gravel Cover Material

Table G-1a - Summary of Proctor Analysis (ASTM D 1557) on Sand and Gravel Cover

Quantity Unit	Test Completed After Import of No. of Units	Date Test Completed	Test Number
Ton	0	3/12/93	C1
	2,000	3/19/93	C2
	4,000	3/15/93	C3
	8,000	3/22/93	C5

Table G-1b - Summary of Grain Size Analysis (ASTM D 422) on Sand and Gravel Cover

Quantity Unit	Test Completed After Import of No. of Units	Date Test Completed	Test Number
Ton	0	3/12/93	C1
	2,000	3/19/93	C2
	4,000	3/15/93	C3
	6,000	3/16/93	C4
	8,000	3/19/93	C5
	10,000	3/22/93	C6
	20,000	3/26/93	C11
	30,000	3/31/93	C17
	40,000	4/14/93	C21

Table G-1c - Summary of In-place Density Tests (ASTM D 2922) on Sand and Gravel Cover

Quantity Unit	Test Completed After Placement of No. of Units	Date Test Completed	Test Number
Square Yard (1st Lift)	3,000	3/11/93	DT-1
	6,000	3/11/93	DT-7
	9,000	3/12/93	DT-9
	12,000	3/15/93	DT-10
	15,000	3/18/93	DT-14
	18,000	3/19/93	DT-18
	21,000	3/22/93	DT-20
	24,000	3/29/93	DT-28
	27,000	3/29/93	DT-30
	30,000	3/30/93	DT-33
	33,000	3/30/93	DT-35
	36,000	5/4/93	DT-53
Square Yard (Top Lift)	3,000	3/11/93	DT-3
	6,000	3/11/93	DT-6
	9,000	3/18/93	DT-17
	12,000	3/19/93	DT-19
	15,000	3/25/93	DT-22
	18,000	3/25/93	DT-23
	21,000	3/26/93	DT-25
	24,000	3/29/93	DT-29
	27,000	3/30/93	DT-32
	30,000	3/30/93	DT-34
	33,000	5/7/93	DT-58
	36,000	5/6/93	DT-54

RECEIVED
MAR 23 1993

PACIFIC TESTING LABORATORIES

EXECUTIVE OFFICES
3257 16th Ave. W. • Seattle, WA 98119
(206) 282-0688 • FAX (206) 282-0710

EASTSIDE DIVISION
11824 North Creek Parkway N #101 • Bothell, WA 98011
(206) 485-4234 • 451-8436 • FAX (206) 485-4611

TACOMA DIVISION
2402 Pacific Highway E • Tacoma, WA 98424
(206) 922-9299 • FAX (206) 922-1512

PENINSULA DIVISION
10726 Silverdale Way N W #105 • Silverdale, WA 98383
(206) 698-6650 • FAX (206) 698-6648

March 22, 1993
Certificate No. 9303-6550

Curt Ratcliffe
Port of Tacoma
P.O. Box 1837
Tacoma, WA 98401-1387

Subject: Soil Analysis

Dear Mr. Ratcliffe

As requested and agreed, Pacific Testing Laboratories analyzed the Cover Material sampled for the Blair Waterway. Material was tested in accordance with ASTM D-1557. Please refer to the test results shown below.

Sample Number	Test Results		Oversized Corrected		Passing Specs.	Material Discription (Cover Material)	HC No.
	Max. Dry Density (pcf)	Opt. Moisture (%)	Max. Dry Density (pcf)	Opt. Moisture (%)			
967	124.8	2.7%	124.8	2.7%	Yes	Fine Sand w/ Gravel	C-1
970	134.1	6.9%	137.4	6.3%	No	Brn. Sand and Gravel w/ trace Silt	C-2

See attached for graphic results.

This report is provided for the information of the client only. The reproduction of this report, by any method, and its transmittal to a third party, by any means, except in full, without the written permission of Pacific Testing Laboratories, is prohibited.

Thank you for using Pacific Testing Laboratories. If you have any questions, please contact us at (206) 922-9299.

Reviewed by: Dennis Rousey, Manager Tacoma Division

Sincerely,

George Gergis, Assistant Manager
Tacoma Division

JB/lr

PROCTOR TEST REPORT

Certificate No.: 9303-6550
Client: Port of Tacoma
Location: Cover Material

LR No.:

Date: 3-16-1993
Test #1
Job #710

Supplier: Lyold's Milton
Contractor: RCI
Sample Pick-up Date: 3-10-1993

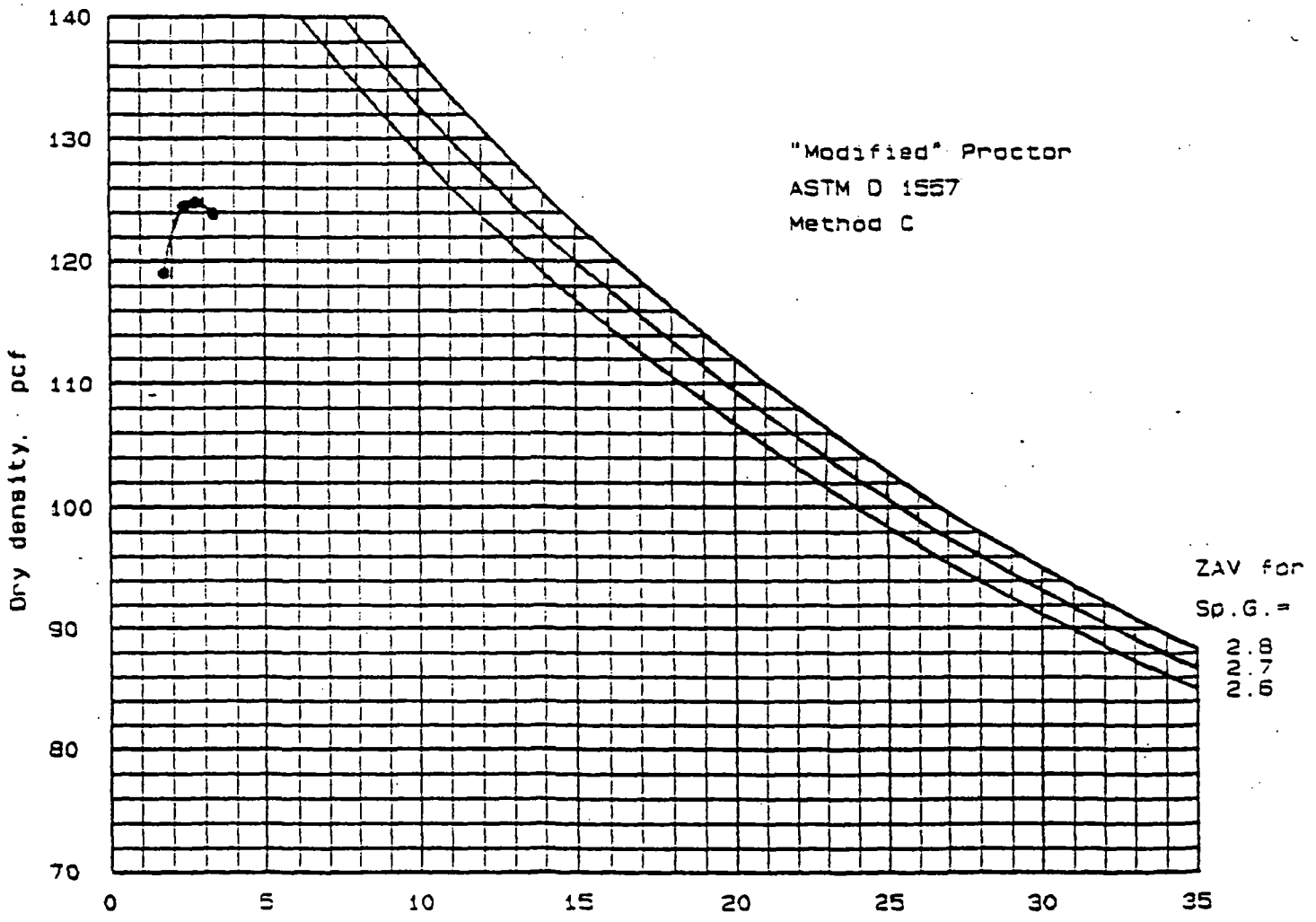
Elev/Depth:
Remarks:
Sample #9303-6550-967

MATERIAL DESCRIPTION

C-1

Description: Fine Sand With Gravel
Classifications: USCS: AASHTO:
Nat. Moist. = %
Sp.G. =
Liquid Limit =
Plasticity Index =
%> No. 4 = 58.4%
%< No. 200 = 1.8%

TEST RESULTS
Maximum dry density = 124.8 pcf
Optimum moisture = 2.7 %

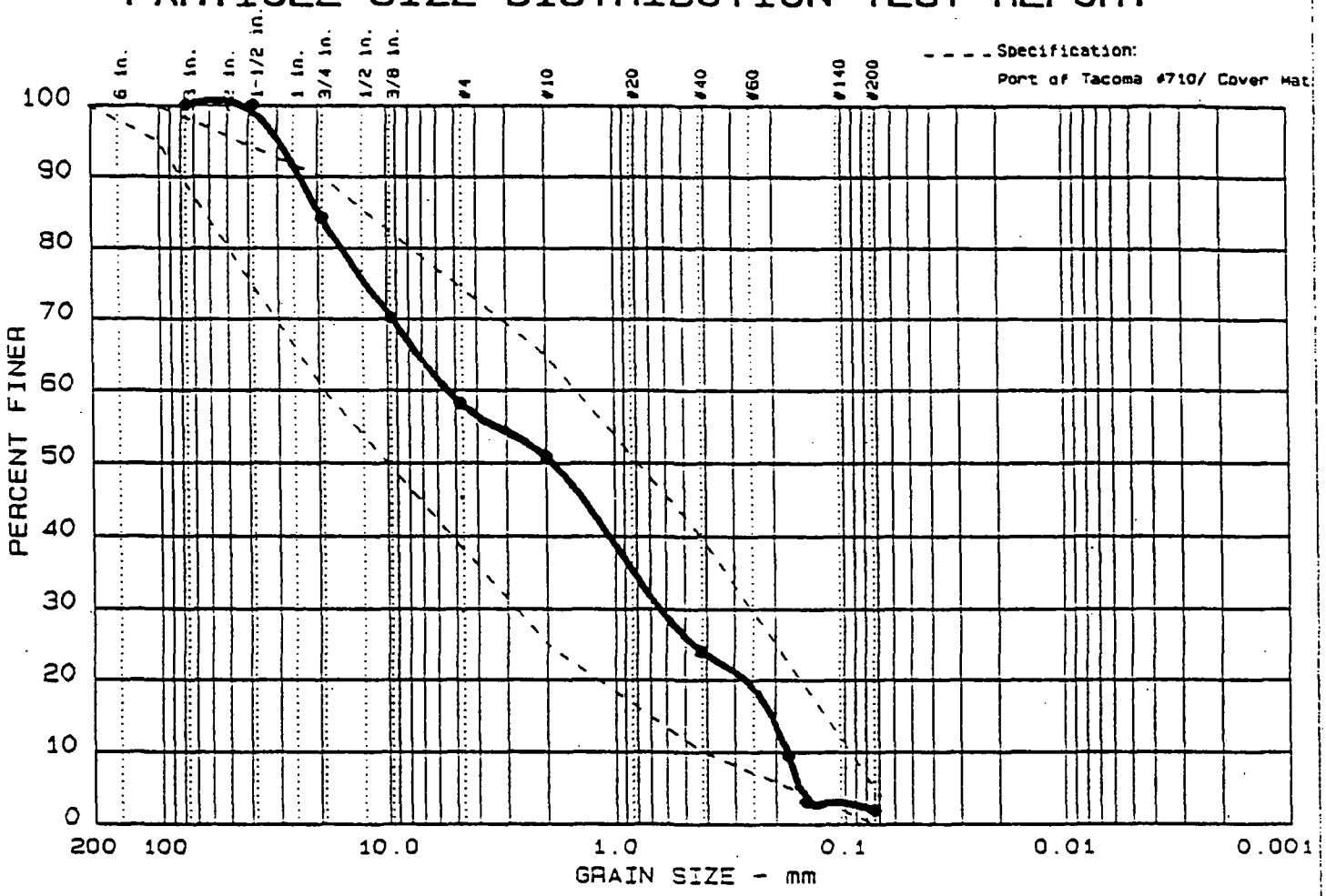


Tested by: J. Bekey
Date: 3-13-1993
Checked by: J. Graham
Date: 3-16-1993

PACIFIC TESTING LABORATORIES

Figure No. ____

PARTICLE SIZE DISTRIBUTION TEST REPORT



	%+75 mm	% GRAVEL	% SAND	% SILT	% CLAY	USCS
●	0.0	41.9	56.3	1.8		SP

SIEVE inches size	PERCENT FINER ●		
3	100.0		
1.5	100.0		
0.75	84.3		
0.375	70.2		
	GRAIN SIZE		
D_{60}	5.43		
D_{30}	0.63		
D_{10}	0.18		
	COEFFICIENTS		
C_c	0.41		
C_u	30.3		

SIEVE number size	PERCENT FINER ●		
4	58.1		
10	50.8		
40	24.0		
80	9.4		
100	3.1		
200	1.9		

Sample information:

● Cover Material
Fine Sand with Gravel

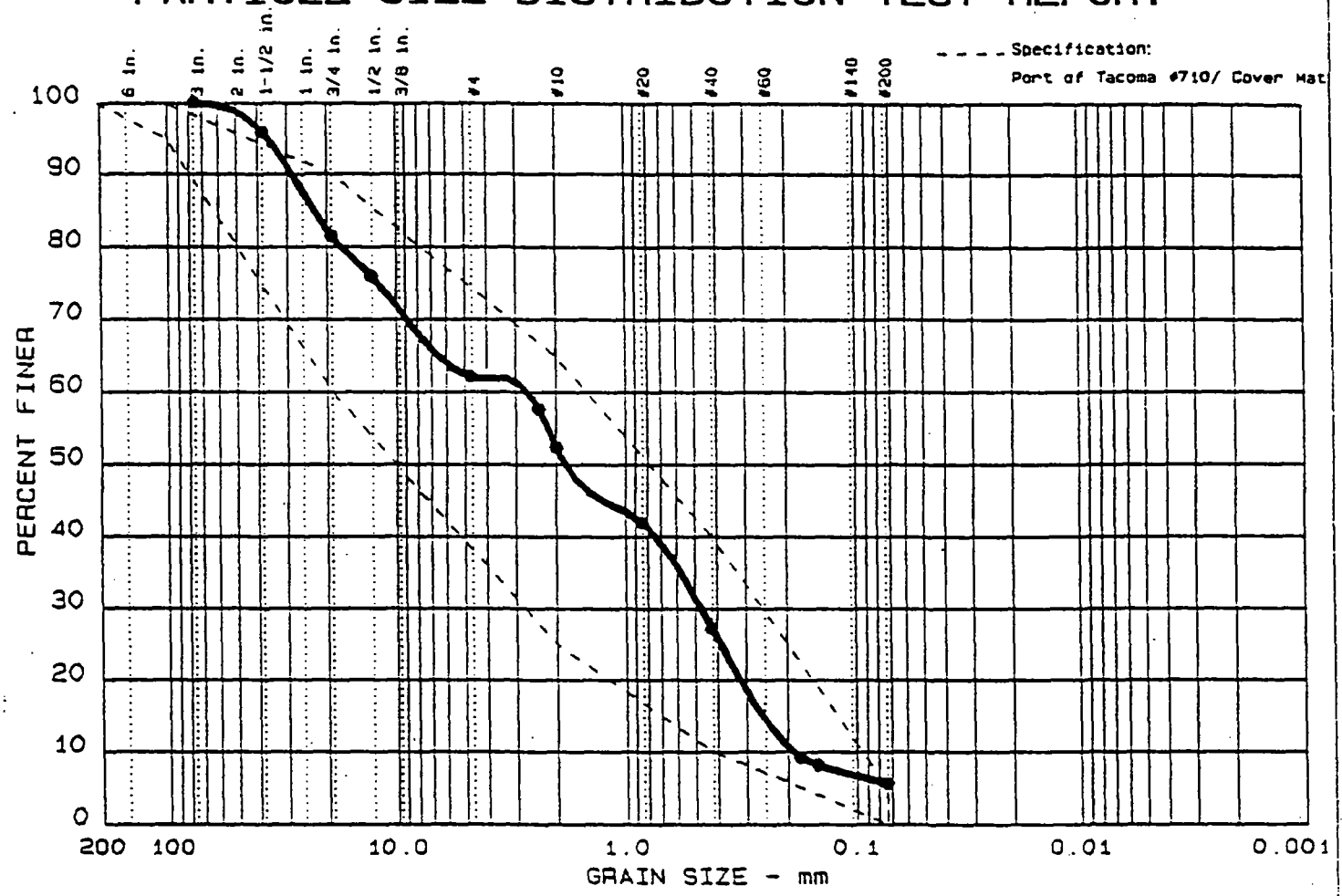
C-1

Tested by: J. Graham
Date: 3-10-1993
Checked by: J. Bekey
Date: 3-11-1993
Sample #9303-6550-967

PACIFIC TESTING LABORATORIES

Certificate No.: 9303-6550 LR No.:
Client: Port of Tacoma
Job #710
Date: 3-23-1993 Fig. No.

PARTICLE SIZE DISTRIBUTION TEST REPORT



	%+75 mm	% GRAVEL	% SAND	% SILT	% CLAY	USCS
●	0.0	37.9	56.5	5.6		SP-SM

SIEVE inches size	PERCENT FINER ●		
3	100.0		
1.5	95.8		
0.75	81.5		
0.5	75.9		
	GRAIN SIZE		
D_{60}	2.66		
D_{30}	0.47		
D_{10}	0.19		
	COEFFICIENTS		
C_c	0.43		
C_u	14.0		

SIEVE number size	PERCENT FINER ●		
4	62.1		
8	57.6		
10	52.3		
20	41.8		
40	27.2		
80	9.2		
100	8.1		
200	5.6		

Sample information:

● Cover Material
Brn. Snd & Grvl W/Trc Slt.

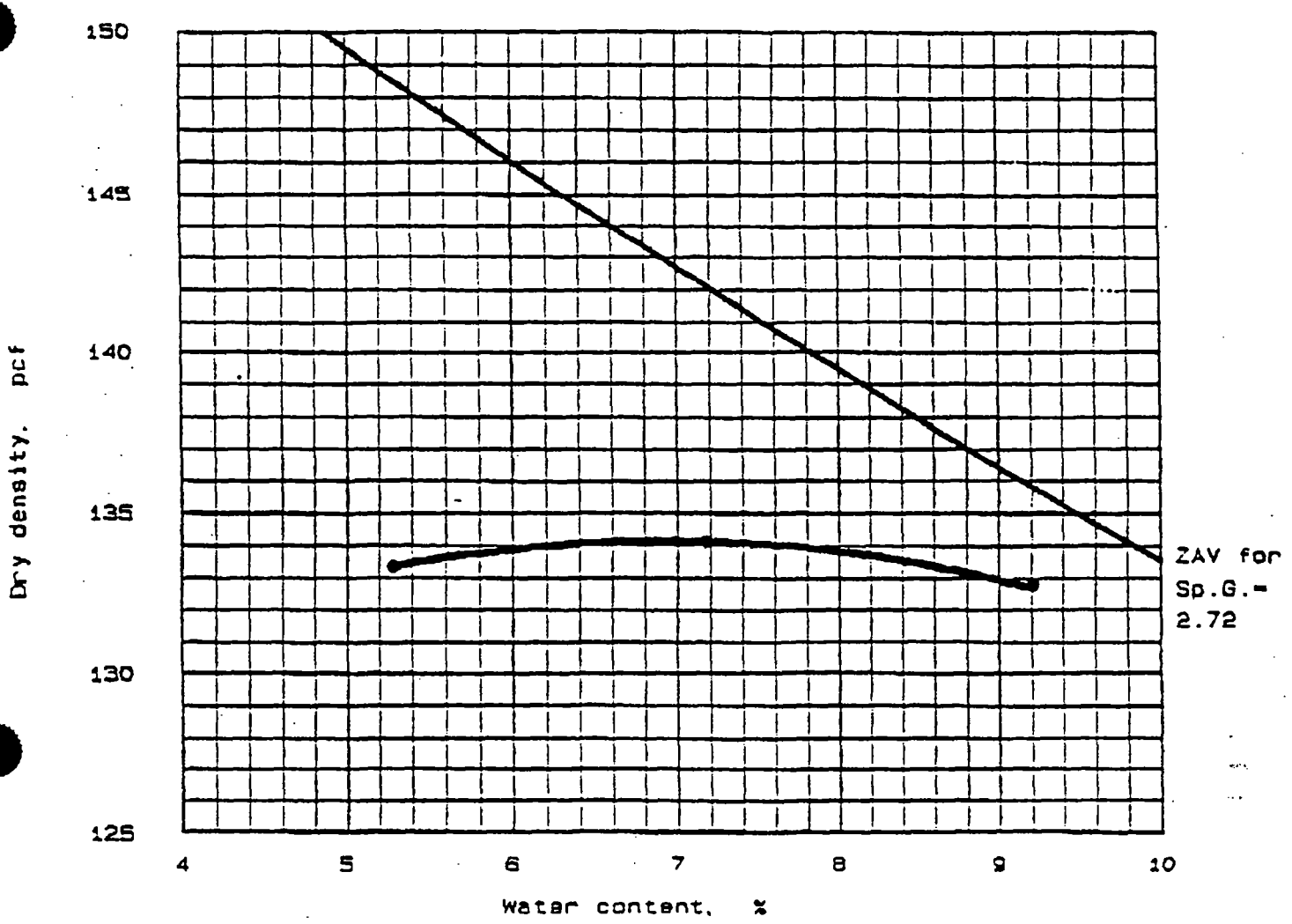
C-2

Tested by: ML
Date: 3-15-1993
Checked by: JSM
Date: 3-15-1993
Sample #9303-6550-970

PACIFIC TESTING LABORATORIES

Certificate No.: 9303-6550 LR No.:
Client: Port of Tacoma
Job #710
Date: 3-23-1993 Fig. No.

PROCTOR TEST REPORT



"Modified" Proctor, ASTM D 1557, Method C

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > No.4	% < No.200
	USCS	AASHTO						
	SP-SM		5.3 %	2.72	NP	NP	37.9 %	5.6 %

TEST RESULTS	MATERIAL DESCRIPTION
Optimum moisture = 6.9 % Maximum dry density = 134.1 pcf	BRWN SND & GRVL TRC SILT Cover Material

Certificate No.: 9303-6550
Client: PORT OF TACOMA
Location: PORT OF TACOMA
SAMPLE F-970
Date: 3-15-1993

LR No.:
Test #2
Job #710
Supplier: Lyold's Milton
Contractor: RCI
Sample Pick-up Date: 3-11-93

Remarks:
CORRECTED PROCTOR: 137.4
CORRECTED MOISTURE: 6.3%

Tested by: ML
Date: 3-15-93
Checked by: JSM
Date: 3-15-93

C-2

PROCTOR TEST REPORT

PACIFIC TESTING LABORATORIES

Figure No. 1

GRAIN SIZE DISTRIBUTION TEST DATA

Test No.: 1

Date: 3-23-1993
Certificate No.: 9303-6550
Client: Port of Tacoma

Supplier: Lyold's Milton
Contractor: RCI

Sample Data

Location of Sample: Cover Material
Sample Description: Fine Sand with Gravel
USCS Class: SP
AASHTO Class:

Liquid limit:
Plasticity index:

Notes

Remarks: Sample #9303-6550-967 Job #710 Sample Pick-up Date: 3-10-1993
Tested by, date: J. Graham, 3-10-1993
Checked by, date: J. Bekey, 3-11-1993
LR No.:
Fig. No.:
Specification: Port of Tacoma #710/ Cover Mat.

Mechanical Analysis Data

C-1

	Initial
Dry sample and tare=	56.02
Tare =	0.00
Dry sample weight =	56.02

Sample split on number 4 sieve
Split sample data:
Sample and tare = 926.9 Tare = 109.7 Sample weight = 817.2
Cumulative weight retained tare= 0
Tare for cumulative weight retained= 0

Sieve	Cumul. Wt. retained	Percent finer	Specification Limits, percent	Deviation, percent
3 inches	0.00	100.0		
1.5 inches	0.00	100.0		
0.75 inches	8.80	84.3	60.0 to 90.0	
0.375 inches	16.71	70.2		
# 4	23.45	58.1		
# 4	0.00	58.1		
# 10	103.80	50.8	25.0 to 65.0	
# 40	479.90	24.0	10.0 to 40.0	
# 80	684.50	9.4		
# 100	773.20	3.1		
# 200	791.10	1.9	0.0 to 5.0	

Fractional Components

% + 3 in. = 0.0 % GRAVEL = 41.9 % SAND = 56.3
% FINES = 1.8

RECEIVED
MAR 23 1993
ENGINEERING DEPT.

GRAIN SIZE DISTRIBUTION TEST DATA

Test No.: 2

Date: 3-23-1993
Certificate No.: 9303-6550
Client: Port of Tacoma

Supplier: Lyold's Milton
Contractor: RCI

Sample Data

Location of Sample: Cover Material
Sample Description: Brn. Snd & Grvl W/Trc Slt
USCS Class: SP-SM
Liquid limit:
AASHTO Class:
Plasticity index:

Notes

Remarks: Sample #9303-6550-970 Job #710
Sample Pick-up Date: 3-11-1993
Tested by, date: ML,3-15-1993
Checked by, date: JSM,3-15-1993
LR No.:
Fig. No.:
Specification: Port of Tacoma #710/ Cover Mat.

Mechanical Analysis Data

C-2

	Initial
Dry sample and tare=	2386.34
Tare =	0.00
Dry sample weight =	2386.34

Tare for cumulative weight retained= 0

Sieve		Cumul. Wt. retained	Percent finer	Specification Limits, percent	Deviation, percent
3	inches	0.00	100.0		
1.5	inches	99.30	95.8		
0.75	inches	440.90	81.5	60.0 to 90.0	
0.5	inches	575.50	75.9		
# 4		905.40	62.1		
# 8		1011.90	57.6		
# 10		1138.70	52.3	25.0 to 65.0	
# 20		1388.60	41.8		
# 40		1738.10	27.2	10.0 to 40.0	
# 80		2166.50	9.2		
# 100		2192.00	8.1		
# 200		2252.80	5.6	0.0 to 5.0	+ 0.6

Fractional Components

% + 3 in. = 0.0 % GRAVEL = 37.9 % SAND = 56.5
% FINES = 5.6

D85= 22.65 D60= 2.661 D50= 1.820
D30= 0.4677 D15= 0.25645 D10= 0.19011

RECEIVED
MAR 23 1993
ENGINEERING DEPT.

CONSTRUCTION MATERIALS TESTING LABORATORIES, INC.

(CMTL, INC.)
4417 Pacific Highway East
Fife, Washington 98424
(206) 922-0798

RECEIVED
MAR 15 1993
ENGINEERING DEPT.

SOIL/AGGREGATE ANALYSIS REPORT

CLIENT:	Port of Tacoma	DATE:	03-12-93
PROJECT:	BLAIR CLEAN-UP CONTRACT #710	PROJECT NO.:	T-8662
ADDRESS:	N/A	REPORT NO.:	01 HC#: C-3
CONTRACTOR:	RCI Environmental	SAMPLED BY:	D.Smith
MATERIAL TYPE:	COVER MATERIAL	SOURCE:	LIOYD'S PIT (MILTON)
LOCATION SAMPLED:	ON SITE STOCKPILE	LAB.NO.:	3-138 I.D.NO.: #1
TESTS REQESTED:	SIEVE ANALYSIS	TECHNICIAN:	T.Nordhaug

SIEVE ANALYSIS

SIEVE SIZE	% PASSING	SPECIFICATIONS
8"		100
4"	100	95-100
1½"	95.8	
3/4"	82.9	60-90
1/2"	74.2	
3/8"	70.6	
1/4"	63.3	
#4	60.2	
#8	55.7	
#10	54.1	25-65
#16	49.4	
#40	31.7	10-40
#100	9.3	
#200	6.0	0-5

ADDITIONAL DATA

SAND EQUIVALENT:
% MOISTURE:
L.A. ABRASION:
DEGRADATION:
% WOOD WASTE:
LOOSE UNIT WEIGHT:
LIQUID LIMIT:
PLASTIC LIMIT:
PLASTICITY INDEX:
FINENESS MODULUS:
SOIL CLASSIFICATION:

OTHERS:

REMARKS:

TN/fd

CONSTRUCTION MATERIALS TESTING LABORATORIES, INC.

(CMTL, INC.)
A Division of Western Testing Laboratories

4417 Pacific Highway East
Fife, Washington 98424
(206) 922-0798

RECEIVED
MAR 15 1993
ENGINEERING DEPT.

MAXIMUM DENSITY-OPTIMUM MOISTURE DETERMINATION

CLIENT: Port of Tacoma
DATE SAMPLED: 03-12-93
PROJECT: BLAIR CLEAN-UP CONTRACT #710
PROJECT NO.: T-8662
ADDRESS: N/A
PROCTOR NO.: 01
CONTRACTOR: RCI Environmental
REPORT NO.: P-1

HC# C-3

FIELD DATA:

Source of Material: LLOYD'S PIT -MILTON

Location Sampled: ON SITE

LABORATORY DATA:

Maximum Density Dry: 142.4 P.C.F.

Optimum Moisture: 5.4 %

Soil Type & Color: COVER MATERIAL

Test Specifications: ASTM D-1557(D)

Cylinder: 6 "

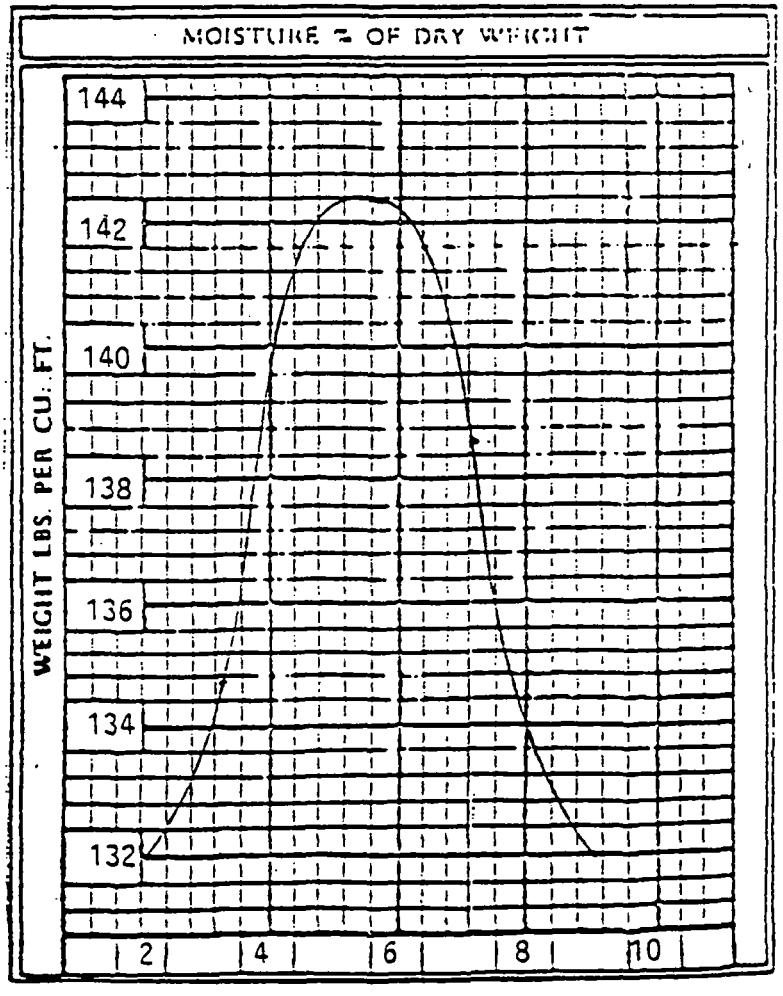
Hammer: 10 lbs.

Drops: 18"

Layers: 5

Blows/Layer: 56

Technician: T.Nordhaug



CONSTRUCTION MATERIALS TESTING LABORATORIES, INC.

(CMTL, INC.)
4417 Pacific Highway East
Fife, Washington 98424
(206) 922-0798

SOIL/AGGREGATE ANALYSIS REPORT

LIENT:	Port of Tacoma	DATE:	03-15-93
ROJECT:	BLAIR CLEAN-UP	PROJECT NO.:	T-8662
DDRESS:	N/A	REPORT NO.:	02 HC#:C-4
ONTRACTOR:	CLIENT	SAMPLED BY:	D.Smith
ATERIAL TYPE:	COVER MATERIAL	SOURCE:	Lloyd's Milton Pit
OCATION SAMPLED:	STOCKPILE	LAB.NO.:	N/A I.D.NO.: #1
ESTS REQESTED:	Sieve Analysis	TECHNICIAN:	T.Nordhaug

SIEVE ANALYSIS

SIEVE SIZE	% PASSING	SPECIFICATIONS
8"		100
4"	100	95-100
2"	96.7	
[illegible]"	95.9	
[illegible]/4"	84.9	60-90
1/2"	77.5	
3/8"	73.1	
1/4"	64.3	
#4	59.1	
#8	54.9	
#10	52.7	25-65
#16	46.0	
#40	26.2	10-40
#100	6.8	
#200	5.0	0-5

ADDITIONAL DATA

SAND EQUIVALENT:
% MOISTURE:
L.A. ABRASION:
DEGRADATION:
% WOOD WASTE:
LOOSE UNIT WEIGHT:
LIQUID LIMIT:
PLASTIC LIMIT:
PLASTICITY INDEX:
FINENESS MODULUS:
SOIL CLASSIFICATION:

OTHERS:

REMARKS: **CONFORMS**

CONSTRUCTION MATERIALS TESTING LABORATORIES, INC.

(CMTL, INC.)
4417 Pacific Highway East
Fife, Washington 98424
(206) 922-0798

C 4

MAXIMUM DENSITY-OPTIMUM MOISTURE DETERMINATION

CLIENT: Port of Tacoma
DATE SAMPLED: 03-15-93
PROJECT: BLAIR CLEAN-UP CONTRACT #710
PROJECT NO.: T-8662
ADDRESS: N/A
REPORT NO.: 02
CONTRACTOR: RCI Environmental
PROCTOR NO.: P-3

FIELD DATA:

SOURCE OF MATERIAL: LIOYD'S MILTON PIT

LOCATION SAMPLED: S.W. HAUL ROAD STOCKPILE.

LABORATORY DATA:

MAXIMUM DENSITY DRY: 140.8 P.C.F.

[illegible]UM MOISTURE: 5.8

SOIL TYPE & COLOR: COVER MATERIAL

TEST SPECIFICATIONS: ASTM D-1557(D)

CYLINDER: 6 "

HAMMER: 10 lbs.

DROPS: 18 "

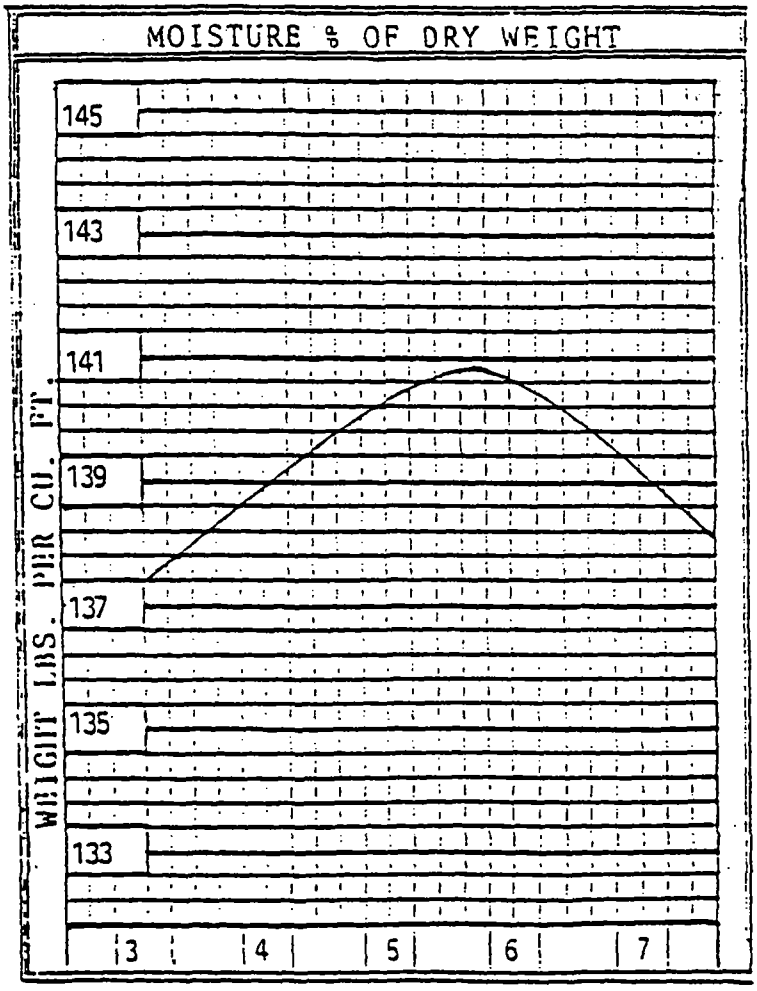
LAYERS: 5

BLOWS/LAYER: 56

TECHNICIAN: T.Nordhaug

SAMPLED BY: D.Smith

REMARKS: N/A



CONSTRUCTION MATERIALS TESTING LABORATORIES, INC.

(CMTL, INC.)
4417 Pacific Highway East
Fife, Washington 98424
(206) 922-0798

SOIL/AGGREGATE ANALYSIS REPORT

HC# C-5

CLIENT:	Port of Tacoma	DATE:	03-18-93
PROJECT:	BLAIR CLEAN-UP CONTRACT #710	PROJECT NO.:	T-8662
ADDRESS:	N/A	REPORT NO.:	
CONTRACTOR:	RCI Environmental	SAMPLED BY:	D.Smith
MATERIAL TYPE:	COVER MATERIAL	SOURCE:	LIOYD'S MILTON PIT
LOCATION SAMPLED:	S.W. HAUL ROAD	LAB.NO.:	I.D.NO.:
TESTS REQESTED:	Sieve Analysis	TECHNICIAN:	T.Nordhaug

SIEVE ANALYSIS

SIEVE SIZE	% PASSING	SPECIFICATIONS
8"		100
4"	100	95-100
1½"	94.0	
1"	84.2	60-90
½"	76.9	
3/8"	73.0	
1/4"	65.4	
#4	61.5	
#8	56.3	
#10	54.2	25-65
#16	48.4	
#40	29.7	10-40
#100	9.1	
#200	6.3	0-5

ADDITIONAL DATA

SAND EQUIVALENT:
% MOISTURE:
L.A. ABRASION:
DEGRADATION:
% WOOD WASTE:
LOOSE UNIT WEIGHT:
LIQUID LIMIT:
PLASTIC LIMIT:
PLASTICITY INDEX:
FINENESS MODULUS:
SOIL CLASSIFICATION:

OTHERS:

REMARKS:

TN/fd

CONSTRUCTION MATERIALS TESTING LABORATORIES, INC.

(CMTL, INC.)
4417 Pacific Highway East
Fife, Washington 98424
(206) 922-0798

C5

MAXIMUM DENSITY-OPTIMUM MOISTURE DETERMINATION

CLIENT: Port of Tacoma
DATE SAMPLED: 03-18-93
PROJECT: BLAIR CLEAN-UP CONTRACT #710
PROJECT NO.: T-8662
ADDRESS: N/A
REPORT NO.: 03
CONTRACTOR: RCI Environmental
PROCTOR NO.: P-5

FIELD DATA:

SOURCE OF MATERIAL: LIOYD'S MILTON PIT

LOCATION SAMPLED: S.W. HAUL ROAD

LABORATORY DATA:

MAXIMUM DENSITY DRY: 142.1 P.C.F.

OPTIMUM MOISTURE: 5.7

SOIL TYPE & COLOR: COVER MATERIAL

TEST SPECIFICATIONS: ASTM D-1557(D)

CYLINDER: 6 "

HAMMER: 10 lbs.

DROPS: 18 "

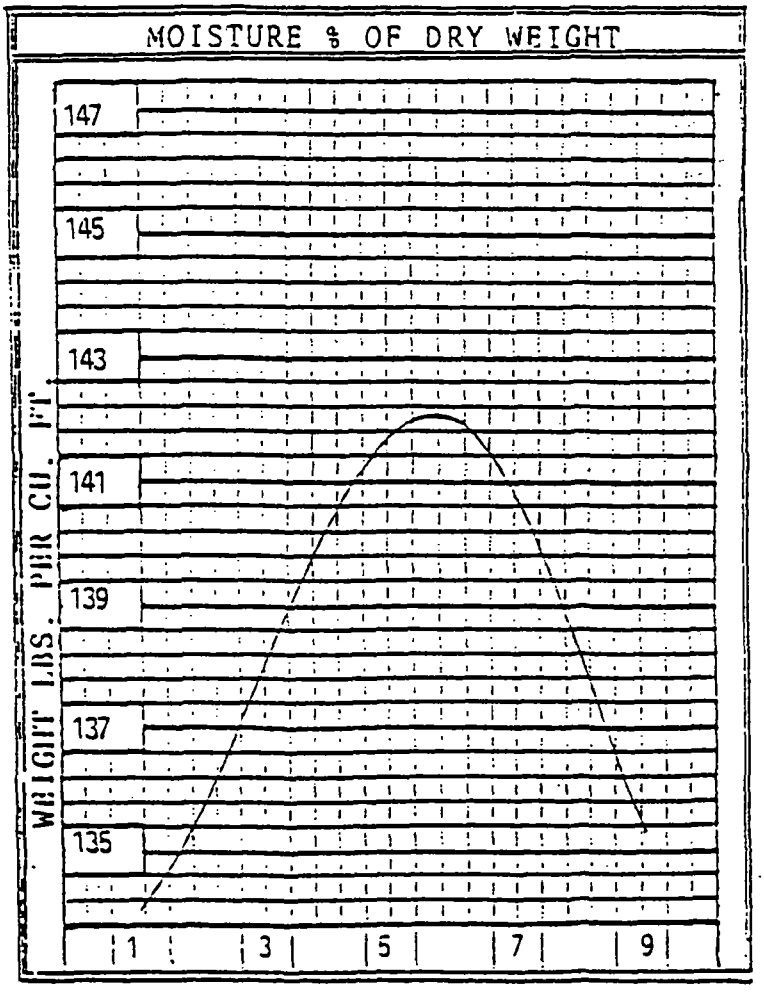
LAYERS: 5

BLOWS/LAYER: 56

TECHNICIAN: T.Nordhaug

SAMPLED BY: D.SMITH

REMARKS: N/A



CONSTRUCTION MATERIALS TESTING LABORATORIES, INC.

(CMTL, INC.)
4417 Pacific Highway East
Fife, Washington 98424
(206) 922-0798

HC # C-6

SOIL/AGGREGATE ANALYSIS REPORT

CLIENT:	Port of Tacoma	DATE:	03-19-93
PROJECT:	BLAIR CLEAN-UP CONTRACT #710	PROJECT NO.:	T-8662
ADDRESS:	N/A	REPORT NO.:	
CONTRACTOR:	RCI Environmental	SAMPLED BY:	CLIENT (Ed)
MATERIAL TYPE:	COVER MATERIAL	SOURCE:	LLOYD'S MILTON PIT
LOCATION SAMPLED:	UNKNOWN	LAB.NO.:	3-169 I.D.NO.: N/A
TESTS REQESTED:	Sieve Analysis	TECHNICIAN:	T.Nordhaug

SIEVE ANALYSIS

SIEVE SIZE	% PASSING	SPECIFICATIONS
8"		100
4"		95-100
[illegible]	100	
[illegible]	91.6	
3/4"	87.9	60-90
1/2"	81.9	
3/8"	76.9	
1/4"	69.7	
#4	64.9	
#8	58.1	
#10	55.8	25-65
#16	50.0	
#40	33.0	10-40 OUT OF SPECS.
#100	11.2	
#200	7.9	0-5

ADDITIONAL DATA

SAND EQUIVALENT:
% MOISTURE:
L.A. ABRASION:
DEGRADATION:
% WOOD WASTE:
LOOSE UNIT WEIGHT:
LIQUID LIMIT:
PLASTIC LIMIT:
PLASTICITY INDEX:
FINENESS MODULUS:
SOIL CLASSIFICATION:

OTHERS:

REMARKS:

TN/fd

CONSTRUCTION MATERIALS TESTING LABORATORIES, INC.

(CMTL, INC.)
4417 Pacific Highway East
Fife, Washington 98424
(206) 922-0798

SOIL/AGGREGATE ANALYSIS REPORT

HC No: C-7

LIENT:	Port of Tacoma	DATE:	03-22-93
ROJECT:	BLAIR CLEAN-UP CONTRACT #710	PROJECT NO.:	T-8662
DDRESS:	N/A	REPORT NO.:	
ONTRACTOR:	RCI Environmental	SAMPLED BY:	D.Smith
ATERIAL TYPE:	COVER MATERIAL	SOURCE:	LIOYD'S MILTON PIT
OCATION SAMPLED:	S.W. HAUL ROAD STOCKPILE	LAB.NO.:	3-172 I.D.NO.: #1
ESTS REQESTED:	Sieve Analysis	TECHNICIAN:	T.Nordhaug

SIEVE ANALYSIS

SIEVE SIZE	% PASSING	SPECIFICATIONS
8"		100
4"		95-100
[illegible]	100	
1½"	97.1	
3/4"	91.2	60-90
1/2"	85.0	
3/8"	81.8	
1/4"	74.6	
#4	70.6	
#8	63.2	
#10	60.2	25-65
#16	52.8	
#40	24.0	10-40
#100	2.0	
#200	1.2	0-5

OUT OF SPECS.

ADDITIONAL DATA

SAND EQUIVALENT:
% MOISTURE:
L.A. ABRASION:
DEGRADATION:
% WOOD WASTE:
LOOSE UNIT WEIGHT:
LIQUID LIMIT:
PLASTIC LIMIT:
PLASTICITY INDEX:
FINENESS MODULUS:
SOIL CLASSIFICATION:

OTHERS:

REMARKS: TAKEN @ 10:30, TWO TRUCKS & TRAILER STOCKPILES.

TN/fd

CONSTRUCTION MATERIALS TESTING LABORATORIES, INC.

(CMTL, INC.)
4417 Pacific Highway East
Fife, Washington 98424
(206) 922-0798

C7

MAXIMUM DENSITY-OPTIMUM MOISTURE DETERMINATION

3/22

CLIENT: Port of Tacoma
DATE SAMPLED: 03-25-93
PROJECT: BLAIR CLEAN-UP CONTRACTL #710
PROJECT NO.: T-8662
ADDRESS: N/A
REPORT NO.: 05
CONTRACTOR: RCI Environmental
PROCTOR NO.: P-6

FIELD DATA:

SOURCE OF MATERIAL: LIOYD'S MILTON PIT

LOCATION SAMPLED: S.W. HAUL ROAD STOCKPILE

LABORATORY DATA:

MAXIMUM DENSITY DRY: 120.5 P.C.F.

OPTIMUM MOISTURE: 6.6

SOIL TYPE & COLOR: COVER MATERIAL

TEST SPECIFICATIONS: ASTM D-1557(D)

CYLINDER: 6 "

HAMMER: 10 lbs.

DROPS: 18 "

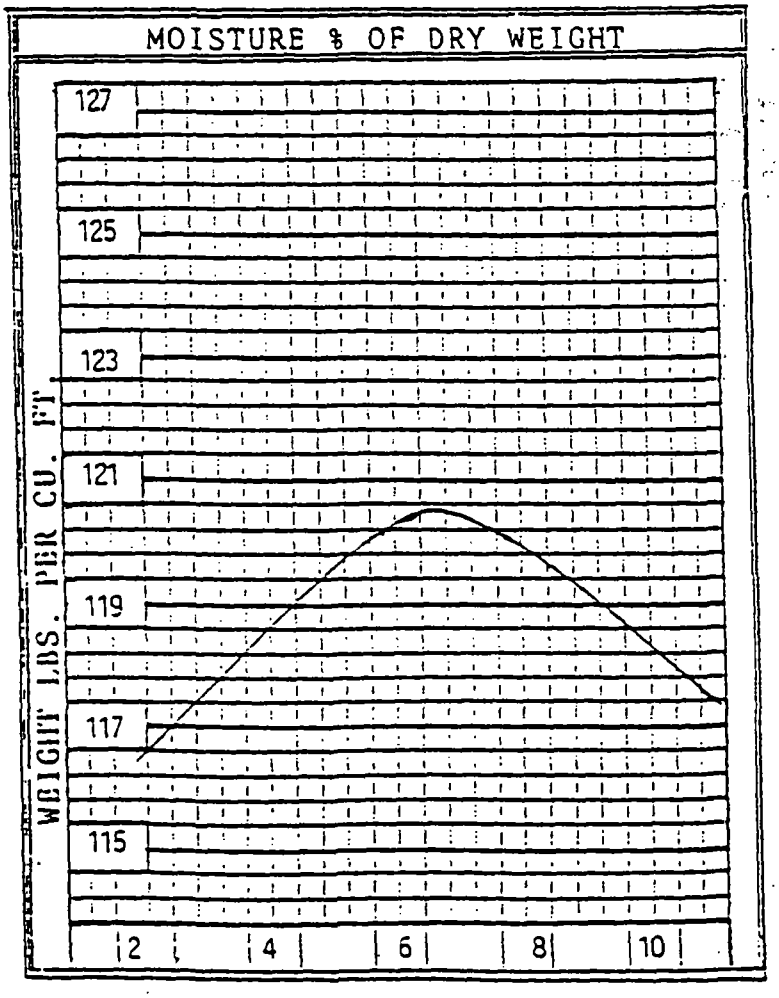
LAYERS: 5

BLOWS/LAYER: 56

TECHNICIAN: T.Nordhaug

SAMPLED BY: D.Smith

REMARKS: TAKEN @ 10:30 HOURS
TWO TRUCKS & TRAILERS



CONSTRUCTION MATERIALS TESTING LABORATORIES, INC.

(CMTL, INC.)
4417 Pacific Highway East
Fife, Washington 98424
(206) 922-0798

SOIL/AGGREGATE ANALYSIS REPORT

HC #: C-8

IENT:	Port of Tacoma	DATE:	03-22-93
OJECT:	BLAIR CLEAN-UP CONTRACT #710	PROJECT NO.:	T-8662
DRESS:	N/A	REPORT NO.:	
NTRACTOR:	RCI Environmental	SAMPLED BY:	D.Smith
ATERIAL TYPE:	COVER MATERIAL	SOURCE:	LIOYD'S MILTON PIT
OCATION SAMPLED:	S.W. HAUL ROAD	LAB.NO.:	3-170 I.D.NO.: #2
ESTS REQESTED:	Sieve Analysis	TECHNICIAN:	T.Nordhaug

SIEVE ANALYSIS

SIEVE SIZE	% PASSING	SPECIFICATIONS
8"		100
4"		95-100
[illegible]	100	
1½"	97.6	
3/4"	90.9	60-90
1/2"	83.7	
3/8"	80.5	
1/4"	73.0	
#4	69.5	
#8	62.7	
#10	60.5	25-65
#16	53.2	
#40	27.4	10-40
#100	3.4	
#200	2.0	0-5

OUT OF SPECS

ADDITIONAL DATA

SAND EQUIVALENT:
% MOISTURE:
L.A. ABRASION:
DEGRADATION:
% WOOD WASTE:
LOOSE UNIT WEIGHT:
LIQUID LIMIT:
PLASTIC LIMIT:
PLASTICITY INDEX:
FINENESS MODULUS:
SOIL CLASSIFICATION:

OTHERS:

REMARKS: TAKEN 11:45 HOURS, TWO TRUCKS & TRAILER STOCKPILES

TN/fd

CONSTRUCTION MATERIALS TESTING LABORATORIES, INC.

(CMTL, INC.)
4417 Pacific Highway East
Fife, Washington 98424
(206) 922-0798

SOIL/AGGREGATE ANALYSIS REPORT

CLIENT:	Port of Tacoma	DATE:	03-25-93
PROJECT:	BLAIR CLEAN-UP CONTRACT #710	PROJECT NO.:	T-8662
ADDRESS:	N/A	REPORT NO.:	07
CONTRACTOR:	RCI Environmental	SAMPLED BY:	Grant H-C
MATERIAL TYPE:	COVER MATERIAL	SOURCE:	LIOYD'S MILTON PIT
LOCATION SAMPLED:	S.W. CORNER OF SITE AT 13:30 HOURS	LAB.NO.:	I.D.NO.: #1
TESTS REQESTED:	Sieve Analysis	TECHNICIAN:	T.Nordhaug

SIEVE ANALYSIS

SIEVE SIZE	% PASSING	SPECIFICATIONS
8"		100
4"		95-100
[illegible]"	100	
[illegible]"	97.1	
3/4"	89.3	69-90
1/2"	81.8	
3/8"	77.8	
1/4"	69.2	
#4	65.2	
#8	55.8	
#10	53.1	25-65
#16	46.3	
#40	23.1	10-40
#100	3.6	
#200	2.4	0-5

ADDITIONAL DATA

SAND EQUIVALENT:
% MOISTURE:
L.A. ABRASION:
DEGRADATION:
% WOOD WASTE:
LOOSE UNIT WEIGHT:
LIQUID LIMIT:
PLASTIC LIMIT:
PLASTICITY INDEX:
FINENESS MODULUS:
SOIL CLASSIFICATION:

OTHERS:

REMARKS: Taken 3/24/93 1320-1330

TN/fd

CONSTRUCTION MATERIALS TESTING LABORATORIES, INC.

(CMTL, INC.)
4417 Pacific Highway East
Fife, Washington 98424
(206) 922-0798

MAXIMUM DENSITY-OPTIMUM MOISTURE DETERMINATION

CLIENT: Port of Tacoma
DATE SAMPLED: 03-24-93
PROJECT: BLAIR CLEAN-UP CONTRACT #710
PROJECT NO.: T-8662
ADDRESS: N/A
REPORT NO.: 07
CONTRACTOR: RCI Envirnmental
PROCTOR NO.: P-7

FIELD DATA:

SOURCE OF MATERIAL: LIOYD'S MILTON PIT

LOCATION SAMPLED: S.W. CORNER OF SITE @ 13:30 HOURS

LABORATORY DATA:

MAXIMUM DENSITY DRY: 130.4 P.C.F.

OPTIMUM MOISTURE: 5.9

SOIL TYPE & COLOR: COVER MATERIAL

TEST SPECIFICATIONS: ASTM D-1557(D)

CYLINDER: 6 "

HAMMER: 10 lbs.

DROPS: 18 "

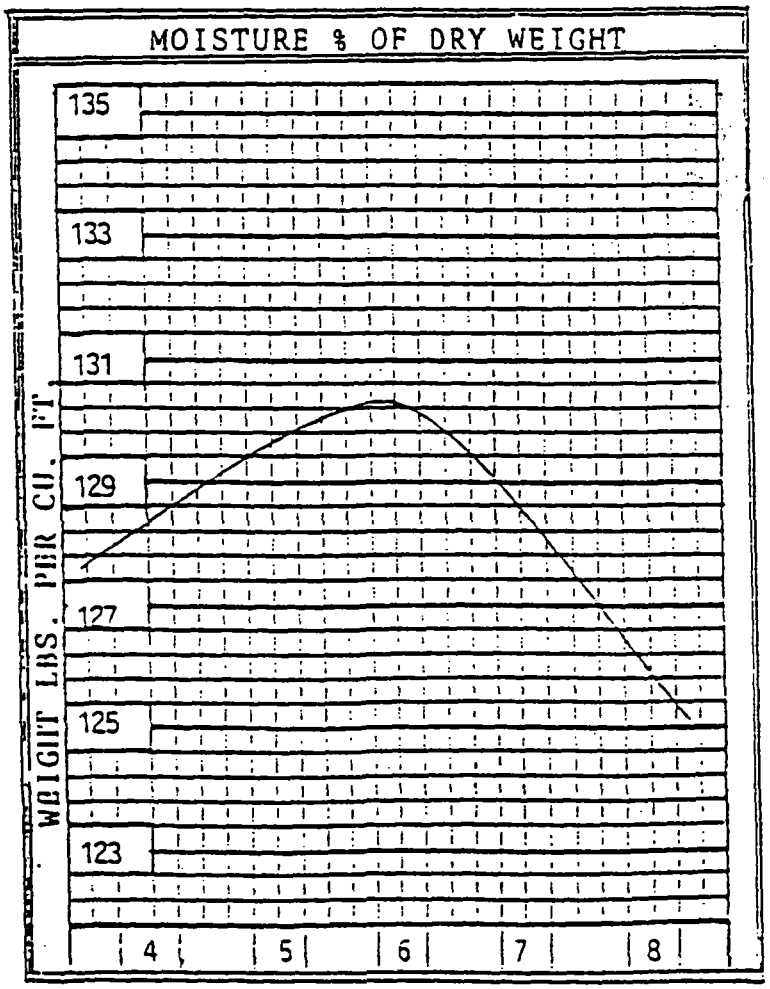
LAYERS: 5

BLOWS/LAYER: 56

TECHNICIAN: T.Nordhaug

SAMPLED BY: Grant Knechtel

REMARKS: TAKEN @ 13:30 HOURS



CONSTRUCTION MATERIALS TESTING LABORATORIES, INC.

(CMTL, INC.)
4417 Pacific Highway East
Fife, Washington 98424
(206) 922-0798

C10
C10
~~C12~~

SOIL/AGGREGATE ANALYSIS REPORT

CLIENT:	Port of Tacoma	DATE:	03-25-93
PROJECT:	BLAIR CLEAN-UP CONTRACT #710	PROJECT NO.:	T-8662
ADDRESS:	N/A	REPORT NO.:	06
CONTRACTOR:	RCI Environmental	SAMPLED BY:	D.Smith
MATERIAL TYPE:	COVER MATERIAL	SOURCE:	LIOYD'S MILTON PIT
LOCATION SAMPLED:	S.W. HAUL ROAD	LAB.NO.:	3-187 I.D.NO.: #2
TESTS REQESTED:	Sieve Analysis	TECHNICIAN:	T.Nordhaug

SIEVE ANALYSIS

SIEVE SIZE	% PASSING	SPECIFICATIONS
8"		100
4"		95-100
2"		
1"	100	
3/4"	92.2	69-90
1/2"	84.4	
3/8"	80.5	
1/4"	73.7	
#4	70.3	
#8	59.9	
#10	57.3	25-65
#16	49.8	
#40	22.9	10-40
#100	3.2	
#200	1.8	0-5

ADDITIONAL DATA

SAND EQUIVALENT:
% MOISTURE:
L.A. ABRASION:
DEGRADATION:
% WOOD WASTE:
LOOSE UNIT WEIGHT:
LIQUID LIMIT:
PLASTIC LIMIT:
PLASTICITY INDEX:
FINENESS MODULUS:
SOIL CLASSIFICATION:

OTHERS:

REMARKS: TAKEN @ 07:45 TO 08:05 HOURS
TRUCK NOS. 50, 47 and 48.

TN/fd

CONSTRUCTION MATERIALS TESTING LABORATORIES, INC.

(CMTL, INC.)
4417 Pacific Highway East
Fife, Washington 98424
(206) 922-0798

C11 ~~C10~~

SOIL/AGGREGATE ANALYSIS REPORT

CLIENT: Port of Tacoma
DATE: 03-25-93
PROJECT: BLAIR CLEAN-UP CONTRACT #710
PROJECT NO.: T-8662
ADDRESS: N/A
REPORT NO.: 06
CONTRACTOR: RCI Environmental
SAMPLED BY: D.Smith
MATERIAL TYPE: COVER MATERIAL
SOURCE: LIOYD'S MILTON PIT
LOCATION SAMPLED: S.W. HAUL ROAD
LAB.NO.: 3-186 I.D.NO.: #1
TESTS REQESTED: Sieve Analysis
TECHNICIAN: T.Nordhaug

SIEVE ANALYSIS

SIEVE SIZE	% PASSING	SPECIFICATIONS
8"		100
4"		95-100
2"		
1½"	100	
3/4"	90.5	69-90
1/2"	84.0	
3/8"	81.0	
1/4"	74.5	
#4	71.5	
#8	63.2	
#10	61.3	25-65
#16	55.2	
#40	29.1	10-40
#100	4.2	
#200	2.5	0-5

ADDITIONAL DATA

SAND EQUIVALENT:
% MOISTURE:
L.A. ABRASION:
DEGRADATION:
% WOOD WASTE:
LOOSE UNIT WEIGHT:
LIQUID LIMIT:
PLASTIC LIMIT:
PLASTICITY INDEX:
FINENESS MODULUS:
SOIL CLASSIFICATION:

OTHERS:

REMARKS: TAKEN AT 10:15 to 10:25 HOURS
TRUCK NOS. 51, 46 and 48.

TN/fd

CONSTRUCTION MATERIALS TESTING LABORATORIES, INC.

(CMTL, INC.)
4417 Pacific Highway East
Fife, Washington 98424
(206) 922-0798

C12
C12
C11

SOIL/AGGREGATE ANALYSIS REPORT

CLIENT:	Port of Tacoma	DATE:	03-25-93
PROJECT:	BLAIR CLEAN-UP CONTRACT #710	PROJECT NO.:	T-8662
ADDRESS:	N/A	REPORT NO.:	06
CONTRACTOR:	RCI Environmental	SAMPLED BY:	D.Smith
MATERIAL TYPE:	COVER MATERIAL	SOURCE:	LIOYD'S MILTON PIT
LOCATION SAMPLED:	S.W. HAUL ROAD	LAB.NO.:	3-190 I.D.NO.: #3
TESTS REQESTED:	Sieve Analysis	TECHNICIAN:	T.Nordhaug

SIEVE ANALYSIS

SIEVE SIZE	% PASSING	SPECIFICATIONS
8"		100
4"		95-100
2"	100	
1 1/2"	97.2	
1"	89.8	69-90
1/2"	84.7	
3/8"	81.4	
1/4"	74.9	
#4	71.6	
#8	63.1	
#10	61.0	25-65
#16	54.6	
#40	27.9	10-40
#100	4.3	
#200	2.5	0-5

ADDITIONAL DATA

SAND EQUIVALENT:
% MOISTURE:
L.A. ABRASION:
DEGRADATION:
% WOOD WASTE:
LOOSE UNIT WEIGHT:
LIQUID LIMIT:
PLASTIC LIMIT:
PLASTICITY INDEX:
FINENESS MODULUS:
SOIL CLASSIFICATION:

OTHERS:

REMARKS: TAKEN @ 13:35 TO 13:50 HOURS
TRUCKS NO. 51, 46 and 54.

TN/fd

C 13

CONSTRUCTION MATERIALS TESTING LABORATORIES, INC.

(CMTL, INC.)
4417 Pacific Highway East
Fife, Washington 98424
(206) 922-0798

SOIL/AGGREGATE ANALYSIS REPORT

LIENT:	Port of Tacoma	DATE:	03-26-93
ROJECT:	BLAIR CLEAN-UP CONTRACT #710	PROJECT NO.:	T-8662
DDRESS:	N/A	REPORT NO.:	
ONTRACTOR:	RCI Environmental	SAMPLED BY:	D.Smith
ATERIAL TYPE:	COVER MATERIAL	SOURCE:	LIOYD'S MILTON PIT
OCATION SAMPLED:	S.W. HAUL ROAD *	LAB.NO.:	3-193 I.D.NO.: #1
ESTS REQESTED:	Sieve Analysis	TECHNICIAN:	T.Nordhaug

SIEVE ANALYSIS

SIEVE SIZE	% PASSING	SPECIFICATIONS
8"		100
4"		95-100
[illegible]	100	
[illegible]	88.9	
3/4"	79.8	60-90
1/2"	75.1	
3/8"	71.1	
1/4"	64.7	
#4	61.1	
#8	53.5	
#10	51.0	25-65
#16	43.9	
#40	20.5	10-40
#100	2.4	
#200	1.4	0-5

ADDITIONAL DATA

SAND EQUIVALENT:
% MOISTURE:
L.A. ABRASION:
DEGRADATION:
% WOOD WASTE:
LOOSE UNIT WEIGHT:
LIQUID LIMIT:
PLASTIC LIMIT:
PLASTICITY INDEX:
FINENESS MODULUS:
SOIL CLASSIFICATION:

OTHERS:

EMARKS: * TAKEN @ 10:15 to 10:25 HOURS
TRUCK & TRAILER NOS. 41, 49 and 48.

