

**APPENDIX A**  
**Area-Wide Consent Decrees and Thea Foss  
Redevelopment Cleanup Action Plan**

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IN THE SUPERIOR COURT OF THE STATE OF WASHINGTON  
FOR PIERCE COUNTY

STATE OF WASHINGTON  
DEPARTMENT OF ECOLOGY,

Plaintiff,

v.

CITY OF TACOMA and  
METROPOLITAN PARK DISTRICT  
OF TACOMA,

Defendant(s).

No. 94-2-10917-6

CONSENT DECREE

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1 | I. INTRODUCTION

2 | A. This Consent Decree (Decree) is made and entered into  
3 | by and between the Washington State Department of Ecology  
4 | (Ecology), the City of Tacoma (City), and the Metropolitan Park  
5 | District of Tacoma (Park District). Successors in  
6 | Interest and Assigns may become parties to this Decree as  
7 | provided herein in Section XIX.

8 | B. In entering into this Consent Decree (Decree), the  
9 | mutual objective of the Washington State Department of Ecology  
10 | (Ecology), and the City of Tacoma and the Metropolitan Park  
11 | District (Defendant(s)) is to provide for remedial action at  
12 | facilities adjacent to the Thea Foss Waterway in the City of  
13 | Tacoma, Washington, where there have been releases or threatened  
14 | releases of hazardous substances causing contamination of soils.  
15 | This Decree establishes potential remedial actions for a number  
16 | of properties, described in Section II. Some of the properties  
17 | potentially subject to this Decree are currently known to be  
18 | contaminated and some are not. Some are currently owned by the  
19 | City and the Park District and some are not. Those properties  
20 | potentially subject to this Decree that are not reported as or  
21 | determined by Ecology to be cleanup sites, and those properties  
22 | that are not eventually purchased by the City or the Park  
23 | District will not be cleaned up under this Decree.

24 | C. Ecology, the City of Tacoma, and the Metropolitan Park  
25 | District are entering into this Consent Decree in order to  
26 | achieve substantial public benefits. The City recently acquired


1 approximately 27 acres along the Thea Foss Waterway, which is  
2 part of the Commencement Bay Nearshore/Tideflats Superfund Site.  
3 The City acquired the property in order to spur cleanup of the  
4 City's waterfront and redevelopment of abandoned industrial and  
5 commercial land. The City's efforts have included the Park  
6 District who has taken title to some of the recently acquired  
7 property so that public access, parks and open spaces will be  
8 included in the ultimate redevelopment.

9 D. The remedial action(s) under this Decree recognize  
10 land use planning and the ultimate reuse of contaminated  
11 property. This Decree will promote expedient, efficient  
12 remedial actions. This Decree will facilitate quicker remedial  
13 action than would occur without the Decree. This Decree allows  
14 Ecology to enforce permanent and effective controls to ensure  
15 that cleanups are protective of human health and the  
16 environment. Furthermore, this Decree will promote the  
17 fulfillment of Ecology's source control obligations set forth in  
18 the 1994 Cooperative Agreement between the U.S. Environmental  
19 Protection Agency (EPA) and Ecology.

20 E. This Decree requires the Defendant(s) to undertake the  
21 following remedial action(s), which are more specifically  
22 described in Sections IX and X of this Decree:

- 23 (1) Conduct remedial investigations of sites;
- 24 (2) Prepare site-specific Cleanup Action Plans for soil  
25 contamination on sites, to be approved by Ecology.

26 The site-specific Cleanup Action Plans will be

- 
- 1 consistent with the Thea Foss Redevelopment Cleanup  
2 Action Plan attached hereto as Exhibit C;
- 3 (3) Remediate soil contamination on sites in accordance  
4 with the site-specific Cleanup Action Plans;
- 5 (4) Provide and maintain institutional controls and  
6 compliance monitoring, as required in this Decree.

7 Ecology has determined that these actions are necessary to  
8 protect public health and the environment. This Decree  
9 addresses soil contamination only. Sites at which active  
10 remediation of groundwater is necessary are not within the scope  
11 of this Decree.

12 F. The Complaint in this action is being filed  
13 simultaneously with this Decree. An answer has not been filed,  
14 and there has not been a trial on any issue of fact or law in  
15 this case. However, the parties wish to resolve the issues  
16 raised by Ecology's complaint. In addition, the parties agree  
17 that settlement of these matters without litigation is  
18 reasonable and in the public interest and that entry of this  
19 Decree is the most appropriate means of resolving these matters.

20 G. In signing this Decree, Defendant(s) agrees to its  
21 entry and agrees to be bound by its terms.

22 H. By entering into this Decree, the parties do not  
23 intend to discharge nonsettling parties from any liability they  
24 may have with respect to matters alleged in the complaint. The  
25 parties retain the right to seek reimbursement, in whole or in  
26

1 part, from any liable persons for sums expended under this  
2 Decree.

3 I. This Decree shall not be construed as proof of  
4 liability or responsibility for any releases of hazardous  
5 substances or cost for remedial action nor an admission of any  
6 facts; provided, however, that the Defendant(s) shall not  
7 challenge the jurisdiction of Ecology or the findings of fact in  
8 this Decree in any proceeding brought by Ecology to enforce this  
9 Decree.

10 J. The Court is fully advised of the reasons for entry of  
11 this Decree, and good cause having been shown: IT IS HEREBY  
12 ORDERED, ADJUDGED, AND DECREED AS FOLLOWS:

13 II. POTENTIAL SCOPE OF DECREE; DESCRIPTION OF SITES

14 A. The property potentially subject to this Decree shall  
15 be: (1) property adjacent to the west side of the Thea Foss  
16 Waterway in the City of Tacoma, Washington, located between the  
17 mean high high water mark on the east and Dock Street on the  
18 west, inclusive of the Dock Street Right of Way; and between  
19 Parcel 1A on the north and the Harmon Cabinets property on the  
20 south; and the City sewage pump station property; and (2)  
21 parcels 5 and 8 and the 11th Street Right of Way adjacent to the  
22 east side of the Thea Foss Waterway, upland of the mean high  
23 high water mark. This geographic boundary is depicted in  
24 Exhibit A to this Decree. The legal descriptions of properties  
25 within this geographic boundary are in Exhibit B. The  
26 properties above-described may extend to the mean low low wa

1 mark if EPA concurs. Any remedial action on property between  
2 the mean high high water mark and the mean low low water mark  
3 shall be interim actions and shall not constitute final cleanup  
4 of that property.

5 B. In this Decree the term "site(s)" or "cleanup site(s)"  
6 shall mean any properties, parcels or portions thereof within  
7 the geographic boundary described in paragraph A that are  
8 currently owned by the City or the Park District or which the  
9 City or the Park District acquires during the duration of this  
10 Decree, on which Ecology has determined that a release or  
11 threatened release of hazardous substances exists. These sites  
12 are "facilities" as defined in RCW 70.105D.020(3).

13 C. The properties which the City owns as of the effective  
14 date of this Decree are: Dock Street Right of Way, Municipal  
15 Dock, Atlas Foundry, Coast Iron Works, Steam Plant, Johnny's  
16 Seafood, 15th Street Right of Way, 18th Street Right of Way,  
17 Sewage Pump Station, and 11th Street Right of Way. The  
18 properties which the Park District owns as of the effective date  
19 of this Decree are: Parcels 1A, 1B, 1C, 1D, 2, 3A, 3B, 3C, 5,  
20 and 8; and the Morris Property (hereinafter Parcel 7). The  
21 properties within the geographic boundary described in paragraph  
22 A but not now owned by either the City or the Park District are:  
23 Albers Mill (hereinafter Parcel 9), Investco Property, Trucco  
24 Property, Harmon Cabinets, and any State Department of Natural  
25 Resources (DNR) property. These properties are generally  
26 depicted on Exhibit A. Defendant(s) will provide the legal



1 descriptions of these properties to Ecology in the Notice of  
2 Intent to Proceed submitted under Section VIII of this Decree.

3 D. The properties currently owned by the City on which  
4 there are known releases of hazardous substances and which are  
5 now known to be "sites" under this Decree are Atlas Foundry,  
6 Steam Plant, and 18th Street Right of Way. The properties  
7 currently owned by the Park District on which there are known  
8 releases of hazardous substances and which are now known to be  
9 sites are: Parcel 7. These sites are generally depicted in  
10 Exhibit A; their legal descriptions are included in Exhibit B.  
11 Other properties depicted in Exhibit A will become "sites" under  
12 this Decree, when (1) Defendant(s) acquires an ownership  
13 interest in the property; and/or (2) Ecology determines the  
14 property is a cleanup site pursuant to Section VII of this  
15 Decree. Ecology has determined that Parcel 9 and Investco  
16 Property contain releases of hazardous substances that require  
17 cleanup.

18 E. The designation of a site by Ecology pursuant to  
19 Section VII of the Decree, where appropriate; receipt of a  
20 Notice of Intent to Proceed by Ecology under Section VIII of the  
21 Decree; and the existence of a binding Prepayment Agreement  
22 under Section VIII are conditions precedent to the applicability  
23 of the remaining sections of the Consent Decree to any  
24 individual site.

25 F. Each of the provisions of this Decree apply to each  
26 site individually.

1 G. On property that the City or the Park District does not  
2 currently own, if Ecology takes enforcement action at that  
3 property prior to the City or Park District's purchase, those  
4 sites shall not be subject to this Decree unless agreed to by  
5 the parties.

6 III. JURISDICTION

7 A. This Court has jurisdiction over the subject matter  
8 and over the parties pursuant to Chapter 70.105D RCW, the Model  
9 Toxics Control Act (MTCA).

10 B. Authority is conferred upon the Washington State  
11 Attorney General by RCW 70.105D.040(4)(a) to agree to a  
12 settlement with any potentially liable person if, after public  
13 notice and hearing, Ecology finds the proposed settlement would  
14 lead to a more expeditious cleanup of hazardous substances. RCW  
15 70.105D.040(4)(b) requires that such a settlement be entered as  
16 a consent decree issued by a court of competent jurisdiction.

17 C. Ecology has determined, or will determine as set forth  
18 in Section VII of this Decree, that releases or threatened  
19 releases of hazardous substances have occurred at the sites  
20 which are the subject of this Decree. Ecology has further  
21 determined, or will determine as set forth in Section VII of  
22 this Decree, that the releases are causing contamination of  
23 soils, surface water and/or groundwater, and will continue to  
24 cause contamination unless the releases are remediated.

25  
26

1 D. The City is a potentially liable person (PLP) for the  
2 Atlas Foundry, Steam Plant, and 18th Street Right of Way sites  
3 as an owner or operator under RCW 70.105D.040(1)(a).

4 E. The City is an owner of Dock Street Right of Way,  
5 Municipal Dock, Coast Iron Works, Johnny's Seafood, 15th Street  
6 Right of Way, Sewage Pump Station, and 11th Street Right of Way,  
7 and will be a PLP if Ecology determines that a release or  
8 threatened release of hazardous substances has occurred at that  
9 property.

10 F. The Park District is a PLP for Parcel 7 as an owner or  
11 operator under RCW 70.105D.040(1)(a).

12 G. The Park District is an owner or operator of Parcels  
13 1A, 1B, 1C, 1D, 2, 3A, 3B, 3C, 5, and 8, and will be a PLP if  
14 Ecology determines that a release or threatened release of  
15 hazardous substances has occurred at that property.

16 H. If the City or the Park District acquires an interest  
17 in Trucco Property, Harmon Cabinets, or any DNR property, it  
18 would be a PLP as an owner if Ecology determines during the  
19 City's or the Park District's ownership that a release or  
20 threatened release of hazardous substances has occurred at that  
21 property. Ecology has already determined that a release of  
22 hazardous substances has occurred at Parcel 9 and Investco  
23 Property, and the City or the Park District would be a PLP as an  
24 owner if either acquires an interest in those properties.  
25  
26

1 I. The City and the Park District have accepted their  
2 status as PLPs for the site(s) and by signing this Decree waive  
3 their right to notice and comment under RCW 70.105D.020(8).

4 J. The actions to be taken pursuant to this Decree are  
5 necessary to protect public health, welfare, and the  
6 environment.

7 K. Defendant(s) has agreed to undertake the actions  
8 specified in this Decree and consents to the entry of this  
9 Decree under the MTCA.

10 IV. PARTIES BOUND

11 A. This Decree shall apply to and be binding upon the  
12 signatories to this Decree. Successors in Interest and Assigns  
13 may become parties as provided in Section XIX. The undersigned  
14 representative of each party hereby certifies that he or she is  
15 fully authorized to enter into this Decree and to execute and  
16 legally bind such party to comply with the Decree. Defendant(s)  
17 agree to undertake all actions required by the terms and  
18 conditions of this Decree and not to contest state jurisdiction  
19 regarding this Decree, nor to contest any findings of fact in  
20 this Decree. No change in ownership, corporate status, or  
21 membership of any governing body shall alter the responsibility  
22 of the Defendant(s) under this Decree. Defendant(s) agrees to  
23 utilize contractual and regulatory means to insure the  
24 implementation and enforceability of this Decree by and against  
25 any subsequent owner, operator, lessee or tenant of the site(s).  
26 Defendant(s) shall remain liable for all obligations agreed to

1 in this Decree in the event of a sale, transfer, or assignment  
2 of any ownership interest from Defendant(s) to a third party.  
3 Nothing herein shall prevent the City or the Park District from  
4 negotiating with purchasers, lessees, or other third parties to  
5 contractually allocate remedial action costs and  
6 responsibilities, provided that such contractual arrangements  
7 are not in breach of this Decree and do not affect the City's or  
8 the Park District's liability hereunder.

9 B. Defendant(s) shall provide a copy of this Decree to  
10 all agents, contractors and subcontractors retained to perform  
11 work required by this Decree and shall ensure that all work  
12 undertaken by such contractors and subcontractors will be in  
13 compliance with this Decree.

14 V. DEFINITIONS

15 Except for as specified herein, all definitions in Chapters  
16 70.105D RCW and 173-340 WAC apply to the terms in this Decree.

17 A. Active Remediation of Groundwater: For purposes of  
18 this Decree, active remediation of groundwater shall mean all  
19 remedial actions related to groundwater except for long term  
20 monitoring of groundwater and remediation of contaminated soil  
21 that is a source of contamination to the groundwater.

22 B. Consent Decree or Decree: Refers to this Consent  
23 Decree, each of the exhibits to the Decree, and any amendments  
24 to the Decree. All exhibits are integral and enforceable parts  
25 of this Consent Decree. In the event of any conflict between  
26

1 the Consent Decree and any exhibits to the Decree, the Consent  
2 Decree shall govern.

3 C. Days: Refers to calendar days unless otherwise  
4 specified.

5 D. Defendant(s): Refers to the City of Tacoma and the  
6 Metropolitan Park District. Successors in Interest and Assigns  
7 may become Defendants as provided in Section XIX.

8 E. Parties: Refers to the Washington State Department of  
9 Ecology, the City of Tacoma and the Metropolitan Park District.  
10 Successors in Interest and Assigns may become parties as  
11 provided in Section XIX.

12 F. Section: Refers to a portion of this Decree  
13 identified by a Roman numeral and including one or more  
14 paragraphs.

15 G. Site(s) or cleanup site(s): Refers to the properties,  
16 or any of them, described in Section II.B of this Decree.

17 H. Successors in Interest and Assigns: Refers to any  
18 person who acquires an interest in the sites under this Decree  
19 through purchase, lease, transfer, or assignment.

20 VI. STATEMENT OF FACTS

21 Ecology makes the following finding of facts without any  
22 express or implied admissions by Defendant(s).

23 A. The City of Tacoma and the Metropolitan Park District  
24 own various parcels of property adjacent to the Thea Foss  
25 Waterway, as described in Section II of this Decree, totaling  
26 approximately 27 acres. Many of the parcels were abandoned,

1 | unused industrial land. Since approximately 1852, these  
2 | properties have been the site of various industrial activities.  
3 | Lumber mills, shipyards, asphalt and concrete plants, flour  
4 | mills, metal plating and foundry facilities, and other  
5 | industrial based operations have occurred along the waterway.

6 |       B. In 1991, the City and the Park District began  
7 | purchasing some of this property for the purpose of cleanup,  
8 | redevelopment, and reuse of the City's waterfront for commercial  
9 | and residential use, including public access, parks and open  
10 | spaces. The City and the Park District may purchase additional  
11 | parcels adjacent to the waterway, for the same purpose. These  
12 | parcels are also described in Section II.

13 |       C. The City and others have performed independent  
14 | environmental investigations of the properties potentially  
15 | subject to this Decree. These investigations are described more  
16 | fully in Section 3.1 of the Thea Foss Redevelopment Cleanup  
17 | Action Plan, attached to this Decree as Exhibit C. Under these  
18 | investigations, soil and groundwater samples were collected from  
19 | 15 of the properties potentially subject to this Decree. These  
20 | investigations have documented the presence of hazardous  
21 | substances that exceed the MTCA method B soil cleanup standards  
22 | under WAC 173-340-740, as described in Section 3.0 of the Thea  
23 | Foss Redevelopment CAP. These hazardous substances are: total  
24 | petroleum hydrocarbons (TPH); benzene, toluene, ethylbenzene,  
25 | and xylene (BTEX); polynuclear aromatic hydrocarbons (PAHs);  
26 |

1 antimony; arsenic; cadmium; chromium; copper; lead; mercury;  
2 nickel; zinc; and polychlorinated biphenyls (PCBs).

3 D. In 1993-94, the City prepared an Area-wide Feasibility  
4 Study (FS) and Phase I Remedial Investigation. The  
5 investigation indicates that the properties potentially subject  
6 to this Decree have similar physical characteristics, past and  
7 future uses, and similar potential contaminant problems,  
8 allowing the development of similar cleanup remedies for all the  
9 properties.

10 VII. DESIGNATION OF CLEANUP SITES

11 A. On property that is owned by Defendant(s) and within  
12 the geographic boundary described in Section II.A but has not  
13 yet been determined by Ecology to be a cleanup site under MTCA,  
14 if a release of a hazardous substance is discovered at the  
15 property, Defendant(s) shall report that release to Ecology in  
16 accordance with WAC 173-340-300. Ecology shall determine  
17 whether the site requires further action under MTCA. Ecology  
18 shall inform Defendant(s) in writing of its decision. Ecology's  
19 decision shall not be subject to dispute resolution under  
20 Section XVIII.B of this Decree. If Defendant(s) disagrees with  
21 Ecology's decision, the site shall not be included within the  
22 scope and effect of this Decree. Sites that Ecology determines  
23 require no further action are also not within the scope and  
24 effect of this Decree. Unless otherwise specified in this  
25 Decree, sites that Ecology determines require further action  
26 under MTCA shall be subject to this Decree, unless Defendant(s)



1 disagrees with Ecology's decision and so informs Ecology in  
2 writing.

3 B. Once Defendant(s) reports a release, Defendant(s)  
4 shall not allow any person or entity to perform any remedial  
5 actions at the site nor physically disturb the site or otherwise  
6 impair or foreclose potential remedial actions until Ecology  
7 determines if the site is subject to this Decree or unless  
8 Ecology otherwise agrees in writing. Defendant(s) and Ecology  
9 anticipate the possible construction of public access facilities  
10 on portions of some sites. Construction of such facilities on  
11 portions of sites that are not contaminated may proceed prior to  
12 or during remediation of sites if Ecology so agrees in writing.

13 **VIII. NOTICE OF INTENT TO PROCEED AND PREPAYMENT OF COSTS**

14 A. On sites that are subsequently determined to be  
15 cleanup sites under Section VII of this Decree and on the Atlas  
16 Foundry, Steam Plant, 18th Street Right of Way, Parcel 7, Parcel  
17 9, and Investco Property sites, prior to physical disturbance of  
18 a site, exclusive of actions necessary to discover the release  
19 of a hazardous substance consistent with WAC 173-340-300, and  
20 those activities agreed to by Ecology as described in Section  
21 VII, the Defendant(s) shall file a written "Notice of Intent to  
22 Proceed" with Ecology. The written Notice of Intent to Proceed  
23 shall indicate that the Defendant(s) is prepared to perform  
24 remedial actions at the site(s) consistent with this Decree.  
25 The Notice shall provide a legal description of the site(s); the  
26 intended use of the site(s); proof that the Defendant(s) own

1 | the property that makes up the site(s); and whether the  
2 | Defendant(s) will be selling, leasing or otherwise transferring  
3 | any ownership or possessory interest in the site(s) to a third  
4 | party(ies), and, if so, the identity of the third party(ies).

5 |       B. The Notice of Intent to Proceed shall be accompanied  
6 | by a draft "Prepayment Agreement" pursuant to Ecology's Toxics  
7 | Cleanup Program's policy POL 500C, as now or hereafter amended.  
8 | If the City or the Park District wish to include any Successors  
9 | in Interest or Assigns as parties to the Consent Decree, the  
10 | City or the Park District shall follow the procedures in  
11 | Section XIX. The Prepayment Agreement is necessary to provide  
12 | Ecology staff resources to oversee implementation of the Consent  
13 | Decree. A Prepayment Agreement may apply to more than one site.  
14 | Ecology, in its sole discretion, may choose not to enter into a  
15 | Prepayment Agreement or implement the Consent Decree until  
16 | sufficient services are needed under the Decree to require at  
17 | least one half of a full time equivalent position (FTE) or  
18 | additional services in increments of at least one half of an  
19 | FTE. Ecology's decision shall not be subject to dispute  
20 | resolution under Section XVIII.B of this Decree.

21 |       C. As an alternative to entering into a Prepayment  
22 | Agreement on each site, the Defendant(s) and Ecology may, at  
23 | their option, agree to enter into a Prepayment Agreement that  
24 | addresses all sites under this Decree, and establishes a prepaid  
25 | account into which funds may be deposited by Defendant(s) and  
26 | drawn upon by Ecology to perform Ecology's obligations under

1 | this Decree. Any such Prepayment Agreement must include a  
2 | provision that the agreement would not become effective, and  
3 | Ecology would not be required to implement the Consent Decree,  
4 | until sufficient services are needed under the Decree to require  
5 | at least one half of an FTE or additional services in increments  
6 | of at least one half of an FTE.

7 | D. If Ecology chooses to enter into a Prepayment  
8 | Agreement, Ecology and the Defendant(s) shall negotiate that  
9 | agreement. If the parties cannot reach agreement on the terms  
10 | of a Prepayment Agreement, the site or sites intended to be  
11 | covered by the agreement will not be within the scope of this  
12 | Consent Decree.

13 | IX. WORK TO BE PERFORMED

14 | A. This Decree contains a program designed to protect  
15 | public health, welfare and the environment from the known  
16 | release, or threatened release, of hazardous substances or  
17 | contaminants at, on, or from the site(s). The work to be  
18 | performed in this Decree is subject to change by Ecology, as  
19 | necessary, to incorporate the substantive requirements of state  
20 | and local laws, as required by Section 14 of ESSB 6339 (1994).  
21 | See Section XXXI.A.6.

22 | B. No sooner than ninety (90) days nor later than one  
23 | hundred twenty (120) days after the parties have entered into a  
24 | site-specific prepayment agreement or, if the parties enter into  
25 | a prepayment agreement for all sites under this Decree, no  
26 | sooner than ninety (90) days nor later than one hundred twenty

1 (120) days after receipt by Ecology of a Notice to Proceed under  
2 Section VIII, unless a shorter time is agreed to by Ecology, the  
3 Defendant(s) shall submit to Ecology a site-specific Remedial  
4 Investigation (RI) work plan consistent with WAC 173-340-350.  
5 The work plan shall include a site-specific Sampling and  
6 Analysis Plan (SSAP) consistent with WAC 173-340-350 and WAC  
7 173-340-820, a site-specific Quality Assurance Project Plan, and  
8 a site-specific Safety and Health Plan consistent with WAC  
9 173-340-810. The SSAP shall incorporate the elements of the  
10 Thea Foss Sampling and Analysis Plan (SAP) and the Thea Foss  
11 Quality Assurance Project Plan (QAPP), attached hereto as  
12 Exhibits D and E, respectively, and shall be modified, as  
13 appropriate, by site-specific characteristics and knowledge.  
14 Ecology shall review and comment on, but not approve or  
15 disapprove, the Safety and Health Plan. The RI work plan shall  
16 include a schedule for conducting all RI tasks and submitting  
17 all deliverables. The RI work plan shall be submitted to  
18 Ecology for review. Ecology will endeavor to review the RI work  
19 plan and submit any comments to Defendant(s) within twenty one  
20 (21) days of Ecology's receipt of the work plan. Within twenty  
21 one (21) days of receipt of Ecology's comments, Defendant(s)  
22 shall submit a revised RI work plan to Ecology that incorporates  
23 Ecology's comments.

24 C. Upon receipt of Ecology's approval of the RI work  
25 plan, Defendant(s) shall implement the plan in accordance with  
26 the schedule in the approved plan. Within 60 days of completion

1 of all work required in the RI work plan, the Defendant(s) sh  
2 prepare and submit to Ecology a remedial investigation (RI)  
3 report. The report must include the Defendant(s)' analysis of  
4 which cleanup action, if any, specified in the Thea Foss  
5 Redevelopment Cleanup Action Plan, attached as Exhibit C to this  
6 Decree, applies to the site and the rationale for that  
7 determination.

8 D. After receipt of the RI report, Ecology shall  
9 determine whether any of the cleanup actions specified in  
10 Exhibit C apply to the site and if so, which one. Ecology shall  
11 provide Defendant(s) with written notice of its decision. If  
12 Ecology determines that none of the cleanup actions in Exhibit C  
13 apply to the site, the site shall no longer be included within  
14 the scope of this Decree. If Ecology determines that  
15 groundwater contamination exists on the site that needs active  
16 remediation, the site shall no longer be included within the  
17 scope of this Decree. Ecology's decisions under this paragraph  
18 shall not be subject to dispute resolution under Section XVIII.B  
19 of this Decree. If Defendant(s) does not agree with Ecology's  
20 final decision under this paragraph, the site shall no longer be  
21 included within the scope of this Decree.

22 E. If Ecology determines one of the cleanup actions in  
23 Exhibit C applies, and Defendant(s) agrees, Defendant(s) shall  
24 prepare a draft site-specific cleanup action plan (SCAP)  
25 consistent with WAC 173-340-360 and the Thea Foss Redevelopment  
26 Cleanup Action Plan attached as Exhibit C. The draft SCAP s 1

1 describe and justify the specific cleanup action proposed for  
2 the site, including the specific technologies proposed to be  
3 used. The justification for the proposed cleanup action shall  
4 be in accordance with WAC 173-340-360. The draft SCAP shall  
5 include a schedule for submission of remedial design documents  
6 and a compliance monitoring plan. Defendant(s) shall submit the  
7 draft SCAP to Ecology for approval within sixty (60) days of  
8 receipt of Ecology's written notice of decision regarding the  
9 appropriate cleanup action for the site. Ecology shall prepare  
10 a final draft SCAP, and may modify the draft SCAP as necessary.

11 F. Ecology shall provide public notice and a 30-day  
12 comment period for the RI report and the final draft SCAP in  
13 accordance with WAC 173-340-600. The public shall be invited to  
14 comment upon all information and decisions for which Ecology did  
15 not previously provide an opportunity for public comment. If  
16 significant public comment is received on these issues, Ecology  
17 shall prepare a responsiveness summary responding to the  
18 comments. Ecology shall then issue a final SCAP. Ecology may  
19 modify the final draft SCAP based on public comment. If, based  
20 on public comment, Ecology determines that none of the cleanup  
21 actions in the Thea Foss Redevelopment Cleanup Action Plan apply  
22 to the site, the site shall no longer be included within the  
23 scope of this Decree.

24 G. The final SCAP shall be included as an amendment to  
25 the Decree, pursuant to the procedures in Section XIX.  
26

1 H. The final SCAP shall be implemented by Defendant(s)  
2 In accordance with the approved time schedule in the SCAP,  
3 Defendant(s) shall submit to Ecology for review a draft  
4 engineering design report, construction plans and  
5 specifications, and an operation and maintenance plan  
6 (collectively referred to as remedial design documents)  
7 consistent with WAC 173-340-400(4), and a draft compliance  
8 monitoring plan consistent with WAC 173-340-410. The remedial  
9 design documents and the compliance monitoring plan may be  
10 submitted separately or combined in one document. The remedial  
11 design documents shall include a schedule for implementing the  
12 final SCAP. Ecology will endeavor to review and comment on the  
13 draft remedial design documents and compliance monitoring plan  
14 within thirty (30) days. Within thirty (30) days of receipt of  
15 Ecology's comments, Defendant(s) shall submit to Ecology final  
16 remedial design documents and a final compliance monitoring plan  
17 that incorporate Ecology's comments on the draft documents.  
18 Upon receipt of Ecology's approval of the remedial design  
19 documents and the monitoring plan, Defendant(s) shall implement  
20 the approved remedial action in accordance with the terms and  
21 schedule contained in those documents. Defendant(s) shall  
22 submit construction documentation to Ecology in accordance with  
23 the approved remedial design documents.

24 I. Defendant(s) agrees not to perform any remedial  
25 actions outside the scope of this Decree unless the signatories  
26 agree to amend the scope of work to cover those actions. Al

1 work conducted under this Decree shall be done in accordance  
2 with chapter 173-340 WAC unless otherwise provided herein.

3 X. INSTITUTIONAL CONTROLS

4 A. For any site(s) on which (1) the cleanup action results  
5 in residual concentrations of hazardous substances on site which  
6 exceed method A or method B cleanup levels established under the  
7 MTCA regulations; (2) conditional points of compliance have been  
8 established; or (3) Ecology determines institutional controls  
9 are required, Defendant(s) shall implement all institutional  
10 controls required by Ecology. At the time Ecology prepares a  
11 final draft SCAP for a site, if Ecology and the Attorney General  
12 determine institutional controls are necessary at the site, they  
13 shall propose a restrictive covenant that includes the necessary  
14 institutional controls. Ecology shall ensure that the  
15 appropriate cities or counties are notified and provided an  
16 opportunity to comment on the proposed restrictive covenant, as  
17 required by ESSB 6123 (1994). Ecology, the Attorney General,  
18 and the Defendant landowner of the site shall use good faith  
19 efforts to reach agreement on the terms of the restrictive  
20 covenant. Negotiations on the restrictive covenant shall not  
21 exceed thirty (30) days, unless agreed to by the negotiating  
22 parties. If these parties cannot reach agreement on the  
23 restrictive covenant within the allotted time period, Ecology  
24 and the Attorney General shall decide the terms of the  
25 restrictive covenant, and such decision shall not be subject to  
26 dispute resolution under this Decree. If Defendant landowner



1 does not agree with the restrictive covenant, the site(s) sh  
2 no longer be included within the scope of this Decree.

3 B. On any site for which a restrictive covenant has been  
4 established under paragraph A of this section, within thirty  
5 (30) days of the issuance of the final SCAP the Defendant  
6 landowner of that site shall record with the Office of the  
7 Pierce County Auditor the established restrictive covenant, and  
8 provide Ecology and the Attorney General with written  
9 confirmation of such recording.

10 C. The City will use available filing and calendaring  
11 mechanisms to ensure that parcels subject to this Decree are  
12 flagged or otherwise noted with use restrictions through the  
13 City's permit system.

14 **XI. DESIGNATED PROJECT COORDINATORS**

15 A. The project coordinator for Plaintiff Ecology is:

16 Marv Coleman  
17 Department of Ecology  
18 Southwest Regional Office  
19 St. Martin's College Campus  
20 P.O. Box 47775  
21 Olympia, WA 98504-7775

22 B. For each site, the Defendant(s) shall include the name  
23 and address of the project coordinator in the Notice of Intent  
24 to Proceed filed with Ecology pursuant to Section VIII of this  
25 Decree.

26 C. Each project coordinator shall be responsible for  
overseeing the implementation of this Decree. The Ecology  
project coordinator will be Ecology's designated representative  
at the site. To the maximum extent possible, communications

1 between Ecology and the Defendant(s) and all documents,  
2 including reports, approvals, and other correspondence  
3 concerning the activities performed pursuant to the terms and  
4 conditions of this Decree, shall be directed through the project  
5 coordinators. The project coordinators may designate, in  
6 writing, working level staff contacts for all or portions of the  
7 implementation of the remedial work required by this Decree.  
8 The project coordinators may agree to minor modifications to the  
9 work to be performed without formal amendments to this Decree.

10 D. Any party may change its respective project  
11 coordinator. Written notification shall be given to the other  
12 parties at least ten (10) calendar days prior to the change.

#### 13 XII. PERFORMANCE

14 All work performed pursuant to this Decree shall be under  
15 the direction and supervision, as necessary, of a professional  
16 engineer or hydrogeologist, or equivalent, with experience and  
17 expertise in hazardous waste site investigation and cleanup.  
18 Any construction work must be under the supervision of a  
19 professional engineer. Defendant(s) shall notify Ecology in  
20 writing as to the identity of such engineer(s) or  
21 hydrogeologist(s), or others and of any contractors and  
22 subcontractors to be used in carrying out the terms of this  
23 Decree, in advance of their involvement at the site.

#### 24 XIII. ACCESS

25 Ecology or any Ecology authorized representatives shall  
26 have the authority to enter and freely move about all property

1 at the site at all reasonable times for the purposes of, inter-  
2 alia: inspecting records, operation logs, and contracts related  
3 to the work being performed pursuant to this Decree; reviewing  
4 Defendant(s)'s progress in carrying out the terms of this  
5 Decree; conducting such tests or collecting such samples as  
6 Ecology may deem necessary; using a camera, sound recording, or  
7 other documentary type equipment to record work done pursuant to  
8 this Decree; and verifying the data submitted to Ecology by the  
9 Defendant(s). Upon request, Ecology shall split any samples  
10 taken during an inspection unless the Defendant(s) fails to make  
11 available a representative for the purpose of splitting samples.  
12 All parties with access to the site pursuant to this paragraph  
13 shall comply with approved safety and health plans.

14 **XIV. SAMPLING, DATA REPORTING, AND AVAILABILITY**

15 A. With respect to the implementation of this Decree,  
16 Defendant(s) shall make the results of all sampling, laboratory  
17 reports, and/or test results generated by it, or on its behalf  
18 available to Ecology and shall submit these results in  
19 accordance with Section XV of this Decree.

20 B. If requested by Ecology, Defendant(s) shall allow  
21 split or duplicate samples to be taken by Ecology and/or its  
22 authorized representatives of any samples collected by  
23 Defendant(s) pursuant to the implementation of this Decree.  
24 Defendant(s) shall notify Ecology five (5) working days in  
25 advance of any sample collection or work activity at the site.  
26 Ecology shall, upon request, allow split or duplicate samples to

1 be taken by Defendant(s) or its authorized representatives of  
2 any samples collected by Ecology pursuant to the implementation  
3 of this Decree provided it does not interfere with the  
4 Department's sampling. Without limitation on Ecology's rights  
5 under Section XIII, Ecology shall endeavor to notify  
6 Defendant(s) prior to any sample collection activity.