TN/fd

C14

CONSTRUCTION MATERIALS TESTING LABORATORIES, INC.

(CMTL, INC.)
4417 Pacific Highway East
Fife, Washington 98424
(206) 922-0798

SOIL/AGGREGATE ANALYSIS REPORT

CLIENT:	Port of Tacoma	DATE:	03-26-93
PROJECT:	BLAIR CLEAN-UP CONTRACT #710	PROJECT NO.:	T-8662
ADDRESS:	N/A	REPORT NO.:	
CONTRACTOR:	RCI Environmental	SAMPLED BY:	D.Smith
MATERIAL TYPE:	COVER MATERIAL	SOURCE:	LIOYD'S MILTON PIT
LOCATION SAMPLED:	S.W. HAUL ROAD *	LAB.NO.:	3-192 I.D.NO.: #2
TESTS REQESTED:	Sieve Analysis	TECHNICIAN:	T.Nordhaug

SIEVE ANALYSIS

SIEVE SIZE	% PASSING	SPECIFICATIONS
8"		100
4"		95-100
3"	100	
1½"	97.0	
3/4"	89.9	60-90
1/2"	84.3	
3/8"	81.8	
1/4"	75.2	
#4	71.7	
#8	63.5	
#10	61.3	25-65
#16	54.3	
#40	26.2	10-40
#100	3.4	
#200	2.0	0-5

ADDITIONAL DATA

SAND EQUIVALENT:

% MOISTURE:

L.A. ABRASION:

DEGRADATION:

% WOOD WASTE:

LOOSE UNIT WEIGHT:

LIQUID LIMIT:

PLASTIC LIMIT:

PLASTICITY INDEX:

FINENESS MODULUS:

SOIL CLASSIFICATION:

OTHERS:

REMARKS: * AT TAKEN 10:30 to 10:45 HOURS.
TRUCK & TRAILER NOS. 87, 72 and 45.

TN/fd

CONSTRUCTION MATERIALS TESTING LABORATORIES, INC.

C15

(CMTL, INC.)
4417 Pacific Highway East
Fife, Washington 98424
(206) 922-0798

SOIL/AGGREGATE ANALYSIS REPORT

CLIENT: Port of Tacoma
DATE: 03-26-93
PROJECT: BLAIR CLEAN-UP CONTRACT #710
PROJECT NO.: T-8662
ADDRESS: N/A
REPORT NO.:
CONTRACTOR: RCI Environmental
SAMPLED BY: D.Smith
MATERIAL TYPE: COVER MATERIAL
SOURCE: LIOYD'S MILTON PIT
LOCATION SAMPLED: S.W. HAUL ROAD *
LAB.NO.: 3-194 I.D.NO.: #3
TESTS REQESTED: Sieve Analysis
TECHNICIAN: T.Nordhaug

SIEVE ANALYSIS

SIEVE SIZE	% PASSING	SPECIFICATIONS
8"		100
[illegible]"		95-100
[illegible]"		
1½"	100	
3/4"	81.0	60-90
1/2"	75.4	
3/8"	71.2	
1/4"	66.3	
#4	62.8	
#8	55.4	
#10	52.4	25-65
#16	45.0	
#40	21.8	10-40
#100	3.3	
#200	2.1	0-5

ADDITIONAL DATA

SAND EQUIVALENT:
% MOISTURE:
L.A. ABRASION:
DEGRADATION:
% WOOD WASTE:
LOOSE UNIT WEIGHT:
LIQUID LIMIT:
PLASTIC LIMIT:
PLASTICITY INDEX:
FINENESS MODULUS:
SOIL CLASSIFICATION:

OTHERS:

REMARKS: * TAKEN AT 13:50 TO 14:05 HOURS.
TRUCK & TRAILER NOS. 74, 48 and 76.

TN/fd

CONSTRUCTION MATERIALS TESTING LABORATORIES, INC.

(CMTL, INC.)
4417 Pacific Highway East
Fife, Washington 98424
(206) 922-0798

C16

SOIL/AGGREGATE ANALYSIS REPORT

ENT:	Port of Tacoma	DATE:	03-29-93
JECT:	BLAIR CLEAN-UP CONTRACT #710	PROJECT NO.:	T-8662
RESS:	N/A	REPORT NO.:	09
TRACTOR:	RCI Environmental	SAMPLED BY:	D.Smith
ERIAL TYPE:	COVER MATERIAL	SOURCE:	LIOYD'S MILTON PIT
ATION SAMPLED:	S.W. HAUL ROAD *	LAB.NO.:	3-198 I.D.NO.: #2
TS REQESTED:	Sieve Analysis	TECHNICIAN:	T.Nordhaug

SIEVE ANALYSIS

IEVE SIZE	% PASSING	SPECIFICATIONS
8"		100
"		95-100
1½	100	
3/4"	89.5	60-90
1/2"	82.4	
3/8"	78.2	
1/4"	71.3	
#4	67.0	
#8	60.3	
#10	58.0	25-65
#16	50.6	
#40	24.3	
#100	3.7	
#200	2.3	0-5

ADDITIONAL DATA

SAND EQUIVALENT:
% MOISTURE:
L.A. ABRASION:
DEGRADATION:
% WOOD WASTE:
LOOSE UNIT WEIGHT:
LIQUID LIMIT:
PLASTIC LIMIT:
PLASTICITY INDEX:
FINENESS MODULUS:
SOIL CLASSIFICATION:

OTHERS:

EMARKS: * TAKEN @ 10:05 to 10:20 HOURS.
TRUCK & TRAILER NOS. 52, 51 and 48 - C16.

TN/fd

CONSTRUCTION MATERIALS TESTING LABORATORIES, INC.

(CMTL, INC.)
4417 Pacific Highway East
Fife, Washington 98424
(206) 922-0798

C17

SOIL/AGGREGATE ANALYSIS REPORT

ENT:	Port of Tacoma	DATE:	03-29-93
ECT:	BLAIR CLEAN-UP CONTRACT #710	PROJECT NO.:	T-8662
RESS:	N/A	REPORT NO.:	09
TRACTOR:	RCI Environmental	SAMPLED BY:	D.Smith
ERIAL TYPE:	COVER MATERIAL	SOURCE:	LIOYD'S MILTON PIT
ATION SAMPLED:	S.W. HAUL ROAD *	LAB.NO.:	3-199 I.D.NO.: #3
TS REQESTED:	Sieve Analysis	TECHNICIAN:	T.Nordhaug

SIEVE ANALYSIS

IEVE SIZE	% PASSING	SPECIFICATIONS
3"		100
2"		95-100
1½	100	
3/4"	86.3	
1/2"	81.0	60-90
3/8"	75.2	
1/4"	72.8	
#4	67.9	
#8	64.2	
#10	58.0	
#16	55.6	25-65
#40	49.4	
#100	25.3	
#200	3.2	
	2.0	0-5

ADDITIONAL DATA

SAND EQUIVALENT:
% MOISTURE:
L.A. ABRASION:
DEGRADATION:
% WOOD WASTE:
LOOSE UNIT WEIGHT:
LIQUID LIMIT:
PLASTIC LIMIT:
PLASTICITY INDEX:
FINENESS MODULUS:
SOIL CLASSIFICATION:

OTHERS:

MARKS: * TAKEN @ 13:00 to 13:15 HOURS.
TRUCK & TRAILER NOS. 51, 46 and 50/(C17).

TN/fd

CONSTRUCTION MATERIALS TESTING LABORATORIES, INC.

(CMTL, INC.)
4417 Pacific Highway East
Fife, Washington 98424
(206) 922-0798

C18

SOIL/AGGREGATE ANALYSIS REPORT

LIENT:	Port of Tacoma	DATE:	03-29-93
OJECT:	BLAIR CLEAN-UP CONTRACT #710	PROJECT NO.:	T-8662
DRESS:	N/A	REPORT NO.:	09
NTRACTOR:	RCI Environmental	SAMPLED BY:	D.Smith
TERIAL TYPE:	COVER MATERIAL	SOURCE:	LIOYD'S MILTON PIT
CATION SAMPLED:	S.W. HAUL ROAD *	LAB.NO.:	3-197 I.D.NO.: #1
STS REQESTED:	Sieve Analysis	TECHNICIAN:	T.Nordhaug

SIEVE ANALYSIS

SIEVE SIZE	% PASSING	SPECIFICATIONS
8"		100
1"		95-100
[illegible]	100	
1/2"	90.2	
3/4"	78.8	60-90
1/2"	74.5	
3/8"	70.4	
1/4"	64.8	
#4	61.2	
#8	53.9	
#10	51.4	25-65
#16	44.7	
#40	21.5	
#100	2.5	
#200	1.4	0-5

ADDITIONAL DATA

SAND EQUIVALENT:
% MOISTURE:
L.A. ABRASION:
DEGRADATION:
% WOOD WASTE:
LOOSE UNIT WEIGHT:
LIQUID LIMIT:
PLASTIC LIMIT:
PLASTICITY INDEX:
FINENESS MODULUS:
SOIL CLASSIFICATION:

OTHERS:

REMARKS: * TAKEN @ 14:19 to 14:35 HOURS.
TRUCK & TRAILER NOS. 45, 76 and 51 - C18

TN/fd

CONSTRUCTION MATERIALS TESTING LABORATORIES, INC.

(CMTL, INC.)
4417 Pacific Highway East
Fife, Washington 98424
(206) 922-0798

C19

SOIL/AGGREGATE ANALYSIS REPORT

ENT:	Port of Tacoma	DATE:	03-30-93
OJECT:	BLAIR CLEAN-UP CONTRACT #710	PROJECT NO.:	T-8662
DRESS:	N/A	REPORT NO.:	10
NTRACTOR:	RCI Environmental	SAMPLED BY:	D.Smith
TERIAL TYPE:	COVER MATERIAL	SOURCE:	LIOYD'S MILTON PIT
CATION SAMPLED:	S.W. HAUL ROAD*	LAB.NO.:	3-203 I.D.NO.: #2
STS REQESTED:	Sieve Analysis	TECHNICIAN:	T.Nordhaug

SIEVE ANALYSIS

SIEVE SIZE	% PASSING	SPECIFICATIONS
8"		100
4"		95-100
1"	100	
3/4"	81.0	60-90
1/2"	78.2	
3/8"	75.3	
1/4"	69.8	
#4	66.6	
#8	60.0	
#10	57.4	25-65
#16	50.6	
#40	24.7	10-40
#100	3.7	
#200	2.4	0-5

ADDITIONAL DATA

SAND EQUIVALENT:
% MOISTURE:
L.A. ABRASION:
DEGRADATION:
% WOOD WASTE:
LOOSE UNIT WEIGHT:
LIQUID LIMIT:
PLASTIC LIMIT:
PLASTICITY INDEX:
FINENESS MODULUS:
SOIL CLASSIFICATION:

OTHERS:

EMARKS: * TAKEN @ 08:35 to 08:50 HOURS
TRUCK & TRAILER NOS. 72, 78 and 51 (C19)

TN/fd

CONSTRUCTION MATERIALS TESTING LABORATORIES, INC.

(CMTL, INC.)
4417 Pacific Highway East
Fife, Washington 98424
(206) 922-0798

C20

SOIL/AGGREGATE ANALYSIS REPORT

ENT:	Port of Tacoma	DATE:	03-30-93
JECT:	BLAIR CLEAN-UP CONTRACT #710	PROJECT NO.:	T-8662
RESS:	N/A	REPORT NO.:	10
TRACTOR:	RCI Environmental	SAMPLED BY:	D.Smith
TERIAL TYPE:	COVER MATERIAL	SOURCE:	LIOYD'S MILTON PIT
CATION SAMPLED:	S.W. HAUL ROAD*	LAB.NO.:	3-202 I.D.NO.: #1
STS REQESTED:	Sieve Analysis	TECHNICIAN:	T.Nordhaug

SIEVE ANALYSIS

SIEVE SIZE	% PASSING	SPECIFICATIONS
8"		100
4"		95-100
[illegible]	100	
[illegible]	89.4	
3/4"	84.0	60-90
1/2"	79.8	
3/8"	75.8	
1/4"	71.0	
#4	67.5	
#8	61.3	
#10	58.8	25-65
#16	52.0	
#40	27.7	10-40
#100	3.7	
#200	2.5	0-5

ADDITIONAL DATA

SAND EQUIVALENT:
% MOISTURE:
L.A. ABRASION:
DEGRADATION:
% WOOD WASTE:
LOOSE UNIT WEIGHT:
LIQUID LIMIT:
PLASTIC LIMIT:
PLASTICITY INDEX:
FINENESS MODULUS:
SOIL CLASSIFICATION:

OTHERS:

EMARKS: * TAKEN @ 12:50 to 13:05 HOURS.
TRUCK & TRAILER NOS. 82, 74 and 51 (C20)

TN/fd

ATTACHMENT G-2
SAND AND GRAVEL BUFFER MATERIAL

B1+B2 occur on following pages - delete B1?

Sand and Gravel Buffer Material

Table G-2a - Summary of Proctor Analysis (ASTM D-1557) on Sand and Gravel Buffer

Quantity Unit	Test Completed After Import of No. of Units	Date Test Completed	Test Number
Ton	0	3/16/93	B2

Table G-2b - Summary of Grain Size Analysis (ASTM D-422) on Sand and Gravel Buffer

Quantity Unit	Test Completed After Import of No. of Units	Date Test Completed	Test Number
Ton	0	3/16/93	B2
	10,000	4/14/93	B5

missing - not in following pages

Table G-2c - Summary of In-place Density Tests (ASTM D-2922) on Sand and Gravel Buffer

Quantity Unit	Test Completed After Placement of No. of Units	Date Test Completed	Test Number
Square Yard	3,000	3/16/93	DT-11
	6,000	3/16/93	DT-12
	9,000	3/16/93	DT-13
	12,000	3/18/93	DT-15
	15,000	4/1/93	DT-38
	18,000	4/1/93	DT-39
	21,000	4/2/93	DT-40
	24,000	4/2/93	DT-41
	27,000	4/2/93	DT-42
	30,000	4/5/93	DT-43
	33,000	4/6/93	DT-45

Donna
Ed
Curt
Dr.

CONSTRUCTION MATERIALS TESTING LABORATORIES, INC.

(CMTL, INC.)
4417 Pacific Highway East
Fife, Washington 98424
(206) 922-0798

RECEIVED
MAR 15 1993
ENGINEERING DEPT.

SOIL/AGGREGATE ANALYSIS REPORT

CLIENT:	Port of Tacoma	DATE:	03-12-93
PROJECT:	BLAIR CLEAN-UP CONTRACT #710	PROJECT NO.:	T-8662
ADDRESS:	N/A	REPORT NO.:	1a HC#: B-1
CONTRACTOR:	RCI Envrionmental	SAMPLED BY:	D.Smith
MATERIAL TYPE:	BUFFER MATERIAL	SOURCE:	LONESTAR
LOCATION SAMPLED:	ON SITE	LAB.NO.:	I.D.NO.: #2
TESTS REQESTED:	SIEVE ANALYSIS	TECHNICIAN:	T.Nordhaug

SIEVE ANALYSIS

SIEVE SIZE	% PASSING	SPECIFICATIONS
2"		100
1½"	100	
3/4"	54.0	
1/2"	29.2	
3/8"	28.6	
1/4"	27.8	30-45
#4	27.4	
#8	25.7	
#10	25.4	
#16	24.4	
#40	14.8	
#100	1.4	
#200	0.6	*NOT MORE THAN 5% OF THE FRACTION PASSING THE 3/4"

ADDITIONAL DATA

SAND EQUIVALENT:
% MOISTURE:
L.A. ABRASION:
DEGRADATION:
% WOOD WASTE:
LOOSE UNIT WEIGHT:
LIQUID LIMIT:
PLASTIC LIMIT:
PLASTICITY INDEX:
FINENESS MODULUS:
SOIL CLASSIFICATION:

OTHERS:

REMARKS: * 1.1% PASSING #200 OF FRACTION PASSING 3/4" SIEVE.

TN/fd

CONSTRUCTION MATERIALS TESTING LABORATORIES, INC.

(CMTL INC.)
A Division of Western Testing Laboratories

4417 Pacific Highway East
Fife, Washington 98424
(206) 922-0798

RECEIVED
MAR 15 1993
ENGINEERING DEPT.

MAXIMUM DENSITY-OPTIMUM MOISTURE DETERMINATION

CLIENT: Port of Tacoma DATE SAMPLED: 03-12-93

PROJECT: BLAIR CLEAN-UP CONTRACT #710 PROJECT NO.: T-8662

ADDRESS: N/A PROCTOR NO.: P-2

CONTRACTOR RCI Environmental REPORT NO.: 1a

HC# B-1

FIELD DATA:

Source of Material: LONESTAR

Location Sampled: ON SITE

LABORATORY DATA:

Maximum Density Dry: 132.6 P.C.F.

Optimum Moisture: 4.0 %

Soil Type & Color: BUFFER MATERIAL

Test Specifications: ASTM D-1557(D)

Cylinder: 6 "

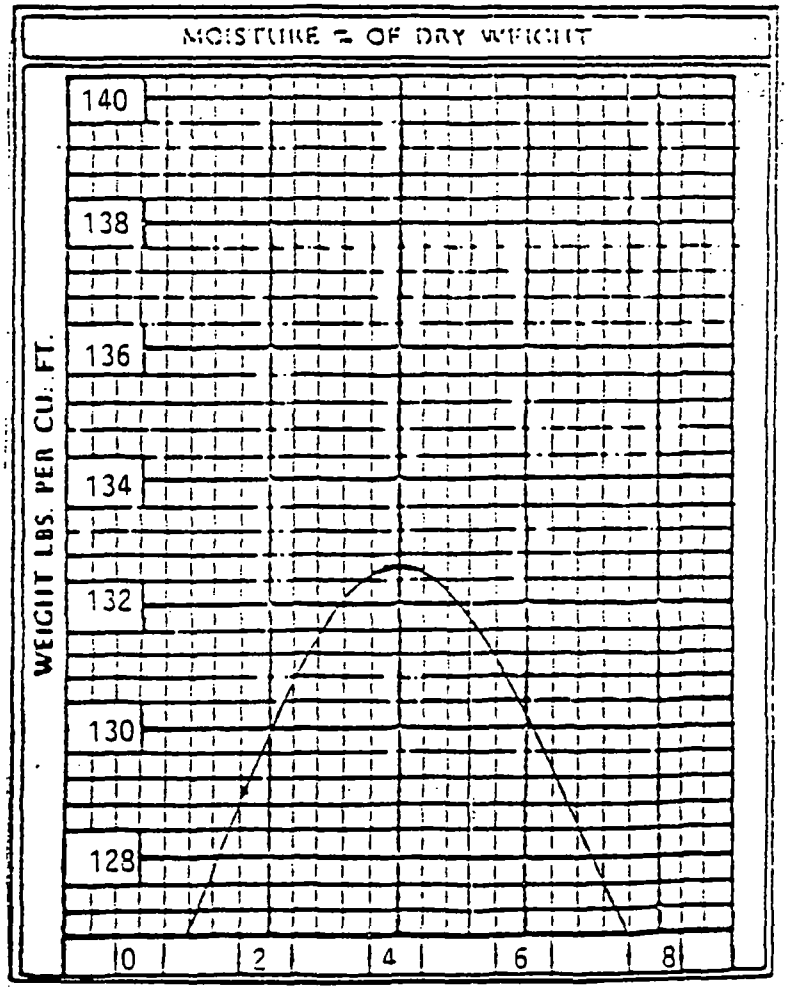
Hammer: 10 lbs.

Drops: 18"

Layers: 5

Blows/Layer: 56

Technician: T.Nordhaug



CONSTRUCTION MATERIALS TESTING LABORATORIES, INC.

(CMTL, INC.)
4417 Pacific Highway East
Fife, Washington 98424
(206) 922-0798

SOIL/AGGREGATE ANALYSIS REPORT

LIENT:	Port of Tacoma	DATE:	03-15-93
ROJECT:	BLAIR CLEAN-UP CONTRACT #710	PROJECT NO.:	T-8662
DDRESS:	N/A	REPORT NO.:	02 HC# B-2
ONTRACTOR:	RCIE	SAMPLED BY:	D.Smith
ATERIAL TYPE:	[redacted]	SOURCE:	LONESTAR
OCATION SAMPLED:	N.E. SIDE OF PROJECT STOCKPILE	LAB.NO.:	N/A I.D.NO.: #2
ESTS REQESTED:	Sieve Analysis	TECHNICIAN:	T.Nordhaug

SIEVE ANALYSIS

SIEVE SIZE	% PASSING	SPECIFICATIONS
2"		100
1½"	100	
1"	63.2	
3/4"	41.9	
3/8"	41.0	
1/4"	39.9	30-45
#4	39.3	
#8	36.3	
#10	35.7	
#16	33.7	
#40	19.2	
#100	2.3	
#200	1.5	*NOT MORE THAN 5% OF THE FRACTION PASSING THE 3/4"

ADDITIONAL DATA

SAND EQUIVALENT:
% MOISTURE:
L.A. ABRASION:
DEGRADATION:
% WOOD WASTE:
LOOSE UNIT WEIGHT:
LIQUID LIMIT:
PLASTIC LIMIT:
PLASTICITY INDEX:
FINENESS MODULUS:
SOIL CLASSIFICATION:

OTHERS:

REMARKS: * 2.4% PASSING #200 OF FRACTION PASSING 3/4" SIEVE.

TN/fd

CONSTRUCTION MATERIALS TESTING LABORATORIES, INC.

(CMTL, INC.)
4417 Pacific Highway East
Fife, Washington 98424
(206) 922-0798

MAXIMUM DENSITY-OPTIMUM MOISTURE DETERMINATION

CLIENT: Port of Tacoma
DATE SAMPLED: 03-15-93
PROJECT: BLAIR CLEAN-UP CONTRACT #710
PROJECT NO.: T-8662
ADDRESS: N/A
REPORT NO.: 02
CONTRACTOR: RCI Enviromnetal
PROCTOR NO.: P-4

FIELD DATA:

SOURCE OF MATERIAL: LONESTAR

LOCATION SAMPLED: N.E. SIDE OF PROJECT STOCKPILE.

LABORATORY DATA:

MAXIMUM DENSITY DRY: 133.9 P.C.F.

OPTIMUM MOISTURE: 6.1

SOIL TYPE & COLOR: BUFFER MATERIAL

TEST SPECIFICATIONS: ASTM D-1557(D)

CYLINDER: 6 "

HAMMER: 10 lbs.

DROPS: 18 "

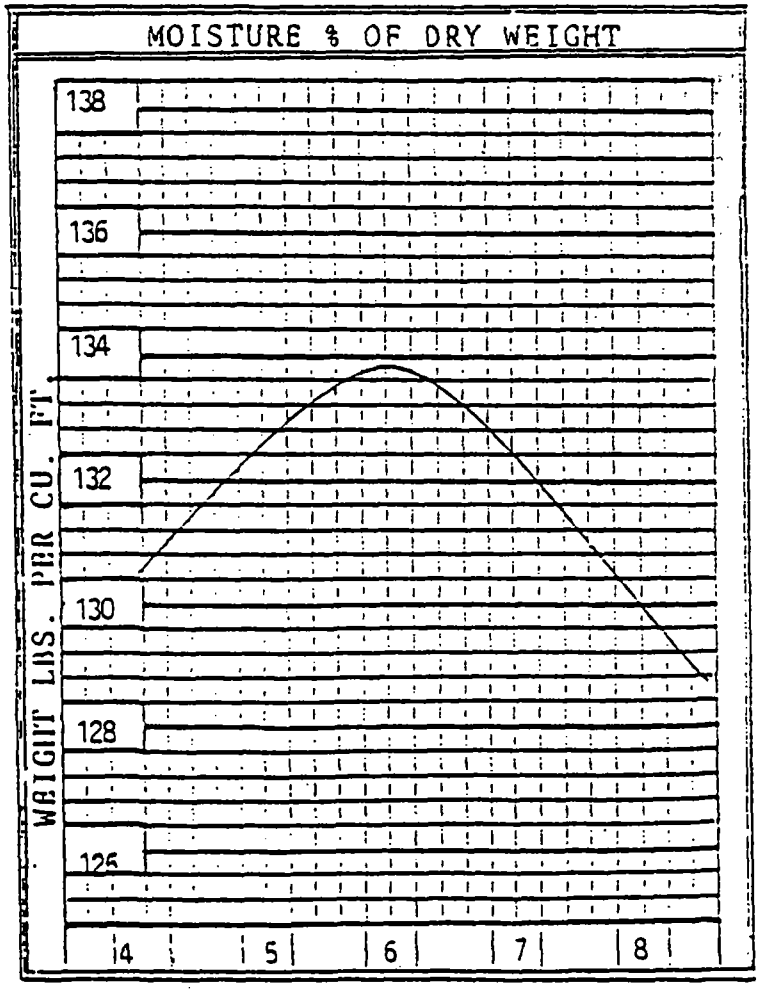
LAYERS: 5

BLOWS/LAYER: 56

TECHNICIAN: T.Nordhaug

SAMPLED BY: D.Smith

REMARKS: N/A



ATTACHMENT G-3
BASE COURSE MATERIAL

Base Course Material

Table G-3a - Summary of Proctor Analysis (ASTM D-1557) on Base Course

Quantity Unit	Test Completed After Import of No. of Units	Date Test Completed	Test Number
Ton	0 10,000	5/11/93 5/12/93	W1 W2

Table G-3b - Summary of Grain Size Analysis (ASTM D-422) on Base Course

Quantity Unit	Test Completed After Import of No. of Units	Date Test Completed	Test Number
Ton	0 10,000	5/11/93 5/12/93	W1 W2

Table G-3c - Summary of In-place Density Tests (ASTM D-2922) on Base Course

Quantity Unit	Test Completed After Placement of No. of Units	Date Test Completed	Test Number
Square Yard	3,000	5/17/93	DT-59
	6,000	5/17/93	DT-60
	9,000	5/17/93	DT-61
	12,000	5/17/93	DT-62
	15,000	5/18/93	DT-63
	18,000	5/18/93	DT-64
	21,000	5/18/93	DT-66
	24,000	5/18/93	DT-67
	27,000	5/18/93	DT-68
	30,000	5/18/93	DT-69
	33,000	5/18/93	DT-70
	36,000	5/18/93	DT-71

CONSTRUCTION MATERIALS TESTING LABORATORIES, INC.

(CMTL, INC.)
4417 Pacific Highway East
Fife, Washington 98424
(206) 922-0798

W-1

SOIL/AGGREGATE ANALYSIS REPORT

IENT:	Port of Tacoma	DATE:	05-04-93
OJECT:	BLAIR CLEAN-UP CONTRACT #710	PROJECT NO.:	T-8662
DRESS:	N/A	REPORT NO.:	
NTRACTOR:	RCI Environmental	SAMPLED BY:	D.Smith
TERIAL TYPE:	1½" CRUSHED	SOURCE:	HYLEBOS PIT WOODWORTH
XCATION SAMPLED:	STOCKPILE @ PIT	LAB.NO.:	3-312 I.D.NO.: #1
STS REQESTED:	Sieve Analysis	TECHNICIAN:	T.Nordhaug

SIEVE ANALYSIS

SIEVE SIZE	% PASSING	SPECIFICATIONS
1½"	100	100
5/8"	70.4	50-80
1/2"	56.3	
[illegible]"	48.6	
[illegible]"	38.0	30-50
#4	32.3	
#8	24.5	
#10	22.8	
#16	18.7	
#40	11.4	3-18
#100	5.2	
#200	3.4	5 MAX.

ADDITIONAL DATA

SAND EQUIVALENT: 70 (40 MIN.)
% MOISTURE:
L.A. ABRASION:
DEGRADATION:
% WOOD WASTE:
LOOSE UNIT WEIGHT:
LIQUID LIMIT:
PLASTIC LIMIT:
PLASTICITY INDEX:
FINENESS MODULUS:
SOIL CLASSIFICATION:

OTHERS:
% FRACTURE: (75 MIN.) 5/8 = 91.8
1/4 = 97.2
#10 = 99.4

EMARKS:

JR/TN/fd

CONSTRUCTION MATERIALS TESTING LABORATORIES, INC.

(CMTL INC.)
4417 Pacific Highway East
Fife, Washington 98424
(206) 922-0798

W-1

MAXIMUM DENSITY-OPTIMUM MOISTURE DETERMINATION

CLIENT: Port of Tacoma
DATE SAMPLED: 05-04-93
PROJECT: BLAIR CLEAN-UP CONTRACT #710
PROJECT NO.: T-8662
ADDRESS: N/A
REPORT NO.:
CONTRACTOR: RCI Environmental
PROCTOR NO.:

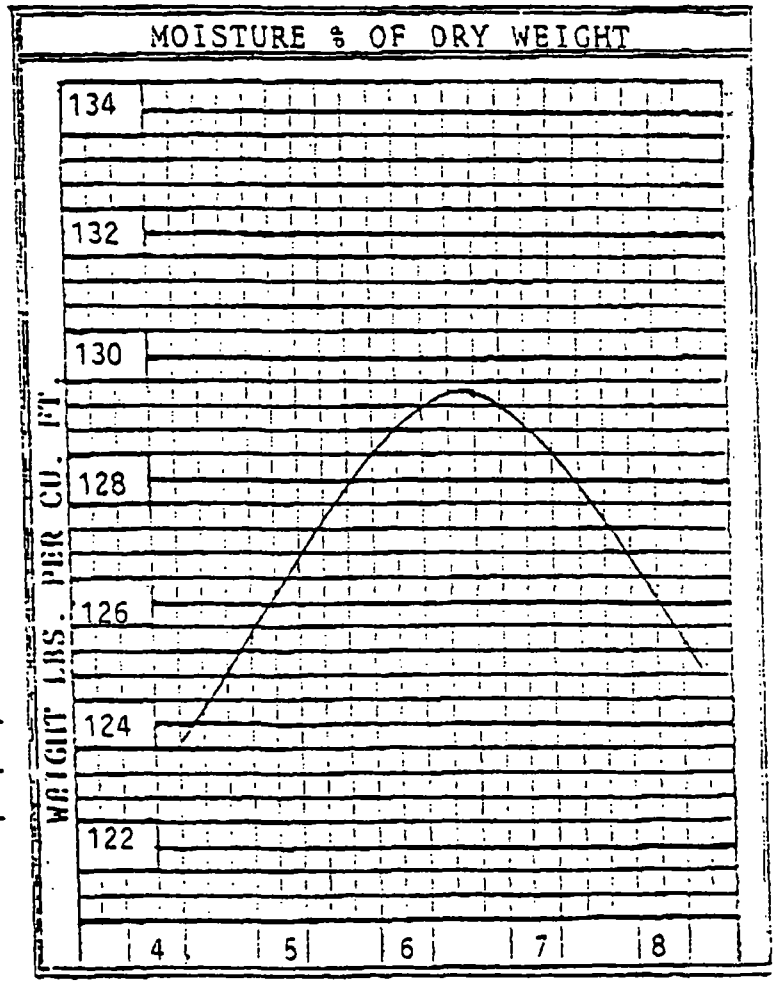
FIELD DATA:

SOURCE OF MATERIAL: HYLEBOS PIT WOODWORTH
LOCATION SAMPLED: STOCKPILE @ PIT

LABORATORY DATA:

MAXIMUM DENSITY DRY: 129.4 P.C.F.
OPTIMUM MOISTURE: 6.5
SOIL TYPE & COLOR: 1½" CRUSHED

TEST SPECIFICATIONS: ASTM D-1557(D)
CYLINDER: 6 "
HAMMER: 10 lbs.
DROPS: 18 "
LAYERS: 5
BLOWS/LAYER: 56
TECHNICIAN: T.Nordhaug
SAMPLED BY: D.Smith
REMARKS: N/A



CONSTRUCTION MATERIALS TESTING LABORATORIES, INC.

(CMTL, INC.)
4417 Pacific Highway East
Fife, Washington 98424
(206) 922-0798

W2

SOIL/AGGREGATE ANALYSIS REPORT

CLIENT: Port of Tacoma
DATE: 05-12-93
PROJECT: BLAIR CLEAN-UP CONTRACT #710
PROJECT NO.: T-8662
ADDRESS: N/A
REPORT NO.: 16
CONTRACTOR: RCI Environmental
SAMPLED BY: D.Smith (CMTL)
MATERIAL TYPE: 1¼" CRUSHED
SOURCE: WOODWORTH HYLEBOS PIT
LOCATION SAMPLED: S.W. HAUL ROAD - BELLY DUMP TRUCK
LAB.NO.: 3-336 I.D.NO.:
TESTS REQESTED: SIEVE/FRACTURE/S.E.
TECHNICIAN: T.Nordhaug

SIEVE ANALYSIS

SIEVE SIZE	% PASSING	SPECIFICATIONS
1¼"	100	100
5/8"	62.9	50-80
1/2"	46.4	
3/8"	38.7	
1/4"	29.7	30-50
#4	25.2	
#8	19.1	
#10	17.8	
#16	14.8	
#40	9.6	3-18
#100	4.5	
#200	2.8	5 MAX.

ADDITIONAL DATA

SAND EQUIVALENT: 63 (40 MIN.)
% MOISTURE:
L.A. ABRASION:
DEGRADATION:
% WOOD WASTE:
LOOSE UNIT WEIGHT:
LIQUID LIMIT:
PLASTIC LIMIT:
PLASTICITY INDEX:
FINENESS MODULUS:
SOIL CLASSIFICATION:

OTHERS:
FRACTURE (75 MIN): 5/8 = 81.3%
1/4 = 89.6%
#10 = 95.7

REMARKS:

TN/fd

(X)

CONSTRUCTION MATERIALS TESTING LABORATORIES, INC.

(CMTL, INC.)
4417 Pacific Highway East
Fife, Washington 98424
(206) 922-0798

W2

MAXIMUM DENSITY-OPTIMUM MOISTURE DETERMINATION

CLIENT: Port of Tacoma
DATE SAMPLED: 05-12-93
PROJECT: BLAIR CLEAN-UP CONTRACT #710
PROJECT NO.: T-8662
ADDRESS: N/A
REPORT NO.: 16
CONTRACTOR: RCI Environmental
PROCTOR NO.: P-10

FIELD DATA:

SOURCE OF MATERIAL: WOODWORTH HYLEBOS PIT

LOCATION SAMPLED: S.W. HAUL ROAD - BELLY DUMP TRUCKS

LABORATORY DATA:

MAXIMUM DENSITY DRY: 133.8 P.C.F.

OPTIMUM MOISTURE: 6.8

SOIL TYPE & COLOR: 1½" CRUSHED

TEST SPECIFICATIONS: ASTM D-1557(D)

CYLINDER: 6 "

HAMMER: 10 lbs.

DROPS: 18 "

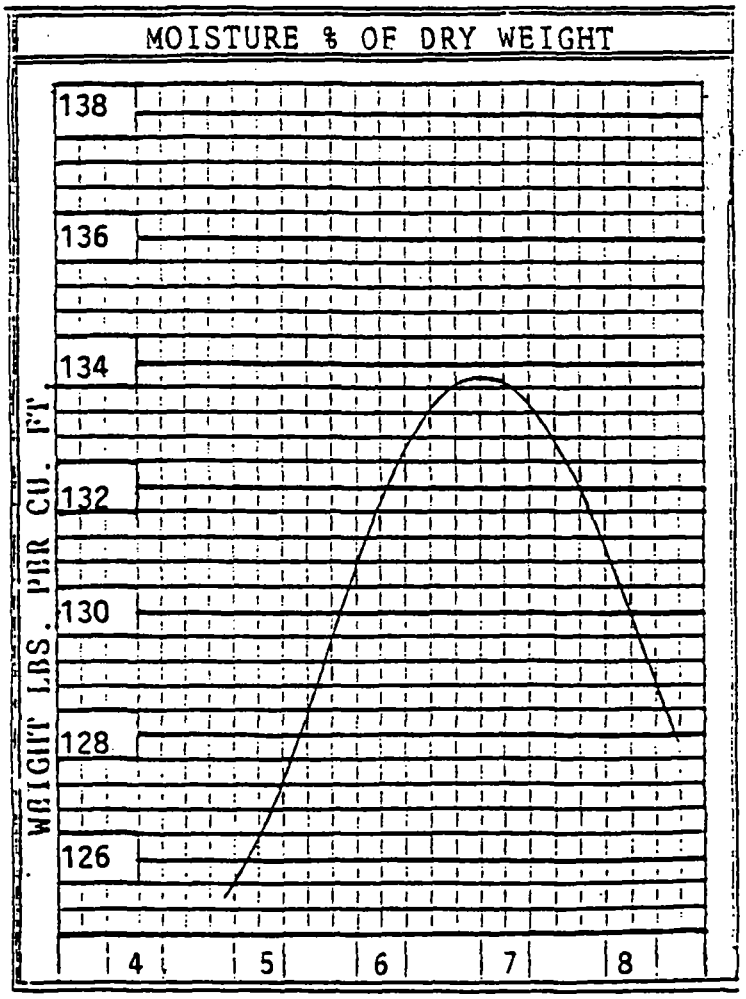
LAYERS: 5

BLOWS/LAYER: 56

TECHNICIAN: T.Nordhaug

SAMPLED BY: D.Smith

REMARKS:



ATTACHMENT G-4
WEARING COURSE MATERIAL

Wearing Course Material

Table G-4a - Summary of Proctor Analysis (ASTM D 1557) on Wearing Course

Quantity Unit	Test Completed After Import of No. of Units	Date Test Completed	Test Number
Ton	0	5/12/93	W2

Table G-4b - Summary of Grain Size Analysis (ASTM D 422) on Wearing Course

Quantity Unit	Test Completed After Import of No. of Units	Date Test Completed	Test Number
Ton	Tests completed approximately every 2,000 tons	5/13/93 5/17/93 7/15/93 8/27/93 10/6/93	W3 W4 W5 W6 W7

Table G-4c - Summary of In-place Density Tests (ASTM D 2922) on Wearing Course

Quantity Unit	Test Completed After Placement of No. of Units	Date Test Completed	Test Number
Square Yard	3,000	9/3/93	DT-90
	6,000	9/3/93	DT-91
	9,000	9/3/93	DT-92
	12,000	9/3/93	DT-93
	15,000	9/3/93	DT-94
	18,000	9/3/93	DT-95
	21,000	10/7/93	DT-96
	24,000	10/7/93	DT-97
	27,000	10/7/93	DT-98
	30,000	10/7/93	DT-99
	33,000	10/7/93	DT-100
	36,000	10/7/93	DT-101

CONSTRUCTION MATERIALS TESTING LABORATORIES, INC.

(CMTL, INC.)
4417 Pacific Highway East
Fife, Washington 98424
(206) 922-0798

W3

SOIL/AGGREGATE ANALYSIS REPORT

CLIENT:	Port of Tacoma	DATE:	05-13-93
PROJECT:	BLAIR CLEAN-UP CONTRACT #710	PROJECT NO.:	T-8662
ADDRESS:	N/A	REPORT NO.:	17
CONTRACTOR:	RCI Environmental	SAMPLED BY:	CLIENT
MATERIAL TYPE:	1¼" CRUSHED BASE & WEARING COURSE	SOURCE:	J2350-22
LOCATION SAMPLED:	W3.QWF BLAIR CLEAN-UP	LAB.NO.:	3-338 I.D.NO.: N/A
TESTS REQESTED:	SIEVE/FRAACTURE/S.E.	TECHNICIAN:	T.Nordhaug

SIEVE ANALYSIS

SIEVE SIZE	% PASSING	SPECIFICATIONS
1¼"	100	100
5/8"	61.0	50-80
1/2"	45.8	
3/8"	38.9	
1/4"	29.7	30-50
#4	24.9	
#8	19.1	
#10	18.1	
#16	15.5	
#40	10.1	3-18
#100	4.9	
#200	3.1	5 MAX.

ADDITIONAL DATA

SAND EQUIVALENT: 62 (40 MIN.)
% MOISTURE:
L.A. ABRASION:
DEGRADATION:
% WOOD WASTE:
LOOSE UNIT WEIGHT:
LIQUID LIMIT:
PLASTIC LIMIT:
PLASTICITY INDEX:
FINENESS MODULUS:
SOIL CLASSIFICATION:

OTHERS:
FRACTURE (75 MIN): 5/8 = 80.4
1/4 = 90.7
#10 = 97.3

REMARKS: SAMPLE PICKED BY D.SMITH ON MAY 14TH, 1993

(X)

CONSTRUCTION MATERIALS TESTING LABORATORIES, INC.

(CMTL, INC.)
4417 Pacific Highway East
Fife, Washington 98424
(206) 922-0798

MAXIMUM DENSITY-OPTIMUM MOISTURE DETERMINATION

CLIENT: Port of Tacoma
DATE SAMPLED: 05-13-93
PROJECT: BLAIR CLEAN-UP CONTRACT #710
PROJECT NO.: T-8662
ADDRESS: N/A
REPORT NO.: 17
CONTRACTOR: RCI Environmental
PROCTOR NO.: P-11

FIELD DATA:

SOURCE OF MATERIAL: J2350-22

LOCATION SAMPLED: W3.QWF - BLAIR CLEAN-UP

LABORATORY DATA:

MAXIMUM DENSITY DRY: 132.1 P.C.F.

OPTIMUM MOISTURE: 6.4

SOIL TYPE & COLOR: 1¼" CRUSHED BASE & WEARING COURSE

TEST SPECIFICATIONS: ASTM D-1557(D)

CYLINDER: 6 "

HAMMER: 10 lbs.

DROPS: 18 "

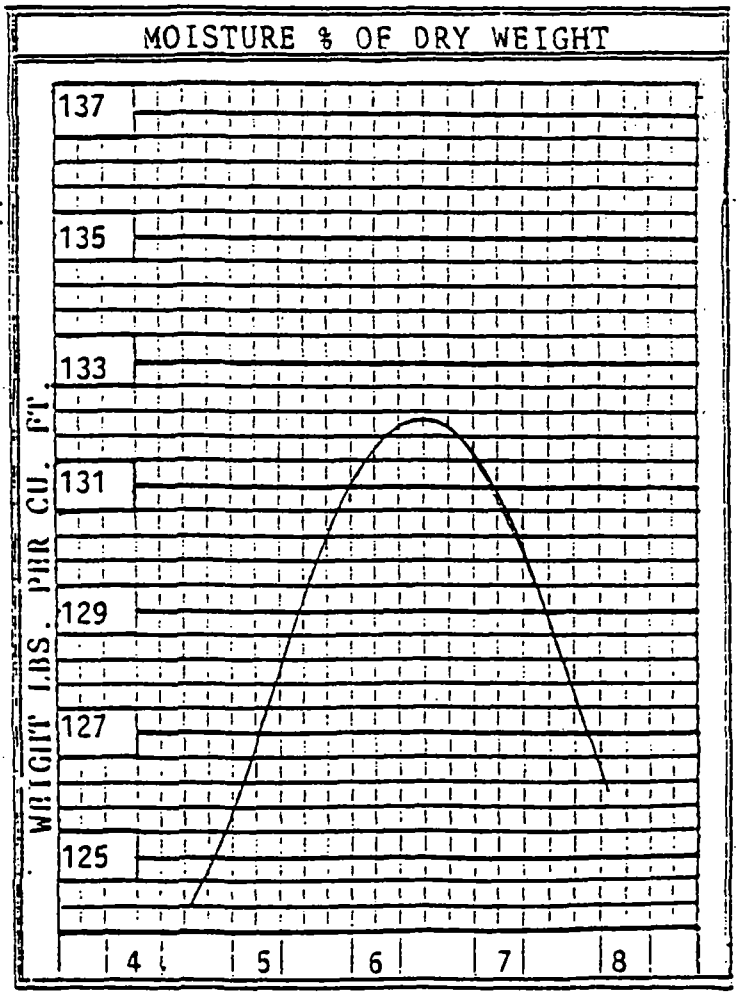
LAYERS: 5

BLOWS/LAYER: 56

TECHNICIAN: T.Nordhaug

SAMPLED BY: D.Smith

REMARKS:



CONSTRUCTION MATERIALS TESTING LABORATORIES, INC.

(CMTL, INC.)
4417 Pacific Highway East
Fife, Washington 98424
(206) 922-0798

W 4

SOIL/AGGREGATE ANALYSIS REPORT

CLIENT:	Port of Tacoma	DATE:	05-17-93
PROJECT:	BLAIR CLEAN-UP CONTRACT #710	PROJECT NO.:	T-8662
ADDRESS:	N/A	REPORT NO.:	18
CONTRACTOR:	RCI Environmental	SAMPLED BY:	D.Smith (CMTL)
MATERIAL TYPE:	1¼" CRUSHED BASE & WEARING COURSE	SOURCE:	WOODWORTH HYLEBOS PIT
LOCATION SAMPLED:	N.E. CORNER OF PROJECT	LAB.NO.:	3-341 I.D.NO.: #1
TESTS REQESTED:	SIEVE/FRACTURE/S.E.	TECHNICIAN:	T.Nordhaug

SIEVE ANALYSIS

SIEVE SIZE	% PASSING	SPECIFICATIONS
1¼"	100	100
5/8"	63.7	50-80
1/2"	47.5	
3/8"	40.1	
1/4"	30.8	30-50
#4	25.9	
#8	19.0	
#10	17.7	
#16	14.6	
#40	9.1	3-18
#100	4.3	
#200	2.7	5 MAX.

ADDITIONAL DATA

SAND EQUIVALENT: 75 (40 MIN)
% MOISTURE:
L.A. ABRASION:
DEGRADATION:
% WOOD WASTE:
LOOSE UNIT WEIGHT:
LIQUID LIMIT:
PLASTIC LIMIT:
PLASTICITY INDEX:
FINENESS MODULUS:
SOIL CLASSIFICATION:

OTHERS:
FRACTURE (75 MIN): 5/8 = 88.4%
1/4 = 95.1%
#10 = 99.8%

REMARKS:

TN/fd

(X)

CONSTRUCTION MATERIALS TESTING LABORATORIES, INC.

(CMTL, INC.)
4417 Pacific Highway East
Fife, Washington 98424
(206) 922-0798

W5

SOIL/AGGREGATE ANALYSIS REPORT

CLIENT: Port of Tacoma
DATE: 07-15-93
PROJECT: BLAIR CLEAN-UP CONTRACT #710
PROJECT NO.: T-8662 REPORT NO.: 20
ADDRESS: N/A
SAMPLED BY: CLIENT
CONTRACTOR: RCI Environmental
SUBMITTED BY: CLIENT
MATERIAL TYPE: 1¼" BASE COURSE
SOURCE: HYLEBOS PIT - WOODWORTH
LOCATION SAMPLED: SAME AS SOURCE
LAB NO.: 3-535 I.D.NO.: N/A
TESTS REQUESTED: SIEVE ANALYSIS
TECHNICIAN: JCRoss

SIEVE ANALYSIS

SIEVE SIZE	% PASSING	SPECIFICATIONS
1¼"	100	100
5/8"	66.0	50-80
1/2"	52.8	
3/8"	45.8	
1/4"	37.6	30-50
#4	32.6	
#8	24.4	
#10	22.6	
#16	18.2	
#40	10.9	3-18
#100	4.8	
#200	3.0	0-7½

ADDITIONAL DATA

SAND EQUIVALENT:
% MOISTURE:
L.A. ABRASION:
DEGRADATION:
% WOOD WASTE:
LOOSE UNIT WEIGHT:
LIQUID LIMIT:
PLASTIC LIMIT:
PLASTICITY INDEX:
FINENESS MODULUS:
SOIL CLASSIFICATION:

OTHERS:

REMARKS:

JCR/fd

CONSTRUCTION MATERIALS TESTING LABORATORIES, INC.

(CMTL, INC.)
4417 Pacific Highway East
Fife, Washington 98424
(206) 922-0798

W6

SOIL/AGGREGATE ANALYSIS REPORT

CLIENT: Port of Tacoma
DATE: 08-27-93
PROJECT: BLAIR CLEAN-UP CONTRACT #710
PROJECT NO.: T-8662 REPORT NO.: 23
ADDRESS: Tacoma
SAMPLED BY: D.SMITH (CMTL)
CONTRACTOR: RCI Environmental
SUBMITTED BY: D.SMITH (CMTL)
MATERIAL TYPE: 1¼" BASE COURE
SOURCE: WOODWORTH HYLEBOS PIT
LOCATION SAMPLED: NORTHEAST SIDE OF PROJECT
LAB NO.: 3-684 I.D.NO.: N/A
TESTS REQUESTED: Sieve Analysis
TECHNICIAN: T.Nordhaug

SIEVE ANALYSIS

SIEVE SIZE	% PASSING	SPECIFICATIONS
1¼"	100	100
1"	98.2	
5/8"	66.9	50-80
1/2"	49.3	
3/8"	39.2	
1/4"	30.4	30-50
#4	26.4	
#8	19.5	
#10	18.3	
#16	15.0	
#40	9.5	3-18
#100	4.1	
#200	2.4	5 MAX.

ADDITIONAL DATA

SAND EQUIVALENT:
% MOISTURE:
L.A. ABRASION:
DEGRADATION:
% WOOD WASTE:
LOOSE UNIT WEIGHT:
LIQUID LIMIT:
PLASTIC LIMIT:
PLASTICITY INDEX:
FINENESS MODULUS:
SOIL CLASSIFICATION:

OTHERS:

REMARKS: **CONFORMS**

TN/fd

ATTACHMENT G-5
DENSITY TEST DATA

2350-22

SUMMARY OF FIELD DENSITY TESTS

JOB NUMBER 2350-22
PROGRESS REPORT NO. 1
DATE 3/16/93

PROJECT Blair Backup

TEST NUMBER	TEST DATE	TEST METHOD	GENERAL LOCATION	ELEV. (feet)	FEET to GRADE	MAT'L TYPE	TYPE COMPACTOR	FIELD MOIST. %	% ± OMC	DRY DENSITY (PCF) FIELD	DRY DENSITY (PCF) MAX.	% COMPACTION FIELD	% COMPACTION SPEC.
DT-1	3/11/93	N	Sand & Gravel cover, east side		±1	gS	V	6.4	+3.7	128.2	137.4	93	92
DT-2					±1	gS	V	6.5	+3.8	130.6	137.4	95	92
DT-3					±0	gS	V	7.9	+5.2	135.8	137.4	99	95
DT-4					±0	gS	V	6.0	+3.3	135.1	137.4	98	95
DT-5					±0	gS	V	8.4	+5.7	135.9	137.4	99	95
DT-6					±0	gS	V	7.5	+4.8	130.3	137.4	95	95
DT-7					±1	gS	V	7.6	+4.9	130.7	137.4	95	92
DT-8					±1	gS	V	7.1	+4.4	128.8	137.4	94	92
DT-9	3/12/93	N	Sand & Gravel Cover, east side		±0	gS	V	7.9	+2.7	129.3	142	91	95
DT-10	3/15/93	N	S&G cover, SW site corner		±1	gS	V	7.1	+1.3	1263	140.8	90	92
RT-10	"	"	same, additional rolling		±1	gS	V	7.6	+1.8	130.2	140.8	92	92
DT-11	3/16/93	N	Sand & Gravel BUFFER, 45' so, 80' w of NE corner		±0	sG	V	5.9	+1.9	131.4	132.6	99	95
DT-12	"	"	" , 165' W. of DT 11		±0	sG	V	2.7	-1.3	126.5	132.6	95	95
DT-13	"	"	" 245' W. of e. side cor, 245' so. of N. side		±0	sG	V	4.8	+0.8	127.4	132.6	96	95

138-140

Percent compaction based on: ☐ Standard AASHO (AASHO T 99-57, ASTM D 698)
☑ Modified AASHO (AASHO T 180-57, ASTM D 1557)

Test Method

N - Nuclear (ASTM D 2922)
SC - Sand Cone (ASTM D 1556)
RB - Rubber Balloon (ASTM D 3167)

Material Type

S - Sand s - sandy
G - Gravel g - gravelly
SI - Silt si - silty
C - Clay c - clayey

Type of Compactor

R - Rubber-tired Roller
V - Vibratory Compactor
S - Sheepsfoot Roller
GD - Grid Roller
L - Loaded Scraper
JJ - Jumping Jack
BV - Backhoe Vibratory Plate
VP - Vibratory Plate
HT - Hand Tamper

OMC - Optimum Moisture Content
DT - Density Test
RT - Retest of an area following additional compaction

SUMMARY OF FIELD DENSITY TESTS

JOB NUMBER 2350-22
PROGRESS REPORT NO. 2
DATE 3/19/93

PROJECT Blair Backup

TEST NUMBER	TEST DATE	TEST METHOD	GENERAL LOCATION	ELEV (feet)	FEET to GRADE	MAT'L TYPE	TYPE COMPACTOR	FIELD MOIST. %	% ± OMC	DRY DENSITY (PCF) FIELD	DRY DENSITY (PCF) MAX.	% COMPACTION FIELD	% COMPACTION SPEC.
DT-14	3/18/93	N	Sand & Gravel COVER, SW site corner		±1	gS	V	6.4	+0.7	127.9	142.1	90	92
RT-14	"	"	as before "		±1	gS	V	6.5	+0.8	130.4	142.1	92	92
DT-15	"	"	Sand & Gravel BUFFER, NE buffer area		±0	sG	V	8.1	+4.1	130.2	132.6	98	95
DT-16	"	"	Sand & Gravel COVER, SW site corner		±1	gS	V	6.2	+0.5	128.8	142.1	91	92
RT-16	"	"	as before		±1	gS	V	5.9	+0.2	129.8	142.1	91	92
DT-17	"	"	Sand & Gravel COVER, SW site corner		±0	gS	V	5.8	+0.1	129.8	142.1	91	95
DT-18	3/19/93	N	Sand & Gravel COVER, SW site corner		±1	gS	V	6.2	+0.5	133.7	142.1	94	92
DT-19	"	"	Sand & Gravel COVER, SW site corner		±0	gS	V	6.3	+0.6	128.3	142.1	90	95
RT-19	"	"	as before		±0	gS	V	6.6	+0.9	131.4	142.1	92	95

Percent compaction based on: ☐ Standard AASHO (AASHO T 99-57, ASTM D 698)
☑ Modified AASHO (AASHO T 180-57, ASTM D 1557)

Test Method

N - Nuclear (ASTM D 2922)
SC - Sand Cone (ASTM D 1556)
RB - Rubber Balloon (ASTM D 3167)

Material Type

S - Sand s - sandy
G - Gravel g - gravelly
Sl - Silt sl - silty
C - Clay c - clayey

Type of Compactor

R - Rubber-tired Roller
V - Vibratory Compactor
S - Sheepsfoot Roller
GD - Grid Roller
L - Loaded Scraper
JJ - Jumping Jack
BV - Backhoe Vibratory Plate
VP - Vibratory Plate
HT - Hand Tamper

OMC - Optimum Moisture Content
DT - Density Test
RT - Retest of an area following additional compaction

HART - CROWSER & associates Inc.