7 **XV. PROGRESS REPORTS**

8 A. Defendant(s) shall submit to Ecology written progress  
9 reports which describe the actions taken during the previous  
10 reporting period to implement the requirements of this Decree.  
11 There shall be quarterly reporting periods when the Defendant(s)  
12 is actively sampling or remediating any site or sites pursuant  
13 to this Decree. Otherwise there shall be annual progress  
14 reports. The progress reports shall include the following:

15 (1) A list of activities on each site that have taken  
16 place during the reporting period;

17 (2) Detailed description of any deviations from required  
18 tasks not otherwise documented in project plans or amendment  
19 requests;

20 (3) Description of all deviations from any approved  
21 schedules for implementing work under the Decree during the  
22 current reporting period and any planned deviations in the  
23 upcoming reporting period;

24 (4) For any deviations in schedule, a plan for recovering  
25 lost time and maintaining compliance with the schedule;

26

1 (5) All raw data (including laboratory analysis) received  
2 by the Defendant(s) during the past reporting period and an  
3 identification of the source of the sample; and

4 (6) A list of deliverables for the upcoming reporting  
5 period if different from the schedule.

6 B. All progress reports shall be submitted by the tenth  
7 day of the month in which they are due after the effective date  
8 of this Decree. Unless otherwise specified, progress reports  
9 and any other documents submitted pursuant to this Decree shall  
10 be sent by certified mail, return receipt requested, to  
11 Ecology's project coordinator.

12 **XVI. RETENTION OF RECORDS**

13 Defendant(s) shall preserve, during the pendency of thi  
14 Decree and for ten (10) years from the date this Decree is no  
15 longer in effect as provided in Section XXIX, all records,  
16 reports, documents, and underlying data in its possession  
17 relevant to the implementation of this Decree and shall insert  
18 in contracts with project contractors and subcontractors a  
19 similar record retention requirement. Upon request of Ecology,  
20 Defendant(s) shall make all non-archived records available to  
21 Ecology and allow access for review. All archived records shall  
22 be made available to Ecology within a reasonable period of time.

23 **XVII. TRANSFER OF INTEREST IN PROPERTY**

24 A. No voluntary or involuntary conveyance or  
25 relinquishment of title, easement, leasehold, or other interest  
26 in any site(s) or portion of any site(s) shall be consummate.

1 without provision for continued operation and maintenance of any  
2 containment system, treatment system, and monitoring system  
3 installed or implemented pursuant to this Decree.

4 B. Prior to transfer of any legal or equitable interest  
5 in all or any portion of the sites(s), and during the effective  
6 period of this Decree, Defendant(s) shall serve a copy of this  
7 Decree upon any prospective purchaser, lessee, transferee,  
8 assignee, or other successor in interest of the site(s); and, at  
9 least thirty (30) days prior to any transfer, Defendant(s) shall  
10 notify Ecology of said contemplated transfer.

11 C. Transfer of any ownership interest in any site(s) or  
12 any portion of any site(s) shall not alter or negate the City's  
13 and the Park District's obligations under this Decree. Nothing  
14 herein shall prevent the City or the Park District from  
15 negotiating with purchasers, lessees, or other third parties to  
16 allocate remedial action costs and responsibilities, provided  
17 that such contractual arrangements are not in breach of this  
18 Decree and do not effect the City's or the Park District's  
19 liability hereunder.

20 XVIII. RESOLUTION OF DISPUTES

21 A. Unless otherwise specified in this Decree, in the  
22 event a dispute arises as to an approval, disapproval, proposed  
23 modification or other decision or action by Ecology's project  
24 coordinator, the parties shall utilize the dispute resolution  
25 procedure set forth below.

26

1 (1) Upon receipt of the Ecology project coordinator's  
2 decision, the Defendant(s) has fourteen (14) days within which  
3 to notify Ecology's project coordinator of its objection to the  
4 decision.

5 (2) The parties' project coordinators shall then confer in  
6 an effort to resolve the dispute. If the project coordinators  
7 cannot resolve the dispute within fourteen (14) days, Ecology's  
8 project coordinator shall issue a written decision.

9 (3) Defendant(s) may then request Ecology management  
10 review of the decision. This request shall be submitted in  
11 writing to the Toxics Cleanup Program Manager within seven (7)  
12 days of receipt of Ecology's project coordinator's decision.

13 (4) Ecology's Toxics Cleanup Program Manager shall conduct  
14 a review of the dispute and shall issue a written decision  
15 regarding the dispute within thirty (30) days of the  
16 Defendant(s)'s request for review. The Program Manager's  
17 decision shall be Ecology's final decision on the disputed  
18 matter.

19 B. Unless otherwise specified in this Decree, if  
20 Ecology's final written decision is unacceptable to  
21 Defendant(s), Defendant(s) has the right to submit the dispute  
22 to the Court for resolution. The parties agree that one judge  
23 should retain jurisdiction over this case and shall, as  
24 necessary, resolve any dispute arising under this Decree. In  
25 the event Defendant(s) presents an issue to the Court for  
26 review, the Court shall review the action or decision of Ecology

1 on the basis of whether such action or decision was arbitrary  
2 and capricious and render a decision based on such standard of  
3 review.

4 C. The parties agree to only utilize the dispute  
5 resolution process in good faith and agree to expedite, to the  
6 extent possible, the dispute resolution process whenever it is  
7 used. Where either party utilizes the dispute resolution  
8 process in bad faith or for purposes of delay, the other party  
9 may seek sanctions.

10 D. Implementation of these dispute resolution procedures  
11 shall not provide a basis for delay of any activities required  
12 in this Decree, unless Ecology agrees in writing to a schedule  
13 extension or the Court so orders.

14 **XIX. AMENDMENT OF CONSENT DECREE; ADDING NEW PARTIES**  
15 **TO DECREE**

16 A. This Decree may only be amended by a written  
17 stipulation among the signatories to this Decree that is entered  
18 by the Court or by order of the Court. Such amendment shall  
19 become effective upon entry by the Court. Agreement to amend  
20 shall not be unreasonably withheld by any signatory to the  
21 Decree.

22 B. With respect to amendments of the Decree for the  
23 purpose of including SCAPs, after Ecology issues a final SCAP  
24 for a site, with the concurrence of the Attorney General, the  
25 signatories shall sign a copy of Exhibit F, an "Amendment to  
26 Consent Decree to Include Site-Specific Cleanup Action Plan",  
and it shall be submitted for entry with the Court.



1 C. If the City or the Park District wish to amend the  
2 Consent Decree to make their Successors in Interest and Assigns  
3 parties to the Decree, the City or the Park District and their  
4 Successors in Interest and Assigns shall use the following  
5 procedure. The City or the Park District shall require the  
6 proposed Successors in Interest and Assigns to sign a copy of  
7 Exhibit G, an "Agreement of Successors in Interest and Assigns",  
8 thereby consenting to be bound by the terms and conditions of  
9 this Decree. This signed agreement shall be sent to Ecology at  
10 the same time as the Notice of Intent to Proceed under Section  
11 VIII of this Decree. If Ecology and the Attorney General  
12 consent to the proposed amendment, the Amendment shall be  
13 submitted for entry with the Court.

14 D. For all amendments not covered by paragraphs B and C of  
15 this section, Defendant(s) shall submit any request for an  
16 amendment to Ecology and the Attorney General for approval.  
17 Ecology shall indicate its approval or disapproval in a timely  
18 manner after the request for amendment is received. If the  
19 amendment to the Decree is substantial, Ecology will provide  
20 public notice and opportunity for comment. Reasons for the  
21 disapproval shall be stated in writing. If Ecology or the  
22 Attorney General does not agree to any proposed amendment, the  
23 disagreement may be addressed through the dispute resolution  
24 procedures described in Section XVIII of this Decree.

25  
26

1 | XX. EXTENSION OF SCHEDULE

2 | A. An extension of schedule shall be granted only when a  
3 | request for an extension is submitted in a timely fashion,  
4 | generally at least 30 days prior to expiration of the deadline  
5 | for which the extension is requested, and good cause exists for  
6 | granting the extension. All extensions shall be requested in  
7 | writing. The request shall specify the reason(s) the extension  
8 | is needed.

9 | An extension shall only be granted for such period of time  
10 | as Ecology determines is reasonable under the circumstances. A  
11 | requested extension shall not be effective until approved by  
12 | Ecology or the Court. Ecology shall act upon any written  
13 | request for extension in a timely fashion. It shall not be  
14 | necessary to formally amend this Decree pursuant to Section XIX  
15 | when a schedule extension is granted.

16 | B. The burden shall be on the Defendant(s) to demonstrate  
17 | to the satisfaction of Ecology that the request for such  
18 | extension has been submitted in a timely fashion and that good  
19 | cause exists for granting the extension. Good cause includes,  
20 | but is not limited to, the following.

21 | (1) Circumstances beyond the reasonable control and  
22 | despite the due diligence of Defendant(s) including delays  
23 | caused by unrelated third parties or Ecology, such as (but not  
24 | limited to) delays by Ecology in reviewing, approving, or  
25 | modifying documents submitted by Defendant(s); or  
26 |

1 (2) Acts of God, including fire, flood, blizzard, extreme  
2 temperatures, storm, or other unavoidable casualty; or

3 (3) Endangerment as described in Section XXI.

4 However, neither increased costs of performance of the  
5 terms of the Decree nor changed economic circumstances shall be  
6 considered circumstances beyond the reasonable control of  
7 Defendant(s).

8 C. Ecology may extend the schedule for a period not to  
9 exceed ninety (90) days, except where an extension is needed as  
10 a result of:

11 (1) Delays in the issuance of a necessary permit which was  
12 applied for in a timely manner; or

13 (2) Other circumstances deemed exceptional or  
14 extraordinary by Ecology; or

15 (3) Endangerment as described in Section XXI.

16 Ecology shall give Defendant(s) written notification in a  
17 timely fashion of any extensions granted pursuant to this  
18 Decree.

19 **XXI. ENDANGERMENT**

20 A. In the event Ecology determines that activities  
21 implementing or in noncompliance with this Decree, or any other  
22 circumstances or activities, are creating or have the potential  
23 to create a danger to the health or welfare of the people on the  
24 site or in the surrounding area or to the environment, Ecology  
25 may order Defendant(s) to stop further implementation of this  
26 Decree for such period of time as needed to abate the danger.

1 may petition the Court for an order as appropriate. During any  
2 stoppage of work under this section, the obligations of  
3 Defendant(s) with respect to the work under this Decree which is  
4 ordered to be stopped shall be suspended and the time periods  
5 for performance of that work, as well as the time period for any  
6 other work dependent upon the work which is stopped, shall be  
7 extended, pursuant to Section XX of this Decree, for such period  
8 of time as Ecology determines is reasonable under the  
9 circumstances.

10 B. In the event Defendant(s) determines that activities  
11 undertaken in furtherance of this Decree or any other  
12 circumstances or activities are creating an endangerment to the  
13 people on the site or in the surrounding area or to the  
14 environment, Defendant(s) may stop implementation of this Decree  
15 for such period of time necessary for Ecology to evaluate the  
16 situation and determine whether Defendant(s) should proceed with  
17 implementation of the Decree or whether the work stoppage should  
18 be continued until the danger is abated. Defendant(s) shall  
19 notify Ecology's project coordinator as soon as possible, but no  
20 later than twenty-four (24) hours after such stoppage of work,  
21 and thereafter provide Ecology with documentation of the basis  
22 for the work stoppage. If Ecology disagrees with the  
23 Defendant(s)'s determination, it may order Defendant(s) to  
24 resume implementation of this Decree. If Ecology concurs with  
25 the work stoppage, the Defendant(s)'s obligations shall be  
26 suspended and the time period for performance of that work, as

1 well as the time period for any other work dependent upon the  
2 work which was stopped, shall be extended, pursuant to Section  
3 XX of this Decree, for such period of time as Ecology determines  
4 is reasonable under the circumstances. Any disagreements  
5 pursuant to the clause shall be resolved through the dispute  
6 resolution procedures in Section XVIII.

7 **XXII. OTHER ACTIONS**

8 A. Ecology reserves its rights to institute remedial  
9 action(s) at the site and subsequently pursue cost recovery, and  
10 Ecology reserves its rights to issue orders and/or penalties or  
11 take any other enforcement action pursuant to available  
12 statutory authority under the following circumstances:

13 (1) Where Defendant(s) fails, after notice, to comply with  
14 any requirement of this Decree;

15 (2) In the event or upon the discovery of a release or  
16 threatened release not addressed by this Decree;

17 (3) Upon Ecology's determination that action beyond the  
18 terms of this Decree is necessary to abate an emergency  
19 situation which threatens public health or welfare or the  
20 environment; or

21 (4) Upon the occurrence or discovery of a situation beyond  
22 the scope of this Decree as to which Ecology would be empowered  
23 to perform any remedial action or to issue an order and/or  
24 penalty, or to take any other enforcement action. This Decree  
25 is limited in scope to the site(s) described in Section II and  
26 to those types and maximum concentrations of hazardous

1 substances that are on site at the time this Decree is entered,  
2 and are described in Section 3.2 of the Thea Foss Redevelopment  
3 Cleanup Action Plan, attached as Exhibit C.

4 B. Ecology reserves all rights regarding the injury to,  
5 destruction of, or loss of natural resources resulting from the  
6 release or threatened release of hazardous substances from the  
7 site(s).

8 C. Ecology reserves the right to take any enforcement  
9 action whatsoever, including a cost recovery action, against  
10 potentially liable persons not party to this Decree.

11 D. Ecology reserves the right to remove all or a portion  
12 of a site from this Decree and take separate enforcement actions  
13 against Defendants at that site if Ecology determines it is  
14 necessary to do so to meet Ecology's source control obligations  
15 under the 1994 Cooperative Agreement between Ecology and EPA.

16 **XXIII. INDEMNIFICATION**

17 Defendant(s) agrees to indemnify and save and hold the  
18 State of Washington, its employees, and agents harmless from any  
19 and all claims or causes of action for death or injuries to  
20 persons or for loss or damage to property arising from or on  
21 account of acts or omissions of Defendant(s), its officers,  
22 employees, agents, or contractors in entering into and  
23 implementing this Decree. However, the Defendant(s) shall not  
24 indemnify the State of Washington nor save nor hold its  
25 employees and agents harmless from any claims or causes of  
26 action arising out of the negligent acts or omissions of the

1 State of Washington, or the employees or agents of the state, in  
2 implementing the activities pursuant to this Decree.

3 **XXIV. COMPLIANCE WITH APPLICABLE LAWS**

4 All actions carried out by Defendant(s) pursuant to this  
5 Decree shall be done in accordance with all applicable federal,  
6 state, and local requirements, including requirements to obtain  
7 necessary permits.

8 **XXV. REMEDIAL AND INVESTIGATIVE COSTS**

9 The Defendant(s) agrees to pay costs incurred by Ecology  
10 pursuant to this Decree. The costs required to be paid under  
11 this Decree shall include work performed by Ecology or its  
12 contractors for, or on, the site(s) under ch. 70.105D RCW both  
13 prior to and subsequent to the issuance of this Decree, for  
14 investigations, remedial actions, and Decree preparation,  
15 negotiations, oversight and administration. Ecology costs shall  
16 include costs of direct activities and support costs of direct  
17 activities as defined in WAC 173-340-550(2). The Defendant(s)  
18 agrees to pay the required amount within ninety (90) days of  
19 receiving from Ecology an itemized statement of costs that  
20 includes a summary of costs incurred, an identification of  
21 involved staff, and the amount of time spent by involved staff  
22 members on the project. A general statement of work performed  
23 will be provided upon request. Itemized statements shall be  
24 prepared quarterly. Failure to pay Ecology's costs within  
25 ninety (90) days of receipt of the itemized statement will  
26 result in interest charges.

1 Ecology entered into an agreement with the City of Tacoma,  
2 dated June 14, 1993 to receive prepayment of remedial action  
3 costs associated with sites under this Decree. Ecology and the  
4 City may enter into additional prepayment agreements for sites  
5 under the Decree, pursuant to Section VIII. If the City pays  
6 remedial action costs pursuant to a prepayment agreement with  
7 Ecology for a site under this Decree, it shall not be required  
8 to pay those costs again under this Consent Decree. The City is  
9 not released from liability for payment of remedial action costs  
10 to Ecology should the City of Tacoma fail to comply with the  
11 conditions of such a prepayment agreement, or should prepayment  
12 agreement be found to be invalid for any reason.

13 **XXVI. IMPLEMENTATION OF REMEDIAL ACTION**

14 If Ecology determines that Defendant(s) has failed without  
15 good cause to implement the remedial action(s) called for by  
16 this Decree, Ecology may, after notice to Defendant(s), perform  
17 any or all portions of the remedial action(s) that remain  
18 incomplete. If Ecology performs all or portions of the remedial  
19 action(s) because of the Defendant(s)'s failure to comply with  
20 its obligations under this Decree, Defendant(s) shall reimburse  
21 Ecology for the costs of doing such work in accordance with  
22 Section XXV, provided that Defendant(s) is not obligated under  
23 this section to reimburse Ecology for costs incurred for work  
24 inconsistent with or beyond the scope of this Decree.

25  
26



1 **XXVII. FIVE YEAR REVIEW**

2 As remedial action, including ground water monitoring,  
3 continues at the site, the parties agree to review the progress  
4 of remedial action at the site, and to review the data  
5 accumulated as a result of site monitoring as often as is  
6 necessary and appropriate under the circumstances. At least  
7 every five years the parties shall meet to discuss the status of  
8 the site and the need, if any, of further remedial action at the  
9 site. Ecology reserves the right to require further remedial  
10 action at the site under appropriate circumstances. This  
11 provision shall remain in effect for the duration of the Decree.

12 **XXVIII. PUBLIC PARTICIPATION**

13 Ecology shall maintain the responsibility for public  
14 participation at the site(s). However, Defendant(s) shall  
15 cooperate with Ecology and, if agreed to by Ecology, shall:

16 A. Prepare drafts of public notices and fact sheets at  
17 important stages of the remedial action, such as the submission  
18 of work plans and the completion of engineering design. Ecology  
19 will finalize (including editing if necessary) and distribute  
20 such fact sheets and prepare and distribute public notices of  
21 Ecology's presentations and meetings;

22 B. Notify Ecology's project coordinator prior to the  
23 preparation of all press releases and fact sheets, and before  
24 major meetings with the interested public and local governments.  
25 Likewise, Ecology shall notify Defendant(s) prior to the  
26

1 issuance of all press releases and fact sheets, and before major  
2 meetings with the interested public and local governments;

3 C. Participate in public presentations on the progress of  
4 the remedial action at the site. Participation may be through  
5 attendance at public meetings to assist in answering questions,  
6 or as a presenter;

7 D. In cooperation with Ecology, arrange and/or continue  
8 information repositories to be located at the Tacoma Public  
9 Library, Main Branch, and Ecology's Southwest Regional Office.  
10 At a minimum, copies of all public notices, fact sheets, and  
11 press releases; all quality assured ground water, surface water,  
12 soil sediment, and air monitoring data; remedial actions plans,  
13 supplemental remedial planning documents, and all other similar  
14 documents relating to performance of the remedial action  
15 required by this Decree shall be promptly placed in these  
16 repositories.

17 **XXIX. DURATION OF DECREE**

18 A. This Decree shall remain in effect and the remedial  
19 program described in the Decree shall be maintained and  
20 continued for a site until the Defendant(s) has received written  
21 notification from Ecology that the requirements of this Decree  
22 have been satisfactorily completed as to that site.

23 B. This Decree shall apply to any property within the  
24 geographic boundary described in Section II.A for which Ecology  
25 has received a Notice of Intent to Proceed under Section VIII  
26 within five (5) years of the effective date of this Decree.

1 C. After five years from the effective date of this  
2 Decree:

3 (1) Ecology and the Attorney General at their convenience  
4 may terminate this Decree as to any site(s) not within the scope  
5 of paragraph B of this section at any time prior to or within  
6 twenty-one (21) days of receipt of a Notice of Intent to Proceed  
7 under Section VIII of this Decree, by providing sixty (60) days  
8 written notice of termination to Defendant(s).

9 (2) Defendant(s) at its convenience may terminate this  
10 Decree as to any site(s) not within the scope of paragraph B of  
11 this section at any time prior to receipt by Ecology of a Notice  
12 of Intent to Proceed, by providing sixty (60) days written  
13 notice to Ecology and the Attorney General.

14 **XXX. CLAIMS AGAINST THE STATE**

15 Defendant(s) hereby agrees that it will not seek to recover  
16 any costs accrued in implementing the remedial action required  
17 by this Decree from the State of Washington Department of  
18 Ecology; and further, that the Defendant(s) will make no claim  
19 against the state Toxics Control Account for any costs incurred  
20 in implementing this Decree. Except as provided above, however,  
21 Defendant(s) expressly reserves its right to seek to recover any  
22 costs incurred in implementing this Decree from any other  
23 potentially liable person under state or federal law.

24 **XXXI. COVENANT NOT TO SUE: REOPENER**

25 In consideration of Defendant(s)'s compliance with  
26 provisions of this Decree, Ecology covenants not to institut

1 further legal or administrative actions against Defendant(s)  
2 regarding matters within the scope of this Decree. This  
3 covenant is limited in its application to the site(s) described  
4 in Section II of this Decree and to the types and maximum  
5 concentrations of hazardous substances that are on site at the  
6 time this Decree is entered, and are described in Section 3.2 of  
7 the Thea Foss Redevelopment Cleanup Action Plan, attached as  
8 Exhibit C. This covenant is not applicable to any other area,  
9 substances, or concentrations of substances. This covenant is  
10 contingent upon Defendant(s)'s compliance with all terms and  
11 conditions of this Decree. This covenant does not affect  
12 Ecology's right to seek recovery for natural resource damages.

13 A. Reopeners: Notwithstanding the covenant given above,  
14 Ecology reserves the right to institute legal or administrative  
15 actions against Defendant(s) seeking to require them to perform  
16 additional response actions at a site under this Decree, and to  
17 pursue appropriate cost recovery in accordance with provisions  
18 set out in RCW 70.105D.050, under the following circumstances:

19 (1) If Defendants fail to meet the requirements of this  
20 Decree, including, but not limited to, failure of the remedial  
21 action to meet the cleanup standards identified in the Thea Foss  
22 Redevelopment Cleanup Action Plan (Exhibit C) and the SCAP for  
23 that site;

24 (2) Upon Ecology's determination that action beyond the  
25 terms of this Decree is necessary to abate an imminent and  
26

1 substantial endangerment to public health or welfare or the  
2 environment;

3 (3) In the event new information becomes available  
4 regarding factors previously unknown to Ecology, including the  
5 nature or quantity of hazardous substances at the Site, and  
6 Ecology determines, in light of this information, that further  
7 remedial action is necessary at the Site to protect human health  
8 or the environment, and Defendants, after notice, fail to take  
9 the necessary action within a reasonable time;

10 (4) In the event the assumptions upon which the cleanup  
11 remedies agreed to in the Thea Foss Redevelopment Cleanup Action  
12 Plan and the SCAP for the site were based do not prove to be  
13 true or accurate;

14 (5) In the event the remedial action conducted at the Site  
15 fails to meet the requirements set forth in the Thea Foss  
16 Redevelopment Cleanup Action Plan and the SCAP for the site; and

17 (6) In the event more stringent or different cleanup  
18 standards or other regulatory requirements regarding remedial  
19 action under MTCA are adopted by the Washington State  
20 Legislature or by Ecology.

21 Further, if factors or conditions at the site, previously  
22 unknown to Ecology, are discovered after entry of this Decree,  
23 and these unknown factors or conditions indicate that the  
24 remedial action is not protective of the public health, or  
25 welfare, or the environment, or present a previously unknown  
26 threat to human health or the environment, Ecology also reserves

1 the right to request the court to amend this covenant not to sue  
2 as required by RCW 70.105D.040(4)(c).

3 B. Applicability: The Covenant Not to Sue set forth  
4 above shall have no applicability whatsoever to:

- 5 1. Criminal liability;
- 6 2. Liability for damages to natural resources;
- 7 3. Any Ecology action against potentially liable parties  
8 not a party to this Decree;
- 9 4. Groundwater contamination that may exist at any of the  
10 property within the geographic boundary described in Section  
11 II.A that requires active remediation;
- 12 5. Property within the geographic boundary described in  
13 Section II.A that is not determined by Ecology to be a cleanup  
14 site under Section VII or to property on which Defendant(s)  
15 otherwise does not fully implement all remedial actions under  
16 this Decree, including a SCAP;
- 17 6. Any portion of a site(s) between the mean high high  
18 water mark and the mean low low water mark.

19 **XXXII. EFFECTIVE DATE**

20 This Decree is effective upon the date it is entered by the  
21 Court.

22 **XXXIII. PUBLIC NOTICE AND WITHDRAWAL OF CONSENT**

23 This Decree has been the subject of public notice and  
24 comment under RCW 70.105D.040(4)(a). As a result of this  
25 process, Ecology has found that this Decree will lead to a more  
26 expeditious cleanup of hazardous substances at the site.

1 If the Court withholds or withdraws its consent to this  
2 Decree, it shall be null and void at the option of any party and  
3 the accompanying Complaint shall be dismissed without costs and  
4 without prejudice. In such an event, no party shall be bound by  
5 the requirements of this Decree.

6 DEPARTMENT OF ECOLOGY

ATTORNEY GENERAL

7 By: Carol Kraege 10/3/94  
8 CAROL KRAEGE Date  
9 Acting Program Manager  
Toxics Cleanup Program

By: Kathryn L. Gerla  
KATHRYN L. GERLA Date  
WSBA #17498 9/30/94  
Assistant Attorney General

10 CITY OF TACOMA

11 By: Ray Lopez  
12 Name: \_\_\_\_\_ Date  
13 Title: \_\_\_\_\_

Robert J. ...  
Name: Robert J. ... 9/29/94 Date  
Attorney for City of Tacoma

14 METROPOLITAN PARK DISTRICT

DAVIES PEARSON, P.C.

15 By: Neil A. O'Esthun  
16 Name: Neil A. O'Esthun Date  
17 Title: Executive Director

Mark R. Roberts  
Name: Mark R. Roberts 9/29/94 Date  
Attorney for Metropolitan Park  
District

18  
19 DATED this 17 day of OCTOBER, 1994.

20  
21 Grant L. Anderson  
JUDGE/COMMISSIONER  
22 Pierce County Superior Court

23  
24  
25  
26 T5/tac/tacomaf.csd

1 enforcing or terminating the terms of this Consent Decree, and of  
2 adjudicating disputes between the parties under this Consent  
3 Decree.

4  
5  
6 ENTERED this \_\_\_\_\_ day of \_\_\_\_\_, 1991.

7  
8  
9 UNITED STATES DISTRICT JUDGE

10  
11 The parties whose signatures appear below hereby  
12 consent to the terms of this Consent Decree. The consent of the  
13 United States is subject to the public notice and comment  
14 requirements of 28 C.F.R. § 50.7 and 42 U.S.C. § 9622. The  
15 consent of the State of Washington is subject to the public  
16 notice and hearing requirements of Section 4(4) of the Model  
17 Toxics Control Act and is expressly conditioned upon the entry of  
18 findings by the Department of Ecology required therein.  
19  
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CITY CLERK CONTRACT/AGREEMENT NO. \_\_\_\_\_

FOR THE CITY OF TACOMA, WASHINGTON

By: [Signature] Dated: 3/20/91  
Ray E. Corpuz, Jr.  
City Manager

By: [Signature] Dated: 3/20/91  
FRED A THOMPSON  
Director of Public Works

By: [Signature] Dated: 3/21/91  
Peter Luttrupp  
Director of Finance

Attest: [Signature] Dated: 3-20-91  
Genelle Birk  
City Clerk

Approved as to form:

By: [Signature] Dated: 3/20/91  
City Attorney

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FOR THE UNITED STATES OF AMERICA

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2  
3 By: *George W. Van Cleave*

Dated: *3/22/91*

4 GEORGE W. VAN CLEVE  
5 Acting Assistant Attorney  
6 General  
7 Land and Natural Resources  
8 Division  
9 U.S. Department of Justice  
10 Washington, D.C. 20530

11 By: *Steven Novick*

Dated: *3/22/91*

12 STEVEN NOVICK  
13 Attorney  
14 Land and Natural Resources  
15 Division  
16 U.S. Department of Justice  
17 Washington, D.C. 20536

18 MIKE MCKAY  
19 UNITED STATES ATTORNEY  
20 3600 Seafirst Fifth Avenue Plaza  
21 800 Fifth Avenue  
22 Seattle, Washington 98104

23 By: *Dana A. Rasmussen*

Dated: *March 20, 1991*

24 DANA A. RASMUSSEN  
25 Regional Administrator  
26 United States Environmental Protection Agency  
27 Region 10  
28 Seattle, Washington 98101

29 By: *Andrew J. Boyd*

Dated: *March 20, 1991*

30 ANDREW J. BOYD  
31 Assistant Regional Counsel  
32 United States Environmental Protection Agency  
33 Region 10  
34 Seattle, Washington 98101

U.S. Department of Justice  
10th St. & Pennsylvania Ave., N.W.  
Washington, D.C. 20530  
(202) 514-1200

FOR THE STATE OF WASHINGTON

By: Carol L. Fleskes  
CAROL S. FLESKES  
Hazardous Waste Investigations  
and Cleanup Program Manager  
Department of Ecology  
Olympia, Washington 98504

Dated: 3/20/91

By: Jeffrey S. Myers  
JERFREY S. MYERS  
Assistant Attorney General  
State of Washington  
Olympia, Washington 98504

Dated: 3/20/91

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**STATE OF WASHINGTON  
PIERCE COUNTY SUPERIOR COURT**

STATE OF WASHINGTON,  
DEPARTMENT OF ECOLOGY,

Plaintiff,

v.

CITY OF TACOMA and FOSS  
WATERWAY DEVELOPMENT  
AUTHORITY,

Defendants.

NO. 94-2-10917-6

CONSENT DECREE – FIRST  
COMPREHENSIVE AMENDMENT

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| 18 | 29. COVENANT NOT TO SUE: REOPENER.....  | 27 |
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| 20 | Amended Exhibit A: Map of Cleanup Sites   |    |
| 21 | Amended Exhibit B: Legal Description of Cleanup Sites                               |    |
| 22 | Exhibit C: Thea Foss Redevelopment Action Plan – not amended                        |    |
| 23 | Exhibit D: Thea Foss Sampling and Analysis Plan – not amended                       |    |
| 24 | Exhibit E: Thea Foss Quality Assurance Project Plan – not amended                   |    |
| 25 | Exhibit F: Amendment to Consent Decree to Include Site-Specific Cleanup Action Plan |    |
| 26 | Amended Exhibit G: Successor Owner or Operator Agreement                            |    |

1 **1. INTRODUCTION**

2 A. This is the First Comprehensive Amendment to this Consent Decree (Decree).  
3 The Decree was originally entered in Pierce County Superior Court on October 17, 1994 as  
4 Consent Decree No. 94-2-10917-6. The Decree was originally signed by the Department of  
5 Ecology (Ecology), the City of Tacoma (City), and the Metropolitan Park District. The Decree  
6 has been amended a number of times since 1994 to add parties to it, including an amendment  
7 to add the Foss Waterway Development Authority (FWDA) as a party after the Park District  
8 conveyed to the FWDA the properties it owned that are subject to this Decree. Other than  
9 these amendments to add parties, there have not previously been any amendments to the  
10 provisions of the Decree. This comprehensive amendment makes significant changes to the  
11 provisions of the original Decree in order to update it and implement a more efficient process  
12 for developing and remediating the properties covered by it.

13 B. This First Comprehensive Amendment to the Decree is made and entered into  
14 by and between the Washington State Department of Ecology (Ecology), the City of Tacoma  
15 (City), and the Foss Waterway Development Authority (FWDA). Successor Owners or  
16 Operators may become Parties to this Decree as provided in Section 17. Parties to this Decree  
17 other than Ecology and the Attorney General are referred to in this Decree in the collective as  
18 “Defendants.”

19 C. In entering into this Decree, the Parties’ mutual objective is to provide for  
20 remedial action at facilities adjacent to the Thea Foss Waterway in the City of Tacoma,  
21 Washington, where there have been releases or threatened releases of hazardous substances  
22 causing contamination of soils.

23 D. This Decree establishes procedures designed to achieve substantial public  
24 benefits. The City and FWDA, with assistance from the Metropolitan Park District, acquired  
25 properties along the west side of the Thea Foss Waterway, which is part of the Commencement  
26

1 Bay Nearshore/Tideflats (CB/NT) Superfund Site, to spur cleanup of the City's waterfront and  
2 redevelopment of abandoned industrial and commercial land. This Decree is intended to  
3 support cleanup and redevelopment of these properties, consistent with the Thea Foss Area-  
4 Wide Consent Decree Cleanup Action Plan, under which the ultimate redevelopment includes  
5 public access, parks and open spaces.

6 E. Remedial actions under this Decree recognize land use planning and the  
7 ultimate reuse of contaminated property. This Decree promotes expedient, efficient remedial  
8 actions, which can occur more quickly than without the Decree. This Decree allows Ecology  
9 to enforce permanent and effective controls to ensure that cleanups are protective of human  
10 health and the environment. Furthermore, this Decree promotes the fulfillment of Ecology's  
11 source control obligations set forth in the 1994 Cooperative Agreement between the U.S.  
12 Environmental Protection Agency (EPA) and Ecology.

13 F. This Decree requires the Defendants to undertake the following remedial action  
14 for the site or sites they own, which are more specifically described in Sections 7 and 8 of this  
15 Decree:

- 16 (1) Conduct remedial investigations of sites;
  - 17 (2) Prepare site-specific Cleanup Action Plans for soil contamination on  
18 sites, to be approved by Ecology. The site-specific Cleanup Action  
19 Plans will be consistent with the Thea Foss Redevelopment Cleanup  
20 Action Plan (Exhibit C);
  - 21 (3) Remediate soil contamination on sites in accordance with the site-  
22 specific Cleanup Action Plans;
  - 23 (4) Provide and maintain institutional controls and compliance monitoring,  
24 as required in this Decree.
- 25  
26

1 Ecology has determined that these actions are necessary to protect public health and the  
2 environment. This Decree addresses soil contamination only. Sites at which active  
3 remediation of groundwater is necessary are not within the scope of this Decree.

4 G. The Complaint in this action was filed simultaneously with this Decree in 1994.  
5 An answer was not filed, and there has not been a trial on any issue of fact or law in this case.  
6 However, the Parties wish to resolve the issues raised by Ecology's complaint. In addition, the  
7 Parties agree that settlement of these matters without litigation is reasonable and in the public  
8 interest and that entry of this Decree is the most appropriate means of resolving these matters.

9 H. In becoming a party to this Decree, each Defendant agrees to its entry and  
10 agrees to be bound by its terms.

11 I. By entering into this Decree, the Parties do not intend to discharge nonsettling  
12 parties from any liability they may have with respect to matters alleged in the complaint. The  
13 Parties retain the right to seek reimbursement, in whole or in part, from any liable persons for  
14 sums expended under this Decree.