SUMMARY OF FIELD DENSITY TESTS

PROJECT Blair Backup

JOB NUMBER 2350-22
PROGRESS REPORT NO. 3
DATE 3/26/93

TEST NUMBER	TEST DATE	TEST METHOD	GENERAL LOCATION	ELEV (feet)	FEET to GRADE	MAT'L TYPE	TYPE COMPACTOR	FIELD MOIST. %	% ± OMC	DRY DENSITY (PCF) FIELD	DRY DENSITY (PCF) MAX.	% COMPACTION FIELD	% COMPACTION SPEC.
DT-20	3/22/93	N	Sand & Gravel Cover; 65'W, 10'N of MH7		±1	gS	V	6.9	11.0	121.8	130.4	96	92
DT-21	"	"	Sand & Gravel Cover, 35'W, 65'So. of MH7		±1	gS	V	7.1	11.2	121.8	130.4	93	92
DT-22	3/25/93	N	Sand & Gravel Cover, 55'W, 35'So of well HC-12S		±0	gS	V	9.3	13.4	124.5	130.4	95	95
DT-23	"	"	S&G Cover, 155'W, 30'No. of well HC-12S		±0	gS	V	8.7	+2.8	124.2	130.4	95	95
RT-19A	3/26/93	N	112'N, 80'E of Swale Corner (S&G COVER)		±0	gS	V	10.2	+4.4	128.1	130.4	99	95
DT-24	3/26/93	N	Storm Dr. Backfill 180'N of MH3 (S&G COVER)		±½	gS	BV	4.4	-1.0	127.1	130.4	97	95
RT-17	"	"	60'E, 20'N of SWI site corner (S&G Cover)		±0	gS	V	8.2	12.3	126.9	130.4	97	95
DT-25	"	"	65'E, 15'N of well HC 12I (S&G Cover)		±0	gS	V	9.2	13.3	124.1	130.4	95	95
DT-26	"	"	Storm Dr. Backfill ±25'No. of CB #2		±2	gS	V	5.5	-0.4	121.9	130.4	93	92

Percent compaction based on: ☐ Standard AASHO (AASHO T 99-57, ASTM D 698)
☑ Modified AASHO (AASHO T 180-57, ASTM D 1557)

Test Method

N - Nuclear (ASTM D 2922)
SC - Sand Cone (ASTM D 1556)
RB - Rubber Balloon (ASTM D 3167)

Material Type

S - Sand — s - sandy
G - Gravel — g - gravelly
SI - Silt — si - silty
C - Clay — c - clayey

Type of Compactor

R - Rubber-tired Roller
V - Vibratory Compactor
S - Sheepsfoot Roller
GD - Grid Roller
L - Loaded Scraper
JJ - Jumping Jack
BV - Backhoe Vibratory Plate
VP - Vibratory Plate
[illegible]

OMC - Optimum Moisture Content
DT - Density Test
RT - Retest of an area following additional compaction

SUMMARY OF FIELD DENSITY TESTS

JOB NUMBER 2350-22
PROGRESS REPORT NO. 4
DATE 4/2/93

PROJECT Blair Backup

TEST NUMBER	TEST DATE	TEST METHOD	GENERAL LOCATION	ELEV. (feet)	FEET to GRADE	MAT'L TYPE	TYPE COMPACTOR	FIELD MOIST. %	% ± OMC	DRY DENSITY (PCF) FIELD	DRY DENSITY (PCF) MAX.	% COMPACTION FIELD	% COMPACTION SPEC.
DT-27	3/20/93	N	Storm Drain Backfill ±12'E. of MH3	±16	±3	gS	BV	6.5	+0.6	121.0	130.4	93	92
DT-28			Sand & Gravel COVER, 70'W, 50'W. of HC12I		±1	gS	V	8.2	+2.3	126.1	130.4	97	92
DT-29			S&G COVER, 45'N, 30'W of MH7		±0	gS	V	7.9	+2.0	125.4	130.4	96	95
DT-30			S&G COVER, 35'So, 50'E of SW corner CAP		±1	gS	V	9.5	+3.6	124.7	130.4	96	92
DT-31			Storm D. Backfill in COVER area, 35'W. of MH2	±18	±1	gS	V	5.5	-0.4	121.4	130.4	93	92
DT-32	3/30/93	N	Sand & Gravel COVER, 50'So, 15'W of EPA-6I		±0	gS	V	7.0	+1.1	126.2	130.4	97	95
DT-33			S&G COVER, ±135'E. of DT-32		±1	gS	V	9.2	+3.3	123.2	130.4	94	92
DT-34			S&G COVER, ±135'E, 10'No. of DT-33		±0	gS	V	8.8	+2.9	124.4	130.4	95	95
DT-35			S&G COVER, ±135'E, 20'So. of DT-34		±1	gS	V	9.5	+3.6	119.5	130.4	92	92
DT-36	3/31/93	N	S&G COVER, ±45'W, 20'So. of EPA 10i well		±0	gS	V	9.2	+3.3	124.2	130.4	95	95
DT-37			S&G COVER ±90'E, 10'So. of EPA 10i well		±1	gS	V	7.2	+1.3	121.4	130.4	93	92
DT-38	4/1/93	N	S&G BUFFER ±35'E, 40'So. of MH7		±0	sG	V	3.2	-2.9	127.2	133.9	95	95
DT-39	"	"	S&G BUFFER, ±50'W, 10'N. of Well EPA7S		±0	sG	V	3.1	-3.0	127.4	133.9	95	95
DT-40	4/2/93	N	S&G BUFFER, ±95'E, 25'N of Well EPA7S		±0	sG	V	3.6	-2.5	131.6	133.9	98	95
DT-41			S&G BUFFER ±60'So. of MH5		±0	sG	V	3.2	-2.9	128.6	133.9	96	95
DT-42			S&G BUFFER ±155'W, 55'No. of Well EPA10i		±0	sG	V	3.7	-2.4	132.9	133.9	99	95

Percent compaction based on: ☐ Standard AASHO (AASHO T 99-57, ASTM D 698)
☑ Modified AASHO (AASHO T 180-57, ASTM D 1557)

Test Method

N - Nuclear (ASTM D 2922)
SC - Sand Cone (ASTM D 1556)
RB - Rubber Balloon (ASTM D 3167)

Material Type

S - Sand s - sandy
G - Gravel g - gravelly
Si - Silt si - silty
C - Clay c - clayey

Type of Compactor

R - Rubber-tired Roller
V - Vibratory Compactor
S - Sheepsfoot Roller
GD - Grid Roller
L - Loaded Scraper
JJ - Jumping Jack
BV - Backhoe Vibratory Plate
VP - Vibratory Plate
HT - Hand Tamper

OMC - Optimum Moisture Content
DT - Density Test
RT - Retest of an area following additional compaction

SUMMARY OF FIELD DENSITY TESTS

PROJECT Blair Backup

JOB NUMBER 2350-22
PROGRESS REPORT NO. 5
DATE 4/9/93

TEST NUMBER	TEST DATE	TEST METHOD	GENERAL LOCATION	ELEV. (feet)	FEET to GRADE	MAT'L TYPE	TYPE COMPACTOR	FIELD MOIST. %	% ± OMC	DRY DENSITY (PCF) FIELD	DRY DENSITY (PCF) MAX.	% COMPACTION FIELD	% COMPACTION SPEC.
DT-43	4/5/93	N	Sand & Gravel BUFFER, ± 55' W, 40' N of MH6		±0	SG	V	5.6	-0.3	133.5	133.9	100	95
DT-44	4/6/93	N	Sand & Gravel BUFFER, ± 30' W, 50' N. of MH5		±0	SG	V	6.5	+0.6	134.8	133.9	100	95
DT-45	"	"	" , ± 50' W, 35' S. of MH3		±0	SG	V	4.2	-1.7	129.5	133.9	97	95

Percent compaction based on: ☐ Standard AASHO (AASHO T 99-57, ASTM D 698)
☑ Modified AASHO (AASHO T 180-57, ASTM D 1557)

Test Method

N - Nuclear (ASTM D 2922)
SC - Sand Cone (ASTM D 1556)
RB - Rubber Balloon (ASTM D 3167)

Material Type

S - Sand s - sandy
G - Gravel g - gravelly
SI - Silt si - silty
C - Clay c - clayey

Type of Compactor

R - Rubber-tired Roller
V - Vibratory Compactor
S - Sheepsfoot Roller
GD - Grid Roller
L - Loaded Scraper
JJ - Jumping Jack
BV - Backhoe Vibratory Plate
VP - Vibratory Plate
HT - Hand Tamper

OMC - Optimum Moisture Content
DT - Density Test
RT - Retest of an area following additional compaction

SUMMARY OF FIELD DENSITY TESTS

PROJECT Blair Backup

JOB NUMBER 2350-[illegible]
PROGRESS REPORT NO. 6
DATE 4/27/93

TEST NUMBER	TEST DATE	TEST METHOD	GENERAL LOCATION	ELEV (feet)	FEET to GRADE	MAT'L TYPE	TYPE COMPACTOR	FIELD MOIST. %	% ± OMC	DRY DENSITY (PCF) FIELD	DRY DENSITY (PCF) MAX.	% COMPACTION FIELD	% COMPACTION SPEC.
DT-46	4/[illegible]	N	Sand & Gravel COVER, 20'N, 330'W. of SE site Cor.		±1	gS	V	8.7	+1.6	132.5	130.[illegible]	100+	92
DT-47			Sand & Gravel COVER, 75'N, 530'W of SE site Corner		±1	gS	V	9.6	+2.5	125.8	130.[illegible]	[illegible]	92
DT-48			Sand & Gravel COVER, 30'N, 730'W of SE site Corner		±1	gS	V	9.1	+2.0	[illegible]	130.[illegible]	[illegible]	92
DT-49			Snd & Grav. COVER, 80'N, 930'W. of SE site Cor.		±1	gS	V	8.3	+1.2	125.[illegible]	130.[illegible]	96	92
DT-50			Snd. & Grav. Cover, 25'N, 1130' W. of SE site Cor.		±1	gS	V	7.9	+0.6	133.1	130.[illegible]	100+	92
DT-16A			Snd & Grav. Cover, 70'E, 60'N of SW site corner		±1	gS	V	7.3	+1.6	131.7	142.1	93	92
DT-51			Snd & Grav. Cover, 225'N, 50'E of SW site corner		±1	gS	V	7.7	+0.6	123.0	[illegible]	94	92
DT-52			Snd, & Grav. Cover, 295'N, 145'E of SW site corner		±1	gS	V	7.0	-0.1	[illegible]	[illegible]	[illegible]	[illegible]

Percent compaction based on: ☐ Standard AASHO (AASHO T 99-57, ASTM D 698)
☒ Modified AASHO (AASHO T 180-57, ASTM D 1557)

Test Method

N - Nuclear (ASTM D 2922)
SC - Sand Cone (ASTM D 1556)
RB - Rubber Balloon (ASTM D 3167)

Material Type

S - Sand
G - Gravel
SI - Silt
C - Clay
s - sandy
g - gravelly
si - silty
c - clayey

Type of Compactor

R - Rubber-tired Roller
V - Vibratory Compactor
S - Sheepsfoot Roller
GD - Grid Roller
L - Loaded Scraper
JJ - Jumping Jack
BV - Backhoe Vibratory Plate
VP - Vibratory Plate
HT - Hand Tamper

OMC - Optimum Moisture Content
DT - Density Test
RT - Retest of an area following additional compaction

SUMMARY OF FIELD DENSITY TESTS

PROJECT Blair Backup

JOB NUMBER 2350-22
PROGRESS REPORT NO. 7
DATE 5/7/93

TEST NUMBER	TEST DATE	TEST METHOD	GENERAL LOCATION	ELEV (feet)	FEET to GRADE	MAT'L TYPE	TYPE COMPACTOR	FIELD MOIST. %	% ± OMC	DRY DENSITY (PCF) FIELD	DRY DENSITY (PCF) MAX.	% COMPACTION FIELD	% COMPACTION SPEC.
DT-53	5/4/93	N	Sand & Gravel COVER; 165' So, 20' E of NW proj. corner		±1	gS	V	11.1	+4.0	127.0	130.4	97	92
DT-54	5/6/93	N	S&G COVER; 110' E, 10' So. of well EPA 8i		±0	gS	V	4.8	-2.3	118.4	130.4	91	95
DT-55	5/6/93	N	S&G Cover; 35' So, 5' W. of well EPA 8i		±0	gS	V	5.0	-2.1	113.2	130.4	87	95
DT-56	5/6/93	N	S&G Cover; 150' W, 10' So. of well EPA 8i		±0	gS	V	7.5	+0.4	123.6	130.4	95	95
DT-57	5/6/93	N	S&G Cover; 55' W, 70' So. of Pennwalt on N. proj. bdy		±0	gS	V	7.8	+0.7	126.6	130.4	97	95
DT-58	5/7/93	N	S&G Cover; 65' E, 65' So. of Middle NW proj. corner		±0	gS	V	6.9	-0.2	123.6	130.4	95	95
DT-59	5/7/93	N	S&G BUFFER; 72' W, 17' So. of MH3	15.5±	±0	sG	V	5.0	-0.9	134.3	133.9	100	95

Percent compaction based on: ☐ Standard AASHO (AASHO T 99-57, ASTM D 698)
☑ Modified AASHO (AASHO T 180-57, ASTM D 1557)

Test Method

N - Nuclear (ASTM D 2922)
SC - Sand Cone (ASTM D 1556)
RB - Rubber Balloon (ASTM D 3167)

Material Type

S - Sand
G - Gravel
Si - Silt
C - Clay
s - sandy
g - gravelly
si - silty
c - clayey

Type of Compactor

R - Rubber-tired Roller
V - Vibratory Compactor
S - Sheepsfoot Roller
GD - Grid Roller
L - Loaded Scraper
JJ - Jumping Jack
BV - Backhoe Vibratory Plate
VP - Vibratory Plate
HT - Hand Tamper

OMC - Optimum Moisture Content
DT - Density Test
RT - Retest of an area following additional compaction

SUMMARY OF FIELD DENSITY TESTS

PROJECT Blair Backup

JOB NUMBER 2350-22
PROGRESS REPORT NO. 8
DATE 5/14/93

TEST NUMBER	TEST DATE	TEST METHOD	GENERAL LOCATION	ELEV (feet)	FEET to GRADE	MAT'L TYPE	TYPE COMPACTOR	FIELD MOIST. %	% ± OMC	DRY DENSITY (PCF) FIELD	DRY DENSITY (PCF) MAX.	% COMPACTION FIELD	% COMPACTION SPEC.
DT-58	5/13/93	N	Storm Drain Backfill 70' W. MH 3	±15	± ½	gS	V	8.7	+1.6	124.1	130.4	95	95

Percent compaction based on: ☐ Standard AASHO (AASHO T 99-57, ASTM D 698)
☑ Modified AASHO (AASHO T 180-57, ASTM D 1557)

Test Method

N - Nuclear (ASTM D 2922)
SC - Sand Cone (ASTM D 1556)
RB - Rubber Balloon (ASTM D 3167)

Material Type

S - Sand s - sandy
G - Gravel g - gravelly
Sl - Silt sl - silty
C - Clay c - clayey

Type of Compactor

R - Rubber-tired Roller
V - Vibratory Compactor
S - Sheepsfoot Roller
GD - Grid Roller
L - Loaded Scraper
JJ - Jumping Jack
BV - Backhoe Vibratory Plate
VP - Vibratory Plate
HT - Hand Tamper

OMC - Optimum Moisture Content
DT - Density Test
RT - Retest of an area following additional compaction

SUMMARY OF FIELD DENSITY TESTS

JOB NUMBER 2350-22
PROGRESS REPORT NO. 9
DATE 5/21/93

PROJECT Blair Backup

TEST NUMBER	TEST DATE	TEST METHOD	GENERAL LOCATION	ELEV (feet)	FEET to GRADE	MAT'L TYPE	TYPE COMPACTOR	FIELD MOIST. %	% ± OMC	DRY DENSITY (PCF) FIELD	DRY DENSITY (PCF) MAX.	% COMPACTION FIELD	% COMPACTION SPEC.
DT-59	5/17/93	N	North pad base course 40'N, 50'E of MH4		±0	sG	V	3.5	-3.0	128.4	129.4	99	95
DT-60			North pad base course 95'N, 80'W of MH4		±0	sG	V	3.8	-2.7	129.3	129.4	100	95
DT-61			North pad base course 70'N, 65'W of MH5		±0	sG	V	3.8	-2.7	126.5	129.4	98	95
DT-62			North pad base course 115'N, 20'W of MH6		±0	sG	V	3.7	-2.8	123.6	129.4	96	95
DT-63	5/18/93	N	North pad base course 50'N, 95'E of MH7		±0	sG	V	3.5	-3.0	126.4	129.4	98	95
DT-64			North pad base course 200'N, 105'E of MH7		±0	sG	V	4.4	-2.1	129.9	129.4	100	95
DT-65			North pad base course 200'N, 85'E of MH6		±0	sG	V	3.6	-2.9	122.7	129.4	95	95
DT-66			North pad base course 190'N, 65'E of MH5		±0	sG	V	3.7	-2.8	126.0	129.4	97	95
DT-67			South Pad base course 130'W, 35'No. SE pad corner		±0	sG	V	3.8	-2.7	138.0	129.4	100	95
DT-68			South Pad base course 75'So. of NE pad corner		±0	sG	V	5.6	-0.9	134.3	129.4	100	95
DT-69			South Pad base course 136'So, 90'E MH 4		±0	sG	V	3.9	-2.6	128.4	129.4	99	95
DT-70			South Pad base course 70'So, 45'W MH 4		±0	sG	V	4.6	-1.9	132.9	129.4	100	95
DT-71			South Pad base course 130'So., 10'E MH5		±0	sG	V	3.8	-2.7	131.6	129.4	100	95
DT-72			South Pad base course 75'So, 50'E MH6		±0	sG	V	5.1	-1.4	123.9	129.4	96	95
DT-73			South Pad base course 55'N, 145'E SW pad corner		±0	sG	V	4.6	-1.9	128.8	129.4	100	95

Percent compaction based on: ☐ Standard AASHO (AASHO T 99-57, ASTM D 698)
☑ Modified AASHO (AASHO T 180-57, ASTM D 1557)

Test Method

N - Nuclear (ASTM D 2922)
SC - Sand Cone (ASTM D 1556)
RB - Rubber Balloon (ASTM D 3167)

Material Type

S - Sand s - sandy
G - Gravel g - gravelly
SI - Silt si - silty
C - Clay c - clayey

Type of Compactor

R - Rubber-tired Roller
V - Vibratory Compactor
S - Sheepsfoot Roller
GD - Grid Roller
L - Loaded Scraper
JJ - Jumping Jack
BV - Backhoe Vibratory Plate
VP - Vibratory Plate
HT - Hand Tamper

OMC - Optimum Moisture Content
DT - Density Test
RT - Retest of an area following additional compaction

SUMMARY OF FIELD DENSITY TESTS

PROJECT Blair Backup

JOB NUMBER 2350-22
PROGRESS REPORT NO. 10
DATE 7/16/~~87~~93

TEST NUMBER	TEST DATE	TEST METHOD	GENERAL LOCATION	ELEV (feet)	FEET to GRADE	MAT'L TYPE	TYPE COMPACTOR	FIELD MOIST. %	% ± OMC	DRY DENSITY (PCF) FIELD	DRY DENSITY (PCF) MAX.	% COMPACTION FIELD	% COMPACTION SPEC.
DT-74	7/15/93	N	South Pad 110'So, 15'W. of MH3		⊖	TOP COURSE	V	6.8	+0	132.1	136.4	97	95
-75			South Pad 35'So., 40'E of MH4						-0.3	133.9		98	95
-76			South Pad 35'No, 160'W. of EPA 10.5' well						-1.4	132.3		97	95
-77			South Pad 55'So., 10'W. of MH5						-0.1	132.6		97	95
-78			South Pad 30'No., 75'E. of EPA 6i well loc.						+0.7	130.3		96	95
-79			South Pad 80'So., 110'W. of MH6						+0.3	134.9		99	95
-80			North Pad 80'No., 35'W. of MH4		0.125	BASE COURSE		6.5	-3.9	122.3	129.4	95	95
-81			North Pad 120'No., 30'W. of MH5		0.125				-2.8	126.3		98	95
-82			North Pad 190'No., 155'E. of MH7		0.125				-1.4	122.5		95	95

Percent compaction based on: ☐ Standard AASHO (AASHO T 99-57, ASTM D 698)
☑ Modified AASHO (AASHO T 180-57, ASTM D 1557)

Test Method

N - Nuclear (ASTM D 2922)
SC - Sand Cone (ASTM D 1556)
RB - Rubber Balloon (ASTM D 3167)

Material Type

S - Sand, s - sandy
G - Gravel, g - gravelly
SI - Silt, si - silty
C - Clay, c - clayey

Type of Compactor

R - Rubber-tired Roller
V - Vibratory Compactor
S - Sheepsfoot Roller
GD - Grid Roller
L - Loaded Scraper
JJ - Jumping Jack
BV - Backhoe Vibratory Plate
VP - Vibratory Plate
HT - Hand Tamper

OMC - Optimum Moisture Content
DT - Density Test
RT - Retest of an area following additional compaction

SUMMARY OF FIELD DENSITY TESTS

PROJECT Blair Backup

JOB NUMBER 2350-22
PROGRESS REPORT NO. 11
DATE 7/20/93

TEST NUMBER	TEST DATE	TEST METHOD	GENERAL LOCATION	ELEV. (feet)	FEET to GRADE	MAT'L TYPE	TYPE COMPACTOR	FIELD MOIST. %	% ± OMC	DRY DENSITY (PCF) FIELD	DRY DENSITY (PCF) MAX.	% COMPACTION FIELD	% COMPACTION SPEC.
DT-83	7/19/93	N	North Fed. 70'N, 5'E of MH4		0	Top Course	V	5.2	-1.3	129.9	136.4	95	95
-84			" 160'N, 75'E of MH5		0			4.1	-2.4	134.3	136.4	98	95
-85			" 45'N of MH5		0			5.2	-1.3	133.5	136.4	98	95
-86			" 205'N, 90'W of MH5		0			5.6	-0.9	129.8	136.4	95	95
-87			" 70'N, 25'E of MH6		0			4.6	-1.9	133.3	136.4	98	95
-88			" 175'N, 70'W of MH6		0			5.7	-0.8	130.9	136.4	96	95
-89			" 75'N, 70'E of MH7		0			5.6	-0.9	134.0	136.4	98	95

Percent compaction based on: ☐ Standard AASHO (AASHO T 99-57, ASTM D 698)
☑ Modified AASHO (AASHO T 180-57, ASTM D 1557)

Test Method

N - Nuclear (ASTM D 2922)
SC - Sand Cone (ASTM D 1556)
RB - Rubber Balloon (ASTM D 3167)

Material Type

S - Sand s - sandy
G - Gravel g - gravelly
SI - Silt si - silty
C - Clay c - clayey

Type of Compactor

R - Rubber-tired Roller
V - Vibratory Compactor
S - Sheepsfoot Roller
GD - Grid Roller
L - Loaded Scraper
JJ - Jumping Jack
BV - Backhoe Vibratory Plate
VP - Vibratory Plate
HT - Hand Tamper

OMC - Optimum Moisture Content
DT - Density Test
RT - Retest of an area following additional compaction

HART - CROWSER & associates inc.

CONSTRUCTION MATERIALS TESTING LABORATORIES, INC.

(CMTL, INC.)
4417 Pacific Highway East
Fife, Washington 98424
(206) 922-0798

IN-PLACE DENSITY TEST REPORT

CLIENT: Port of Tacoma
DATE: 09-03-93
PAGE: 1 of 1
PROJECT: BLAIR CLEAN-UP CONTRACT #710
PROJECT NO.: T-8662
REPORT NO.: 25
ADDRESS: Port of Tacoma Road, Tacoma
CONTRACT or PERMIT NO.: N/A
CONTRACTOR: RCI Environmental
TECHNICIAN: D.Smith
IN-PLACE DENSITY TEST METHOD: ASTM D-2922
MAXIMUM DENSITY TEST METHOD: ASTM D-1557(D)

CONFORMS

TEST NO.	ELEVATION	LOCATION	HC No.	LAB CURVE NO.	FIELD DENSITY LBS. WET	FIELD DENSITY CU.FT. DRY	PER-CENT MOIST-URE	LAB CURVE DRY WT. # / CF.	LAB CURVE OPTIMUM WATER %	PER-CENT COM-PACT	COM-PACT % REQ.
9	1½"CRUSHED B.C.*	50'West CB#6 & 50'North.	OT-90	P-11	133.9	126.6	5.8	132.1	6.4	95.8	95%
0	1½"CRUSHED B.C.	75'West & 150'North of CB#6.	OT-91	P-11	132.1	125.5	5.2	132.1	6.4	95.0	"
1	1½"CRUSHED B.C.	60'West & 200'North of CB#5.	OT-92	P-11	137.8	131.0	5.1	132.1	6.4	99.2	"
2	1½"CRUSHED B.C.	40'West & 110'North of CB#5.	OT-93	P-11	131.7	126.0	4.5	132.1	6.4	95.4	"
3	1½"CRUSHED B.C.	70'West & 25'North of CB#4.	OT-94	P-11	131.9	125.8	4.8	132.1	6.4	95.2	"
4	1½"CRUSHED B.C.	20'West & 125'North of CB#4.	OT-95	P-11	132.6	126.8	4.6	132.1	6.4	96.0	"

REMARKS: * BASE COURSE

SUMMARY OF FIELD DENSITY TESTS

JOB NUMBER 2350-24
PROGRESS REPORT NO. 12
DATE 10/8/93

PROJECT Blair Backup

TEST NUMBER	TEST DATE	TEST METHOD	GENERAL LOCATION	ELEV. (feet)	FEET to GRADE	MAT'L TYPE	TYPE COMPACTOR	FIELD MOIST. %	% ± OMC	DRY DENSITY (PCF) FIELD	DRY DENSITY (PCF) MAX.	% COMPACTION FIELD	% COMPACTION SPEC.
RT-9	10/6/93	N	110'So, 10'W NE site corner, S&G Cover		0	gS	V	4.8		132.7	130.4	100	95
RT-8			120'So, 15'W. NE site corner, S&G COVER		1	gS	V	4.3		131.5	137.0	96	92
RT-54			100'E, 30'So. of EPA 9.5'R well, S&G Cover		0	gS	V	4.4		124.4	130.4	95	95
RT-55			15'W, 10'So. of EPA 9.5'R well, S&G COVER		0	gS	V	4.0		126.4	130.4	97	95
DT-96	10/7/93	N	85'So MH3, WEARING COURSE		0	CRB	V	5.2		128.6	132.1	97	95
-97			40'N, 30'W EPA 10' well, WEARING COURSE		0			4.7		125.6	132.1	95	95
-98			70'So, 35'W. MH4, WEARING COURSE		0			6.4		126.9	132.1	96	95
-99			120'So, 10'E of MH5, WEARING COURSE		0			5.6		125.0	132.1	95	95
-100			70'E, 55'So. MH6, WEARING COURSE		0			5.8		125.2	132.1	95	95
-101			105'N, 40'W EPA 7.5'R well, WEARING COURSE		0			6.7		125.6	132.1	95	95
DT-102	10/8/93	N	S&G COVER, 70'E, 15'So. EPA 9.5'R well		1	gS	V	5.8		119.5	130.4	92	92
DT-103	"	"	S&G COVER, 240'W, 20'So. EPA 9.5'R well		1	gS	V	5.6		121.8	130.4	93	92

Percent compaction based on: ☐ Standard AASHO (AASHO T 99-57, ASTM D 698)
☑ Modified AASHO (AASHO T 180-57, ASTM D 1557)

Test Method

N - Nuclear (ASTM D 2922)
SC - Sand Cone (ASTM D 1556)
RB - Rubber Balloon (ASTM D 3167)

Material Type

S - Sand s - sandy
G - Gravel g - gravelly
SI - Silt si - silty
C - Clay c - clayey

Type of Compactor

R - Rubber-tired Roller
V - Vibratory Compactor
S - Sheepsfoot Roller
GD - Grid Roller
L - Loaded Scraper
JJ - Jumping Jack
BV - Backhoe Vibratory Plate
VP - Vibratory Plate
HT - Hand Tamper

OMC - Optimum Moisture Content
DT - Density Test
RT - Retest of an area following additional compaction

HART-CROWSER & associates inc.

Appendix H

APPENDIX H
ASPHALT CAP SYSTEM

HARTCROWSER

Earth and Environmental Technologies

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102
FAX 206.328.5581
206.324.9530

MEMORANDUM

DATE: June 21, 1993

TO: Karen Keeley - EPA Region 10

FROM: John Verduin - Hart Crowser

RE: Asphalt Cap Submittal
Blair Waterway and Backup Properties Cleanup - 1993
J-2350-22

This memorandum presents all submittals received from RCIE pertaining to the asphalt concrete cap as described in Section 02513 of the Port of Tacoma's Blair Waterway and Backup Properties Cleanup - 1993 specifications. Below, a brief description and the results of each submittal are described. The submittals are attached.

The following submittals have been received:

- Aggregate tests per 2.01 of Section 02513;
- Bituminous materials per 2.02 of Section 02513;
- Paving fabric per 2.04 of Section 02513; and
- Mix design per 2.03 of Section 02513.

Aggregate Test Submittals

Cascade Testing Laboratory, Inc. completed the following tests on the asphalt concrete aggregate:

- ASTM C-131 Los Angeles Abrasion
- ASTM C-88 Sulfate Soundness Test
- Percent Fracture Content - Two Face
- WSDOT Test 113 Degradation Factor
- Sand Equivalent Test

Table 1 is a summary of Cascade's data. Attachment 1 presents the raw data.

Table 1 - Aggregate Test Data

Test	Objective	Observed	Specified
Los Angeles Abrasion	Percent Loss after 500 revolutions	15%	30% max
Sulfate Soundness Test	Percent Loss after 5 cycles	2.2%	NA
Percent Fracture Content - Two Face	Weighted Percent	99%	75%
Degradation Factor	Factor	67%	30% min
Sand Equivalent Test	S.E. Value (5/8-inch minus)	81%	45% min
Sand Equivalent Test	S.E. Value (Blend Sand)	77%	30% min

Bituminous Materials

Watson Asphalt stated that they will use AR-4000W for their bituminous material. There was a error on their April 21, 1993, letter which omitted the W.

Paving Fabric

Attachment 2 is Watson's submittal describing the Amoco construction fabric (AMOPAVE 4599) they propose to use. Table 2 presents a summary of the paving fabric's properties.

Table 2 - AMOPAVE 4599 Paving Fabric

Property	ASTM Test Designation	Typical Property	Specified
Tensile Strength in pounds	D-4632	90	90 min
Weight in oz/sy	-	5	4 to 6
Width in inches	-	150	36 min

Mix Design

Specifications stated that the asphalt concrete mix shall be designed using the Marshall Method and 75 blows. Table 3 is a summary of Cascade's mix design. The raw data are presented in Attachment 3.

Table 3 - Watson's Marshall Mix Design

Sieve Size	Percent Passing	Specified
5/8-inch	100	100
1/2-inch	98	90 to 100
3/8-inch	90	75 to 90
1/4-inch	73	55 to 75
No. 4	64	-
No. 8	45	-
No. 10	40	32 to 48
No. 40	16	11 to 24
No. 80	10	-
No. 100	8	-
No. 200	5.2	3 to 7
Percent Asphalt	5.6	-

The Marshall mix density was 147.4 pounds per cubic foot (pcf).

Specifications required the mix to have a stability of at least 1,800 pounds and a maximum permeability of 10^{-7} cm/sec. Cascade prepared three samples of the mix design. The average stability was 1,875 pounds. They also completed a permeability analysis on the mix and found the permeability to be 1.1×10^{-7} cm/sec.

Cascade prepared a 4.257 inch high, 4 inch diameter sample of the mix design and submitted the sample to Hart Crowser. The sample had a density of 145.7 pcf. Hart Crowser ran a flexible wall permeability test on the sample in accordance with ASTM D-5084 (Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter - Raising Tailwater Method). Hart Crowser applied a thin coat of AR-4000W along the edge of the sample, leaving the top and bottom in

their received condition. Vacuum grease was also applied along the sample edge prior to installing the confining membrane. A confining pressure of 70 psi was applied to the sample. A headwater back pressure of 22.5 psi and tailwater back pressure of 20.0 psi were applied. The sample had a measured permeability of 1.2×10^{-8} cm/sec.

This packet should contain all required information. Please do not hesitate to contact us if you have any questions or require additional information.

JV:cen
CAPSBMTL.mem

cc: Curtis Ratcliffe - Port of Tacoma

Attachments:

1 - Aggregate Test Submittals
2 - Paving Fabric Submittals
3 - Mix Design Submittals

ATTACHMENT 1
AGGREGATE TEST SUBMITTALS

CASCADE TESTING LABORATORY, INC.
TESTING & INSPECTION / ENGINEERS / GEOLOGISTS

June 15, 1993
Watson Asphalt Co.
Cert No. 9304-44
Page No. 2

5/8" Minus Asphalt Aggregate

ASTM C-131 Los Angeles Abrasion

Grading	C
% Loss after 500 Revolutions:	15.26 %
Specification:	30 % max.

ASTM C-88 Sulfate Soundness Test

% Loss after 5 cycles:	2.15 %

Percent Fracture Content - Two Face

% Two Face Fracture (Weighted %):	99.2 %
Specification:	75 % minimum

WSDOT Test 113 Degradation Factor

Degradation Factor:	67 %
Specification:	30 % minimum

Sand Equivalent Test

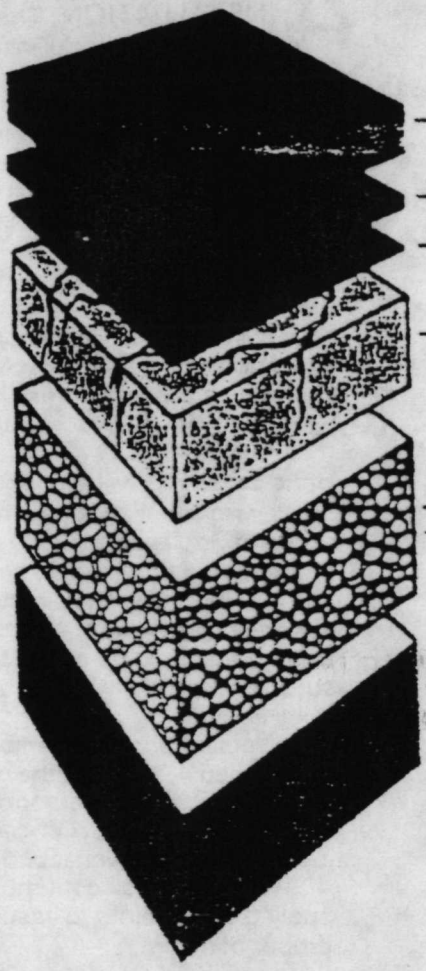
Sand Equivalent Value:(5/8" minus)	81 %
Specification:	45 % minimum
Sand Equivalent Value:(Blend Sand)	77 %
Specification:	30 % minimum

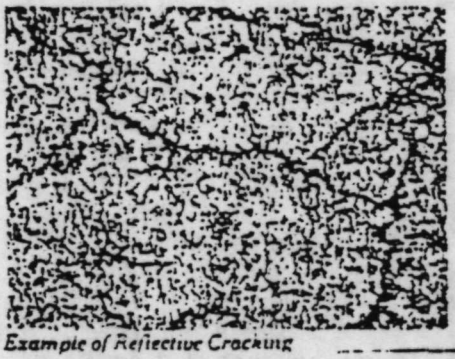
ATTACHMENT 2
PAVING FABRIC SUBMITTALS

AMOCO CONSTRUCTION FABRICS

AMOPAVE' ASPHALT OVERLAY FABRICS ADD YEARS OF LIFE TO PAVEMENT

One of the leading causes of pavement failure is the intrusion of water through cracks in the pavement into the road base and subgrade. When combined with an AC tack coat, AmoPave asphalt overlay fabrics provide a waterproofing membrane to prevent intrusion of water through the pavement. This, in turn, increases pavement life by retarding reflective cracking.




Example of Reflective Cracking

ASPHALT CEMENT GRADE BY VISCOSITY AT 60°C (ORIGINAL ASPHALT)				
AC 2.5	AC 5*	AC 10*	AC 20**	AC 40**
ASPHALT CEMENT GRADE BY VISCOSITY AT 60°C (RESIDUE)				
AR 1000	AR 2000*	AR 4000*	AR 8000**	AR 16000**
ASPHALT CEMENT BY PENETRATION GRADE				
40-50	60-70*	85-100**	120-150**	200-300

*Grades most commonly used when the air temperature is below 55° F.
**Grades most commonly used when the air temperature is above 55°F.

CATIONIC EMULSIFIED ASPHALTS ASTM 2397-73	
CRS—1 & 2	CMS—1, 2, 2H
ANIONIC EMULSIFIED ASPHALTS ASTM D-977-77	
RS—1, 2	MS—1, 2, 2H

INSTALLATION INSTRUCTIONS

1 SURFACE PREPARATION. The old pavement should be cleaned, removing all dirt, water, oil and foreign materials. Cracks 1/4" wide and wider should be cleaned out and filled with an asphalt emulsion slurry, a light grade of emulsified asphalt mixed with fine sand or repaired by any other method approved by the engineer. Large cracks and potholes should be filled to their depth with hot mix.

2 TACK COAT. Prior to the installation of AmoPave, a liquid asphalt must be applied to the prepared surface. Although both asphalt cements and emulsified asphalts are acceptable for use as tack coats, an asphalt cement is preferred because it develops adhesive strength quicker. Emulsions typically contain 40% water requiring considerable time for the water to evaporate (break-time) which may result in costly construction delays. Cutback grade asphalt should not be used as tack coats with AmoPave asphalt overlay fabrics. Vapors released during paving can cause rapid cracking of pavements and damage to the fabric.

The rate of tack coat will depend on the porosity of the existing pavement. The normal range for

Applying tack coat

AMOCO CONSTRUCTION FABRICS

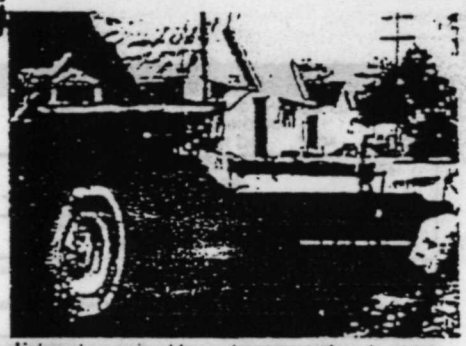
AmoPave will be from 0.20 gallons/yd² to 0.25 gallons/yd² of residual asphalt (AmoPave HD requires .25 to .30 because of fabric weight). To obtain the required rate of application of an emulsion, apply the following formula:

$$\frac{\text{Required Residue Asphalt Rate}}{\text{Liquid Asphalt Content \%}} = \text{Required Application Rate}$$

EXAMPLE:

$$\frac{.25\ \text{gal/yd}^2}{60} = .42\ \text{gal/yd}^2\ \text{Application Rate of Emulsion}$$

To maintain the specified tack rate, apply the tack coat with a calibrated distributor truck. It is recommended that the application temperature for the tack be high enough to assure uniform distribution (for example: 300 °F to 325 °F for grade AC 20). The width of distribution should be 6" wider than the width of the fabric.



Fabric being laid by unit mounted on backhoe

3 INSTALLATION. For small jobs (1500 linear feet or less), handheld units consisting of adjustable disc-type fabric tensioners can be used.

For large jobs, fabric can be easily installed with a mechanical unit that is mounted on the front bucket of a tractor or backhoe. This type of installation requires only two laborers and an operator, and the crew will easily outpace the paving operation.

Fabric installation units for both large and small jobs are readily available from a variety of manufacturers nationwide.

4 FABRIC INSTALLATION. The key to a successful installation rests with the operator. Pavement brush pressure should be light without bending the bristles excessively. The brushes need only touch the pavement at the middle of the unit and be elevated 1/4" on both ends.

Driving the vehicle straight with as few steering deviations as possible will assure a virtually wrinkle-free installation. Turns should be made gradually.

Hand brooming will eliminate any small wrinkles. For large wrinkles, those having a length of 1" or greater, the fabric should be cut and overlapped in the direction of the paving operation. Additional tack coat should be added to insure bonding.

Transverse fabric joints should be overlapped 4" to 6" in the direction of the paving operation as the illustration indicates. Longitudinal joints should be overlapped 2" to 4". Additional tack coat must be applied to the joints to assure proper bonding.

Hand rolled AmoPave on small job

5 PAVING. Standard paving operations should follow the fabric installation. *A minimum of 1 1/2 inches of compacted asphalt thickness is recommended to assure proper bonding between layers.*

Before paving, light vehicle traffic will not damage the exposed fabric. *However, as a safety precaution it is not recommended that you allow traffic to operate on the exposed fabric. Wet fabric will be significantly slicker than asphalt pavement. Should the fabric become wet prior to paving, it must be allowed to dry completely before paving.*

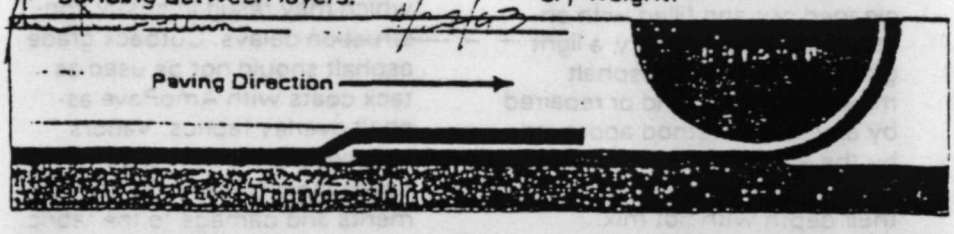
AmoPave Highway Installation

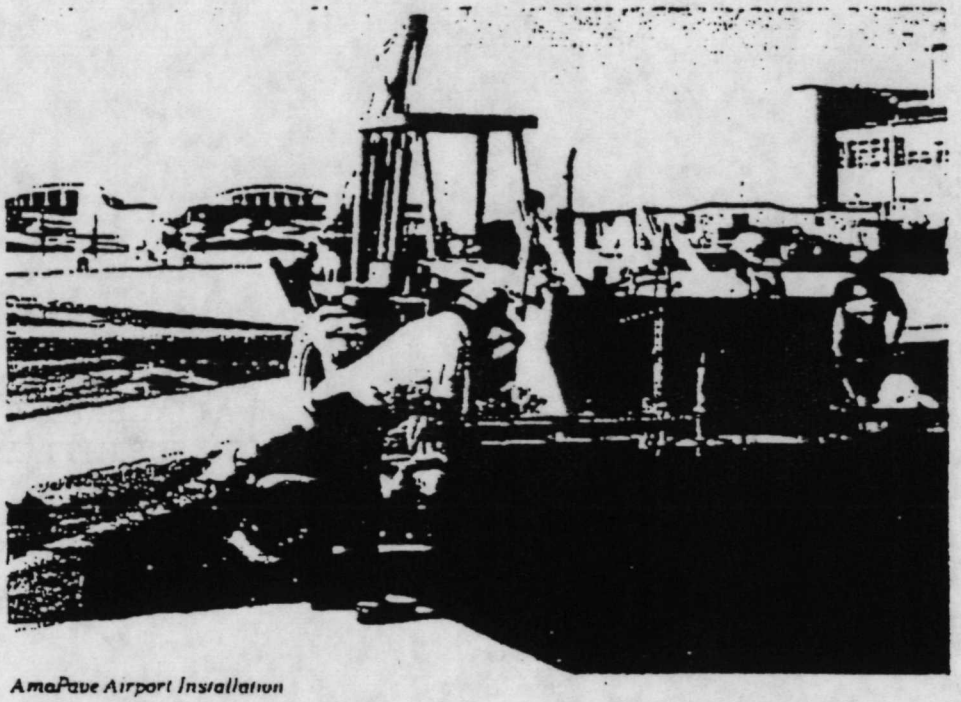
6 RECYCLING. Normally the overlay fabric is considered part of the permanent pavement structure and is not recycled.

However, if future plans call for recycling of 1 1/2" of pavement, then the fabric should be initially installed at 2" or deeper. The fabric increases the life of the pavement and any other recycled overlays.

It should be pointed out that if required, fabric can be recycled. All evidence to date shows that the presence of a staple polypropylene fabric does not adversely affect the milling operation or the finished asphalt mix.

7 STORAGE. Rolls of fabric should be stored in a dry place. When outdoor storage is required, the rolls should be elevated and covered with a tarp. If exposed to moisture, a roll of fabric can absorb three times its dry weight.





AmoPave Airport Installation

PROPERTIES REQUIRED FOR MAXIMUM PERFORMANCE

TACK COAT ABSORPTION: To insure proper bonding between asphalt layers. To provide an adequate moisture barrier.

DURABILITY: To withstand abrasive forces of installation.

FLEXIBILITY: To conform to the road surface without wrinkling.

UV STABILITY: To resist the effects of sunlight during construction.

Fibers fused on one side prevents bleed-through of tack coat and sticking of fabric to wheels of construction equipment.

Heat bond one side only is required by CALTRANS & Oklahoma DOT.

SPECIFICATIONS [1]

AmoPAVE 4599

Grab Tensile	ASTM-D-4632	lbs.	90
Grab Elongation	ASTM-D-4632	%	55
Mullen Burst	ASTM 3786	psi	215
Puncture	ASTM 4833	lbs.	60
Trapezoidal Tear	ASTM-D-4533	lbs.	35
U.V Resistance (Strength Retained)	ASTM-4355 [2]	% [3]	70
Asphalt Retention	TX DOT 3099 TF 25 #8	gal/s.y. (oz./sq./ft.)	.25 .35
Melting Point	ASTM D 276	Degrees F	329

Roll Width (ft.)	12.5
Roll Length (ft.)	360
Roll Diameter (in.)	13
Gross Weight (lbs.)	155
Area (sq. yd.)	500

The information presented herein, while not guaranteed, is to the best of our knowledge true and accurate. Except when agreed to in writing for specific conditions of use, no warranty or guarantee expressed or implied is made regarding the performance of any product, since the manner of use and handling are beyond our control. Nothing contained herein is to be construed as permission or as a recommendation to infringe any patent.

Nonfunctional properties such as color and thickness are not shown.

**These properties have been defined as minimum required properties for achieving maximum desired performance by the U.S. FHWA's Task Force 25 on geotextiles.*

1. *Minimum Roll Average Values*
2. *(Usual)*
3. *(Usual)*

4/27/93

AMOCO

Amoco Fabrics and Fibers Company

Amoco Fabrics and Fibers Company
900 Circle 75 Parkway, Suite 300
Atlanta, Georgia 30339
(404) 984-4444
Fax: (404) 956-2430

ATTACHMENT 3
MIX DESIGN SUBMITTALS

CASCADE TESTING LABORATORY, INC.
TESTING & INSPECTION / ENGINEERS / GEOLOGISTS
12919 N.E. 126TH PLACE
KIRKLAND, WASHINGTON 98034
KIRKLAND: (206) 823-6500
FAX: (206) 823-6503
SEATTLE: (206) 525-3700
EVERETT: (206) 259-0817

April 21, 1993
Cert No. 9304-44

Watson Asphalt Co.
P.O. Box 845
Redmond, Washington 98073

Attention: Cliff Schroeder

Reference: Marshall Design Proof Mix
Asphalt Concrete Cap Project

Gentlemen;

In accordance with your request we have performed laboratory testing for determination of a Asphaltic Concrete blend which will meet the permeability and material specification requirements as provided for the above noted project.

As indicated on the attached sheets we would recommend the following blend of materials;

5/8" - 0	Asphalt Aggregate	85 percent
3/8" - 0	Asphalt Aggregate	15 percent
AR-4000 Asphalt Cement		5.6 percent

Based on the above blend and shown on the attaches sheets this material obtained a permeability factor of 1.12×10^{-7} and achieved a stability average of 1875 pounds.

We hope this will answer any questions you may have, if any should arise or we can be of further assistance please do not hesitate to give us a call.

Respectfully;

CASCADE TESTING LABORATORY, INC.

Kenneth B. Foot
Vice President

☑ CONFORMS TO DESIGN CONCEPT
☐ CONFORMS TO DESIGN CONCEPT WITH REVISIONS SHOWN
☐ NON-CONFORMING - REVISE AND RESUBMIT

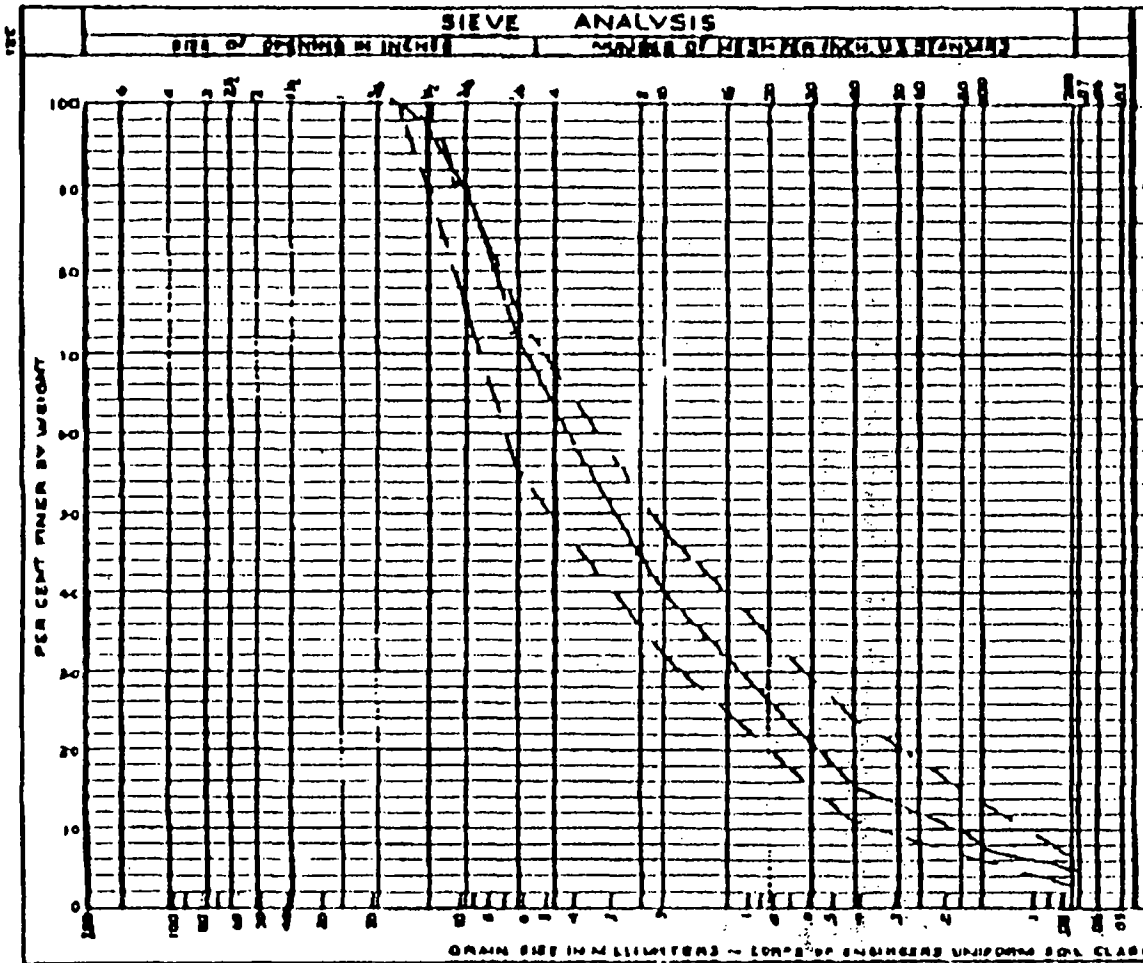
This submittal has been reviewed for general conformance to design concept only. This review does not relieve the contractor or supplier of full responsibility for adhering to the contract documents and satisfactory completion of all work.

By: John R Vedina Date: 4/27/93

HART CROWSER, INC.

CASCADE TESTING LABORATORY, INC.
TESTING & INSPECTION / ENGINEERS / GEOLOGISTS
2219 FIFE WAY PLACE
FIRELAND, WASHINGTON 98034
(206) 813-8800
SEATTLE (206) 532-9700
EVERETT (206) 339-0817

SIEVE ANALYSIS



SIEVE ANALYSIS

SIEVE SIZE	% PASS	SPECS
5/8"	100	100
1/2"	98	90-100
3/8"	90	75-90
1/4"	73	55-75
#4	64	-
#8	45	-
#10	40	32-48
#40	16	11-24
#80	10	-
#100	8	-
#200	5.2	3-7

Aggregate Blend

85 % 5/8" - 0

15 % 3/8" - 0

COBBLES	GRAVEL		SAND		
	Coarse	Fine	Coarse	Medium	Fine

MATERIAL Blended Aggregates

SAMPLE NO.	DEPTH - FT	CLASSIFICATION	NAT WC	LL	PI

PROJECT
Asphalt Concrete Cap
Watson Asphalt Co.

CERT. NO. 9304-44

Tested K
Checked F

4-21-93
(Date of report)

Chief, Engineering Branch

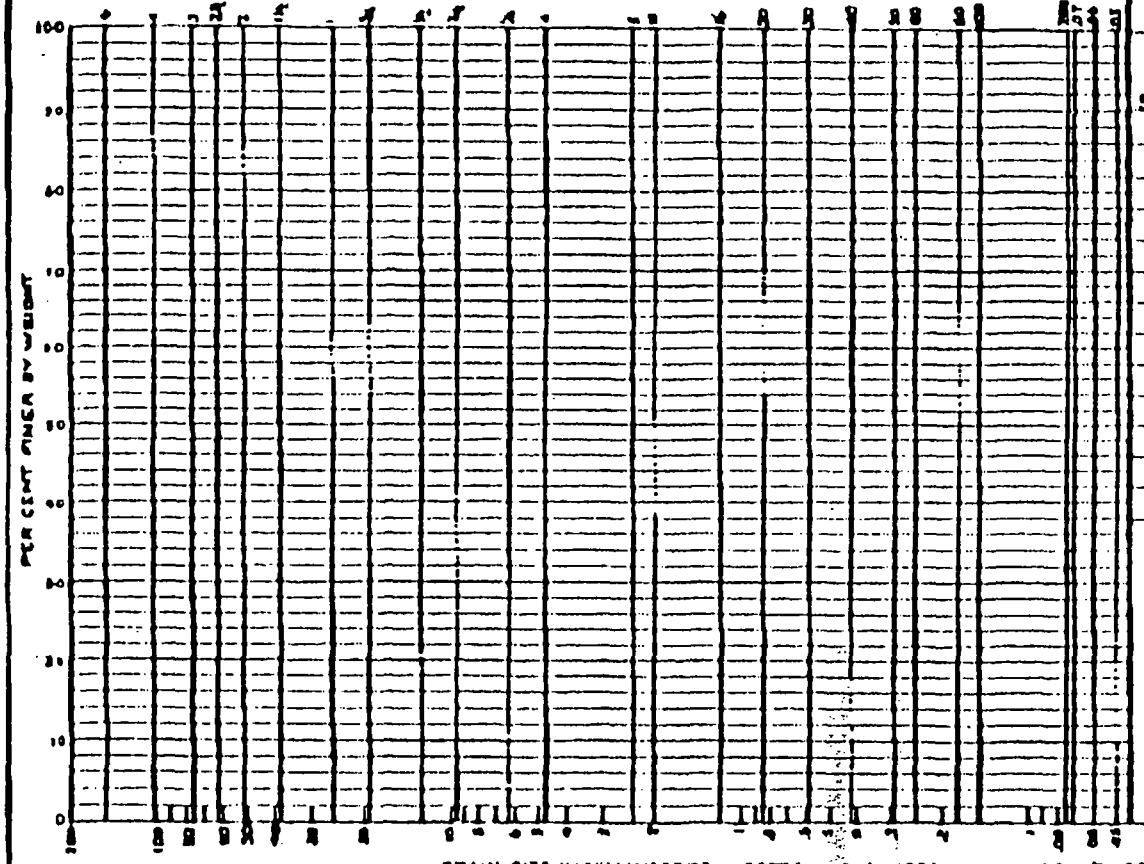
Date 4/22/93

CASCADE TESTING LAB TEL No.2068232205 Apr 21.93 11:18 No.002 P.05

CASCADE TESTING LABORATORY, INC.
TESTING & INSPECTION/ENGINEERS/GEOLOGISTS
[illegible] NE, [illegible] PLACE
KIRKLAND, WASHINGTON 98004
(206) 823-6000
SEATTLE (204) 525-4700
EVERETT (204) 259-0417

SIEVE ANALYSIS

SIZE OF OPENING IN INCHES | NUMBER OF MESH PER INCH, U.S. STANDARD



SIEVE ANALYSIS

SIEVE SIZE	% PASS	SPECS
5/8"	100	
1/2"	98	
3/8"	89	
1/4"	69	
#4	58	
#8	39	
#10	35	
#40	14	
#80	9	
#100	7	
#200	4.8	

COBBLES	GRAVEL		SAND		
	Coarse	Fine	Coarse	Medium	Fine

MATERIAL 5/8" - 0 Aggregate

SAMPLE NO	DEPTH - FT	CLASSIFICATION	MT WC	LL	PI

PROJECT
Asphalt Concrete Cap
Watson Asphalt Co

CERT. NO. 9304-44

Project: K
Checked: F

4-21-93
(Date of report)

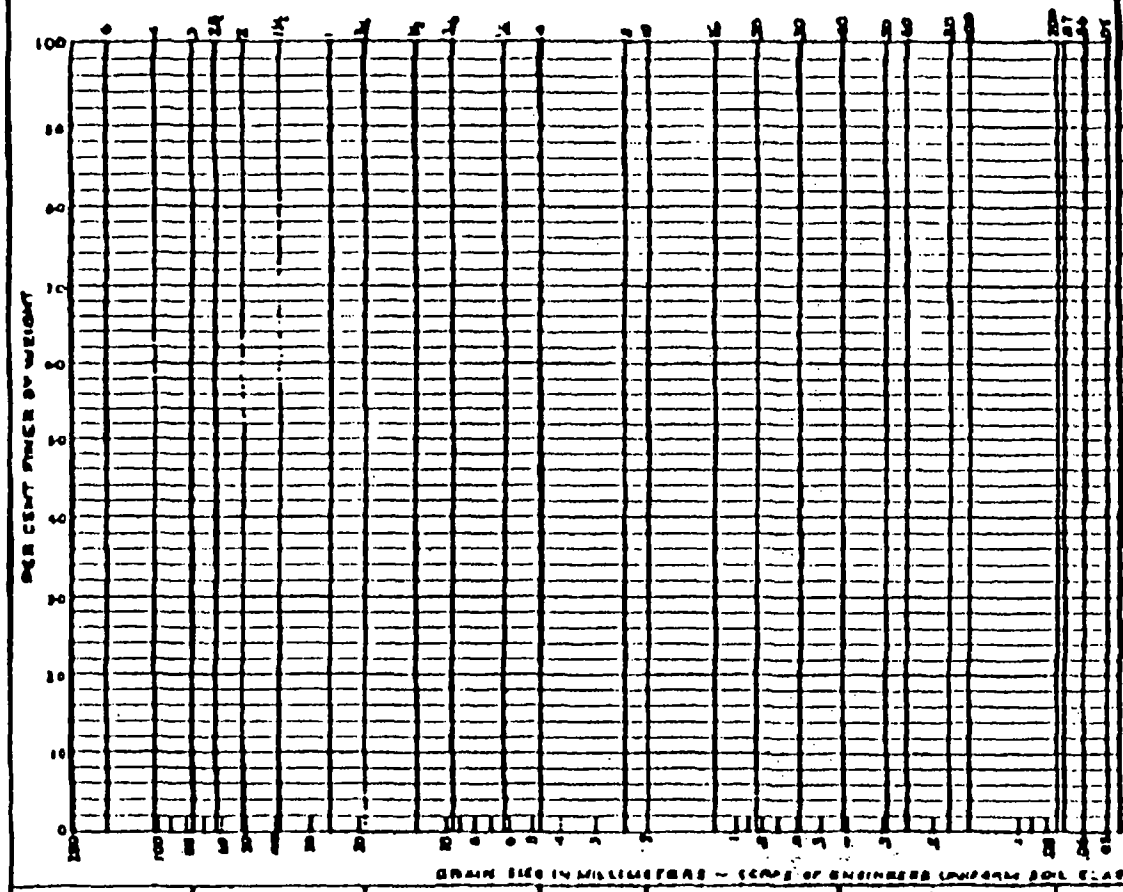
Dept. Soil Production Branch

REVISIONS SHOWN
AND RESUBMIT
Date: 4/27/93

CASCADE TESTING LABORATORY, INC.
TESTING & INSPECTION / ENGINEERS / GEOLOGISTS
12010 N.E. 126th PLACE
KIRKLAND, WASHINGTON 98034
(206) 823-9000
SEATTLE (206) 935-9700
EVERETT (206) 259-0617

SIEVE ANALYSIS

SIZE OF OPENING IN INCHES | NUMBER OF MESH PER INCH, U.S. STANDARD



SIEVE ANALYSIS

SIEVE SIZE	% PASS	SPECS
3/8"	100	
1/4"	99	
#4	95	
#8	75	
#10	68	
#40	28	
#80	16	
#100	12	
#200	7.7	

COBBLES	GRAVEL		SAND		
	Coarse	Fine	Coarse	Medium	Fine

MATERIAL 3/8 - 0 Aggregate

SAMPLE NO.	DEPTH - FT	CLASSIFICATION	W.W.C.	L.L.	P.I.

PROJECT
Asphalt Concrete Cap
Watson Asphalt Co.

CERT. NO. 9304-44

Tested E.
Checked F.

4-21-93
(Date of report)

Chief, Soil Mechanics Branch

CASCADE TESTING LABORATORY, INC.

MARSHALL METHOD - COMPUTATION OF PROPERTIES OF ASPHALT MIXTURES

DATE OF COMPUTATION: 4-21-93

JOB NUMBER: 9304-44

PROJECT: Asphalt Concrete Cap

DESCRIPTION OF BLEND: Class "B" Modified

SPECIMEN NUMBER	ASPHALT CEMENT (Percent)	THICKNESS (Inches)	WEIGHT (Grams) IN AIR	WEIGHT (Grams) IN WATER	VOLUME CC	SPECIFIC GRAVITY ACTUAL	SPECIFIC GRAVITY THEORIZED	AC BY VOLUME (Percent)	VOIDS (Percent) TOTAL MIX	VOIDS (Percent) FILLED	UNIT WEIGHT TOTAL MIX (Lb./Cu.Ft.)	STABILITY (Pounds) MEASURED	STABILITY (Pounds) CONVERTED	FLOW UNITS OF 1/100 IN.
a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
					(d - e)	(d)/(f)	R.C.	(b x g)/(Sp.Gr. of AC)	100 - 100 (g)/(h)	(i)/(i + j)	(g x 62.4)		q	
1-A		2½	1199	690	509	2.356						133	1925	11
B		2½	1201	694	507	2.369						135	1950	13
C		2½	1202	693	509	2.361						121	1750	14
Avg	5.6					2.362	2.455	13.06	3.79	77.5	144.4		7875	13

Coefficient of Permeability = 1.12×10^{-7}

* From conversion table

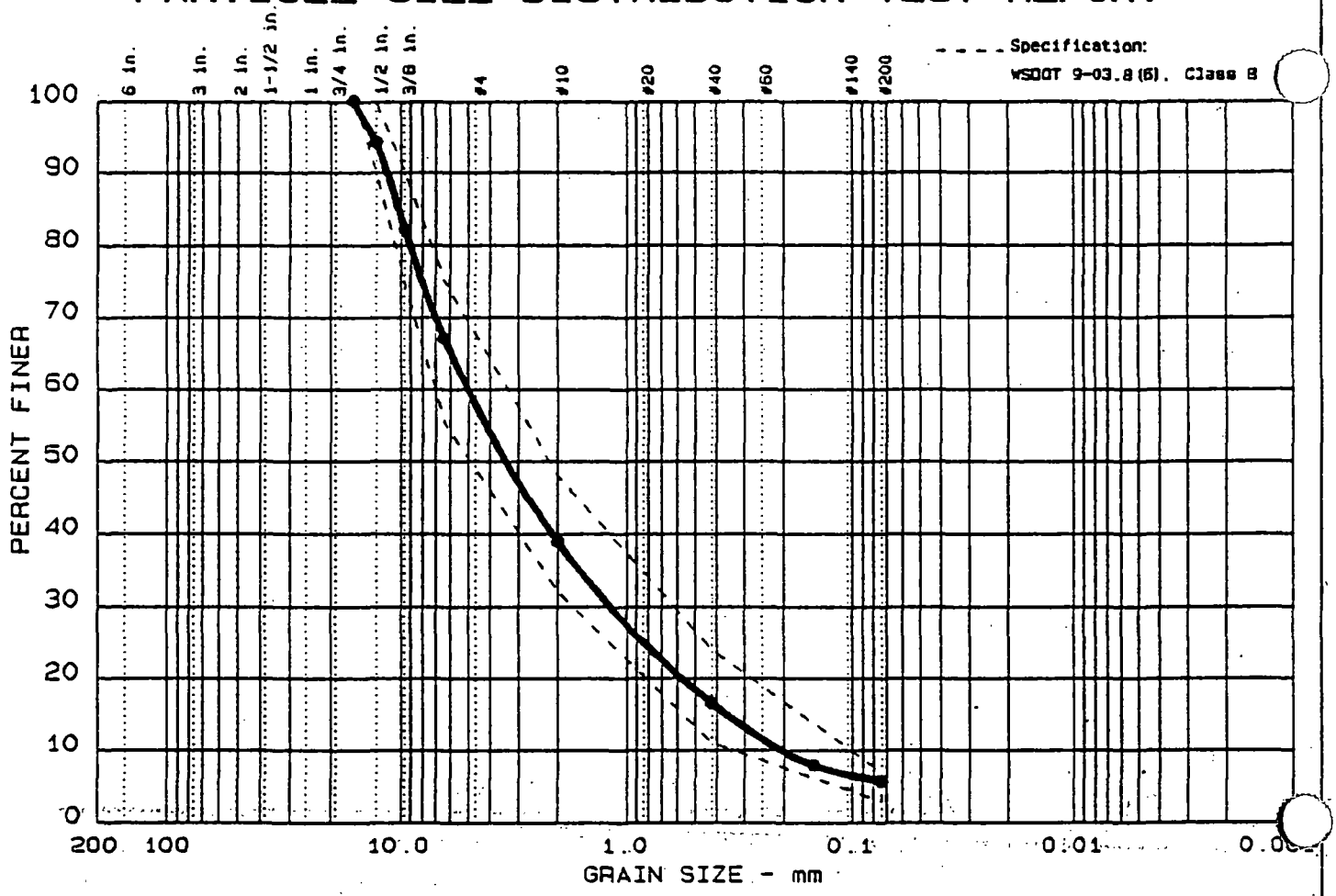
COMPUTED BY: Kenneth B Foot

CHECKED BY: [signature]

PREVIOUS EDITION OF THIS FORM IS OBSOLETE.

Port of Tac

PARTICLE SIZE DISTRIBUTION TEST REPORT



	%+75 mm	% GRAVEL	% SAND	% SILT	% CLAY	USCS
●	0.0	41.6	52.8	5.6		SW-SM

SIEVE inches size	PERCENT FINER ●		
0.625	100.0		
0.5	94.3		
0.375	82.1		
0.25	67.0		
	GRAIN SIZE		
D_{60}	5.01		
D_{30}	1.18		
D_{10}	0.20		
	COEFFICIENTS		
C_c	1.38		
C_u	24.6		

SIEVE number size	PERCENT FINER ●		
10	38.8		
40	16.5		
100	7.9		
200	5.7		

Sample information:

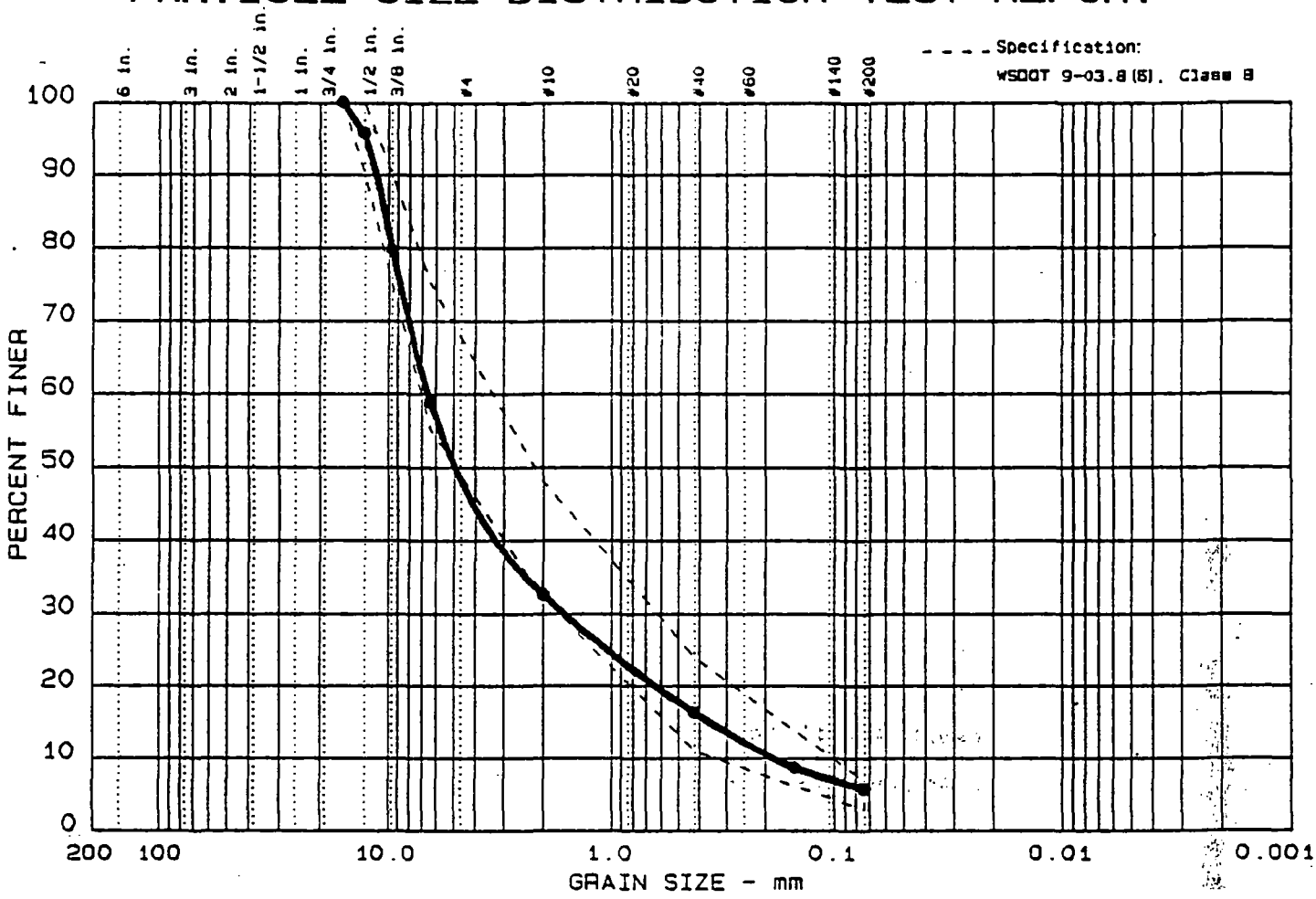
● Fri. Aug. 13. AM SAMPLE
Class B Asphalt

Tested by: J. Bekey
Date: 8-13-1993
Checked by: G. Gergis
Date: 8-16-1993
Sample %9303-6550-1297

PACIFIC TESTING LABORATORIES

Certificate No.: 9303-6550 LR No.:
Client: PORT OF TACOMA/BLAIR WATERWAY CAP
% A.C. 6.0
Date: 8-16-1993 Fig. No.