15 J. This Decree shall not be construed as proof of liability or responsibility for any  
16 releases of hazardous substances or cost for remedial action nor an admission of any facts;  
17 provided, however, that no Defendant may challenge the jurisdiction of Ecology or the  
18 findings of fact in this Decree in any proceeding brought by Ecology to enforce this Decree.

19 K. The Court fully advised of the reasons for entry of this Decree, and good cause  
20 having been shown:

21 IT IS HEREBY ORDERED, ADJUDGED, AND DECREED AS FOLLOWS:

## 22 2. SCOPE OF DECREE

23 A. The property subject to this Decree is property adjacent to the west side of the  
24 Thea Foss Waterway in the City of Tacoma, Washington, located between the mean high water  
25 mark, the geographic boundary of which is depicted in Amended Exhibit A to this Decree,  
26



1 which replaces Exhibit A of the original Decree. The legal descriptions of properties within  
2 this geographic boundary are in Amended Exhibit B. These properties may extend to the mean  
3 low water mark if EPA concurs. Such concurrence shall occur on a parcel-by-parcel basis  
4 considering, where appropriate, clean up actions taken under the CB/NT Superfund remedy.

5 B. In this Decree the terms “site” or “cleanup site” mean, in the singular or plural,  
6 any properties, parcels or portions thereof within the geographic boundary described in  
7 paragraph A that are currently owned by a Defendant or which a Defendant acquires during the  
8 duration of this Decree. These sites are “facilities” as defined in RCW 70.105D.020(3).

9 C. Each of the provisions of this Decree apply to each site individually.

### 10 3. JURISDICTION

11 A. This Court has jurisdiction over the subject matter and over the Parties pursuant  
12 to Chapter 70.105D RCW, the Model Toxics Control Act (MTCA).

13 B. Authority is conferred upon the Washington State Attorney General by RCW  
14 70.105D.040(4) (a) to agree to a settlement with any potentially liable person if, after public  
15 notice and hearing, Ecology finds the proposed settlement would lead to a more expeditious  
16 cleanup of hazardous substances. RCW 70.105D.040(4)(b) requires that such a settlement be  
17 entered as a consent decree issued by a court of competent jurisdiction.

18 C. Ecology has determined that releases or threatened releases of hazardous  
19 substances have occurred at the sites which are the subject of this Decree. Ecology has further  
20 determined that the releases are causing contamination of soils, surface water and/or  
21 groundwater, and will continue to cause contamination unless the releases are remediated.

22 D. Each Defendant is a PLP for each property for which it is an owner or operator  
23 under RCW 70.105D.040(I)(a) if Ecology has determined that a release or threatened release  
24 of hazardous substances has occurred at that property.

1 E. Each Defendant accepts their status as a PLP for the sites they own. By signing  
2 this Decree Defendants waive their right to notice and comment under RCW 70.105D.020(8).  
3 However, if additional contamination is discovered after a Defendant signs this Decree, the  
4 Defendant retains the right to assert any applicable defenses to liability for the newly-  
5 discovered contamination. Furthermore, with regard to claims for contribution against any  
6 Defendant for matters addressed in this Decree, Ecology agrees that Defendants are entitled to  
7 protection from contribution actions or claims as is provided by MTCA, RCW 70.105D.040, or  
8 as otherwise provided by law.

9 F. The actions to be taken pursuant to this Decree are necessary to protect public  
10 health, welfare, and the environment.

11 G. Each Defendant agrees to undertake the actions specified in this Decree as they  
12 apply to the site or sites owned by each Defendant and consents to the entry of this Decree  
13 under the MTCA.

#### 14 **4. PARTIES BOUND**

15 A. This Decree applies to and is binding upon the signatories to this Decree.  
16 Successor Owners or Operators may become Parties as provided in Section 17. The  
17 undersigned representative of each Party hereby certifies that he or she is fully authorized to  
18 enter into this Decree and to execute and legally bind such Party to comply with the Decree.  
19 Defendant agrees to undertake all actions required by the terms and conditions of this Decree  
20 and not to contest state jurisdiction regarding this Decree, nor to contest any findings of fact in  
21 this Decree. No change in ownership, corporate status, or membership of any governing body  
22 shall alter the responsibility of a Defendant under this Decree. Each Defendant agrees to  
23 utilize contractual and regulatory means to insure the implementation and enforceability of this  
24 Decree by and against any subsequent, owner, operator, lessee or tenant of a site. Each  
25 Defendant remains liable for all obligations agreed to in this Decree in the event of a sale,  
26

1 transfer, or assignment of any ownership interest from the Defendant to a third party. Nothing  
2 in this Decree prevents the City or the FWDA from negotiating with purchasers, lessees, or  
3 other third parties to contractually allocate remedial action costs and responsibilities, provided  
4 that such contractual arrangements are not in breach of this Decree and do not affect the City's  
5 or FWDA's liability under it.

6 B. Each Defendant shall provide a copy of this Decree to all agents, contractors  
7 and subcontractors retained to perform work required by this Decree and shall ensure that all  
8 work undertaken by such contractors and subcontractors will be in compliance with this  
9 Decree.

## 10 5. DEFINITIONS

11 Unless otherwise specified, all definitions in Chapters 70.15D RCW and 173-340 WAC  
12 apply to the terms in this Decree.

13 A. Active Remediation of Groundwater: For purposes of this Decree, active  
14 remediation of groundwater means all remedial actions related to groundwater except for long  
15 term monitoring of groundwater and remediation of contaminated soil that is a source of  
16 contamination to the groundwater.

17 B. Consent Decree or Decree: Refers to this Consent Decree, each of the exhibits  
18 to the Decree, and any amendments to the Decree. All exhibits are integral and enforceable  
19 parts of this Consent Decree. In the event of any conflict between the Consent Decree and any  
20 exhibits to the Decree, the Consent Decree shall govern.

21 C. Days: Refers to calendar days unless otherwise specified.

22 D. Defendant: Refers to the signatories to this Decree other than the Department  
23 of Ecology and Attorney General.

1 E. Party: Refers to any signatory to this Decree. Successor Owners or Operators  
2 of property covered by this Decree may become Parties (and Defendants) as provided in  
3 Section 17.

4 F. Section: Refers to a portion of this Decree identified by a number and including  
5 one or more paragraphs.

6 G. Site or Cleanup Site: Refers to the properties covered by this Decree, as  
7 described in Section 2.A of this Decree.

8 H. Successor Owner or Operator: Refers to any person who acquires an interest in  
9 a Site, whether through purchase, lease, transfer, or assignment.

## 10 6. STATEMENT OF FACTS

11 Ecology makes the following finding of facts without any express or implied  
12 admissions by Defendants.

13 A. This Decree covers various parcels described in Amended Exhibit A. Many of  
14 the parcels were abandoned, unused industrial land. Since approximately 1852, these  
15 properties have been the site of various industrial activities. Lumber mills, shipyards, asphalt  
16 and concrete plants, flour mills, metal plating and foundry facilities, and other industrial based  
17 operations have occurred along the waterway.

18 B. In 1991, the City and the Park District began purchasing some of this property  
19 for the purpose of cleanup, redevelopment, and reuse of the City's waterfront for commercial  
20 and residential use, including public access, parks and open spaces. In 2000, the Park District  
21 transferred its interest in parcels covered under this Decree to the FWDA, which, in turn,  
22 intends to transfer its interest in these parcels to developers in accordance with the current  
23 Operating Agreement between the City and FWDA. The City or the FWDA may purchase  
24 additional parcels adjacent to the waterway, for the same purpose. The Parties agree that if  
25 such purchase occurs, they will amend the Decree to include those parcels.

1 C. The City and others have performed independent environmental investigations  
2 of the properties subject to this Decree. Under these investigations, soil and groundwater  
3 samples were collected, documenting the presence of hazardous substances that exceed the  
4 MTCA method B soil cleanup standards under WAC 173-340-740. These hazardous  
5 substances are: total petroleum hydrocarbons (TPH); benzene, toluene, ethylbenzene, and  
6 xylene (BTEX); polynuclear aromatic hydrocarbons (PAHs); antimony; arsenic; cadmium;  
7 chromium; copper; lead; mercury; nickel; zinc; and polychlorinated biphenyls (PCBs).

8 D. In 1993-94, the City prepared an Area-wide Feasibility Study (FS) and Phase I  
9 Remedial Investigation. The investigation indicates, and subsequent site-specific remedial  
10 investigations confirm, that the properties subject to this Decree have similar physical  
11 characteristics, past and future uses, and similar potential contaminant problems, allowing the  
12 development of similar cleanup remedies for all the properties.

## 13 **7. WORK TO BE PERFORMED**

14 A. This Decree contains a program designed to protect public health, welfare and  
15 the environment from the known release, or threatened release, of hazardous substances or  
16 contaminants at, on, or from the sites. The work to be performed in this Decree is subject to  
17 change by Ecology, as necessary, to incorporate the substantive requirements of state and local  
18 laws, as required by RCW 90.105D.090.

19 B. On sites that are subsequently determined to be cleanup sites, exclusive of  
20 actions necessary to discover the release of a hazardous substance consistent with WAC 173-  
21 340-300, the Defendant shall file a written "Notice of Intent to Proceed" with Ecology. The  
22 written Notice of Intent to Proceed shall indicate that the Defendant is prepared to perform  
23 remedial actions at the site consistent with this Decree. The Notice shall provide a legal  
24 description of the site; the intended use of the site; proof that the Defendant owns the property  
25 that makes up the site; and whether the Defendant will be selling, leasing or otherwise  
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1 transferring any ownership or possessory interest in the site to a third party, and, if so, the  
2 identity of the third party.

3 C. No sooner than 90 days nor later than 120 days after receipt by Ecology of a  
4 Notice to Proceed under paragraph 7.B, unless a shorter time is agreed to by Ecology,  
5 Defendant shall submit to Ecology a site-specific Remedial Investigation (RI) work plan  
6 consistent with WAC 173-340-350. The work plan shall include a site-specific Sampling and  
7 Analysis Plan (SSAP) consistent with WAC 173-340-350 and WAC 173-340-820, a site-  
8 specific Quality Assurance Project Plan, a site-specific Safety and Health Plan consistent with  
9 WAC 173-340-810. The SSAP shall incorporate the elements of the Thea Foss Sampling and  
10 Analysis Plan (SAP) and the Thea Foss Quality Assurance Project Plan (QAPP) (Exhibits D  
11 and E to this Decree), and shall be modified, as appropriate, by site-specific characteristics and  
12 knowledge. Ecology shall review and comment on, but not approve or disapprove, the Safety  
13 and Health Plan. The RI work plan shall include a schedule for conducting all RI tasks and  
14 submitting all deliverables. The RI work plan shall be submitted to Ecology for review.  
15 Ecology will endeavor to review the RI plan and submit any comments to Defendant within 21  
16 days of Ecology's receipt of the work plan. Within 21 days of receipt of Ecology's comments,  
17 Defendant shall submit a revised RI work plan to Ecology that incorporate Ecology's  
18 comments.

19 D. Upon receipt of Ecology's approval of the RI work plan, Defendant shall  
20 implement the plan in accordance with the schedule in the approved plan. Within 60 days of  
21 completing all work required in the RI work plan, the Defendant shall prepare and submit to  
22 Ecology a remedial investigation (RI) report. The report must include the Defendant's analysis  
23 of which cleanup action specified in the Thea Foss Redevelopment Cleanup Action Plan,  
24 attached as Exhibit C to this Decree, applies to the site and the rationale for that determination.  
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1 E. After Ecology determines which cleanup action in Exhibit C applies, Defendant  
2 shall prepare a draft site-specific cleanup action plan (SCAP) consistent with WAC 173-340-  
3 360 and the Thea Foss Redevelopment Cleanup Action Plan attached as Exhibit C. The draft  
4 SCAP shall describe and justify the specific cleanup action proposed for the site, including the  
5 specific technologies proposed to be used. The justification for the proposed cleanup action  
6 shall be in accordance with WAC 173-340-360. The draft SCAP shall include a schedule for  
7 submission of remedial design documents and a compliance monitoring plan. If the selected  
8 cleanup action includes institutional controls, the SCAP shall address financial assurances  
9 pursuant to WAC 173-340-440(11). Defendant shall submit the draft SCAP to Ecology for  
10 approval within 60 days of receipt of Ecology's written notice of decision regarding the  
11 appropriate cleanup action for the site. Ecology shall prepare a final draft SCAP, and may  
12 modify the draft SCAP as necessary.

13 F. Ecology shall provide public notice and a 30-day comment period for the RI  
14 report and the final draft SCAP in accordance with WAC 173-340-600. The public shall be  
15 invited to comment upon all information and decisions for which Ecology did not previously  
16 provide an opportunity for public comment. If significant public comment is received on these  
17 issues, Ecology shall prepare a responsiveness summary responding to the comments and issue  
18 it in a timely manner. Ecology shall then issue a final SCAP. Ecology may modify the final  
19 draft SCAP based on public comment.

20 G. The final SCAP shall be included as an amendment to the Decree, pursuant to  
21 the procedures in Section 17.

22 H. The final SCAP shall be implemented by Defendant. In accordance with the  
23 approved time schedule in the SCAP, Defendant shall submit to Ecology for review a draft  
24 engineering design report, construction plans and specifications, and an operation and  
25 maintenance plan (collectively referred to as remedial design documents) consistent with WAC  
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1 opportunity to comment on the proposed restrictive covenant, as required by WAC 173-340-  
2 440(6). Ecology, the Attorney General, and the Defendant landowner of the site shall use good  
3 faith efforts to reach agreement on the terms of the restrictive covenant. Negotiations on the  
4 restrictive covenant shall not exceed 30 days, unless agreed to by the negotiating parties. If  
5 these parties cannot reach agreement on the restrictive covenant within the allotted time period,  
6 Ecology and the Attorney General shall decide the terms of the restrictive covenant, and such  
7 decision shall not be Subject to dispute resolution under this Decree.

8 B. On any site for which a restrictive covenant has been established under  
9 paragraph A of this section, within 90 days of the issuance of the final SCAP the Defendant  
10 landowner of that site shall record with the Office of the Pierce County Auditor the established  
11 restrictive covenant, and provide Ecology and the Attorney General with written confirmation  
12 of such recording.

13 C. The City will use available filing and calendaring mechanisms to ensure that  
14 parcels subject to this Decree are flagged or otherwise noted with use restrictions through the  
15 City's permit system.

## 16 9. DESIGNATED PROJECT COORDINATORS

17 A. The project coordinator for Plaintiff Ecology is:

18 Marv Coleman  
19 Department of Ecology  
20 Southwest Regional Office  
21 300 Desmond Drive  
P.O. Box 47775  
Olympia, WA 98504-7775

22 B. For each site, the Defendant shall include the name and address of the project  
23 coordinator in the Notice of Intent to Proceed filed with Ecology pursuant to Section 7.B of  
24 this Decree.  
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1 C. Each project coordinator shall be responsible for overseeing the implementation  
2 of this Decree. The Ecology project coordinator will be Ecology's designated representative at  
3 the site. To the maximum extent possible, communications between Ecology and the  
4 Defendant and all documents, including reports, approvals, and other correspondence  
5 concerning the activities performed pursuant to the terms and conditions of this Decree, shall  
6 be directed through the project coordinators. The project coordinators may designate, in  
7 writing, working level staff contacts for all or portions of the implementation of the remedial  
8 work required by this Decree. The project coordinators may agree to minor modifications to  
9 the work to be performed without formal amendments to this Decree.

10 D. Any Party may change its respective project coordinator. Written notification  
11 shall be given to the other parties at least 10 calendar days prior to the change.

## 12 10. PERFORMANCE

13 All work performed pursuant to this Decree shall be under the direction and  
14 supervision, as necessary, of a professional engineer or hydrogeologist, or equivalent, with  
15 experience and expertise in hazardous waste site investigation and cleanup. Any construction  
16 work must be under the supervision of a professional engineer. Defendant shall notify Ecology  
17 in writing as to the identity of such engineer or hydrogeologist, or others and of any contractors  
18 and subcontractors to be used in carrying out the terms of this Decree, in advance of their  
19 involvement at the site.

## 20 11. ACCESS

21 Ecology or any Ecology authorized representatives shall have the authority to enter and  
22 freely move about all property at the site at all reasonable times for the purposes of, *inter alia*:  
23 inspecting records, operation logs, and contracts related to the work being performed pursuant  
24 to this Decree; reviewing Defendant's progress in carrying out the terms of this Decree;  
25 conducting such tests or collecting such samples as Ecology may deem necessary; using a  
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1 camera, sound recording, or other documentary type equipment to record work done pursuant  
2 to this Decree; and verifying the data submitted to Ecology by the Defendant. Upon request,  
3 Ecology shall split any samples taken during an inspection unless the Defendant fails to make  
4 available a representative for the purpose of splitting samples. All parties with access to the  
5 site pursuant to this paragraph shall comply with approved safety and health plans.

## 6 **12. SAMPLING, DATA REPORTING, AND AVAILABILITY**

7 A. With respect to the implementation of this Decree, Defendant shall make the  
8 results of all sampling, laboratory reports, and/or test results generated by it, or on its behalf  
9 available to Ecology and shall submit these results in accordance with Section 13 of this  
10 Decree.

11 B. If requested by Ecology, Defendant shall allow split or duplicate samples to be  
12 taken by Ecology and/or its authorized representatives of any samples collected by Defendant  
13 pursuant to the implementation of this Decree. Defendant shall notify Ecology five working  
14 days in advance of any sample collection or work activity at the site. Ecology shall, upon  
15 request, allow split or duplicate samples to be taken by Defendant or its authorized  
16 representatives of any samples collected by Ecology pursuant to the implementation of this  
17 Decree provided it does not interfere with the Department's sampling. Without limitation on  
18 Ecology's rights under Section 11, Ecology shall endeavor to notify Defendant prior to any  
19 sample collection activity.

## 20 **13. PROGRESS REPORTS**

21 A. Defendant shall submit to Ecology written progress reports which describe the  
22 actions taken during the previous reporting period to implement the requirements of this  
23 Decree. These reports must be submitted quarterly when the Defendant is actively sampling or  
24 remediating any site under this Decree. At other times before the remediation process is  
25 complete, these progress reports must be submitted annually. After Defendant has received  
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1 written notification from Ecology that the requirements of the Decree have been satisfactorily  
2 completed under Section 27, Defendant is no longer required to submit progress reports, except  
3 that ongoing monitoring reports are required for properties with one or more ground water  
4 wells. Nothing in this section affects any obligation by Defendants under this Decree to notify  
5 or consult with Ecology. The progress reports shall include the following:

- 6 (1) A list of activities on each site that have taken place during the reporting  
7 period;
- 8 (2) Detailed description of any deviations from required tasks not otherwise  
9 documented in project plans or amendment requests;
- 10 (3) Description of all deviations from any approved schedules for  
11 implementing work under the Decree during the current reporting period  
12 and any planned deviations in the upcoming reporting period;
- 13 (4) For any deviations in schedule, a plan for recovering lost time and  
14 maintaining compliance with the schedule;
- 15 (5) All raw data (including laboratory analysis) received by the Defendant  
16 during the past reporting period and an identification of the source of the  
17 sample; and
- 18 (6) A list of deliverables for the upcoming reporting period if different from  
19 the schedule.

20 B. All progress reports shall be submitted by the tenth day of the month in which  
21 they are due after the effective date of this Decree. Unless otherwise specified, progress reports  
22 and any other documents submitted pursuant to this Decree shall be sent by certified mail,  
23 return receipt requested, to Ecology's project coordinator.  
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1 **14. RETENTION OF RECORDS**

2 Defendant shall preserve, during the pendency of this Decree and for 10 years from the  
3 date this Decree is no longer in effect as provided in Section 27, all records, reports,  
4 documents, and underlying data in its possession relevant to the implementation of this Decree  
5 and shall insert in contracts with project contractors and subcontractors a similar record  
6 retention requirement. Upon request of Ecology, Defendant shall make all non-archived  
7 records available to Ecology and allow access for review. All archived records shall be made  
8 available to Ecology within a reasonable period of time.

9 **15. TRANSFER OF INTEREST IN PROPERTY**

10 A. No voluntary or involuntary conveyance or relinquishment of title, easement,  
11 leasehold, or other interest in any site or portion of any site shall be consummated without  
12 provision for continued operation and maintenance of any containment system, treatment  
13 system, and monitoring system installed or implemented pursuant to this Decree.

14 B. Before transferring any legal or equitable interest in all or any portion of a site  
15 during the effective period of this Decree, Defendant shall serve a copy of this Decree upon  
16 any prospective purchaser, lessee, transferee, assignee, or other successor in interest of the site;  
17 and, at least 30 days before any transfer, Defendant shall notify Ecology of the contemplated  
18 transfer.

19 C. Nothing in this Decree prevents the City or the FWDA from negotiating with  
20 purchasers, lessees, or other third parties to allocate remedial action costs and responsibilities,  
21 provided that such contractual arrangements are not in breach of this Decree and do not affect  
22 the City's or the FWDA's liability under this Decree.

1 **16. RESOLUTION OF DISPUTES**

2 A. Unless otherwise specified in this Decree, in the event a dispute arises as to an  
3 approval, disapproval, proposed modification or other decision or action by Ecology’s project  
4 coordinator, the parties shall utilize the dispute resolution procedure set forth below.

5 (1) Upon receipt of the Ecology project coordinator’s decision, the  
6 Defendant has 14 days within which to notify Ecology’s project  
7 coordinator of its objection to the decision.

8 (2) The parties’ project coordinators shall then confer in an effort to resolve  
9 the dispute. If the project coordinators cannot resolve the dispute within  
10 14 days, Ecology’s project coordinator shall issue a written decision.

11 (3) Defendant may then request Ecology management review of the  
12 decision. This request shall be submitted in writing to the Toxics  
13 Cleanup Program Manager within 7 days of receipt of Ecology’s project  
14 coordinator’s decision.

15 (4) Ecology’s Toxics Cleanup Program Manager shall conduct a review of  
16 the dispute and shall issue a written decision regarding the dispute  
17 within 30 days of the Defendant’s request for review. The Program  
18 Manager’s decision shall be Ecology’s final decision on the disputed  
19 matter.

20 B. Unless otherwise specified in this Decree, if Ecology’s final written decision is  
21 unacceptable to Defendant, Defendant has the right to submit the dispute to the Court for  
22 resolution. The Parties agree that one judge should retain jurisdiction over this case and shall,  
23 as necessary, resolve any dispute arising under this Decree. In the event Defendant presents an  
24 issue to the Court for review, the Court shall review the action or decision of Ecology on the  
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1 basis of whether such action or decision was arbitrary and capricious and render a decision  
2 based on such standard of review.

3 C. The Parties agree to only utilize the dispute resolution process in good faith and  
4 agree to expedite, to the extent possible, the dispute resolution process whenever it is used.  
5 Where either Party utilizes the dispute resolution process in bad faith or for purposes of delay,  
6 the other party may seek sanctions.

7 D. Implementation of these dispute resolution procedures shall not provide a basis  
8 for delay of any activities required in this Decree, unless Ecology agrees in writing to a  
9 schedule extension or the Court so orders.

#### 10 **17. AMENDMENTS; ADDING NEW PARTIES**

11 A. Amendments of this Decree that will directly affect all parcels covered by it  
12 may be processed through a written stipulation among the Decree signatories that is entered by  
13 the Court or by order of the Court. Agreement to amend shall not be unreasonably withheld by  
14 any signatory to the Decree. Amendments to the Decree that affect only specific parcels  
15 require written stipulation by Ecology, the City, the FWDA, and the affected Party. This  
16 includes amendments to add a new party and amendments to include a site-specific cleanup  
17 action plan (SCAP). All amendments shall become effective upon entry by the Court.

18 B. With respect to amendments of the Decree for the purpose of including SCAPs,  
19 after Ecology issues a final SCAP for a site, with the concurrence of the Attorney General, the  
20 signatories shall sign a copy of Exhibit F, an “Amendment to Consent Decree to Include Site  
21 Specific Cleanup Action Plan” and it shall be submitted for entry with the Court.

22 C. Defendants may amend the Consent Decree to make a Successor Owner or  
23 Operator a party to the Decree, using the following procedure. Any proposed Successor  
24 Owner or Operator that will design or construct a cleanup action must become a party to the  
25 Decree by signing a copy of the “Successor Owner or Operator Agreement” in Amended  
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1 Exhibit G, thereby consenting to be bound by the terms and conditions of this Decree as it  
2 applies to the particular parcel in which they are assuming an interest. This Agreement does  
3 not make new Parties jointly and severally liable for Sites for which they are not a Successor  
4 Owner or Operator. The signed Successor Owner or Operator Agreement shall be sent to  
5 Ecology. If Ecology and the Attorney General consent to the proposed amendment, the  
6 Amendment shall be submitted for entry with the Court. This Decree is not a unique  
7 circumstances consent decree under RCW 70.105D.040(4)(e)(ii).

8 D. After this Decree has been amended to include a final SCAP for a particular  
9 site, any Successor Owner or Operator of that site who is not a party to this Decree and who  
10 meets the criteria in RCW 70.105D.040(4)(e)(i) is not subject to enforcement by the State and  
11 is not liable for claims for contribution regarding matters addressed in the settlement.

12 E. For all amendments not covered by paragraphs B and C of this section,  
13 Defendant shall submit any request for an amendment to Ecology and the Attorney General for  
14 approval. Ecology shall indicate its approval or disapproval in a timely manner after the  
15 request for amendment is received. If the amendment to the Decree is substantial, Ecology  
16 will provide public notice and opportunity for comment. Reasons for the disapproval shall be  
17 stated in writing. If Ecology or the Attorney General does not agree to any proposed  
18 amendment, the disagreement may be addressed through the dispute resolution procedures  
19 described in Section 16 of this Decree.

## 20 18. EXTENSION OF SCHEDULE

21 A. An extension of schedule shall be granted only when a request for an extension  
22 is submitted in a timely fashion, generally at least 30 days prior to expiration of the deadline  
23 for which the extension is requested, and good cause exists for granting the extension. All  
24 extensions shall be requested in writing. The request shall specify the reason the extension  
25 is needed.



1 An extension shall only be granted for such period of time as Ecology determines is  
2 reasonable under the circumstances. A requested extension shall not be effective until  
3 approved by Ecology or the Court. Ecology shall act upon any written request for extension in  
4 a timely fashion. It shall not be necessary to formally amend this Decree pursuant to Section  
5 17 when a schedule extension is granted.

6 B. The burden shall be on the Defendant to demonstrate to the satisfaction of  
7 Ecology that the request for such extension has been submitted in a timely fashion and that  
8 good cause exists for granting the extension. Good cause includes, but is not limited to, the  
9 following.

- 10 (1) Circumstances beyond the reasonable control and despite the due  
11 diligence of Defendant including delays caused by unrelated third  
12 parties or Ecology, such as (but not limited to) delays by Ecology in  
13 reviewing, approving, or modifying documents submitted by Defendant;  
14 or  
15 (2) Acts of God, including fire, flood, blizzard, extreme temperatures,  
16 storm, or other unavoidable casualty; or  
17 (3) Endangerment as described in Section 19.

18 However, neither increased costs of performance of the terms of the Decree nor  
19 changed economic circumstances shall be considered circumstances beyond the reasonable  
20 control of Defendant.

21 C. Ecology may extend the schedule for a period not to exceed 90 days, except  
22 where an extension is needed as a result of:

- 23 (1) Delays in the issuance of a necessary permit which was applied for in a  
24 timely manner; or  
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- 1 (2) Other circumstances deemed exceptional or extraordinary by Ecology;  
2 or  
3 (3) Endangerment as described in Section 19.

4 Ecology shall give Defendant written notification in a timely fashion of any extensions  
5 granted pursuant to this Decree.

#### 6 **19. ENDANGERMENT**

7 A. In the event Ecology determines that activities implementing or in  
8 noncompliance with this Decree, or any other circumstances or activities, are creating or have  
9 the potential to create a danger to the health or welfare of the people on the site or in the  
10 surrounding area or to the environment, Ecology may order Defendant to stop further  
11 implementation of this Decree for such period of time as needed to abate the danger or may  
12 petition the Court for an order as appropriate. During any stoppage of work under this section,  
13 the obligations of Defendant with respect to the work under this Decree which is ordered to be  
14 stopped shall be suspended and the time periods for performance of that work, as well as the  
15 time period for any other work dependent upon the work which is stopped, shall be extended,  
16 pursuant to Section 18 of this Decree, for such period of time as Ecology determines is  
17 reasonable under the circumstances.

18 B. In the event Defendant determines that activities undertaken in furtherance of  
19 this Decree or any other circumstances or activities are creating an endangerment to the people  
20 on the site or in the surrounding area or to the environment, Defendant may stop  
21 implementation of this Decree for such period of time necessary for Ecology to evaluate the  
22 situation and determine whether Defendant should proceed with implementation of the Decree  
23 or whether the work stoppage should be continued until the danger is abated. Defendant shall  
24 notify Ecology's project coordinator as soon as possible, but no later than 24 hours after such  
25 stoppage of work, and thereafter provide Ecology with documentation of the basis for the work  
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1 stoppage. If Ecology disagrees with the Defendant's determination, it may order Defendant to  
2 resume implementation of this Decree. If Ecology concurs with the work stoppage, the  
3 Defendant's obligations shall be suspended and the time period for performance of that work,  
4 as well as the time period for any other work dependent upon the work which was stopped,  
5 shall be extended, pursuant to Section 18 of this Decree, for such period of time as Ecology  
6 determines is reasonable under the circumstances. Any disagreements pursuant to the clause  
7 shall be resolved through the dispute resolution procedures in Section 16.

## 8 **20. OTHER ACTIONS**

9 A. Ecology reserves its rights to institute remedial action at the site and  
10 subsequently pursue cost recovery, and Ecology reserves its rights to issue orders and/or  
11 penalties or take any other enforcement action pursuant to available statutory authority under  
12 the following circumstances:

- 13 (1) Where Defendant fails, after notice, to comply with any requirement of  
14 this Decree;
- 15 (2) In the event or upon the discovery of a release or threatened release not  
16 addressed by this Decree;
- 17 (3) Upon Ecology's determination that action beyond the terms of this  
18 Decree is necessary to abate an emergency situation which threatens  
19 public health or welfare or the environment; or
- 20 (4) Upon the occurrence or discovery of a situation beyond the scope of  
21 this Decree as to which Ecology would be empowered to perform any  
22 remedial action or to issue an order and/or penalty, or to take any other  
23 enforcement action. This Decree is limited in scope to each site  
24 described in Section 2 and to those types and maximum concentrations  
25 of hazardous substances that are on site at the time this Decree is  
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1 entered, and are described in Section 3.2 of the Thea Foss  
2 Redevelopment Cleanup Action Plan, attached as Exhibit C.

3 B. Ecology reserves all rights regarding the injury to, destruction of, or loss of  
4 natural resources resulting from the release or threatened release of hazardous substances from  
5 each site.

6 C. Ecology reserves the right to take any enforcement action whatsoever, including  
7 a cost recovery action, against potentially liable persons not party to this Decree.

8 D. Ecology reserves the right to remove all or a portion of a site from this Decree  
9 and take separate enforcement actions against Defendants at that site if Ecology determines it  
10 is necessary to do so to meet Ecology's source control obligations under the 1994 Cooperative  
11 Agreement between Ecology and EPA.

## 12 **21. INDEMNIFICATION**

13 Each Defendant agrees to indemnify and save and hold the State of Washington, its  
14 employees, and agents harmless from any and all claims or causes of action for death or  
15 injuries to persons or for loss or damage to property arising from or on account of acts or  
16 omissions of Defendant, its officers, employees, agents, or contractors in entering into and  
17 implementing this Decree. However, no Defendant is obligated to indemnify the State of  
18 Washington, or save or hold its employees and agents harmless, from any claims or causes of  
19 action arising out of the negligent acts or omissions of the State of Washington, or the  
20 employees or agents of the state, in implementing the activities pursuant to this Decree.

## 21 **22. COMPLIANCE WITH APPLICABLE LAWS**

22 All actions carried out by a Defendant pursuant to this Decree shall be done in  
23 accordance with all applicable federal, state, and local requirements, including requirements to  
24 obtain necessary permits.  
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1 **23. REMEDIAL AND INVESTIGATIVE COSTS**

2 Each Defendant agrees to pay costs incurred by Ecology pursuant to this Decree. The  
3 costs required to be paid under this Decree shall include work performed by Ecology or its  
4 contractors for, or on, each site under ch. 70.105D RCW both prior to and subsequent to the  
5 issuance of this Decree, for investigations, remedial actions, and Decree preparation,  
6 negotiations, oversight and administration. Ecology costs shall include costs of direct activities  
7 and support costs of direct activities as defined in WAC 173-340-550(2). Defendant agrees to  
8 pay the required amount within 90 days of receiving from Ecology an itemized statement of  
9 costs that includes a summary of costs incurred, an identification of involved staff, and the  
10 amount of time spent by involved staff members on the project. A general statement of work  
11 performed will be provided upon request. Itemized statements shall be prepared quarterly.  
12 Failure to pay Ecology’s costs within 90 days of receipt of the itemized statement will result in  
13 interest charges.

14 Ecology entered into an agreement with the City of Tacoma, dated June 14, 1993 to  
15 receive prepayment of remedial action costs associated with sites under this Decree. Ecology  
16 and the City may enter into additional prepayment agreements for sites under the Decree. If  
17 the City pays remedial action costs pursuant to a prepayment agreement with Ecology for a site  
18 under this Decree, it shall not be required to pay those costs again under this Consent Decree.  
19 The City is not released from liability for payment of remedial action costs to Ecology should  
20 the City of Tacoma fail to comply with the conditions of such a prepayment agreement, or  
21 should prepayment agreement be found to be invalid for any reason.

22 **24. IMPLEMENTATION OF REMEDIAL ACTION**

23 If Ecology determines that a Defendant has failed without good cause to implement the  
24 remedial action called for by this Decree, Ecology may, after notice to Defendant, perform any  
25 or all portions of the remedial action(s) that remain incomplete. If Ecology performs all or  
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1 portions of the remedial action because of the Defendant's failure to comply with its  
2 obligations under this Decree, Defendant shall reimburse Ecology for the costs of doing such  
3 work in accordance with Section 23, provided that Defendant is not obligated under this  
4 section to reimburse Ecology for costs incurred for work inconsistent with or beyond the scope  
5 of this Decree.

## 6 **25. FIVE YEAR REVIEW**

7 As remedial action, including ground water monitoring, continues at the site, the parties  
8 agree to review the progress of remedial action at the site, and to review the data accumulated  
9 as a result of site monitoring as often as is necessary and appropriate under the circumstances.  
10 At least every five years the parties shall meet to discuss the status of the site and the need, if  
11 any, of further remedial action at the site. Ecology reserves the right to require further  
12 remedial action at the site under appropriate circumstances. This provision shall remain in  
13 effect for the duration of the Decree.