PARTICLE SIZE DISTRIBUTION TEST REPORT



	%+75 mm	% GRAVEL	% SAND	% SILT	% CLAY	USCS
●	0.0	51.1	43.1	5.8		GW-GM

SIEVE inches size	PERCENT FINER ●		
0.625	100.0		
0.5	95.7		
0.375	79.7		
0.25	59.0		
	GRAIN SIZE		
D_{60}	6.50		
D_{30}	1.61		
D_{10}	0.19		
	COEFFICIENTS		
C_c	2.16		
C_u	35.1		

SIEVE number size	PERCENT FINER ●		
10	32.5		
40	16.3		
100	8.7		
200	5.8		

Sample information:

● Fri. Aug. 13, PM SAMPLE
Class B Asphalt

Tested by: J. Bekey
Date: 8-13-1993
Checked by: G. Gergis
Date: 8-16-1993
Sample #9303-6550-1298

PACIFIC TESTING LABORATORIES

Certificate No.: 9303-6550 LR No.:
Client: PORT OF TACOMA/BLAIR WATERWAY CAP
% A.C. 5.7
Date: 8-16-1993 Fig. No.

REPORT NUMBER **LR** 95101

PREVIOUS RPT. NO. _____

PACIFIC TESTING LABORATORIES

EXECUTIVE OFFICES
3257 16th Ave. W. • Seattle, WA 98119
(206) 282-0666 • FAX (206) 282-0710

EASTSIDE DIVISION
11824 North Creek Parkway N. #101 • Bothell, WA 98011
(206) 485-4244 • 451-8436 • FAX (206) 485-4611

TACOMA DIVISION
2402 Pacific Highway E. • Tacoma, WA 98424
(206) 922-9299 • FAX (206) 922-1512

PENINSULA DIVISION
10728 Silverdale Way N.W. #105 • Silverdale, WA 98383
(206) 698-6650 • FAX (206) 698-6648

MAILING ADDRESS: Port of Tacoma
P.O. Box 1837
Tacoma Wn. 98401-1837
ATTENTION: Curt Ratcliff

PROJECT: Blair Water Way A.C. cap

LOCATION: Taylor Way

PURCH. ORD. NUMBER: _____

REPORTED BY: T. Kendle DATE: 8-13-93

REVIEWED BY: _____ DATE: _____

PERMIT NUMBER: N/A CERTIFICATE NUMBER: 9303-6550

ARCHITECT: _____

ENGINEER: Hart Crowser

CONTRACTOR: R.C.I.

In reference to R.R. 09973 the following is noted.

Upon my arrival a sample of A.C. was delivered to the lab for a marshall value. This sample was taken from paving machine at 1st panel approx 2+50.

Due to failing tests between approximately 40' & 80' from so. edge the contractor requested a 2nd marshall value be delivered to the lab. This sample taken from approximately 110' from so. edge at 9+00.

When we recieved the value of 147.2 for second marshall it became uncertain as to results of today's testing. This was about 4:30 p.m. and at 5:00 p.m. job was shut down by Ed Stephens untill above noted problem can be reconciled.

At this point another marshall value was requested by the contractor and was delivered to the lab.

The various values are

I.D. =	1297 / 144.8 P.C.F.	sampled at 1st panel	2+50
"	1298 / 147.2 P.C.F.	Sampled 110' fr. so. edge	9+00
"	1299 / 147.5 P.C.F.	Sampled Nailz of ctr. slope	3+00

ASTM TEST METHOD (AS APPLICABLE)

EQUIPMENT IDENTIFICATION AND S/N (AS APPLICABLE) WORK CONFORMS YES ☐ NO ☐

"This report is provided for the information of the client only. The reproduction of this report, by any method, and its transmittal to a third party, by any means, except in full, without the written permission of Pacific Testing Laboratories, is prohibited."

"This certification attests to the accuracy of the results obtained from the actual test performed and/or observations made within the defined scope of the work. Certification shall not be construed to represent inspection, approval or acceptance of other associated work or a warranty of design or workability of the specification requirements."

Certified Report by Pacific Testing Laboratories _____ DATE _____

FIELD CONTACT: _____ DATE _____

LR 89-2

REPORT NUMBER DR 09973

PREVIOUS RPT. NO. _____

PACIFIC TESTING LABORATORIES

EXECUTIVE OFFICES
3257 16th Ave. W. • Seattle, WA 98119
(206) 282-0688 • FAX (206) 282-0710

EASTSIDE DIVISION
11824 North Creek Parkway N. #101 • Bothell, WA 98011
(206) 485-4244 • 451-8438 • FAX (206) 485-4611

TACOMA DIVISION
2402 Pacific Highway E. • Tacoma, WA 98424
(206) 922-9299 • FAX (206) 922-1512

PENINSULA DIVISION
P.O. Box 505 • Silverdale, WA 98383
(206) 698-6650 • FAX (206) 485-4611

MAILING ADDRESS: Port of Tacoma
P.O. Box 1837
Tacoma Wn. 98401-1837

ATTENTION: Grant Ratcliff

PROJECT: Blair Waterway A.C. Cap

LOCATION: Taylor Way

PURCH. ORD. NUMBER: _____

REPORTED BY: T. Kenelle DATE: 6-13-93

REVIEWED BY: _____ DATE: _____

PERMIT NUMBER: N/A CERTIFICATE NUMBER: 9303-655

ARCHITECT: _____

ENGINEER: Hart Crowser

CONTRACTOR: R.C.I.

WORK DESCRIPTION: At the request of the client P.T.L. representative on site at 7:00 a.m. for in place density testing of top lift of A.C. cap
Initially a rolling pattern was established, with final in place tests as follow
Refer to L.R. 9510 for further information.

INPLACE DENSITY TEST RESULTS

TEST	LOCATION	WET DEN.	DRY DEN.	MOIST %	•	COMP %	SPEC %	P/F
1	So. panel Sta 3+50	144.2	—	—	✓	99.6	95	P
2	20' from So. edge Sta. 3+50	144.3	—	—	✓	99.7	✓	P
3	So. panel Sta. 6+00	142	—	—	✓	98.1	✓	P
4	20' from So. edge Sta. 6+25	142.3	—	—	✓	98.3	✓	P
5	45' from So. edge Sta. 6+00	134	—	—	✓	92.5	✓	F
6	Re comp. @ velest of ±5'	137.8	—	—	✓	95.2	✓	F
7	50' from So. edge Sta. 5+20	134	—	—	✓	93.9	✓	F
8	Re comp. @ velest of ±7	135.2	—	—	✓	93.4	✓	F
9	Re comp @ velest of ±5'	137.6	—	—	✓	95	✓	F
10	55' from So. edge Sta. 5+75	139.1	—	—	✓	96	✓	F

GAUGE STANDARD: MS 2314 DS 7590

LAB METHOD: ☐ D1557 ☐ D698 ☐ ~~Rice~~ Marshall

ASTM TEST METHOD (AS APPLICABLE) D-2950

*1 SAMPLE I.D. 1247 PROCTOR VALUE 144.5 P.C.F.

*2 SAMPLE I.D. 1245 PROCTOR VALUE 147.2 P.C.F.

*3 SAMPLE I.D. PROCTOR VALUE 147.5 P.C.F.

EQUIPMENT IDENTIFICATION AND S/N (AS APPLICABLE) Troxler 3440 / S.N. 1253

WORK CONFORMS YES ☐ NO ☑

"This report is provided for the information of the client only. The reproduction of this report, by any method, and its transmittal to a third party, by any means, except in full, without the written permission of Pacific Testing Laboratories, is prohibited."

"This certification attests to the accuracy of the results obtained from the actual test performed and/or observations made within the defined scope of the work. Certification shall not be construed to represent inspection, approval or acceptance of other associated work or a warranty of design or workability of the specification requirements."

Certified Report by Pacific Testing Laboratories _____ DATE _____

FIELD CONTACT: _____ DATE _____

DR 93-2

REPORT NUMBER **DR 09974**

PREVIOUS RPT. NO. 09973

PACIFIC TESTING LABORATORIES

EXECUTIVE OFFICES
3257 16th Ave. W. • Seattle, WA 98119
(206) 282-0668 • FAX (206) 282-0710

EASTSIDE DIVISION
11824 North Creek Parkway N. #101 • Bothell, WA 98011
(206) 485-4244 • 451-8438 • FAX (206) 485-4611

TACOMA DIVISION
2402 Pacific Highway E. • Tacoma, WA 98424
(206) 922-9299 • FAX (206) 922-1512

PENNINSULA DIVISION
P.O. Box 505 • Silverdale, WA 98383
(206) 698-6650 • FAX (206) 485-4611

MAILING ADDRESS: Port of Tacoma

REPORTED BY: T. Kendle DATE: 8-13-93

REVIEWED BY: DATE:

PERMIT NUMBER: CERTIFICATE NUMBER:

ATTENTION: Curt Ratcliff

ARCHITECT:

PROJECT: Blair Waterway A.C. Cap

ENGINEER:

LOCATION: Taylor Way

PURCH. ORD. NUMBER:

CONTRACTOR:

WORK DESCRIPTION: Refer to DR 09973 for notes.

INPLACE DENSITY TEST RESULTS

TEST	LOCATION	WET DEN.	DRY DEN.	MOIST %		COMP %	SPEC %	P/F
11	65' from So. edge Sta 5+75	140.4	–	–	1	97	98	F
12	Re comp. @ re-test of #10	140.4	–	–	✓	97	✓	F
13	80' from So. edge Sta 4+75	143.9	–	–	✓	99.4	✓	P
14	90' from So. edge Sta. 5+50	142.7	–	–	✓	98.6	✓	P
15	100' from So. edge Sta. 7+00	145.8	–	–	✓	100	✓	P
16	45' from So. edge Sta. 8+25	134.1	–	–	✓	96	✓	F
17	55' from So. edge Sta. 2+50	143.1	–	–	✓	98.8	✓	P
18	30' from So. edge Sta. 2+25	141.4	–	–	✓	97.7	✓	F
19	45' from So. edge Sta. 2+25	132.2	–	–	✓	91.3	✓	F
20	34' from So. edge Sta. 8+00	139	–	–	✓	96	✓	F

GAUGE STANDARD: MS DS

*1 SAMPLE I.D. PROCTOR VALUE

LAB METHOD: ☐ D1557 ☐ D698 ☐ Rice

*2 SAMPLE I.D. PROCTOR VALUE

ASTM TEST METHOD (AS APPLICABLE)

*3 SAMPLE I.D. PROCTOR VALUE

EQUIPMENT IDENTIFICATION AND S/N (AS APPLICABLE)

WORK CONFORMS YES ☐ NO ☑

"This report is provided for the information of the client only. The reproduction of this report, by any method, and its transmittal to a third party, by any means, except in full, without the written permission of Pacific Testing Laboratories, is prohibited."

"This certification attests to the accuracy of the results obtained from the actual test performed and/or observations made within the defined scope of the work. Certification shall not be construed to represent inspection, approval or acceptance of other associated work or a warranty of design or workability of the specification requirements."

Certified Report by Pacific Testing Laboratories DATE

FIELD CONTACT: DATE

DR 93-2

REPORT NUMBER **DR 09975**

PREVIOUS RPT. NO. 09971

PACIFIC TESTING LABORATORIES

EXECUTIVE OFFICES
3257 16th Ave. W. • Seattle, WA 98119
(206) 282-0668 • FAX (206) 282-0710

EASTSIDE DIVISION
11824 North Creek Parkway N. #101 • Bothell, WA 98011
(206) 485-4244 • 451-8438 • FAX (206) 485-4611

TACOMA DIVISION
2402 Pacific Highway E. • Tacoma, WA 98424
(206) 922-9299 • FAX (206) 922-1512

PENINSULA DIVISION
P.O. Box 505 • Silverdale, WA 98383
(206) 698-6650 • FAX (206) 485-4611

MAILING ADDRESS: Port of Tacoma

REPORTED BY: T. Kendle DATE: 8-13-93

REVIEWED BY: DATE:

PERMIT NUMBER: CERTIFICATE NUMBER:

ATTENTION:

ARCHITECT:

PROJECT: Blair Waterway A.C. Cap

ENGINEER:

LOCATION: Taylor Way PURCH. ORD. NUMBER:

CONTRACTOR:

WORK DESCRIPTION: Refer to D.R. 09973 for notes.

INPLACE DENSITY TEST RESULTS

TEST	LOCATION	WET DEN.	DRY DEN.	MOIST %	•	COMP %	SPEC %	P/F
21	58' From So. edge Sta. 8+20	136.5	–	–	✓	94.3	98	F
22	65' From So. edge Sta. 7+90	134.	–	–	✓	93.9	✓	F
23	80' From So. edge Sta. 7+50	137.4	–	–	✓	95.6	✓	F
24	80' From So. edge Sta. 6+00	140.2	–	–	✓	96.8	✓	F
25	90' From So. edge Sta. 7+00	147.2	–	–	✓	98.2	✓	P
26	115' From So. edge Sta. 4+00	144.2	–	–	✓	99.5	✓	P
27	So. 1/2 of Center Valley Sta. 6+00	145.4	–	–	✓	100	✓	P

GAUGE STANDARD: MS DS

LAB METHOD: ☐ D1557 ☐ D698 ☐ Rice

ASTM TEST METHOD (AS APPLICABLE)

*1 SAMPLE I.D. PROCTOR VALUE

*2 SAMPLE I.D. PROCTOR VALUE

*3 SAMPLE I.D. PROCTOR VALUE

EQUIPMENT IDENTIFICATION AND S/N (AS APPLICABLE)

WORK CONFORMS YES ☐ NO ☐

"This report is provided for the information of the client only. The reproduction of this report, by any method, and its transmittal to a third party, by any means, except in full, without the written permission of Pacific Testing Laboratories, is prohibited."

"This certification attests to the accuracy of the results obtained from the actual test performed and/or observations made within the defined scope of the work. Certification shall not be construed to represent inspection, approval or acceptance of other associated work or a warranty of design or workability of the specification requirements."

Certified Report by Pacific Testing Laboratories DATE

FIELD CONTACT: DATE

DR 93-2

cc Dorsey
Ed

MAILED
OCT 14 1993

RECEIVED
OCT 15 1993
ENGINEERING DEPT.

REPORT NUMBER DR 10191
PREVIOUS RPT. NO.

PACIFIC TESTING LABORATORIES

PACIFIC TESTING LABORATORIES

EXECUTIVE OFFICES
3257 16th Ave. W. • Seattle, WA 98119
(206) 282-0688 • FAX (206) 282-0710

EASTSIDE DIVISION
11824 North Creek Parkway N. #101 • Bothell, WA 98011
(206) 485-4244 • 451-9438 • FAX (206) 485-4611

TACOMA DIVISION
2402 Pacific Highway E. • Tacoma, WA 98424
(206) 922-9299 • FAX (206) 922-1512

PENINSULA DIVISION
P.O. Box 505 • Silverdale, WA 98383
(206) 698-6550 • FAX (206) 485-4611

MAILING ADDRESS: Port of Tacoma, PO Box 1837, Tacoma WA 98401-1837

ATTENTION: Curt Radcliff

PROJECT: Blair Waterway Backupletenge ~~Port Contract~~

LOCATION: Taylor Way

PURCH. ORD. NUMBER:

REPORTED BY: M Bokey DATE: 10-2-93

REVIEWED BY: DJP DATE: 10-08-93

PERMIT NUMBER:

CERTIFICATE NUMBER: 9303655

ARCHITECT:

ENGINEER: Hart Crowser

CONTRACTOR: RCL + Watson

WORK DESCRIPTION: PTL Rep Michael Bokey on site to perform In place density test on first lift of repaving of section of south segment of Cape Parling South Pass 550' W of settlement plate to 150' E of plate, Middle Pass 250' West of plate to 550' W of plate North Pass 350' N of plate to 550' North of plate. Work conforms to 98% compaction spec.

INPLACE DENSITY TEST RESULTS

TEST	LOCATION	WET DEN.	DRY DEN.	MOIST %	*	COMP %	SPEC %	P/F
1	100' West of Settlement Plate South Pass	148.7	—	—	1	100+	98	P
2	200' West of ~~Pigeonmeter~~ Settlement Plate (South Pass)	146.4	—	—	1	99.3	98	P
3	400' West of Settlement Plate South Pass	146.0	—	—	1	99.0	98	P
4	300' West of Settlement Plate Middle Pass	144.4	—	—	1	98.0	98	P
5	500' West of Settlement Plate Middle Pass	145.1	—	—	1	98.4	98	P
6	400' West of Settlement Plate North Pass	144.5	—	—	1	98.0	98	P
7	100' East of Settlement Plate South Pass	144.6	—	—	1	98.1	98	P

GAUGE STANDARD: ~~MB~~ DS 7542 DS 2325

LAB METHOD: ☐ D1557 ☐ D698 ☐ Rice Marshal

ASTM TEST METHOD (AS APPLICABLE) D2950

*1 SAMPLE I.D. CTL PROCTOR VALUE 147.4 pcf

*2 SAMPLE I.D. PROCTOR VALUE

*3 SAMPLE I.D. PROCTOR VALUE

EQUIPMENT IDENTIFICATION AND S/N (AS APPLICABLE) TROXLER 4640 S/N R57

WORK CONFORMS YES ☑ NO ☐

"This report is provided for the information of the client only. The reproduction of this report, by any method, and its transmittal to a third party, by any means, except in full, without the written permission of Pacific Testing Laboratories, is prohibited."

"This certification attests to the accuracy of the results obtained from the actual test performed and/or observations made within the defined scope of the work. Certification shall not be construed to represent inspection, approval or acceptance of other associated work or a warranty of design or workability of the specification requirements."

Certified Report by
Pacific Testing Laboratories: [signature] DATE 10/11/93

FIELD CONTACT: Sandy Lawing Watson Asphalt DATE 10-2-93

DR 93-2

RECEIVED

MAILED

OCT 1 5 1993

OCT 1 4 1993

ENGINEERING DEPT

REPORT NUMBER DR 10127

PREVIOUS RPT. NO. 10191

PACIFIC TESTING LABORATORIES

EXECUTIVE OFFICES
3257 16th Ave. W. • Seattle, WA 98119
(206) 282-0686 • FAX (206) 282-0710

EASTSIDE DIVISION
11824 North Creek Parkway N. #101 • Bothell, WA 98011
(206) 485-4244 • 451-8436 • FAX (206) 485-4611

TACOMA DIVISION
2402 Pacific Highway E. • Tacoma, WA 98424
(206) 922-9299 • FAX (206) 922-1512

PENINSULA DIVISION
P.O. Box 505 • Silverdale, WA 98383
(206) 698-6650 • FAX (206) 485-4611

MAILING ADDRESS: Port of Tacoma, PO Box 1837, TACOMA WA 98401-1837

ATTENTION: Curt Radcliff

PROJECT: Blair Waterway backup/cleanup (Port contract #710)

LOCATION: Taylor Way

PURCH. ORD. NUMBER:

REPORTED BY: M. BEKEY DATE: 10-4-93

REVIEWED BY: DRC DATE: 10-08-93

PERMIT NUMBER:

CERTIFICATE NUMBER: 9303-653

ARCHITECT:

ENGINEER: Hart Crowser

CONTRACTOR: RCI / Watson

WORK DESCRIPTION: PTL Rep Michael Bekey on site to perform in place density test on final (second) lift of asphaltic concrete being placed in area non conforming asphalt was removed from. Asphalt being placed over textile place over asphalt place 10-2-93 edges have had tack coat applied.

INPLACE DENSITY TEST RESULTS

TEST	LOCATION	WET DEN.	DRY DEN.	MOIST %	•	COMP %	SPEC %	P/F
1	100' East of settlement plate south pass	145.0	—	—	1	98.4	98	P
2	100' West of settlement plate, south pass	145.3	—	—	1	98.6		P
3	200' West	147.2	—	—	1	99.9		P
4	400' West	147.3	—	—	1	99.9		P
5	300' West of settlement plate middle pass	147.8	—	—	1	100+		P
6	500' West of settlement plate middle pass	149.3	—	—	1	100+		P
7	400' West of settlement plate final pass	146.8	—	—	1	99.9		P
8	Retest #2	149.0	—	—	1	100+		P
9	Retest #1	148.8	—	—	1	100+		P

GAUGE STANDARD: ~~MS~~ DS 2583 DS 2325

LAB METHOD: ☐ D1557 ☐ D698 ☐ Rice Marshal

ASTM TEST METHOD (AS APPLICABLE) D2950

EQUIPMENT IDENTIFICATION AND S/N (AS APPLICABLE) TRoxler 4640 SN 1253

*1 SAMPLE I.D. CTL PROCTOR VALUE 147.4 pcf

*2 SAMPLE I.D. PROCTOR VALUE

*3 SAMPLE I.D. PROCTOR VALUE

WORK CONFORMS YES ☒ NO ☐

"This report is provided for the information of the client only. The reproduction of this report, by any method, and its transmittal to a third party, by any means, except in full, without the written permission of Pacific Testing Laboratories, is prohibited."

"This certification attests to the accuracy of the results obtained from the actual test performed and/or observations made within the defined scope of the work. Certification shall not be construed to represent inspection, approval or acceptance of other associated work or a warranty of design or workability of the specification requirements."

Certified Report by Pacific Testing Laboratories: [signature] DATE 10/11/93

FIELD CONTACT: Gandy Sierra Watson Asphalt DATE 10-4-93

DR 93-2

REPORT NUMBER **DR 10191**

PREVIOUS RPT. NO. _____

PACIFIC TESTING LABORATORIES

EXECUTIVE OFFICES
3257 16th Ave. W. • Seattle, WA 98119
(206) 282-0686 • FAX (206) 282-0710

EASTSIDE DIVISION
11824 North Creek Parkway N. #101 • Bothell, WA 98011
(206) 485-4244 • 451-8438 • FAX (206) 485-4611

TACOMA DIVISION
2402 Pacific Highway E. • Tacoma, WA 98424
(206) 922-9299 • FAX (206) 922-1512

PENINSULA DIVISION
P.O. Box 505 • Silverdale, WA 98383
(206) 698-6650 • FAX (206) 485-4611

MAILING ADDRESS: Port of Tacoma, PO Box 1837, Tacoma WA 98401-1837

ATTENTION: Curt Radcliff

PROJECT: Blair Waterway Backup/Leveing #710 (Port Contract)

LOCATION: Taylor Way

PURCH. ORD. NUMBER: _____

REPORTED BY: M Bokey DATE: 10-2-93

REVIEWED BY: _____ DATE: _____

PERMIT NUMBER: _____ CERTIFICATE NUMBER: 9303655

ARCHITECT: _____

ENGINEER: Hart Crowser

CONTRACTOR: RCI / Watson

WORK DESCRIPTION: PTL Rep Michael Bokey on site to perform In place density test on First lift of repaving of section of south segment of cap. Paving South pass 550' W of settlement plate to 150' E of plate, middle pass 250 West of plate to 500' W of plate North pass 350' West of plate to 550' North of plate. Work conforms to 98% compaction spec.

INPLACE DENSITY TEST RESULTS

TEST	LOCATION	WET DEN.	DRY DEN.	MOIST %	•	COMP %	SPEC %	P/F
1	100' West of Settlement Plate South Pass	148.7	—	—	1	100+	98	P
2	200' West of ~~Piezometer~~ Settlement Plate (South Pass)	146.4	—	—	1	99.3	98	P
3	400' West of Settlement Plate South Pass	146.0	—	—	1	99.0	98	P
4	300' West of Settlement Plate Middle Pass	144.4	—	—	1	98.0	98	P
5	500' West of Settlement Plate Middle Pass	145.1	—	—	1	98.4	98	P
6	400' West of Settlement Plate North Pass	144.5	—	—	1	98.0	98	P
7	100' East of Settlement Plate South Pass	144.6	—	—	1	98.1	98	P

GAUGE STANDARD: DS 7542 DS 2325

LAB METHOD: ☐ D1557 ☐ D698 ☐ Rice Marshal

ASTM TEST METHOD (AS APPLICABLE) D2950

*1 SAMPLE I.D. CTL PROCTOR VALUE 147.4

*2 SAMPLE I.D. PROCTOR VALUE

*3 SAMPLE I.D. PROCTOR VALUE

EQUIPMENT IDENTIFICATION AND S/N (AS APPLICABLE) TROXLER 4640 S/N 1257

WORK CONFORMS YES ☑ NO ☐

"This report is provided for the information of the client only. The reproduction of this report, by any method, and its transmittal to a third party, by any means, except in full, without the written permission of Pacific Testing Laboratories, is prohibited."

"This certification attests to the accuracy of the results obtained from the actual test performed and/or observations made within the defined scope of the work. Certification shall not be construed to represent inspection, approval or acceptance of other associated work or a warranty of design or workability of the specification requirements."

Certified Report by Pacific Testing Laboratories _____ DATE _____

FIELD CONTACT: Randy Stevens DATE 10-2-93

DR 93-2

REPORT NUMBER **DR 10127**

PREVIOUS RPT. NO. 10191

PACIFIC TESTING LABORATORIES

EXECUTIVE OFFICES
3257 16th Ave. W. • Seattle, WA 98119
(206) 282-0688 • FAX (206) 282-0710

EASTSIDE DIVISION
11824 North Creek Parkway N. #101 • Bothell, WA 98011
(206) 485-4244 • 451-8438 • FAX (206) 485-4611

TACOMA DIVISION
2402 Pacific Highway E. • Tacoma, WA 98424
(206) 922-9299 • FAX (206) 922-1512

PENNINSULA DIVISION
P.O. Box 505 • Silverdale, WA 98383
(206) 698-6650 • FAX (206) 485-4611

MAILING ADDRESS: Port of Tacoma
PO Box 1837
TACOMA WA 98401-1837

ATTENTION: Curt Radcliff

PROJECT: Blair Waterway Parkup/Cleanup Port contract #710

LOCATION: Taylor Way

PURCH. ORD. NUMBER:

REPORTED BY: M BEKEY DATE: 10-4-93

REVIEWED BY: DATE:

PERMIT NUMBER:

CERTIFICATE NUMBER: 9303-6551

ARCHITECT:

ENGINEER: Hart Crowser

CONTRACTOR: RCI / Watson

WORK DESCRIPTION: PTL Rep Michael Bekey on site to perform In place density test on final (second) lift of Asphaultic concrete being placed in area Non conforming Asphault was removed from. Asphault Being placed over textile place over Asphault place 10-7-93 edges have had tack coat applied.

INPLACE DENSITY TEST RESULTS

TEST	LOCATION	WET DEN.	DRY DEN.	MOIST %	*	COMP %	SPEC %	P/F
1	100' East of settlement plate south pass	145.0	—	—	1	98.4	91	P
2	100' West of settlement plate south pass	145.3	—	—	1	98.6		P
3	200' West	147.2	—	—	1	99.9		P
4	400' West	147.3	—	—	1	99.9		P
5	300' West of settlement plate middle pass	147.8	—	—	1	100+		P
6	500' West of settlement plate middle pass	149.3	—	—	1	100+		P
7	400' West of settlement plate North pass	146.8	—	—	1	99.9		P
8	Retest #2	149.0	—	—	1	100+		P
9	Retest #1	148.8	—	—	1	100+		P

GAUGE STANDARD: ~~MS~~ DS 7543 DS 7325

LAB METHOD: ☐ D1557 ☐ D698 ☐ Rice Marshal

ASTM TEST METHOD (AS APPLICABLE) D2950

*1 SAMPLE I.D. CTL PROCTOR VALUE 147.4

*2 SAMPLE I.D. PROCTOR VALUE

*3 SAMPLE I.D. PROCTOR VALUE

EQUIPMENT IDENTIFICATION AND S/N (AS APPLICABLE) TRoxler 4640 S/N 1253

WORK CONFORMS YES ☑ NO ☐

"This report is provided for the information of the client only. The reproduction of this report, by any method, and its transmittal to a third party, by any means, except in full, without the written permission of Pacific Testing Laboratories, is prohibited."

"This certification attests to the accuracy of the results obtained from the actual test performed and/or observations made within the defined scope of the work. Certification shall not be construed to represent inspection, approval or acceptance of other associated work or a warranty of design or workability of the specification requirements."

Certified Report by Pacific Testing Laboratories DATE

FIELD CONTACT: Gordy Sievers Watson Asphalt DATE 10-4-93

DR 93-2

Appendix I

APPENDIX I
TRIBAL FUTURE DESIGN CONSIDERATIONS
PLATE LOAD TEST DATA

November 5, 1993

Mr. Jeffrey S. Lyon
Puyallup International
3702 Marine View Drive N.E.
Suite 200
Tacoma, WA 98422

Subject: Port of Tacoma Contract No. 710
Blair Backup Properties
Plate Load Test Data
Work Order No. E1192

This is a follow-up to my letter of February 8, 1993 in which I transmitted pavement and foundation deign calculations on the Blair Backup Properties. These calculations were based on unsubstantiated assumptions and could not be verified until the project was complete. Please be advised, that field verification has been completed and the observed values exceed the assumed values used in these calculations.

The calculations and load test should not be substituted for a pavement design study for any future pavements. A competent geotechnical engineer will need to evaluate the subsurface conditions against the anticipated structure.

Very truly yours,

Curtis L. Ratcliffe, P.E.
Chief Engineer

Attachments

cc: Roy Perry
Bill Casper
John Verdiun
Karen Keeley
Don Meyer

P.O. Box 1837 • Tacoma, Washington 98401-1837 • Telephone (206) 383-5841 • Telex 32-7473
Commissioners: Robert G. Earley • Jack A. Fabulich • Philip M. Lelli • Patrick O'Malley • Ned Shera
Executive Director: John J. Terpstra

HARTCROWSER

Earth and Environmental Technologies

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102
FAX 206.328.5581
206.324.9530

MEMORANDUM

DATE: October 27, 1993

TO: Curtis Ratcliffe - Port of Tacoma

FROM: John Verduin - Hart Crowser

RE: Plate Load Test Data
Blair Waterway and Backup Properties Cleanup - 1993
J-2350-24

Per your February 8, 1993, letter to Mr. Jeffrey S. Lyon of Puyallup International, Inc., we have completed the field verification of our February 3, 1993, pavement design calculations. Two plate load tests were completed as shown on Attachment 1:

- One test was completed on the wearing course material; and
- One test was completed on the sand and gravel cover material.

As seen on Attachments 2 and 3 the following modulus of subgrade reactions (k) were estimated from the tests:

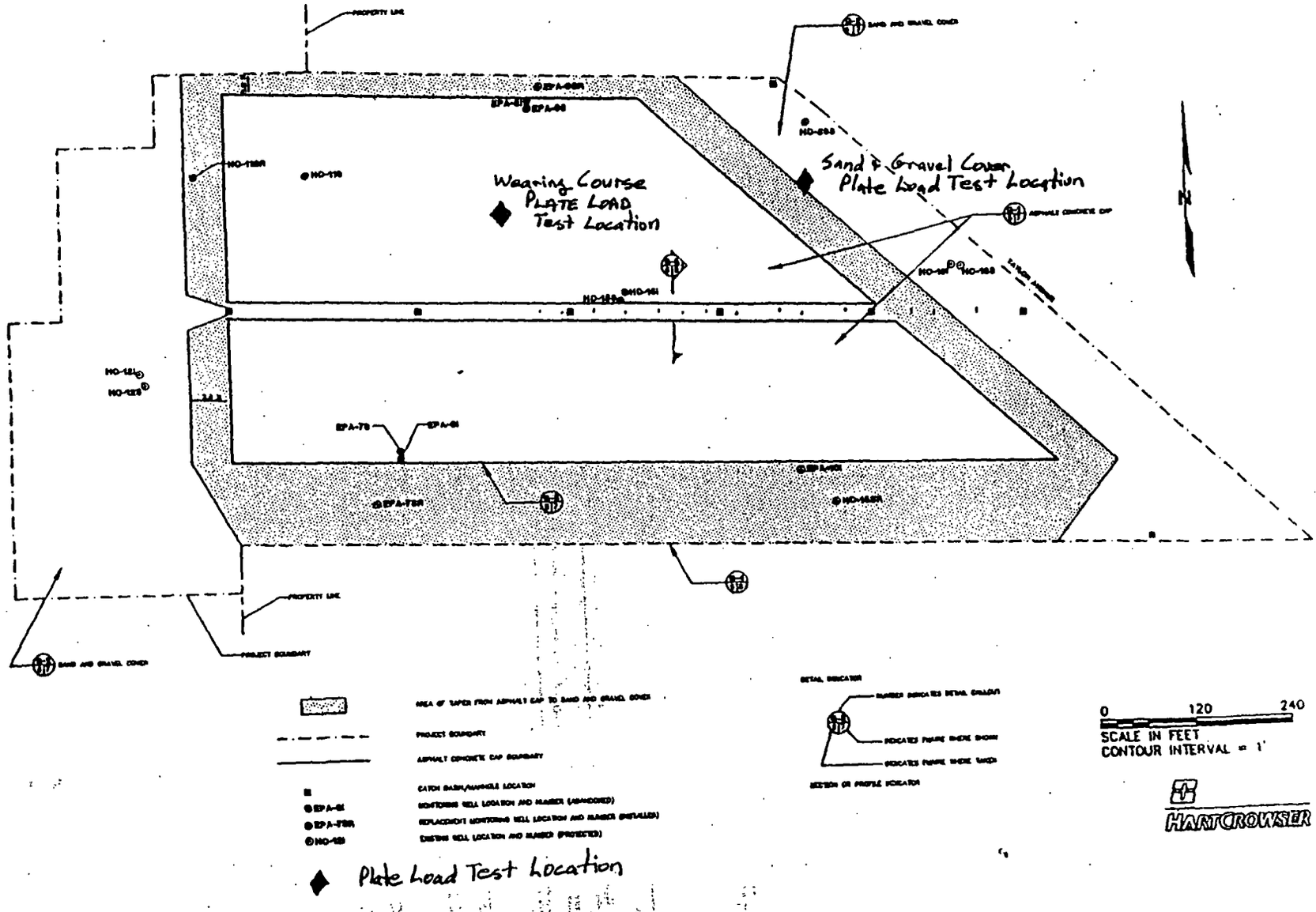
- 350 pci for the wearing course material; and
- 590 pci for the sand and gravel cover material.

These observed values exceed the assumed k values as shown on page 11 of the February 3, 1993, calculations. Therefore, the two plate load tests have verified that the subgrade assumptions of the calculations are valid.

The calculations and load test should not be substituted for a pavement design study for any future pavements. A competent geotechnical engineer will need to evaluate the subsurface conditions against the anticipated structure.

BLAIRPLT.mem

POST-CONSTRUCTION PLATE LOAD TEST LOCATION PLAN



ATTACHMENT 1

Blair Waterway & Backup Properties Cleanup - 1993

Plate Load Test

Sand & Gravel Cover Material

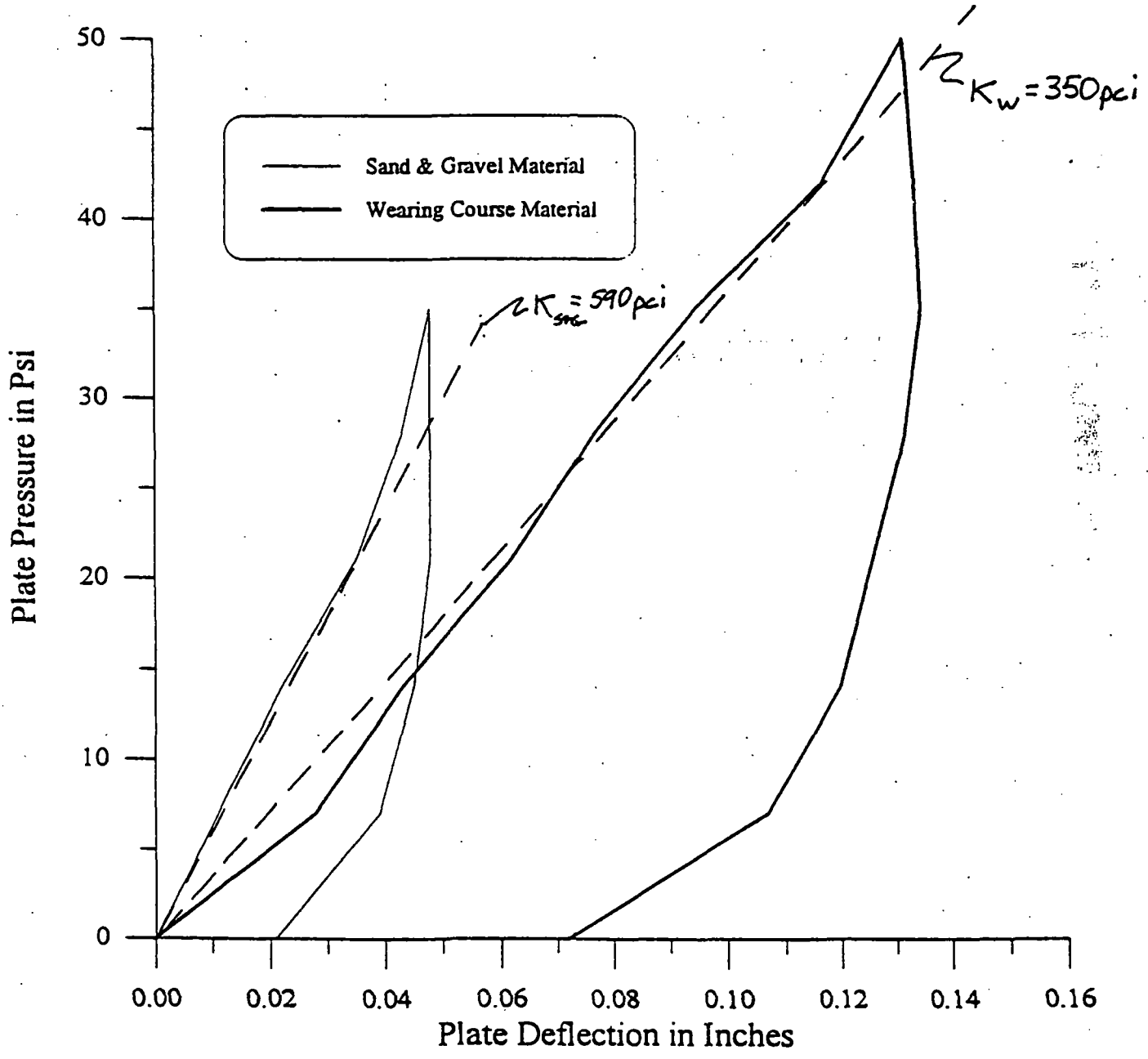
Pressure Guage in (psi)	Load in (kips)	Plate Pressure in (psi)	Deflection Gauge Reading in (Inches)			
			#1	#2	#3	Average
50	-	0	0.000	0.000	0.000	0.000
310	5	7	0.004	0.018	0.012	0.011
560	10	14	0.012	0.031	0.023	0.022
820	15	21	0.025	0.044	0.037	0.035
110	20	28	0.034	0.049	0.047	0.043
1350	25	35	0.043	0.053	0.049	0.048
1100	20	28	0.043	0.053	0.049	0.048
820	15	21	0.043	0.053	0.048	0.048
560	10	14	0.039	0.049	0.048	0.045
310	5	7	0.032	0.040	0.045	0.039
0	0	0	0.018	0.021	0.025	0.021

Wearing Course Material

Pressure Guage in (psi)	Load in (kips)	Plate Pressure in (psi)	Deflection Gauge Reading in (Inches)			
			#1	#2	#3	Average
50	-	0	0.000	0.000	0.000	0.000
310	5	7	0.014	0.041	0.028	0.028
560	10	14	0.022	0.061	0.045	0.043
820	15	21	0.030	0.089	0.068	0.062
110	20	28	0.036	0.108	0.088	0.077
1350	25	35	0.044	0.129	0.113	0.095
1600	30	42	0.055	0.153	0.144	0.117
1850	35	50	0.063	0.170	0.164	0.132
1600	30	42	0.064	0.172	0.166	0.134
1350	25	35	0.064	0.173	0.168	0.135
1100	20	28	0.061	0.169	0.165	0.132
820	15	21	0.059	0.162	0.158	0.126
560	10	14	0.055	0.153	0.151	0.120
320	5	7	0.048	0.139	0.135	0.107
0	0	0	0.019	0.100	0.098	0.072

ATTACHMENT 2

Blair Waterway and Backup Properties Cleanup - 1993
Plate Load Tests



ATTACHMENT 3

February 8, 1993

Jeffrey S. Lyon
Puyallup International, Inc
3600 Port of Tacoma Road
Suite 302
Tacoma WA 98424

Subject: Port of Tacoma Contract No. 710
Blair Backup Property
Footing and Pavement Design Calculations
Work Order No. E1192

Attached are the calculations for footing capacity and recommended pavement design for your future Blair Backup Property. These calculations are the engineer's best attempt to present an estimation of the pavement and the foundation capacities over the sand and gravel cover area and the asphalt cap cover area. All calculations presented herein are based on the assumption that the subgrade is in the same condition as at the completion of the cap and cover construction. Therefore, site subgrade degradation from any site activities after completion of this work must be addressed and repaired prior to development in order to consider those calculations viable. At the conclusion of the construction work, these calculations will be field verified through testing and these test results will supplement these calculations.

These calculations should not be substituted for a foundation engineering design study of future structures. A competent geotechnical engineer will need to evaluate the subsurface conditions against the anticipated structure.

Thank you for your effort on this matter.

Very truly yours,

Curtis L. Ratcliffe, P.E.
Chief Engineer

cc: Roy Perry
Bill Casper
Gary Horvitz
Don Meyer

Attachment

P.O. Box 1837 • Tacoma, Washington 98401-1837 • Telephone (206) 383-5841 • Telex 32-7473

CALCULATIONS FOR FOOTING CAPACITY AND PAVEMENT DESIGN
SAND AND GRAVEL COVER/ASPHALT PAVEMENT CAP AREAS
OFA/PENNWALT AREA
BLAIR BACKUP PROPERTY

Prepared for the Port of Tacoma

February 3, 1993

Hart Crowser
J-2350-21

RECEIVED
FEB 04 1993
ENGINEERING DEPT.

FOOTING CAPACITY

TYPICAL FOOTING DESIGN IN THE PORT OF TACOMA AREA

- Allowable capacity of 2,000 to 3,000 pounds per square foot (psf) for lightly loaded warehouse structures. More heavier loaded structures typically require a pile foundation system.
- Embedment of 18 inches below grade for frost protection

ASSUMPTIONS

- Footings embedded a minimum of 18 inches below lowest adjacent grade.
- Square footing that is at least 2 feet wide.
- Factor of safety of 3.0 is required.

Equation (1) $q_{ult} = d_q \gamma' D_f N_q + d_\gamma \frac{1}{2} B \gamma' N_\gamma$

ANALYSIS

Sand & Gravel Cover Fill Area

Case 1 - Footing Placed on Finished Grade with 18-inches of Additional Fill and/or Pavement Placed Above the Footing Base

The cover material consists of 4-inch minus gravelly sand compacted to 95 percent modified Proctor. Footing capacity is predominately from the sand and gravel cover material. Therefore, for analysis of Case 1 the following soil properties were assumed:

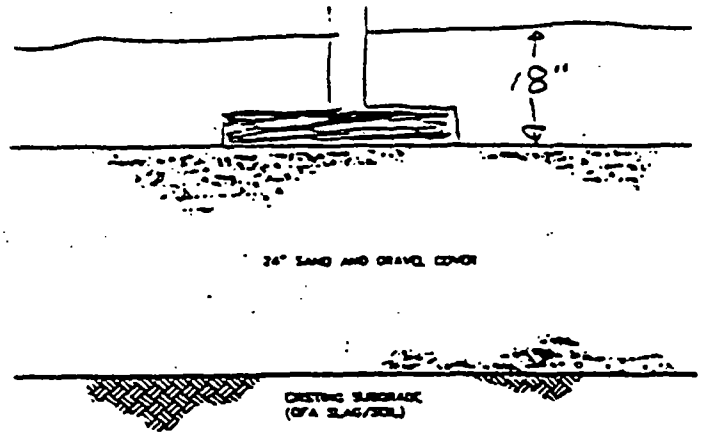
- $\phi = 32$
- $\gamma' = 135$ pounds per cubic foot (pcf)

Based on assumed soil properties, footing construction, and the attached plot the following variables in equation (1) are:

- $N_q = 28$
- $N_\gamma = 30$
- $D_f = 1.5$ feet
- $B = 2$ feet
- Depth factor (d_q, d_γ):

$$d_q = d_\gamma = 1 + (0.1)(D_f/B)\tan(45° + \phi/2)$$
$$= 1 + (0.1)(1.5/2)\tan(45° + 32/2)$$
$$= 1.14$$

Sketch:



Calculation: q_{ult} = (1.14)(135)(1.5)(28) + (1.14)(0.5)(2)(135)(30)
= 6464 + 4617
= 11080psf
q_{all} =4,000 psf (FS=3.0)

Case 2 - Footing Embedded 18-inches into 24-inch Cover Material

The cover material consists of 4-inch minus gravelly sand compacted to 95 percent modified Proctor. Footing capacity is controlled more by the OFA soil slag material since the footing base is closer to this layer. Soil properties are subsequently reduced in Case 2 from Case 1 because of this. Therefore, for analysis the following soil properties were assumed:

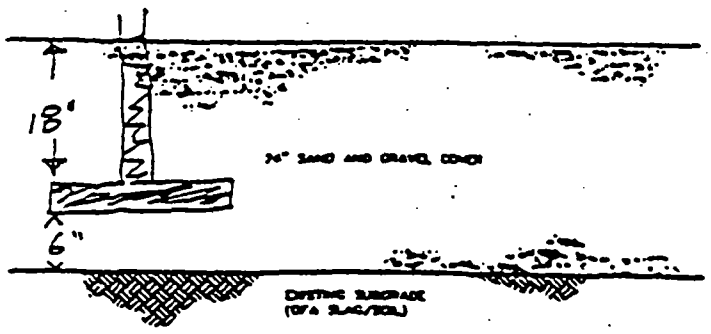
- ϕ = 28
- γ' = 130 pcf

Based on assumed soil properties, footing construction, and the attached plot the following variables in equation (1) are:

- N_q = 19
- N_γ = 18
- D_f = 1.5 feet
- B = 2 feet
- Depth factor (d_q, d_γ):

$$d_q = d_\gamma = 1 + (0.1)(1.5/2)\tan(45° + 28/2)$$
$$= 1.15$$

Sketch:



Calculations: $q_{ult} = (1.15)(130)(1.5)(19) + (1.15)(0.5)(2)(130)(18)$
$= 4261 + 2691$
$= 6952$
$q_{all} = 2{,}500$ psf (FS=3.0)

Case 3 - Footing Placed on Finished Sand & Gravel Cover with no Surrounding Surcharge

The cover material consists of 4-inch minus gravelly sand compacted to 95 percent modified Proctor. Footing capacity is predominately from the sand and gravel cover material. Therefore, for analysis of Case 3 the following soil properties were assumed:

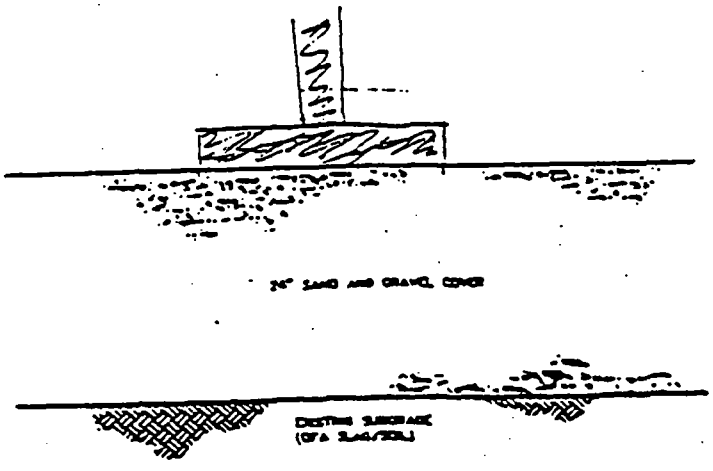
- $\phi = 32$
- $\gamma' = 135$ pounds per cubic foot (pcf)

Based on assumed soil properties, footing construction, and the attached plot the following variables in equation (1) are:

- $N_q = 28$
- $N_\gamma = 30$
- $D_f = 0$ feet
- $B = 2$ feet
- Depth factor (d_q, d_γ):

$d_q = d_\gamma = 1 + (0.1)(0/2)\tan(45° + 32/2)$
$= 1 + 0$
$= 1$

Sketch:



Calculation: $q_{ult} = (1.0)(135)(0.0)(28) + (1.0)(0.5)(2)(135)(30)$
$= 0 + 4050$
$= 4050$ psf
$q_{all} = 1{,}400$ psf (FS=3.0)

[redacted]

[redacted]

Asphalt Cap Area

Case 1 - Footing Placed Directly on Asphalt Cap with 18-inches of Additional Fill and/or Pavement Placed Above the Footing Base

Beneath the footing with depth is 3 inches of asphalt concrete, 6 inches of crushed rock, 17 inches of slag material, and 6 inches of sand and gravel buffer. Therefore, for analysis the following properties were assumed:

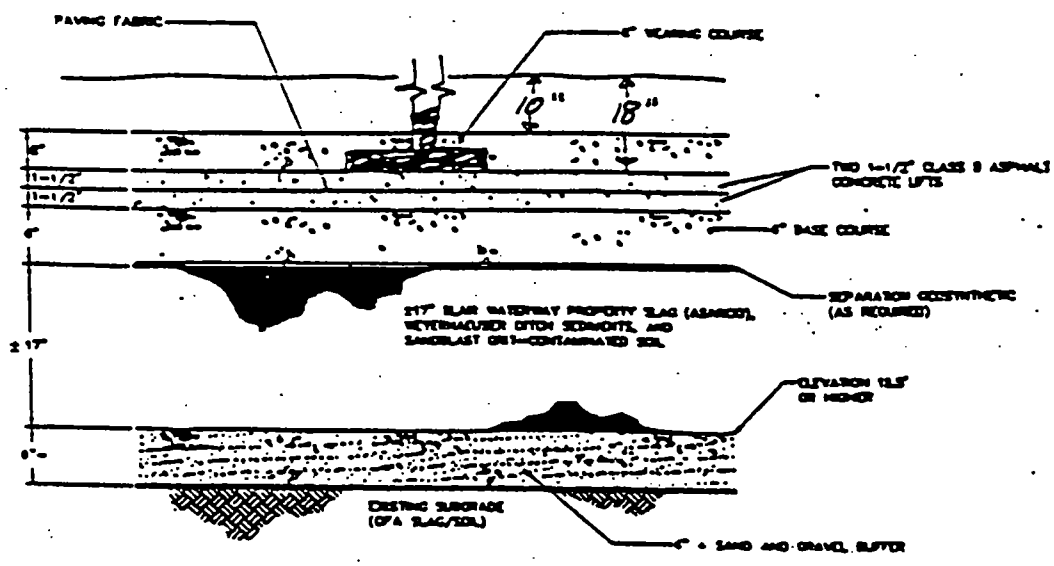
- $\phi = 36$
- $\gamma' = 135$

Based on assumed soil properties, footing construction, and the attached plot the following variables in equation (1) are:

- $N_q = 50$
- $N_\gamma = 60$
- $D_f = 1.5$ feet
- $B = 2$ feet
- Depth factor (d_q, d_γ):

$$d_q = d_\gamma = 1 + (0.1)(1.5/2)\tan(45+36/2)$$
$$= 1.15$$

Sketch:



Calculations: $q_{ult} = (1.15)(135)(1.5)(50) + (1.15)(0.5)(2)(135)(60)$
$= 11644 + 9315$
$= 20959$
$q_{all} = 6{,}500$ psf (FS=3.0)

Case 2 - Footing Placed Directly on Crushed Rock Wearing Course with no Surrounding Surcharge

Beneath the footing with depth is 8 inches of crushed rock, 3 inches of asphalt concrete, 6 inches of crushed rock, 17 inches of slag material, and 6 inches of sand and gravel buffer. Therefore, for analysis the following properties were assumed:

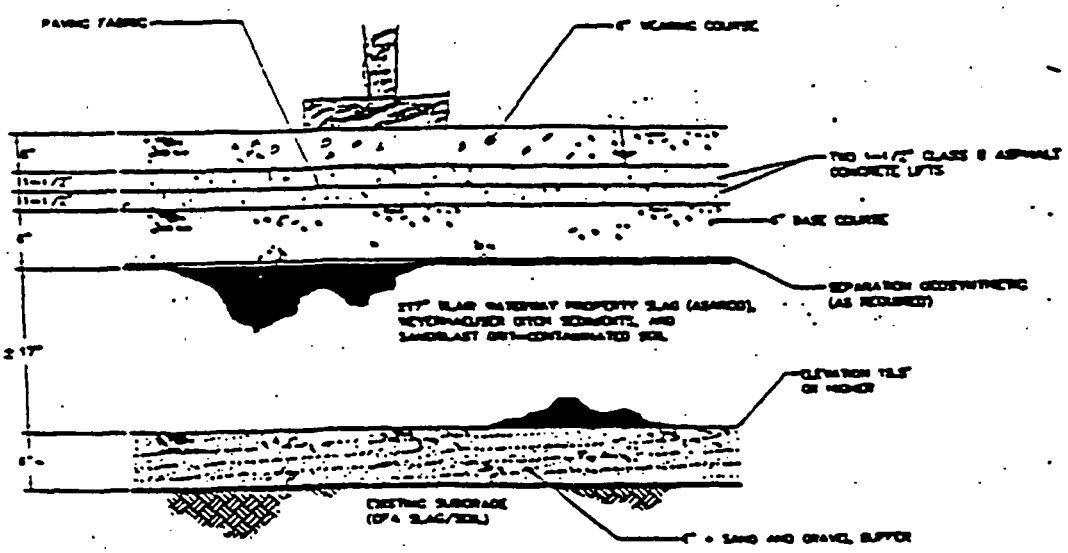
- $\phi = 36$
- $\gamma' = 135$

Based on assumed soil properties, footing construction, and the attached plot the following variables in equation (1) are:

- $N_q = 50$
- $N_\gamma = 60$
- $D_f = 0$ feet
- $B = 2$ feet
- Depth factor (d_q, d_γ):

$d_q = d_\gamma = 0$

Sketch:



Calculations: $q_{ult} = (1.0)(135)(0.0)(50) + (1.0)(0.5)(2)(135)(60)$
$= 0 + 8100$
$= 8100$
$q_{all} = 2{,}700$ psf (FS=3.0)

[redacted]

When $\phi = 0$:

$N_\gamma = 0$, $N_c = 5.14$, $N_q = 1$ for Strip

$N_\gamma = 0$, $N_c = 6.16$, $N_q = 1$ for Square

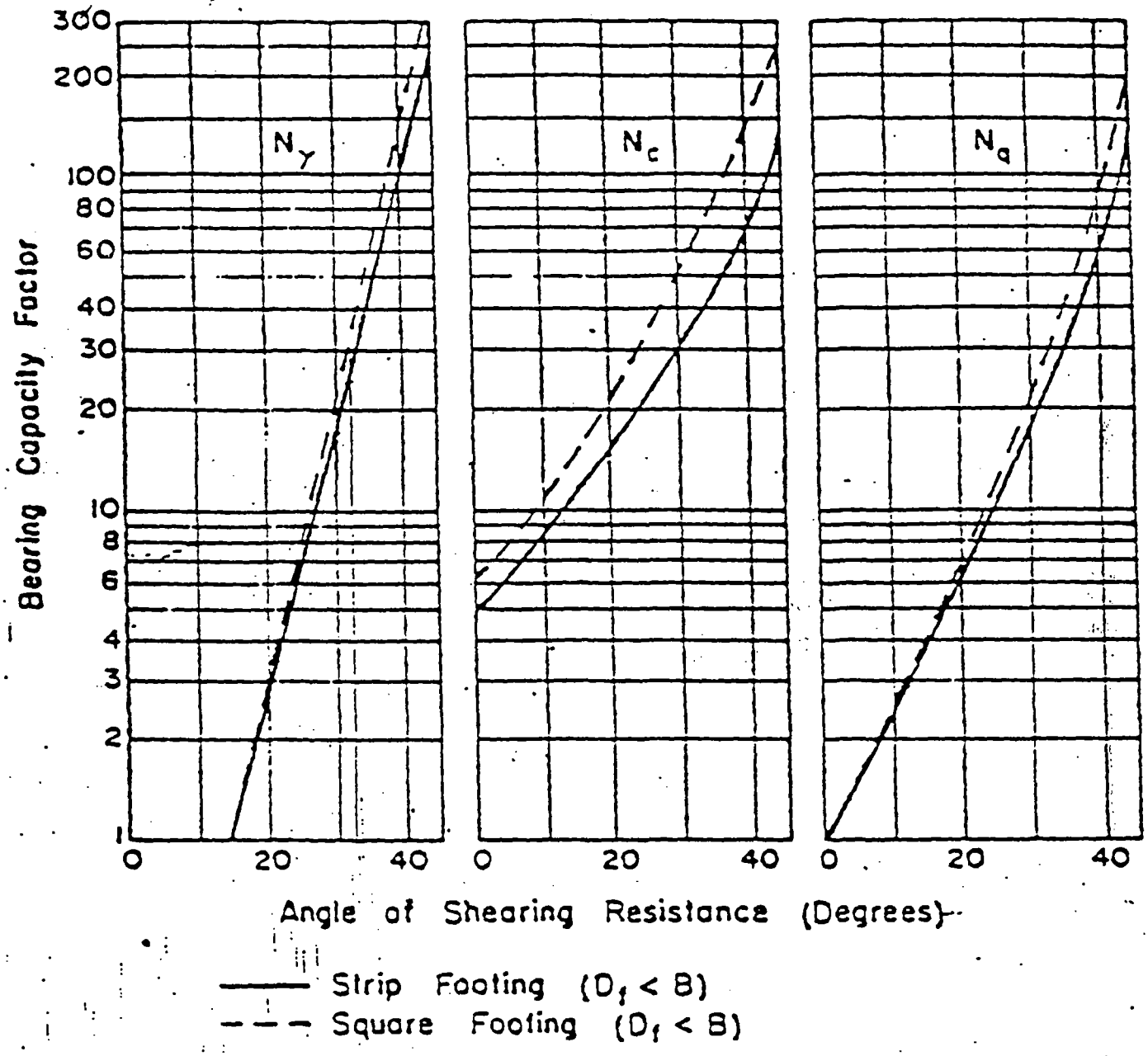


Figure 10.14 - Bearing Capacity Factors for Shallow Foundatio

MEYERHOF

PAVEMENT DESIGN

GENERAL

Three potential site uses over the Sand and Gravel Cover area and Asphalt Cap area were analyzed:

- Auto Storage Yard
- Industrial/Commercial Mixed
- Cargo Container Yard

SUBGRADE ASSUMPTIONS

- A single plate load test was completed on the graded site indicating a modulus of subgrade reaction (k) of roughly 200 pounds per cubic inch (pci). The test was in a better portion of the site and it is felt that a more representative value for the entire site would be lower.

- Therefore, in the Sand and Gravel Cover area a k of 100 pci and resilient modulus (Mr) of 6,000 psi was used.

- In the Asphalt Capped area the existing subgrade conditions should have a limited effect on the pavement design after placing 3.3 feet of material - the last 17 inches includes crushed rock and asphalt concrete. Therefore, a k of 200 pci and Mr of 12,000 psi was used.

ANALYSIS ASSUMPTIONS

The pavement designs presented herein are based on the subgrade assumptions made above. The designs will need to be confirmed after the Port completes plate load tests on the Sand and Gravel Cover and Asphalt Cap at the conclusion of construction.

Auto Storage Yard

Typical Pavement Design in the Port of Tacoma Area

- Two (2) inches of asphalt concrete over 4 to 12 inches of crushed rock.

Assumed Loading Conditions

- Two-axle cars - light to moderate traffic

Analysis

- In Sand and Gravel Cover area 2 inches of asphalt concrete over 4 inches of crushed rock.

- In Asphalt Cap area 2 inches of asphalt concrete over 2 inches of top course

crushed rock.

Industrial/Commercial Mixed Use

Typical Pavement Design in the Port of Tacoma Area

- Two (2) inches of asphalt concrete over 4 to 12 inches of crushed rock in light traffic areas.
- Three (3) inches of asphalt concrete over 6 to 12 inches of crushed rock in heavier traffic areas.

Assumed Loading Conditions

- Two-axle cars - light to heavy traffic.
- Truck traffic.

Analysis

- In Sand and Gravel Cover area 3 inches of asphalt concrete over 4 inches of crushed rock. If sand and gravel in poor condition use 6 inches of crushed rock.
- In Asphalt Cap area 3 inches of asphalt concrete over 2 inches of top course crushed rock.

Cargo Container Yard

Typical Pavement Design in the Port of Tacoma Area

- Five to six (5 to 6) inches of asphalt concrete over 12 inches of crushed rock.

Assumed Loading Conditions

- Straddle Carrier:
  - 66 ton dead weight
  - 44 ton capacity
  - Asphalt Institute recommends 60% of rated capacity for pavement design since Strads are sometimes empty when loading pavement
  - 5,000 repetitions per year were assumed.
  - Tire pressure of 125 psi.

Analysis

Used Asphalt Institute Manual "Thickness Design: Asphalt Pavements for Heavy Wheel Loads" (MS-No. 23) for design:

P=wheel load	= 23 kips
p=tire-ground contact pressure	=125psi
A=contact area	=(P/p)=23,000/125=185 square inches
a=radius of circular area	$= \sqrt{A/\pi}$ =7.5
20 year design	Total reps = 20(5,000) = 100,000 reps

From attached sheets:

- Sand and Gravel Cover Area $T_{A/a} = 1.8$
- Asphalt Cap Area $T_{A/a} = 1.6$

Required Asphalt Thickness

$$t = T_{A/a}(a)$$

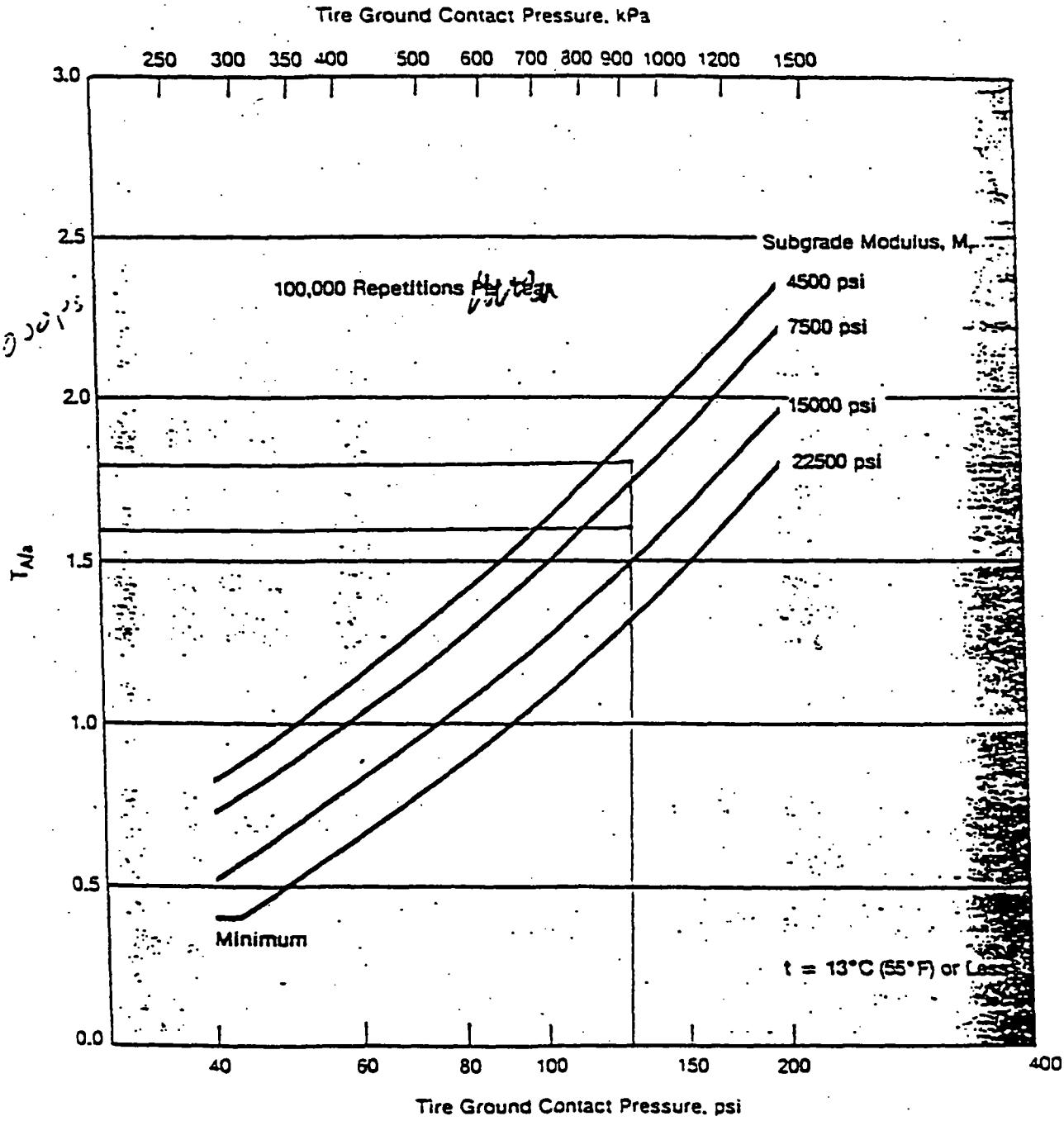
- Sand and Gravel Cover Area t = 1.8(7.5) = 13.5 inches
- Asphalt Cap Area t = 1.6(7.5) = 12 inches

<u>Pavement Section Design</u>

Typically, to reduce asphalt thickness it is assumed that 2 inches of crushed rock is equivalent to 1 inch of asphalt for structural capacity. Therefore:

- In the Sand and Gravel Cover area 10 inches of asphalt over 6 inches of crushed rock.
- In the Asphalt Cap area 8 inches of asphalt over 4 inches of crushed rock.