## 14 **26. PUBLIC PARTICIPATION**

15 Ecology shall maintain the responsibility for public participation at each site. However,  
16 each Defendant shall cooperate with Ecology and, if agreed to by Ecology, shall:

17 A. Prepare drafts of public notices and fact sheets at important stages of the  
18 remedial action, such as the submission of work plans and the completion of engineering  
19 design. Ecology will finalize (including editing if necessary) and distribute such fact sheets  
20 and prepare and distribute public notices of Ecology's presentations and meetings;

21 B. Notify Ecology's project coordinator prior to the preparation of all press  
22 releases and fact sheets, and before major meetings with the interested public and local  
23 governments. Likewise, Ecology shall notify Defendant prior to the issuance of all press  
24 releases and fact sheets, and before major meetings with the interested public and local  
25 governments;

1 C. Participate in public presentations on the progress of the remedial action at the  
2 site. Participation may be through attendance at public meetings to assist in answering  
3 questions, or as a presenter;

4 D. In cooperation with Ecology, arrange and/or continue information repositories  
5 to be located at the Tacoma Public Library, Main Branch, and Ecology's Southwest Regional  
6 Office. At a minimum, copies of all public notices, fact sheets, and press releases; all quality  
7 assured ground water, surface water, soil sediment, and air monitoring data; remedial actions  
8 plans, supplemental remedial planning documents, and all other similar documents relating to  
9 performance of the remedial action required by this Decree shall be promptly placed in these  
10 repositories.

## 11 **27. DURATION OF DECREE**

12 A. This Decree shall remain in effect and the remedial program described in the  
13 Decree shall be maintained and continued for a Site until the Defendant has received written  
14 notification from Ecology that the requirements of this Decree have been satisfactorily  
15 completed as to that site. Upon completion of active remedial actions specified under the  
16 SCAP, a Defendant may request, and if warranted Ecology will issue, a written confirmation  
17 that such active remedial actions have been completed.

18 B. This Decree shall apply to any property within the geographic boundary  
19 described in Amended Exhibit A for which Ecology has received a Notice of Intent to Proceed  
20 under Section 7.B within 5 years of the effective date of this Decree, or within 5 years of the  
21 effective date of the First Comprehensive Amendment to the Decree.

22 C. After five years from the effective date of the First Comprehensive Amendment  
23 to this Decree:

- 24 (1) Ecology and the Attorney General at their convenience may terminate  
25 this Decree as to any site not within the scope of paragraph B of this  
26

1 section at any time prior to or within 21 days of receipt of a Notice of  
2 Intent to Proceed under Section 7.B of this Decree, by providing 60 days  
3 written notice of termination to Defendant.

- 4 (2) Defendant at its convenience may terminate this Decree as to any site  
5 not within the scope of paragraph B of this section at any time prior to  
6 receipt by Ecology of a Notice of Intent to Proceed, by providing 60  
7 days written notice to Ecology and the Attorney General.

#### 8 **28. CLAIMS AGAINST THE STATE**

9 Each Defendant hereby agrees that it will not seek to recover any costs accrued in  
10 implementing the remedial action required by this Decree from the State of Washington  
11 Department of Ecology; and further, that the Defendant will make no claim against the state  
12 Toxics Control Account for any costs incurred in implementing this Decree. Except as  
13 provided above, however, Defendant expressly reserves its right to seek to recover any costs  
14 incurred in implementing this Decree from any other potentially liable person under state or  
15 federal law.

#### 16 **29. COVENANT NOT TO SUE: REOPENER**

17 In consideration of Defendant's compliance with provisions of this Decree, Ecology  
18 covenants not to institute further legal or administrative actions against Defendant regarding  
19 matters within the scope of this Decree. This covenant is limited in its application to the sites  
20 described in Section 2 of this Decree and to the types and maximum concentrations of  
21 hazardous substances that are on site at the time this Decree is entered, and are described in  
22 Section 3.2 of the Thea Foss Redevelopment Cleanup Action Plan, attached as Exhibit C. This  
23 covenant is not applicable to any other area, substances, or concentrations of substances. This  
24 covenant is contingent upon Defendant's compliance with all terms and conditions of this  
25  
26



1 Decree. This covenant does not affect Ecology’s right to seek recovery for natural resource  
2 damages.

3 A. Reopeners: Notwithstanding the covenant given above, Ecology reserves the  
4 right to institute legal or administrative actions against a Defendant seeking to require them to  
5 perform additional response actions at a site under this Decree, and to pursue appropriate cost  
6 recovery in accordance with provisions set out in RCW 70.105D.050, under the following  
7 circumstances:

- 8 (1) If Defendants fail to meet the requirements of this Decree, including, but  
9 not limited to, failure of the remedial action to meet the cleanup  
10 standards identified in the Thea Foss Redevelopment Cleanup Action  
11 Plan (Exhibit C) and the SCAP for that site;
- 12 (2) Upon Ecology’s determination that action beyond the terms of this  
13 Decree is necessary to abate an imminent and substantial endangerment  
14 to public health or welfare or the environment;
- 15 (3) In the event new information becomes available regarding factors  
16 previously unknown to Ecology, including the nature or quantity of  
17 hazardous substances at the Site, and Ecology determines, in light of this  
18 information, that further remedial action is necessary at the Site to  
19 protect human health or the environment, and Defendants, after notice,  
20 fail to take the necessary action within a reasonable time;
- 21 (4) In the event the assumptions upon which the cleanup remedies agreed to  
22 in the Thea Foss Redevelopment Cleanup Action Plan and the SCAP for  
23 the site were based do not prove to be true or accurate;

1 (5) In the event the remedial action conducted at the Site fails to meet the  
2 requirements set forth in the Thea Foss Redevelopment Cleanup Action  
3 Plan and the SCAP for the site; and

4 (6) In the event more stringent or different cleanup standards or other  
5 regulatory requirements regarding remedial action Under MTCA are  
6 adopted by the Washington State Legislature or by Ecology if it  
7 determines that applying the new standards to a particular site is  
8 necessary to protect human health or the environment.

9 Further, if factors or conditions at the site, previously unknown to Ecology, are  
10 discovered after entry of this Decree, and these unknown factors or conditions indicate that the  
11 remedial action is not protective of the public health, or welfare, or the environment, or present  
12 a previously unknown threat to human health or the environment, Ecology also reserves the  
13 right to request the court to amend this covenant not to sue as required by RCW  
14 70.105D.040(4)(c).

15 B. Applicability: The Covenant Not to Sue set forth above shall have no  
16 applicability whatsoever to

- 17 (1) Criminal liability;
- 18 (2) Liability for damages to natural resources;
- 19 (3) Any Ecology action against potentially liable parties not party to this  
20 Decree;
- 21 (4) Groundwater contamination that may exist at any of the property  
22 covered under Section 2.A that requires active remediation;
- 23 (5) Property covered under Section 2.A on which Defendant does not fully  
24 implement all remedial actions under this Decree, including a SCAP;
- 25
- 26

1 (6) Any portion of a site between the mean high water mark and the low  
2 water mark.

3 **30. EFFECTIVE DATE**

4 This Decree was originally effective on October 17, 1994, the date it was entered by the  
5 Court. The “Consent Decree – First Comprehensive Amendment” is effective on the date it is  
6 entered by the Court.

7 **31. PUBLIC NOTICE AND WITHDRAWAL OF CONSENT**

8 This Decree has been the subject of public notice and comment under RCW  
9 70.105D.040(4)(a). As a result of this process, Ecology has found that this Decree will lead to  
10 a more expeditious cleanup of hazardous substances at the site.

11 //

12 //

13 //

14 //

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18 //

19 //

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21 //

22 //

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25

26

1 If the Court withholds or withdraws its consent to this Decree, it shall be null and void  
2 at the option of any Party and the accompanying Complaint shall be dismissed without costs  
3 and without prejudice. In such an event, no Party shall be bound by the requirements of this  
4 Decree.

5 DATED this \_\_\_\_\_ day of \_\_\_\_\_, 2002.

6  
7 \_\_\_\_\_  
8 JUDGE/COMMISSIONER  
9 Pierce County Superior Court

10 DEPARTMENT OF ECOLOGY

CHRISTINE O. GREGOIRE  
Attorney General

11  
12 \_\_\_\_\_  
13 JAMES PENDOWSKI  
14 Program Manager  
15 Toxics Cleanup Program  
16 Date: \_\_\_\_\_

17 \_\_\_\_\_  
18 STEVEN J. THIELE, WSBA #20275  
19 Assistant Attorney General  
20 Attorneys for Plaintiff  
21 Department of Ecology  
22 Date: \_\_\_\_\_

16 CITY OF TACOMA

17  
18 By: \_\_\_\_\_  
19 Date: \_\_\_\_\_  
20 Name: \_\_\_\_\_  
21 Title: \_\_\_\_\_

22 \_\_\_\_\_  
23 DOUGLAS F. MOSICH, WSBA #18341  
24 Attorney for City of Tacoma  
25 Date: \_\_\_\_\_

21 FOSS WATERWAY DEVELOPMENT  
22 AUTHORITY

PRESTON GATES & ELLIS LLP

23 \_\_\_\_\_  
24 DONALD G. MEYER  
25 Executive Director  
26 Date: \_\_\_\_\_

27 \_\_\_\_\_  
28 KIRK A. LILLEY, WSBA #20369  
29 Attorneys for Foss Waterway  
30 Development Authority  
31 Date: \_\_\_\_\_

CD First Amend version 10-08-01.doc

WORKING/REFERENCE  
COPY

**EXHIBIT C**

**THEA FOSS REDEVELOPMENT CLEANUP ACTION PLAN**

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# THEA FOSS AREA WIDE CONSENT DECREE CLEANUP ACTION PLAN

## 1.0 INTRODUCTION

This final Cleanup Action Plan (CAP) is provided to describe the proposed remedial actions for certain Thea Foss Area-Wide Redevelopment Properties (hereinafter collectively referred to as "Site"; individual parcels referred to as "site(s)") located along the upland portions of the Thea Foss Waterway in Tacoma, Washington as more fully described in Section 2.1. (Figure 1-1 shows the entire Thea Foss Waterway Area; Figure 1-2 shows the sites subject to this Cleanup Action Plan.) This CAP has been prepared to satisfy the requirements of the Model Toxics Control Act (MTCA). The purposes of this Cleanup Action Plan are to: 1) describe the Site, including a summary of its history and extent of contamination as presented in the Area-Wide Feasibility Study and Phase I Remedial Investigation (Area-Wide Report); 2) identify the site specific cleanup standards; 3) summarize the remedial alternatives presented in the Feasibility Study (FS); and 4) identify and describe the selected alternative for Site remediation.

A major component of the City of Tacoma's Thea Foss Waterway Environmental Master Plan project is to facilitate the cleanup process on the publicly owned upland properties. These cleanups are expected to be conducted under a Consent Decree which would have jurisdiction over the investigation, design and cleanup processes on these public properties and will define potential cleanup action alternatives based on future use and contaminants encountered. In compliance with the Washington State Model Toxics Control Act (MTCA), the Consent Decree is accompanied by this Cleanup Action Plan which defines the Ecology requirements for cleanup actions conducted under the Consent Decree.

This CAP establishes potential remedial actions for a number of properties, described in Section 2.1, below. Some of the properties potentially subject to this CAP are currently known to be contaminated and some are not. Some are currently owned by the City and the Metropolitan Park District of Tacoma and some are not. Those properties potentially subject to this CAP that are not reported as or determined to be cleanup sites, and those properties that are not purchased by the City or the Park District at some time in the future will not be cleaned up under the Decree or this CAP.

Thorough descriptions of the Site and the remedial alternatives set forth are found in the Area-Wide Report (B & V Waste Science and Technology Corp. (BVWST), 1994). The Area-Wide Report was generated as an independent action by the City of Tacoma, with technical assistance by Ecology.

## 2.0 SITE DESCRIPTION

The Thea Foss Waterway is comprised of approximately three and one-half miles of shoreline adjacent to the City of Tacoma central business district (Figure 1-1). The upland properties on the Thea Foss Waterway have been sites of



industrial activity since 1852. Lumber mills were the original industry until the 1880's when shipping and warehousing began to dominate the waterfront. Since the turn of the century, shipyards, asphalt and concrete plants, flour mills, metal plating and foundry facilities, and other industrial based operations have occurred along the waterway.

Since the late 1970s, the properties adjacent to the waterway have, for the most part, become vacant. In 1991 the City of Tacoma (City) and the Metropolitan Park District of Tacoma (MPD) began acquiring 27 acres of property adjacent to the Waterway with plans for future redevelopment. Some of these properties were known to contain varying amounts of contamination. The City of Tacoma redevelopment plans, which were formalized in the *Thea Foss Waterway Design and Development Plan* (MAKERS 1992), focus on transitioning the area from abandoned industrial land to a thriving commercial, retail, office, and residential setting.

### 2.1 Applicable Properties

Previous investigations indicate that the properties adjacent to the waterway subject to this CAP are likely to have similar physical characteristics and similar potential contaminant problems. Previous studies also indicate that identified contamination is primarily due to petroleum related spills and discharges, and metals wastes.

The similarities include physical setting, past use, future use, and contamination characteristics. These similarities facilitate the development of a comprehensive environmental cleanup solution for all of the publicly owned properties adjacent to the waterway.

The specific properties to which this CAP potentially applies are: Dock Street Right of Way (ROW), Municipal Dock, Former Atlas Foundry, Coast Iron Works, Former Steam Plant, Johnny's Seafood, parcels 1A, 1B, 1C, 1D, 2, 3A, 3B, 3C, 5, 7, 8, and 9, 15th Street ROW, 18th Street ROW, 11th Street ROW, Sewage Pump Station, Investco property, Trucco property, Harmon Cabinets and any State Department of Natural Resources (DNR) property. Parcels 4A, 4B and the area labeled "Former Coal Gasification Site" are known to be contaminated by a former manufactured coal gasification facility and are sources of contamination to the waterway. The cleanup of the Former Coal Gasification Site is currently being addressed under a separate Agreed Order DE 93TC-S166 (dated October 28, 1993) with Ecology and is not within the scope of this CAP.

This Cleanup Action Plan applies to the above properties located adjacent to the Thea Foss Waterway, shown in Figure 1-2, which meet all the following criteria:

- Are owned now or in the future by the City of Tacoma or the Metropolitan Park District of Tacoma.

- Are located within boundaries defined by Dock Street, inclusive, and the Waterway between parcel 1A and the Harmon Cabinets property, and the sewage pump station on the west side of the Waterway, or are one of the selected parcels on the east side of the Waterway, as shown in Figure 1-2.
- Have contamination of sufficient degree to warrant a cleanup under MTCA (Chapter 70.105D RCW).
- Have only the contaminants listed in Table 3-1 with site-wide concentrations less than or equal to the maximums which are listed in Table 3-1 and detailed in Section 3.2.
- Have soil contamination only. Parcels with ground water contamination which, in Ecology's opinion, requires active remediation (defined in subsection 4.2.1), are not addressed by this Cleanup Action Plan.

## 2.2 Waterway Area Characteristics

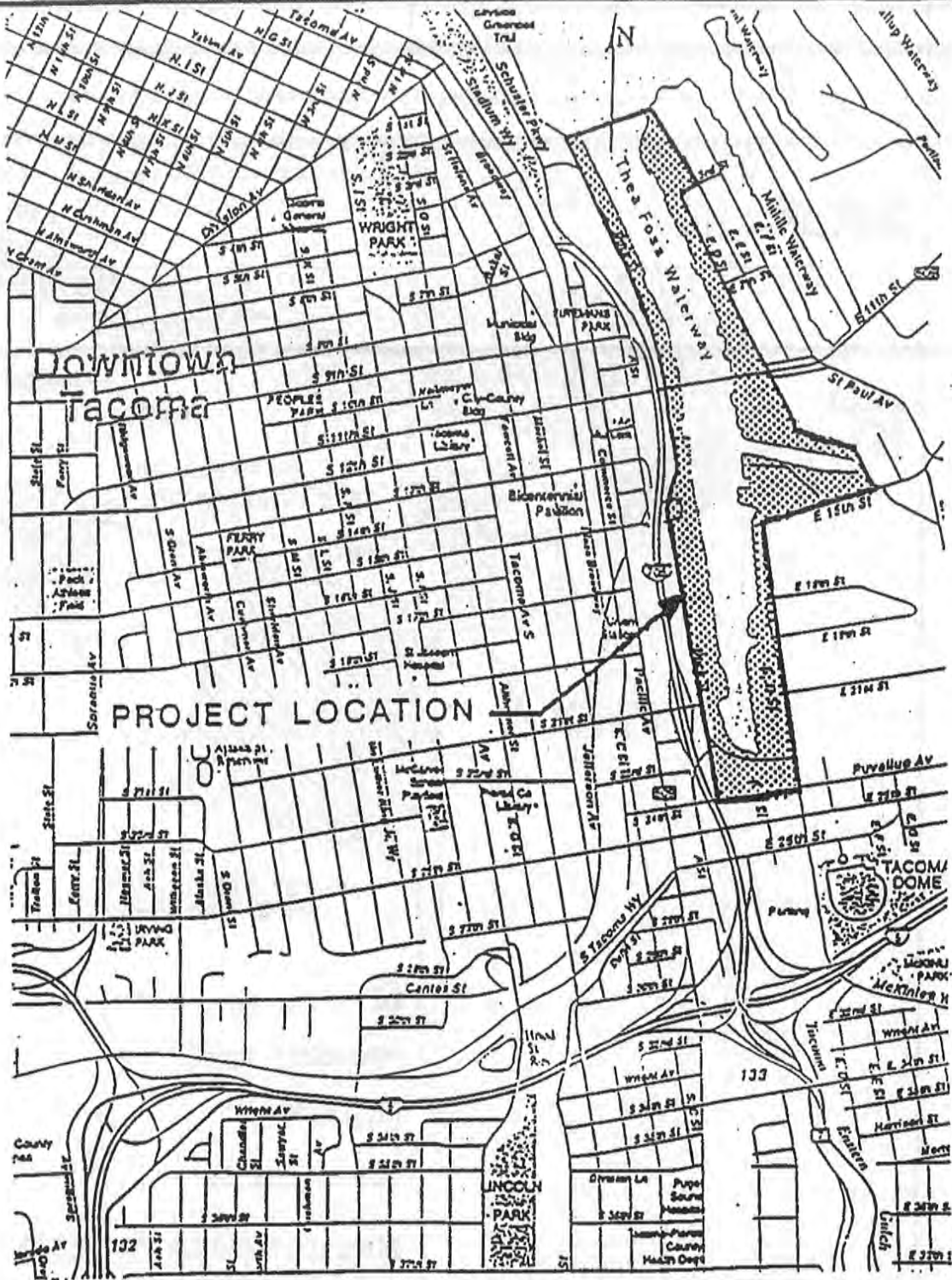
Characteristics of the Site, including area geology, hydrogeology, vegetation, terrestrial wildlife resources, aquatic resources, and environmentally sensitive species and areas are described in detail in Sections 3.0 and 4.0 of the Area-Wide Report.

## 2.3 Commencement Bay Superfund Site Considerations

In 1983, the Commencement Bay area was identified as a federal Superfund site. Thea Foss Waterway marine sediments were found to be contaminated with metals, polynuclear aromatic hydrocarbons (PAHs), oil and grease (treated herein as TPH), polychlorinated biphenyls (PCBs), and other organic chemicals (Tetra Tech, 1985, 1988). The Record of Decision for the Commencement Bay Nearshore/Tideflats Superfund Site (US EPA, 1989) defines the cleanup plan for the marine environment throughout the superfund site. The overall objective of the plan is to achieve sediment quality in the bay that will support a healthy marine environment and will reduce the risk of eating contaminated seafood from the bay.

The selected remedy calls for: 1) continued public health warnings on seafood consumption, 2) source control, 3) natural recovery of marginally contaminated sediments, 4) active cleanup of significantly contaminated sediments, and 5) long-term monitoring. To implement the cleanup plan, EPA and Ecology entered into an agreement in which Ecology is lead for source control and EPA is the lead for sediment remedial action.

The Source Control Strategy (EPA, May 1992) describes Ecology's source control efforts. The source identification phase is complete in the Thea Foss and Wheeler Osgood Waterways. Ecology is continuing its work on source characterization and source control.



**CITY OF TACOMA  
THEA FOSS WATERWAY  
ENVIRONMENTAL MASTER PLAN**

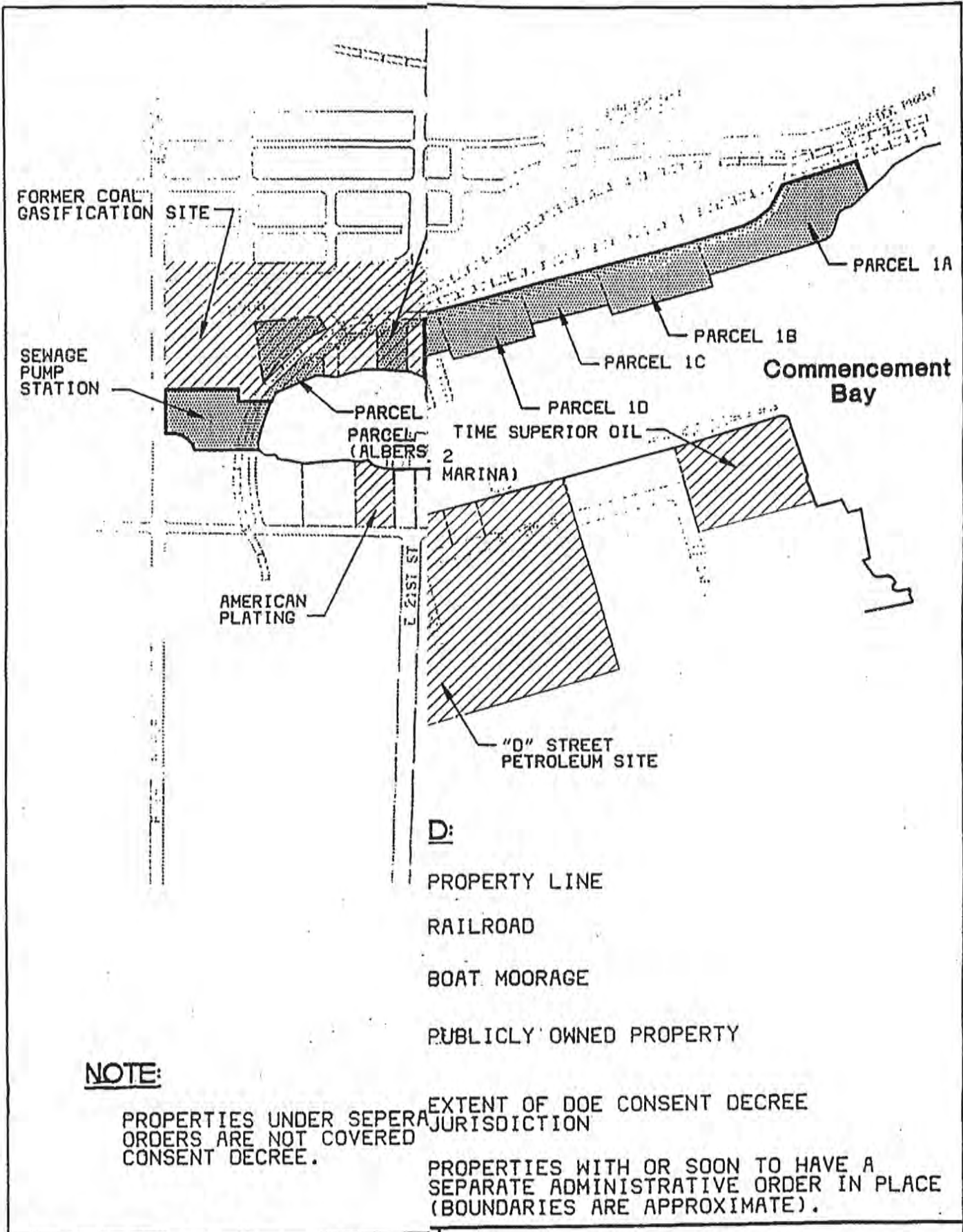
**CLEANUP ACTION PLAN**



BLACK & VEATCH  
Waste Science, Inc.  
1201 PACIFIC AVE.  
SUITE 1100  
TACOMA, WA. 98402  
(206) 393-1436

**LOCATION MAP**

**FIGURE 1-1**



CITY OF TACOMA  
 THEA FOSS WATERWAY  
 ENVIRONMENTAL MASTER PLAN

SITE MAP  
 FIGURE 1-2

Planning for sediment cleanup has also begun in the Thea Foss and Wheeler Osgood Waterways. EPA and the City of Tacoma signed an Administrative Order on Consent on March 23, 1994 that calls for sediment remedial design in the Thea Foss and Wheeler Osgood Waterways. Remedial design work will confirm natural recovery estimates, designate areas and volumes of sediment needing cleanup, identify potential disposal sites and cleanup options. During remedial design, EPA will determine whether source control is complete enough to move forward with sediment remedial action. Decisions on these matters will be subject to public comment before a final cleanup decision is made.

### 3.0 SITE CHARACTERIZATION

#### 3.1 Previous Investigations

During 1993 and early 1994, the City's contractor, BVWST, performed a study and compilation of previous environmental investigations performed on properties along the Thea Foss Waterway. With Ecology technical assistance, the City then generated an Area-Wide Feasibility Study and Phase I Remedial Investigation report (Area-Wide Report), with the objectives of: 1) evaluating alternatives available to provide a permanent site remedy for the waterway area, in accordance with the Model Toxics Control Act, and 2) providing a framework for site specific remedial investigations, to be performed as waterway properties are developed. The Area-Wide Report was submitted to Ecology in March 1994.

##### 3.1.1 Summary of Investigations

Under previous investigations, soil and ground water environmental samples have been collected from 15 of the properties adjacent to the Thea Foss Waterway currently owned by the City or the MPD (hereinafter: "publicly owned"). Properties considered under this Cleanup Action Plan which have not been sampled are Parcel 1B, the Municipal Dock, Johnny's Seafood, the 15th Street right-of-way (ROW), the sewage pump station, and the East 11th Street ROW. The environmental samples were collected during environmental assessments and underground storage tank (UST) removals. The combined data from these individual sampling efforts, and from limited additional sampling conducted by the City, provides a basis for the environmental evaluation of the properties in this Cleanup Action Plan and development of the FS Contaminant Scenario presented in Chapter 6.0 of the Area Wide Report (BVWST 1994).

In May 1990, a Phase I Environmental Assessment was conducted on several parcels on the west side of the Thea Foss Waterway (Parametrix, Inc. 1990). The individual assessments were performed by collecting and reviewing historical data, conducting interviews with current and previous employees or owners of the parcels, and visiting the parcels. These assessments were performed at the Municipal Dock Building, the former Atlas Foundry/Coast Iron Works properties, the former Steam Plant property, East 18th Street ROW, Parcel 7, and Parcel 4A. A low to moderate potential for soil and ground

water contamination was indicated for all of these parcels except Parcel 4A which was given moderate to high potential due to proximity to the former coal gasification plant site.

In December 1990, a Phase II Environmental Site Assessment was conducted prior to the City and MPD purchase of several parcels adjacent to the Thea Foss Waterway. Soil samples were collected from Parcels 1A, 1C, 1D, 3A, 3B, 3C, 4A, 5, 7, and 8 (Bison Engineering, Inc. 1990). However, some problems are noted with this report. The detection limits used for arsenic (3.3 ppm), hexachlorobenzene (2.0 ppm) and individual carcinogenic polycyclic aromatic hydrocarbons (PAH) (1.0 ppm) were generally greater than the MTCA Method B cleanup standards of 1.43 ppm, 0.63 ppm, and 0.14 ppm, respectively. Additionally, the documentation of composite samples is not consistent. Additional site characterizations have been conducted on Parcel 3, Parcel 7, Parcel 2, the Atlas Foundry property, the Coast Iron Works property, and the Steam Plant property.

Soil samples were collected from Parcel 3 during two separate UST removals (Tacoma-Pierce County Health Department (TPCHD) UST File 1993) and prior to an interim beautification measure on the property (Spectra Laboratories, Inc. 1993). In addition, ground water samples were collected from Parcel 3 as part of a City Waterway Special Study Report (Ecology and Environment, Inc. 1990). The ground water samples collected as a part of this study were not collected from wells constructed in accordance with Chapter 173-160 WAC. Therefore, these data can only be used to indicate the possible presence of contamination. In addition, some samples did not meet holding time or other QC limits and others had sodium interference which prohibited the results for the total halogenated hydrocarbon analyses from being obtained.

At Parcel 7, additional investigations included a Phase II Environmental Site Assessment (Kennedy/Jenks Consultants 1991), and a Site Characterization and Remedial Alternatives Investigation (BVWST 1993). Multiple soil samples were collected from the Totem Marina property while three USTs were removed and the soil adjacent to the tanks was remediated by aerating stockpiled soils onsite (TPCHD UST File 1993).

One slag sample was collected at the former Atlas Foundry site from a location immediately above the waterline of the Thea Foss Waterway (Coleman 1992). Three soil samples were collected at the former Coast Iron Works site (Tacoma WWTP Laboratory 1990). During a TPCHD environmental assessment of the Steam Plant site, soil, sediment, sludge, brick, and concrete samples were collected and analyzed (TPCHD 1988).

### 3.1.2 Summary of Environmental Sampling Results

The upland soil organic contamination detected on all of the publicly owned properties along the Waterway can be generalized as weathered petroleum hydrocarbons resulting from past industrial practices. Nine of the thirteen publicly owned sites along the Waterway contained petroleum products or PAH detections greater than MTCA Method B cleanup standards. A majority of this

soil has not been remediated to date. However, there are also several sites where leaking underground storage tanks (LUSTs) have been removed and contaminated soils were remediated to the satisfaction of the TPCHD.

Four of the thirteen sites along the Waterway contained metals concentrations greater than MTCA Method B cleanup standards. One of these sites, the former Atlas Foundry site contains antimony, arsenic, chromium, copper and lead, all detected in a single slag sample from the Waterway bank at concentrations greater than the Method B soil cleanup standards. Much of the slag on the site may be able to be separated from the soil and removed from the site. The potential for metals contamination from leaching of this slag is unknown on this site. The former Steam Plant site contained one sample with mercury concentrations greater than the MTCA B soil cleanup standard. The other two sites (Parcels 3A and 7) each contained lead detected at concentrations greater than the cleanup standards. For Parcel 3A this detection was from a composite sample and for Parcel 7 this detection occurred in the Dock Street ROW, near the railroad ROW.

Ground water analytical data has been established for four publicly owned properties (Parcels 3A, 3B, 3C, and 7) and one privately owned property (Parcel 9) along the Waterway. None of the concentrations of chemicals from the ground water samples collected exceed the marine chronic surface water criteria per Chapter 173-201A WAC. Samples from three of the sites were ground water grab samples. Two of these sites (Parcels 3B and 3C) had concentrations of PAHs which exceed the standard for the protection of human health through the consumption of aquatic organisms per 40 CFR 131 Subpart D. However, these samples also had quality control problems which make the data suspect. If these chemicals are present, then a LUST is a potential source. However, since BTEX and TPH were not analyzed, verification of a LUST as a source is difficult. The two properties to the south (Parcel 7 and Parcel 9), had ground water samples collected from approved wells. PAHs were not detected in any of these wells, however, TPH and benzene were detected at elevated levels in one Parcel 7 well. These compounds are probably related to a LUST, recorded on the site, which was removed in 1989.

### 3.2 Soil Quality

The previous section discussed the contaminants that are known to be present on properties adjacent to the Waterway based on previous investigations. The major chemicals of concern in soils are TPH, the carcinogenic PAHs, metals, and PCBs. Additionally, the potential exists along the waterway for soil and ground water contamination caused by LUSTs. Because of this potential, BTEX is listed as a contaminant of concern.

For the Area-Wide Report, a "Feasibility Study (FS) Contaminant Scenario" was developed to describe the range of existing contaminants of concern. Based on existing data, future site specific investigations on parcels will likely identify site contamination which will fall within the parameters of this scenario. Site histories, previous land use and environmental investigations conducted to date indicate a low potential for other types of previously unidentified hazardous compounds in concentrations which would pose a threat

to human health and the environment. Further, relatively volatile contaminants are not expected to be present at elevated levels on parcels based primarily on the duration of time since industrial uses have occurred. Table 3-1 specifically identifies the primary chemicals of concern and the maximum concentrations expected. The Cleanup Action Plan is not applicable to any site that contains contaminants other than those listed in Table 3-1 or to any site with site-wide concentrations of any contaminants that exceed the maximum soil concentrations listed in Table 3-1. The maximum anticipated concentrations for TPH and the carcinogenic PAHs presented in Table 3-1 are based on the highest concentrations observed during previous investigations. The maximum concentration for benzene is based on a five percent benzene concentration common in gasoline. The reasonable maximum concentration for benzene was calculated as five percent of the TPH-G maximum of 5,000 mg/kg, or

**Table 3-1**  
**CAP Contaminant Scenario**  
**Soil Contamination Maximums**  
**Applicable to the CAP Contamination Scenario**

| Compound               | Maximum Soil Concentration (mg/Kg)                      | Compound               | Maximum Soil Concentration (mg/Kg) |
|------------------------|---|------------------------|------------------------------------|
| TPH <sup>1</sup>       | 5,000   | Indeno(1,2,3-cd)pyrene | 10.0                               |
| Benzene                | 250   | Antimony               | 320                                |
| Toluene                | 5,000   | Arsenic                | 200 <sup>2</sup>                   |
| Ethylbenzene           | 5,000   | Cadmium                | 400                                |
| Xylenes                | 5,000   | Chromium               | 4,000                              |
| Benzo(a)anthracene     | 10.0  | Copper                 | 29,600                             |
| Benzo(a)pyrene         | 10.0  | Lead                   | 2,500 <sup>3</sup>                 |
| Benzo(b)fluoranthene   | 10.0  | Mercury                | 240                                |
| Benzo(k)fluoranthene   | 10.0  | Nickel                 | 16,000                             |
| Chrysene               | 10.0  | Zinc                   | 240,000                            |
| Dibenzo(a,h)anthracene | 10.0  | PCBs (total)           | 50.0                               |
| 1                      | TPH by WTPH 418.1 modified, WTPH-D, or WTPH-G analyses. |                        |                                    |
| 2                      | Based on background concentration.                      |                        |                                    |
| 3                      | Based on Method A standard.                             |                        |                                    |



250 mg/kg. The toluene, ethylbenzene, and xylene maximum soil concentrations were first calculated as ten times the soil standard for ground water protection (WAC 173-340-740(3)(a)(ii)(A)). However, this yielded unacceptably high values with respect to flammability. Therefore, the maximum soil concentrations deemed acceptable for the cleanup scenario for toluene, ethylbenzene, and xylene were set at 5,000 ppm. The ground water standard is based on the protection of surface water as discussed in Chapter 7.0 of the Area-Wide Report. The maximum concentration for xylene is based on the MTCA Method B ground water standard (WAC 173-340-720(3)) because xylene does not have a surface water standard. The maximum concentrations for antimony, cadmium, chromium, copper, mercury, nickel, and zinc are ten times the Method B soil standard. The maximum concentration for arsenic is ten times the background level of 20 ppm (WAC 173-340-740(2), Table 2). The maximum concentration for lead is ten times the Method A soil standard since there is no Method B standard for lead. PCBs have not been analyzed in soils during previous investigations, therefore PCB presence and concentrations are currently unknown. Any PCB contamination is expected to be localized and associated with a spill or catastrophic failure of a transformer. The maximum concentration for PCBs (total) has been set such that soils cleaned up under the CAP Contaminant Scenario would not be regulated by the Toxic Substances Control Act (TSCA) dangerous waste disposal regulations.

All maximum contamination concentrations described above define the upper limit of contamination of low to moderate concern, for which similar remedial technologies are applicable.

There are at least two sites along the Thea Foss Waterway where source materials (i.e. slag or masses of tar-like petroleum hydrocarbons) have been encountered in the soil matrix. The source materials have concentrations of contaminants which are greater than those described by this CAP Contaminant Scenario (Table 3-1). However, these contaminants are likely to be readily identifiable, separable and removable from the soil matrix. Based upon data included in a site-specific RI, Ecology, at its discretion, may determine that the presence of these materials does not exclude a site from applicability under this CAP. Analytical results obtained from these source materials should not be used in site-wide statistical concentration calculations.

Comprehensive subsurface investigations have not been conducted on each site, therefore, volumes of contaminated soils were estimated for use in the Feasibility Study. Both low and high estimates of contaminated volumes were used to define and compare alternatives for remediation. The volume estimates are provided in Table 3-2. These estimates were calculated based on the existing site data (Chapter 5.0 and Appendix A of the Area-Wide Report) and on the following assumptions:

- The low estimate assumes that all parcels north of the 11th Street bridge do not require remediation, and that other parcels individually contain soil contamination requiring remediation ranging from 0 percent (Coast Iron Works, Johnny's Seafood, and 11th St. ROW) to 50 percent (Atlas Foundary) of the parcel area.

- The high estimate assumes that individual parcels contain soil contamination which will require remediation ranging from 0 percent (Johnny's Seafood) to 80 percent (Atlas Foundary, Coast Iron Works, Steam Plant) of the parcel area.
- Contamination on each parcel is assumed to extend vertically to the water table. Static ground water is approximately 8 feet below existing grade.

The sum of the total volume of potentially contaminated soils on publicly owned properties adjacent to the Thea Foss Waterway is estimated between 60,000 cubic yards and 155,000 cubic yards.

### 3.3 Ground Water Quality

As discussed in Section 7.0 of the Area-Wide Report, shallow ground water at the site is not a current or potential future source of drinking water due to the fact that the near-surface water-bearing zones in the Site are expected to produce relatively poor quality water, based on secondary water quality standards. Because of this, ground water quality will be evaluated with respect to its potential to discharge to the closest surface water body and will therefore be compared with federal and state marine surface water quality standards.

As stated in Section 3.1.2 ground water environmental samples have been collected from only five properties adjacent to the waterway that are not under another administrative order. Data from only two of these properties was properly collected and documented. Only TPH and benzene were detected at elevated levels in only one of the wells. All other ground water samples collected from these properties were free of contaminants at levels that indicate ground water contamination above marine surface water quality standards.

Table 3-2  
Estimated Volumes of Soil Requiring Remediation

| Property            | Total Area<br>(sq ft) | Estimated %<br>Requiring Remediation |      | Depth of<br>Remediation<br>(ft) | Estimated Area (sq ft)<br>Requiring Remediation |        | Estimated Volume (cu ft)<br>Requiring Remediation |         | Estimated Volume (cu yd)<br>Requiring Remediation |         |
|---------------------|-----------------------|--------------------------------------|------|---------------------------------|---|--------|---|---------|---|---------|
|                     |                       | low                                  | high |                                 | low   | high   | low   | high    | low   | high    |
| Parcel 1A           | 60,000                | 0%                                   | 0%   | 8                               | 0   | 0      | 0   | 0       | 0   | 0       |
| Parcel 1B           | 67,500                | 0%                                   | 0%   | 8                               | 0   | 0      | 0   | 0       | 0   | 0       |
| Parcel 1C           | 57,000                | 0%                                   | 0%   | 8                               | 0   | 0      | 0   | 0       | 0   | 0       |
| Parcel 1D           | 67,500                | 0%                                   | 5%   | 8                               | 0   | 3,375  | 0   | 27,000  | 0   | 1,000   |
| Totem Marina        | 200,000               | 0%                                   | 5%   | 8                               | 0   | 10,000 | 0   | 80,000  | 0   | 3,000   |
| Municipal Dock      | 45,000                | 0%                                   | 0%   | 8                               | 0   | 0      | 0   | 0       | 0   | 0       |
| Atlas Foundry       | 45,000                | 50%                                  | 80%  | 8                               | 22,500  | 36,000 | 180,000   | 288,000 | 6,700   | 10,700  |
| Coast Iron Works    | 37,500                | 0%                                   | 80%  | 8                               | 0   | 30,000 | 0   | 240,000 | 0   | 8,900   |
| Steam Plant         | 22,500                | 40%                                  | 80%  | 8                               | 9,000   | 18,000 | 72,000  | 144,000 | 2,700   | 5,300   |
| Johnny's Seafood    | 3,750                 | 0%                                   | 0%   | 8                               | 0   | 0      | 0   | 0       | 0   | 0       |
| Parcel 3A           | 169,000               | 20%                                  | 50%  | 8                               | 33,800  | 84,500 | 270,400   | 676,000 | 10,000  | 25,000  |
| Parcel 3B           | 136,000               | 20%                                  | 50%  | 8                               | 27,200  | 68,000 | 217,600   | 544,000 | 8,100   | 20,100  |
| Parcel 3C           | 59,400                | 20%                                  | 50%  | 8                               | 11,880  | 29,700 | 95,040  | 237,600 | 3,500   | 8,800   |
| Parcel 7            | 77,500                | 43%                                  | 60%  | 8                               | 33,325  | 46,500 | 266,600   | 372,000 | 9,900   | 13,800  |
| Parcel 4A           | 28,500                | 10%                                  | 50%  | 8                               | 2,850   | 14,250 | 22,800  | 114,000 | 800   | 4,200   |
| Sewage Pump Station | 113,000               | 10%                                  | 60%  | 8                               | 11,300  | 67,800 | 90,400  | 542,400 | 3,300   | 20,100  |
| Parcel 5            | 81,000                | 30%                                  | 50%  | 8                               | 24,300  | 40,500 | 194,400   | 324,000 | 7,200   | 12,000  |
| Parcel 8            | 75,000                | 30%                                  | 75%  | 8                               | 22,500  | 56,200 | 180,000   | 450,000 | 6,700   | 16,700  |
| 11th Street ROW     | 52,000                | 0%                                   | 30%  | 8                               | 0   | 15,600 | 0   | 124,800 | 0   | 4,600   |
| Totals              |                       |                                      |      |                                 |   |        |   |         | 58,900  | 154,200 |

Some contaminants, particularly those typically associated with petroleum products from LUSTs, may be found in the ground water. Ground water contamination for which soil remediation is an appropriate remedial alternative is addressed by this CAP. However, this CAP will not be applicable to sites at which the type and concentrations of contaminants found in ground water are of a nature to warrant active ground water remediation.

#### 3.4 Surface Water Quality:

Surface water resulting from precipitation occurs onsite and primarily runs overland to City of Tacoma storm drains along Dock Street or D Street, depending upon the specific property location. These storm drains eventually discharge to the Thea Foss Waterway. Some precipitation runoff discharges directly to the waterway from near-shore upland and waterway bank areas.

The City of Tacoma's storm drains will be addressed by an NPDES permit and are also included in the Agreed Order on Consent (AOC) for the Thea Foss Waterway under the EPA CBN/T Superfund action.

Sampling of storm runoff over near-shore and bank areas has not been performed. Sampling and analysis to evaluate this transport mechanism and its impact on the marine surface waters and sediments will be a requirement of future site specific remedial investigations on those properties where bank or surface soil contamination has been documented.

#### 4.0 CLEANUP STANDARDS

##### 4.1 Soil Cleanup Standards

Cleanup standards were developed for this Site based on Chapter 173-340 WAC (Table 4-1). Soil cleanup standards are based on the protection of ground water and surface water and on estimates of reasonable maximum exposure expected for the protection of human health. Ecology has determined that exposure under the residential use scenario as defined in MTCA represents the reasonable maximum exposure scenario based on direct contact.

##### 4.1.1 Non-industrial Sites

MTCA states that Method A cleanup levels may be used for routine cleanup actions or when relatively few contaminants are involved. Method B cleanup levels are the standard method for determining cleanup levels. Since comprehensive RIs have not been conducted on the majority of the upland parcels addressed in the Area-Wide Report, the standard method of determining cleanup levels (Method B) shall be used. Lead and TPH, however, are not defined under Method B. The Method A cleanup standard for lead (250 ppm) shall be used.

Current Ecology policy calls for cleanup of TPH soil contamination to a level of 200 ppm. This standard is deliberately conservative and is based on the protection of ground water. Ecology is in the process of evaluating

information for establishing TPH cleanup concentrations that will be based on protection of human health and the environment. Ecology recognizes that higher levels of TPH in a weathered state exist in soils at the sites that may be protective of ground water. However, unless Ecology subsequently approves TPH cleanup levels other than the 200 ppm standard as being protective of human health and the environment, the current standards shall apply.

#### 4.1.2 Industrial/Commercial Sites

Method C cleanup levels are conditional and may be used for industrial/commercial sites if certain criteria are met (WAC 173-340-740(1)(c)).

To qualify the site must:

- Be currently zoned for industrial/commercial use.
- Be currently used for industrial/commercial purposes or have a history of use as industrial/commercial properties.
- Be adjacent to and in the general vicinity of properties which are used for or are designated for industrial/commercial use.
- Be expected to be used for industrial/commercial uses in the foreseeable future due to zoning, comprehensive plans and other relevant factors.
- Properties to be considered for Method C cleanup must also meet the definition of "industrial properties" per RCW 70.105D.020 and Engrossed Substitute Senate Bill 6123, Section 2(13), 1994.

Properties on the east side of the Thea Foss Waterway including Parcel 5, Parcel 8, and the 11th Street ROW (Figure 1-2) are currently potentially subject to these conditions. No other sites currently subject to this CAP are eligible for use of Method C cleanup standards. If remediation is proposed for these parcels in the future, at that time Ecology, at its sole discretion, will evaluate and decide whether Method B or Method C cleanup standards apply.

Concentrations of contaminants will be determined on a site-wide statistical basis as described in Ecology's *Statistical Guidance for Ecology Site Managers* and supplements (Ecology 1992) with adjustment for source material which can easily be separated from the soil matrix (Section 3.2). Cleanup levels may exceed concentrations determined by Method B or C only if background concentrations (WAC 173-340-700(4)(d)) or analytical considerations (WAC 173-340-707) warrant it. Cleanup levels may also exceed Method B concentrations if attainment of those concentrations is not technically possible (WAC 173-340-706(i)(c)). Adjustments to cleanup levels for multiple hazardous substances will be made in accordance with WAC 173-340-708(5) & (6) and WAC 173-340-740(5). Cleanup levels may be adjusted to comply with new requirements in accordance with WAC 173-340-710(5). Data to support the use of any of the above adjustments to the cleanup standards will be documented in

subsequent SCAPs. Cleanup must be permanent to the maximum extent practicable.

#### 4.2 Ground Water Cleanup Standards

In accordance with MTCA (WAC 173-340-720), ground water is considered to be drinking water (potable) unless three criteria are met. These criteria are:

- The aquifer is not a current drinking water source.
- The aquifer is not a future drinking water source.
- That it is unlikely that contaminants will be transported to an area where ground water is a current or potential source of drinking water.

The upland properties in the vicinity of the Thea Foss Waterway currently meet all of the three criteria for determining the shallow aquifer in the area to be non-potable. The aquifer is not presently a drinking water source, nor is it suitable for future use as a drinking water source due to the high potential of saline intrusion during pumping. Current municipal controls implemented through zoning ordinances restrict the placement of drinking water wells in the shallow aquifer, and municipal water is available for all parcels along the Waterway. Municipal wells have been and will continue to be placed in the deeper, semi-confined water bearing units. Contaminated substances will not likely be transported to the lower aquifer due to the upward vertical gradients and effective aquiclude observed regionally and locally.

In the development of cleanup standards for the upland properties in the vicinity of the Thea Foss Waterway, the shallow aquifer is considered non-potable.

##### 4.2.1 Protection of Surface Water

MTCA states that when an aquifer can be considered as non-potable, ground water cleanup standards will be based on the next highest use. In this case, the next highest use is protection of adjacent surface waters (WAC 173-370-720(1)(c)). As such, the appropriate cleanup standards to apply to the ground water at these properties are the marine chronic criteria from the surface water standards (WAC 173-201A), and the federal water quality standards (40 CFR 131) including marine chronic standards and standards for the protection of human health from consumption of aquatic organisms.

Ground water contamination above applicable cleanup standards is not expected on these properties except as related to LUST discharges. For the purposes of this CAP, ground water that exceeds the cleanup standards, background levels, and practical quantitation limits, will be considered to be contaminated. This CAP is not applicable to any site, which in the opinion of Ecology, has ground water contamination at sufficient concentrations to require active ground water remediation. Active ground water remediation is all remedial

actions related to ground water except for remediation of source materials such as contaminated soil or long term monitoring.

Cleanup standards were developed for this Site based on Chapter 173-340 WAC (Table 4-1)\*.

Table 4-1

| SITE CLEANUP STANDARDS FOR SOIL AND GROUND WATER |                             |          |                                   |
|--|-----------------------------|----------|-----------------------------------|
| CONTAMINANT                                      | SOIL (mg/kg) <sup>(b)</sup> |          | GROUND WATER(ug/l) <sup>(b)</sup> |
|  | Method B                    | Method C |                                   |
| TPH <sup>(a)</sup>                               | 200                         | 200      | 1,000                             |
| Benzene  | 34.5                        | 1,380    | 71.0                              |
| Toluene  | 16,000                      | 64,000   | 200,000                           |
| Ethylbenzene                                     | 8,000                       | 32,000   | 29,000                            |
| Xylenes  | 160,000                     | 640,000  | 16,000                            |
| Carginogenic PAH Compounds                       | 0.137                       | 5.48     | 0.031                             |
| Antimony   | 32.0                        | 128      | 4,300                             |
| Arsenic  | 1.43 (20 <sup>(c)</sup> )   | 57.1     | 0.14                              |
| Cadmium  | 80.0                        | 320      | 8.0                               |
| Chromium (VI)                                    | 400                         | 1,600    | 50.0                              |
| Copper   | 2,960                       | 11,800   | 2.5                               |
| Lead <sup>(d)</sup>                              | 250                         | 250      | 5.8                               |
| Mercury  | 24.0                        | 96.0     | 0.025                             |
| Nickel   | 1,600                       | 6,400    | 7.9                               |
| Zinc   | 24,000                      | 96,000   | 76.6                              |
| PCBs (total)                                     | 0.13                        | 5.19     | 0.030                             |

Key: (a) The current Ecology TPH cleanup standard of 200 ppm may be adjusted to allow for alternatives in setting the standard based on new risk assessment methods or Ecology standards not yet developed as per Section 4.1.1. Reassessment of the TPH cleanup standard will be considered at the time of site-specific work, to take into account site-specific characteristics and contemporary cleanup policies.

- (b) Practical Quantitation Limits (PQL): Ecology recognizes that the PQL may be higher than the cleanup standard for a given parameter. In these cases, the cleanup standard may be considered to be attained if the parameter is undetected at the PQL, consistent with the latest Ecology Implementation policy, and if the conditions of WAC 173-340-707 are met.
- (c) Cleanup level based on background concentration in the state of Washington (WAC 173-340-740). Natural or area background values may be substituted as cleanup objectives if Ecology determines the requirements of WAC 173-340-708(11) are satisfied.
- (d) Soils cleanup levels for lead are not defined under Method B or Method C. The Method A cleanup level will be used.

\*In accordance with WAC 173-340-708(5) & (6) and WAC 173-340-740(5), the cumulative hazardous index shall not exceed 1 and the cumulative total excess cancer risk shall not exceed  $1 \times 10^{-5}$  for contaminants included in Table 4-1.

## 5.0 SUMMARY OF REMEDIAL ALTERNATIVES

The MTCA requires at a minimum that all cleanup actions protect human health and the environment, comply with cleanup standards, comply with applicable state and federal laws, and provide for compliance monitoring. In addition, all cleanup actions must consider implementation time, cost effectiveness, permanent solutions, and resource recovery technologies to the maximum extent practicable.

A number of potential remediation alternatives were screened in the Feasibility Study process to select the most effective, implementable, and cost effective alternatives for more detailed evaluation. The Feasibility Study developed four remedial alternatives to address potential human health and environmental risks associated with the potential soil contamination at the site. Each alternative is briefly described below.

### 5.1 Alternative 1: No Action

The no action alternative is carried forward as a baseline alternative for comparison purposes only.

### 5.2 Alternative 2: Isolation of Contaminants

This remedial alternative includes use of caps such as concrete, asphalt or three foot thick soil covers, to prevent contact with, and ingestion or inhalation of contaminated soils or dusts. Any excavations for foundations or utility trenches would need to be located in uncontaminated soils. No contaminated soils would be disturbed and therefore no treatment of any soil would occur. This alternative would significantly restrict the development



activities possible on these parcels. This alternative would also require institutional controls on all contaminated parcels.

### 5.3 Alternative 3: Remediation of Soils Based on Future Land Use Development

This remedial alternative does not restrict the type of development possible for the properties. Instead this alternative describes remediation components which are applicable to each of the potential future land use categories.

For public open space parcels, commercial/retail/office use parcels, or for those parcels in which commercial/retail or parking uses are proposed at the ground floor with multifamily residential uses possible on upper floors, this alternative proposes remedial measures which include soil treatment and/or isolation with soil covers/caps. Exposure to contaminated soils would be restricted by a requirement for concrete or asphalt pavement or three foot thick clean soil covers to be placed above all contaminated soil areas. Soil covers would be clean fill or treated soils which meet cleanup standards. Remediation would be required for all contaminated soil removed from all excavations on the site. Treatment of excavated contaminated soils would be required whenever practicable, but actual treatment process options must not be selected before a site specific remedial investigation has been conducted. Areas where repeated excavations are anticipated in the future, such as at utility corridors, would be over-excavated or lined with a geofabric and backfilled to limit future exposure. Soil cleanup standards would meet Method B requirements.

For properties at which residential use is proposed at the ground surface, or where private yards on the ground surface are proposed, this alternative would require that soils be remediated to Method B standards to a depth equal to the mean-high ground water level.

Under this alternative, it is proposed that parcels on the east side of the Waterway be considered for Method C industrial/commercial soil cleanup standards if all of the requirements under WAC 173-340-740(1)(c) can be met for the parcel at the time of remediation.

Under this alternative, all properties on which residual contamination remains following remediation would require institutional controls to control future excavations and land use, provide for long-term maintenance of surface treatments, and potentially provide for routine environmental monitoring.

### 5.4 Alternative 4: Remediation of All Soils to the Mean-High Ground Water Level

Under this alternative, remediation of all contaminated soil would be required, regardless of future land use development, to a depth equal to the mean-high ground water level. Soil would be remediated to MTCA Method B standards. This alternative does not limit the type of development possible for the properties. Deed restrictions would be required for sites at which residual contamination remains below the mean-high ground water level.

## 6.0 SELECTED CLEANUP ACTION:

For purposes of this section, remediate(d)(tion) shall mean cleanup of soils to levels presented on Table 4-1. The specific technology to achieve these levels is not stated herein, but will be addressed in site-specific cleanup action plans.

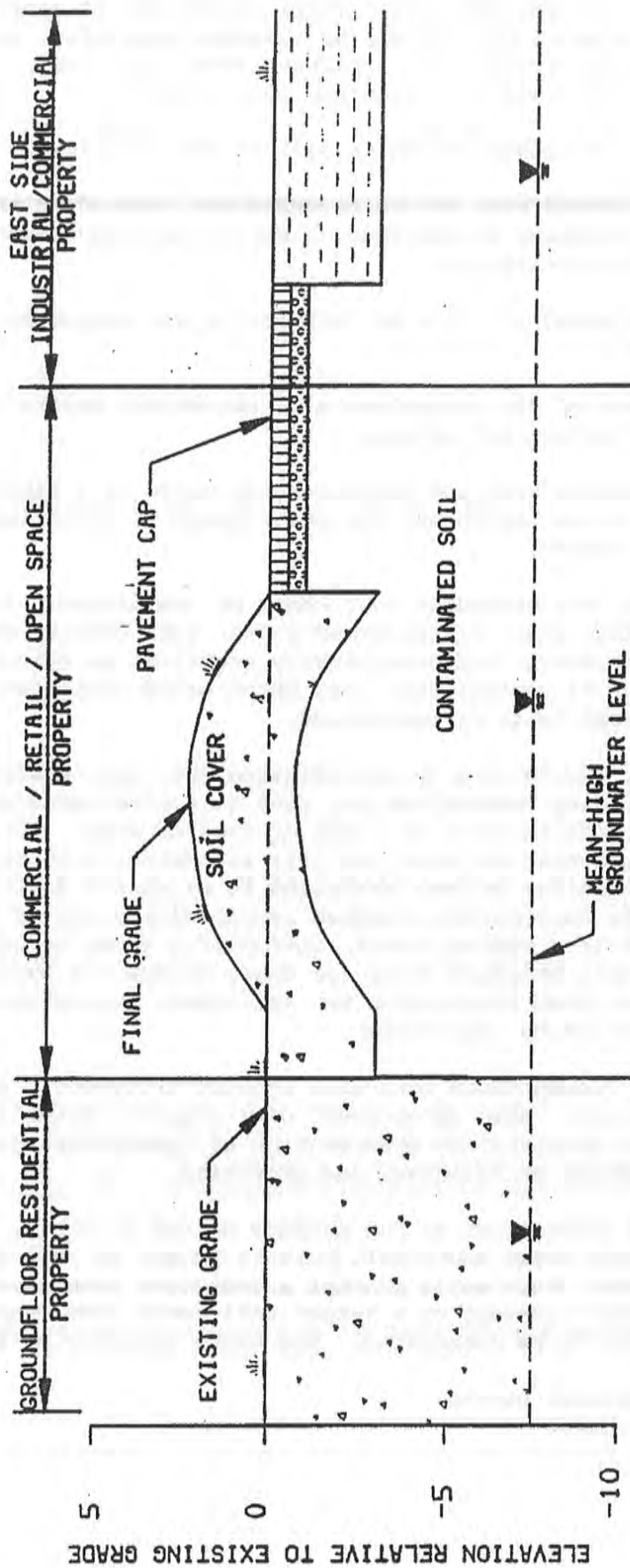
Based on the comparative analysis, it is Ecology's opinion that Alternative 3: Remediation Based on Future Land Use Development would provide the greatest protection of human health and the environment, for the relative costs incurred.

Alternative 3 is a combination of Alternatives 2 and 4, which incorporate isolation measures, soil removal and treatment processes, and institutional controls to meet Remedial Action Objectives (RAOs), based on the type of use expected for each parcel of property within the Site.


### 6.1 Detailed Description of the Selected Cleanup Action

This alternative will aid in realizing the land use development potential for the properties. The quantity and depth of soil to be remediated will be based on the following three land use scenarios proposed for each parcel. This alternative includes the use of soil treatment technologies and processes to reduce toxicity, mobility, and volume of the contaminants; soil covers and caps to limit exposure if contaminants are left on-site; deed restrictions to limit exposure to contaminated soil and prohibit use of ground water for domestic uses; and long-term ground water monitoring which could be required for parcels with residual contamination. Figure 6-1 illustrates the conceptual design for the remediation of soils for various land use scenarios for this alternative. The following is a description of the land use scenarios and applicable cleanup remedies subject to this CAP.

- (1) For properties proposed for redevelopment with ground floor residential uses, contaminated soil will be remediated to a depth equal to the mean-high ground water level (approximately 8 feet below ground surface) to meet MTCA Method B standards.
- (2) For properties proposed for use as commercial/retail, open space, or upper story residential uses, contaminated soil will be isolated below 3 feet of clean soil, a building, or a pavement cap. Remediation measures could include excavating and treating up to 3 feet of soil to MTCA Method B standards followed by backfilling using clean soil covers and/or caps.
- (3) For selected properties on the east side, for which industrial or commercial activities are proposed, soil will be remediated to MTCA Method C standards per WAC 173-340-740 if Ecology determines that the property meets all of the requirements for industrial/commercial cleanup standards under MTCA. Remediation measures would include treating up to three feet of soil or using clean



**LEGEND:**

-  FILL OR TREATED SOIL WILL MEET MTC METHOD B STANDARDS
-  FILL OR TREATED SOIL WILL MEET MTC METHOD C INDUSTRIAL/COMMERCIAL STANDARDS

**NOTES:**

1. RELATIONSHIP OF FINAL AND EXISTING GRADES WILL VARY.
2. ALL EXCAVATED CONTAMINATED SOIL WILL BE REMEDIATED.

**NOT TO SCALE**

**CITY OF TACOMA  
THEA FOSS WATERWAY  
ENVIRONMENTAL MASTER PLAN**

**CLEANUP ACTION PLAN**



**BLACK & VEATCH**  
Waste Science, Inc.  
1201 PACIFIC AVE.  
SUITE 1100  
TACOMA, WA 98402  
(206) 383-1436



**REMEDICATION OF CONTAMINATED SOIL BASED ON  
FUTURE LAND USE DEVELOPMENT (ALTERNATIVE 3)**

soil covers and caps.

In compliance with WAC 173-340-360(9)(b), small quantities of contaminated soil which would remain below soil covers or pavement caps shall be remediated to meet Table 4-1 cleanup levels. To facilitate these decisions, the following criteria will be used to define the word "small":

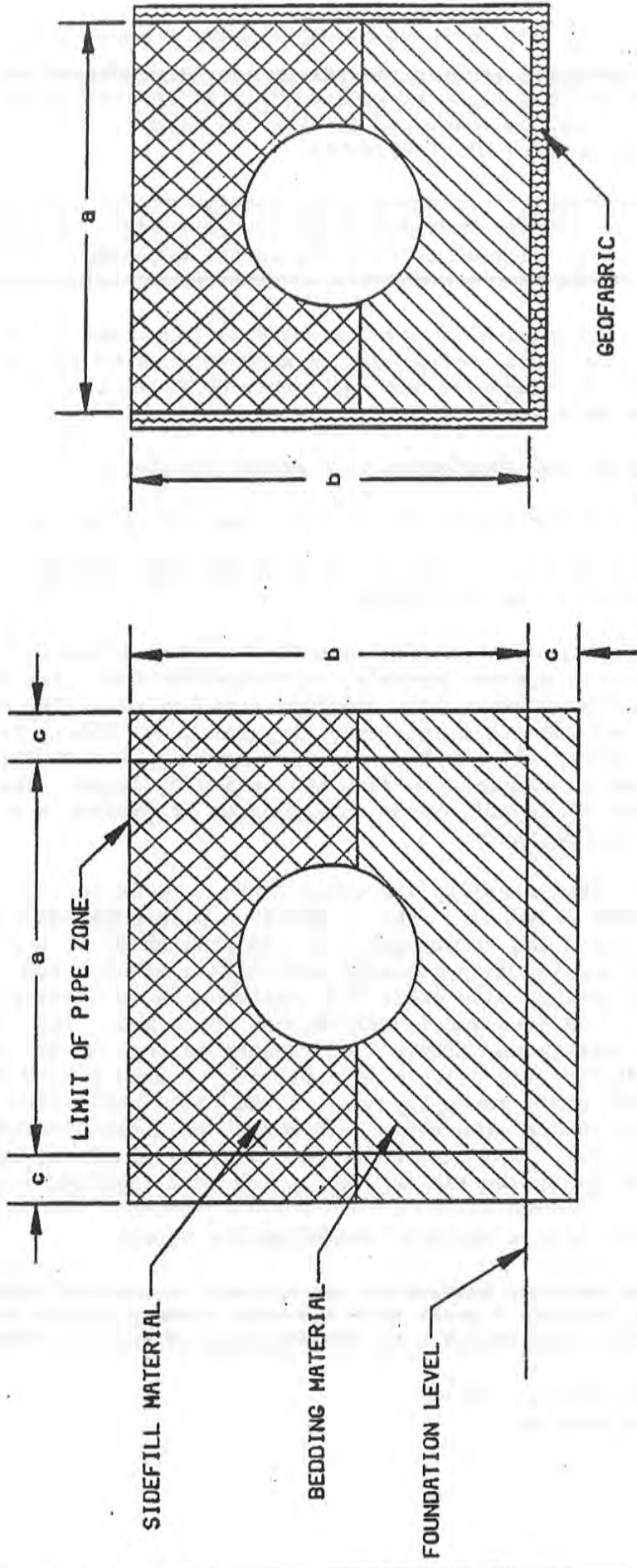
- The extent of contamination is defined and localized.
- The contaminated soil can be accessed and removed or remediated without disturbing foundations, harming the environment, or spreading contamination.
- The contaminated soil can be technically and economically removed or treated.
- The location of the contaminants is accessible during development or source control activities.
- The contaminant type and concentration would be a significant threat to human health and the environment if contamination were to remain onsite.

Under this alternative, all excavated soil shall be remediated. Soil treatment for these soils shall be performed rather than offsite disposal in landfills whenever technically and economically practical as determined by Ecology. Small volumes of contaminated soil which would otherwise remain below covers or caps must be fully remediated.

Structural and utility excavations in contaminated soil may be allowed under this alternative. Building foundations may rest on contaminated soil, but backfill around the foundation must be clean or treated soil. Utility trenches would be constructed to state and city standards, with the additional requirement that all trenches be over-excavated to allow for a minimum 1-foot perimeter of clean soil outside the standard trench dimensions or lined with geofabric. Figure 6-2 is a typical cross section of a sewer trench as specified in Washington's Standard Plans for Road, Bridge and Municipal Construction (DOT 1991) that illustrates the additional over-excavation and backfill and geofabric lining requirement.

A large percentage of contaminated soil will require treatment. All soil cannot be capped in place. Site development will require excavation of surface soils on every property for construction of appropriate site grading, drainage, and construction of buildings and utilities.

Assuming contaminated soils exist at the surface of the property, the surface elevation considerations noted above will have to be met as well as any remedial considerations. This would prevent a developer from simply capping the entire property with pavement or a 3-foot soil cover, and require at least some contaminated soils to be remediated. The exact quantity or percentage of



**NOTE:**

DIMENSIONS "a" AND "b" SPECIFIED IN THE STATE STANDARD SPECIFICATION FOR PIPE BEDDING FOR SANITARY SEWERS IN TRENCHES ONLY. DIMENSION "c" IS ONE FOOT OVER EXCAVATION ZONE.

**NOT TO SCALE**

**CITY OF TACOMA  
THEA FOSS WATERWAY  
ENVIRONMENTAL MASTER PLAN**



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(206) 383-1436

**CLEANUP ACTION PLAN**

**TYPICAL UTILITY CROSS SECTION ILLUSTRATING  
OVER-EXCAVATION AND GEOFABRIC**

**FIGURE 6-2**

soils that will be remediated is impossible to estimate until a development is proposed and a site specific remedial investigation is conducted on the given site. All excavated soils must be remediated to cleanup standards; contaminated soils may not be relocated on site and capped. Excavated soil to be remediated will be treated if practicable.

In all properties abutting the waterway, construction of the public esplanade shall require that all surface drainage be collected inboard of the esplanade, such that drainage is not allowed to flow beyond the esplanade pavement and into the Waterway.

If any soils cleaned up under this CAP designate as Dangerous Waste under chapter 70.105 RCW, they shall be managed in accordance with all applicable ARARs. Dangerous Waste management and applicable ARARs will be addressed, if and as necessary, in each SCAP.

### 6.2 Activities Expected for Completion of Cleanup Process

The activities expected for completion of Site remediation are as follows:

- 1) Provide Ecology with a Notice of Intent to Proceed, regarding parcel or parcels (site(s)) to be remediated.
- 2) After Ecology approval of a site specific Remedial Investigation work plan, proceed with a State Remedial Investigation (RI), per WAC 173-340-350, to include a site-specific Sampling and Analysis Plan consistent with WAC 173-340-820 and a site-specific Health and Safety Plan consistent with WAC 173-340-810. (Note: Per WAC 173-340-350(7), Ecology will allow information from the Area Wide Report, that has previously been submitted, to be incorporated by reference to avoid unnecessary duplication.)

All work, including sampling and other field data gathering activities, and any remedial or removal action, shall be performed under an appropriate health and safety plan for the protection of workers and the surrounding community in accordance with OSHA and WISHA requirements. The health and safety plan shall also satisfy the requirements of WAC 173-340-810 and be consistent with Chapter 49.17 RCW. The City shall submit a Site Health and Safety Plan (SHASP) to Ecology for comment prior to commencing any actions on a particular site(s) subject to this CAP. The SHASP shall be appropriate to the field activities and other information to ensure site safety and health requirements for that particular site(s). The City shall be solely responsible for ensuring that the SHASP satisfies all applicable laws and regulations.

- 3) Provide Ecology with a Remedial Investigation Report.
- 4) For sites that Ecology determines are subject to cleanup under this CAP, the City will prepare a draft Site Specific Cleanup Action Plan (SCAP) for the site(s), consistent with the findings of the Area-Wide

Feasibility Study and with WAC 173-340-360(10) which will be subject to public comment. Ecology will prepare a final SCAP consistent with WAC 173-340-360(12), and include that document as an amendment to the Consent Decree. The SCAP shall ensure compliance with all ARARs.

- 5) Proceed with remediation construction. A key component of the cleanup action will be remedial design documents consistent with WAC 173-340-400(4)(a)-(c). These documents, in addition to specifying the design and construction criteria for each site cleanup, will document any contaminants expected to remain on-site above cleanup standards. An Operations and Maintenance Plan will be prepared as part of the remedial design documents which will specify, among other things, inspections and monitoring to be performed as part of any institutional controls that may be placed on the site(s).
- 6) Institutional controls that may be required as a result of contamination above MTCA Method B cleanup standards left on site(s) include, but are not limited to:
  - a. Disruption of soil covers or cap systems is prohibited, without Ecology approval.
  - b. Any breach of isolation systems is to be reported to Ecology.
  - c. Ground water monitoring will be performed, as appropriate, according to the SCAP and remedial design documents.
  - d. Utility corridors and foundations will be constructed according to the Feasibility Study criteria and SCAP.
  - e. Prohibiting property uses other than the types of uses upon which the selection of cleanup actions was based.
  - f. At least every five years, Ecology and the PLPs shall meet to discuss the status of site(s) and the need, if any, for further remedial actions.
- 7) Institutional controls (WAC 173-340-440) expected to be required will be enumerated in each SCAP and will be recorded as restrictive covenants on the property. Use of conditional cleanup levels under Method C, for industrial properties, are subject to the provisions noted in subsection 4.1.2, above.
- 8) With respect to all above activities, Ecology will ensure compliance with the applicable substantive provisions of chapters 70.94, 70.95, 70.105, 75.20, 90.48, and 90.58 RCW, as required by Section 14 of ESSB 6339 (1994) and the substantive provisions of any laws requiring or authorizing local government permits or approvals.