FIGURE VI-2
SIGN $T_{A/a}$ VALUES (100,000 REPETITIONS)



19

Hart Crowser
J-2350-24

APPENDIX J
OPERATION AND MAINTENANCE PLAN
BLAIR BACKUP PROPERTY REMEDIATION

APPENDIX J
OPERATION AND MAINTENANCE PLAN
BLAIR BACKUP PROPERTY REMEDIATION

The following section addresses long-term operation and maintenance of the sand and gravel cover, pavement cap, storm water system, groundwater monitoring system, and groundwater monitoring in the OFA/Pennwalt Area of the Blair Backup Property. Figure J-1 is the schedule of the groundwater monitoring and inspections required. Attached after Figure J-1 are example inspection logs.

Sand and Gravel Cover

The sand and gravel cover will be inspected on the dates shown on Figure J-1. The sand and gravel cover will also be inspected after at least one 25-year, 24-hour storm. If no 25-year, 24-hour storm occurs by the last inspection date, an additional inspection will be performed when the storm does occur. Monitoring will occur past the last date if requested by EPA. Inspections will cease once the sand and gravel portion is paved. Attached is a log outlining the inspection process and an example log. Inspections will entail walking the sand and gravel cover area focusing on rutting and erosion problems. Voids or ruts will be filled with sand and gravel and compacted per specifications.

Asphalt Concrete Cap

The 7-acre pavement cap will be inspected in two phases. The first phase will involve inspections on the dates shown on Figure J-1. The Port will inspect once every year thereafter subject to EPA review until the second phase inspections begin. These first phase inspections will be made over a 25-square-foot (ft^2) area of the surface for every acre of pavement. The capped portion will be divided into 7 sections each an acre in area. The 25 ft^2 areas will be randomly chosen in a different portion of the 7 sections for each inspection. The 25 ft^2 area (5 feet by 5 feet) will give a good indication of the asphalt cap condition without impairing the integrity of the cap system. If there are any concerns at the time of inspection, the 25 ft^2 area will be expanded as necessary.

The second phase will involve 6-month inspections for 1½ years. These inspections will occur after the asphalt cap area is paved. The inspections will entail walking each of the 7-acre sections looking for pavement distress. Areas of significant pavement distress (cracking and/or pumping) will be removed down to the asphalt cap for cap inspection.

Included in this appendix are two logs for cap inspection. They are for Phase 1 inspection (no site development) and for Phase 2 inspection (pavement over cap). Also included are the two logs filled out assuming an inspection was completed.

Tearing or stretching of the paving fabric within the asphalt cap is the main concern of cracking as well as a water pathway. Significant, potentially damaging cracks will be considered as:

- Alligator cracks over a 5 ft^2 area or larger;
- Parallel transverse or longitudinal cracks; or
- Cracks at construction joints.

Single hairline cracks with no apparent pattern will not be of concern.

Repair of cracks will include:

- Identifying extent of cracks.
- Brushing crack area clean.
- Blowing all miscellaneous debris from cracks with high pressure air.
- Sealing cracks with epoxy.
- Replacing 8 inch wearing course layer per original specifications.
- Inspecting area during next 6 month interval.

Storm Water System

The storm water system will be inspected on the dates shown on Figure J-1. The storm water system will also be inspected after at least one 25-year, 24-hour storm. If no 25-year, 24-hour storm occurs by the last inspection date, an additional inspection will be performed when the storm does occur. Monitoring will occur past the last date if requested by EPA. Attached is a log outlining the inspection process and an example log. Inspections will entail removing manhole and catch basin covers and visually inspecting the manholes, noting damage or debris. If debris is found that material will be removed.

Groundwater Monitoring System

The groundwater monitoring system will be inspected during groundwater monitoring according to the schedule shown on Figure J-1. Attached is a log outlining the inspection process and an example log. Inspections will entail observing the condition of the wells during sampling.

Groundwater Monitoring

Sampling of the OFA/Pennwalt Area shallow aquifer wells will be conducted semiannually for five years (see Figure J-1). Each of the post-placement sampling events will consist of sampling the eight OFA/Pennwalt Area shallow aquifer wells (plus one replicate sample) and analyzed samples for dissolved As, Cu, Pb, Ni, and Zn. If elevated concentrations of metals are found in the groundwater, EPA may require additional sampling at more frequent intervals. Following the fifth year of monitoring, EPA will determine whether modifications to the groundwater monitoring program are adequate.

In order to evaluate potential changes in groundwater flow directions, water levels will also be measured on a semiannual basis at the time of the water quality sampling. These data will be used to evaluate changes in flow direction and any impacts that may have on the water quality monitoring program.

Refer to Appendices A and F of the CUP (Hart Crowser, 1993) for a more detailed discussion of the groundwater monitoring plan.

Provisions for Future Construction

Future construction at the site that would involve excavation of the sand and gravel or pavement cap must be performed with minimal disturbance to the underlying materials. Excavations will need to be performed in such a way that direct contact with the underlying materials is avoided. Voids or cracks left in the surface after construction will need to be resealed or covered.

REFERENCE

Hart Crowser, 1993. Final Cleanup Plan, OFA/Pennwalt Area, Blair Backup Property, Port of Tacoma, Washington, prepared for the Port of Tacoma, dated February 17, 1993, J-2350-21.

APPENDIX J

Monitoring/Inspection Schedule

Tasks	Scheduled Monitoring/Inspection Week of	1994				1995				1996				1997				1998				1999			
		Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4
Construction Completed	11/15/93	◆																							
Groundwater Monitoring and Monitoring System Inspection				—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
Round 1a	4/15/94			◆																					
Round 1b	10/15/94					◆																			
Round 2a	4/15/95							◆																	
Round 2b	10/15/95									◆															
Round 3a	4/15/96											◆													
Round 3b	10/15/96													◆											
Round 4a	4/15/97															◆									
Round 4b	10/15/97																	◆							
Round 5a	4/15/98																			◆					
Detailed Report	10/15/98																					◆			
Asphalt Cap Inspection[1]			—	—	—	—	—																		
Inspection 1	1/15/94		◆																						
Inspection 2	4/15/94			◆																					
Inspection 3	10/15/94					◆																			
Inspection 4	4/15/95							◆																	
Sand & Gravel Cover Inspection[2]			—	—	—	—	—																		
Inspection 1	1/15/94		◆																						
Inspection 2	4/15/94			◆																					
Inspection 3	10/15/94					◆																			
Inspection 4	4/15/95							◆																	
Storm Water System Inspection[2]			—	—	—	—	—																		
Inspection 1	1/15/94		◆																						
Inspection 2	4/15/94			◆																					
Inspection 3	10/15/94					◆																			
Inspection 4	4/15/95							◆																	

Notes: 1. After the asphalt capped area is paved three inspections will occur every six months for 1-1/2 years. See text for other requirements.

2. Inspections will also occur after at least one, 25 year, 24-hour storm. If no 25 year, 24 hour storm occurs by the April 1995 inspection, an additional inspection will be performed when the storm does occur.

HARTCROWSER
J-2360-24 11/93
Figure J-1

core1\jobs\23502412 cvd 1/7/94

Blair Backup Property

Sand and Gravel Cover Inspection Log

Date of Inspection: _____ Inspector: _____

Weather: _____ Temperature: _____

Area Number: _____

Area Location Sketch (Include and North Arrow)

1. Condition of sand and gravel cover material surface (ruts, vegetation, etc.):

_____

2. Condition of sand and gravel cover material at depth (moisture content, gradation, etc.):

_____

3. Thickness of sand and gravel cover material:

_____

4. Additional Investigation Required?:

_____

5. Findings of Additional Investigation:

_____

_____

Blair Backup Property

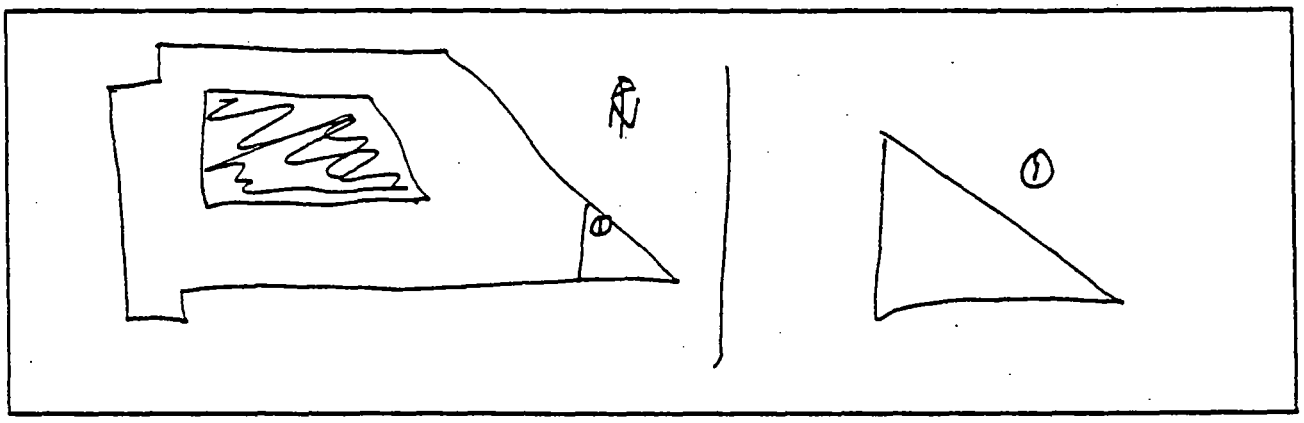
Sand and Gravel Cover Inspection Log

Date of Inspection: April 5, 1994 Inspector: Joe Port

Weather: Rain Temperature: 50°

Area Number: 1

Area Location Sketch (Include and North Arrow)



1. Condition of sand and gravel cover material surface (ruts, vegetation, etc.):

No ruts, vegetation nor erosion channels

2. Condition of sand and gravel cover material at depth (moisture content, gradation, etc.):

Moist, sandy gravel

3. Thickness of sand and gravel cover material:

24 inches. Up to 25 inches in places

4. Additional Investigation Required?:

No

5. Findings of Additional Investigation:

—

Blair Backup Property

Asphalt Cap Inspection Log

No Site Development

Date of Inspection: _____ Inspector: _____

Weather: _____ Temperature: _____

Area Number: _____

Area Location Sketch (Include North Arrow)

WEARING COURSE

1. Condition of wearing course surface (ruts, vegetation, etc.):

2. Condition of wearing course (moisture content, gradation, etc.):

3. Thickness of wearing course (inches):

ASPHALT CAP

1. Condition of asphalt cap (ruts, cracks, etc.):

2. Is Cracking Visible ?

2A. Width of cracks (inches):

2B. Length of cracks (inches):

2C. Depth of cracks (inches):

2D. Spacing of cracks (inches):

3. Additional Investigation Required?:

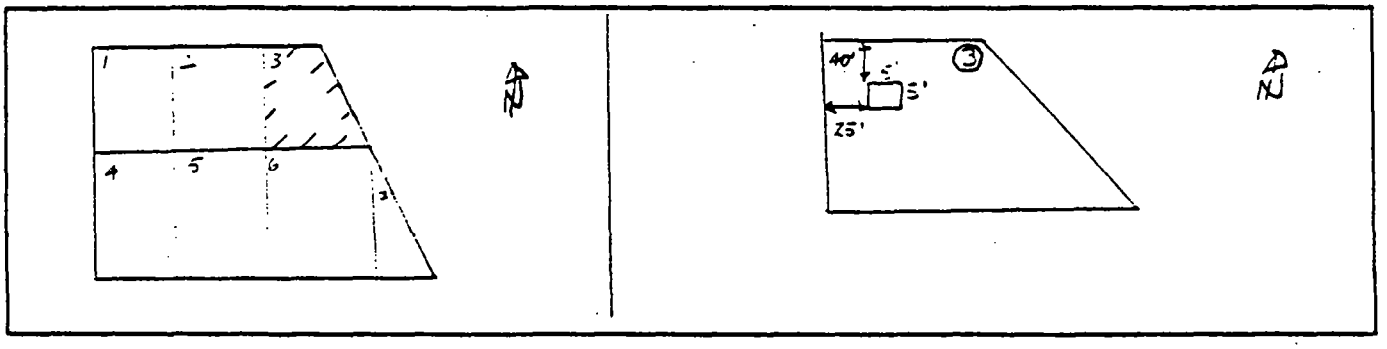
3A. Findings of additional investigation:

Blair Backup Property
Asphalt Cap Inspection Log

No Site Development

Date of Inspection: May 2 = 1992
Weather: Overcast
Area Number: 3
Inspector: Joe Pont
Temperature: 60°

Area Location Sketch (Include North Arrow)



WEARING COURSE

1. Condition of wearing course surface (ruts, vegetation, etc.):
Excellent. Isolated weeds

2. Condition of wearing course (moisture content, gradation, etc.):
Moist, slightly sandy gravel

3. Thickness of wearing course (inches):
8.1"

ASPHALT CAP

1. Condition of asphalt cap (ruts, cracks, etc.):
Excellent. One hair line crack.

2. Is Cracking Visible ?
Minimal

2A. Width of cracks (inches):
<0.1"

2B. Length of cracks (inches):
4"

2C. Depth of cracks (inches):
< 0.1"

2D. Spacing of cracks (inches):
Only one crack.

3. Additional Investigation Required?:
No. Hair line crack of no concern.

3A. Findings of additional investigation:
—

Blair Backup Property
Asphalt Cap Inspection Log

Pavement Over Cap

Date of Inspection: _____ Inspector: _____
Weather: _____ Temperature: _____
Area Number: _____
Area Location Sketch (Include North Arrow)

EXISTING PAVEMENT

1. Condition of surface pavement (ruts, cracking, etc.):

2. If cracking or rutting evident, what is its extent?:

3. Investigation of asphalt cap warranted?

3A. Condition of asphalt cap (ruts, cracks, etc.):

3B. Is Cracking Visible ?

3B1. Width of cracks (inches):

3B2. Length of cracks (inches):

3B3. Depth of cracks (inches):

3B4. Spacing of cracks (inches):

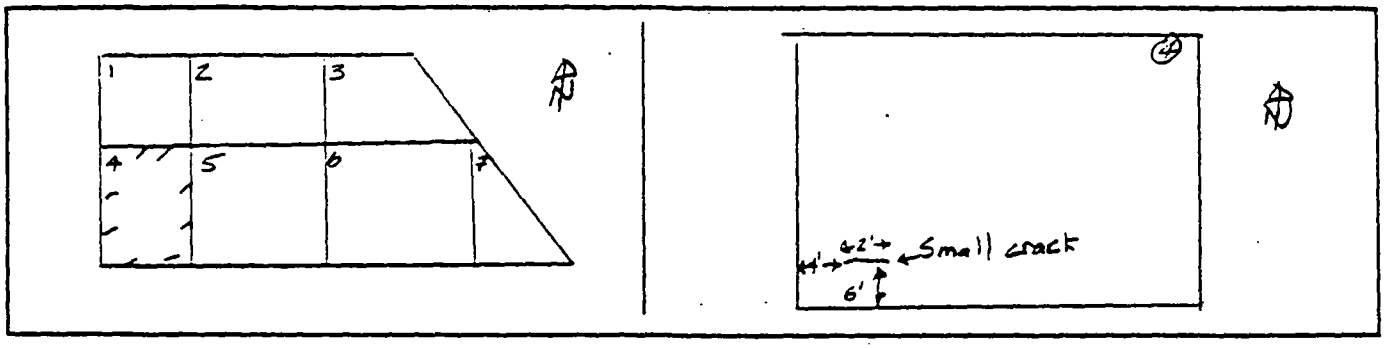
3C. Additional Investigation Required?:

3C1. Findings of additional investigation:

Blair Backup Property
Asphalt Cap Inspection Log

Pavement Over Cap

Date of Inspection: March 20 1995
Inspector: Joe Arpt
Weather: Light rain
Temperature: 50°
Area Number: 4
Area Location Sketch (Include North Arrow)



EXISTING PAVEMENT

1. Condition of surface pavement (ruts, cracking, etc.):
Excellent

2. If cracking or rutting evident, what is its extent?:
Small 2' long crack in southwest corner (see sketch)

3. Investigation of asphalt cap warranted?
No. Small crack in pavement with no apparent pattern. Less than 0.2" deep.

3A. Condition of asphalt cap (ruts, cracks, etc.):
—

3B. Is Cracking Visible ?
—

3B1. Width of cracks (inches):
—

3B2. Length of cracks (inches):
—

3B3. Depth of cracks (inches):
—

3B4. Spacing of cracks (inches):
—

3C. Additional Investigation Required?:
—

3C1. Findings of additional investigation:
—

Blair Backup Property

Storm Water System Inspection Log

Date of Inspection: _____ Inspector: _____

Weather: _____ Temperature: _____

Manhole Number: _____

Area Location Sketch (Include and North Arrow)

1. Condition of manhole grate (plugged, damaged, etc.):

_____

2. Condition of inlet and outlet 24-inch diameter CMP (plugged, damaged, etc.):

_____

3. Condition of tide gate (if applicable):

_____

4. Condition of manhole (cracking in concrete, etc.):

_____

5. Additional Investigation Required?:

_____

6. Findings of Additional Investigation:

_____

_____

_____

Blair Backup Property

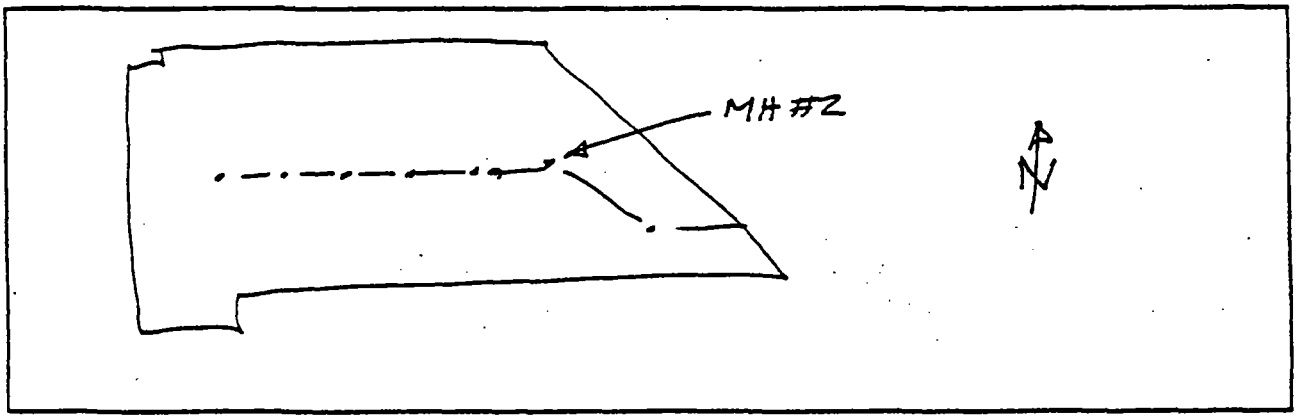
Storm Water System Inspection Log

Date of Inspection: April 4, 1994 Inspector: Joe Port

Weather: Rain Temperature: 50°

Manhole Number: MH#2

Area Location Sketch (Include and North Arrow)



1. Condition of manhole grate (plugged, damaged, etc.):

Free draining

2. Condition of inlet and outlet 24-inch diameter CMP (plugged, damaged, etc.):

Excellent, free draining

3. Condition of tide gate (if applicable):

Good. Working properly

4. Condition of manhole (cracking in concrete, etc.):

No cracks visible. No siltation in bottom.

5. Additional Investigation Required?:

No

6. Findings of Additional Investigation:

—

Blair Backup Property

Groundwater Monitoring System Inspection Log

Date of Inspection: _____ Inspector: _____

Weather: _____ Temperature: _____

Well Number: _____

Area Location Sketch (Include and North Arrow)

1. Condition of well monument:

_____

2. Any visual evidence of well damage?:

_____

3. Additional Investigation Required?:

_____

4. Findings of Additional Investigation:

_____

_____

Blair Backup Property

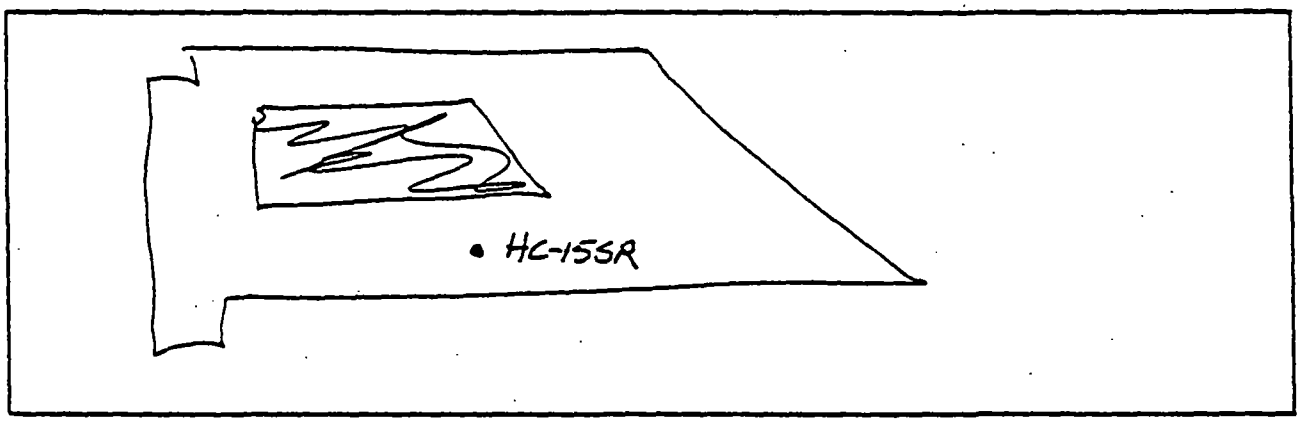
Groundwater Monitoring System Inspection Log

Date of Inspection: April 4, 1994 Inspector: Joe Port

Weather: Rain Temperature: 50°

Well Number: HC-15SR

Area Location Sketch (Include and North Arrow)



1. Condition of well monument:

Good

2. Any visual evidence of well damage?:

No.

3. Additional Investigation Required?:

No

4. Findings of Additional Investigation:

—

Appendix K

APPENDIX K
PROJECT CORRESPONDENCE

HARTCROWSER

Hart Crowser, Inc
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206 328 5581
206 324 9530

Earth and Environmental Technologies

Letter of Transmittal

To: EPA Region 10
1200 Sixth Avenue
Seattle, WA 98101

Date: 3-18-93

Job No. 2350-22

Attn: Ms. Karen Keeley

Re: Blair Backup Property

We are sending the following items:

Date	Copies	Description
3-19-93	4	Culvert Design Calculations

These are transmitted:

- ☐ For your information
- ☐ For action specified below
- ☐ For review and comment
- ☒ For your use
- ☐ As requested

Remarks:

By: John R. Verduin, P.E.

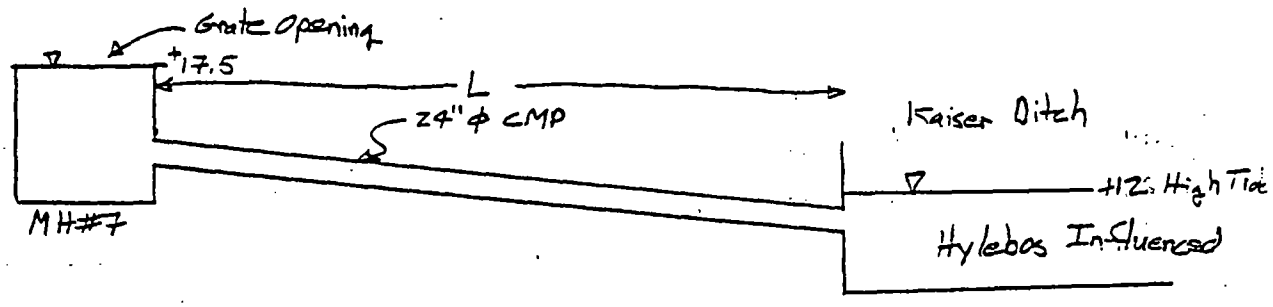
Copies to:

Title: Project Engineer

Under the worst case the storm water system would be at capacity with tide to elevation +12. In this case the system would become a pressure conduit. Therefore, since both the entrance & exit of culvert are submerged, the discharge will be independent of the CMP slope.

ANALYSIS

Sketch of Pressure Conduit



With this case critical depth cannot occur, and the water surface elevation at MH#7 for a given discharge is a function of the tide elevation.

Assume velocity head at MH#7 inlet, entrance friction loss & the exit friction loss are neglected the discharge is:

$$Q = C_d A_o \sqrt{\frac{2g(h_1 - h_4)}{1 + \frac{29 C_d^2 n^2 L}{(r_H)^{4/3}}}}$$ Torricelli Equation

where:

h_1 = head @ MH#7 grate = 17.5'
h_4 = head @ pipe exit = 12'

C_d = discharge coefficient = 0.82 (short tube orifice)
n = Manny Roughness = 0.012 (24" helical CMP - page 3)
L = 1200' (w/in B.B. property see sheet C-21 of plans) + 50' (beneath Taylor Ave to open ditch) = 1250'

r_H = hydraulic radius = $\frac{\text{area}}{\text{perimeter}} = \frac{\pi r^2}{2\pi r} = 0.5$
A_o = 3.14 ft² (area of pipe)
g = 32.2

HARTCROWSER

Page 2 of 3

Job No. 2350-22

Project

Date 3/16/93

Calculations for

Made by VEFUIII

$$Q = (0.82)(3.14)\sqrt{\frac{2(32.2)(17.5-12)}{1+\frac{29(0.82)^2(0.012)^2(1250)}{(0.5)^{4/3}}}}$$

$$Q = (0.82)(3.14)\sqrt{\frac{3542}{1+\frac{3.5}{0.40}}}$$

$= 15.5$ cfs $>$ 13.7 cfs required ✓

3/3

Values of Coefficient of Roughness (n)

For Contech Corrugated Steel Pipe (Manning's Formula)

Corrugations	Annular 2⅔ x ½ in. All Diameters	Helical* 1½ x ¼ in. (11, 12) 8 in.	10 in.	12 in.	18 in.	24 in.	36 in.	48 in.	2⅔ x ½ in. 60 in. and Larger
Unpaved	0.024	0.012	0.014	0.011	0.013	0.015	0.018	0.020	0.021
PAVED-INVERT	0.021					0.014	0.017	0.020	0.019
SMOOTH-FLO	0.012					0.012	0.012	0.012	0.012
HEL-COR CL	0.012					0.012	0.012	0.012	0.012

	Annular 3 x 1 in.	Helical—3 x 1 in. 48 in.	54 in.	60 in.	66 in.	72 in.	78 in. and Larger
Unpaved	0.027	0.023	0.023	0.024	0.025	0.026	0.027
PAVED-INVERT	0.023	0.020	0.020	0.021	0.022	0.022	0.023
SMOOTH-FLO	0.012	0.012	0.012	0.012	0.012	0.012	0.012
HEL-COR CL	0.012		0.012	0.012	0.012	0.012	0.012

	Annular 5 x 1 in.	Helical—5 x 1 in. 54 in.	60 in.	66 in.	72 in. and Larger
Unpaved	0.025	0.022	0.023	0.024	0.025
PAVED-INVERT	0.022	0.019	0.020	0.021	0.022
SMOOTH-FLO	0.012	0.012	0.012	0.012	0.012
HEL-COR CL	0.012	0.012	0.012	0.012	0.012

* Tests on helically corrugated pipe demonstrate a lower coefficient of roughness than for annually corrugated steel pipe when there is a significant amount of helix or spiral in the pipe. For a given diameter, the greater the angle of helix, the less the friction factor. For a given helix, the greater the diameter, the less friction factor.

For additional information refer to the references listed below.

The values in the above table are based on standard helical pipe manufactured from a 24-inch net width strip of steel.

1. Silberman, Edward. "Effect of Helix Angle on flow in Corrugated Pipes" Journal of the Hydraulics Division, ASCE, Vol. 96, No. HY11, Nov., 1970, pp. 2253–2263.

2. Handbook of Steel Drainage and Highway Construction Products, AISI (New York, N.Y., 1983), p. 185.

3. Webster, M.J. and Metcalf, L.R., "Friction Factors in Corrugated Metal Pipe," Journal of the Hydraulics Division, ASCE, Vol. 85, No. HY9, Proc. Paper 2148, Sept., 1959, pp. 35–67.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, Washington 98101

March 18, 1993

Reply To
Attn Of: HW-113

Mr. Curtis Ratcliffe
Port of Tacoma
P.O. Box 1837
Tacoma, Washington 98401-1837

Re: **Approval of Material Submittals**
Blair Waterway Property and Blair Backup Property
Puyallup Settlement Agreement
Commencement Bay Nearshore/Tideflats Superfund Site

Dear Mr. Ratcliffe:

With this letter, the U.S. Environmental Protection Agency (EPA) accepts the following material submittals for the cleanup actions at the Blair Waterway Property and the Blair Backup Property. This acceptance is conditioned upon the Port's compliance with EPA's requests in our letter to the Port dated March 16, 1993.

1. Work Order Number 5, for CMP material, is accepted.

2. Materials Submittals, Contract No. 710, submitted March 5, 1993:

   Material submittals for CMP material, concrete catch basin and manhole material, catch basin frame and grate, and manhole frame and lid material are accepted.

3. EPA has reviewed the Culvert Design Technical Memorandum (Hart Crowser, March 16, 1993) and we agree to a change from 1 percent to 0.3 percent slope in the storm drain system. This acceptance is conditioned upon the Port's assurance that working tidegates will be maintained at Manholes 1 and 2 on the Blair Backup Property.

If you have any questions, I can be reached in Seattle at (206) 553-2141.

Sincerely,

Karen Keeley

Karen Keeley
Superfund Site Manager

cc: J. Verduin, Hart Crowser

Printed on Recycled Paper

HARTCROWSER

Earth and Environmental Technologies

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102
FAX 206.328.5581
206.324.9530

MEMORANDUM

DATE: March 24, 1993

TO: Karen Keeley - EPA Region 10

FROM: John Verduin - Hart Crowser

RE: 6-inch Perforated ADS Pipe Bedding and Cover Requirements
Blair Waterway and Backup Properties Cleanup - 1993
J-2350-22

This memorandum documents the bedding and cover requirements for the 6-inch diameter perforated polyethylene drainage pipe. This is in response to item number 1 of the March 16, 1993 letter addressed to the Port. The letter requested information on the adequacy of the 6-inch perforated pipe bedding and cover. We briefly discuss the purpose of the pipe concluding with our findings concerning the requirements below.

The perforated pipe will be used in two areas. The first area is at invert elevation 16.5 feet on the central strip asphalt cap. Its purpose is to drain any accumulated water in the central swale. The second location is at invert elevation 14.5 in the central strip. Its purpose is an added protection draining any groundwater which may raise near the imported slag.

The Contractor submitted an Advanced Drainage Systems, Inc. (ADS) product. ADS documentation on the product recommends a minimum cover of 12 inches over the perforated pipe. The minimum 12 inch cover is accounted in the current design for perforated pipe placement.

Hart Crowser contacted ADS about having asphalt as a bedding layer. They felt that an asphalt bedding layer would be satisfactory for support under the anticipated loading conditions.

Please do not hesitate to call if you have any questions or comments.

cc: Curtis Ratcliffe - Port of Tacoma

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, Washington 98101

April 14, 1993

Reply To
Attn Of: HW-113

Mr. Curtis Ratcliffe
Port of Tacoma
P.O. Box 1837
Tacoma, Washington 98401-1837

Re: **Approval of Material Submittals and Request for Information**
Blair Waterway Property and Blair Backup Property
Puyallup Settlement Agreement
Commencement Bay Nearshore/Tideflats Superfund Site

Dear Mr. Ratcliffe:

With this letter, the U.S. Environmental Protection Agency (EPA) approves the following material submittals for the cleanup actions at the Blair Waterway Property and the Blair Backup Property. We apologize for the delay, but our team's technical reviewer had been on vacation.

1. Material Submittal Number 14, separation geosynthetic material, and Number 18, are approved.

2. Technical Memorandum re: 6-inch perforated ADS Pipe Bedding and Cover Requirements (dated March 24, 1993) is accepted. With acceptance of this memorandum, the Material Submittal for ADS pipe is approved.

3. Contractor's Remedial Action Plan - Page 4 revision is accepted.

4. Port's Plans and Specifications for the Charcoal Cleanup Plan: Earthwork-Charcoal Briquette-Laden Soil Removal are accepted.

With this letter, EPA also requests that the Port of Tacoma submit additional information to EPA:

5. In regards to the Material Submittal Number 17, the sieve analysis report indicates that the material meets specifications for the wearing and base course, but not for the sand and gravel buffer. It is unclear why the Port has requested that the material be approved for sand and gravel buffer. What volume of material was involved?

Printed on Recycled Paper

6. Please provide calculations showing the maximum cover allowed for the 6-inch perforated pipe.

7. Based on a preliminary review of Hart Crowser's field notes, EPA requests clarification on the following issues:

   a. EPA is uncertain whether an adequate number of cover compaction tests have been conducted given the amount of cover material reported as delivered to the site and the required testing frequency of one test every 2,000 to 3,000 yd2. Please provide documentation to EPA that testing requirements are being met, including testing conducted for each lift. Also, verify whether compaction tests are being conducted the same day as placement.

   b. Based on a review of compaction test results reported in the field notes, certain areas of the site did not meet specs (e.g., 90% vs. 95% required). What is the process for re-testing these areas to ensure that compaction requirements are met?

   c. On at least four days (March 19, 25, 29, and 30), the cover soil was placed in lifts thicker than the 10 to 12 inches specified in the Cleanup Plan. The March 25 report explicitly states that the cover was placed in a 2-foot lift. The reports do not provide justification for allowing this deviation from the specifications.

   d. The reports do not include an explicit discussion of the soft subgrade present in many areas around the site. We understand that a map has been produced to detail these soft areas. Please provide a copy to EPA.

8. As required in the Cleanup Plan, the Port must provide documentation to EPA showing that the area with the buffer is at least 15.5 feet prior to slag placement. We understand that this work has been completed, and would like to review the information as soon as it's available.

We appreciate your excellent efforts in implementing the Cleanup Plan. If you have any questions, I can be reached in Seattle at (206) 553-2141.

Sincerely,

Karen Keeley

Karen Keeley
Superfund Site Manager

cc: J. Verduin, Hart Crowser

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, Washington 98101

April 21, 1993

Reply To
Attn Of: HW-113

Mr. Curtis Ratcliffe
Port of Tacoma
P.O. Box 1837
Tacoma, Washington 98401-1837

Re: **Approval of Material Submittal and Other Information**
Blair Waterway Property and Blair Backup Property
Puyallup Settlement Agreement
Commencement Bay Nearshore/Tideflats Superfund Site

Dear Mr. Ratcliffe:

With this letter, the U.S. Environmental Protection Agency (EPA) approves Hart Crowser's April 14 and 16, 1993 memoranda in response to EPA's April 14, 1993 letter, including:

1. Material Submittal Number 17 is approved. (We had reviewed the original spec rather than the revised spec).

2. The maximum cover for the 6-inch ADS pipe is acceptable.

3. a. Based on conversations with Hart Crowser, it appears that an adequate number of compaction tests have been performed.

   b. Per Hart Crowser's April 16, 1993 memorandum, the Port agrees that certain locations and lifts will be re-tested. Hart Crowser also agrees to clarify, in the field notes, when different fill material is placed and "new" testing numbers are not provided. The soft subgrade map was attached to this memorandum.

   c. Per Hart Crowser's April 14, 1993 memorandum, Hart Crowser will document the measured compaction in the "thicker" areas in future field reports and density test summary forms.

As previously discussed, the Port agrees to submit the following information to EPA:

4. The Port has agreed to provide an asbuilt showing the 15.5 feet elevations for the buffer material.

Printed on Recycled Paper

5. Hart Crowser's field reports for the Blair Backup Property will include observations and documentation of the decontamination procedures used by RCI for the slag placement and charcoal removal at the Blair Backup Property.

We appreciate your excellent efforts in implementing the Cleanup Plan. If you have any questions, I can be reached in Seattle at (206) 553-2141.

Sincerely,

Karen Keeley

Karen Keeley
Superfund Site Manager

cc: J. Verduin, Hart Crowser

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, Washington 98101

April 29, 1993

Reply To
Attn Of: HW-113

Mr. Curtis Ratcliffe
Chief Engineer
Port of Tacoma
P.O. Box 1837
Tacoma, Washington 98401-1837

Re: **Request for Additional Information on Asphalt Pavement**
Blair Backup Property
Puyallup Settlement Agreement
Commencement Bay Nearshore/Tideflats Superfund Site
U.S. EPA Docket No. 1093-03-05-106

Dear Mr. Ratcliffe:

The U.S. Environmental Protection Agency (EPA) received information from the Port of Tacoma regarding the design mix for the asphalt cap at the Blair Backup Property (copy of facsimile to RCI from Cliff Schroeder, Watson Asphalt Paving Co., Inc., dated April 21, 1993). The information received by EPA is not adequate to approve the material for the asphalt cap at the site. The Port should submit the following information to EPA:

1. Regarding the submitted information, please provide individual test data for all parameters (e.g., percent air voids, unit weight, asphalt cement percent, permeability) rather than average test data. Also, the laboratory report should be modified to include the specific method and procedures followed for the permeability testing (e.g., amount of head applied over specified timeframe for each test). Finally, the reported permeability of 1.12X10E-7 cm/sec exceeds the minimum permeability requirement of 1X10E-7 cm/sec in Specs §2.03, and the reported stability of 1750 does not meet the minimum requirement of 1800 in Specs §2.03.

2. The reported asphalt cement (AR-4000) used for the test is different than the asphalt cement (AR-4000W) listed in Specs 02513 §2.02 B.

3. Please provide material submittals as required under Specs 02513 §2.01 A, B, and C; §2.02 A; and §2.04.

Printed on Recycled Paper

As has been discussed, asphalt paving at the Blair Backup Property may not occur for several weeks. Please notify EPA in advance of any paving, as we would like to provide field oversight during the first few days of that effort.

If you have any questions, I can be reached in Seattle at (206) 553-2141.

Sincerely,

Karen Keeley

Karen Keeley
Superfund Site Manager

cc: J. Verduin, Hart Crowser
E. Stephens, Port of Tacoma
C. Massimino, EPA
B. Sullivan, Puyallup Tribe

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, Washington 98101

May 3, 1993

Reply To
Attn Of: HW-113

Mr. Curtis Ratcliffe
Chief Engineer
Port of Tacoma
P.O. Box 1837
Tacoma, Washington 98401-1837

Re: Approval of Modification to Cleanup Plan for the Blair Backup Property, Puyallup Land Settlement Commencement Bay Nearshore/Tideflats Superfund Site U.S. EPA Docket No. 1093-03-05-106

Dear Mr. Ratcliffe:

With this letter, the U.S. Environmental Protection Agency (EPA) approves a modification to the Cleanup Plan for the Blair Backup Property, as described in the memorandum to EPA from Hart Crowser dated April 30, 1993. Under the modification, the Port will reduce the size of the northern portion of the asphalt cap. The northern edge of the asphalt cap will be roughly 70 feet south of the property boundary, rather than 20 feet south of the property boundary as originally set forth in the Cleanup Plan. Slag will only be placed under the asphalt cap, and 2 feet of sand and gravel cover will be placed in the area from the northern edge of the asphalt cap to the property boundary. The Port will identify any proposed changes to locations in groundwater monitoring wells.

The EPA and Port discussed this modification with Mr. Bill Sullivan of the Puyallup Tribe at a meeting held on April 30. The Tribe approved the modification in a letter to EPA dated May 3, 1993.

If you have any questions, I can be reached in Seattle at (206) 553-2141.

Sincerely,

Karen Keeley
Superfund Site Manager

cc: J. Verduin, Hart Crowser
E. Stephens, Port of Tacoma

Printed on Recycled Paper

PORT of TACOMA U.S.A.

May 17, 1993

Karen Keeley
Environmental Protection
Agency
1200 Sixth Avenue
Seattle WA 98101

Subject: Port of Tacoma Contract No. 710
Tribal Transfer
Blair Waterway and Blair Backup Properties
Drum Disposal
Work Plan Revisions
U.S. EPA Docket No. 1093-03-05-106

Attached is the test information of the remaining drums on the Blair Waterway property. There are 57 drums to be disposed of, with all drum contents to be placed under the asphalt cap in the Blair Backup property, with the exception of drums 205 and 202 (two drums marked same number). These drums will be respectively disposed of on our Wasser Winters and our Murray Pacific Properties (54 drums on Blair). Your authorization to proceed and revise the work plan is requested.

Your help on this mater is greatly appreciated.

Very truly yours,

Curtis L. Ratcliffe, P.E.
Chief Engineer

Attachments

cc: Ed Stephens
Jerry Ninteman, Landau
John Verduin, Hart Crowser

Attachment

C710KK

P.O. Box 1837 • Tacoma, Washington 98401-1837 • Telephone (206) 383-5841 • Telex 32-7473
Commissioners: Robert G. Earley • Jack A. Fabulich • Philip M. Lelli • Patrick O'Malley • Ned Shera
Executive Director: John J. Terpstra

LANDAU ASSOCIATES, INC.
P.O. Box 1029
Edmonds, WA 98020-9129
(206)778-0907 / FAX:(206)778-6409

RECEIVED
MAY 20 1993
ENGINEERING DEPT.

Facsimile Memo

(Please deliver upon receipt)

SENDER:

Date 5/20/93

Time

From Jerry Nineman

Job No. 118003.75

Number of Pages (including this sheet) 8

Mail Follow-up Copy? ☐ Yes ☒ No

RECIPIENT:

To Edward Stephens

Company Port of Tacoma

Phone No.

FAX No. 206-593-4506

If you do not receive all pages, telephone immediately

Message As you requested. Spectra Labs is supposed to send final analytical results to Suzanne.

4/91

STAFF 1120037S JRN

SPECTRA Laboratories, Inc.
2221 Ross Way • Tacoma, WA 98421 • (206) 272-4850

FACSIMILE TRANSMISSION

TO: Landau Associates

DATE: 5-19-93

FROM: Marie

Attn: Jerry Ninteman

SUBJECT:

MESSAGE:

This is page 1 of total 7 pages. Spectra Fax Number 206-572-9838

SPECTRA Laboratories, Inc.

2221 Ross Way • Tacoma, WA 98421 • (206) 272-4850

May 19, 1993

Landau Associates, Inc.
P.O. Box 1029
Edmonds, WA 98020

Attn: Jerry Ninteman

Sample ID: IDW-S-4-30-93
Project: 118003.7S Blair Waterway
Sample Matrix: Soil
Date Sampled: 4-30-93
Spectra Project: S304-252
Spectra #2462
RUSH

Date Received: 4-30-93
Date Extracted: 5-11-93
Date Analyzed: 5-11-93
Dilution Factor: 1
< = less than

ORGANOCHLORINE PESTICIDES AND PCB'S — METHOD 8080A/8081

Compound	Result ug/Kg
Aldrin	<1.7
Alpha BHC	<1.7
Beta BHC	<1.7
Delta BHC	<1.7
Gamma BHC (Lindane)	<1.7
Chlordane (Total)	<3.3
4,4'-DDD	<3.3
4,4'-DDE	<3.3
4,4'-DDT	<3.3
Dieldrin	<3.3
Endosulfan I	<1.7
Endosulfan II	<3.3
Endosulfan Sulfate	<3.3
Endrin	<3.3
Endrin Aldehyde	<3.3
Endrin Ketone	<3.3
Heptachlor	<1.7
Heptachlor Epoxide	<1.7
Methoxychlor	<17
Toxaphene	<170
PCB-1016	<33
PCB-1221	<67
PCB-1232	<33
PCB-1242	<33
PCB-1248	<33
PCB-1254	<33
PCB-1260	<33

Surrogate Recovery - Tetrachloro-m- xylene 149%

Richard J. Forrester
Manager, Organic Chemistry

SPECTRA Laboratories, Inc.

2221 Ross Way • Tacoma, WA 98421 • (206) 272-4850

May 19, 1993

Landau Associates, Inc.
P.O. Box 1029
Edmonds, WA 98020

Attn: Jerry Ninteman

Sample ID: IDW-W-4-30-93
Project: 118003.7S Blair Waterway
Sample Matrix: Water
Date Sampled: 4-30-93
Spectra Project: S304-252
Spectra #2463
RUSH

Date Received: 4-30-93
Date Extracted: 5-11-93
Date Analyzed: 5-11-93
Dilution Factor: 1
< = less than

ORGANOCHLORINE PESTICIDES AND PCB'S — METHOD 8080A/8081

Compound	Result ug/L
Aldrin	<0.05
Alpha BHC	<0.05
Beta BHC	<0.05
Delta BHC	<0.05
Gamma BHC (Lindane)	<0.05
Chlordane (Total)	<1.0
4,4'-DDD	<0.10
4,4'-DDE	<0.10
4,4'-DDT	<0.10
Dieldrin	<0.10
Endosulfan I	<0.05
Endosulfan II	<0.10
Endosulfan Sulfate	<0.10
Endrin	<0.10
Endrin Aldehyde	<0.10
Endrin Ketone	<0.10
Heptachlor	<0.05
Heptachlor Epoxide	<0.05
Methoxychlor	<0.50
Toxaphene	<5.0
PCB-1016	<1.0
PCB-1221	<2.0
PCB-1232	<1.0
PCB-1242	<1.0
PCB-1248	<1.0
PCB-1254	<1.0
PCB-1260	<1.0

Surrogate Recovery - Tetrachloro-m- xylene 63%

Richard J. Forrester
Manager, Organic Chemistry

SPECTRA Laboratories, Inc.

2221 Ross Way • Tacoma, WA 98421 • (206) 272-4850

May 19, 1993

Landau Associates, Inc.
P.O. Box 1029
Edmonds, WA 98020

Attn: Jerry Nuteman

Sample ID: IDW-S-4-30-93
Project: 118003.7S Blain Waterway
Sample Matrix: Soil
Date Sampled: 4-30-93
Spectra Project: S304-252
Spectra #2462

Date Extracted: 5-3-93
Date Analyzed: 5-3-93
Dilution: 1
< = less than

SEMIVOLATILE ORGANIC ANALYSIS METHOD 8270

Compound	mg/Kg	Compound	mg/Kg
Phenol	<0.33	Acenaphthene	<0.33
bis(2-Chloroethyl)Ether	<0.33	2,4-Dinitrophenol	<1.65
2-Chlorophenol	<0.33	4-Nitrophenol	<1.65
1,3-Dichlorobenzene	<0.33	Dibenzofuran	<0.33
1,4-Dichlorobenzene	<0.33	2,4-Dinitrotoluene	<0.33
Benzyl Alcohol	<0.33	2,6-Dinitrotoluene	<0.33
1,2-Dichlorobenzene	<0.33	Diethylphthalate	<0.33
2-Methylphenol	<0.33	4-Chlorophenyl-phenylether	<0.33
bis(2-chloroisopropyl)Ether	<0.33	Fluorene	<0.33
4-Methylphenol	<0.33	4-Nitroaniline	<1.65
N-Nitroso-Di-n-Propylamine	<0.33	4,6-Dinitro-2-Methylphenol	<1.65
Hexachloroethane	<0.33	N-Nitrosodiphenylamine	<0.33
Nitrobenzene	<0.33	4-Bromophenyl-phenylether	<0.33
Isophorone	<0.33	Hexachlorobenzene	<0.33
2-Nitrophenol	<0.33	Pentachlorophenol	<1.65
2,4-Dimethylphenol	<0.33	Phenanthrene	<0.33
Benzoic Acid	<1.65	Anthracene	<0.33
bis(2-Chloroethoxy)Methane	<0.33	Di-n-Butylphthalate	<0.33
2,4-Dichlorophenol	<0.33	Fluoranthene	<0.33
1,2,4-Trichlorobenzene	<0.33	Pyrene	<0.33
Naphthalene	<0.33	Butylbenzylphthalate	<0.33
4-Chloroaniline	<0.33	3,3-Dichlorobenzidine	<0.66
Hexachlorobutadiene	<0.33	Benzo(a)Anthracene	<0.33
4-Chloro-3-Methylphenol	<0.33	bis(2-Ethylhexyl)Phthalate	<0.33
2-Methylnaphthalene	<0.33	Chrysene	<0.33
Hexachlorocyclopentadiene	<0.33	Di-n-Octyl Phthalate	<0.33
2,4,6-Trichlorophenol	<0.33	Benzo(b)Fluoranthene	<0.33
2,4,5-Trichlorophenol	<0.33	Benzo(k)Fluoranthene	<0.33
2-Chloronaphthalene	<0.33	Benzo(a)Pyrene	<0.33
2-Nitroaniline	<1.65	Indeno(1,2,3-cd)Pyrene	<0.33
Dimethyl Phthalate	<0.33	Dibenz(a,h)Anthracene	<0.33
Acenaphthylene	<0.33	Benzo(ghi)Perylene	<0.33
3-Nitroaniline	<1.65		

SURROGATE RECOVERIES

Nitrobenzene-d5	47%	Phenol-d5	54%
2-Fluorobiphenyl	63%	2-Fluorophenol	41%
p-Terphenyl-d14	73%	2,4,6-Tribromophenol	73%

Richard J. Ferrenti, Manager, Organic Chem.

SPECTRA Laboratories, Inc.

2221 Ross Way • Tacoma, WA 98421 • (206) 272-4850

May 19, 1993

Landau Associates, Inc.
P.O. Box 1029
Edmonds, WA 98020

Attn: Jerry Nineman

Sample ID: IDW-W-4-30-93
Project: 118003.7S Blair Waterway
Sample Matrix: Water
Date Sampled: 4-30-93
Spectra Project: S304-252
Spectra #2463

Date Extracted: 5-4-93
Date Analyzed: 5-5-93
Dilution: 1
< = less than

SEMIVOLATILE ORGANIC ANALYSIS METHOD 8270

Compound	ug/L	Compound	ug/L
Phenol	<10	Acenaphthene	<10
bis(2-Chloroethyl)Ether	<10	2,4-Dinitrophenol	<50
2-Chlorophenol	<10	4-Nitrophenol	<50
1,3-Dichlorobenzene	<10	Dibenzofuran	<10
1,4-Dichlorobenzene	<10	2,4-Dinitrotoluene	<10
Benzyl Alcohol	<10	2,6-Dinitrotoluene	<10
1,2-Dichlorobenzene	<10	Diethylphthalate	<10
2-Methylphenol	<10	4-Chlorophenyl-phenylether	<10
bis(2-chloroisopropyl)Ether	<10	Fluorene	<10
4-Methylphenol	<10	4-Nitroaniline	<50
N-Nitroso-Di-n-Propylamine	<10	4,6-Dinitro-2-Methylphenol	<50
Hexachloroethane	<10	N-Nitrosodiphenylamine	<10
Nitrobenzene	<10	4-Bromophenyl-phenylether	<10
Isophorone	<10	Hexachlorobenzene	<10
2-Nitrophenol	<10	Pentachlorophenol	<50
2,4-Dimethylphenol	<10	Phenanthrene	<10
Benzoic Acid	<50	Anthracene	<10
bis(2-Chloroethoxy)Methane	<10	Di-n-Butylphthalate	<10
2,4-Dichlorophenol	<10	Fluoranthene	<10
1,2,4-Trichlorobenzene	<10	Pyrene	<10
Naphthalene	<10	Butylbenzylphthalate	<10
4-Chloroaniline	<10	3,3-Dichlorobenzidine	<20
Hexachlorobutadiene	<10	Benzo(a)Anthracene	<10
4-Chloro-3-Methylphenol	<10	bis(2-Ethylhexyl)Phthalate	<10
2-Methylnaphthalene	<10	Chrysene	<10
Hexachlorocyclopentadiene	<10	Di-n-Octyl Phthalate	<10
2,4,6-Trichlorophenol	<10	Benzo(b)Fluoranthene	<10
2,4,5-Trichlorophenol	<10	Benzo(k)Fluoranthene	<10
2-Chloronaphthalene	<10	Benzo(a)Pyrene	<10
2-Nitroaniline	<50	Indeno(1,2,3-cd)Pyrene	<10
Dimethyl Phthalate	<10	Dibenz(a,h)Anthracene	<10
Acenaphthylene	<10	Benzo(ghi)Perylene	<10
3-Nitroaniline	<50		

SURROGATE RECOVERIES

Nitrobenzene-d5	79%	Phenol-d5	85%
2-Fluorobiphenyl	92%	2-Fluorophenol	71%
p-Terphenyl-d14	96%	2,4,6-Tribromophenol	94%

Richard J. Forrester, Manager, Organic Chem.

SPECTRA Laboratories, Inc.

2221 Ross Way • Tacoma, WA 98421 • (206) 272-4850

May 19, 1993

Landau Associates, Inc.
P.O. Box 1029
Edmonds, WA 98020

Attn: Jerry Ninteman

Project: 118003.7S Blair Waterway
Client ID: IDW-S-4-30-93
Sample Matrix: Soil
Date Sampled: 4-30-93
Date Received: 4-30-93
Date Analyzed: 5-4-93
Dilution Factor: 1
Spectra Project: S304-252
Spectra #2462

VOLATILE ORGANIC COMPOUNDS		EPA Method 8240 Direct Sparge	
COMPOUNDS	mg/KG	COMPOUNDS	mg/KG
Chloromethane	<0.010	1,1,2,2-Tetrachloroethane	<0.005
Bromomethane	<0.010	1,2-Dichloropropane	<0.005
Vinyl Chloride	<0.010	trans-1,3-Dichloropropene	<0.005
Chloroethane	<0.010	Trichloroethene	<0.005
Methylene Chloride	<0.020	Dibromochloromethane	<0.005
Acetone	<0.050	1,1,2-Trichloroethane	<0.005
Carbon Disulfide	<0.005	Benzene	<0.005
1,1-Dichloroethene	<0.005	cis-1,3-Dichloropropene	<0.005
1,1-Dichloroethane	<0.005	Bromoform	<0.005
trans-1,2-Dichloroethene	<0.005	2-Hexanone	<0.025
cis-1,2-Dichloroethene	<0.005	4-Methyl-2-Pentanone	<0.025
Chloroform	<0.005	Tetrachloroethene	<0.005
1,2-Dichloroethane	<0.005	Toluene	<0.005
2-Butanone	<0.050	Chlorobenzene	<0.005
1,1,1-Trichloroethane	<0.005	Ethyl Benzene	<0.005
Carbon Tetrachloride	<0.005	Styrene	<0.005
Vinyl Acetate	<0.025	Total Xylenes	<0.005
Bromodichloromethane	<0.005		

Surrogate Percent Recoveries:

1,2-Dichloroethane-d4	102
Toluene-d8	102
Bromofluorobenzene	99

SPECTRA LABORATORIES, INC.

Richard J. Forrester
Manager, Organic Chemistry

SPECTRA Laboratories, Inc.

2221 Ross Way • Tacoma, WA 98421 • (206) 272-4850

May 19, 1993

Landau Associates, Inc.
P.O. Box 1029
Edmonds, WA 98020

Attn: Jerry Nintemian

Project: 118003.7S Blair Waterway
Client ID: IDW-W-4-30-93
Sample Matrix: Water
Date Sampled: 4-30-93
Date Received: 4-30-93
Date Analyzed: 5-4-93
Dilution Factor: 1
Spectra Project: S304-252
Spectra #2463

VOLATILE ORGANIC COMPOUNDS, ug/L — EPA Method 624/8240

COMPOUNDS	RESULTS	COMPOUNDS	RESULTS
Chloromethane	<10	1,1,2,2-Tetrachloroethane	<5
Bromomethane	<10	1,2-Dichloropropane	<5
Vinyl Chloride	<10	trans-1,3-Dichloropropene	<5
Chloroethane	<10	Trichloroethene	<5
Methylene Chloride	<20	Dibromochloromethane	<5
Acetone	<50	1,1,2-Trichloroethane	<5
Carbon Disulfide	<5	Benzene	<5
1,1-Dichloroethene	<5	cis-1,3-Dichloropropene	<5
1,1-Dichloroethane	<5	Bromoform	<5
trans-1,2-Dichloroethene	<5	2-Hexanone	<25
cis-1,2-Dichloroethene	<5	4-Methyl-2-Pentanone	<25
Chloroform	<5	Tetrachloroethene	<5
1,2-Dichloroethane	<5	Toluene	<5
2-Butanone	<50	Chlorobenzene	<5
1,1,1-Trichloroethane	<5	Ethyl Benzene	<5
Carbon Tetrachloride	<5	Styrene	<5
Vinyl Acetate	<25	Total Xylenes	<5
Bromodichloromethane	<5		

Surrogate Percent Recoveries:

1,2-Dichloroethane-d4	99
Toluene-d8	100
Bromofluorobenzene	101

SPECTRA LABORATORIES, INC.

Richard J. Forrester
Manager, Organic Chemistry

PORT of TACOMA U.S.A.

May 17, 1993

Karen Keeley
Environmental Protection
Agency
1200 Sixth Avenue
Seattle WA 98101

Subject: Port of Tacoma Contract No. 710
Tribal Transfer
Blair Waterway Property
Work Plan Revisions
U.S. EPA Docket No. 1093-03-05-106

It is requested that the work plan be revised to change the slag closure procedure and to change the proposed asphalt cap edges. Both changes enhance the final work product and supporting information is attached.

Your effort on this matter is greatly appreciated.

Very truly yours,

Curtis L. Ratcliffe, P.E.
Chief Engineer

Attachments

cc: Ed Stephens
Jerry Ninteman, Landau
John Verduin, Hart Crowser

C710KK

P.O. Box 1837 • Tacoma, Washington 98401-1837 • Telephone (206) 383-5841 • Telex 32-7473

cc Dorgan
Ed

HARTCROWSER

Earth and Environmental Technologies

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102
FAX 206 328 5581
206 324 9530

RECEIVED
MAY 17 1993
ENGINEERING DEPT.

MEMORANDUM

DATE: May 13, 1993

TO: Curtis Ratcliffe - Port of Tacoma

FROM: John Verduin - Hart Crowser

RE: Asphalt Cap Edges
Blair Waterway and Backup Properties Cleanup 1993
J-2350-22

This memorandum addresses the slope of the proposed asphalt cap edges. RCIE proposes to flatten the current slope of the asphalt cap edges from 33 percent slope, as shown on the plans, to roughly 6 percent slope along the central ditch and a maximum of 8 percent along the outside edges of the asphalt cap. Below, we discuss the details and benefits of flattening the central and exterior asphalt cap edges. Attached are two sketches illustrating the proposed cap edge slope modification along the central ditch and the outside.

Central Ditch Edges

Along the central ditch the proposed configuration would consist of the following:

- The Blair Waterway slag will be 12 feet from the centerline of the central ditch. (No change from the original design).

- The top of the asphalt cap would slope from elevation 16 feet from the central ditch out 30 feet upward at a 6.3 percent slope. Everywhere beneath the asphalt cap would be at least 6 inches of base course material. (Asphalt cap edge is flattened from 33 percent to 6.3 percent).

- The wearing course will be placed to elevations as shown on the plans tieing into the manhole inlets. (No change from the original design).

The benefits of the modification include:

- Elimination of asphalt placed by hand. With a flatter slope (6.3 percent) the asphalt cap can be placed by a paving machine thus eliminating the task of asphalt placement by hand. Placing by machine will also help ensure a better final product.

- Better drainage to the perforated pipe. The old design had a wide central valley. The proposed configuration has a V-shaped valley better focusing any surface water to a drainage outlet.