### 6.3 Points of Compliance/Compliance Monitoring

The selected cleanup alternative includes isolation of hazardous substances on-site; therefore requirements of WAC 173-340-740(6)(d) must be met, including compliance monitoring to ensure the long-term integrity of any isolation systems, and other requirements for isolation technologies in WAC 173-340-360(8).

If the SCAP includes construction of monitoring wells, ground water will be monitored by wells located on the perimeter of the isolation (cap) system, near the Thea Foss Waterway; these wells shall represent the points of compliance for ground water cleanup standards monitoring. All wells will sample the uppermost aquifer system. Specific well placements, designs, and monitoring methodologies will be developed during the remedial design phase.

The vertical point of compliance for soils cleanup will be the Mean High Ground Water Level.

### 7.0 JUSTIFICATIONS/DETERMINATIONS:

The MTCA requires that any alternative selected for site remediation must, at a minimum, meet four threshold requirements: protect human health and the environment; comply with cleanup standards; comply with applicable state and federal laws; and, provide for compliance monitoring.

#### 7.1 Protection of Human Health and the Environment

The risks identified in the Area Wide Report are: 1) potential human health impacts from ingestion, inhalation, or dermal contact with on-site soils containing elevated levels of organic and/or inorganic contaminants; 2) potential water quality impact in the Thea Foss Waterway attributable to surface water or ground water runoff containing elevated levels of contaminants; 3) potential impacts to marine sediments in Thea Foss Waterway attributable to surface water or ground water runoff containing elevated levels of contaminants on particulates.

The selected cleanup action eliminates the human health risks from ingestion, inhalation, and dermal contact by: 1) removing or treating contaminated soil combined with, 2) use of soil covers, impermeable or semi-permeable caps, and 3) use of deed restrictions regarding future property use and modifications.

The selected cleanup action eliminates potential impacts to surface waters and marine sediments by removing or treating contaminated source materials (soils), requiring surface treatments that eliminate surface runoff to the waterway, and monitoring ground water that migrates from the Site to the waterway. Ground water monitoring that indicates migration of contaminants above cleanup levels to the waterway will be reported to Ecology as a breach of an isolation system (subsection 6.2 above).



As noted in Section 2.3 above, Ecology believes that various locations within the Site are potential sources, along with other sources, of contaminants of concern to the Thea Foss Waterway sediments. Remediation of the Thea Foss Waterway sediments will be addressed in other activities pursuant to the Commencement Bay Nearshore/Tideflats Record of Decision.

#### 7.2 Compliance with Cleanup Standards

The selected alternative is designed to comply with the Remedial Action Objectives listed in Section 5.0 and detailed in Section 6.0 above.

#### 7.3 Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

This evaluation criterion is used to determine the degree to which the selected cleanup action complies with federal and state standards and regulations. The following ARARs apply to the site:

##### STATE LAWS AND REGULATIONS

- a. Chapter 70.105D RCW, Model Toxics Control Act
- b. Chapter 173-340 WAC, Model Toxics Control Act Cleanup Regulations
- c. Chapter 173-303 WAC, Washington Dangerous Waste Regulations
- d. Chapter 173-201A WAC, Water Quality Standards for Surface Waters of the State of Washington
- e. Chapter 173-204 WAC, Sediment Management Standards
- f. Chapter 173-14 WAC, Shoreline Management Act
- g. Chapter 90.48 RCW, Water Pollution Control Act
- h. Chapter 70.94 RCW, Washington Clean Air Act
- i. Chapter 173-160 WAC, Minimum Standards for Construction and Maintenance of Wells
- j. Chapter 197-11 WAC, State Environmental Policy Act Rules
- k. Washington Industrial Safety and Health Act (WISHA)

##### FEDERAL LAWS AND REGULATIONS

- l. 33 USC 1251 et. seq. Clean Water Act of 1977
- m. 40 CFR 131 Subpart D, Federally Promulgated Water Quality Standards
- n. 40 CFR 761 Subpart D, Toxic Substances Control Act (TSCA)
- o. Resource Conservation and Recovery Act (RCRA)
- p. Commencement Bay Nearshore/Tideflats Record of Decision
- q. 29 CFR Subpart 1910.120, Occupational Safety and Health Act

The selected cleanup action achieves all ARARs listed above. Other ARARs such as local air quality regulations will be complied with as an integral part of the remedial design and implementation steps.

#### 7.4 Compliance Monitoring

Compliance monitoring as specified in WAC 173-340-410 will be provided to determine compliance with the cleanup standards listed in Section 4.0 above.

Thea Foss Area-Wide Consent Decree  
Cleanup Action Plan/8-24-94

Ground water will be monitored in cases where contaminants are left on-site above MTCA Method B levels to evaluate compliance with ground water cleanup standards. A compliance monitoring plan will be prepared and submitted to Ecology for approval during the remedial design phase.

#### 7.5 Short-Term Effectiveness

Short-term effectiveness considers how each alternative would impact human health and the environment during the implementation (construction) phase and prior to attainment of cleanup standards.

Risks to workers and the community will be minimal during the implementation phase of the selected cleanup action. The primary risks would be associated with construction and treatment process activities. Risks would vary with specific treatment processes selected.

All workers in direct contact with contaminated soils will be expected to comply with OSHA standards; earthwork will be expected to include control measures such as watering to reduce dust generation; onsite drainage and erosion control measures will be required to minimize potential impacts to the Thea Foss Waterway.

#### 7.6 Long-Term Effectiveness

Long-term effectiveness is evaluated in terms of the magnitude of residual risk and the adequacy and reliability of the cleanup action. The magnitude of the residual risk will vary with land use scenario and treatment options selected for the specific site, but on the whole the residual risks will be significantly reduced following application of the selected cleanup action. The residual risks would be essentially eliminated for the ground floor residential scenario and properties that would be remediated to ground water. The residual risks will be higher for other land use scenarios, as contaminated soils will remain below isolation measures.

The needs for long-term management of soil covers, caps, and ground water monitoring of the sites will vary with the degree of remediation performed and land use scenario. Properties in which soil covers and caps are placed over contamination will require long-term management. Areas which are fully remediated will require no long term monitoring. Future construction activities can affect either the soil covers or caps, requiring replacement or reconstruction in those areas. Soil covers and caps requiring replacement or reconstruction will increase the risk of exposure for a short period of time. Deed restrictions will prohibit extraction of ground water for domestic and commercial purposes and restrict excavations. Some level of deed restrictions may be necessary for all properties where contamination remains onsite. All treatment options that can be implemented per Section 6.0, above, will result in the permanent destruction or removal of the contaminants from soil that is remediated.

### 7.7 Permanent Reduction of Toxicity, Mobility, or Volume

This evaluation criterion addresses the statutory preference for selecting remedial actions that employ treatment technologies that permanently and significantly reduce toxicity, mobility, and volume of the hazardous substances present.

The toxicity, mobility, and volume of the contaminants of concern will be reduced under the selected cleanup action through use of treatment, removal/disposal, and isolation measures. The degree of reduction will be dependent on the remedial action selected for the specific property. For some properties, the contaminants of concern will be eliminated. Handling of treatment residuals will vary with treatment technologies and processes and will be documented in remedial design plans for each property.

### 7.8 Implementability/Technical Feasibility

The technologies that can be utilized in the selected alternative have been implemented and used reliably elsewhere to remediate contaminated soil. Special skills and knowledge are required for some remedial measures such as thermal treatment. Health and safety monitoring will be required for some treatment processes. Each of the treatment processes selected are administratively feasible and generally acceptable to Ecology.

### 7.9 Cost

Table 7-1 (4 pages) details the approximate expected capital costs for parcels remediated under all alternatives, based on assumptions and existing data used in the Feasibility Study. Long-term ground water monitoring and sampling costs are not included. The five major cost areas are site preparation, mobilization, treatment, engineering design, and contingencies.

Site preparation costs include clearing, grubbing, and grading of property required to conduct the remedial action. Site preparation is assumed to cost \$2,000 per acre of land requiring remedial action.

Mobilization costs are typically lump sum fees charged by the vendor to transport, set up, and breakdown all equipment necessary for remediation. Mobilization/demobilization costs are estimated at ten percent of the direct capital cost.

Soil treatment costs may vary considerably depending on the treatment technology and processes employed. Treatment costs may range from \$60 per cubic yard of soil for removal and disposal of petroleum contaminated soil at a sanitary landfill to \$400 per cubic yard for incineration. For the purposes of the Feasibility Study, treatment of petroleum contaminated soil is assumed to cost \$123 per cubic yard of contaminated soil. Treatment costs include excavation, soil preparation, treatment, sampling, backfill preparation, and backfilling. The volume of metals and PCB contaminated soil is expected to be small on most sites. Cost to dispose and transport metals and PCB

TABLE 7-1(1)

ASSUMPTIONS:

| Assumed Land Use<br>low | Property          | Total Area<br>(sq ft) | Estimated %<br>Requiring Remediation |      | Estimated Area (sq ft)<br>Requiring Remediation |        | Estimated % Requiring<br>Metals/PCB Remediation |      |
|-------------------------|-------------------|-----------------------|--------------------------------------|------|---|--------|---|------|
|                         |                   |                       | low                                  | high | low   | high   | low   | high |
| Open Space              | Parcel 1A         | 60,000                | 0%                                   | 0%   | 0   | 0      | 0%  | 0%   |
| Commercial              | Parcel 1B         | 87,500                | 0%                                   | 0%   | 0   | 0      | 0%  | 0%   |
| Commercial              | Parcel 1C         | 57,000                | 0%                                   | 0%   | 0   | 0      | 0%  | 0%   |
| Commercial              | Parcel 1D         | 87,500                | 0%                                   | 5%   | 0   | 3,375  | 0%  | 0%   |
| Commercial              | Tobin Marina      | 200,000               | 0%                                   | 5%   | 0   | 10,000 | 0%  | 0%   |
| Commercial              | Municipal Dock    | 45,000                | 0%                                   | 0%   | 0   | 0      | 0%  | 0%   |
| Commercial              | Atlas Foundry     | 45,000                | 50%                                  | 80%  | 22,500  | 36,000 | 80%   | 100% |
| Commercial              | Coast Iron Works  | 37,500                | 0%                                   | 80%  | 0   | 30,000 | 50%   | 100% |
| Commercial              | Sham Plant        | 22,500                | 40%                                  | 80%  | 9,000   | 18,000 | 5%  | 20%  |
| Commercial              | Johnny's Sea food | 3,750                 | 0%                                   | 0%   | 0   | 0      | 0%  | 0%   |
| Open Space              | Parcel 3A         | 188,000               | 20%                                  | 50%  | 33,600  | 84,500 | 5%  | 25%  |
| Commercial              | Parcel 3B         | 138,000               | 20%                                  | 50%  | 27,200  | 69,000 | 0%  | 10%  |
| Commercial              | Parcel 3C         | 59,400                | 20%                                  | 50%  | 11,880  | 29,700 | 0%  | 10%  |
| Commercial              | Parcel 3C         | 77,500                | 43%                                  | 60%  | 33,325  | 46,500 | 0%  | 0%   |
| Commercial              | Parcel 7          | 28,500                | 10%                                  | 50%  | 2,850   | 14,250 | 0%  | 0%   |
| Commercial              | Parcel 4A         | 113,000               | 10%                                  | 60%  | 11,300  | 67,800 | 0%  | 10%  |
| Industrial              | Sewage Pump Sta   | 81,000                | 30%                                  | 50%  | 24,300  | 40,500 | 0%  | 5%   |
| Industrial              | Parcel 5          | 75,000                | 30%                                  | 75%  | 22,500  | 56,250 | 0%  | 5%   |
| Industrial              | 11th Street ROW   | 52,000                | 0%                                   | 30%  | 0   | 15,600 | 0%  | 5%   |

General

Assumptions made for Percentages of Area off and which is Occupied by Buildings, Pavement, and Vegetation is as follows

| Land Use    | % Buildings or<br>Utility Corridors | % Paved | % Vegetated |
|-------------|-------------------------------------|---------|-------------|
| Commercial  | 30%                                 | 40%     | 30%         |
| Open space  | 10%                                 | 30%     | 60%         |
| Industrial  | 50%                                 | 30%     | 20%         |
| Residential | 40%                                 | 30%     | 30%         |

Remediation Costs include excavation, soil preparation (screening etc.), treatment process (thermal, bio, etc.), impiling, preparation of soil for backfill, transport cost for offsite disposal (for metals), disposal costs, load and haul, purchase of clean common earth for backfill, and backfilling.

Cost to Remediate TPH, PAH, and BTEX contaminated soils per cu yd = \$388.85

Cost to Remediate Metals contaminated soils per cu yd = \$122.83

Mobilization costs are based on 10% of the site preparation, remediation, soil cover, and asphalt cap costs.

Engineering costs, including the cost of obtaining permits, are based on 10% of the site preparation, remediation, soil cover, and asphalt cap costs.

Contingency costs are based on 20% of the site preparation, remediation, soil cover, and asphalt cap costs.

Many of the costs included here would be incurred during development even if the properties were not contaminated (e.g. site preparation, pavement, some soil cover, etc.)

Alternative 2

Foundation excavations and utility corridors will need to be placed in uncontaminated locations.

No contaminated soils will be disturbed or remediated.

Three feet of soil cover will be placed on all vegetated areas where contamination exists.

Alternative 3

Areas under buildings or within utility corridors will be remediated to an average depth of 4 feet.

Areas under pavement will not require remediation.

Soil cover consists of two feet of remediated soils and one foot of clean soil.

Areas to be vegetated will be remediated to an average depth of 2 feet.

Soil cover cost includes delivery, hauling, and compaction of 1 foot of imposed soil on the vegetable areas of the property which requires remediation.

A feasibility study will cost an average of \$21,000. This cost is shared equally among three properties requiring remediation.

Properties with residential units on the ground floor (Parcels 1A) will require remediation of all contaminated soils to mean-high groundwater level (approx 8 feet below current grade).

Alternative 4

All contaminated soils will be remediated to a 6 foot depth.

A feasibility study will cost an average of \$21,000. This cost is shared equally among three properties requiring remediation.

TABLE 7-1(2)

VOLUME OF SOIL AND COSTS TO REMEDIATE SOIL -- ALTERNATIVE 2

LOW ESTIMATE

COSTS ARE BASED ON THE ASSUMPTIONS STATED ON PRECEDING PAGE AND ARE ORDER OF MAGNITUDE ESTIMATES ONLY.

| Assumed Land Use | Property         | Estimate Area (sq ft) Requiring Remediation | % Buildings or Utility Corridors | % Paved | % Vegetated | Volume of Soil Requiring Remediation (cu ft) | Area to Be Paved (sq yd) | Site Preparation (\$2000/acre) | Cost to Remediate Soils (\$18.20/cu yd) | Soil Cover (\$18.20/cu yd) | Asphalt Cap (\$13.80/sq yd) | Testability Study | Mobilization, Engineering, Contingency | Total    |     |           |           |     |           |           |
|------------------|------------------|---|----------------------------------|---------|-------------|--|--------------------------|--------------------------------|---|----------------------------|-----------------------------|-------------------|--|----------|-----|-----------|-----------|-----|-----------|-----------|
| Open Space       | Parcel 1A        | 0   | 10%                              | 30%     | 80%         | 0  | 0                        | \$0                            | \$0                                     | \$0                        | \$0                         | \$0               | \$0                                    | \$0      |     |           |           |     |           |           |
| Commercial       | Parcel 1B        | 0   | 30%                              | 40%     | 30%         | 0  | 0                        | \$0                            | \$0                                     | \$0                        | \$0                         | \$0               | \$0                                    | \$0      |     |           |           |     |           |           |
| Commercial       | Parcel 1C        | 0   | 30%                              | 40%     | 30%         | 0  | 0                        | \$0                            | \$0                                     | \$0                        | \$0                         | \$0               | \$0                                    | \$0      |     |           |           |     |           |           |
| Commercial       | Parcel 1D        | 0   | 30%                              | 40%     | 30%         | 0  | 0                        | \$0                            | \$0                                     | \$0                        | \$0                         | \$0               | \$0                                    | \$0      |     |           |           |     |           |           |
| Commercial       | Tobin Marina     | 0   | 30%                              | 40%     | 30%         | 0  | 0                        | \$0                            | \$0                                     | \$0                        | \$0                         | \$0               | \$0                                    | \$0      |     |           |           |     |           |           |
| Commercial       | Municipal Dock   | 0   | 30%                              | 40%     | 30%         | 0  | 0                        | \$0                            | \$0                                     | \$0                        | \$0                         | \$0               | \$0                                    | \$0      |     |           |           |     |           |           |
| Commercial       | Alba Foundry     | 22,500                                      | 30%                              | 40%     | 30%         | 0  | 1,000                    | \$1,000                        | \$13,700                                | \$13,700                   | \$13,800                    | \$0               | \$11,000                               | \$40,000 |     |           |           |     |           |           |
| Commercial       | Coast Iron Works | 0   | 30%                              | 40%     | 30%         | 0  | 0                        | \$0                            | \$0                                     | \$0                        | \$0                         | \$0               | \$0                                    | \$0      |     |           |           |     |           |           |
| Commercial       | Steam Plant      | 9,000                                       | 30%                              | 40%     | 30%         | 0  | 400                      | \$400                          | \$3,500                                 | \$3,500                    | \$3,500                     | \$0               | \$5,000                                | \$15,000 |     |           |           |     |           |           |
| Commercial       | Johnny's Seafood | 0   | 30%                              | 40%     | 30%         | 0  | 0                        | \$0                            | \$0                                     | \$0                        | \$0                         | \$0               | \$0                                    | \$0      |     |           |           |     |           |           |
| Open Space       | Parcel 3A        | 33,800                                      | 10%                              | 30%     | 80%         | 0  | 1,127                    | \$1,600                        | \$41,200                                | \$41,200                   | \$0                         | \$0               | \$0                                    | \$0      |     |           |           |     |           |           |
| Commercial       | Parcel 3B        | 27,200                                      | 30%                              | 40%     | 30%         | 0  | 1,209                    | \$1,200                        | \$16,000                                | \$16,700                   | \$0                         | \$0               | \$23,000                               | \$61,000 |     |           |           |     |           |           |
| Commercial       | Parcel 3C        | 11,890                                      | 30%                              | 40%     | 30%         | 0  | 328                      | \$500                          | \$7,200                                 | \$7,300                    | \$0                         | \$0               | \$8,000                                | \$21,000 |     |           |           |     |           |           |
| Open Space       | Parcel 7         | 33,325                                      | 10%                              | 30%     | 80%         | 0  | 1,111                    | \$1,500                        | \$40,700                                | \$40,700                   | \$0                         | \$0               | \$23,000                               | \$81,000 |     |           |           |     |           |           |
| Commercial       | Parcel 4A        | 2,850                                       | 30%                              | 40%     | 30%         | 0  | 127                      | \$100                          | \$1,700                                 | \$1,700                    | \$0                         | \$0               | \$1,000                                | \$5,000  |     |           |           |     |           |           |
| Industrial       | Seage Pump Sta   | 11,300                                      | 50%                              | 30%     | 20%         | 0  | 377                      | \$500                          | \$4,800                                 | \$4,800                    | \$0                         | \$0               | \$4,000                                | \$14,000 |     |           |           |     |           |           |
| Industrial       | Parcel 5         | 24,300                                      | 50%                              | 30%     | 20%         | 0  | 810                      | \$1,100                        | \$8,900                                 | \$8,900                    | \$0                         | \$0               | \$9,000                                | \$31,000 |     |           |           |     |           |           |
| Industrial       | Parcel 8         | 22,500                                      | 50%                              | 30%     | 20%         | 0  | 750                      | \$1,000                        | \$8,200                                 | \$8,200                    | \$0                         | \$0               | \$9,000                                | \$29,000 |     |           |           |     |           |           |
| Industrial       | 11th Street ROW  | 0   | 10%                              | 30%     | 80%         | 0  | 0                        | \$0                            | \$0                                     | \$0                        | \$0                         | \$0               | \$0                                    | \$0      |     |           |           |     |           |           |
| Totals           |                  |   |                                  |         |             |  |                          |                                |   |                            |                             |                   |  | \$9,900  | \$0 | \$150,300 | \$102,600 | \$0 | \$104,000 | \$370,000 |

HIGH ESTIMATE

COSTS ARE BASED ON THE ASSUMPTIONS STATED ON PRECEDING PAGE AND ARE ORDER OF MAGNITUDE ESTIMATES ONLY.

| Assumed Land Use | Property         | Estimate Area (sq ft) Requiring Remediation | % Buildings or Utility Corridors | % Paved | % Vegetated | Volume of Soil Requiring Remediation (cu ft) | Area to Be Paved (sq yd) | Site Preparation (\$2000/acre) | Cost to Remediate Soils (\$18.20/cu yd) | Soil Cover (\$18.20/cu yd) | Asphalt Cap (\$13.80/sq yd) | Testability Study | Mobilization, Engineering, Contingency | Total     |     |           |           |     |           |           |
|------------------|------------------|---|----------------------------------|---------|-------------|--|--------------------------|--------------------------------|---|----------------------------|-----------------------------|-------------------|--|-----------|-----|-----------|-----------|-----|-----------|-----------|
| Open Space       | Parcel 1A        | 0   | 10%                              | 30%     | 80%         | 0  | 0                        | \$0                            | \$0                                     | \$0                        | \$0                         | \$0               | \$0                                    | \$0       |     |           |           |     |           |           |
| Commercial       | Parcel 1B        | 0   | 30%                              | 40%     | 30%         | 0  | 0                        | \$0                            | \$0                                     | \$0                        | \$0                         | \$0               | \$0                                    | \$0       |     |           |           |     |           |           |
| Commercial       | Parcel 1C        | 0   | 30%                              | 40%     | 30%         | 0  | 0                        | \$0                            | \$0                                     | \$0                        | \$0                         | \$0               | \$0                                    | \$0       |     |           |           |     |           |           |
| Commercial       | Parcel 1D        | 3,375                                       | 30%                              | 40%     | 30%         | 0  | 150                      | \$200                          | \$2,100                                 | \$2,100                    | \$0                         | \$0               | \$2,000                                | \$6,000   |     |           |           |     |           |           |
| Commercial       | Tobin Marina     | 10,000                                      | 30%                              | 40%     | 30%         | 0  | 444                      | \$500                          | \$8,100                                 | \$8,100                    | \$0                         | \$0               | \$5,000                                | \$16,000  |     |           |           |     |           |           |
| Commercial       | Municipal Dock   | 0   | 30%                              | 40%     | 30%         | 0  | 0                        | \$0                            | \$0                                     | \$0                        | \$0                         | \$0               | \$0                                    | \$0       |     |           |           |     |           |           |
| Commercial       | Alba Foundry     | 38,000                                      | 30%                              | 40%     | 30%         | 0  | 1,600                    | \$1,700                        | \$22,000                                | \$22,000                   | \$0                         | \$0               | \$18,000                               | \$64,000  |     |           |           |     |           |           |
| Commercial       | Coast Iron Works | 30,000                                      | 30%                              | 40%     | 30%         | 0  | 1,333                    | \$1,400                        | \$18,300                                | \$18,300                   | \$0                         | \$0               | \$15,000                               | \$53,000  |     |           |           |     |           |           |
| Commercial       | Steam Plant      | 18,000                                      | 30%                              | 40%     | 30%         | 0  | 800                      | \$900                          | \$11,000                                | \$11,000                   | \$0                         | \$0               | \$9,000                                | \$32,000  |     |           |           |     |           |           |
| Commercial       | Johnny's Seafood | 0   | 30%                              | 40%     | 30%         | 0  | 0                        | \$0                            | \$0                                     | \$0                        | \$0                         | \$0               | \$0                                    | \$0       |     |           |           |     |           |           |
| Open Space       | Parcel 3A        | 84,500                                      | 10%                              | 30%     | 80%         | 0  | 2,817                    | \$3,900                        | \$38,900                                | \$38,900                   | \$0                         | \$0               | \$58,000                               | \$204,000 |     |           |           |     |           |           |
| Residential      | Parcel 3B        | 68,000                                      | 40%                              | 30%     | 30%         | 0  | 2,267                    | \$2,100                        | \$41,500                                | \$0                        | \$0                         | \$0               | \$16,000                               | \$63,000  |     |           |           |     |           |           |
| Commercial       | Parcel 3C        | 29,700                                      | 30%                              | 40%     | 30%         | 0  | 1,320                    | \$1,400                        | \$18,100                                | \$18,100                   | \$0                         | \$0               | \$15,000                               | \$53,000  |     |           |           |     |           |           |
| Commercial       | Parcel 7         | 46,500                                      | 30%                              | 40%     | 30%         | 0  | 2,067                    | \$2,100                        | \$28,500                                | \$28,500                   | \$0                         | \$0               | \$24,000                               | \$83,000  |     |           |           |     |           |           |
| Commercial       | Parcel 4A        | 14,250                                      | 30%                              | 40%     | 30%         | 0  | 633                      | \$700                          | \$8,700                                 | \$8,700                    | \$0                         | \$0               | \$7,000                                | \$25,000  |     |           |           |     |           |           |
| Commercial       | Seage Pump Sta   | 87,000                                      | 50%                              | 30%     | 20%         | 0  | 2,260                    | \$3,100                        | \$27,600                                | \$27,600                   | \$0                         | \$0               | \$25,000                               | \$80,000  |     |           |           |     |           |           |
| Industrial       | Parcel 5         | 40,500                                      | 50%                              | 30%     | 20%         | 0  | 1,350                    | \$1,800                        | \$16,900                                | \$16,900                   | \$0                         | \$0               | \$15,000                               | \$52,000  |     |           |           |     |           |           |
| Industrial       | Parcel 8         | 58,250                                      | 50%                              | 30%     | 20%         | 0  | 1,875                    | \$2,800                        | \$22,900                                | \$22,900                   | \$0                         | \$0               | \$21,000                               | \$72,000  |     |           |           |     |           |           |
| Industrial       | 11th Street ROW  | 15,000                                      | 50%                              | 30%     | 20%         | 0  | 520                      | \$700                          | \$8,300                                 | \$8,300                    | \$0                         | \$0               | \$6,000                                | \$20,000  |     |           |           |     |           |           |
| Totals           |                  |   |                                  |         |             |  |                          |                                |   |                            |                             |                   |  | \$24,100  | \$0 | \$332,600 | \$238,900 | \$0 | \$238,000 | \$830,000 |

TABLE 7-1(3)

VOLUME OF SOIL AND COSTS TO REMEDIATE SOIL -- ALTERNATIVE 3

LOW ESTIMATE COSTS ARE BASED ON THE ASSUMPTIONS STATED ON PRECEDING PAGE AND ARE ORDER OF MAGNITUDE ESTIMATES ONLY.

| Assumed Land Use | Property         | Estimated Area (sq ft) Requiring Remediation | % Buildings or Utility Corridors | % Paved | % Vegetated | Volume of Soil Requiring Remediation (cu ft) | Volume of Soil Remediation (cu yd) | Area to Be Paved (sq yd) | Site Preparation (\$2000/acre) | Cost to Remediate Soils | Soil Cover (\$18.30/cu yd) | Asphalt Cap (\$13.80/sq yd) | Feasibility Study | Mobilization, Engineering, Contingency | Total     |             |
|------------------|------------------|--|----------------------------------|---------|-------------|--|------------------------------------|--------------------------|--------------------------------|-------------------------|----------------------------|-----------------------------|-------------------|--|-----------|-------------|
| Open Space       | Parcel 1A        | 0  | 10%                              | 30%     | 60%         | 0  | 0                                  | 0                        | 0                              | \$0                     | \$0                        | \$0                         | \$0               | \$0                                    | \$0       |             |
| Commercial       | Parcel 1B        | 0  | 30%                              | 40%     | 30%         | 0  | 0                                  | 0                        | 0                              | \$0                     | \$0                        | \$0                         | \$0               | \$0                                    | \$0       |             |
| Commercial       | Parcel 1C        | 0  | 30%                              | 40%     | 30%         | 0  | 0                                  | 0                        | 0                              | \$0                     | \$0                        | \$0                         | \$0               | \$0                                    | \$0       |             |
| Commercial       | Parcel 1D        | 0  | 30%                              | 40%     | 30%         | 0  | 0                                  | 0                        | 0                              | \$0                     | \$0                        | \$0                         | \$0               | \$0                                    | \$0       |             |
| Commercial       | Tobin Marina     | 0  | 30%                              | 40%     | 30%         | 0  | 0                                  | 0                        | 0                              | \$0                     | \$0                        | \$0                         | \$0               | \$0                                    | \$0       |             |
| Commercial       | Municipal Dock   | 0  | 30%                              | 40%     | 30%         | 0  | 0                                  | 0                        | 0                              | \$0                     | \$0                        | \$0                         | \$0               | \$0                                    | \$0       |             |
| Commercial       | Atlas Foundry    | 22,500                                       | 30%                              | 40%     | 30%         | 40,500                                       | 1,500                              | 1,000                    | \$1,000                        | \$479,000               | \$4,600                    | \$13,800                    | \$7,000           | \$169,000                              | \$704,000 |             |
| Commercial       | Coast Iron Works | 0  | 30%                              | 40%     | 30%         | 0  | 0                                  | 0                        | 0                              | \$0                     | \$0                        | \$0                         | \$0               | \$0                                    | \$0       |             |
| Commercial       | Steam Plant      | 9,000  | 30%                              | 40%     | 30%         | 18,200                                       | 600                                | 400                      | \$400                          | \$81,000                | \$1,600                    | \$5,500                     | \$7,000           | \$25,000                               | \$131,000 |             |
| Commercial       | Johnny's Seafood | 0  | 30%                              | 40%     | 30%         | 0  | 0                                  | 0                        | 0                              | \$0                     | \$0                        | \$0                         | \$0               | \$0                                    | \$0       |             |
| Open Space       | Parcel 3A        | 33,800                                       | 10%                              | 30%     | 60%         | 54,080                                       | 2,003                              | 1,127                    | \$1,600                        | \$271,000               | \$13,700                   | \$15,500                    | \$7,000           | \$121,000                              | \$430,000 |             |
| Commercial       | Parcel 3B        | 27,200                                       | 30%                              | 40%     | 30%         | 46,800                                       | 1,813                              | 1,209                    | \$1,200                        | \$223,000               | \$5,500                    | \$16,700                    | \$7,000           | \$69,000                               | \$352,000 |             |
| Commercial       | Parcel 3C        | 11,880                                       | 30%                              | 40%     | 30%         | 21,384                                       | 792                                | 528                      | \$500                          | \$97,000                | \$2,400                    | \$7,300                     | \$7,000           | \$43,000                               | \$157,000 |             |
| Open Space       | Parcel 7         | 33,325                                       | 10%                              | 30%     | 60%         | 53,320                                       | 1,973                              | 1,111                    | \$1,500                        | \$243,000               | \$13,600                   | \$15,300                    | \$7,000           | \$109,000                              | \$389,000 |             |
| Commercial       | Parcel 4A        | 2,850  | 30%                              | 40%     | 30%         | 5,130  | 190                                | 127                      | \$100                          | \$25,000                | \$600                      | \$1,700                     | \$7,000           | \$10,000                               | \$42,000  |             |
| Industrial       | Sewage Pump Sta  | 11,300                                       | 50%                              | 30%     | 20%         | 27,120                                       | 1,004                              | 377                      | \$500                          | \$268,000               | \$1,500                    | \$5,200                     | \$7,000           | \$52,000                               | \$188,000 |             |
| Industrial       | Parcel 5         | 24,500                                       | 50%                              | 30%     | 20%         | 58,320                                       | 2,180                              | 610                      | \$1,100                        | \$288,000               | \$3,300                    | \$11,200                    | \$7,000           | \$113,000                              | \$402,000 |             |
| Industrial       | Parcel 6         | 22,500                                       | 50%                              | 30%     | 20%         | 54,000                                       | 2,000                              | 750                      | \$1,000                        | \$246,000               | \$3,100                    | \$10,400                    | \$7,000           | \$104,000                              | \$372,000 |             |
| Industrial       | 11th Street ROW  | 0  | 10%                              | 30%     | 60%         | 0  | 0                                  | 0                        | 0                              | \$0                     | \$0                        | \$0                         | \$0               | \$0                                    | \$0       |             |
| Totals           |                  |  |                                  |         |             |  |                                    |                          |                                | \$8,900                 | \$2,052,000                | \$50,100                    | \$102,600         | \$70,000                               | \$685,000 | \$3,170,000 |

HIGH ESTIMATE COSTS ARE BASED ON THE ASSUMPTIONS STATED ON PRECEDING PAGE AND ARE ORDER OF MAGNITUDE ESTIMATES ONLY.