Exterior Asphalt Cap Edges

Along the exterior of the asphalt cap the proposed configuration would consist of the following:

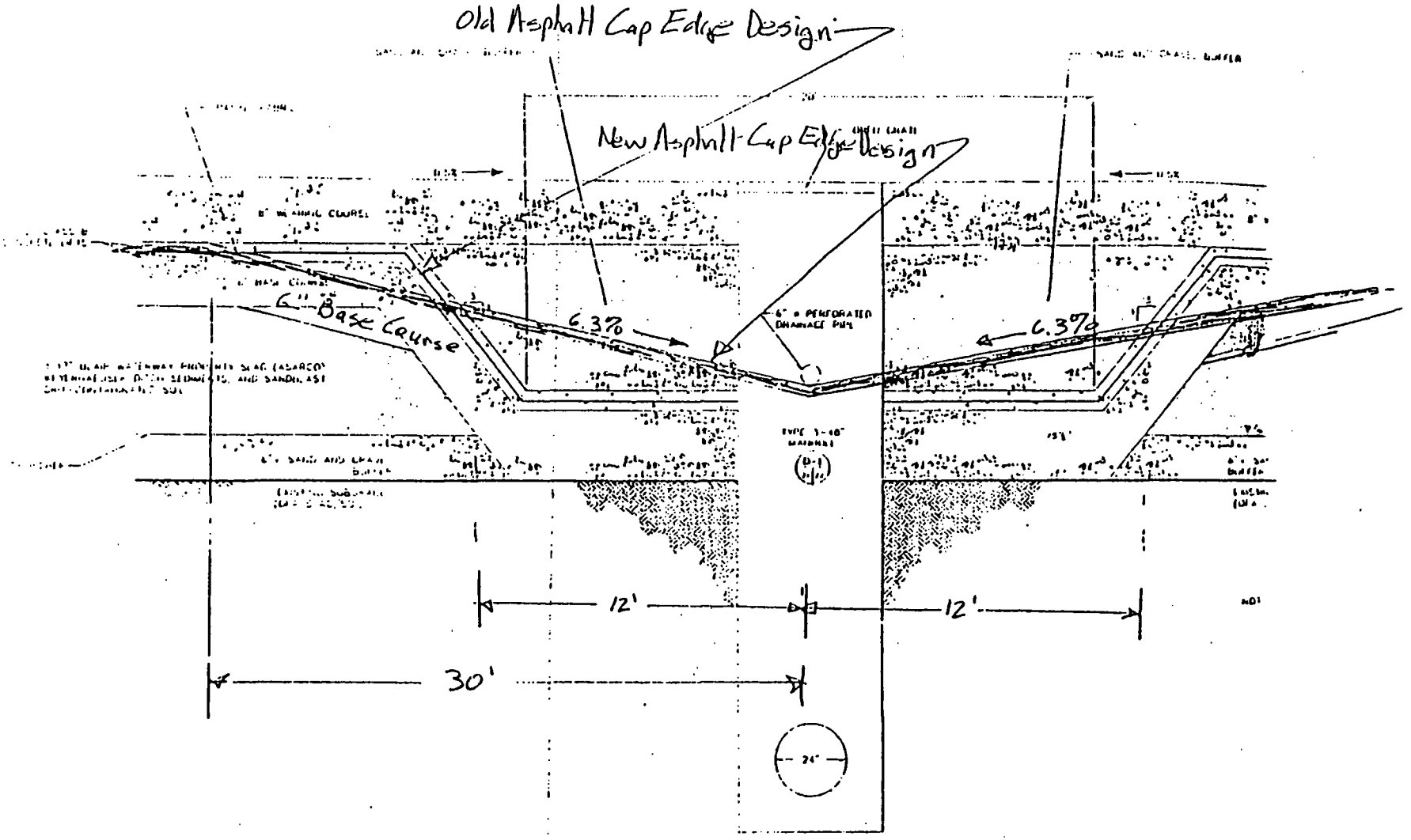
- The top of the asphalt cap would slope from the asphalt concrete cap boundary, as shown on sheet C-16, out 20 feet upward at a maximum 8 percent slope. Note that the northern edge of the cap has been moved southward. Everywhere beneath the asphalt cap would be at least 6 inches of base course material. (Asphalt cap edge is flattened from 33 percent to 8 percent).

- The wearing course will be placed to elevations as shown on the plans and tapers would still occur from the asphalt cap area to the sand and gravel cover area.

The benefit of the new edge configuration is as stated before; the asphalt cap can be placed by machine allowing for better cap construction.

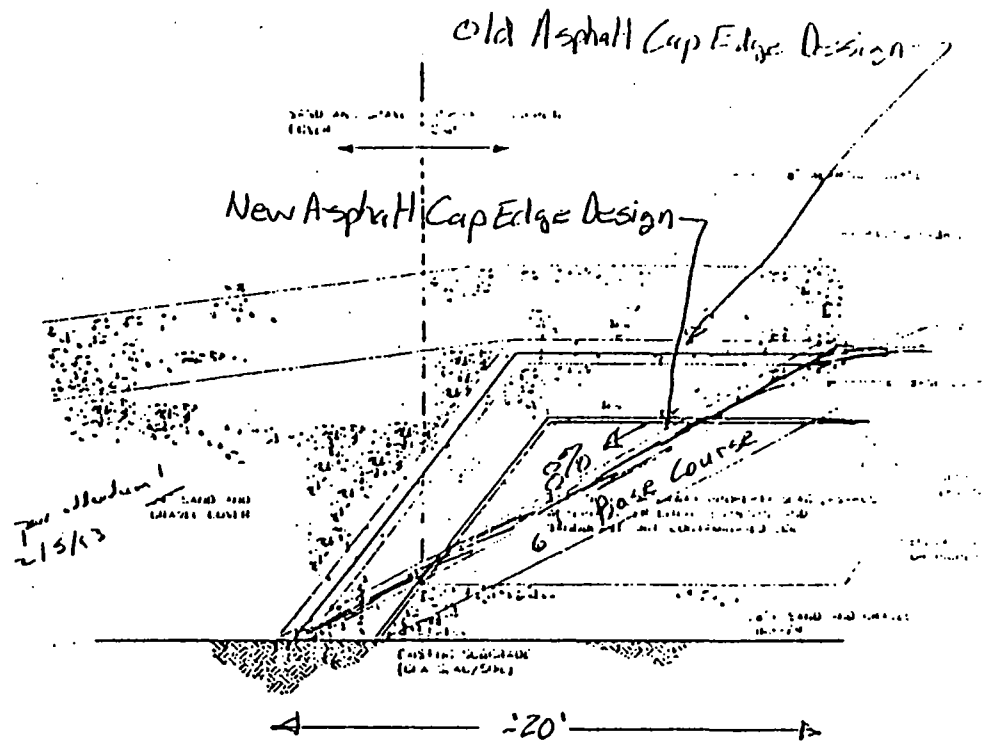
Please call if you have any questions or comments.

ASPHTCAP.mem



CENTRAL STRIP BETWEEN
ASPHALT CONCRETE CAPS

G-5



EDGE	TAPER DISTANCE	APPROXIMATE TAPER SLOPE (PERCENT)
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]

ASPHALT EDGES

Memorandum

TO: Karen Keeley, U.S. Environmental Protection Agency

FROM: Curtis Ratcliffe, Port of Tacoma

PREPARED BY: Jerry Ninteman, Landau Associates, Inc.

RE: BLAIR WATERWAY PROPERTY CLEANUP PLAN ADDENDUM
GRAVING DOCK CONFIRMATION SAMPLING

Date: April 21, 1993
(Modified May 7, 1993)

PURPOSE

This memorandum transmits an Addendum to the Blair Waterway Property Cleanup Plan dated February 19, 1993. This addendum revises the confirmation sampling approach for removal of slag from the below-water portion of the Graving Dock. The removal of slag from the above-water portion of the Graving Dock and confirmation sampling of the above-water portion will be conducted in accordance with the Cleanup Plan.

BACKGROUND

The existing confirmation sampling approach for the below-water portion of the Graving Dock consists of sampling the excavated surface of the Graving Dock at three locations along approximately 65 profiles spaced on 25 ft centers around the Graving Dock, using a clamshell sampler (Ponar Sampler). The samples are inspected for the visible presence of slag. A profile is considered clean if each of the three samples contains no visible slag. If slag is observed, an additional 6 inches of material (slag and underlying soil) is removed from 12 feet on either side of the profile.

As of April 21, 1993, the below-water portion of the Graving Dock sideslopes have been excavated to a depth ranging from between 1.5 to 5 ft, but typically at least 2 ft in most areas, using a fabricated dredge. The thickness of slag was typically found to range between 0.5 to 1 ft. The sideslopes were initially excavated until the excavated material primarily consisted of the underlying silty material, and little or no slag was observed. Confirmation sampling was then conducted. Approximately 25 percent of the 65 profiles have met confirmation sampling cleanup

criteria and are considered clean. The remaining profiles were found to contain slag in one or more samples. Repeated passes of the dredge excavator over the profiles containing slag, followed by further confirmation sampling, did not result in any additional profiles meeting cleanup criteria. An average of about 30 passes were conducted on these areas. Apparently, a small amount of slag was somehow pushed into and became embedded within the underlying silty material.

The quantity of silty material removed from below the concentrated slag layer has greatly exceeded original estimates because of the need to excavate the residual slag within the underlying silt. Other methods to remove the slag without generating excessive quantities of silt (e.g. raking or sieving) were not found to be technically practicable. As you are aware, all excavated material from the Blair Waterway Property is being placed under an asphalt pavement cap on the Blair Backup Property. The wet, silty material requires extensive mixing with coarser material (at least 3 parts coarse material to 1 part silt) to achieve compaction requirements on the Blair Backup Property. We expect that an additional 1 to 1.5 ft of silt from the below-water portion of the Graving Dock sideslopes (an additional 1,400 to 2,100 yd^3) will require removal in order to achieve the existing confirmation sampling cleanup criteria. After mixing this silt with coarse material (import material), an additional 5,600 to 8,400 yd^3 of material would require capping on the Blair Backup Property. This would result in a 42 percent to 63 percent increase in the volume of material being capped on the Blair Backup Property, and a significant increase in the area of the Blair Backup Property requiring capping. The limited reduction in risk to human health and the environment that is gained by removing the trace amount of slag remaining in the underlying silt is greatly disproportionate to the cost.

DESCRIPTION OF REVISED CONFIRMATION SAMPLING APPROACH

The revised confirmation sampling approach consists of estimating the bulk concentration of arsenic in the upper few inches of the below-water Graving Dock material and comparing this concentration to the MTCA Method A Industrial Soil Cleanup Level of 200 ppm. The bulk concentration is obtained by measuring the weight percent of slag (which is known to contain approximately 2,000 ppm arsenic) in a representative sample of excavated sideslope material. The revised approach yields a cleanup level, in terms of the weight percent of slag, that is generally equivalent to the MTCA Method A Industrial Soil Cleanup Level. The revised approach consists of the following steps:

1. Given that the concentration of arsenic in the slag from the Blair Waterway Property is approximately 2000 ppm (based on the analysis of 2 composite samples of slag collected on the Blair Waterway Property and reported in a May 1, 1992 letter to Leslie Sacha, Port of Tacoma, from Landau Associates), and knowing the MTCA Method A Industrial soil cleanup level for arsenic of 200 ppm, calculate the weight percent of slag in a sample of slag and soil that would result in an exceedance of the 200 ppm cleanup level. This calculation is shown on the attached sheet and the resulting cleanup level weight percent is 7 percent. This result also considers the moisture content of the slag and soil. It is emphasized that the 7 percent is a weight percent and not a volume percent. On a volume basis, 7 percent slag by weight is approximately equivalent to 3 cups of slag per 5 gallons of slag and silt mix.

2. Remove a load of material (slag and silt) from profiles spaced on 25 ft centers around the Graving Dock using the fabricated dredge, and measure (in the field) the weight percent of slag remaining in a representative sample of the excavated material. This measurement would be made by separating the silt and slag using a 3/8-inch sieve that would retain slag pieces larger than 1/4 inch. Non-slag material retained on the sieve would be removed prior to weighing. The representative sample would be obtained by collecting an approximately equal weight of material from 5 evenly spaced, predetermined locations along the 12 ft length of the excavated material.

3. Compare this measured weight percent to the cleanup level weight percent calculated in Step 1. If the measured weight percent is less than the cleanup level weight percent, cleanup has been achieved. If the measured weight percent is greater than the cleanup level weight percent, a second scrape of the same section will be conducted and the process repeated until the measured weight percent is less than the cleanup level weight percent.

Dredged material from passes containing greater than 7 percent slag would be hauled to the stockpile for mixing with coarse material. Dredged material from passes containing less than 7 percent slag would be pushed back into the Graving Dock. Further dredging would not be conducted within 12.5 feet on either side on the 15 (approximate) profiles that have already achieved the existing confirmation sampling cleanup criteria.

RATIONALE

The rationale for revising the existing confirmation sampling approach to this approach is summarized below:

- As described above, the limited reduction in risk to human health and the environment that is gained by removing the trace amount of slag remaining in the underlying silt is greatly disproportionate to the cost. The Port has already removed an estimated 99 percent or more of the slag placed in the Graving Dock.

- The Port has removed most of the slag placed in the Graving Dock using multiple thin lifts, as described in the Cleanup Plan. Other methods to remove the residual slag without generating excessive quantities of silt were not found to be technically practicable.
- Plans exist to fill the Graving Dock within the near future. After filling, the residual slag will be at least 7 to 8 ft below grade, which is well below the depth of most excavations for foundations and utilities.
- The residual slag will only be present in below-water areas along a narrow, 30 ft wide band extending around three sides of the Graving Dock, and not under the entire Graving Dock
- The revised approach yields a cleanup level in terms of the weight percent of slag that is generally equivalent to the MTCA Method A Industrial Soil Cleanup Level and, therefore, institutional controls on the Graving Dock would not be required.

JRN/fas
No. 118003.75
Attachment: Calculation

Calculation of Acceptable Weight Percent of Slag
Blair Waterway Property Cleanup
J. Nintemon
4/20/93

Given:

- Arsenic concentration in slag = 2000 ppm
- MTCA Method A Industrial Soil Cleanup Level for Arsenic = 200 ppm
- Moisture content of soil = 30%

Basic Equation:

$$\frac{[(\text{Conc. of As in slag})(\text{wt. of slag})] + [(\text{Conc. of As in soil})(\text{wt. of soil})]}{[(\text{wt. of slag}) + (\text{wt. of soil})](1 - \text{Moisture Content})} < \text{Cleanup Level}$$

$$\frac{2000(\text{wt of slag}) + 0(\text{wt of soil})}{[(\text{wt of slag}) + (\text{wt of soil})](1 - 0.30)} < 200$$

Divide both sides by 2000 and mutiply by (1 - 0.30):

$$\frac{(\text{wt. of slag})}{(\text{wt of slag}) + (\text{wt of soil})} < \frac{200(1 - 0.30)}{2000}$$

$$\frac{(\text{wt of slag})}{(\text{wt of slag} + \text{wt of soil})} < 0.07 = 7\%$$

$\Rightarrow$ weight percent of slag < 7%

Mary Riveland
~~CHRISTINE O. GREGOIRE~~
Director

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
7272 Cleanwater Lane, LU-11 • Olympia, Washington 98504-8711 • (206) 753-2353

RECEIVED
MAY 26 1993
ENGINEERING DEPT.

May 24, 1993

Mr. Curtis Ratcliffe
Port of Tacoma
P.O. Box 1837
Tacoma, Washington 98401

RE: Port of Tacoma Exemption from the Dangerous Waste Regulations for PAH-Contaminated Soils Generated at the Blair Backup Property

Dear Mr. Ratcliffe:

Ecology did not receive any comments on Ecology's "Tentative Decision Document and Request for Public Comment." The comment period ended on Monday, May 17, 1993. However, the City of Tacoma commented (see enclosed comments and Ecology response) on Ecology's SEPA Mitigated Determination of Non-Significance. Ecology has reached a final decision on the Port petition for an exemption from the Dangerous Waste Regulations for the approximately 4,100 cubic yards of PAH-contaminated soils generated at your Blair Backup Property. As described in Ecology's Tentative Decision Document, there are conditions placed on the exemption.

The following controls and requirements shall be placed on the transport of these industrial soils:

1. The industrial soils shall be placed into a visqueen-lined dump truck or railroad car.

2. Once the transport vehicles have been loaded with the industrial soils, the industrial soils shall be covered and secured with an approved covering to ensure spillage will not occur during transport.

3. The Port of Tacoma shall submit an emergency spill plan to Ecology for review and approval. The spill plan shall provide the transportation route from the point of generation to the point of disposal that will be taken for the transport of the industrial soils. The Port will provide Ecology 48-hour prior notice of the date the soils begin to leave the Blair Backup Property. The Port will also provide Ecology prior 48-hour notice if the transportation route is deviated from. In addition, the Port will provide Ecology with notice within 24 hours after completion of soil transportation as well as the total quantity of soils disposed of under this exemption.

4. Each vehicle shall be thoroughly cleaned of the industrial soils before leaving the Blair Backup Property, as well as after unloading the industrial soils and prior to departing from the disposal site. Specifically, the industrial soils shall be thoroughly removed from the outside of the transportation vehicle before leaving the Blair Backup Property. However, before leaving the disposal site after having unloaded the industrial soils, the transportation vehicle shall be thoroughly cleaned (both inside the box and the exterior of the vehicle).

5. Comply with all local, state, and federal laws and regulations.

In addition to the recordkeeping requirements in the Solid Waste Landfill MFS regulations, the operating record will contain information about the quantity of each soil shipment received, and the date of receipt and placement within the Subtitle D Landfill, a copy of the Port of Tacoma's petition, and a copy of Ecology's final decision document for the disposal of the industrial soils generated at the Port of Tacoma - Blair Backup Property. A site map showing the location of the soil placement within the Subtitle D landfill must also be made part of the operating records.

Finally, the Port of Tacoma also needs to seek approval from local government and the operator of the Subtitle D landfill prior to disposal of the industrial soils in a particular landfill. Conditional use permits for landfills (see conditional use permit section of this petition for exemption) state that wastes which are exempted shall not be accepted without agencies' (Ecology and local government) approval. The Port of Tacoma must submit to Ecology prior to transporting and disposing of these soils written approvals from local government and landfill operators.

If you have any questions or concerns, please contact Robert Warren at (206) 586-0504. Please continue to coordinate with Mr. Warren as the project continues.

Sincerely,

K Seiler

K Seiler, Acting Section Supervisor
Solid and Hazardous Waste Section
Southwest Regional Office

RWW:dc

cc: Karen Keeley, EPA

Enclosures

June 14, 1993

Ms. K. Seiler
Department of Ecology
7272 Cleanwater Lane, LU 11
Olympia WA 98504-6811

Subject: Port of Tacoma Contract No. 710
Port of Tacoma Exemption from the
Dangerous Waste Regulation for PAH
- Contaminated Soils Generated at the
Blair Backup Property

This is in response to your letter dated May 24, 1993 and in reference to the above mentioned subject. Our responses are as follows:

1. See Hart Crowser letter dated June 10, 1993.

2. See Hart Crowser letter dated June 10, 1993.

3. Regional Disposal Companies (RDC) emergency spill plan attached.

4. See Hart Crowser letter dated June 10, 1993.

5. The Port and its agents will comply with all regulations.

6. See Hart Crowser letter dated June 10, 1993.

7. Written approval for disposal of this material from local government and landfill operations is attached.

Please be advised that we anticipate starting our loading on this material on the a.m. of June 16, 1993 and will continue the loading operation as availability of cars occurs. Your help on this matter is greatly appreciated.

Very truly yours,

Curtis L. Ratcliffe, P.E.
Chief Engineer

cc: Bob Warren, DOE
Ed Stephens, POT
Pat Gailey, RCI
John Verdiun, HC

P.O. Box 1837 • Tacoma, Washington 98401-1837 • Telephone (206) 383-5841 • Telex 32-7473
Commissioners: Robert G. Earley • Jack A. Fabulich • Philip M. Lelli • Patrick O'Malley • Ned Shera
Executive Director: John J. Terpstra

Mary Riveland
XXXXXXXXXXXXXXXX
Director

RECEIVED
MAY 26 1993
ENGINEERING DEPT.

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
7272 Cleanwater Lane, LU-11 • Olympia, Washington 98504-6811 • (206) 753-2353

May 24, 1993

Mr. Curtis Ratcliffe
Port of Tacoma
P.O. Box 1837
Tacoma, Washington 98401

RE: Port of Tacoma Exemption from the Dangerous Waste Regulations for PAH-Contaminated Soils Generated at the Blair Backup Property

Dear Mr. Ratcliffe:

Ecology did not receive any comments on Ecology's "Tentative Decision Document and Request for Public Comment." The comment period ended on Monday, May 17, 1993. However, the City of Tacoma commented (see enclosed comments and Ecology response) on Ecology's SEPA Mitigated Determination of Non-Significance. Ecology has reached a final decision on the Port petition for an exemption from the Dangerous Waste Regulations for the approximately 4,100 cubic yards of PAH-contaminated soils generated at your Blair Backup Property. As described in Ecology's Tentative Decision Document, there are conditions placed on the exemption.

The following controls and requirements shall be placed on the transport of these industrial soils:

1. The industrial soils shall be placed into a visqueen-lined dump truck or railroad car.

2. Once the transport vehicles have been loaded with the industrial soils, the industrial soils shall be covered and secured with an approved covering to ensure spillage will not occur during transport.

3. The Port of Tacoma shall submit an emergency spill plan to Ecology for review and approval. The spill plan shall provide the transportation route from the point of generation to the point of disposal that will be taken for the transport of the industrial soils. The Port will provide Ecology 48-hour prior notice of the date the soils begin to leave the Blair Backup Property. The Port will also provide Ecology prior 48-hour notice if the transportation route is deviated from. In addition, the Port will provide Ecology with notice within 24 hours after completion of soil transportation as well as the total quantity of soils disposed of under this exemption.

4. Each vehicle shall be thoroughly cleaned of the industrial soils before leaving the Blair Backup Property, as well as after unloading the industrial soils and prior to departing from the disposal site. Specifically, the industrial soils shall be thoroughly removed from the outside of the transportation vehicle before leaving the Blair Backup Property. However, before leaving the disposal site after having unloaded the industrial soils, the transportation vehicle shall be thoroughly cleaned (both inside the box and the exterior of the vehicle).

5. Comply with all local, state, and federal laws and regulations.

In addition to the recordkeeping requirements in the Solid Waste Landfill MFS regulations, the operating record will contain information about the quantity of each soil shipment received, and the date of receipt and placement within the Subtitle D Landfill, a copy of the Port of Tacoma's petition, and a copy of Ecology's final decision document for the disposal of the industrial soils generated at the Port of Tacoma - Blair Backup Property. A site map showing the location of the soil placement within the Subtitle D landfill must also be made part of the operating records.

Finally, the Port of Tacoma also needs to seek approval from local government and the operator of the Subtitle D landfill prior to disposal of the industrial soils in a particular landfill. Conditional use permits for landfills (see conditional use permit section of this petition for exemption) state that wastes which are exempted shall not be accepted without agencies' (Ecology and local government) approval. The Port of Tacoma must submit to Ecology prior to transporting and disposing of these soils written approvals from local government and landfill operators.

If you have any questions or concerns, please contact Robert Warren at (206) 586-0504. Please continue to coordinate with Mr. Warren as the project continues.

Sincerely,

K Seiler

K Seiler, Acting Section Supervisor
Solid and Hazardous Waste Section
Southwest Regional Office

RWW:dc

cc: Karen Keeley, EPA

Enclosures

C Dorcas

HARTCROWSER

Earth and Environmental Technologies

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102
FAX 206.328.5581
206.324.9530

RECEIVED
JUN 11 1993
ENGINEERING DEPT.

J-2350-25

June 10, 1993

Curtis Ratcliffe, P.E.
Chief Engineer
Port of Tacoma
P.O. Box 1837
Tacoma, Washington 98401-1837

Re: Response to Letter from Washington State Department of Ecology Dated May 24, 1993
Charcoal Briquette Contaminated Soil Removal
Blair Waterway and Backup Properties Cleanup - 1993

Dear Curtis:

This letter addresses the May 24, 1993, letter from the Washington State Department of Ecology (Ecology) discussing the conditions placed on the petition for exemption of charcoal briquette contaminated soils from Washington Dangerous Waste Regulations Chapter 173-303 WAC. Below we discuss the controls and requirements Ecology discussed and the Regional Disposal Company's (RDC) planned actions.

RDC stated that all railroad containers hauling the soil will be lined with visqueen and covered with an approved tarp. RCI Environmental, Inc., will sweep clean the outside of all containers prior to their leaving the Blair Backup property. All containers will be swept clean at the landfill after soil disposal. RDC will generate a map showing charcoal briquette contaminated soil disposal locations within the landfill.

Enclosed is the emergency response plan (Plan) generated by RDC. The Plan is what Ecology referred to as an emergency spill plan. The Plan provides the transportation route from the point of generation to the point of disposal. The Plan also discusses RDC's planned response in case of any emergency involving the

charcoal briquette contaminated soil during handling, transport, and disposal to the Roosevelt Regional Landfill.

We trust this letter meets your needs. Please call at your convenience if you have any questions or comments.

Sincerely,

HART CROWSER, INC.

GARRY E. HORVITZ, P.E.
Principal Engineer

JOHN R. VERDUIN III, P.E.
Project Engineer

Enclosure:
Final Emergency Response Plan (ERP)
Transport of Contaminated Soils Generated at the Blair Backup Property in Tacoma, Wash. to Roosevelt, Wash.
Prepared by Regional Disposal Company
June 8, 1993

REGIONAL DISPOSAL COMPANY
(RDC)

FINAL
EMERGENCY RESPONSE PLAN (ERP)

TRANSPORT OF CONTAMINATED SOILS GENERATED AT THE BLAIR BACKUP PROPERTY IN TACOMA, WASH. TO ROOSEVELT, WASH.

Prepared by

Regional Disposal Company (RDC)
4730 32nd Avenue South
Seattle, Washington 98118

June 8, 1993

FOR 24-HOUR EMERGENCY RESPONSE CALL

Primary Number: (800) 275-5641
or
Secondary Number: (206) 623-4080

1. INTRODUCTION AND PURPOSE

The purpose of the Emergency Response Plan (ERP) is to outline emergency response procedures and establish a notification schedule for responding to changes in transportation routes or emergencies involving the handling, transport, and disposal of contaminated soils (CS) from the Blair Backup Property, Port of Tacoma, in Tacoma at the Roosevelt Regional Landfill. The transport and disposal will be performed by Regional Disposal Company (RDC).

Loading of the CS for transport and disposal is being performed by Port of Tacoma Contractors, Hart-Crowser, Inc. and RCI Environmental. Under the direction of Hart-Crowser, RCI Environmental will load CS directly into open-top containers, which are on railroad flat-cars, staged on a railroad siding on the affected property. RDC, and its transportation sub-contractors Burlington Northern Railroad (BNRR) and Ross Trucking, will transport the loaded containers to Roosevelt, Washington and dispose of the material in the Roosevelt Regional Landfill.

1.1 TRANSPORTATION ROUTE

The operation is expected to take 9-12 days. Two sets of rail equipment (containers and railroad cars) will be used in this operation. On a daily basis, RCI Environmental will load 24 containers with 23 tons of material. Once containers are loaded the railcars will be taken by the Tacoma Municipal Railraod to the main BNRR yard in Tacoma. The cars will remain on a BNRR siding until RDC's daily dedicated train arrives in Tacoma (about 6:00-7:00 p.m.). The cars will be connected to the RDC train and proceed south along the BNRR mainline to Rocky Point near Longview. At Rocky Point the train will take the BNRR east-bound mainline, which runs north of the Columbia River, to the Roosevelt Intermodal Yard in Roosevelt, Washington.

At the Roosevelt Intermodal Yard the container will be off-loaded by a top-pick onto a self-tipping chassis. The container will be taken by Ross Trucking to the Roosevelt Regional Landfill (about 5 miles) via Roosevelt Grade Road. At the landfill, the container is weighed in and its number recorded (for billing and tracking purposes). The weighed-in container will then proceed to the tipping face where, using the self-tipping chassis, the material will be deposited as directed by the tipping foreman. Once the material is disposed the container will be returned to the scale, re-weighed, and then returned to the Roosevelt Yard.

Empty containers are returned, by the top-pick, to the railroad car. The empty containers will be returned to Tacoma, following the same route and method. The return train will depart Roosevelt at about 6:00 p.m. and arrive in Tacoma about 5:00-6:00 a.m. the following day.

1.2 ALTERNATIVE ROUTES

If for any reason service on the BNRR mainline is unavailable, BNRR will transport using alternative routes. The route to be used will be determined by BNRR. In the event an alternative is needed, the Port of Tacoma, through Hart-Cowser, will be notified and will provide the Department of Ecology with notice of the change. Alternative route #1 would use entail BNRR transporting the loaded containers to Seattle for connection to the RDC train and

movement of that train east from Everett through Wenatchee to Spokane, then south through the Tri-Cities and to Roosevelt. Alternative rail route #2 would use the BNRR mainline south to across the Columbia River to Portland and then continue east on the Union Pacific Railroad mainline along the south side of the Columbia River to Pendelton where it would proceed north on the BNRR, back across the Columbia to Pasco, and then west to Roosevelt.

1.3 EMERGENCY RESPONSE TEAM (ERTeam) SCOPE

The RDC Emergency Response Team (the ERTeam) will respond to any emergency involving contaminated soils from Tacoma during its handling, transport, and disposal to the Roosevelt Regional Landfill.

1.4 OBJECTIVE

RDC will maintain a team of emergency response personnel, under the direction of an Emergency Response Coordinator (the ERCoordinator) and Emergency Response Leader (ERLeader), trained and equipped to respond to any emergency involving contaminated soils en route from Tacoma to the Roosevelt Regional Landfill.

2. EMERGENCY RESPONSE PROCEDURES AND NOTIFICATION SCHEDULE

This section discusses: ERTeam duties and responsibilities; emergency response notification procedures; the Emergency Response Plan (ERP); transportation procedures; public relations; and post-emergency procedures.

2.1 ERTeam DUTIES AND RESPONSIBILITIES

The ERTeam includes an ERCoordinator, ERLeader, and ERTeam Members. In an emergency, the ERCoordinator will be located at the Roosevelt Regional Landfill site office, and the ERLeader will assemble the ERTeam Members and accompany them to the scene of the emergency, if an on-site response is necessary. Duties and responsibilities of the ERCoordinator, ERLeader and ERTeam Members are described in this section.

2.1.1 ERCoordinator

Preparedness

- Maintain written, detailed, up-to-date emergency response procedures
- Be experienced and knowledgeable in emergency response procedures, and on-call and available on a 24-hour basis
- Be thoroughly acquainted with the properties and general characteristics of RDC's primary handling, transport, and disposal system for Port of Tacoma contaminated soils
- Maintain list of locations and contacts for outside resources
- Keep record of training received by each ERTeam Member

- Be prepared to respond to questions from the news media about emergency situations, if necessary
- Serve as ERLeader, if necessary

Response

- Coordinate response planning with ERLeader
- Arrange transportation for ERTeam to scene of emergency
- Communicate with caller to give additional advice and notify that ERTeam is responding
- Contact regulatory agencies, as necessary
- Maintain frequent communication with ERTeam at scene
- Arrange for additional personnel and supplies at the scene, if necessary
- Update RDC contacts regularly on status of emergency
- Arrange for relief ERTeam Members, as needed

2.1.2 ERLeader

Preparedness

- Maintain emergency equipment in operable condition at all times
- Ensure availability of sufficient number of ERTeam Members
- Be experienced and knowledgeable in emergency response procedures, and on-call and available on a 24-hour basis
- Participate in exercises at least annually to demonstrate emergency preparedness
- Evaluate and update equipment at least yearly
- Serve as ERCoordinator, if necessary

Response

- Coordinate assembly of ERTeam Members and equipment
- Maintain contact with person or official in charge at scene
- Consult and work under the direction of the person in charge at scene
- Direct ERTeam in on-site activities
- Communicate frequently with ERCoordinator for advice and, if necessary, assistance in obtaining additional equipment
- Monitor the health and safety of ERTeam Members
- Ensure equipment is cleaned and stored after emergency
- Complete post-emergency critique and Emergency Response Report

2.1.3 ERTeam Members

Preparedness

- Train and practice on emergency response equipment

- Serve as ERLeader, if necessary

Response

- Work under direction of ERLeader at scene
- Work in a safe, efficient manner
- Ask for help from ERLeader, if necessary

2.2 EMERGENCY RESPONSE NOTIFICATION

The ERTeam may receive notification of an emergency, generally by telephone, from several sources including outside customers or facilities, government agencies, or other interested parties. The person receiving the call (the Contact), who may or may not be a member of the ERTeam, will get as much information as possible from the caller, using the Call Report (contained in Appendix 3.1) to record the information. The Contact will transfer the information to the ERCoordinator, or ERTeam Member on-call (see Figure 1), which will initiate the ERTeam Emergency Response Plan (ERP).

2.3 EMERGENCY RESPONSE PLAN

Upon receiving a call from the Contact regarding an emergency call received, the ERCoordinator will determine the type of response that is necessary.

2.3.1 Criteria and Circumstances for Implementing ERP

Based on an immediate initial assessment, the ERCoordinator will use his or her best judgment to determine when to initiate the ERP. An emergency poses a threat requiring implementation of the ERP if the emergency has the potential to:

- Threaten human health or the environment from fire and/or explosion, or exposure to contaminated soilsor contaminated water
- Contaminate surface water or groundwater
- Result in significant soil contamination
- Result in impacts to fisheries resources or
- Disrupt commonly-used transportation routes

If any of these criteria are satisfied, the ERCoordinator will implement the ERP immediately.

Circumstances that have the potential to satisfy one more of the above criteria include:

- Release of solids and/or liquids en route to the Roosevelt Regional Landfill
- Release of liquids from the Roosevelt Regional Landfill
- Fire and/or explosion en route or at the Roosevelt Regional Landfill
- Vehicle accident en route or at the Roosevelt Regional Landfill

Each circumstance is described briefly in Section 2.3.2.

2.3.2 Types of Emergencies and Actions Required

Table 1 identifies the types of emergencies that have the potential to occur and the nature of response that will be required. The table also identifies who will be responsible for initial response, who will be rsponsible for mobilizing for a resposne, and under what circumstances. Emergency situations rarely involve local agencies. Burlington Northern Railroad (BNRR) sub-contractor providing the primary transportation, is responsible for initial responses for emergencies en route, while containers are being transported by rail.

Each type of emergency and the actions that will be required are described in this section. Section 2.3.3 describes specific procedures that will be followed in emergencies for which Western Refuse is primarily responsible, those which will require consultation only by RDC, and those which will require either minor or full ERTeam response by RDC.

Release of Solids and/or Liquids en Route to the Roosevelt Regional Landfill

In the event solids and/or liquids are released en route to the Roosevelt Regional Landfill, BNRR will be responsible for the initial response which includes contacting RDC to determine the actual response necessary. Response procedures are described in Section 2.3.3 of this ERP.

If solids and/or liquids are released along the transportation route, BNRR will be responsible for contacting RDC and RDC will be responsible for response. Response procedures for releases along Roosevelt Grade Road are described in Section 5.7.9 of the Final Design Report for the Roosevelt Regional Landfill (see Appendix 3.6 of this ERP). If an ERTeam response is required, the procedures described in Section 2.3.3 of this ERP will be followed, as appropriate.

Table 1: EMERGENCY RESPONSE

	Responsible for Response		Type of Response		
Emergency Situation	Initial	Mobilize	Consultation Only	Minor ERTeam Response	Full ERTeam Response
Release of Solids and/ or Liquids en Route to the Roosevelt Regional Landfill	BNRR	RDC	Unlikely	Likely	Possible

Emergency Situation	Responsible for Response: Initial	Responsible for Response: Mobilize	Type of Response: Consultation Only	Type of Response: Minor ERTeam Response	Type of Response: Full ERTeam Response
Fire and/or Explosion en Route or at the Roosevelt Regional Landfill	BNRR/RDC	RDC	Unlikely	Possible	Likely
Release of Gases en Route or at the Roosevelt Regional Landfill	BNRR/RDC	RDC	Unlikely	Possible	Likely
Truck Accident en Route or at the Roosevelt Regional Landfill	Ross	RDC	Likely	Possible	Unlikely
Problem With a Container or Chassis During Short Haul	Ross	RDC	Likley	Unlikely	Unlikely

Fire and/or Explosion En Route or at the Roosevelt Regional Landfill

In the event of fire and/or explosion en route to the Roosevelt Regional Landfill, BNRR will be responsible for the initial response and will contact RDC to determine the response necessary. Response procedures are described in Section 2.3.3 of this ERP.

If fire and/or explosion occurs along Roosevelt Grade Road, RDC will be responsible for first response. If an ERTeam response is required, the procedures described in Section 2.3.3 of this ERP will be followed, as appropriate.

Release of Gases En Route or at the Roosevelt Regional Landfill

The release of gases en route is extremely unlikely. These types of soils do not have any substances which could generate gases. In the unlikely event gases are released BNRR will be responsible for contacting RDC and RDC will be responsible for first response. The recipient of the release will be protected immediately and emergency medical assistance will be requested, if necessary. The local Health District will be notified of the release. If an ERTeam response is required, the procedures described in Section 2.3.3 of this ERP will be followed, as appropriate.

Truck Accident En Route or at the Roosevelt Regional Landfill

In the event of a truck accident en route or at the Roosevelt Regional Landfill, Ross Trucking will be responsible for in initial response, including contacting RDC. RDC will be responsible for any required response. The ERCoordinator will be notified as soon as possible by the truck driver. The ERCoordinator will notify the Washington State Patrol and Washington State Department of Transportation (WSDOT), as appropriate, to describe the nature, location, date and time of the accident, and other pertinent information. If the accident involves a release of contaminated soils, response procedures described in Section 2.3.3 of this ERP will be followed.

2.3.3 Response to Emergencies Involving Burlington Northern Railroad (BNRR)

If the emergency involves BNRR, as would be typical in a derailment, BNRR will be responsible for first response. The ERCoordinator will contact BNRR to relay information about the call received and to offer ERTeam assistance, if necessary. BNRR has an emergency response plan in place, including particular measures for solid waste loads.

If the incident involves a release of solid waste and/or liquids and BNRR requests ERTeam assistance, the ERTeam, under direction of BNRR emergency response personnel, will follow the procedures outlined in Section 2.3.4 of the ERP.

2.3.4 Response to All Other Emergencies

Emergencies either will require consultation only, minor response to the scene of the emergency, or full ERTeam response to the scene (see Table 1 in Section 2.3.2). It is anticipated that most emergencies will require either consultation only or minor ERTeam response. In instances where consultation only is required, The Port of Tacoma will not be notified. Procedures that will be followed for each type of emergency are discussed in this section.

Emergencies Requiring Consultation Only

If the emergency can be resolved through consultation, the ERCoordinator will discuss the emergency with the caller. No further response is necessary.

Emergencies Requiring Response to the Scene

If a response to the scene of the emergency is necessary, the ERCoordinator will notify The Port of Tacoma, who will in turn contact the Department of Ecology. RDC will determine, to the extent possible, the type of response required.

If a response to the scene of the emergency is necessary, the ERCoordinator will notify the Port of Tacoma and will determine, to the extent possible, the type of response required.

Emergencies either will require minor response, involving one or two ERTeam members, or full ERTeam response. In either case, the ERLeader first will determine how many ERTeam Members will respond. The ERLeader will notify the ERTeam Members chosen to respond and brief them on the situation.

At the same time, the ERCoordinator, located at RDC's Roosevelt office, will:

- Contact the caller and advise the caller on response measures to take while the ERTeam is traveling to the scene
- Gather as much information as possible from the caller to determine personnel and equipment needed for the response
- Contact the ERLeader to discuss the type of response necessary and the transportation mode to be used
- Arrange for necessary transportation
- Contact government agencies and officials at the scene to notify them of the ERTeam's location and approximate time of arrival
- If the response involves air transport, arrange for land transport when the ERTeam arrives.

Upon arriving at the scene, the ERLeader will:

- Contact the individual in charge, or take charge if he or she is the only response person on site
- Thoroughly evaluate the situation
- Consult with officials at the scene
- Determine what action will be taken
- Communicate the information to the ERCoordinator, who will consult with the ERLeader and provide additional resources, if necessary.

If the incident involves a release of contaminated soils, upon arriving at the scene, the ERLeader, will:

- Identify the character, source, amount, and extent of the release
- Assess the direct, indirect, or immediate impacts to human health and the environment that may result
- Direct the ERTeam in containing the release
- Initiate remedial action and cleanup
- Contact the Port of Tacoma and the Department of Ecology.
- Arrange for reloading of the waste
- Document the release (i.e., with photographs), and complete an Emergency Response Report.

Follow-up Actions for All Emergencies Requiring ERTeam Response

After the initial evaluation, the ERLeader will contact the ERCoordinator with updated information on the situation, and request additional personnel or equipment, if necessary. The

ERLeader and ERCoordinator will maintain periodic communications throughout the incident until the emergency has been resolved.

The ERTeam will remain at the scene until released by the person in charge. The ERCoordinator will arrange travel for the ERTeam's return to base. The ERCoordinator will contact appropriate government agencies and other interested parties to advise them that the emergency is over.

Refer to Section 2.6 of this ERP for a description of the required post-emergency critique.

2.4 TRANSPORTATION PROCEDURES

If an ERTeam response to the scene of the emergency is necessary, transportation will be required. The type of transportation used will be determined by the ERCoordinator, based on several factors:

- Urgency of response
- Distance to scene
- Available access to scene
- Amount of equipment needed
- Number of team members required to respond, and
- Weather conditions.

If immediate response is necessary, the fastest mode of transportation to the scene will be used. If air transportation is used, arrangements will be made for travel to the scene from the nearest airfield. The ERCoordinator will make travel arrangements.

If the response is less urgent, or is to provide backup or to relieve another ERTeam Member at the scene, then ground transportation will be used.

2.5 PUBLIC RELATIONS

Calls from the news media will be directed to the ERCoordinator identified in Appendix 3.2 of the ERP. If the ERCoordinator is not available, calls will be directed to the person designated by the ERCoordinator as the appropriate media contact. If an ERTeam Member is approached at the scene by a reporter or photographer, the team member will direct the inquiry to the ERLeader.

Upon arrival at the scene, the ERLeader will:

- Check with the person in charge and notify him or her that the ERTeam will to keep all appropriate people up-to-date on the status of the emergency
- Offer to have appropriate questions from the news media directed to the ERLeader
- Be prepared to answer questions about the ERTeam and its activities

- Keep an informal log of reporters and camera crews with whom the ERLeader has interacted, including their affiliations, telephone numbers, and information communicated.

In talking to the news media, the ERLeader will:

- Be available to respond to questions in the early morning and early afternoon, the most likely times when reporters on deadline will be seeking information
- Brief the news media at least once every 30 minutes on the status of the emergency and, even when new information is not available, be accessible to answer questions that may arise
- Treat television and newspaper representatives equally
- Be brief and factual in responses, never speculate on probable causes, and explain the facts simply, so the reporter will not have to check back later
- Know the facts (an inaccurate or misleading answer can be more detrimental than no answer); if a response is not available, indicate when a response is expected
- Be courteous and responsive, maintain a level, factual tone of voice, and do not get agitated
- Never speak "off the record"
- Never use the words "no comment," use the response: "I don't have enough information to answer that question" or "I really don't think I can talk about that"
- Never attempt to assign a dollar estimate to damage that has occurred
- Never release names of injured people; tell reporters the hospital where the injured people have been taken, if appropriate
- Never comment on the competency or performance of another person responding to the emergency.
- Never attempt to physically restrain a member of the news media (i.e., at a barricade); notify local law enforcement personnel, who will respond appropriately.

2.6 POST-EMERGENCY CRITIQUE

Upon return to base, the ERLeader will supervise the cleaning and storage of equipment. The ERLeader will conduct a critique of the incident with all ERTeam Members. The ERLeader will complete an Emergency Response Report and provide a copy to the ERCoordinator, RDC management and other responsible agents upon request.

REGIONAL DISPOSAL COMPANY
A WASHINGTON JOINT VENTURE

March 25, 1993

Curtis Ratcliffe
Port of Tacoma
PO Box 1837
Tacoma, WA 98401

Subject: Route of RDC Train to Landfill

The route of the Burlington Northern Railroad's daily contract trail from Seattle, Washington, to Roosevelt is as follows:

> The train departs from Seattle, Washington at approximately 4:30 p.m. daily and proceed south along Interstate 5. At approximately 5:30 p.m. the same day the train will arrive in Tacoma, Washington to hook up with the units staged in the Burlington Northern Railroad Tacoma yard. After hooking up with these units, the train will proceed south along Interstate 5 on the Burlington Northern's mainline track. Upon arrival at Vancouver, Washington, the trail will head east on the eastbound mainline track, parallel to Highway 14 in Washington State. The train proceeds east until arriving at the Regional Disposal Company intermodal yard at Roosevelt, Washington.

Should you have any additional questions about the route of the train, please feel free to call.

Thank you.

Sincerely,

Gary Schulze
Vice President

CORPORATE OFFICE: 4730 32ND AVENUE SOUTH SEATTLE, WASHINGTON 98118 (206) 725-1700 Fax: (206) 725-800
LANDFILL SITE: 1800 ROOSEVELT GRADE ROAD P.O. BOX 204 ROOSEVELT, WASHINGTON 99356 (509) 374-5641 Fax: (509) 374-586

Printed on Recycled Paper

ROOSEVELT REGIONAL LANDFILL
OPERATIONS PLAN

Appendix D

ROOSEVELT REGIONAL LANDFILL OPERATIONS PLAN[1]

1.0 GENERAL OPERATING PROCEDURES

Waste will be delivered to the facility in containers transported by tractor-trailer vehicles coming from the intermodal transportation facility at North Roosevelt and by trucks hauling directly to the landfill from both within and outside Klickitat County. Waste will be transported by truck from each of the recycling/transfer stations located in Goldendale, Dallesport, and the Bingen area. Vehicles entering the facility will be weighed in at the scale house where data will be recorded on weight, waste type and waste source. The scales are manufactured by Toledo Corporation.

The containers received from jurisdictions outside of Klickitat County will originate from transfer stations or recycling centers where recycling and waste inspection has occurred. Each container will have a security seal attached by the jurisdiction generating the waste. That seal will remain in place until the container is dumped at the working face of the landfill. Jurisdictions sending waste will have programs in place to monitor waste shipped to the landfill, and RDC will audit those monitoring measures. RDC will monitor waste generated within Klickitat County, with inspection by the County.

Waste will be deposited at the working face with a hydraulic tipper. The tipper is mobile and moves with the active face of the landfill. A tipper unit can dump a transfer trailer in less than 10 minutes. The number of tipper units required to handle the waste will vary with the waste volume. Wastes will also be dumped from dump trucks, self-tipping trailers, or walking-floor trailers as appropriate or necessary.

The waste will be spread by bulldozer up a working face of the landfill into thin layers (approximately 2 feet). A landfill compactor will then condense the waste by making three to five passes over the waste. The resulting lift height will be approximately 10 to 20 feet, and the working face will be approximately 200 feet wide.

Daily cover will be placed over all waste to a depth of six inches. The source of daily cover will be material excavated and stockpiled onsite. The primary material used will be sandstone from the Rattlesnake Ridge Member. Daily cover will be brought to the working face by scraper or dump truck and spread by bulldozers.

---

(1) An operations plan is an evolving document, changing as the activities of the landfill and the requirements of regulatory agencies may dictate. Publication of this plan will assist Klickitat County, Ecology, and other agencies in their review and approval of RDC's operation plans.

2.4 Construction and Demolition Debris

RDC will accept construction and demolition debris at the Roosevelt Regional Landfill. The waste will be placed, compacted, and covered along with other solid waste in the MSW landfill.

2.5 Sewage Sludge

Sewage sludge from wastewater treatment facilities will be accepted to the extent it can be put to beneficial use. One method will be direct land application to the dry-land wheat agricultural area on RDC's property. This method requires separate permits not related to landfill operations, and therefore is not discussed further herein.

RDC's preferred method for managing sewage sludge as part of landfill operations will be to mix it with soil at approximately a 50:50 ratio in a sludge management area outside of the landfill operating area. The sludge will be dumped and mixed with soil using a bulldozer. Mixed sludge/soil will then be stockpiled and used as topsoil in the final cover system when portions of the landfill are closed.

3.0 SCREENING FOR UNACCEPTABLE WASTE

Jurisdictions sending waste to the landfill are required by Klickitat County to have an approved waste reduction and recycling program and moderate risk waste management plan. Preventing unacceptable, dangerous or moderate risk waste from entering the waste stream is the goal of all political jurisdictions that could potentially deliver solid waste to the Roosevelt Regional Landfill. RDC is assisting Klickitat County in implementing its moderate risk waste management plan. Nonetheless, RDC maintains an aggressive waste inspection program at the landfill to ensure that unacceptable wastes are not placed in the landfill (see Appendix A: Summary of Potentially Acceptable and Unacceptable Wastes).

Prior to accepting wastes, RDC reviews the source of the waste and the history of the facility from which the waste originated. RDC also reviews representative waste samples and appropriate laboratory analyses. This waste screening and review prevents dangerous, infectious, and hazardous wastes from entering the landfill. Analytical data are provided to RDC along with a signed agreement certifying that the waste is non-dangerous, non-infectious, and non-hazardous. RDC reviews each submittal and confers with regulatory agencies as required. The County inspects submittals regularly. Records are retained on all waste streams received at the landfill, and include items such as waste type and quantity, source of waste, and lab results.

Landfill employees are trained to look for evidence of potentially unacceptable wastes. Such evidence includes (Joyce and Neal 1989):

- Containers with warning labels
- Sealed drums
- Leaking containers

4.2 Dust Control

Dust control of exposed surfaces is also an important requirement because of the dry, fine-grained soils onsite and the high winds. Dust control is handled by paving or by using a water truck to wet roads, excavation and construction areas. Soil stockpiles are wetted as required. Stockpiles of topsoil are hydroseeded to establish vegetation and reduce wind erosion. Calcium chloride or similar dust suppressant application are also used on the roads to reduce dust.

4.3 Vector Control

Vectors include insects, rats, and birds. Vector control is accomplished by good compaction of the solid waste and placement of daily cover. The operator places, compacts, and covers solid waste as described in Section 5. 1. These procedures have proven effective in minimizing vectors at solid waste landfills (Parametrix 1987). Waste containers are also cleaned on the inside to discourage growth and breeding of insects.

Bird control is necessary. RDC uses fixed noise guns, cracker shells, and bird distress recordings to discourage gulls. If these methods are not effective in minimizing the gull population, RDC will use suspended wires over the working face to further discourage gulls.

Specific control measures to mitigate potential impacts related to introduction of insect pests include the following:

- Placement of insect traps and host plants around the landfill site to monitor the possible introduction of insect pests

- Placement of fine-mesh screens over air vents on solid waste transport containers to prevent the possible escape of insect pests.

4.4 Noise Control

Noise control should not be necessary because of the remote location of the site (2 miles to the nearest home) and the topographical barriers between the landfill and public roads. However, when operating within 350 feet of a property boundary and above an elevation of 1,620 feet MSL, RDC is monitoring noise at the boundary on a monthly basis. If measured noise exceeds allowable limits, approximately 15-foot-high beams will be constructed between the operating area and the property boundary. Such barriers commonly reduce noise levels by as much as 20 decibels.

4.5 Erosion and Sedimentation Control

Erosion and sedimentation control includes both temporary and permanent measures. These measures are designed to either prevent erosion from occurring or remove eroded sediment from water prior to its discharge from the site. Permanent erosion and sedimentation measures

- Use of communication equipment
- Emergency notification procedures
- First aid and CPR
- Health and safety, personal protective equipment
- Emergency response to a solid waste accident.

6.2 Fire Protection

Routine fire prevention measures are employed in buildings and maintenance areas. These measures include maintaining cleanliness and proper storage of flammables and oily rags. A firemain system is installed to serve the entrance area facilities. Portable fire extinguishing equipment is also available to allow rapid response in the event of fire. A watchman is present on site after normal business hours. His responsibilities include making rounds of all buildings and watching for fires.

Fire prevention on the landfill includes inspection for "hot loads" (waste that may be burning or smoldering at the time of delivery) and compaction and covering to reduce oxygen intrusion into the waste. Inspection for "hot loads" is done by the waste inspector (see Section 3.0).

Buildings and enclosures potentially subject to methane accumulation will have continuous monitoring and alarms. Such alarms are set to sound at 25% of the lower explosive limit.

RDC maintains firefighting equipment on site. The equipment includes installed and portable firefighting equipment, and personal protective gear. In addition, the water truck is equipped with pumps and hoses so that it can be used as a firefighting truck in emergencies.

RDC conducts routine firefighting drills to train and evaluate staff in firefighting techniques, and to test both installed and portable equipment. These drills are conducted under the supervision of the Site Superintendent.

To exercise coordinated firefighting capabilities, an annual drill, that is based on a realistic emergency scenario, is conducted in coordination with local authorities and fire districts. Performance during the drill is reviewed and critiqued. Regular drills ensure that the firefighting team is ready if a real emergency were ever to occur.

7.0 CONTINGENCY PLAN

The landfill operations site contingency plan addresses the following areas:

- Emergency Response
- Fire or explosion
- Contaminant release
- Severe storms and rapid snowmelt events (Chinook winds)
- Methane migration
- Discovery of dangerous waste

SOLID WASTE REGULATORY AGENCIES

Southwest Washington Health District	
Goldendale	773-4565
Vancouver	1-206-695-9215
Department of Ecology	
Central Region Office	575-2800
Hazardous Substance Hotline	1-800-633-7585
24-Hour Emergency Response	1-206-885-1900

HISTORIC AND CULTURAL RESOURCE EVALUATION

Memorandum of Understanding Contractor:	
Larson Anthropological/Archaeological Services	1-206-782-0980
Yakima Indian Nation	865-5121
State Archeological & Historical Preservation	1-206-753-4011
Klickitat County Planning Department	773-5703

7.2 Fire or Explosion

7.2.1 Landfill Surface Fires

Recognition

Fires will be recognized by landfill employees detecting elevated temperature, smell of smoke, and/or visible smoke and open flame.

Response

Fires or hot loads that are spotted in the haul vehicles or containers, or on the ground will be moved to an isolated area if at all possible. The debris will be spread out and drenched with water to reduce the chances of smoldering. To ensure that the material will not reignite, a 24-hour watch will be established for a period of at least 5 days after extinguishing the fire. After it has been determined that the load is safe, it will be disposed in the landfill and covered.

7.2.2 Landfill Subsurface Fires

Recognition

Evidence of subsurface fires can be detected by unusual or rapid settlement, cracks, venting of smoke, high concentrations of carbon monoxide (CO), and/or elevated surface temperatures. The location and extent of the fire can be determined by thermographic scans, excavation, borings and test wells.

5.3 Surface Water

Surface water is monitored for compliance at the discharge of the detention/sedimentation basin located near the east end of the landfill. A background sample is collected at the closest point upstream of the basin discharge that is flowing. Samples are collected four times per year during precipitation or snowmelt, when eroded sediments are most likely to enter the surface water management system. Samples are tested for the following parameters:

- Specific conductivity
- pH
- Temperature
- Dissolved oxygen
- Fecal coliform
- Total suspended solids
- Total dissolved solids.

A qualitative comparison is made between the background and compliance sampling points to determine if discharge from the facility surface water management system exceeds background quality or to determine if there is a trend of increasing contamination. As of the date of this update of the Operations Plan there have been no surface water events.

5.4 Subsurface Methane Migration

Methane monitoring probes are placed every 1,000 feet along the outside boundary of the landfill footprint. The monitoring probes will be added in phases corresponding to landfill development. The monitoring probes will be completed to a depth 10 feet greater than the bottom of the landfill at that point. The probes are monitored at least quarterly for methane. Readings of less than 5% methane by volume indicate the landfill is not violating the methane migration performance standards of WAC 173-304-460.

5.5 Leachate Treatment and Disposal System

Detailed operations and maintenance for the leachate treatment and disposal system will be developed after final design and vendor selection and provided in the facilities operation and maintenance manual. Generally, the system will be monitored at the following points:

- Leachate intake (volume and chemical characteristics)
- Leachate recirculation (volume and chemical characteristics)
- Methane intake (volume and gas constituents)
- Stack emissions (temperature and gas constituents) .

One leachate equalization pond with a total capacity of approximately 650,000 gallons is presently installed. RDC will construct another pond of similar size in the fall of 1992. RDC will haul leachate from these ponds to either the Columbia Aluminum, Goldendale, or Wishram

- Take immediate action to stop, contain, and clean up any unauthorized discharges, including notifying Ecology immediately by telephone
- Take all reasonable steps to minimize any adverse impacts to surface or ground water and correct the problem.

7.3.1 Groundwater

Contaminant release to groundwater is an extremely remote possibility because of both climate and the protective features incorporated into the landfill design, including the bottom liner, leachate collection and removal system, leachate treatment and disposal system, and the surface water management system. In the remote event that leachate does escape from the landfill, it will be picked up in the shallow monitoring aquifer and detected by the sampling and statistical analysis program described in the Groundwater Monitoring Plan (Pacific Groundwater Group, December 1990). Leachate may also be detected in the vadose zone monitoring system. The deep regional aquifer that is a source of drinking water is naturally protected by the low permeability and thickness (340 feet) of the Selah Formation underlying the landfill.

Should a statistically significant increase of contaminants be detected in the monitoring system, all wells will be immediately resampled and tested for primary and secondary drinking water standards and EPA priority pollutants. Should any of these contaminants exceed applicable standards, RDC will implement a corrective action program. If the vadose monitoring system shows presence of contaminated liquid, the corrective action program will also be implemented.

The corrective action program will include installing additional monitoring wells and sampling to better define the limits of contamination. Locations for these additional wells will include the area along the downgradient boundary of the landfill footprint as it exists at the time of the contaminant release. From the additional investigations and sampling, it will be possible to better approximate the source of the leak and close that area of the landfill. Subsequent construction and operations will be modified to avoid using the closed area.

To prevent any contamination from leaving the property, groundwater extraction wells will be installed and operated to remove contaminated groundwater and dispose of it in the leachate evaporator system. These wells will be placed immediately downgradient of the monitoring wells east of the landfill. Because of the configuration of the shallow aquifer, extraction wells will remove contaminated groundwater before it could leave RDC property. This feature ensures that contamination will not impact the underlying regional aquifer, Coyote Creek, Pine Creek, or the Columbia River. Corrective actions described above will remove the source of contamination, restoring the quality of the aquifer.

7.3.2 Surface Water

Discharges from the surface water management system must meet Washington state water quality standards established for the receiving water body. Suspended solids (sediments) are the only typical contaminants expected in site runoff. RDC will monitor surface water discharges

7.6 Discovery of Unacceptable Waste

Screening for unacceptable waste at the landfill is carried out as described in Section 3.0. A log of all unacceptable materials is maintained indicating the type of material, source of generation, and disposition at the landfill. If suspected unacceptable waste is discovered, the material will be set aside, placed in leak-proof containers, the area roped off, and the regulatory agencies notified immediately. Qualified personnel will collect samples to be shipped by next-day delivery to a qualified laboratory for analysis. Based on the analytical results, a final decision will be made on whether the waste is unacceptable. Unacceptable waste will be returned to the sender. Dangerous waste will be properly manifested in accordance with WAC 173-303 and delivered by RDC to an approved dangerous waste disposal facility.

RDC will notify the jurisdiction where the unacceptable or dangerous waste originated and review its waste handling and inspection procedures to prevent a reoccurrence. RDC will refuse additional waste from any jurisdiction that repeatedly delivers unacceptable or dangerous waste until the problem is permanently corrected.

7.7 Medical or Personnel Injury Emergency

Personnel injury could occur in accidents on heavy equipment, exposure to dangerous waste, or exposure to toxic or oxygen-deficient atmospheres in enclosed spaces. In any event, first aid will be given onsite by trained staff (all employees will be trained in first aid, including CPR), and an ambulance called immediately. Immediate medical care will be provided in Goldendale, approximately one hour by car from the site. If necessary, further medical care will be provided at larger hospitals in the region. Transportation by plane or helicopter will be arranged if necessary.

7.8 Discovery of Historic or Cultural Artifacts

Discovery of previously unknown historic or cultural resources will be considered important and proper authorities will be notified. Work will cease immediately to prevent damage to the suspected resource until it can be inspected by qualified archaeologists and members of the Yakima Nation. A Memorandum of Understanding has been developed for this purpose between RDC, Klickitat County, and the State Historic Preservation Officer (SHPO). RDC's designated cultural resources contractor is Larson Anthropological/Archaeological Services of Seattle. A plan will be developed to either avoid the identified resource or mitigate damage to it. Such a plan will be in conjunction with the Yakima Nation, if the resource is important to its members.

7.9 Solid Waste Container Accident

The potential exists for an accident to occur at the intermodal transportation facility or along Roosevelt Grade Road (East Road) that could cause a container to break open and release solid waste. Should this occur, RDC will be notified by radio by the truck driver or a following truck driver. RDC will dispatch a clean-up team to pick up the solid waste and deliver it to the landfill. In the event the accident occurs in an area with difficult access and the solid waste

- Calendar year covered by report
- Annual solid waste quantity, in tons
- Calculated in-place density in lb/yd^3 of solid waste handled, by type of waste (as available)
- Results of all monitoring.

The Health District and Ecology will be notified in writing within seven days if any of the monitoring systems indicate the migration of leachate or methane in excess of the performance standards.

REGIONAL DISPOSAL COMPANY

A WASHINGTON JOINT VENTURE

Post-it™ brand fax transmittal memo 7671	# of pages ▸ 1
To Gary Schulze	From Rick Morck
Co.	Co.
Dept.	Phone #
Fax #	Fax #

June 14, 1993

Mr. Curtis Ratcliffe
Chief Engineer
Port of Tacoma
P.O. Box 1837
Tacoma, WA 98401

Re: EXEMPTED SOIL

Dear Mr. Ratcliffe:

RDC accepts the exempted PAH-contaminated soil from the Port of Tacoma at the Blair Backup Property. This soil was exempted by Ecology in their May 24, 1993 letter. Approval from local authority has also been granted for disposal.

Very truly yours,

Richard H. Morck, P.E.
Vice President and Operations Manager

cc: Julie Atwood, Ecology CRO
Gary Bickett, SWWHD
Tom Moughan, Klickitat Co.

CORPORATE OFFICE: 4730 32ND AVENUE SOUTH SEATTLE, WASHINGTON 98118 (206) 725-1700 Fax: (206) 725-8001
LANDFILL SITE: 1800 ROOSEVELT GRADE ROAD P.O. BOX 204 ROOSEVELT, WASHINGTON 98571 (509) 374-5841 Fax: (509) 374-5881

Printed on Recycled Paper

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
106 South 6th Ave. • Yakima, Washington 98902-3387 • (509) 575-2490

June 14, 1993

Mr. Ratcliff
Chief Engineer
Port of Tacoma
P O Box 1837
Tacoma WA 98401

Dear Mr. Ratcliff:

This letter is written to inform you of the status of the Roosevelt Landfill with regard to the acceptance of charcoal briquettes and associated soils from the Port of Tacoma.

The Roosevelt Landfill is a permitted facility and meets the design criteria outlined in the decision document, prepared in response to the petition for exemption.

If you have any questions or would like additional information about this facility, you may contact me at (509) 454-7298.

Sincerely,

Julie Atwood
Solid & Hazardous Waste
Section Supervisor

JAmnt

HARTCROWSER

Earth and Environmental Technologies

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102
FAX 206.328.5581
206.324.9530

MEMORANDUM

DATE: June 21, 1993

TO: Karen Keeley - EPA Region 10

FROM: John Verduin - Hart Crowser

RE: Asphalt Cap Submittal
Blair Waterway and Backup Properties Cleanup - 1993
J-2350-22

This memorandum presents all submittals received from RCIE pertaining to the asphalt concrete cap as described in Section 02513 of the Port of Tacoma's Blair Waterway and Backup Properties Cleanup - 1993 specifications. Below, a brief description and the results of each submittal are described. The submittals are attached.

The following submittals have been received:

- Aggregate tests per 2.01 of Section 02513;
- Bituminous materials per 2.02 of Section 02513;
- Paving fabric per 2.04 of Section 02513; and
- Mix design per 2.03 of Section 02513.

Aggregate Test Submittals

Cascade Testing Laboratory, Inc. completed the following tests on the asphalt concrete aggregate:

- ASTM C-131 Los Angeles Abrasion
- ASTM C-88 Sulfate Soundness Test
- Percent Fracture Content - Two Face
- WSDOT Test 113 Degradation Factor
- Sand Equivalent Test

Table 1 is a summary of Cascade's data. Attachment 1 presents the raw data.

Table 1 - Aggregate Test Data

Test	Objective	Observed	Specified
Los Angeles Abrasion	Percent Loss after 500 revolutions	15%	30% max
Sulfate Soundness Test	Percent Loss after 5 cycles	2.2%	NA
Percent Fracture Content - Two Face	Weighted Percent	99%	75%
Degradation Factor	Factor	67%	30% min
Sand Equivalent Test	S.E. Value (5/8-inch minus)	81%	45% min
Sand Equivalent Test	S.E. Value (Blend Sand)	77%	30% min

Bituminous Materials

Watson Asphalt stated that they will use AR-4000W for their bituminous material. There was a error on their April 21, 1993, letter which omitted the W.

Paving Fabric

Attachment 2 is Watson's submittal describing the Amoco construction fabric (AMOPAVE 4599) they propose to use. Table 2 presents a summary of the paving fabric's properties.