| Assumed Land Use | Property         | Estimated Area (sq ft) Requiring Remediation | % Buildings or Utility Corridors | % Paved | % Vegetated | Volume of Soil Requiring Remediation (cu ft) | Volume of Soil Remediation (cu yd) | Area to Be Paved (sq yd) | Site Preparation (\$2000/acre) | Cost to Remediate Soils | Soil Cover (\$18.30/cu yd) | Asphalt Cap (\$13.80/sq yd) | Feasibility Study | Mobilization, Engineering, Contingency | Total       |              |
|------------------|------------------|--|----------------------------------|---------|-------------|--|------------------------------------|--------------------------|--------------------------------|-------------------------|----------------------------|-----------------------------|-------------------|--|-------------|--------------|
| Open Space       | Parcel 1A        | 0  | 10%                              | 30%     | 60%         | 0  | 0                                  | 0                        | 0                              | \$0                     | \$0                        | \$0                         | \$0               | \$0                                    | \$0         |              |
| Commercial       | Parcel 1B        | 0  | 30%                              | 40%     | 30%         | 0  | 0                                  | 0                        | 0                              | \$0                     | \$0                        | \$0                         | \$0               | \$0                                    | \$0         |              |
| Commercial       | Parcel 1C        | 0  | 30%                              | 40%     | 30%         | 0  | 0                                  | 0                        | 0                              | \$0                     | \$0                        | \$0                         | \$0               | \$0                                    | \$0         |              |
| Commercial       | Parcel 1D        | 3,375  | 30%                              | 40%     | 30%         | 8,073  | 225                                | 150                      | \$200                          | \$28,000                | \$700                      | \$2,100                     | \$7,000           | \$12,000                               | \$50,000    |              |
| Commercial       | Tobin Marina     | 10,000                                       | 30%                              | 40%     | 30%         | 18,000                                       | 687                                | 444                      | \$500                          | \$82,000                | \$2,000                    | \$6,100                     | \$7,000           | \$36,000                               | \$134,000   |              |
| Commercial       | Municipal Dock   | 0  | 30%                              | 40%     | 30%         | 0  | 0                                  | 0                        | 0                              | \$0                     | \$0                        | \$0                         | \$0               | \$0                                    | \$0         |              |
| Commercial       | Atlas Foundry    | 36,000                                       | 30%                              | 40%     | 30%         | 64,800                                       | 2,400                              | 1,600                    | \$1,700                        | \$885,000               | \$7,300                    | \$22,100                    | \$7,000           | \$368,000                              | \$1,289,000 |              |
| Commercial       | Coast Iron Works | 30,000                                       | 30%                              | 40%     | 30%         | 54,000                                       | 2,000                              | 1,333                    | \$1,400                        | \$737,000               | \$8,100                    | \$16,400                    | \$7,000           | \$305,000                              | \$1,075,000 |              |
| Commercial       | Steam Plant      | 18,000                                       | 30%                              | 40%     | 30%         | 32,400                                       | 1,200                              | 800                      | \$600                          | \$206,000               | \$3,700                    | \$11,000                    | \$7,000           | \$69,000                               | \$318,000   |              |
| Commercial       | Johnny's Seafood | 0  | 30%                              | 40%     | 30%         | 0  | 0                                  | 0                        | 0                              | \$0                     | \$0                        | \$0                         | \$0               | \$0                                    | \$0         |              |
| Open Space       | Parcel 3A        | 84,500                                       | 10%                              | 30%     | 60%         | 135,200                                      | 5,007                              | 2,917                    | \$3,900                        | \$623,000               | \$34,400                   | \$38,900                    | \$7,000           | \$400,000                              | \$1,407,000 |              |
| Residential      | Parcel 3B        | 86,000                                       | 40%                              | 30%     | 30%         | 344,000                                      | 20,148                             | 2,267                    | \$3,100                        | \$2,872,000             | \$0                        | \$0                         | \$7,000           | \$1,180,000                            | \$4,172,000 |              |
| Commercial       | Parcel 3C        | 28,700                                       | 30%                              | 40%     | 30%         | 53,480                                       | 1,980                              | 1,320                    | \$1,400                        | \$282,000               | \$8,000                    | \$18,200                    | \$7,000           | \$127,000                              | \$452,000   |              |
| Commercial       | Parcel 7         | 48,500                                       | 30%                              | 40%     | 30%         | 83,700                                       | 3,100                              | 2,087                    | \$2,100                        | \$381,000               | \$9,500                    | \$28,500                    | \$7,000           | \$188,000                              | \$568,000   |              |
| Commercial       | Parcel 4A        | 14,250                                       | 30%                              | 40%     | 30%         | 25,650                                       | 950                                | 633                      | \$700                          | \$117,000               | \$2,900                    | \$8,700                     | \$7,000           | \$52,000                               | \$186,000   |              |
| Industrial       | Sewage Pump Sta  | 87,800                                       | 50%                              | 30%     | 20%         | 182,720                                      | 6,927                              | 2,260                    | \$3,100                        | \$889,000               | \$9,200                    | \$31,200                    | \$7,000           | \$373,000                              | \$1,313,000 |              |
| Industrial       | Parcel 5         | 40,500                                       | 50%                              | 30%     | 20%         | 87,200                                       | 3,800                              | 1,350                    | \$1,800                        | \$487,000               | \$5,500                    | \$18,800                    | \$7,000           | \$205,000                              | \$725,000   |              |
| Industrial       | Parcel 6         | 58,250                                       | 50%                              | 30%     | 20%         | 135,000                                      | 5,000                              | 1,875                    | \$2,600                        | \$676,000               | \$7,600                    | \$25,900                    | \$7,000           | \$265,000                              | \$1,004,000 |              |
| Industrial       | 11th Street ROW  | 15,800                                       | 50%                              | 30%     | 20%         | 37,440                                       | 1,387                              | 520                      | \$700                          | \$167,000               | \$2,100                    | \$7,200                     | \$7,000           | \$79,000                               | \$293,000   |              |
| Totals           |                  |  |                                  |         |             |  |                                    |                          |                                | \$24,100                | \$8,862,000                | \$87,000                    | \$236,900         | \$68,000                               | \$3,667,000 | \$13,010,000 |

TABLE 7-1(4)

VOLUME OF SOIL AND COSTS TO REMEDIATE SOIL -- ALTERNATIVE 4

LOW ESTIMATE

COSTS ARE BASED ON THE ASSUMPTIONS STATED ON PRECEDING PAGE AND ARE ORDER OF MAGNITUDE ESTIMATES ONLY

| Assumed Land Use | Property            | Volume of Soil Requiring Remediation (cu ft) | Area to Be Paved (sq yd) | Site Preparation (\$2000/acre) | Remediate Soils (\$18.30/cu yd) | Soil Cover Asphalt (\$13.60/sq yd) | Treatability Study | Mobilization, Engineering, Contingency | Total        |
|------------------|---------------------|--|--------------------------|--------------------------------|---------------------------------|------------------------------------|--------------------|--|--------------|
| Open Space       | Parcel 1A           | 0  | 0                        | 0                              | \$0                             | \$0                                | \$0                | \$0                                    | \$0          |
| Commercial       | Parcel 1B           | 0  | 0                        | 0                              | \$0                             | \$0                                | \$0                | \$0                                    | \$0          |
| Commercial       | Parcel 1C           | 0  | 0                        | 0                              | \$0                             | \$0                                | \$0                | \$0                                    | \$0          |
| Commercial       | Parcel 1D           | 0  | 0                        | 0                              | \$0                             | \$0                                | \$0                | \$0                                    | \$0          |
| Commercial       | Tobin Marina        | 0  | 0                        | 0                              | \$0                             | \$0                                | \$0                | \$0                                    | \$0          |
| Commercial       | Municipal Dock      | 0  | 0                        | 0                              | \$0                             | \$0                                | \$0                | \$0                                    | \$0          |
| Commercial       | Atlas Foundry       | 180,000                                      | 6,667                    | \$1,000                        | \$2,130,000                     | \$0                                | \$7,000            | \$832,000                              | \$2,969,000  |
| Commercial       | East Iron Works     | 0  | 0                        | 0                              | \$0                             | \$0                                | \$0                | \$0                                    | \$0          |
| Commercial       | Steam Plant         | 72,000                                       | 2,667                    | \$400                          | \$381,000                       | \$0                                | \$7,000            | \$145,000                              | \$513,000    |
| Commercial       | Johnny's Seafood    | 0  | 0                        | 0                              | \$0                             | \$0                                | \$0                | \$0                                    | \$0          |
| Open Space       | Parcel 3A           | 270,400                                      | 1,127                    | \$1,600                        | \$1,354,000                     | \$0                                | \$7,000            | \$342,000                              | \$1,905,000  |
| Commercial       | Parcel 3B           | 217,600                                      | 8,059                    | \$1,200                        | \$991,000                       | \$0                                | \$7,000            | \$397,000                              | \$1,396,000  |
| Commercial       | Parcel 3C           | 85,040                                       | 3,520                    | \$500                          | \$433,000                       | \$0                                | \$7,000            | \$173,000                              | \$614,000    |
| Open Space       | Parcel 7            | 288,600                                      | 9,874                    | \$1,500                        | \$1,214,000                     | \$0                                | \$7,000            | \$468,000                              | \$1,709,000  |
| Commercial       | Parcel 4A           | 22,800                                       | 844                      | \$100                          | \$104,000                       | \$0                                | \$7,000            | \$42,000                               | \$153,000    |
| Industrial       | Sewage Pump Station | 80,400                                       | 3,348                    | \$500                          | \$412,000                       | \$0                                | \$7,000            | \$165,000                              | \$594,000    |
| Industrial       | Parcel 5            | 184,400                                      | 7,200                    | \$1,100                        | \$895,000                       | \$0                                | \$7,000            | \$354,000                              | \$1,247,000  |
| Industrial       | Parcel 6            | 180,000                                      | 6,667                    | \$1,000                        | \$820,000                       | \$0                                | \$7,000            | \$328,000                              | \$1,156,000  |
| Industrial       | 11th Street ROW     | 0  | 0                        | 0                              | \$0                             | \$0                                | \$0                | \$0                                    | \$0          |
| Totals           |                     |  |                          | \$8,900                        | \$8,704,000                     | \$0                                | \$70,000           | \$3,484,000                            | \$12,270,000 |

HIGH ESTIMATE

COSTS ARE BASED ON THE ASSUMPTIONS STATED ON PRECEDING PAGE AND ARE ORDER OF MAGNITUDE ESTIMATES ONLY

| Assumed Land Use | Property            | Volume of Soil Requiring Remediation (cu ft) | Area to Be Paved (sq yd) | Site Preparation (\$2000/acre) | Remediate Soils (\$18.30/cu yd) | Soil Cover Asphalt (\$13.60/sq yd) | Treatability Study | Mobilization, Engineering, Contingency | Total        |
|------------------|---------------------|--|--------------------------|--------------------------------|---------------------------------|------------------------------------|--------------------|--|--------------|
| Open Space       | Parcel 1A           | 0  | 0                        | 0                              | \$0                             | \$0                                | \$0                | \$0                                    | \$0          |
| Commercial       | Parcel 1B           | 0  | 0                        | 0                              | \$0                             | \$0                                | \$0                | \$0                                    | \$0          |
| Commercial       | Parcel 1C           | 0  | 0                        | 0                              | \$0                             | \$0                                | \$0                | \$0                                    | \$0          |
| Commercial       | Parcel 1D           | 27,000                                       | 1,000                    | \$200                          | \$123,000                       | \$0                                | \$7,000            | \$49,000                               | \$179,000    |
| Commercial       | Tobin Marina        | 80,000                                       | 2,953                    | \$500                          | \$364,000                       | \$0                                | \$7,000            | \$146,000                              | \$517,000    |
| Commercial       | Municipal Dock      | 0  | 0                        | 0                              | \$0                             | \$0                                | \$0                | \$0                                    | \$0          |
| Commercial       | Atlas Foundry       | 288,000                                      | 10,667                   | \$1,700                        | \$3,932,000                     | \$0                                | \$7,000            | \$1,573,000                            | \$5,514,000  |
| Commercial       | East Iron Works     | 240,000                                      | 8,668                    | \$1,400                        | \$3,277,000                     | \$0                                | \$7,000            | \$1,211,000                            | \$4,598,000  |
| Commercial       | Steam Plant         | 144,000                                      | 5,333                    | \$600                          | \$391,000                       | \$0                                | \$7,000            | \$368,000                              | \$1,294,000  |
| Commercial       | Johnny's Seafood    | 0  | 0                        | 0                              | \$0                             | \$0                                | \$0                | \$0                                    | \$0          |
| Open Space       | Parcel 3A           | 676,000                                      | 2,817                    | \$3,900                        | \$4,818,000                     | \$0                                | \$7,000            | \$1,848,000                            | \$6,473,000  |
| Commercial       | Parcel 3B           | 544,000                                      | 2,267                    | \$3,100                        | \$2,872,000                     | \$0                                | \$7,000            | \$1,190,000                            | \$4,172,000  |
| Commercial       | Parcel 3C           | 237,600                                      | 8,600                    | \$1,400                        | \$1,268,000                     | \$0                                | \$7,000            | \$330,000                              | \$1,626,000  |
| Commercial       | Parcel 7            | 372,000                                      | 13,778                   | \$2,067                        | \$1,894,000                     | \$0                                | \$7,000            | \$678,000                              | \$2,581,000  |
| Commercial       | Parcel 4A           | 114,000                                      | 4,222                    | \$700                          | \$519,000                       | \$0                                | \$7,000            | \$208,000                              | \$735,000    |
| Industrial       | Sewage Pump Station | 542,400                                      | 2,260                    | \$3,100                        | \$2,983,000                     | \$0                                | \$7,000            | \$1,186,000                            | \$4,159,000  |
| Industrial       | Parcel 5            | 324,000                                      | 12,000                   | \$1,900                        | \$1,823,000                     | \$0                                | \$7,000            | \$650,000                              | \$2,282,000  |
| Industrial       | Parcel 6            | 450,000                                      | 16,667                   | \$2,800                        | \$2,254,000                     | \$0                                | \$7,000            | \$903,000                              | \$3,167,000  |
| Industrial       | 11th Street ROW     | 124,800                                      | 4,822                    | \$700                          | \$625,000                       | \$0                                | \$7,000            | \$230,000                              | \$862,000    |
| Totals           |                     |  |                          | \$24,100                       | \$27,178,000                    | \$0                                | \$98,000           | \$10,880,000                           | \$38,160,000 |

contaminated soil is estimated to be \$369 per cubic yard. A treatability study is often required prior to implementation of a remedial technology to insure the treatment process will meet objectives. For the purposes of the costs estimate, it was assumed that a \$21,000 treatability study would be conducted for every 3 parcels requiring remediation. Therefore, a lump sum cost of \$7,000 has been added to the cost estimate to perform a treatability study.

Engineering design fees for the detailed design of the treatment system are estimated at 10 percent of the direct capital cost. A contingency of 20 percent is added to the direct capital cost to account for the uncertainties associated with this alternative. Assumptions used to develop the cost scenarios are detailed in Chapter 10.0 of the Area Wide Report.

#### 7.10 Elimination of Other Alternatives

Alternative 1 was not selected because it would not adequately protect human health and the environment. Alternative 2 was not selected because it would not, by itself, adequately protect human health and the environment on some properties within the Site. Alternative 4 could meet the requirements for protectiveness by eliminating all soils that contain contaminants above the cleanup standards, on all properties within the Site. However, the additional cost for excavation and remediation of all soils in the Site is excessive, considering the minimal degree of additional protection it would achieve over the recommended alternative: Low=\$370,000 versus high=\$38,180,000.

Alternative 3, which includes elements of alternatives 2 and 4, provides adequate protection by requiring the use of remediation technologies that are appropriate to the types, volumes, and concentrations of contaminants found and on the future use of each property within the Site. The particular design for each property cleanup will be determined by performing Site Specific Remedial Investigations and developing Site Specific Cleanup Action Plans prior to further improvements being made on the properties.

#### 8.0 STATE ENVIRONMENTAL POLICY ACT (SEPA)

Due to the phased approach of this Cleanup Action Plan (an initial Area-Wide CAP, followed by Site-Specific CAPs), along with new legislation regarding the integration of SEPA & MTCA, the following protocol will be observed with respect to SEPA compliance.

Per WAC 173-11-060(5), a phased review approach will be utilized to comply with SEPA. An initial threshold determination for the general actions addressed by the area-wide feasibility study and CAP has been issued. A Determination of Nonsignificance has been issued. At the completion of each site-specific remedial investigation, the responsible official of the lead agency will make a determination as to the scope and level of detail of environmental review, if necessary, that is appropriate for that stage of work. Subsequent action will be based on the requirements of SEPA, including



sections 197-11-340, 197-11-350, 197-11-360, and Part Six of Chapter 197-11 WAC.

#### 9.0 STATE AND COMMUNITY ACCEPTANCE

Community acceptance will be evaluated based on the comments received during the public comment period. Based on the information gathered from the public, Ecology will modify the draft Cleanup Action Plan to arrive at a final Cleanup Action Plan. The draft SCAPs and final SCAPs will be subject to public comment (final SCAPs entered as amendments to the Decree).

#### 10.0 CLEANUP ACTION REQUIREMENTS

The cleanup action as selected is designed to accomplish the following requirements:

- 1) Protect human health and the environment.
- 2) Comply with cleanup standards per WAC 173-340-700 through 760.
- 3) Comply with applicable state and federal laws per WAC 173-340-710.
- 4) Provide compliance monitoring per WAC 173-340-410.
- 5) Use permanent solutions to the maximum extent practicable per WAC 173-340-360(4).
- 6) Provide a reasonable restoration time frame per WAC 173-340-360(6).
- 7) Consider public concerns, if any, raised during public comment on the draft Cleanup Action Plan per WAC 173-340-360(10) through (13).

#### 11.0 SCHEDULE FOR IMPLEMENTATION/UPCOMING ACTIVITIES

Ecology has begun negotiations on a Consent Decree per MTCA with the City of Tacoma to cover all phases of the work to be performed. The time line for implementation of all general project phases will be defined in the Consent Decree. (A general, area wide Quality Assurance Project Plan (QAPP), Sampling and Analysis Plan (SAP), and Public Participation Plan (PPP) accompany the Consent Decree to provide general guidance for activities associated with the area-wide effort. Specific SAPs and schedules will be developed for each site specific RI to provide protocols appropriate to the characteristics of each site.)

Schedules for the implementation of remedial actions for specific parcels will be detailed in Site Specific Cleanup Action Plans. Full public participation, including a 30 day public comment period and public meeting, will accompany the MTCA Consent Decree. Full public participation, including 30 day comment periods, will accompany subsequent SCAPs, as these will be entered as amendments to the Consent Decree.

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**APPENDIX B**  
**Draft Site-Specific Remedial Investigation Report**

**Draft**  
**Site-Specific Remedial Investigation**  
**Thea Foss Upland Properties**  
**Hicks-Bull, Coast Iron Works, and**  
**Steam Plan Properties**  
**Tacoma, Washington**



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**Prepared for**  
**City of Tacoma**  
**Public Works Department**

**February 26, 2002**  
**4676-72**

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*Chemical Data Quality Review*

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**DRAFT  
SITE-SPECIFIC REMEDIAL INVESTIGATION  
THEA FOSS UPLAND PROPERTIES  
HICKS-BULL, COAST IRON WORKS, AND STEAM PLANT PROPERTIES  
TACOMA, WASHINGTON**

**INTRODUCTION**

This report addresses the site-specific remedial investigation conducted for the Hicks-Bull, Coast Iron Works, and Steam Plant properties (Figure 1). The remedial investigation and any subsequent cleanup activities are being conducted under Consent Decree 94-10917 6 between the Washington State Department of Ecology (Ecology) and the City of Tacoma and Metropolitan Parks District of Tacoma.

The Hicks-Bull, Coast Iron Works, and Steam Plant properties are located between the South 11th Street ROW and the approximate area of the South 13th Street ROW extension (Figure 1). Currently, the only building on the properties is the Sea Scouts building, which is located in the former Coast Iron Works building. The remaining area of these parcels is not currently developed and is used for parking, with paved and unpaved areas. The site is one of four waterfront properties north of South 15th Street between Dock Street and the Thea Foss Waterway currently being investigated for the purpose of developing a cleanup action plan under the Consent Decree.

Under the process outlined in the Consent Decree, if a contaminant release has occurred, a site-specific remedial investigation (RI) is performed. The purpose of the site-specific RI is to identify contaminant release(s) on the property that require cleanup and to propose cleanup actions consistent with the Cleanup Action Plan (CAP) defined in the Consent Decree. Site-specific cleanup actions plans (SCAPs) are then developed that are consistent with long-term plans for use of the site.

For the purposes of redevelopment, the site has been divided into Development Site 8 and Development Site 9, as shown on Figure 1 and subsequent figures. Future development of these sites is currently envisioned as mixed-use commercial/residential. Land use plans include esplanade and public access areas. Structures built within the parcels could include multi-story buildings with commercial development on the ground floor. Excavations for pile caps, footings, subsurface parking structures, and/or future sites for utilities are the most likely future subsurface disturbance.

## **Scope of Work**

The scope of work completed to prepare this report was detailed in the Thea Foss Uplands Site-Specific Remedial Investigation Work Plan for properties north of South 15th Street (Hart Crowser 2000). The scope included:

- Excavating ten test pits and drilling six hollow-stem auger soil borings to obtain data regarding subsurface physical conditions and soil quality;
- Completing three of the soil borings as groundwater monitoring wells;
- Collecting and analyzing two rounds of groundwater quality samples from the three new and one existing monitoring wells, and collecting one bank seep water quality sample at low tide. An additional round of water quality sampling and analysis was performed to assess the effects of salinity on the results of metals analyses;
- Comparing the environmental data to Cleanup Levels and Soil Contamination Maximums established in the Consent Decree;
- Evaluating the available data from the investigations to determine if sources of any detected contamination can be identified; and
- Identifying a cleanup action that is consistent with the Consent Decree Cleanup Action Plan and anticipated future land use of the properties.

## **HISTORICAL LAND USE**

Figure 2 presents significant historical features on the subject properties. The properties originally were open tidelands fronting a steep bluff to the west. Initially, railroad lines were developed along the base of the bluff. By 1893, the parcels south of 11th Street were filled with sediments dredged from the Thea Foss Waterway between 1890 and 1905, but remained relatively undeveloped. By 1896, a railroad spur extended from beneath the 11th Street Bridge onto the developed parcels. In 1910, Northern Pacific Railway transferred the properties to the City of Tacoma, who began leasing the lots to various industries, primarily machine and metal working shops. Since the railroad spur divided the western (Dock Street) and eastern (waterway) portions of the lots, these lots were often leased to separate operations.

### **Hicks Bull Machine Shop/Dravis Engineering and Machine Works (Lots 1 through 3)**

The first operation indicated on these parcels was the Hicks Bull Machine Shop. They operated in two buildings on Lot 2 from the 1910s through the 1930s. A building had previously been located on Lot 1 in the early 1900s and may also have been part of their operation. In the 1910s, the machine shop was in the western building. By the 1920s, the machine shop was moved to the eastern building and operations had expanded to include two additional sheds.

Dravis Engineering and Machine Works, who bought out the Hicks-Bull operation, occupied the site from 1937 until 1960. They had one expansive building rather than the four former Hicks Bull buildings, a small oil house, and a small coal house. Their operations included machining and blacksmithing. In 1963, Dravis transferred the buildings and improvements on Lots 1 and 2 and the north 25 feet of Lot 3 to Atlas Foundry. Atlas used the building for storage and manufacture of wood forms used in their casting facility in the Nalley Valley area. In 1978, the City leased Lots 1 through 5 to Moorage Associates (Totem Boat Haven). None of the historical structures remain and these lots are currently paved parking.

### **Tacoma Welding/Coast Iron and Machine Works/Fish Packing (Lots 3 through 5)**

The Tacoma Welding Company, founded circa 1914, operated in a building on Lot 4 along Dock Street until the mid-1930s. They were replaced by an auto repair shop, that was located there for approximately 10 years. According to title records, the auto repair business was sold in 1946, including one 280-gallon gasoline underground storage tank (UST). The location of this UST is not known. Later uses of this building (1950s) were by the Marush Fish and Oyster Company retail store and by Johnny's Seafood from 1960 through 1975.

The Coast Iron and Machine Works, also founded circa 1914, initially operated in a building on Lot 5 along Dock Street until they moved further south to Lots 7 and 8. The building eventually was removed and the empty lot used for parking.

The southern portion of Lot 3 and the eastern portions of Lots 4 and 5 were occupied primarily by fish and seafood packers. These included the Tacoma Fish and Packing Company (near the waterway in the 1930s), the Marush Fish and Oyster Company (primarily on Lot 3), and Johnny's Seafood. For a brief period, the U.S. Coast Guard had an address along the waterway. Lots 3, 4, and 5 are currently paved parking leased to Moorage Associates.

### ***Tacoma Steam Boiler Works (Lot 6)***

The Tacoma Steam Boiler Works operated in a building that encompassed the western portion of Lot 6 and a northwestern portion of Lot 7 circa 1920. They were one of the oldest boiler, tank, stack, and ship repair plants in the Pacific Northwest and were in business through 1955. Due to ownership changes, their name changed to the Tacoma Steam Boiler and Welder Works in the 1930s, before becoming the Tacoma Boiler Works in 1943. The building walls were eventually removed, and the concrete floor used for parking.

### ***Coast Iron and Machine Works (Lots 7 and 8)***

Although Coast Iron and Machine Works were not the original occupants of these lots, they built a large machine shop along Dock Street for their operations of at least 50 years. Coast Iron and Machine Works was a general industrial shop that also built custom machinery. They moved to this location in the early 1930s (they were previously on Lot 5), replacing a small office building on Lot 7 that housed the Shaffer Brokerage Company and a larger building on Lot 8 for Sunset Products. Another building had previously been on Lot 7 in 1912 at the location of the brokerage office; its use is not known.

After Coast Iron and Machine Works ceased to occupy the building, it was vacant until the Boy Scouts began using the building in the early 1990s for their Sea Scout program.

### ***The Pacific Machine Shop (Lot 9)***

The first identified occupant of Lot 9 was the Case-Shaffer Furnace Company, which was listed at the 1133 Dock Street in 1913. The Pacific Machine Shop, founded circa 1918, developed their plant along Dock Street on Lot 9. They specialized in acetylene and gas welding and manufacture of valves, pumps, and other equipment for the chemical industry. Their original building was replaced at least once in the 68 years that they operated on this parcel. By 1969, their machine shop was set back from Dock Street, closer to the waterway. In 1990, the City of Tacoma demolished the Pacific Machine Shop building. This lot is currently unpaved parking.

### ***Food Warehouses/Auto Repair (Lots 10 and 11)***

The first operation indicated on these lots and the southern portion of Lot 9 was the Ryan Fruit Company warehouse in the 1920s (potentially earlier). They were succeeded by William Brothers, who initially operated a warehouse, but then

begin operating a maintenance garage in the late 1940s for approximately 15 years.

By 1966, the Western Fish and Oyster Company operated a retail fish store built primarily on Lot 10 (and the southern portion of Lot 9). Lot 11 was used for parking. In 1990, the City of Tacoma demolished the Western Fish & Oyster Company building and removed a 6,000-gallon UST southeast of the former building. According to Tacoma-Pierce County Health Department (TPCHD) files, the UST formerly contained fuel oil, and was emptied and filled with sand and gravel in 1970.

### ***The City Steam-Electricity Plant (Lots 11 and 12)***

The southern half of Lot 11 and the northern half of Lot 12 of Block 62 were transferred with Lots 1 through 10 by Northern Pacific Railway to the City of Tacoma in 1910. The City established Tacoma Steam Plant No. 1 in 1922, which occupied these lots. The City steam plant was built as a backup electrical plant and was reportedly rarely operated. The City demolished the plant in 1988.

## **ENVIRONMENTAL INVESTIGATIONS**

### ***Summary of Previous Investigations***

Several previous investigations have been completed within the area of these properties. The investigations primarily included slag sampling along the bank of the waterway and verification samples collected after soil excavation. A summary of these investigations is presented below. Figure 3 shows the previous sampling locations. A summary of the results of soil and groundwater sampling from previous investigations is presented in the following section.

### **City of Tacoma (1980s) Boardwalk Construction**

The City of Tacoma constructed a boardwalk adjacent to the former Coast Iron Works in the 1980s. Materials including massive slag, friable slag, metal turnings, and miscellaneous debris were identified during construction. Three soil samples were reportedly collected for the boardwalk construction project in December 1989 (Ecology 1993 and Black & Veatch 1994); however, documentation of sampling locations and analytical data were not available for this report. According to Black and Veatch, samples were collected at the bank, about 3 or 4 feet below a "slag-like" layer and analyzed for total petroleum hydrocarbons (TPH), polycyclic aromatic hydrocarbons (PAHs), and halogenated

hydrocarbons. Leachability of metals, pesticides, and herbicides was evaluated by extraction procedure toxicity (EP Tox). The slag and metallic waste materials were apparently overlain with fabric and covered with stone riprap when the boardwalk was built. Two samples were noted to have TPH concentrations (4,418 and 1,739 mg/kg) greater than the cleanup goal of 200 mg/kg. The samples results for PAHs were reported as greater than the cleanup goal.

### **TPCHD (1988) Preliminary Environmental Assessment**

TPCHD conducted an environmental assessment of the former Steam Plant (TPCHD 1988) to evaluate health and environmental risk associated with past site use. Twenty samples were collected for chemical analysis and two powder samples were submitted for fish bioassay (for waste designation purposes). Thirteen samples were concrete, brick, ash, and wood shaving; and four were sludge samples. Samples were submitted for analyses of polychlorinated biphenyls (PCBs), priority pollutant metals, halogenated hydrocarbons/PAH, and oil and grease. The location of these samples could not be duplicated since they were located within building structures that have since been demolished. The remaining three were soil or sediment samples (TCL-1, TCL-2, and TCL-3) collected from locations as presented on Figure 3. Samples were submitted for analyses of priority pollutant metals, halogenated hydrocarbons/PAHs, and oil and grease. The halogenated hydrocarbon/PAH test indicated chlorinated halogens were not present in the samples.

### **City of Tacoma Phase I Environmental Site Assessment (1990)**

Parametrix conducted a Phase I Site Assessment on several parcels along the Thea Foss Waterway, including Coast Irons Works, Pacific Machine Shop, the Western Fish and Oyster Company, and the Steam-Electricity Plant (Parametrix 1990).

As cited in this report, the City of Tacoma noted several USTs were closed and filled in the 1970s in the Coast Iron Works area. However, documentation for only one UST removal was found, as discussed below (TPCHD 1990). During the site reconnaissance conducted by Parametrix, several empty 5-gallon paint containers were noted. Large quantities of metals shavings were noted at depths of up to 6 feet along the east side of the Sea Scouts Building. Additional soil and groundwater characterization was recommended for TPH and metals.

No evidence of USTs was encountered on the former Steam-Electricity Plant property in the historical and agency review conducted in this report. It was noted that the building structures were likely supported by driven timber piles.

## **TPCHD (1990) Tank Removal**

A tank was identified on 1137 Dock Street (near former Western Fish and Oyster Company-Lot 10). In the 1970s, the tank was emptied and filled with sand. According to the TPCHD file (TPCHD 1990), the tank was removed on May 17, 1990. After the tank was removed, contaminated soil was excavated from around the tank area. Verification samples were collected to confirm removal of soil. Two samples on the south and west side of the excavation were noted to contain TPH at concentrations of 406 and 788 mg/kg, respectively.

## **City of Tacoma Contaminated Soil Removal (1991)**

The City of Tacoma removed approximately 30 cubic yards of TPH-contaminated soils from the former Steam-Electricity Plant site (Figure 2). Approximately 16 verification soil samples were collected and submitted for TPH analysis. Excavation was continued until samples contained less than 200 mg/kg TPH. The excavated soil was stockpiled to the north of the Public Walkway (on Lot 9) for bioremediation.

## **UBAT (1992) Bank Slag Sampling**

Ecology's Urban Bay Action Team (UBAT) collected samples of slag waste materials along the bank of the waterway on December 2, 1992, to determine whether metals of concern to the waterway exceeded sediment quality objectives (SQOs). Sampling activities were documented in an Ecology memorandum (Ecology 1993). A surface grab sample, ATL-BANK1 (labeled as UBAT92-1 on Figure 3), was collected from the bank below the 11th Street Bridge. The bank sample was analyzed for total metals.

## **Ecology Sampling (1994)**

During a site visit on April 28, 1994, a seep was observed flowing from the bank of the former Steam Plant. Although no pipe was observed, flow at this location was approximately 5 gpm. A seep sample (SPW) was collected and submitted for analysis of total metals. A sediment sample (SP3) was also collected near the seep location and submitted for analysis of total metals.

## **Thea Foss Waterway Round 1 Sampling (1994)**

Hart Crowser completed Round 1 waterway sediment and bank sampling of the Thea Foss Waterway in 1994 (City of Tacoma 1995). A composite bank sediment sample, RD-B32, was collected below the slag and metal turnings pile under the 11th Street Bridge. Analyses included total metals, semivolatile

organic compounds (SVOCs), PAHs, benzene, toluene, ethylbenzene, and xylenes (BTEX), and PCBs/pesticides. In addition, one composite sediment sample (RD-S21) and one sediment sample (RD-S24) were collected from nearshore areas. The sampling locations are shown on Figure 2. Analyses for these samples included total metals, SVOCs, PAHs, and PCBs/pesticides.

### **UBAT (1995) Bank Slag Sampling**

Ecology's UBAT sampled the bank slag area between June 7, 1994, and March 1995. Samples were analyzed for total metals (similar to the 1992 UBAT investigation). One surface sample (UBAT95-1) was collected from a different area of the slag pile in the South 11th Street ROW as shown on Figure 3. In addition, seven samples (UBAT-94-1, UBAT-95-2 through UBAT-95-7) were collected along the bank and submitted for total metals analysis. One seep sample (UBAT-94-Seep) was also collected for analysis of total metals.

### **Ecology (1995) Bank Slag Resampling and Leachability Analysis**

Ecology resampled the slag originally sampled in the UBAT (1992) investigation in June 1995. In addition to total metals analyses, the slag was subjected to leaching tests using the toxicity characteristic leaching procedure (TCLP) (digestion with dilute acetic acid) and ASTM method (digestion with deionized water) to determine whether the slag could be considered an ongoing source to the waterway. The locations of these bank samples, 11ROW-L1 and CIW-L1, are shown on Figure 3.

### **Thea Foss Waterway Round 3 Sampling (1997)**

Hart Crowser completed the Round 3 waterway sediment and groundwater sampling of the Thea Foss Waterway in 1997 (City of Tacoma 1999). As part of this work, an upland shallow and deep well cluster was installed at location RD3-UMW2 A/B and a tidal monitoring study was performed. No soil or groundwater samples were collected for chemical analysis from this location.

### **Hart Crowser (1998) 11th Street ROW Remedial Investigation**

Hart Crowser completed soil and groundwater sampling as part of the RI for the 11th Street Right of Way (ROW) in 1998 (Hart Crowser 1998). Three borings (R11-B01 through R11-B03) were drilled to depths of 20 feet below ground surface. Two test pits (R11-TP01 and R11-TP02) were also excavated to depths of 5 to 6.5 feet. In addition, one monitoring well (R11-MW01) was installed, screened at a depth of 5 to 15 feet. Soil samples were submitted for analysis of total metals, TCLP metals, SVOCs, VOCs, PCBs and pesticides, and TPH.



Groundwater samples were submitted for analyses of dissolved metals, PAHs, VOCs, and TPH.

### ***Summary of Soil Quality Results from Previous Investigations***

The existing soil quality data are primarily from bank samples collected in the intertidal area. Figure 3 presents a summary map of concentrations which exceed the Consent Decree cleanup levels. Data from samples UBAT-95-3 and UBAT-95-4 had not been found at the time of this report. Sediment within the intertidal zone exceeding the Sediment Quality Objectives (SQOs) for Commencement Bay are being addressed under the Thea Foss Waterway cleanup.

Concentrations in the intertidal zone do not necessarily indicate a source from the adjacent upland property; however, they are presented here as indications of the types of contaminants that may be present.

As might be expected with the occurrence of slag and a history of metal foundries, the data indicate elevated metals concentrations. Concentrations of antimony, arsenic, chromium, copper, and lead were above Consent Decree cleanup levels. In one sample, (11ROW-L1), lead (4,680 mg/kg) was above the Maximum Soil Concentration Level of 2,500 mg/kg under the Cleanup Action Plan.

Total PCBs, total carcinogenic PAH (cPAHs), and TPH as heavy oil were detected in the recent fill beneath the 11th Street ROW at concentrations above the screening criteria. These concentrations are likely related to cutting oils and other lubricants that may be present in machined metal.

In addition, one bank sample (RD-B32) also contained elevated concentrations of total cPAHs. Total PCBs were also detected at RD-S21 and RD-S24 at concentrations above the screening level. The concentrations detected in the bank and nearshore sediments may be related to potential isolated sloughing of recent fill material.

Both TCLP and ASTM leaching tests were conducted on slag samples collected from the bank. The ASTM test method more closely resembles freshwater leaching (e.g., from precipitation infiltration and/or upgradient groundwater) and the TCLP test data are used to assess the feasibility of landfilling the material. The ASTM leaching test indicated that low concentrations of copper, lead, and nickel may be leached from the slag. These data are discussed further in the groundwater quality section below. The lead concentration from the TCLP testing of sample 11ROW-L1 indicates the potential for a characteristic

dangerous waste that would not be accepted for RCRA Subtitle D landfill disposal.

### ***Summary of Groundwater Quality Results from Previous Investigations***

As shown on Figure 3, dissolved arsenic, copper, lead, nickel, and silver in groundwater exceeded the Consent Decree cleanup levels at R11-MW01. Total zinc was detected at concentrations above the Consent Decree cleanup levels for dissolved zinc at UBAT-94-Seep. No information is available on dissolved zinc concentrations at this location.

ASTM leaching data for slag samples do not exceed Consent Decree cleanup levels for groundwater, indicating that slag is likely not impacting groundwater. However, as discussed above the more aggressive TCLP testing does indicate that some slag or soil may not be suitable for RCRA Subtitle D landfill disposal.

### ***Current Site Investigation***

Slag outcrops on the bank, investigations from adjacent properties, and available historical information suggest that past activities on these properties have impacted local environmental conditions. The current investigation focused on characterizing the nature and extent of impacts to soil and groundwater on the site with the following specific goals:

- Evaluate current soil quality in fill materials at the site;
- Evaluate groundwater quality entering the waterway; and
- Determine vertical and lateral extent of slag and other waste material and identify potential sources of contamination to soil and groundwater.

The field investigation was completed by Hart Crowser between March 7 and 21, 2001, with additional groundwater and seep sampling performed on December 10, 2001. The purpose of the field investigations was to collect site characterization data to support evaluation of any potential site cleanup needs. The locations of test pits and borings completed for this investigation are shown on Figures 4 and 5. Boring logs and field investigation procedures are presented in Appendix A.

### **Test Pits**

Ten test pits were excavated at the site using a backhoe on March 7 and 8, 2001. One shallow sample and one deep sample from each test pit were

submitted to the City of Tacoma laboratory for analysis of diesel- and oil-range petroleum hydrocarbons, PAHs, metals, and total solids. The shallow samples were collected from a depth of less than 2.5 feet and the deeper samples were collected from depths of between 5 and 10 feet. Occasionally, when there were multiple distinct fill layers, a third sample was collected and submitted for chemical analysis to better characterize fill soil quality.

### **Soil Borings**

Five borings (HB-B01, HB-B02, and HB-MW01 through HB-MW03) were drilled at the site using a hollow-stem auger drill rig on March 8 and 9, 2001. The borings were advanced to a depth of 17 feet. Soil samples were collected at 2.5-foot-depth intervals using an 18-inch split-spoon sampler. One shallow and one deep sample were submitted for laboratory analysis per boring, except at HB-MW01 where no shallow sample was collected because of poor sample recovery. The shallow sample was collected from within the upper 5 feet, and the deep sample was collected from across the water table at a depth of approximately 10 feet. The samples were submitted to the City of Tacoma laboratory for analysis of diesel- and oil-range petroleum hydrocarbons, PAHs, metals, and total solids. One sample (HB-MW01 S-4), where a strong odor was noted and where photoionization detector (PID) readings were elevated above background levels, was also submitted for analysis of gasoline-range petroleum hydrocarbons and BTEX.

### **Monitoring Wells**

Three of the soil borings (HB-MW01 through HB-MW03) were completed as monitoring wells. Monitoring wells were completed using 2-inch-diameter PVC casing with 10-foot-long well screens. The wells were screened across the water table, with screened intervals between approximately 4 and 14 feet below ground surface. The wells were developed on March 15, 2001, prior to sampling. Groundwater elevations were measured in site monitoring wells before each sampling event and on three other occasions, as summarized in Table 1.

### **Groundwater and Seep Sampling**

Groundwater quality samples were collected from the three new monitoring wells and the existing shallow well RD3-UMW-2A on March 20 and 21, 2001. Samples were collected at low (March 20) and high (March 21) tides to assess variability in groundwater quality due to potential mixing with seawater. A seep sample was also collected from location HB-S01 at low tide on March 27, 2001. These samples were submitted to the City of Tacoma laboratory for analysis of

diesel- and oil-range petroleum hydrocarbons, dissolved metals, and PAHs. Due to high salinities in the groundwater and seep samples, metals analyses were performed by Sound Analytical of Fife, Washington. Samples from HB-MW01 and HB-MW03 were also submitted for analysis of gasoline-range hydrocarbons and BTEX.

To confirm detections of elevated concentrations of metals in groundwater and seep samples, and to evaluate possible interference with analytical techniques due to high salinities, an additional round of groundwater and seep sampling was performed on December 10, 2001. Wells HB-MW02, HB-MW03, and RD3-UMW-2A, and seep HB-S01 were sampled at low tide. Well HB-MW01 was underneath a parked car and could not be accessed. A surface water reference sample was collected from Owens Beach at Point Defiance Park. These samples were submitted for analysis of dissolved arsenic, copper, and nickel.

## **PHYSICAL SUBSURFACE CONDITIONS**

The subsurface soil and groundwater conditions were evaluated to understand the physical setting with respect to contaminant occurrence and migration. In general, the upper fill soils are the most significant with respect to direct contact risk (e.g., to site workers during soil excavation for utilities work). Deeper soils are of more concern with respect to groundwater impact and contaminant migration to the Thea Foss Waterway. A summary of the soil and groundwater conditions is presented in the following sections.

### ***Subsurface Stratigraphy***

Our interpretation of subsurface stratigraphy is based on the soil explorations performed for this and previous investigations and knowledge of site history. The location of the explorations are shown on Figures 4 and 5 and the exploration logs are presented in Appendix A.

The general stratigraphy at the site consists of surface soils or asphalt pavement over a Mixed Fill unit, containing varying amounts of slag, wood, and debris. This is underlain by black sand with shells, interpreted as being early Dredge Fill and Native Tideflat deposits. The Mixed Fill is generally thickest near the waterway and appears to pinch out to the west. Although the exact western boundary of this unit was not defined, it was not encountered in borings DSN-MW01 and DSN-MW02 on Dock Street immediately west of the site.

Figures 8 and 9 present cross sections running north-south through Development Sites 9 and 8. Development Site 9 is overlain by asphalt parking. Between 1 and 12 feet of Mixed Fill was encountered beneath the asphalt. Non-soil materials described in the Mixed Fill included brick, concrete, wood, burnt wood, coal, and orange or reddish-brown slag. Silvery-gray ash or cinders, possibly boiler ash, were observed in the upper 2 feet of test pits HB-TP03 and HB-TP04, located between the former Coast Iron Works/Tacoma Boiler Works and Hicks-Bull Machine Shop.

Development Site 8 is partially covered by the Sea Scouts building. With the exception of a sidewalk leading to the Public Esplanade, the rest of the site is unpaved parking. Approximately 1 to 8 feet of Mixed Fill was encountered beneath surface soils. Non-soil materials described in the Mixed Fill included brick, concrete, asphalt chunks, wood, burnt wood, coal, and orange or reddish brown slag. Black slag was also noted at HB-TP05. White or silver ash or cinders were also observed in HB-TP05 and HB-TP06, located at the former Coast Iron Works and Tacoma Boiler Works. A tan ash material was noted at a depth of 1 to 2 feet in HB-TP10, located on the former Steam-Electricity Plant site. Deep pilings, which were likely supports the former Steam-Electricity Plant, were encountered to the full depth explored of 9 feet at HB-TP09.

### ***Groundwater Conditions***

Groundwater elevations were measured at several high and low tides in site monitoring wells and the two off-site wells located in Dock Street (Table 1). In 1997 a tidal monitoring study was performed at the site using well RD3-UMW2A (City of Tacoma 1999). Based on these data, groundwater elevations at the site are expected to vary between approximately 4 and -3 feet Tacoma Public Works Datum (TPWD), depending on tide stage and location. Average groundwater elevations at the site are expected to be around 2 feet TPWD. Most of the site is at an elevation of approximately 11 feet TPWD, so that the minimum expected depth to water will typically be around 7 feet, with an average depth of about 9 feet. Results of the tidal monitoring study also indicate that net groundwater flow is toward the waterway, although short-term flow reversals occur during high tide.

## **NATURE AND EXTENT OF CONTAMINATION**

This section describes the nature and extent of constituents identified in soil and groundwater at concentrations above the site cleanup levels. The results of chemical testing on soil and groundwater from the investigations were compared to the cleanup standards for soil and groundwater developed as part

of the Consent Decree (Table 2). This table has been modified from the original values developed in the Consent Decree to reflect changes under new MTCA Amendments (Hart Crowser 2001). The basis of the cleanup levels is as follows:

- Soil cleanup levels are based on the protection of human health under a residential use scenario (MTCA Method B direct contact criteria); and
- Groundwater cleanup levels are based on the protection of marine surface water. Groundwater at the site has been determined by Ecology to not be a current or future source of drinking water based on MTCA criteria. Groundwater cleanup levels include protection of aquatic life (marine chronic criteria; Chapter 173-201A WAC) and the protection of human health from consumption of aquatic organisms (40 CFR 131).

As defined by the Consent Decree Cleanup Action Plan (CAP), groundwater contamination above applicable standards is not expected on the upland properties. Thus, soil quality criteria for groundwater protection is considered only if groundwater quality has been impacted such that active remediation is required, or an active source in the soil is encountered.

The Consent Decree CAP was based on the concept that the properties had similar physical characteristics, past land uses, and similar contaminant problems, which allowed for similar cleanup remedies. Given these conditions, a contaminant scenario was developed within which the CAP would be applicable. The contaminant scenario included "Soil Contaminant Maximums" applicable to the CAP contamination scenario. The Soil Contaminant Maximums are presented in Table 2, along with the soil and groundwater cleanup levels. Each site is evaluated relative to the nature and extent of the contaminants identified as well as the Soil Contaminant Maximums to assess applicability of the Consent Decree CAP.

### **Soil Quality Results**

In total, 33 soil samples were collected at 15 locations. Table 3 presents a summary of the soil chemical analyses completed by location and depth. A summary of the soil cleanup level exceedences is presented in Table 4. Soil exceedences are shown in plan view on Figures 6 and 7, and in cross section on Figures 8 and 9.

Exceedences of Consent Decree soil cleanup levels are limited to the Mixed Fill unit. Total cPAHs exceed soil cleanup levels throughout much of the site, primarily in shallow soils. Lead exceeds soil cleanup levels in the vicinity of the former Coast Iron Works (currently the Sea Scouts building) in the central

portion of the site and at one location on the former Steam-Electricity Plant. Lead exceedences are also primarily limited to shallow soils. One arsenic exceedence was also encountered at the former Coast Iron Work. One heavy oil exceedence was encountered in the upper foot at test pit HB-TP01 located at the northeast corner of the site near the 11th Street ROW.

With the exception of lead from one sample at HB-TP05, analyte concentrations in soil samples were below the Soil Contamination Maximums outlined in the CAP. The lead concentration of 2,630 mg/kg at a depth of 3 to 5 feet at this location slightly exceeds the Soil Contamination Maximum of 2,500 mg/kg.

The complete results of the soil quality analyses are presented in Tables B-1 through B-5 of Appendix B, which are sorted by chemical groups and exploration location. Appendix C provides a chemical data quality review summary and laboratory certificates of analysis for the current samples. All chemical analytical results were deemed acceptable for use on this project.

### **Petroleum Hydrocarbons**

Results of petroleum-range hydrocarbon analyses are presented in Table B-4. Gasoline-range hydrocarbons were not detected in the one sample (HB-MW01 S-4) submitted for analysis. This sample was selected for analysis of gasoline-range hydrocarbons based on elevated PID readings during field screening. Diesel-range hydrocarbons were detected in 1 of 33 samples submitted for analysis. In HB-TP05 S-2, diesel-range hydrocarbons were detected at a concentration of 43 mg/kg, well below the soil cleanup level of 2,000 mg/kg (Table 2).

Oil-range hydrocarbons were detected in 17 of 33 samples, with detections occurring throughout much of the site. The only sample to exceed the heavy oil cleanup level of 2,000 mg/kg was HB-TP01 S-1, with a concentration of 4,000 mg/kg. Detected concentrations at other locations ranged from 44 to 1,300 mg/kg, and were typically less than 500 mg/kg.

### **Polycyclic Aromatic Hydrocarbons**

Results of PAH analyses are presented in Tables B-1 and B-2. Relatively low concentrations, well below Consent Decree cleanup criteria, of several non-carcinogenic PAHs were detected in samples from throughout the site. Detected non-carcinogenic PAH compounds included 2-methylnaphthalene, benzo(g,h,i)perylene, acenaphthene, acenaphthylene, fluoranthene, fluorene, naphthalene, phenanthrene, and pyrene at concentrations ranging up to 21 mg/kg.

Individual cPAHs were detected throughout the site, with the highest concentrations generally occurring in shallow soils. Total cPAH concentrations were calculated using the toxicity equivalent methodology presented in WAC 173-340-708(8). Total cPAH concentrations exceeded the cleanup criteria of 0.137 mg/kg in 18 of 33 soil samples, as summarized in Table 4. Locations and depths of cPAH exceedences are shown on Figures 6 and 7.

A comparison of total cPAH exceedences with soil descriptions on the exploration logs (Appendix A) indicate three different likely sources for cPAHs in site soils. The relatively low-level exceedences in the upper 2 feet of soil on the northern half of the site (HB-TP01 through HB-TP03) may be the result of near-surface soils in direct contact with the asphalt paving. Similarly, asphalt chunks were noted in the upper 2 feet of soil at HB-TP05. The second likely source of total cPAHs is the occurrence of creosote-treated wood planking and pilings, as observed in deeper samples from HB-TP01, HB-TP02, and HB-MW01 and along one side of HB-TP09. The final likely source of cPAHs, burnt wood and/or coal, was observed in HB-TP04 through HB-TP06 and HB-TP10.

## Metals

Results of metals analyses are presented in Table B-3. As summarized in Table 4 and shown on Figures 6 and 7, lead was detected above the cleanup level of 250 mg/kg in five samples, with concentrations ranging from 252 to 2,630 mg/kg. Arsenic was detected above the cleanup level of 20 mg/kg in one sample, at a concentration of 77.2 mg/kg. Concentrations of other metals analyzed for in soils at the site were below soil cleanup levels.

Four of the lead exceedences (HB-TP3 S-1, HB-TP04 S-1, HB-TP05 S-2, and HB-TP06 S-1) occurred in the vicinity of the former Coast Iron Works. These exceedences appear to be associated with red-orange slag and/or silvery-gray cinders or ash encountered in the Mixed Fill in this area. The lead concentration at HB-TP05 S-2 (depth of 3 to 5 feet) was 2,630 mg/kg, which exceeds the Maximum Soil Concentration of 2,500 mg/kg defined in the Consent Decree. Lead concentrations in test pits north and south (HB-TP04 and HB-TP06) of this location were well below the 2,500 mg/kg maximum and the lead concentration immediately below this sample (HB-TP05 S-3, 5 to 7 feet) was only 4.67 mg/kg. This indicates that the extent of soil exceeding the maximum concentration is relatively limited.

The fifth lead exceedence was at HB-TP10 S-1, on the former Steam-Electricity Plant, with a concentration of 252 mg/kg. Non-soil material encountered in this sample included tan ashy material, which may be the source of the elevated lead concentration.



Arsenic was detected in one sample (HB-TP05 S-2) at a concentration of 77.2 mg/kg. This sample location also had the highest lead concentration. Black slag was encountered at this location in addition to the red-orange slag and gray ash discussed above.

Concentrations of other metals from samples in the Mixed Fill were elevated above typical background concentrations; however, these concentrations are well below consent decree cleanup levels.

## **Groundwater Quality Results**

### **Petroleum Hydrocarbons**

Results of petroleum hydrocarbon analyses are summarized in Table B-9. Diesel- and oil-range hydrocarbons were not detected in groundwater and seep samples collected at the site. Gasoline-range hydrocarbons and BTEX compounds were not detected in groundwater samples collected from HB-MW01 and HB-MW03.

### **Polycyclic Aromatic Hydrocarbons**

Results of PAH analyses are summarized in Tables B-6 and B-7. Carcinogenic PAHs were not detected in groundwater and seep samples collected at the site. Low concentrations, below cleanup levels, of the non-carcinogenic PAHs acenaphthene, anthracene, fluoranthene, fluorene, and phenanthrene were detected in groundwater samples collected from HB-MW01. Creosote-treated wood timbers and pilings encountered during drilling of this monitoring well likely account for these detections. No other non-carcinogenic PAHs were detected in site groundwater or seep samples.

### **Dissolved Metals**

Results of dissolved metals analyses are presented in Table B-8. As summarized in Table 6, dissolved metals (arsenic, copper, and nickel) were the only constituents detected at concentrations above groundwater cleanup levels on the site. Figure 10 presents arsenic, copper, and nickel concentrations from previous and ongoing upland investigations along the waterway. Concentrations of each of these constituents are elevated at the properties north of South 15th Street along the west side of the waterway. With the exception of nickel at HB-MW02, the detected concentrations at the site are in the general range of those detected at other upland parcels with high salinity groundwater.

The elevated metal concentrations are believed to be the result in part to saltwater interferences with the laboratory analyses. The inductively coupled

argon plasma-mass spectrometry (ICP-MS) method used for the metals analysis to achieve extra-low detection limits, can cause either false positive results or reported results higher than actually present in the sample for a number of metals in the presence of seawater because of sodium and chloride interferences. These interferences result from ions formed in the plasma that have the same mass as metals of interest. While the laboratory applies interference correction factors, high concentrations of salt such as those in seawater, still cause a positive bias to analytical results. In particular, arsenic and copper are metals that may be positively biased in saline water samples.

To evaluate this, a surface water reference sample (OB-1) collected from Owen's Beach at Point Defiance State Park was analyzed for dissolved arsenic, copper, and nickel. As seen in Table 6, concentrations of arsenic and copper measured in this sample are higher than those measured in any of the site groundwater or seep samples. With the exception of samples collected from monitoring well HB-MW02 (concentrations ranging from 25.8 to 47 ug/L), the nickel concentration measured in OB-1 (10.8 ug/L) is similar to what was measured in other seep and groundwater samples at the site (8.8 to 13 ug/L). Based on this, HB-MW02 appears to be the only location where groundwater is being adversely impacted.

### ***Summary of Subsurface Contaminant Conditions***

The primary contaminant issues identified at the site are total cPAHs, lead, and arsenic in soil and nickel in groundwater. With the exception of nickel, contaminated soils at the site do not appear to be impacting groundwater quality.

In soil, contamination appears to be contained within the upper 1 to 2 feet in the central and western portions of the site, with the exception of HB-TP09 where total cPAH contamination was observed at a depth of 9 feet. Nearer to the waterway the depth of contaminated soil increases to as much as 10 feet.

Total cPAH exceedences are associated with the occurrence of asphalt, creosote-treated wood, and coal or burnt wood. Generally these exceedences are confined to shallow soils, except where creosote-treated wood pilings are encountered at depth or where the Mixed Fill unit thickens near the waterway.

Elevated metals concentrations are generally associated with the occurrence of slag in the Mixed Fill. However, the slag does not seem to be resulting in widespread exceedences of soil cleanup levels. Samples with arsenic and lead exceedences around the Coast Iron Works contained silver or gray to white ash and/or cinder materials in addition to slag. Similarly, no slag was noted in

association with the lead exceedence at HB-TP10; however, there was a tan ashy material. It seems likely the main source of soil exceedences is ash or cinders, possibly boiler ash.

Concentration of nickel in groundwater at HB-MW02 exceeds cleanup levels and is higher than that measured in the surface water reference sample. The highest nickel concentrations in soil at the site were measured in samples HB-TP05 S-2 (72.1 mg/kg), HB-TP06 S-1 (103 mg/kg), and HB-TP07 S-1 (168 mg/kg), which are the three explorations located closest to HB-MW02, indicating that soils in this area are most likely the source of nickel in groundwater.

The data indicate the site meets the intent of the Consent Decree Cleanup Action Plan with expected contaminant types, land use history, and analyte concentrations. With the exception of lead in relatively shallow soils at HB-TP05, the identified contamination is below the maximum soil concentrations allowed in the Consent Decree.

## **CLEANUP ACTION ANALYSIS**

The cleanup action analysis identifies general remedial technologies that conform to the objectives of the Consent Decree, and provides a conceptual understanding of the remedial actions applicable to the site under the terms of the Consent Decree CAP. The CAP identifies Alternative 3 Remediation of Soils Based on Future Land Use Development as the appropriate alternative for site cleanup all along the Thea Foss waterfront based on an Area-Wide Feasibility Study (Black & Veatch 1994).

The Hicks-Bull, Coast Iron Works, and Steam Plant properties consist of two development sites (8 and 9) that may potentially be developed separately. An analysis of the cleanup action applicable to the sites taken as a whole and the rationale are described herein. Site-specific cleanup action plans (SCAPs) will be prepared separately for Development Sites 8 and 9. Specific technologies will be addressed in greater detail in the SCAPs.

### ***Proposed Cleanup Action for the Hicks-Bull, Coast Iron Works, and Steam Plant Properties***

The Development Sites 8 and 9 SCAPs will address proposed development and land use changes at the sites. Future development of these sites is currently envisioned as mixed-use commercial/residential. Land use plans include an esplanade and public access areas along the waterfront. Structures built within

the parcels could include multi-story buildings with commercial development on the ground floor. Subsurface disturbance associated with development will most likely consist of excavations for pile caps, footings, subsurface parking structures, and/or future sites for utilities.

Detected soil contamination at Development Site 8 occurs beneath approximately 1 foot of surface soils in unpaved parking areas. These soils will either need to be excavated or capped with asphalt or 3 feet of clean soil to be protective of human health and the environment. Detected soil contamination at Development Site 9 occurs beneath an asphalt surface which provides protection of human health and the environment under current conditions.

During construction excavation at both sites contaminated soils will likely be encountered, particularly in shallow soils (upper 3 feet) on the eastern half of the sites. From the perspective of protecting human health during excavation, soil cleanup levels based on commercial or industrial land use represent appropriate remediation action levels.

A potential soil source area has been identified for the nickel contamination in groundwater. Soil cleanup levels based on protection of groundwater would represent the appropriate remediation action levels for nickel in the vicinity of HB-MW02. Using default parameters under MTCA and the Consent Decree Cleanup Levels for nickel in groundwater, the soil remediation level for protection of groundwater would be 10.3 mg/kg. Most of the site soils are above this concentration, while the area of impacted groundwater is limited, indicating that this remediation level is likely too conservative. Therefore, a site-specific soil cleanup level for protection of groundwater will be developed based on leaching tests.

Application of the CAP alternatives are currently envisioned as follows:

- **No Action** is applicable where no contamination is identified or where contamination is isolated beneath a cap (asphalt or 3 feet of clean soil), there is no related groundwater contamination, and no excavation is planned. This alternative applies for most of Development Site 9, which is currently capped, has relatively low soil constituent concentrations, and no evidence of groundwater contamination. This applies to a relatively limited area of Development Site 8, including the vicinity of HB-TP08 and potentially the western part of the site along Dock Street and north of HB-TP10.
- **Isolation by Cap or Cover** is applicable throughout both sites, with the exception of the area around HB-TP05 where lead concentrations exceed the Soil Contaminant Maximum and the area upgradient of HB-MW02,

where nickel in soil is impacting groundwater. A cap/cover is currently provided in most areas of Development Site 9 by the existing building footprints and asphalt/concrete paving. Given the relatively low detected constituent concentrations and the lack of groundwater contamination, the subsurface soils elsewhere on Development Sites 8 and 9 will likely not pose a threat to human health or the environment if left in place and capped by pavement or buildings or covered by 3 feet of clean soil.

- **Excavation and Treatment or Disposal** is applicable in the area around HB-TP05 where lead concentrations exceed the Soil Contaminant Maximum; the area upgradient of HB-MW02, where nickel in soil is impacting groundwater; and if construction excavation activities are planned for areas of contaminated soils.

### **Soil Excavation in the Vicinity of HB-TP05 and HB-MW02**

Soils in the vicinity of HB-TP05 that exceed the Soil Contaminant Maximum concentration for lead will need to be excavated to the extent practicable. The depth of excavation will likely be on the order of 5 feet; however, the lateral extent of these soils has not been determined.

Soils upgradient of HB-MW02 contributing nickel to groundwater will likely need to be excavated. The depth of elevated nickel concentrations in this area is relatively shallow, approximately 1 to 5 feet. The extent of any soil removal will depend on the development of appropriate remediation levels based on groundwater protection.

Landfill disposal and/or stabilization of lead- and nickel-contaminated soils are feasible treatment alternatives.

### **Soil Excavation during Construction Work**

In general, excavation on the site should proceed with caution, particularly in shallow Mixed Fill soils. Elevated cPAHs and/or lead concentrations should be expected. If a significant quantity of observable non-soil material (e.g., slag-like material, ash, coal, burnt or creosote-treated wood) is identified, it should be segregated from other excavated soil for specific testing and appropriate disposal. Soil recycling through the use of off-site thermal desorption (a preferred destructive technology) is a feasible soil treatment alternative for cPAH-contaminated soils. Cleaned soil could be returned to the site and used as backfill where needed. Landfill disposal with or without stabilization are feasible alternatives for metals-contaminated soils.

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Table 1 - Groundwater Level Data

| Location   | Date            | Measuring Point Elevation in Feet TPWD | Depth to Water in Feet | Groundwater Elevation in Feet TPWD | Notes                                       |
|------------|-----------------|--|------------------------|------------------------------------|---|
| HB-MW01    | 3/20/2001       | 10.15                                  | 9.20                   | 0.95                               | Low Tide                                    |
|            | 3/21/2001       | 10.15                                  | 9.00                   | 1.15                               | High Tide                                   |
|            | 3/27/2001       | 10.15                                  | 10.39                  | -0.24                              | Low Tide                                    |
|            | 10/18/2001      | 10.15                                  | 7.75                   | 2.40                               | High Tide                                   |
|            | 10/18/2001      | 10.15                                  | 9.00                   | 1.15                               | Low Tide                                    |
| HB-MW02    | 3/20/2001       | 10.72                                  | 9.20                   | 1.52                               | Low Tide                                    |
|            | 3/21/2001       | 10.72                                  | 9.05                   | 1.67                               | High Tide                                   |
|            | 3/27/2001       | 10.72                                  | 9.59                   | 1.13                               | Low Tide                                    |
|            | 10/18/2001      | 10.72                                  | 8.78                   | 1.94                               | High Tide                                   |
|            | 10/18/2001      | 10.72                                  | 9.38                   | 1.34                               | Low Tide                                    |
| 12/10/2001 | 10.72           | 8.44                                   | 2.28                   | Low Tide                           |   |
| HB-MW03    | 3/20/2001       | 8.70                                   | 9.78                   | -1.08                              | Low Tide                                    |
|            | 3/21/2001       | 8.70                                   | 8.90                   | -0.20                              | High Tide                                   |
|            | 3/27/2001       | 8.70                                   | 11.40                  | -2.70                              | Low Tide                                    |
|            | 10/18/2001      | 8.70                                   | 7.54                   | 1.16                               | High Tide                                   |
|            | 10/18/2001      | 8.70                                   | 9.48                   | -0.78                              | Low Tide                                    |
| 12/10/2001 | 8.70            | 10.54                                  | -1.84                  | Low Tide                           |   |
| RD3-UMW2A  | 8/22 to 8/25/97 | 11.09                                  | 9.12                   | 1.97                               | Average from 72-hour tidal monitoring study |
|            | 8/22/1997       | 11.09                                  | 7.70                   | 3.39                               | Maximum during tidal monitoring study       |
|            | 8/25/1997       | 11.09                                  | 10.91                  | 0.18                               | Minimum during tidal monitoring study       |
|            | 3/20/2001       | 11.09                                  | 9.77                   | 1.32                               | Low Tide                                    |
|            | 3/21/2001       | 11.09                                  | 9.02                   | 2.07                               | High Tide                                   |
|            | 3/27/2001       | 11.09                                  | 11.29                  | -0.20                              | Low Tide                                    |
|            | 10/18/2001      | 11.09                                  | 8.62                   | 2.47                               | High Tide                                   |
|            | 10/18/2001      | 11.09                                  | 9.60                   | 1.49                               | Low Tide                                    |
| 12/10/2001 | 11.09           | 10.37                                  | 0.72                   | Low Tide                           |   |
| DSN-MW01   | 3/20/2001       | 10.92                                  | 9.50                   | 1.42                               | Low Tide                                    |
|            | 3/21/2001       | 10.92                                  | 9.15                   | 1.77                               | High Tide                                   |
|            | 3/27/2001       | 10.92                                  | 9.78                   | 1.14                               | Low Tide                                    |
|            | 10/18/2001      | 10.92                                  | 9.55                   | 1.37                               | High Tide                                   |
|            | 10/18/2001      | 10.92                                  | 9.70                   | 1.22                               | Low Tide                                    |
| DSN-MW02   | 3/20/2001       | 11.26                                  | 9.58                   | 1.68                               | Low Tide                                    |
|            | 3/21/2001       | 11.26                                  | 9.22                   | 2.04                               | High Tide                                   |
|            | 3/27/2001       | 11.26                                  | 9.93                   | 1.33                               | Low Tide                                    |
|            | 10/18/2001      | 11.26                                  | 9.49                   | 1.77                               | High Tide                                   |
|            | 10/18/2001      | 11.26                                  | 9.75                   | 1.51                               | Low Tide                                    |

Notes:

TPWD = Tacoma Public Works Datum, NGVD 1929.

Measuring point elevations for wells are surveyed top of casing elevations.



**Table 2 - Soil and Groundwater Cleanup Levels and Soil Contamination Maximums**

| Constituent                                 | Soil Cleanup Level in mg/kg | Maximum Soil Concentration in mg/kg | Groundwater Cleanup Level in ug/L |
|---|-----------------------------|-------------------------------------|-----------------------------------|
| TPH <sup>a</sup> :                          |                             |                                     |                                   |
| Gasoline-Range Organics (BTEX Restrictions) | <b>100</b>                  | 5,000                               | <b>1,000</b>                      |
| Gasoline-Range Organics (All other GRO)     | <b>30</b>                   | 5,000                               | <b>800</b>                        |
| Diesel-Range Organics                       | <b>2,000</b>                | 5,000                               | <b>500</b>                        |
| Heavy Oil                                   | <b>2,000</b>                | 5,000                               | <b>500</b>                        |
| Benzene                                     | 34.5                        | 250                                 | 71.0                              |
| Toluene                                     | 16,000                      | 5,000                               | 200,000                           |
| Ethylbenzene                                | 8,000                       | 5,000                               | 29,000                            |
| Xylenes                                     | 160,000                     | 5,000                               | 16,000                            |
| Total cPAHs (as BAP) <sup>d</sup>           | <b>0.137</b>                | 10.0                                | 0.031                             |
| Antimony                                    | 32.0                        | 320                                 | 4,300                             |
| Arsenic                                     | <b>0.7 (20<sup>b</sup>)</b> | 200                                 | <b>0.14<sup>g</sup></b>           |
| Cadmium                                     | 80.0                        | 400                                 | <b>9.3<sup>f</sup></b>            |
| Chromium (VI) <sup>e</sup>                  | <b>240</b>                  | 4,000                               | 50.0                              |
| Copper                                      | 2,960                       | 29,600                              | <b>3.1<sup>f</sup></b>            |
| Lead  | 250 <sup>c</sup>            | 2,500                               | <b>8.1<sup>f</sup></b>            |
| Mercury                                     | 24.0                        | 240                                 | 0.025                             |
| Nickel                                      | 1,600                       | 16,000                              | <b>8.2<sup>f</sup></b>            |
| Zinc  | 24,000                      | 240,000                             | <b>81<sup>f</sup></b>             |
| PCB (Total)                                 | <b>0.5</b>                  | 50.0                                | 0.030                             |

**Notes:**

Bold values have been revised from original Table 1 in the Consent Decree to reflect new MTCA Amendments of February 2001.

- <sup>a</sup> TPH cleanup criteria are based on Method A Cleanup Standards. TPH Cleanup levels may be adjusted using site-specific risk assessment procedures outlined in MTCA Method B and C equations.
- <sup>b</sup> The arsenic Method B risk-based cleanup standard is 0.7 mg/kg, while the cleanup level based on Washington State background is 20 mg/kg. The arsenic Method B and C soil cleanup criteria no longer use a GI absorption fraction of 0.4.
- <sup>c</sup> Soils cleanup levels for lead are not defined under Method B or Method C. The Method A cleanup level is used for the direct contact value.
- <sup>d</sup> Total cPAHs calculated using toxicity equivalent methodology presented in WAC 173-340-708(8).
- <sup>e</sup> The chromium VI cleanup standards are based on an updated oral reference dose of 0.003 mg/kg/day (previous oral RfD was 0.005 mg/kg/day).
- <sup>f</sup> Cleanup standard based on WAC 173-201A Marine Water Chronic.
- <sup>g</sup> Cleanup standard based on Federal Ambient Water Quality Criteria (40CFR 131) for human consumption of aquatic organisms

**Table 3 - Soil Chemistry Results Count  
Hick's-Bull**

| Sample ID   | Depth in Feet | Sampling Date | Conven-<br>tionals | Metals,<br>Total | PAHs | BTEX | TPH |
|-------------|---------------|---------------|--------------------|------------------|------|------|-----|
| HB-B01 S-1  | 2.5 - 4       | 3/9/2001      | 1                  | 8                | 17   |      | 2   |
| HB-B01 S-4  | 10 - 11.5     | 3/9/2001      | 1                  | 8                | 17   |      | 2   |
| HB-B02 S-1  | 3 - 4.5       | 3/9/2001      | 1                  | 8                | 17   |      | 2   |
| HB-B02 S-4  | 10.5 - 12     | 3/9/2001      | 1                  | 8                | 17   |      | 2   |
| HB-MW01 S-4 | 10 - 11.5     | 3/9/2001      | 1                  | 8                | 17   | 4    | 3   |
| HB-MW01 S-6 | 14.5 - 15     | 3/9/2001      | 1                  | 8                | 17   |      | 2   |
| HB-MW02 S-1 | 3 - 4.5       | 3/9/2001      | 1                  | 8                | 17   |      | 2   |
| HB-MW02 S-3 | 8 - 9.5       | 3/9/2001      | 1                  | 8                | 17   |      | 2   |
| HB-MW03 S-1 | 3 - 4.5       | 3/9/2001      | 1                  | 8                | 17   |      | 2   |
| HB-MW03 S-4 | 10.5 - 12     | 3/9/2001      | 1                  | 8                | 17   |      