Table 2 - AMOPAVE 4599 Paving Fabric

Property	ASTM Test Designation	Typical Property	Specified
Tensile Strength in pounds	D-4632	90	90 min
Weight in oz/sy	-	5	4 to 6
Width in inches	-	150	36 min

Mix Design

Specifications stated that the asphalt concrete mix shall be designed using the Marshall Method and 75 blows. Table 3 is a summary of Cascade's mix design. The raw data are presented in Attachment 3.

Table 3 - Watson's Marshall Mix Design

Sieve Size	Percent Passing	Specified
5/8-inch	100	100
1/2-inch	98	90 to 100
3/8-inch	90	75 to 90
1/4-inch	73	55 to 75
No. 4	64	-
No. 8	45	-
No. 10	40	32 to 48
No. 40	16	11 to 24
No. 80	10	-
No. 100	8	-
No. 200	5.2	3 to 7
Percent Asphalt	5.6	-

The Marshall mix density was 147.4 pounds per cubic foot (pcf).

Specifications required the mix to have a stability of at least 1,800 pounds and a maximum permeability of 10^{-7} cm/sec. Cascade prepared three samples of the mix design. The average stability was 1,875 pounds. They also completed a permeability analysis on the mix and found the permeability to be 1.1×10^{-7} cm/sec.

Cascade prepared a 4.257 inch high, 4 inch diameter sample of the mix design and submitted the sample to Hart Crowser. The sample had a density of 145.7 pcf. Hart Crowser ran a flexible wall permeability test on the sample in accordance with ASTM D-5084 (Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter - Raising Tailwater Method). Hart Crowser applied a thin coat of AR-4000W along the edge of the sample, leaving the top and bottom in

their received condition. Vacuum grease was also applied along the sample edge prior to installing the confining membrane. A confining pressure of 70 psi was applied to the sample. A headwater back pressure of 22.5 psi and tailwater back pressure of 20.0 psi were applied. The sample had a measured permeability of 1.2×10^{-8} cm/sec.

This packet should contain all required information. Please do not hesitate to contact us if you have any questions or require additional information.

JV:cen
CAPSBMTL.mem

cc: Curtis Ratcliffe - Port of Tacoma

Attachments:

1 - Aggregate Test Submittals
2 - Paving Fabric Submittals
3 - Mix Design Submittals

ATTACHMENT 1
AGGREGATE TEST SUBMITTALS

CASCADE TESTING LABORATORY, INC.
TESTING & INSPECTION / ENGINEERS / GEOLOGISTS

June 15, 1993
Watson Asphalt Co.
Cert No. 9304-44
Page No. 2

5/8" Minus Asphalt Aggregate

ASTM C-131 Los Angeles Abrasion

Grading	C
% Loss after 500 Revolutions:	15.26 %
Specification:	30 % max.

ASTM C-88 Sulfate Soundness Test

% Loss after 5 cycles:	2.15 %

Percent Fracture Content - Two Face

% Two Face Fracture (Weighted %):	99.2 %
Specification:	75 % minimum

WSDOT Test 113 Degradation Factor

Degradation Factor:	67 %
Specification:	30 % minimum

Sand Equivalent Test

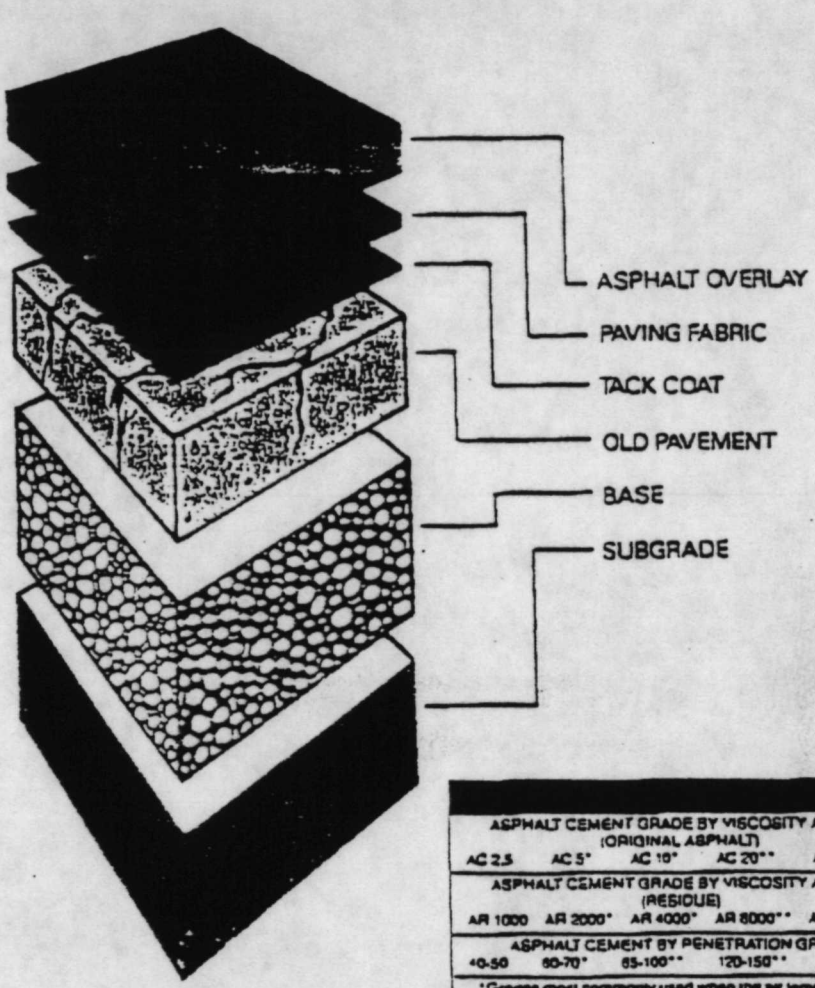
Sand Equivalent Value:(5/8" minus)	81 %
Specification:	45 % minimum
Sand Equivalent Value:(Blend Sand)	77 %
Specification:	30 % minimum

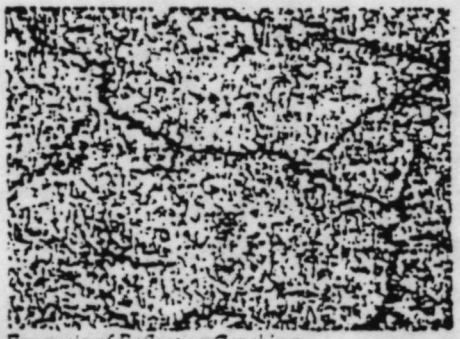
ATTACHMENT 2
PAVING FABRIC SUBMITTALS

AMOCO CONSTRUCTION FABRICS

AMOPAVE' ASPHALT OVERLAY FABRICS ADD YEARS OF LIFE TO PAVEMENT

One of the leading causes of pavement failure is the intrusion of water through cracks in the pavement into the road base and subgrade. When combined with an AC tack coat, AmoPave asphalt overlay fabrics provide a waterproofing membrane to prevent intrusion of water through the pavement. This, in turn, increases pavement life by retarding reflective cracking.




Example of Reflective Cracking

ASPHALT CEMENT GRADE BY VISCOSITY AT 60°C (ORIGINAL ASPHALT)				
AC 2.5	AC 5*	AC 10*	AC 20**	AC 40**
ASPHALT CEMENT GRADE BY VISCOSITY AT 60°C (RESIDUE)				
AR 1000	AR 2000*	AR 4000*	AR 8000**	AR 16000**
ASPHALT CEMENT BY PENETRATION GRADE				
40-50	60-70*	85-100**	120-150**	200-300

*Grades most commonly used when the air temperature is below 55° F.
**Grades most commonly used when the air temperature is above 55°F.

CATIONIC EMULSIFIED ASPHALTS ASTM 2397-73	
CRS—1 & 2	CMS—1, 2, 2H
ANIONIC EMULSIFIED ASPHALTS ASTM D-977-77	
RS—1, 2	MS—1, 2, 2H

INSTALLATION INSTRUCTIONS

1 SURFACE PREPARATION. The old pavement should be cleaned, removing all dirt, water, oil and foreign materials. Cracks 1/4" wide and wider should be cleaned out and filled with an asphalt emulsion slurry, a light grade of emulsified asphalt mixed with fine sand or repaired by any other method approved by the engineer. Large cracks and potholes should be filled to their depth with hot mix.

2 TACK COAT. Prior to the installation of AmoPave, a liquid asphalt must be applied to the prepared surface. Although both asphalt cements and emulsified asphalts are acceptable for use as tack coats, an asphalt cement is preferred because it develops adhesive strength quicker. Emulsions typically contain 40% water requiring considerable time for the water to evaporate (break-time) which may result in costly construction delays. Cutback grade asphalt should not be used as tack coats with AmoPave asphalt overlay fabrics. Vapors released during paving can cause rapid cracking of pavements and damage to the fabric.

The rate of tack coat will depend on the porosity of the existing pavement. The normal range for

Applying tack coat

AMOCO CONSTRUCTION FABRICS

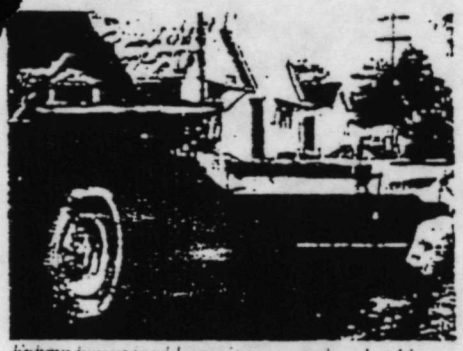
AmoPave will be from 0.20 gallons/yd² to 0.25 gallons/yd² of residual asphalt (AmoPave HD requires .25 to .30 because of fabric weight). To obtain the required rate of application of an emulsion, apply the following formula:

$$\frac{\text{Required Residue Asphalt Rate}}{\text{Liquid Asphalt Content \%}} = \text{Required Application Rate}$$

EXAMPLE:

$$\frac{.25\ \text{gal/yd}^2}{60} = .42\ \text{gal/yd}^2\ \text{Application Rate of Emulsion}$$

To maintain the specified tack rate, apply the tack coat with a calibrated distributor truck. It is recommended that the application temperature for the tack be high enough to assure uniform distribution (for example: 300 °F to 325 °F for grade AC 20). The width of distribution should be 6" wider than the width of the fabric.



Fabric being laid by unit mounted on backhoe

3 INSTALLATION. For small jobs (1500 linear feet or less), handheld units consisting of adjustable disc-type fabric tensioners can be used.

For large jobs, fabric can be easily installed with a mechanical unit that is mounted on the front bucket of a tractor or backhoe. This type of installation requires only two laborers and an operator, and the crew will easily outpace the paving operation.

Fabric installation units for both large and small jobs are readily available from a variety of manufacturers nationwide.

4 FABRIC INSTALLATION. The key to a successful installation rests with the operator. Pavement brush pressure should be light without bending the bristles excessively. The brushes need only touch the pavement at the middle of the unit and be elevated 1/4" on both ends.

Driving the vehicle straight with as few steering deviations as possible will assure a virtually wrinkle-free installation. Turns should be made gradually.

Hand brooming will eliminate any small wrinkles. For large wrinkles, those having a length of 1" or greater, the fabric should be cut and overlapped in the direction of the paving operation. Additional tack coat should be added to insure bonding.

Transverse fabric joints should be overlapped 4" to 6" in the direction of the paving operation as the illustration indicates. Longitudinal joints should be overlapped 2" to 4". Additional tack coat must be applied to the joints to assure proper bonding.

Hand rolled AmoPave on small job

5 PAVING. Standard paving operations should follow the fabric installation. *A minimum of 1 1/2 inches of compacted asphalt thickness is recommended to assure proper bonding between layers.*

Before paving, light vehicle traffic will not damage the exposed fabric. *However, as a safety precaution it is not recommended that you allow traffic to operate on the exposed fabric. Wet fabric will be significantly slicker than asphalt pavement. Should the fabric become wet prior to paving, it must be allowed to dry completely before paving.*

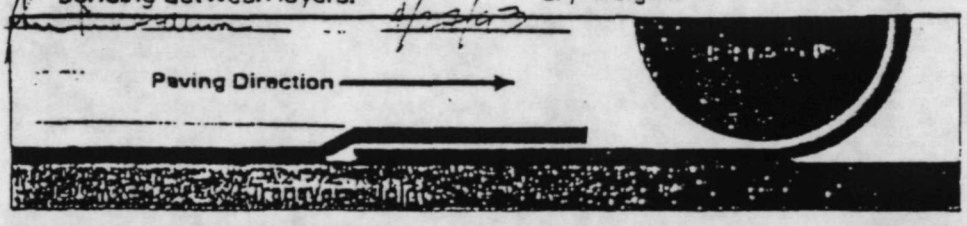
AmoPave Highway Installation

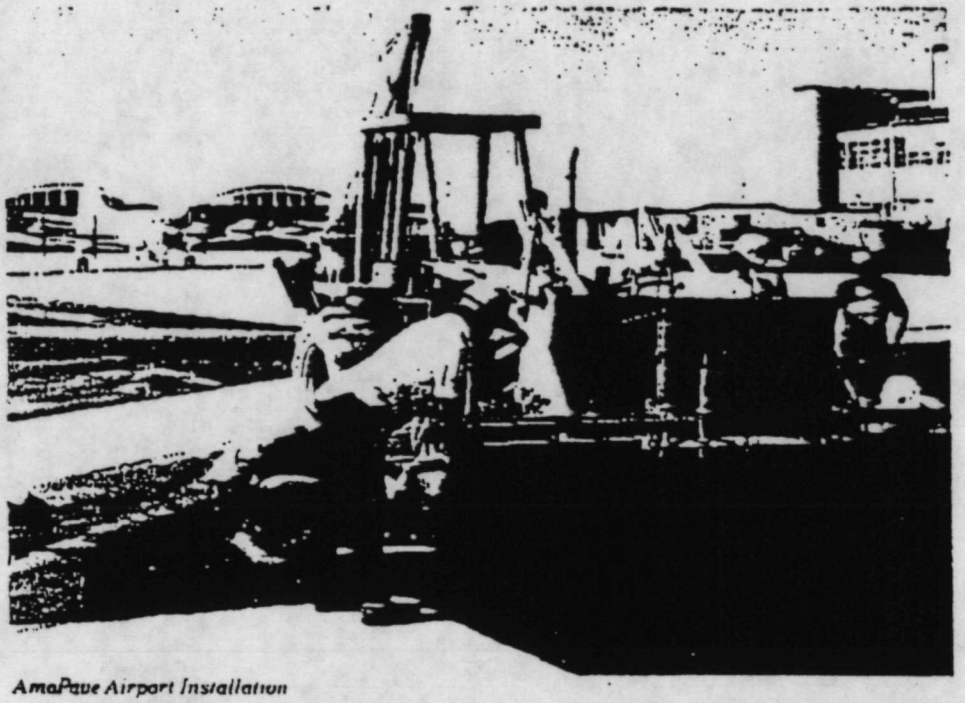
6 RECYCLING. Normally the overlay fabric is considered part of the permanent pavement structure and is not recycled.

However, if future plans call for recycling of 1 1/2" of pavement, then the fabric should be initially installed at 2" or deeper. The fabric increases the life of the pavement and any other recycled overlays.

It should be pointed out that if required, fabric can be recycled. All evidence to date shows that the presence of a staple polypropylene fabric does not adversely affect the milling operation or the finished asphalt mix.

7 STORAGE. Rolls of fabric should be stored in a dry place. When outdoor storage is required, the rolls should be elevated and covered with a tarp. If exposed to moisture, a roll of fabric can absorb three times its dry weight.





AmoPave Airport Installation

PROPERTIES REQUIRED FOR MAXIMUM PERFORMANCE

TACK COAT ABSORPTION: To insure proper bonding between asphalt layers. To provide an adequate moisture barrier.

DURABILITY: To withstand abrasive forces of installation.

FLEXIBILITY: To conform to the road surface without wrinkling.

UV STABILITY: To resist the effects of sunlight during construction.

Fibers fused on one side prevents bleed-through of tack coat and sticking of fabric to wheels of construction equipment.

Heat bond one side only is required by CALTRANS & Oklahoma DOT.

SPECIFICATIONS [1]

AmoPAVE 4599 –

Grab Tensile	ASTM-D-4632	lbs.	90
Grab Elongation	ASTM-D-4632	%	55
Mullen Burst	ASTM 3786	psi	215
Puncture	ASTM 4833	lbs.	60
Trapezoidal Tear	ASTM-D-4533	lbs.	35
U.V Resistance (Strength Retained)	ASTM-4355 [2]	% [3]	70
Asphalt Retention	TX DOT 3099 TP 25 #8	gal/s.y. (oz./sq./ft.)	.25 .35
Melting Point	ASTM D 276	Degrees F	329

Roll Width (ft.)	12.5
Roll Length (ft.)	360
Roll Diameter (in.)	13
Gross Weight (lbs.)	155
Area (sq. yd.)	500

The information presented herein, while not guaranteed, is to the best of our knowledge true and accurate. Except when agreed to in writing for specific conditions of use, no warranty or guarantee expressed or implied is made regarding the performance of any product, since the manner of use and handling are beyond our control. Nothing contained herein is to be construed as permission or as a recommendation to infringe any patent.

Nonfunctional properties such as color and thickness are not shown.

**These properties have been defined as minimum required properties for achieving maximum desired performance by the U.S. FHWA's Task Force 25 on geotextiles.*

1. *Minimum Roll Average Values*
2. *(Usual)*
3. *(Usual)*

[illegible] 4/27/93

AMOCO

Amoco Fabrics and Fibers Company

Amoco Fabrics and Fibers Company
900 Circle 75 Parkway, Suite 300
Atlanta, Georgia 30339
(404) 984-4444
Fax: (404) 956-2430

ATTACHMENT 3
MIX DESIGN SUBMITTALS

CASCADE TESTING LABORATORY, INC.
TESTING & INSPECTION / ENGINEERS / GEOLOGISTS
[illegible] N.E. [illegible]TH PLACE
KIRKLAND, WASHINGTON [illegible]
KIRKLAND [illegible]
FAX [illegible]
SEATTLE [illegible]
EVERETT [illegible]

April 21, 1993
Cert No. 9304-44

Watson Asphalt Co.
P.O. Box 845
Redmond, Washington 98073

Attention: Cliff Schroeder

Reference: Marshall Design Proof Mix
Asphalt Concrete Cap Project

Gentlemen;

In accordance with your request we have performed laboratory testing for determination of a Asphaltic Concrete blend which will meet the permeability and material specification requirements as provided for the above noted project.

As indicated on the attached sheets we would recommend the following blend of materials;

5/8" - 0	Asphalt Aggregate	85 percent
3/8" - 0	Asphalt Aggregate	15 percent
AR-4000 Asphalt Cement		5.6 percent

Based on the above blend and shown on the attaches sheets this material obtained a permeability factor of 1.12×10^{-7} and achieved a stability average of 1875 pounds.

We hope this will answer any questions you may have, if any should arise or we can be of further assistance please do not hesitate to give us a call.

Respectfully;

CASCADE TESTING LABORATORY, INC.

Kenneth B. Foot
Vice President

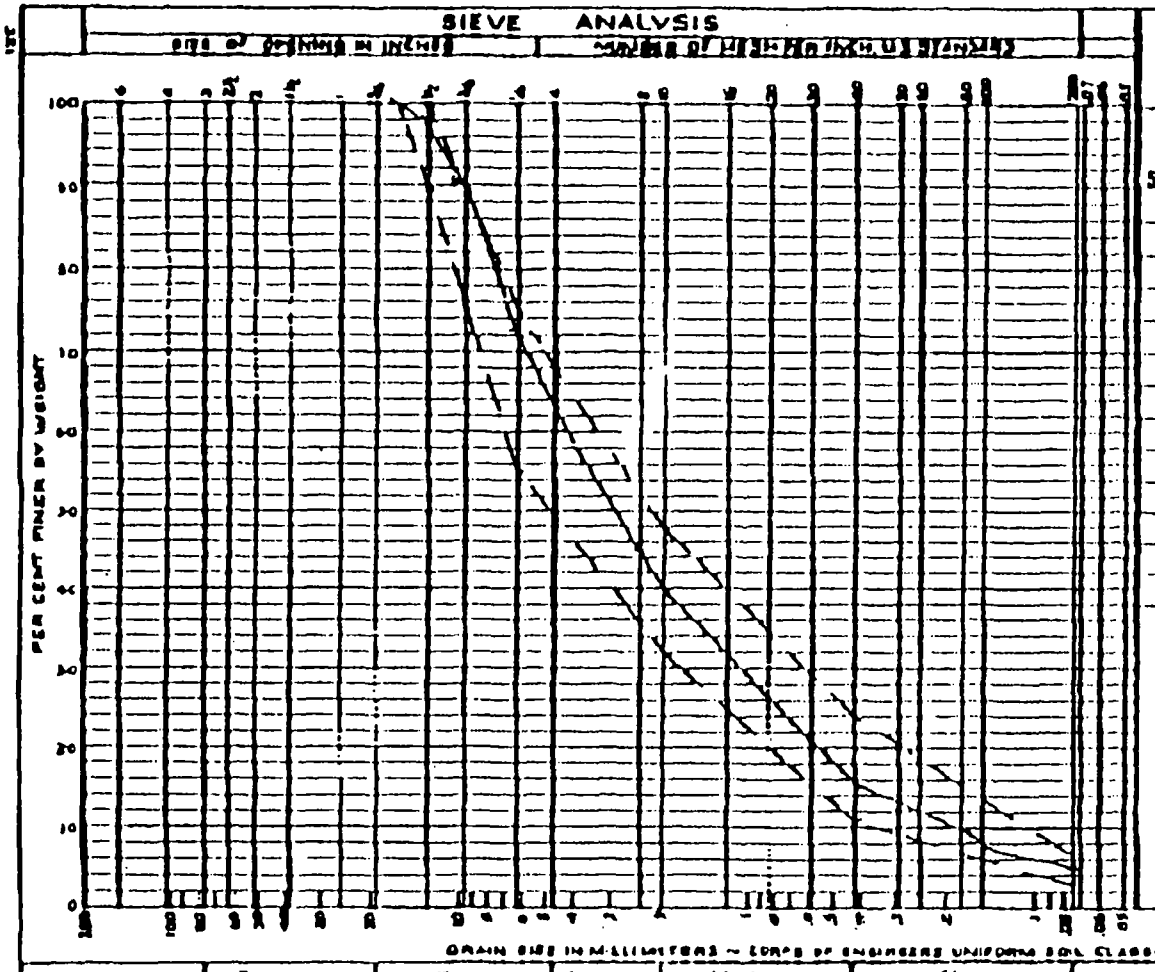
☑ CONFORMS TO DESIGN CONCEPT
☐ CONFORMS TO DESIGN CONCEPT WITH REVISIONS SHOWN
☐ NON-CONFORMING - REVISE AND RESUBMIT

This submittal has been reviewed for general conformance to design concept only. This review does not relieve the contractor or supplier of full responsibility for adhering to the contract documents and satisfactory completion of all work.

By: John R Vedinson Date: 4/27/93

HART CROWSER, INC.

CASCADE TESTING LABORATORY, INC.
TESTING & INSPECTION / ENGINEERS / GEOLOGISTS
2310 NE 95th PLACE
ORLAND, WASHINGTON 98004
(206) 823-9000
SEATTLE (204) 335-8700
EVERETT (204) 339-0613



SIEVE ANALYSIS

SIEVE SIZE	% PASS	SPECS
5/8"	100	100
1/2"	98	90-100
3/8"	90	75-90
1/4"	73	55-75
#4	64	-
#8	45	-
#10	40	32-48
#40	16	11-24
#80	10	-
#100	8	-
#200	5.2	3-7

Aggregate Blend

85 % 5/8" - 0

15 % 3/8" - 0

COBBLES	Coarse	Fine	Coarse	Medium	Fine
	GRAVEL		SAND		

MATERIAL Blended Aggregates

SAMPLE NO	DEPTH - FT	CLASSIFICATION	NAT WC	LL	PI

PROJECT
Asphalt Concrete Cap
Watson Asphalt Co.

CERT. NO. 9304-44

Plotted K
Checked F

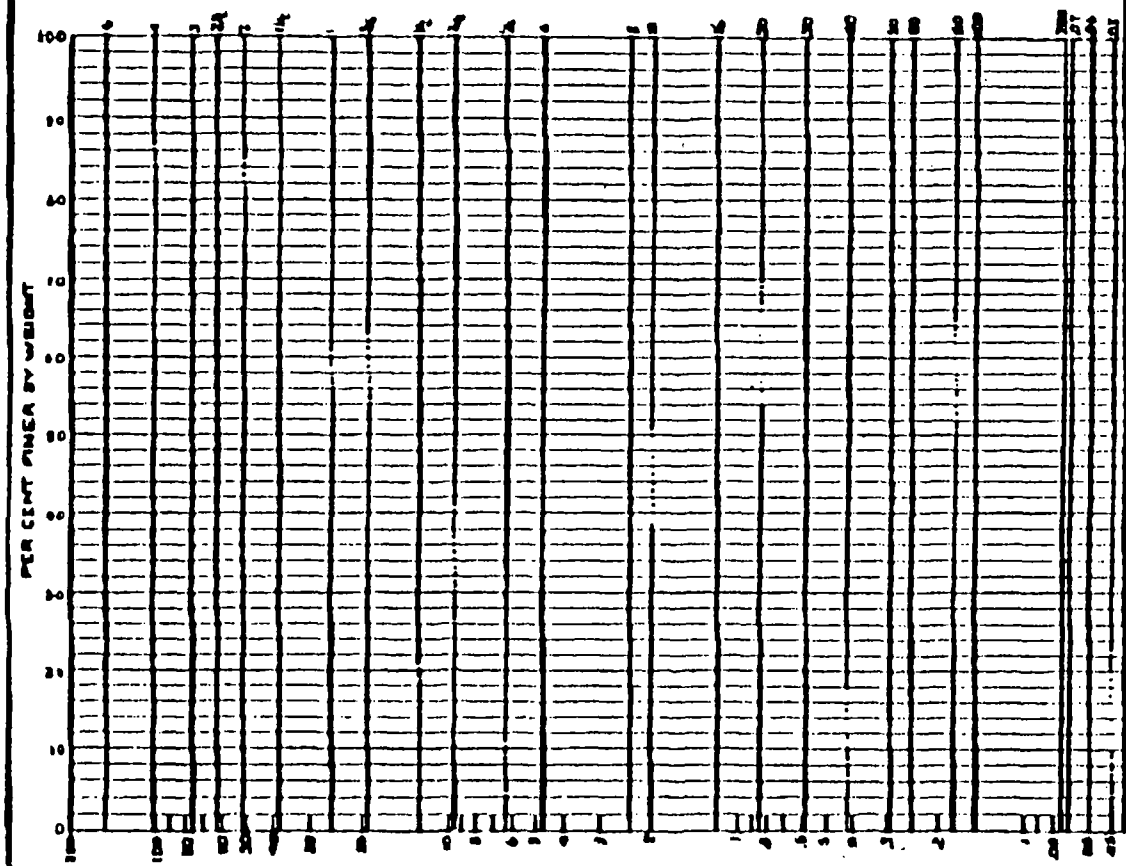
4-21-93
(Date of report)

Chief, Soil Mechanics Branch

Date 4/27/93

CASCADE TESTING LABORATORY, INC.
TESTING & INSPECTION/ENGINEERS/GEOLOGISTS
12919 NE 126th PLACE
KIRKLAND, WASHINGTON 98034
(206) 823-8800
SEATTLE (206) 529-6700
EVERETT (206) 488-0617

SIEVE ANALYSIS



SIEVE ANALYSIS

SIEVE SIZE	% PASS	SPECS
5/8"	100	
1/2"	98	
3/8"	89	
1/4"	69	
#4	58	
#8	39	
#10	35	
#40	14	
#80	9	
#100	7	
#200	4.8	

COBBLES	GRAVEL		SAND		
	Coarse	Fine	Coarse	Medium	Fine

MATERIAL 5/8" - 0 Aggregate

SAMPLE NO	DEPTH - FT	CLASSIFICATION	NAT WC	LL	PI

PROJECT
Asphalt Concrete Cap
Watson Asphalt Co

CERT. NO. 9304-44

Tested: K
Checked: F

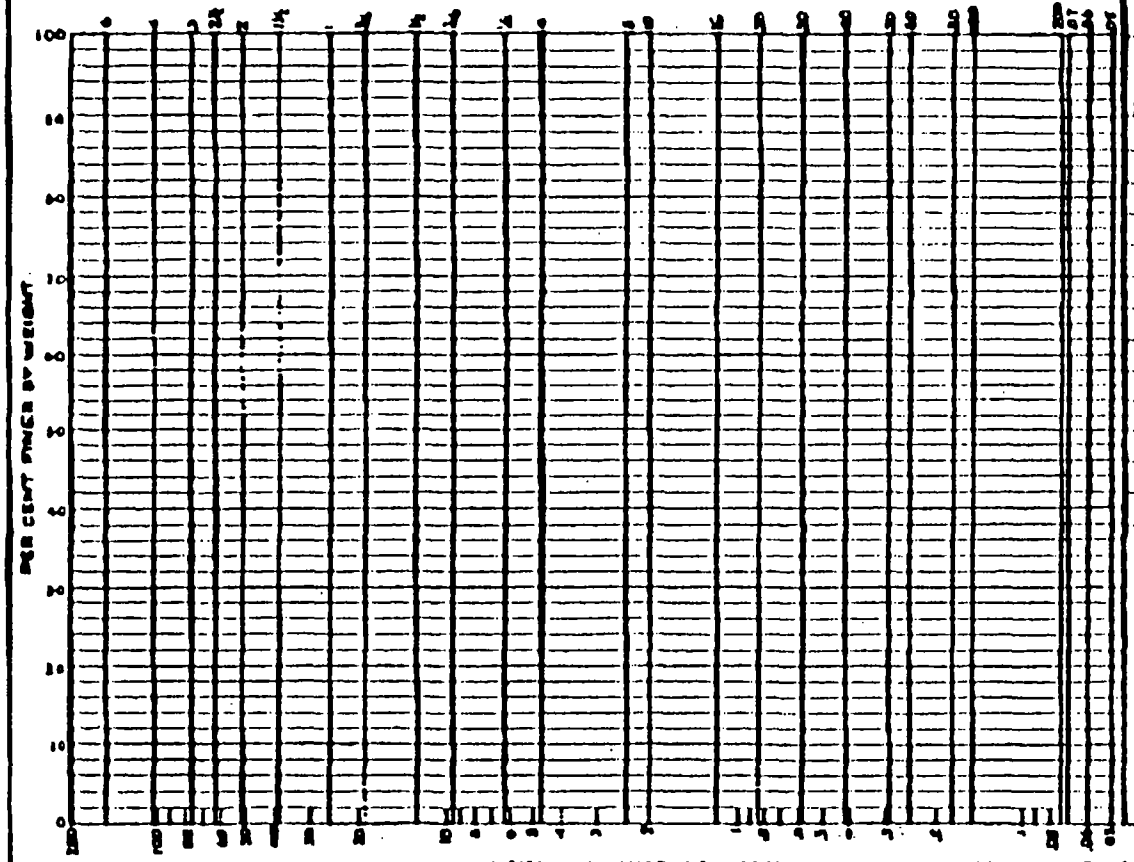
4-21-93
(Date of report)

Chief, Soil Mechanics Branch

WITH REVISIONS SHOWN
NO RESUBMIT
Date: 4/27/93

CASCADE TESTING LABORATORY, INC.
TESTING & INSPECTION / ENGINEERS / GEOLOGISTS
[illegible] NE [illegible] PLACE
KIRKLAND, WASHINGTON [illegible]
[illegible]
SEATTLE [illegible]
EVERETT [illegible]

SIEVE ANALYSIS



SIEVE ANALYSIS

SIEVE SIZE	% PASS	SPECS
3/8"	100	
1/4"	99	
#4	95	
#8	75	
#10	68	
#40	28	
#80	16	
#100	12	
#200	7.7	

COBBLES	GRAVEL		SAND		
	Coarse	Fine	Coarse	Medium	Fine

MATERIAL 3/8 - 0 Aggregate

SAMPLE NO	DEPTH - FT	CLASSIFICATION	NJ WC	LL	PI

PROJECT
Asphalt Concrete Cap
Watson Asphalt Co.

CERT. NO. 9304-44

Tested E
Checked E

4-21-93
(Date of report)

[signature]
Chief, Soil Mechanics Branch

CASCADE TESTING LABORATORY, INC.

MARSHALL METHOD - COMPUTATION OF PROPERTIES OF ASPHALT MIXTURES

DATE OF COMPUTATION: 4-21-93

JOB NUMBER: 9304-44

PROJECT: Asphalt Concrete Cap

DESCRIPTION OF BLEND: Class "B" Modified

SPECIMEN NUMBER	ASPHALT CEMENT (Percent)	THICKNESS (Inches)	WEIGHT (Grams) IN AIR	WEIGHT (Grams) IN WATER	VOLUME CC	SPECIFIC GRAVITY ACTUAL	SPECIFIC GRAVITY THEORIZED	AC BY VOLUME (Percent)	VOIDS (Percent) TOTAL MIX	VOIDS (Percent) FILLED	UNIT WEIGHT TOTAL MIX (Lb./Cu.Ft.)	STABILITY (Pounds) MEASURED	STABILITY (Pounds) CONVERTED	FLOW UNITS OF 1/100 IN.
a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
					(d - e)	(d)/(f)		(b x g)/(Sp. Gr. of AC)	(100 - 100 (g)/(h))	(i)/(i + j)	(g x 62.4)		4	
1-A		2½	1199	690	509	2.356						133	1925	11
B		2½	1201	694	507	2.369						135	1950	13
C		2½	1202	693	509	2.361						121	1750	14
Avg	5.6					2.362	2.455	13.06	3.79	77.5	149.4		7875	13

Coefficient of Permeability = 1.12×10^{-7}

* From conversion table

COMPUTED BY: Kenneth B Foot

CHECKED BY: [signature]

PREVIOUS EDITION OF THIS FORM IS OBSOLETE.

HART CROWSER INC.

PORT of TACOMA U.S.A.

July 1, 1993

Karen Keeley
Environmental Protection
Agency
1200 Sixth Avenue
Seattle WA 98101

Subject: Port of Tacoma Contract No. 710
Tribal Transfer
Blair Waterway Property
Work Plan Revisions
U.S. EPA Docket No. 1093-03-05-106

It is requested that the work plan be revised to change the elevations of final grades as defined in the attached Hart Crowser memo dated June 28, 1993. These changes should enhance the final work product as well as expedite the completion of the project.

Your effort on this matter is greatly appreciated.

Very truly yours,

Ed Stephens for

Curtis L. Ratcliffe, P.E.
Chief Engineer

cc: John Verdiun, Hart Crowser
Jerry Ninteman, Landau & Associates
Ed Stephens

Attachment

P.O. Box 1837 • Tacoma, Washington 98401-1837 • Telephone (206) 383-5841 • Telex 32-7473
Commissioners: Robert G. Earley • Jack A. Fabulich • Philip M. Lelli • Patrick O'Malley • Ned Shera
Executive Director: John J. Terpstra

HARTCROWSER

Earth and Environmental Technologies

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102
FAX 206.328.5581
206 324.9530

MEMORANDUM

DATE: June 28, 1993

TO: Karen Keeley - EPA Region 10

FROM: John Verduin - Hart Crowser

RE: Additional Thickness of Crushed Rock Beneath Asphalt Cap
Blair Waterway and Backup Properties Cleanup - 1993
J-2350-22

This memorandum addresses the proposed addition of crushed rock beneath the asphalt cap. Both the southern and northern pads were proof-rolled with a loaded dump truck to observe the condition of the subgrades. The southern pad appeared to be firm with some areas of slight pumping. The northern pad had larger areas of pumping observed. Currently the plans and specifications call for 6 inches of crushed rock base course over both pads. Below, we discuss the proposed thickness changes, and our reasons, for both the north and south pads.

Proposed South Pad Changes

We propose to add 2 inches loose thickness (roughly 1½ inches compacted) crushed rock top course on the south pad. This top course material would meet the requirements of section 9-03.9(3) top course crushed surfacing. The purpose of this material is to provide additional subgrade support, level the grade, and present a tighter working surface for the first asphalt lift placement.

The south pad final cap area elevation will be 1½ inches higher than currently shown on the plans.

Proposed North Pad Changes

We propose to place up to 4 additional inches (loose thickness) of crushed rock base course per section 02230 of the specifications on the north pad. Above this material will be placed 2 inches loose thickness of top course. The additional base course material will provide additional subgrade support. Tentatively, the base course will be placed in a 2½ inch loose-lift thickness followed by proof-rolling. If the subgrade appears to be firm, the 2 inches of top course will be placed. If the subgrade is still pumping in some areas, the remaining 1½ inches of base course will be placed followed by the 2 inches of top course.

The description and purpose of the crushed rock top course will be as described above.

The north pad final cap area elevation will be 3 to 4½ inches higher than currently shown on the plans.

Please do not hesitate to call if you have any questions or comments.

CRPLACEMEM

cc: Curtis Ratcliffe - Port of Tacoma

Appendix L

APPENDIX L
DOCUMENTATION OF CONCURRENCE

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, Washington 98101

February 9, 1994

Reply To
Attn Of: HW-113

Mr. Curtis Ratcliffe
Port of Tacoma
P.O. Box 1837
Tacoma, Washington 98401-1837

Re: **Approval of Completion Report for the OFA/Pennwalt Area of the Blair Backup Property, Puyallup Settlement Agreement Commencement Bay Nearshore/Tideflats Superfund Site**

Dear Mr. Ratcliffe:

With this letter, the U.S. EPA approves the Port of Tacoma's "*Completion Report, OFA/Pennwalt Area, Blair Backup Property, Tacoma, Washington*" (Hart Crowser January 21, 1994), which was submitted to the U.S. Environmental Protection Agency (EPA) on January 24, 1994. Additional errata pages were received on February 3, 1994.

EPA is also in receipt of a letter from Mr. Bill Sullivan of the Puyallup Tribe, dated January 20, 1994, in which the Tribe approves the Blair Backup Completion Report. EPA agrees with the Tribe that the institutional controls sections of the reports be consistent with the draft Consent Decree currently being negotiated between the Port, Tribe, and EPA. As agreed to with the Tribe and Port, an institutional control for the property, as described in the Completion Report, will be clarified as follows: "*The future use of shallow and intermediate aquifer (as defined in the Investigation Report for the Blair Backup Property) within the capped and covered area of the Blair Backup Property for any purposes is prohibited. Drawdown of the aquifers could induce settlement of soils in the area of the asphalt cap, which could subsequently cause cracking in the asphalt cap.*" EPA recommends that Page 25 of the report be modified.

EPA has also reviewed the January 1994 inspection logs for the asphalt cap, sand and gravel cover, and storm drainage system. EPA and the Tribe should be notified of the Port's actions to implement corrective actions identified in those inspection logs.

Printed on Recycled Paper

If you have any questions please give me a call at 553-2141.

Sincerely,

Karen Keeley

Karen Keeley
Superfund Site Manager

cc: D. Smith, Ecology
B. Sullivan, Puyallup Tribe
J. Verduin, Hart Crowser

APPENDIX M
POST CLOSURE GROUNDWATER MONITORING REPORTS

HARTCROWSER

FIELD REPORT

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
FAX 206.328.5581
206.324.9530

Job No. 2350-24
Field Report No. ____
Page 1 of 1
DATE 14 January, 1997
S M T W Th (F) S

JOB Blair Backup
ARRIVAL TIME: 0745
LOCATION Taylor Way, Tacoma, WA
DEPARTURE TIME: 1245
CLIENT Port of Tacoma
WEATHER: Fog, 50°
PURPOSE OF OBSERVATIONS Cap & Cover ~~Inspection~~ Observation
H-C REPRESENTATIVE Grant Kuechtel
H C PROJECT MANAGER John Verduin
CONTRACTOR —
PERMIT NO. —
CONTRACTOR REP. —
JOB PHONE —

This report presents opinions formed as a result of our observation of the contractor's activities relating to geotechnical engineering. We rely on the contractor to comply with the plans and specifications throughout the duration of the project irrespective of the presence of the Hart Crowser representative. The presence of our field representative will be for the purpose of providing observation and field testing. Our work does not include supervision or direction of the actual work of the contractor, his employees or agents. Neither the presence of our representative nor the observation and testing by our firm shall excuse the contractor in any way for defects discovered in his work. Our firm will not be responsible for job or site safety on this project. The conclusions and recommendations of this field report are subject to review by the Hart Crowser Project Manager.

COMMENTS: On site to ~~inspect~~ observe asphalt concrete (AC) cap, sand and gravel COVER, and storm drainage system. Ed Stephens arranged a backhoe and operator for removing crushed rock Base Course from over AC. Divided CAP area into apx ~~5~~ one acre sections and checked ~~5~~ one 5' square areas chosen at random within each section. Inspection logs for each section are included. No cracking was noted at any of the sections checked. Pulled manhole cover (MH) and grates for the storm drainage system. Inspection logs for each are included. System appears to be working as designed. Note that insides of connections for 6" perforated lateral drains to manholes had not been grouted, nor connection debris removed. Recommend contractor be contacted to complete this work. Walked sand & gravel cover which appears to be performing well - some erosion has occurred along N & S sides at the lateral ditches, and recommend this be repaired. A log for COVER inspection is included. Port has Sitts & Hill surveyors on site, locating Manholes MH 2 & MH7. They will locate test sections at the CAP. Also requested they locate and measure elevations for the four settlement plates. Port's backhoe operator will refill areas and wheel-roll crushed rock base.

BY: [signature]
HART CROWSER REPRESENTATIVE

REVIEWED BY: John R Verduin
HART CROWSER PROJECT MANAGER

I have read and understand the content of this Field Report.
CONTRACTOR REPRESENTATIVE

Blair Backup Property

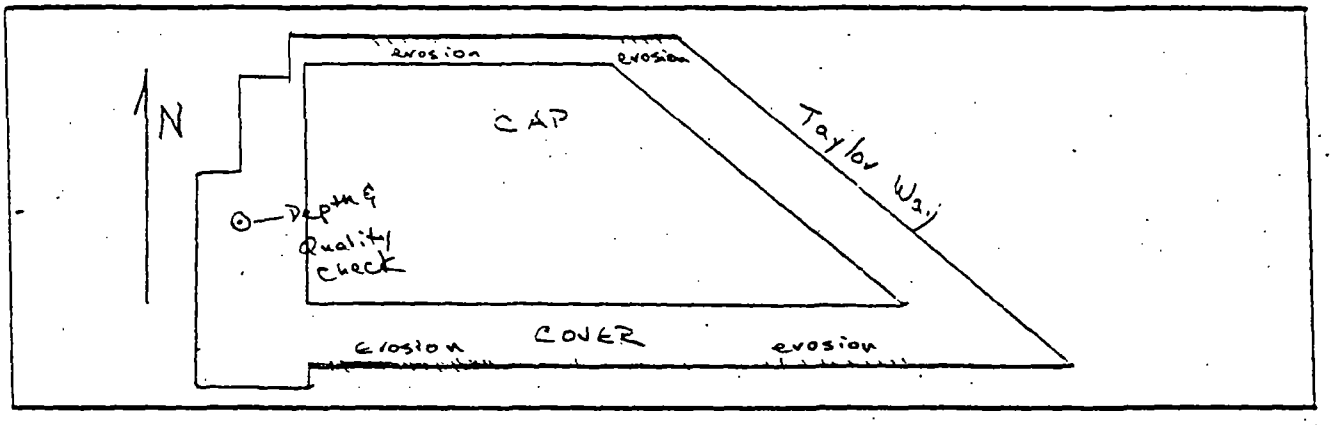
Sand and Gravel Cover Inspection Log

Date of Inspection: 1/14/94 Inspector: Grant Knechtel, Hart Gunser

Weather: Fog Temperature: 50°F

Area Number: All

Area Location Sketch (Include and North Arrow)



1. Condition of sand and gravel cover material surface (ruts, vegetation, etc.):
Slight rutting to 1" deep max. most 1/2" or less. No Vegetation. Erosion along edges where slope breaks steeply to lateral ditches. Note Below.

2. Condition of sand and gravel cover material at depth (moisture content, gradation, etc.):
Moist, sl. silty to clean gravelly SAND, well compacted

3. Thickness of sand and gravel cover material:
2.0' - measured 30' north of well HC12I

4. Additional Investigation Required?:
None

5. Findings of Additional Investigation:
NA

Note: Erosion mostly in small gullies 4"-6" deep 4' to 25' apart along north and south sides where slope break is most abrupt.

Blair Backup Property

Asphalt Cap Inspection Log

No Site Development

Date of Inspection: 1/14/04

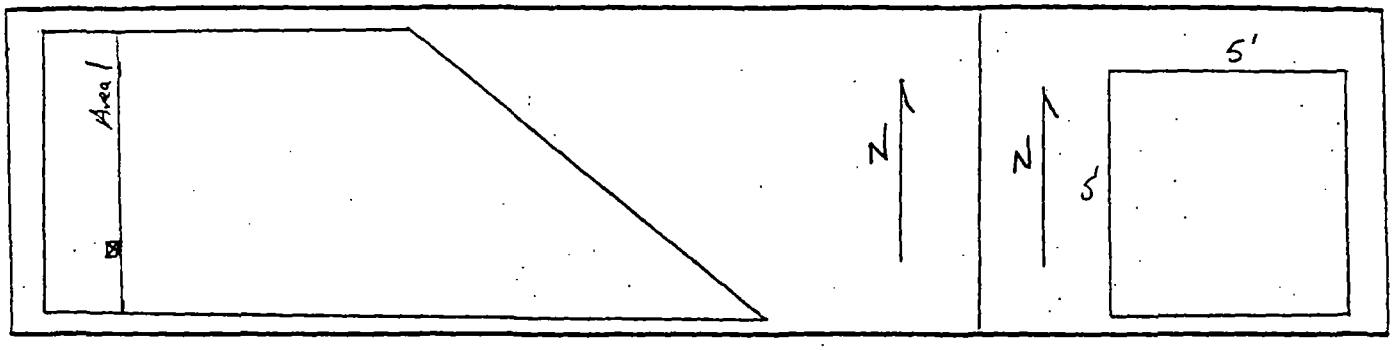
Weather: Fog

Area Number: ~ 1

Inspector: Grant Knochel

Temperature: 50°F

Area Location Sketch (Include North Arrow)



WEARING COURSE

1. Condition of wearing course surface (ruts, vegetation, etc.):
good, slight rutting to south less than ½" deep

2. Condition of wearing course (moisture content, gradation, etc.):
well graded, saturated bottom 1½"

3. Thickness of wearing course (inches):
9"

ASPHALT CAP

1. Condition of asphalt cap (ruts, cracks, etc.):
no ruts or cracks. water flowing across top of AC in CRB.

2. Is Cracking Visible ?
no

2A. Width of cracks (inches):
NA

2B. Length of cracks (inches):
NA

2C. Depth of cracks (inches):
NA

2D. Spacing of cracks (inches):
NA

3. Additional Investigation Required?:
None

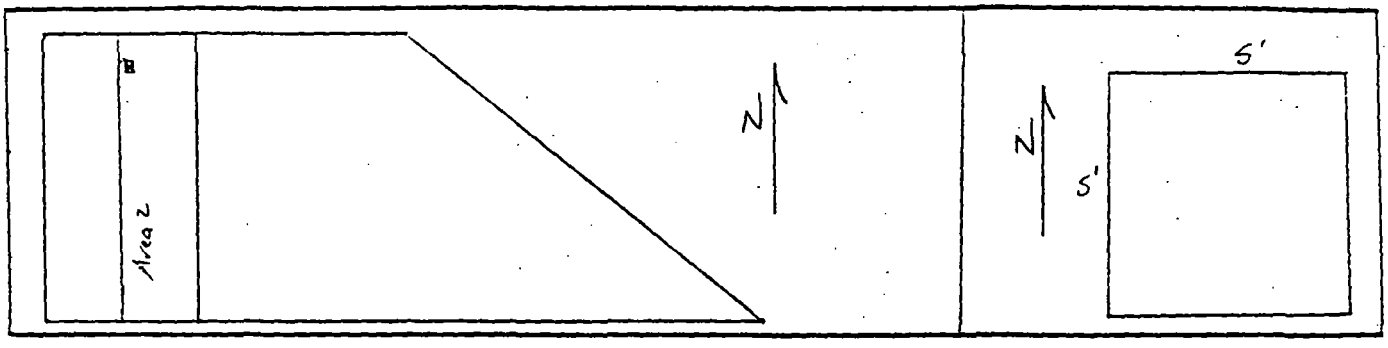
3A. Findings of additional investigation:
NA

Blair Backup Property
Asphalt Cap Inspection Log

No Site Development

Date of Inspection: 1/14/94
Weather: Fog
Area Number: 2
Inspector: Grant Knechtel
Temperature: 50°F

Area Location Sketch (Include North Arrow)



WEARING COURSE

1. Condition of wearing course surface (ruts, vegetation, etc.):
good - no ruts or vegetation

2. Condition of wearing course (moisture content, gradation, etc.):
good, well graded, well compacted, saturated bottom 1/2".

3. Thickness of wearing course (inches):
9"

ASPHALT CAP

1. Condition of asphalt cap (ruts, cracks, etc.):
good - no ruts or cracks visible. Water flows across ± 1/2" deep.

2. Is Cracking Visible ?
No

2A. Width of cracks (inches):
NA

2B. Length of cracks (inches):
NA

2C. Depth of cracks (inches):
NA

2D. Spacing of cracks (inches):
NA

3. Additional Investigation Required?:
None

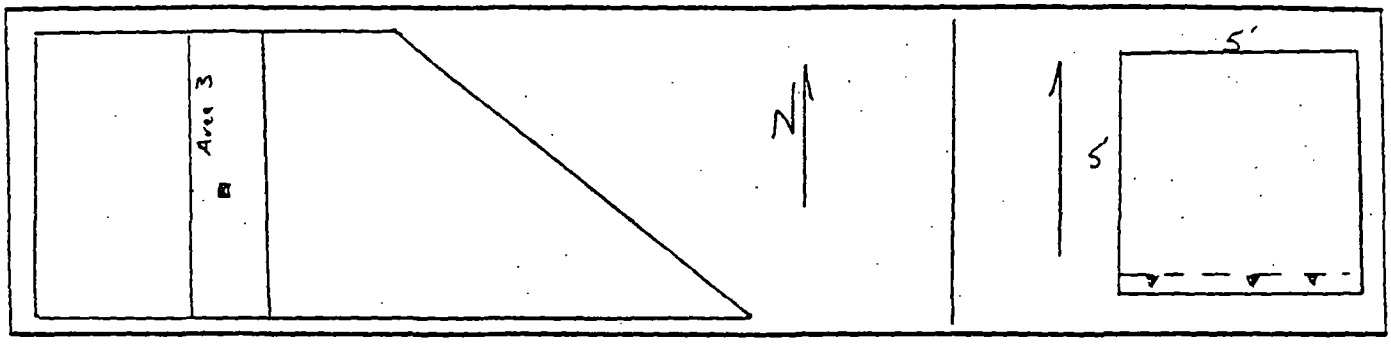
3A. Findings of additional investigation:
NA

Blair Backup Property
Asphalt Cap Inspection Log

No Site Development

Date of Inspection: [illegible]
Weather: Fog
Area Number: 3
Inspector: Grant Knechtel
Temperature: [illegible]

Area Location Sketch (Include North Arrow)



WEARING COURSE

1. Condition of wearing course surface (ruts, vegetation, etc.):
Good. No ruts or vegetation

2. Condition of wearing course (moisture content, gradation, etc.):
Good. Moist, well graded & compact - Saturated bottom < 1/4".

3. Thickness of wearing course (inches):
10 1/2"

ASPHALT CAP

1. Condition of asphalt cap (ruts, cracks, etc.):
Good. No ruts or cracks. Location @ slope break to central valley. Water flows across AC < 1/4" deep

2. Is Cracking Visible ?
No

2A. Width of cracks (inches):
NA

2B. Length of cracks (inches):
NA

2C. Depth of cracks (inches):
NA

2D. Spacing of cracks (inches):
NA

3. Additional Investigation Required?:
None

3A. Findings of additional investigation:
NA

Blair Backup Property

Asphalt Cap Inspection Log

No Site Development

Date of Inspection: 1/14/94

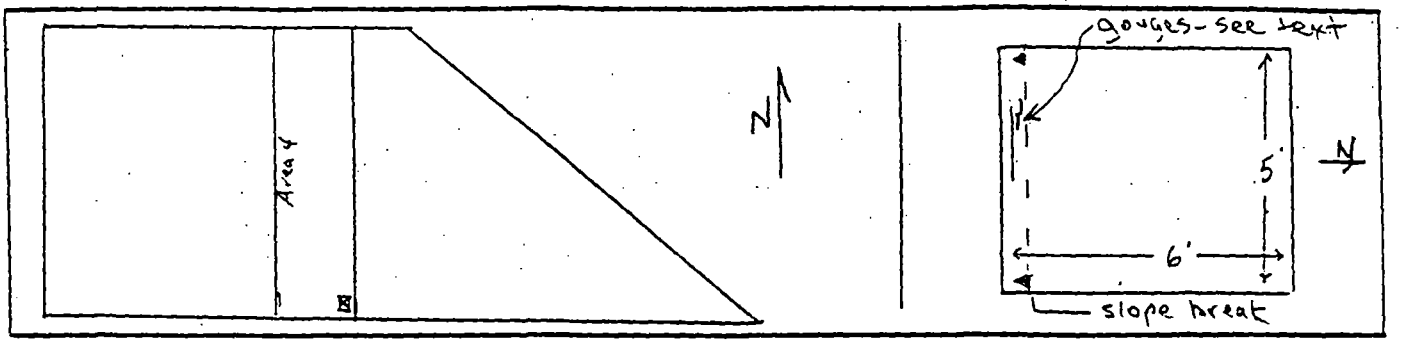
Inspector: Grant Knechtel

Weather: Foo

Temperature:

Area Number: 4

Area Location Sketch (Include North Arrow)



WEARING COURSE

1. Condition of wearing course surface (ruts, vegetation, etc.):
Good. No ruts or vegetation

2. Condition of wearing course (moisture content, gradation, etc.):
Good. Well graded, moist, compact. Saturated bottom 1/2"

3. Thickness of wearing course (inches):
8 1/2"

ASPHALT CAP

1. Condition of asphalt cap (ruts, cracks, etc.):
Good. 2 linear gouges @ so. Edge 1 - 1 1/2' x 1/2" x < 1/8" Deep. 1 - 1/2' x 3/4" x < 1/8" deep
Located @ slope break to south cap edge.

2. Is Cracking Visible ?
No

2A. Width of cracks (inches):
NA

2B. Length of cracks (inches):
NA

2C. Depth of cracks (inches):
NA

2D. Spacing of cracks (inches):
NA

3. Additional Investigation Required?:
None

3A. Findings of additional investigation:
NA

Blair Backup Property

Asphalt Cap Inspection Log

No Site Development

Date of Inspection: [illegible]

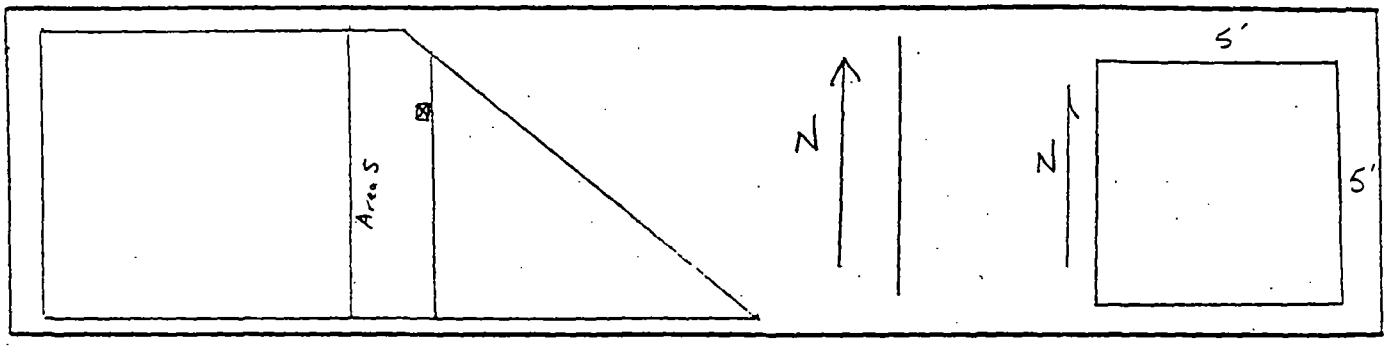
Inspector: Grant [illegible]

Weather: [illegible]

Temperature: 50°

Area Number: 5

Area Location Sketch (Include North Arrow)



WEARING COURSE

1. Condition of wearing course surface (ruts, vegetation, etc.):
   Good. No ruts or vegetation.

2. Condition of wearing course (moisture content, gradation, etc.):
   Good. Moist. well graded. compact. Saturated bottom ½"

3. Thickness of wearing course (inches):
   8"

ASPHALT CAP

1. Condition of asphalt cap (ruts, cracks, etc.):
   Good. No ruts or cracks.

2. Is Cracking Visible ?
   No.

2A. Width of cracks (inches):
   NA

2B. Length of cracks (inches):
   NA

2C. Depth of cracks (inches):
   NA

2D. Spacing of cracks (inches):
   NA

3. Additional Investigation Required?:
   None

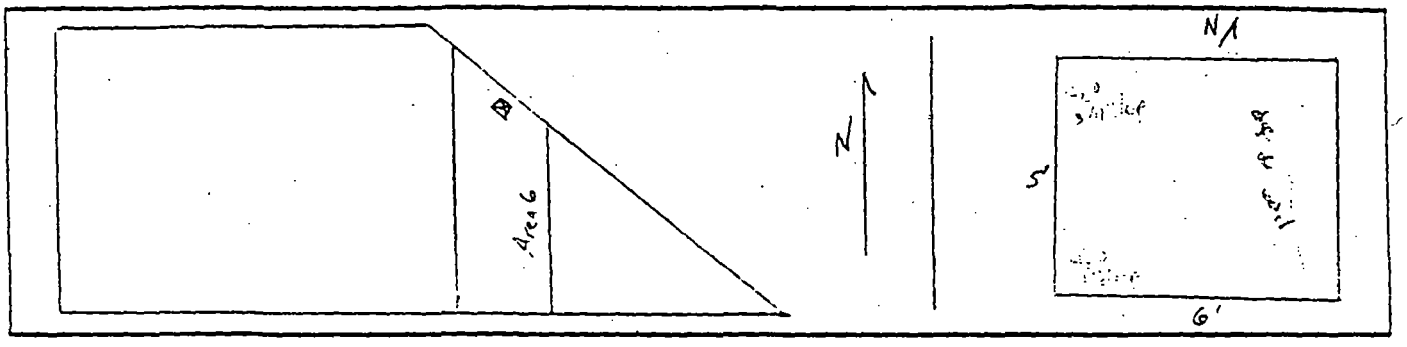
3A. Findings of additional investigation:
   NA

Blair Backup Property
Asphalt Cap Inspection Log

No Site Development

Date of Inspection: 1/14/94
Weather: Fog
Area Number: 6
Inspector: Grant Knechtel
Temperature: 50°

Area Location Sketch (Include North Arrow)



WEARING COURSE

1. Condition of wearing course surface (ruts, vegetation, etc.):
Good. No ruts or cracking.

2. Condition of wearing course (moisture content, gradation, etc.):
Good. Moist, well compacted, well grade. Saturated bottom ½ to 1" @ SE end.

3. Thickness of wearing course (inches):
8"

ASPHALT CAP

1. Condition of asphalt cap (ruts, cracks, etc.):
Good. No ruts or cracks

2. Is Cracking Visible ?
No.

2A. Width of cracks (inches):
NA

2B. Length of cracks (inches):
NA

2C. Depth of cracks (inches):
NA

2D. Spacing of cracks (inches):
NA

3. Additional Investigation Required?:
None

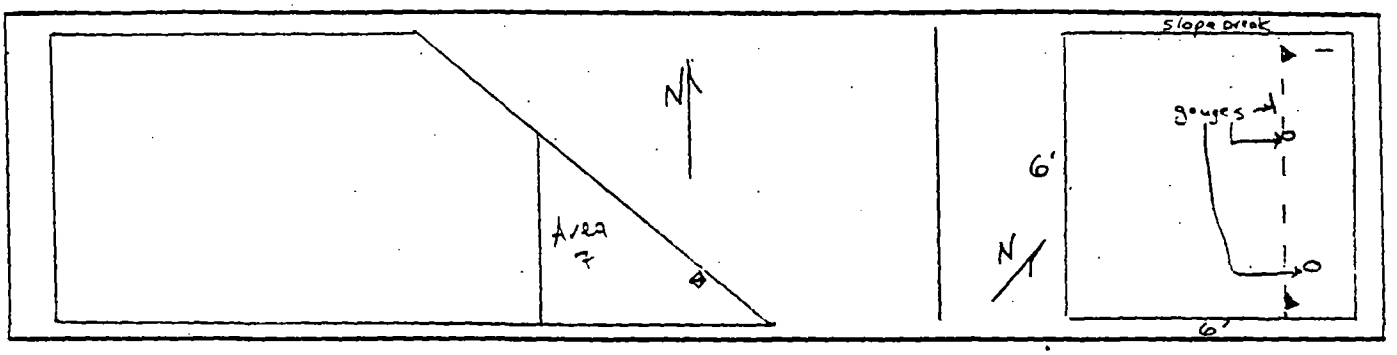
3A. Findings of additional investigation:
NA

Blair Backup Property
Asphalt Cap Inspection Log

No Site Development

Date of Inspection: 1/14/94
Weather: Fm
Area Number: 7
Inspector: Grant Knechtel
Temperature: 50°F

Area Location Sketch (Include North Arrow)



WEARING COURSE

1. Condition of wearing course surface (ruts, vegetation, etc.):
Good. No ruts or vegetation

2. Condition of wearing course (moisture content, gradation, etc.):
Good. Moist, well graded, well compacted. Saturated bottom < 1/8"

3. Thickness of wearing course (inches):
8"

ASPHALT CAP

1. Condition of asphalt cap (ruts, cracks, etc.):
Good. 3 gauges. Minor 3" x 1/4" x < 1/8", 1-oval, 1"Ø, < 1/8", 1-oval 3"x4"x 3/16" deep
see on sketch. Location on slope break to NE edge.

2. Is Cracking Visible ?
No

2A. Width of cracks (inches):
NA

2B. Length of cracks (inches):
NA

2C. Depth of cracks (inches):
NA

2D. Spacing of cracks (inches):
NA

3. Additional Investigation Required?:
None

3A. Findings of additional investigation:
NA

Blair Backup Property

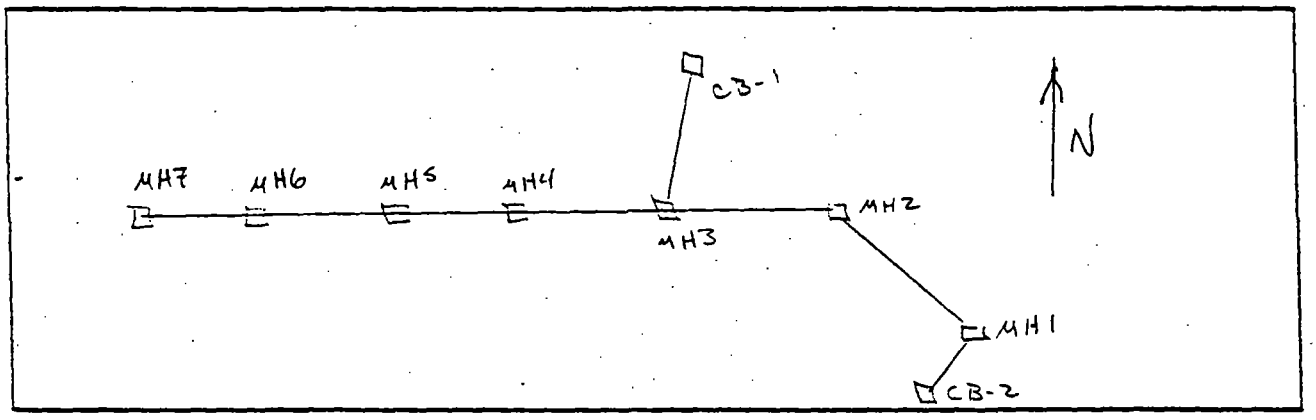
Storm Water System Inspection Log

Date of Inspection: 1/14/94 Inspector: Grant Kroeckel

Weather: Fog Temperature: 50°F

Manhole Number: MH1

Area Location Sketch (Include and North Arrow)



1. Condition of manhole grate (plugged, damaged, etc.):

Lid is Good

2. Condition of inlet and outlet 24-inch diameter CMP (plugged, damaged, etc.):

Good. Lateral drains operating normal.

3. Condition of tide gate (if applicable):

Good operation normal

4. Condition of manhole (cracking in concrete, etc.):

Good. ± 1-2" sediment & gravel in catch.

5. Additional Investigation Required?:

None

6. Findings of Additional Investigation:

NA

Blair Backup Property

Storm Water System Inspection Log

Date of Inspection: 1/14/94 Inspector: Grant Knechtel

Weather: Fog Temperature: 50°F

Manhole Number: MH 2

Area Location Sketch (Include and North Arrow)

See Sketch MH1

1. Condition of manhole grate (plugged, damaged, etc.):
   Good. Top ±6" above surrounding grade

2. Condition of inlet and outlet 24-inch diameter CMP (plugged, damaged, etc.):
   Good. Lateral drains operating normal

3. Condition of tide gate (if applicable):
   Good. Operating normal.

4. Condition of manhole (cracking in concrete, etc.):
   Good. 0-2" sediment & gravel in catch

5. Additional Investigation Required?:
   None

6. Findings of Additional Investigation:
   NA

Blair Backup Property

Storm Water System Inspection Log

Date of Inspection: 1/14/94 Inspector: Grant Knechtel

Weather: Fog Temperature: 50°F

Manhole Number: MH 3

Area Location Sketch (Include and North Arrow)

See Sketch MH-1

1. Condition of manhole grate (plugged, damaged, etc.):

Good

2. Condition of inlet and outlet 24-inch diameter CMP (plugged, damaged, etc.):

Good. Grout @ Bottom inlet from CB 1 leaking @ bottom.

3. Condition of tide gate (if applicable):

NA

4. Condition of manhole (cracking in concrete, etc.):

OK. Inlet from upper (west) lateral drain not grouted inside. Concrete debris not removed after installing lateral drain. 1/2" sediment in channel. Strong iron staining.

5. Additional Investigation Required?:

Contractor completion of drain. removal of debris.

6. Findings of Additional Investigation:

NA

Blair Backup Property

Storm Water System Inspection Log

Date of Inspection: 1/14/94 Inspector: Grant Knerl

Weather: Fog Temperature: 50°F

Manhole Number: MH4

Area Location Sketch (Include and North Arrow)

See Sketch MH1

1. Condition of manhole grate (plugged, damaged, etc.):
   Good

2. Condition of inlet and outlet 24-inch diameter CMP (plugged, damaged, etc.):
   Good. 6" lateral drains not grouted to CB inside. Drains operating.

3. Condition of tide gate (if applicable):
   NA

4. Condition of manhole (cracking in concrete, etc.):
   Good. 1" sediment & gravel in channel. Strong iron staining.

5. Additional Investigation Required?:
   Contractor complete installation of lateral drains

6. Findings of Additional Investigation:

Blair Backup Property

Storm Water System Inspection Log

Date of Inspection: 1/14/94 Inspector: Grant Knechtel

Weather: Fog Temperature: 50° F

Manhole Number: MH5

Area Location Sketch (Include and North Arrow)

See Sketch MH1

1. Condition of manhole grate (plugged, damaged, etc.):

Good

2. Condition of inlet and outlet 24-inch diameter CMP (plugged, damaged, etc.):

Good. 6" perf lateral drains not grouted to MH inside. Drains operating normal.

3. Condition of tide gate (if applicable):

NA

4. Condition of manhole (cracking in concrete, etc.):

Good. 2" sediment & gravel in channel. Strong iron staining. Brick from lateral drain installing left in channel.

5. Additional Investigation Required?:

Contractor complete installation lateral drains.

6. Findings of Additional Investigation:

NA

Blair Backup Property

Storm Water System Inspection Log

Date of Inspection: 1/14/94 Inspector: Grant Knechtel

Weather: Fog Temperature: 50°F

Manhole Number: MH6

Area Location Sketch (Include and North Arrow)

See Sketch MH1

1. Condition of manhole grate (plugged, damaged, etc.):

Good

2. Condition of inlet and outlet 24-inch diameter CMP (plugged, damaged, etc.):

Good. Strong water flow into pipe from crack @ bottom grout @ outlet

3. Condition of tide gate (if applicable):

NA

4. Condition of manhole (cracking in concrete, etc.):

Good. See note @ outlet. 1" sediment & gravel in channel. Strong iron staining

5. Additional Investigation Required?:

None

6. Findings of Additional Investigation:

NA

Blair Backup Property

Storm Water System Inspection Log

Date of Inspection: 1/14/04 Inspector: Grant Kreckel

Weather: Fog Temperature: 50°F

Manhole Number: MH7

Area Location Sketch (Include and North Arrow)

See Sketch MH1

1. Condition of manhole grate (plugged, damaged, etc.):
   Good

2. Condition of inlet and outlet 24-inch diameter CMP (plugged, damaged, etc.):
   Good. slight cracking to 6" PVC side drain grout connections

3. Condition of tide gate (if applicable):
   NA

4. Condition of manhole (cracking in concrete, etc.):
   slight radial cracking @ 6" inlets. <1" sediment in catch.

5. Additional Investigation Required?:
   None.

6. Findings of Additional Investigation:
   Noted small frog in water in outlet

Blair Backup Property

Storm Water System Inspection Log

Date of Inspection: 1/14/94 Inspector: Grant Knechtel

Weather: Fog Temperature: 50° F

Manhole Number: CB1

Area Location Sketch (Include and North Arrow)

See Sketch MH 1

1. Condition of manhole grate (plugged, damaged, etc.):
   Good. Some Blackberries across grate.

2. Condition of ~~inlet~~ NA and outlet 24-inch diameter CMP (plugged, damaged, etc.):
   Good

3. Condition of tide gate (if applicable):
   NA

4. Condition of manhole (cracking in concrete, etc.):
   Good. ±8" Sediment in catch. ± 3" left to pipe

5. Additional Investigation Required?:
   None

6. Findings of Additional Investigation:
   NA

Blair Backup Property

Storm Water System Inspection Log

Date of Inspection: 1/14/04 Inspector: Grant Knechtel

Weather: Fog Temperature: 50° F

Manhole Number: CB 2

Area Location Sketch (Include and North Arrow)

See sketch MH1

1. Condition of manhole grate (plugged, damaged, etc.):
   Good. Grate ring not cemented to catch basin. Some large bark fragments.

2. Condition of ~~inlet~~ NA and outlet 24-inch diameter CMP (plugged, damaged, etc.):
   Good

3. Condition of tide gate (if applicable):
   NA

4. Condition of manhole (cracking in concrete, etc.):
   Good. Catch has ± 1" sediment.

5. Additional Investigation Required?:
   None

6. Findings of Additional Investigation:
   NA

Hart Crowser
J-2350-24

RECEIVED
MAY 06 1994
SUPERFUND REMEDIAL BRANCH

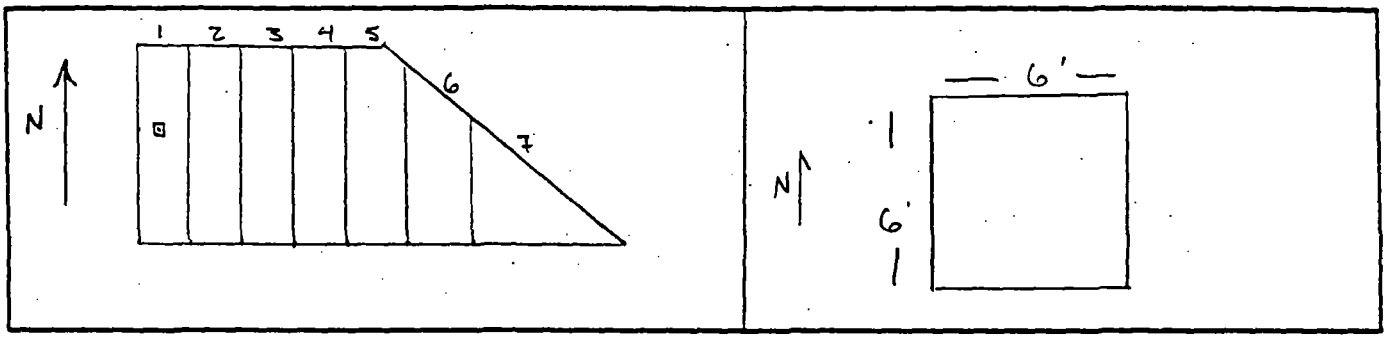
APRIL 14, 1994, OBSERVATIONS

Blair Backup Property
Asphalt Cap Inspection Log

No Site Development

Date of Inspection: 4/14/94
Weather: Partly Sunny
Area Number: 1
Area Location Sketch (Include North Arrow)

Inspector: Grant Knechtel Hart Crowser
Temperature: 50°F



WEARING COURSE

1. Condition of wearing course surface (ruts, vegetation, etc.):
good. no ruts or vegetation

2. Condition of wearing course (moisture content, gradation, etc.):
good. wet bottom 1". well graded

3. Thickness of wearing course (inches):
8½

ASPHALT CAP

1. Condition of asphalt cap (ruts, cracks, etc.):
Good

2. Is Cracking Visible ?
No

2A. Width of cracks (inches):
NA

2B. Length of cracks (inches):
NA

2C. Depth of cracks (inches):
NA

2D. Spacing of cracks (inches):
NA

3. Additional Investigation Required?:
None

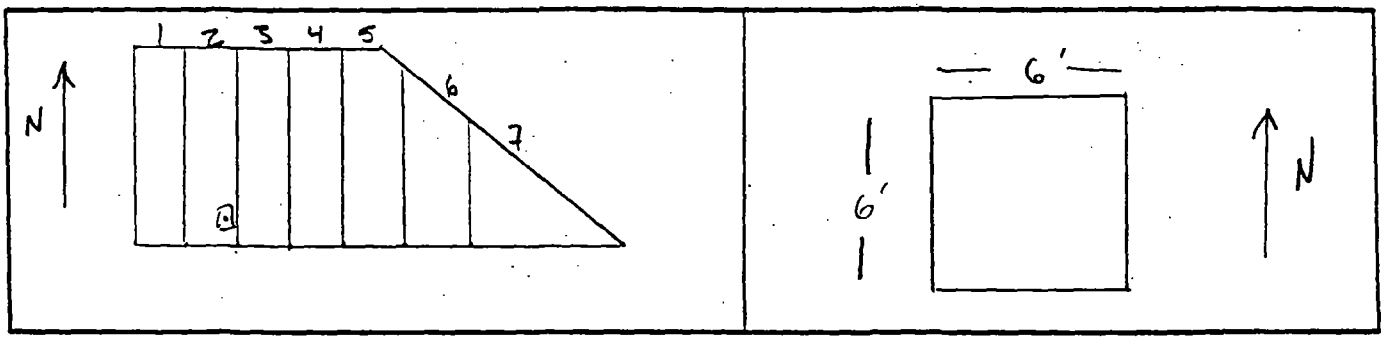
3A. Findings of additional investigation:

Blair Backup Property
Asphalt Cap Inspection Log

No Site Development

Date of Inspection: 4/14/04
Weather: Partly sunny
Area Number: 1 2 1 1
Area Location Sketch (Include North Arrow)

Inspector: Grant Knechtel
Temperature: 50°F



WEARING COURSE

1. Condition of wearing course surface (ruts, vegetation, etc.):
good. No ruts or vegetation.

2. Condition of wearing course (moisture content, gradation, etc.):
good. wet bottom 1" well graded

3. Thickness of wearing course (inches):
9

ASPHALT CAP

1. Condition of asphalt cap (ruts, cracks, etc.):
Good

2. Is Cracking Visible ?
No

2A. Width of cracks (inches):
NA

2B. Length of cracks (inches):
NA

2C. Depth of cracks (inches):
NA

2D. Spacing of cracks (inches):
NA

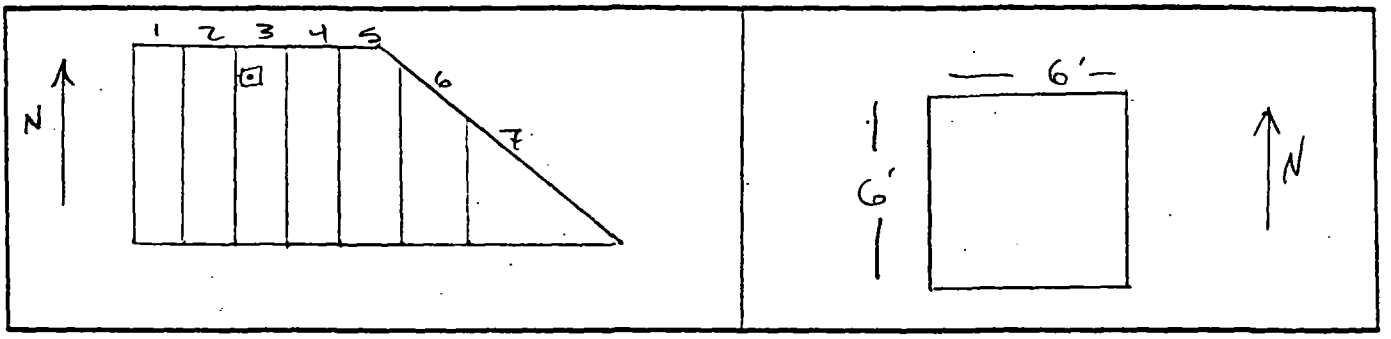
3. Additional Investigation Required?:
None

3A. Findings of additional investigation:

Blair Backup Property
Asphalt Cap Inspection Log

No Site Development

Date of Inspection: 4/14/04
Inspector: Grant Knechtel
Weather: partly sunny
Temperature: 50°F
Area Number: 3
Area Location Sketch (Include North Arrow)



WEARING COURSE

1. Condition of wearing course surface (ruts, vegetation, etc.):
Excellent. No ruts or vegetation

2. Condition of wearing course (moisture content, gradation, etc.):
Excellent, wet bottom 1/2", well graded

3. Thickness of wearing course (inches):
10 1/2

ASPHALT CAP

1. Condition of asphalt cap (ruts, cracks, etc.):
Good

2. Is Cracking Visible ?
No

2A. Width of cracks (inches):
NA

2B. Length of cracks (inches):
NA

2C. Depth of cracks (inches):
NA

2D. Spacing of cracks (inches):
NA

3. Additional Investigation Required?:
None

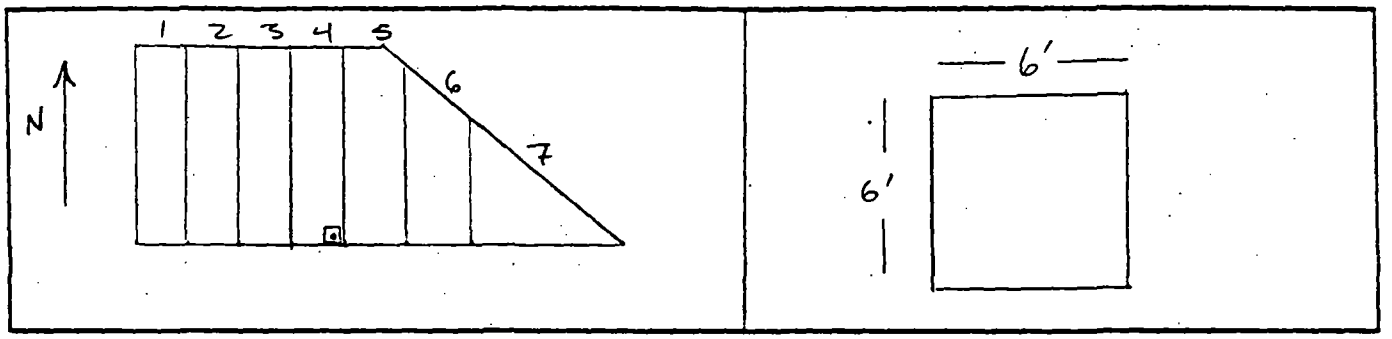
3A. Findings of additional investigation:

Blair Backup Property
Asphalt Cap Inspection Log

No Site Development

Date of Inspection: 4/14/94
Weather: partly Sunny
Area Number: 4
Area Location Sketch (Include North Arrow)

Inspector: Grant Knechtel
Temperature: 50°F



WEARING COURSE

1. Condition of wearing course surface (ruts, vegetation, etc.):
Excellent

2. Condition of wearing course (moisture content, gradation, etc.):
Excellent

3. Thickness of wearing course (inches):
10"

ASPHALT CAP

1. Condition of asphalt cap (ruts, cracks, etc.):
Good

2. Is Cracking Visible ?
NO

2A. Width of cracks (inches):
NA

2B. Length of cracks (inches):
NA

2C. Depth of cracks (inches):
NA

2D. Spacing of cracks (inches):
NA

3. Additional Investigation Required?:
None

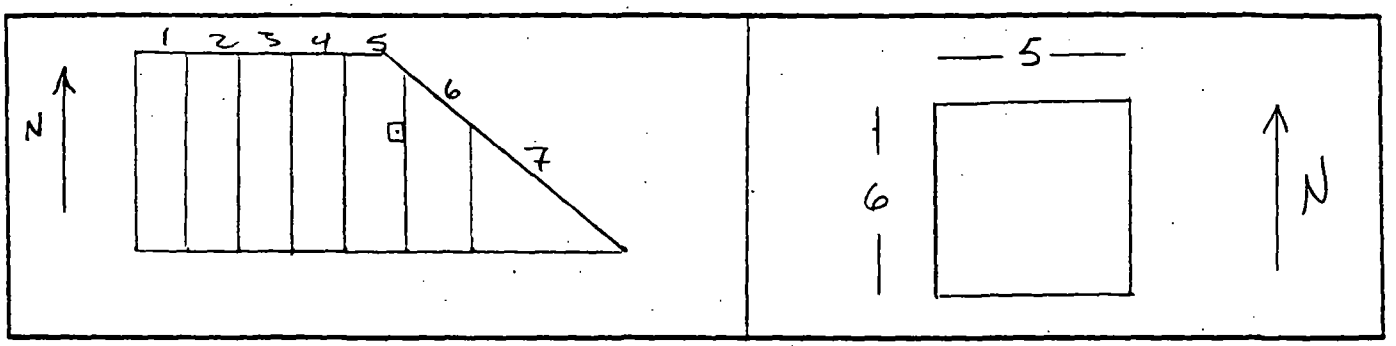
3A. Findings of additional investigation:

Blair Backup Property
Asphalt Cap Inspection Log

No Site Development

Date of Inspection: 4/14/94
Weather: partly cloudy
Area Number: 5
Area Location Sketch (Include North Arrow)

Inspector: Grant Knechtel
Temperature: 50°F



WEARING COURSE

1. Condition of wearing course surface (ruts, vegetation, etc.):
Good

2. Condition of wearing course (moisture content, gradation, etc.):
Good, well graded, wet bottom 1½"

3. Thickness of wearing course (inches):
9"

ASPHALT CAP

1. Condition of asphalt cap (ruts, cracks, etc.):
Good

2. Is Cracking Visible ?
No

2A. Width of cracks (inches):
NA

2B. Length of cracks (inches):
NA

2C. Depth of cracks (inches):
NA

2D. Spacing of cracks (inches):
NA

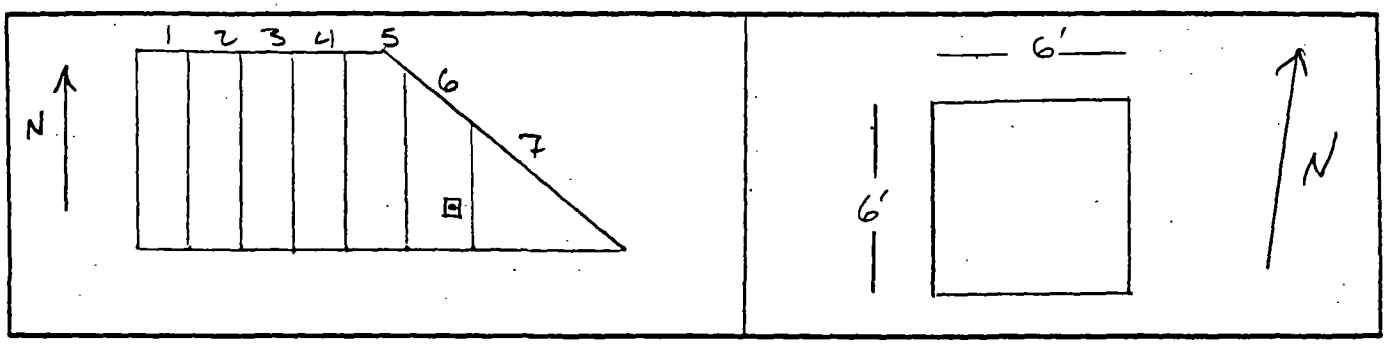
3. Additional Investigation Required?:
None

3A. Findings of additional investigation:

Blair Backup Property
Asphalt Cap Inspection Log

No Site Development

Date of Inspection: 4/14/94
Inspector: Grant Knechtel
Weather: partly sunny
Temperature:
Area Number: 6
Area Location Sketch (Include North Arrow)



WEARING COURSE

1. Condition of wearing course surface (ruts, vegetation, etc.):
Excellent

2. Condition of wearing course (moisture content, gradation, etc.):
Excellent, well graded, wet bottom 1"

3. Thickness of wearing course (inches):
10

ASPHALT CAP

1. Condition of asphalt cap (ruts, cracks, etc.):
Good

2. Is Cracking Visible ?
No

2A. Width of cracks (inches):
NA

2B. Length of cracks (inches):
NA

2C. Depth of cracks (inches):
NA

2D. Spacing of cracks (inches):
NA

3. Additional Investigation Required?:
None

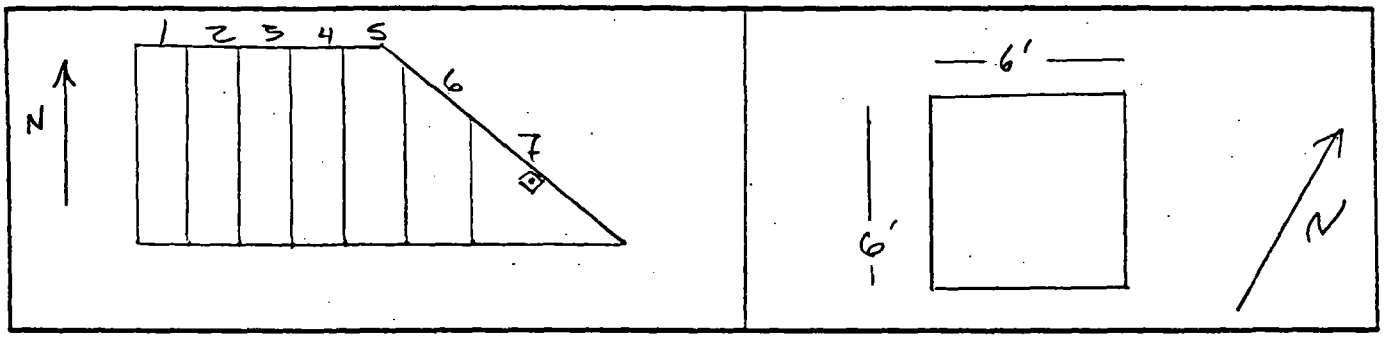
3A. Findings of additional investigation:

Blair Backup Property
Asphalt Cap Inspection Log

No Site Development

Date of Inspection: 4/14/94
Weather: Partly Sunny
Area Number: 7
Area Location Sketch (Include North Arrow)

Inspector: Grant Knechtel
Temperature: 50°F



WEARING COURSE

1. Condition of wearing course surface (ruts, vegetation, etc.):
Good

2. Condition of wearing course (moisture content, gradation, etc.):
Good, well graded, wet bottom ½"

3. Thickness of wearing course (inches):
9

ASPHALT CAP

1. Condition of asphalt cap (ruts, cracks, etc.):
Good

2. Is Cracking Visible ?
No

2A. Width of cracks (inches):
NA

2B. Length of cracks (inches):
NA

2C. Depth of cracks (inches):
NA

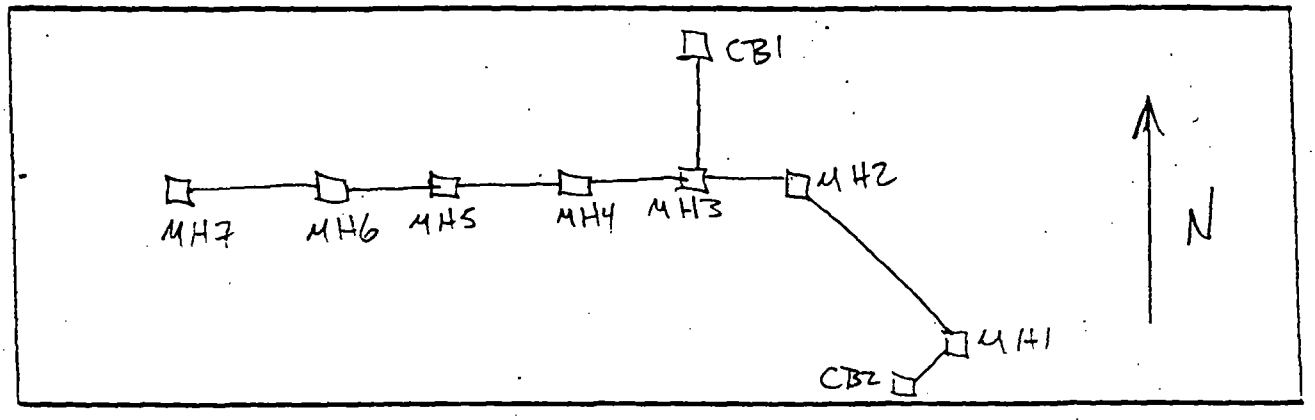
2D. Spacing of cracks (inches):
NA

3. Additional Investigation Required?:
None

3A. Findings of additional investigation:

Blair Backup Property
Storm Water System Inspection Log

Date of Inspection: 4/14/94 Inspector: GWK
Weather: partly sunny Temperature: 50°F
Manhole Number: MH1
Area Location Sketch (Include and North Arrow)



1. Condition of manhole grate (plugged, damaged, etc.):
good (solid manhole)

2. Condition of inlet and outlet 24-inch diameter CMP (plugged, damaged, etc.):
good

3. Condition of tide gate (if applicable):
good, operating

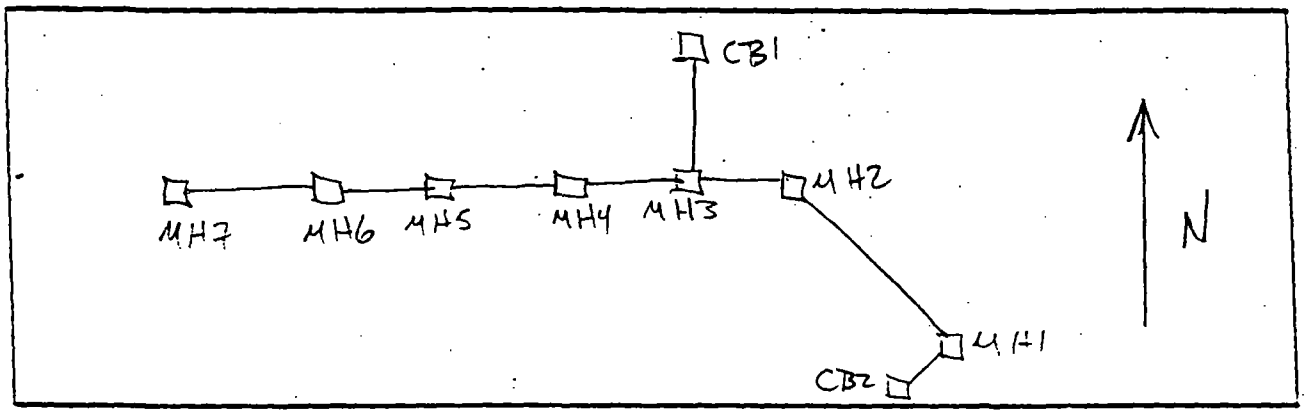
4. Condition of manhole (cracking in concrete, etc.):
good

5. Additional Investigation Required?:
No

6. Findings of Additional Investigation:

Blair Backup Property
Storm Water System Inspection Log

Date of Inspection: 4/14/94 Inspector: GWK
Weather: partly sunny Temperature: 50°F
Manhole Number: MH2
Area Location Sketch (Include and North Arrow)



1. Condition of manhole grate (plugged, damaged, etc.):
good

2. Condition of inlet and outlet 24-inch diameter CMP (plugged, damaged, etc.):
good

3. Condition of tide gate (if applicable):
good, operating

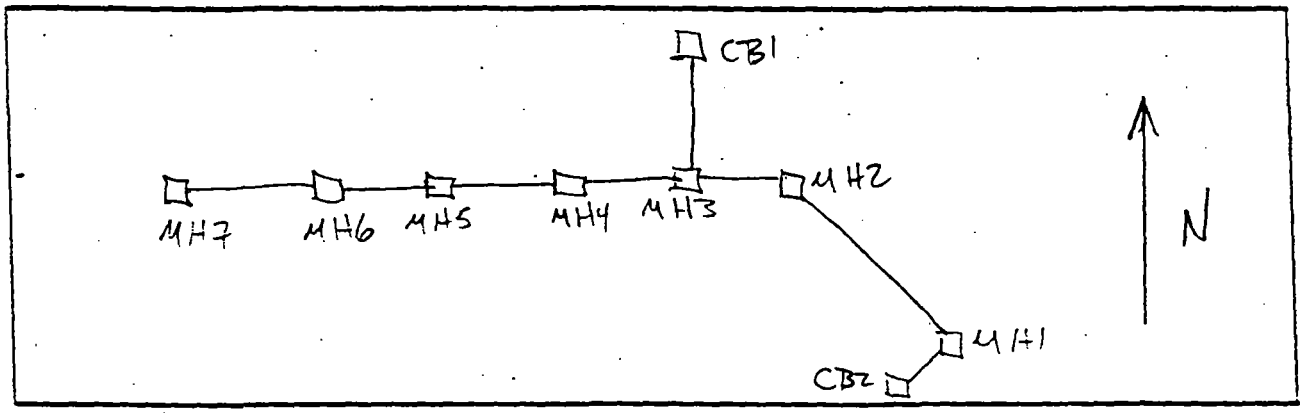
4. Condition of manhole (cracking in concrete, etc.):
good

5. Additional Investigation Required?:
No

6. Findings of Additional Investigation:

Blair Backup Property
Storm Water System Inspection Log

Date of Inspection: 4/14/94 Inspector: GWK
Weather: cloudy Temperature: 50°F
Manhole Number: MH3
Area Location Sketch (Include and North Arrow)



1. Condition of manhole grate (plugged, damaged, etc.):
good.

2. Condition of inlet and outlet 24-inch diameter CMP (plugged, damaged, etc.):
good. perf pipe inlets grouted to manhole per recs.

3. Condition of tide gate (if applicable):
NA

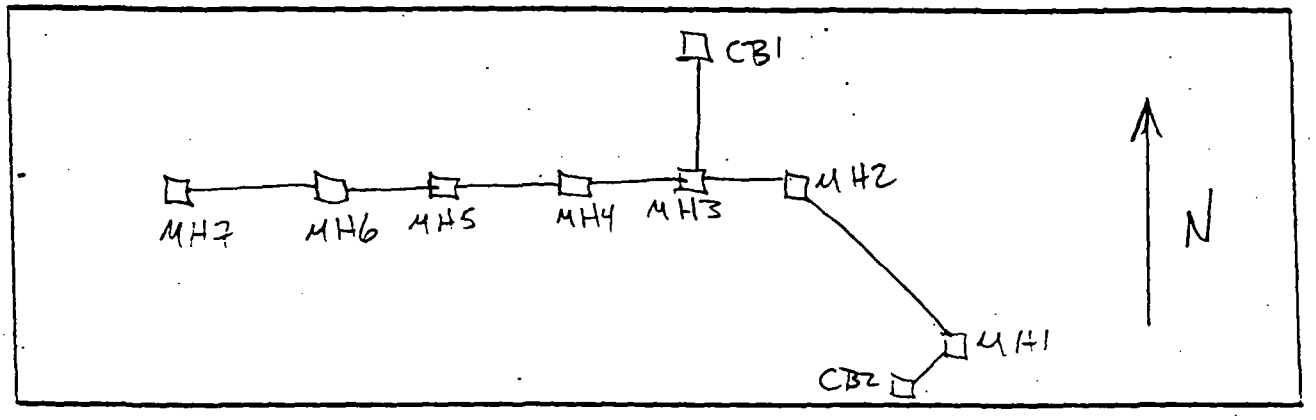
4. Condition of manhole (cracking in concrete, etc.):
good

5. Additional Investigation Required?:
No

6. Findings of Additional Investigation:

Blair Backup Property
Storm Water System Inspection Log

Date of Inspection: 4/14/94 Inspector: GWK
Weather: cloudy Temperature: 50°F
Manhole Number: MH4
Area Location Sketch (Include and North Arrow)



1. Condition of manhole grate (plugged, damaged, etc.):
good.

2. Condition of inlet and outlet 24-inch diameter CMP (plugged, damaged, etc.):
good. perf pipe inlets grouted to MH per recs.

3. Condition of tide gate (if applicable):
NA

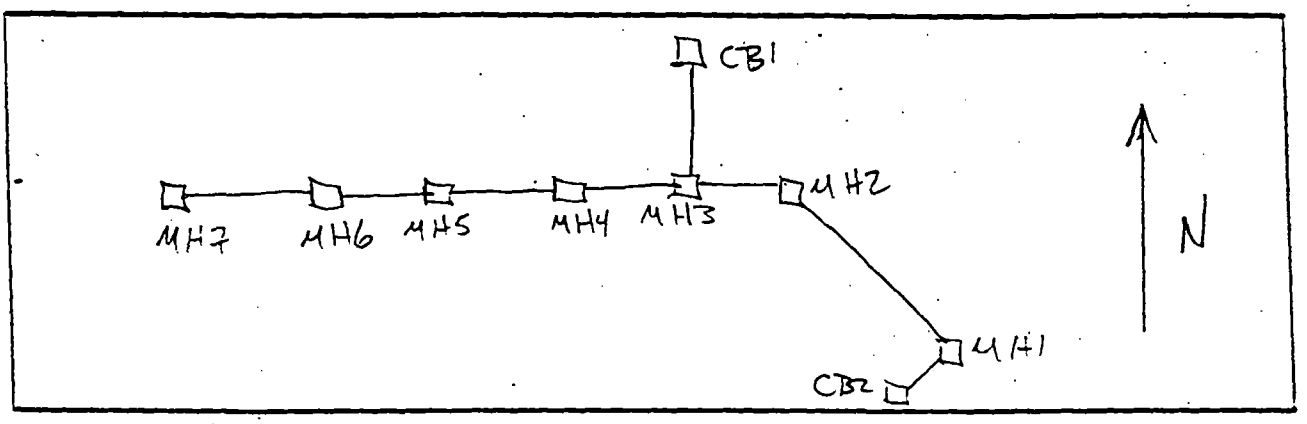
4. Condition of manhole (cracking in concrete, etc.):
good

5. Additional Investigation Required?:
No

6. Findings of Additional Investigation:

Blair Backup Property
Storm Water System Inspection Log

Date of Inspection: 4/14/94 Inspector: GWK
Weather: cloudy Temperature: 50°F
Manhole Number: MH5
Area Location Sketch (Include and North Arrow)



1. Condition of manhole grate (plugged, damaged, etc.):
good

2. Condition of inlet and outlet 24-inch diameter CMP (plugged, damaged, etc.):
good. perf pipe inlets grouted to MH per recs.

3. Condition of tide gate (if applicable):
NA

4. Condition of manhole (cracking in concrete, etc.):
good

5. Additional Investigation Required?:
No

6. Findings of Additional Investigation:

Blair Backup Property

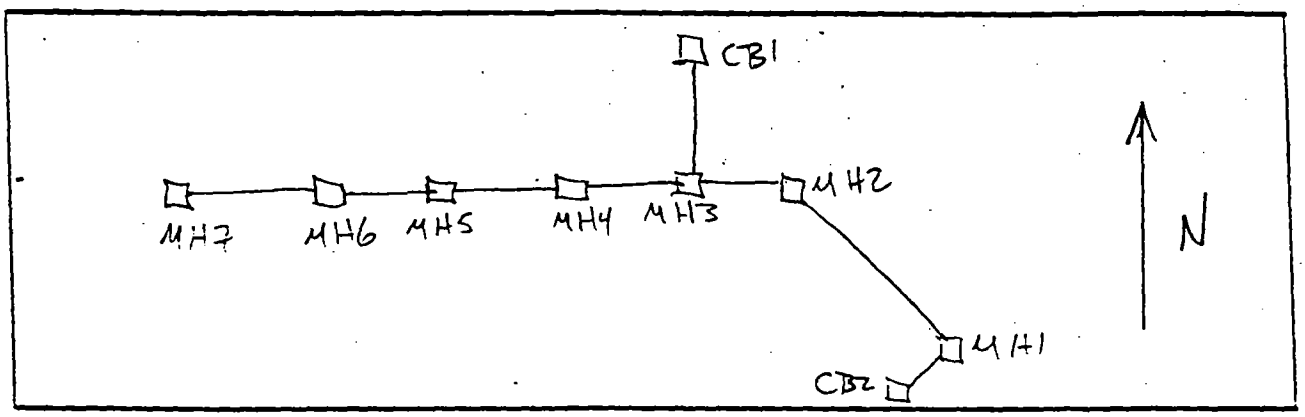
Storm Water System Inspection Log

Date of Inspection: 4/14/94 Inspector: GWK

Weather: cloudy Temperature: 50°F

Manhole Number: MH6

Area Location Sketch (Include and North Arrow)



1. Condition of manhole grate (plugged, damaged, etc.):

good

2. Condition of inlet and outlet 24-inch diameter CMP (plugged, damaged, etc.):

good

3. Condition of tide gate (if applicable):

NA

4. Condition of manhole (cracking in concrete, etc.):

good

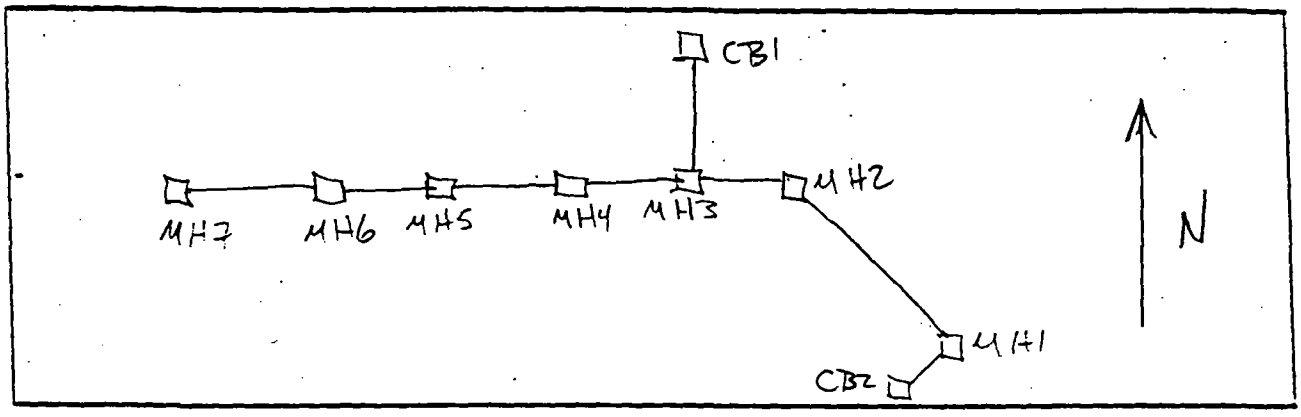
5. Additional Investigation Required?:

No

6. Findings of Additional Investigation:

Blair Backup Property
Storm Water System Inspection Log

Date of Inspection: 4/14/94 Inspector: GWK
Weather: cloudy Temperature: 50°F
Manhole Number: MH7
Area Location Sketch (Include and North Arrow)



1. Condition of manhole grate (plugged, damaged, etc.):
good

2. Condition of ~~inlet~~ NA and outlet 24-inch diameter CMP (plugged, damaged, etc.):
good

3. Condition of tide gate (if applicable):
NA

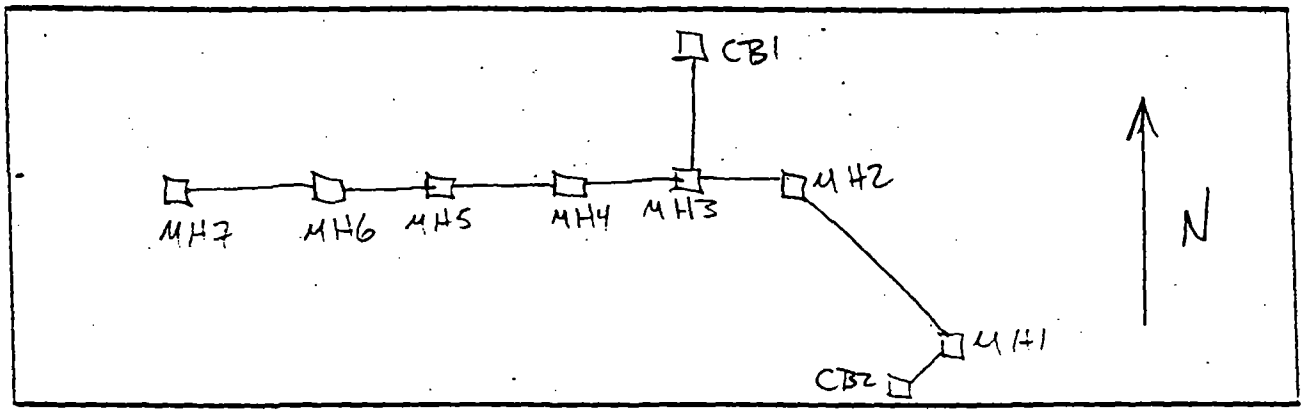
4. Condition of manhole (cracking in concrete, etc.):
good

5. Additional Investigation Required?:
No

6. Findings of Additional Investigation:

Blair Backup Property
Storm Water System Inspection Log

Date of Inspection: 4/14/94 Inspector: GWK
Weather: light showers Temperature: 50°F
Manhole Number: CB 1
Area Location Sketch (Include and North Arrow)



1. Condition of manhole grate (plugged, damaged, etc.):
good

2. Condition of ~~inlet~~ NA and outlet 24-inch diameter CMP (plugged, damaged, etc.):
good

3. Condition of side gate (if applicable):
NA

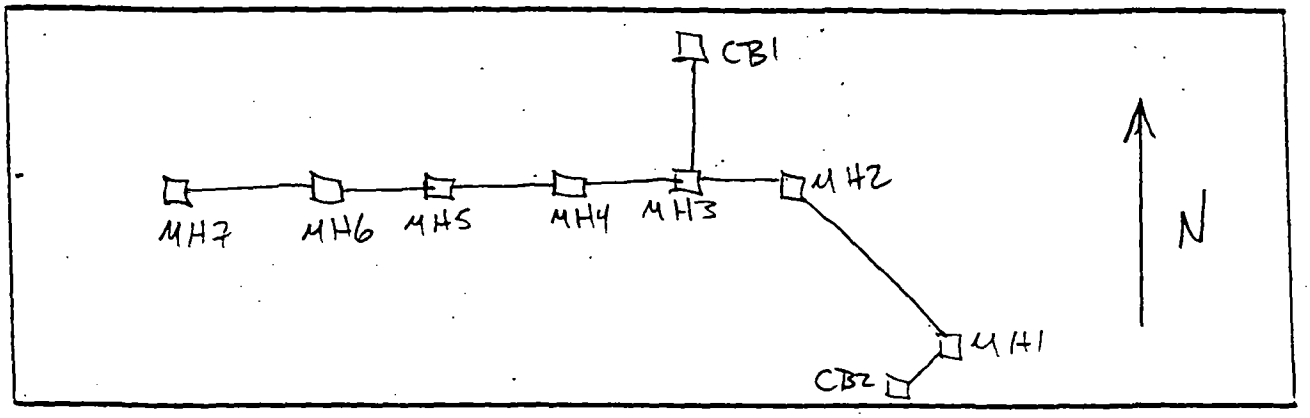
4. Condition of manhole (cracking in concrete, etc.):
good. catch nearly full of sand & gravel

5. Additional Investigation Required?:
None

6. Findings of Additional Investigation:

Blair Backup Property
Storm Water System Inspection Log

Date of Inspection: 4/14/94 Inspector: GWK
Weather: light showers Temperature: 50°F
Manhole Number: CB2
Area Location Sketch (Include and North Arrow)



1. Condition of manhole grate (plugged, damaged, etc.):
good

2. Condition of ~~inlet~~ NA and outlet 24-inch diameter CMP (plugged, damaged, etc.):
good

3. Condition of tide gate (if applicable):
NA

4. Condition of manhole (cracking in concrete, etc.):
Good. Grate ring not grouted to catch basin.

5. Additional Investigation Required?:
None

6. Findings of Additional Investigation:

Blair Backup Property

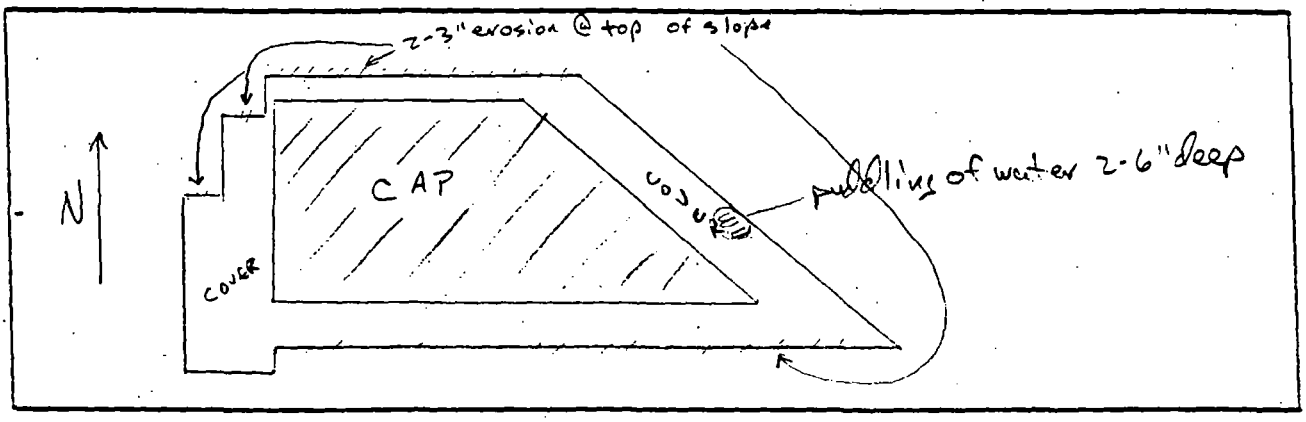
Sand and Gravel Cover Inspection Log

Date of Inspection: 4/14/94 Inspector: Grant Kuechtel

Weather: cloudy / light showers Temperature: 50°F

Area Number: All

Area Location Sketch (Include and North Arrow)



1. Condition of sand and gravel cover material surface (ruts, vegetation, etc.):
good. some puddling of water near middle of cover along Taylor Way

2. Condition of sand and gravel cover material at depth (moisture content, gradation, etc.):
Good. Well graded, compact, moist

3. Thickness of sand and gravel cover material:
2', thicker in places, slightly eroded along tops of some slopes as noted on sketch

4. Additional Investigation Required?:
NO

5. Findings of Additional Investigation:

Blair Backup Property

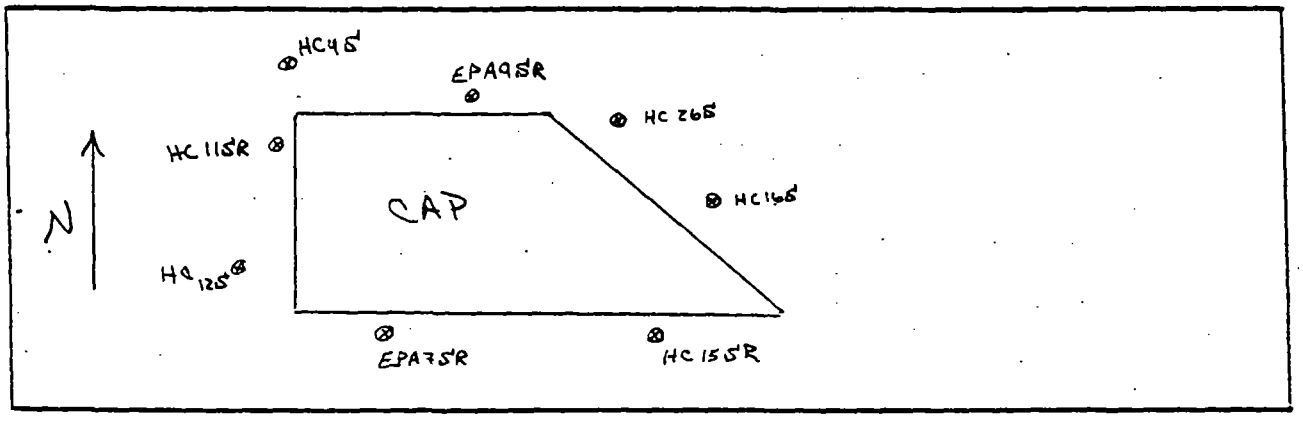
Groundwater Monitoring System Inspection Log

Date of Inspection: 4/13/94 Inspector: Grant Kuechtel

Weather: partly cloudy Temperature: 55°F

Well Number: HC 4S'

Area Location Sketch (Include and North Arrow)



1. Condition of well monument:

Good

2. Any visual evidence of well damage?:

No

3. Additional Investigation Required?:

No

4. Findings of Additional Investigation:

Blair Backup Property

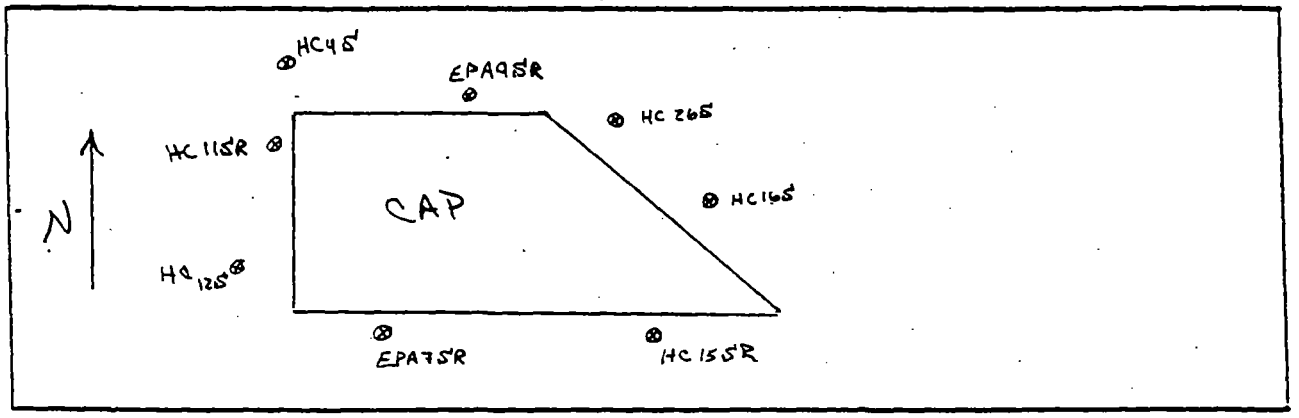
Groundwater Monitoring System Inspection Log

Date of Inspection: 4/13/94 Inspector: Grant Koechtel

Weather: partly cloudy Temperature: 55°F

Well Number: EPA 7SR

Area Location Sketch (Include and North Arrow)



1. Condition of well monument: Flush mount, no bollards. good. water inside to above cap, pumped out prior to opening well. No evidence water leaked past cap

2. Any visual evidence of well damage?:

No

3. Additional Investigation Required?:

No

4. Findings of Additional Investigation:

Blair Backup Property

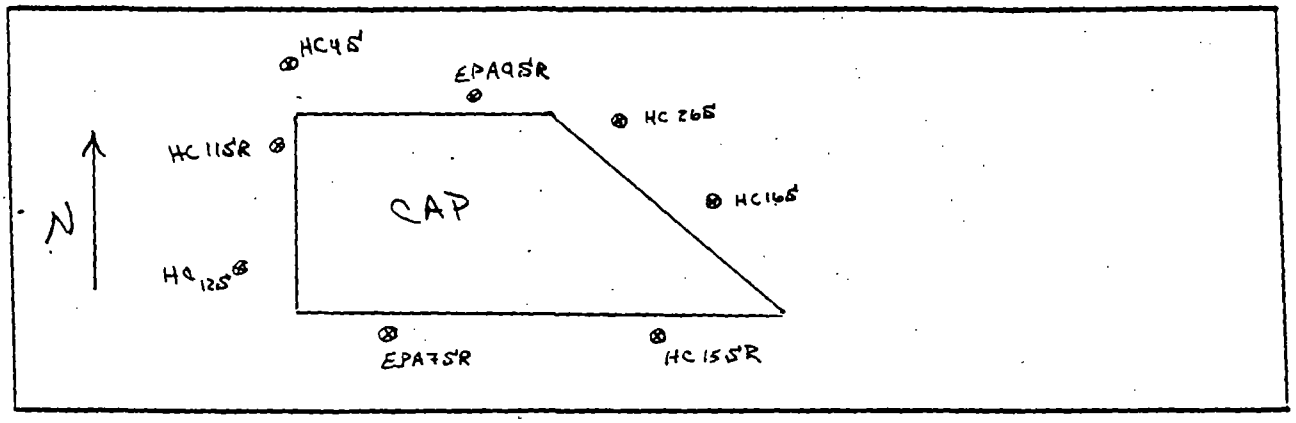
Groundwater Monitoring System Inspection Log

Date of Inspection: 4/13/94 Inspector: Grant Kruechtel

Weather: partly cloudy Temperature: 55°F

Well Number: EPA 9SR

Area Location Sketch (Include and North Arrow)



1. Condition of well monument: Flush mount, no bollards. Good.

2. Any visual evidence of well damage?: No

3. Additional Investigation Required?: No

4. Findings of Additional Investigation:

Blair Backup Property

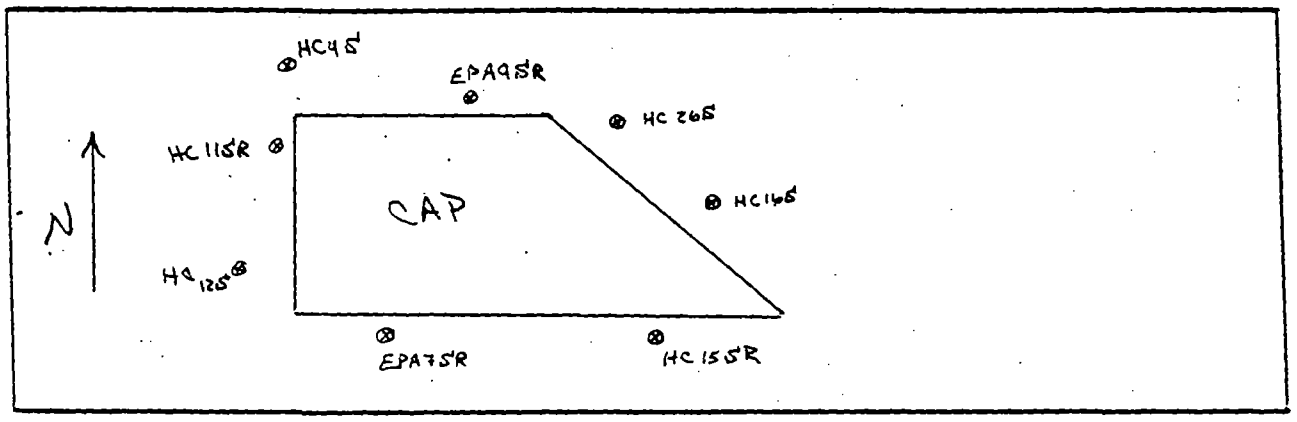
Groundwater Monitoring System Inspection Log

Date of Inspection: 4/13/94 Inspector: Grant Kruchten

Weather: Partly Sunny Temperature: 56°F

Well Number: HC115R

Area Location Sketch (Include and North Arrow)



1. Condition of well monument: Good, flush mount, no bollards. Water in monument to near cap, pumped out before opening. No evidence of surface water entering well.

2. Any visual evidence of well damage?:
No

3. Additional Investigation Required?:
No

4. Findings of Additional Investigation:

Blair Backup Property

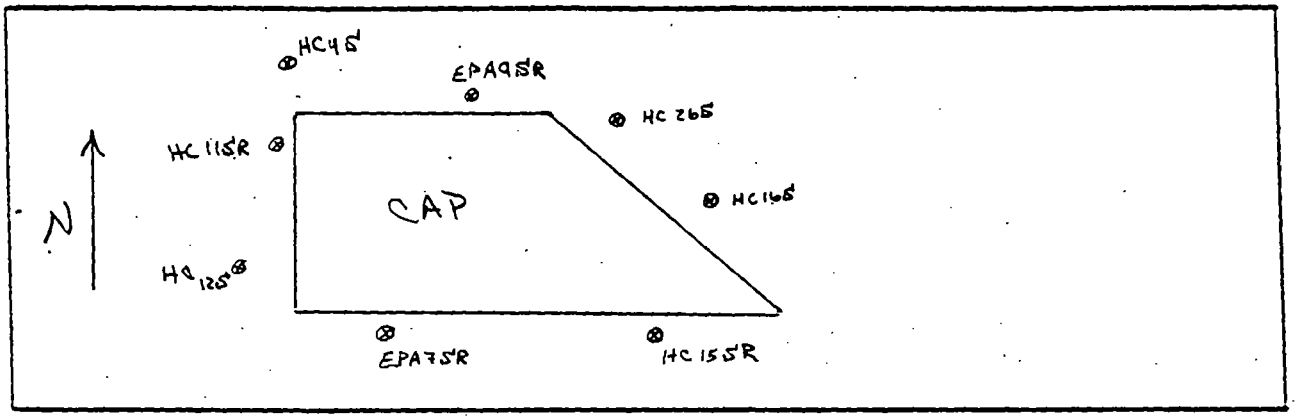
Groundwater Monitoring System Inspection Log

Date of Inspection: 4/13/94 Inspector: Grant Knechtel

Weather: partly cloudy Temperature:

Well Number: HC12S

Area Location Sketch (Include and North Arrow)



1. Condition of well monument:

Good

2. Any visual evidence of well damage?:

No

3. Additional Investigation Required?:

No

4. Findings of Additional Investigation:

Blair Backup Property

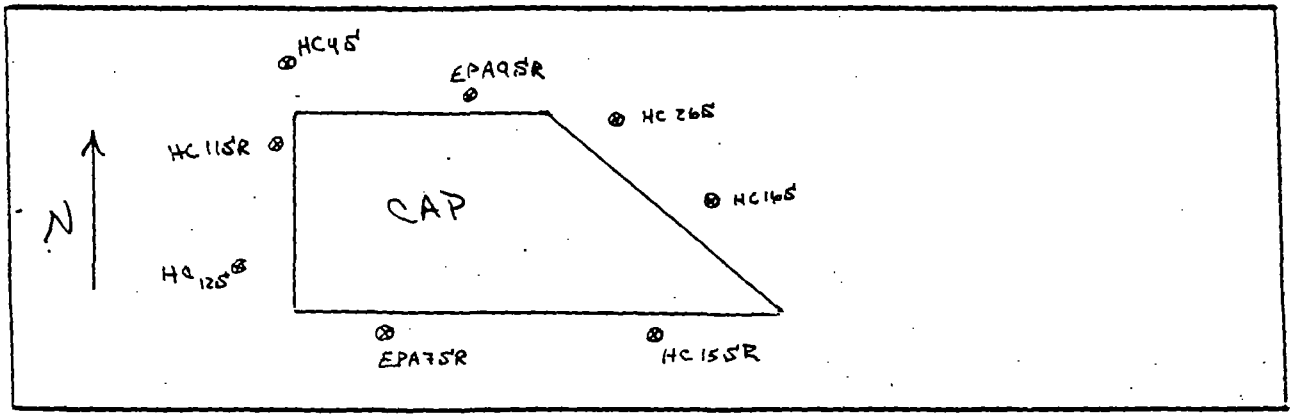
Groundwater Monitoring System Inspection Log

Date of Inspection: 4/13/94 Inspector: Grant Kuechtl

Weather: partly cloudy Temperature: 55° F

Well Number: HC 16 S

Area Location Sketch (Include and North Arrow)



1. Condition of well monument:

Good

2. Any visual evidence of well damage?:

NO

3. Additional Investigation Required?:

NO

4. Findings of Additional Investigation:

Blair Backup Property

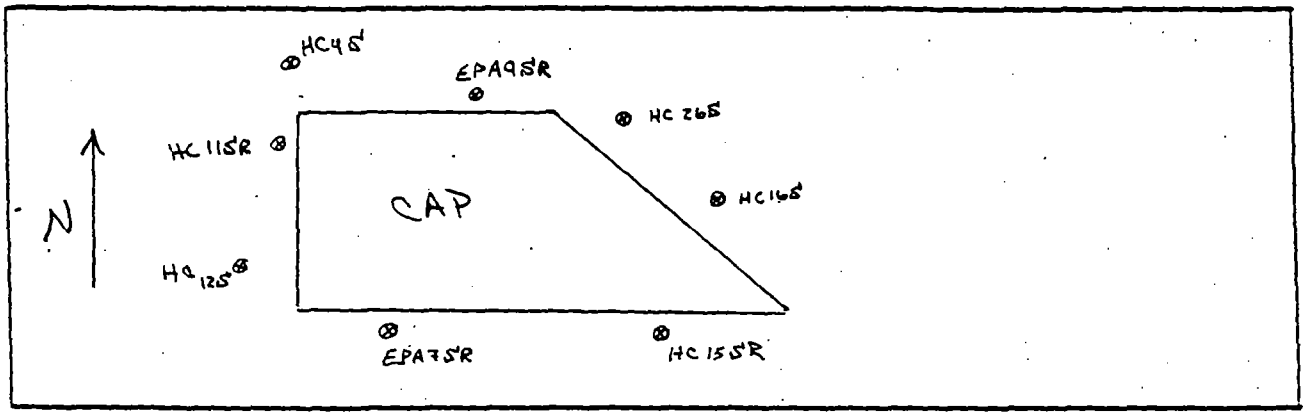
Groundwater Monitoring System Inspection Log

Date of Inspection: 4/13/94 Inspector: Grant Knechtel

Weather: partly cloudy Temperature: 55°F

Well Number: HC 26S

Area Location Sketch (Include and North Arrow)



1. Condition of well monument:

Good, flush mount monument ± 1/2' above adjacent grade, no bollards.

2. Any visual evidence of well damage?:

No

3. Additional Investigation Required?:

No

4. Findings of Additional Investigation: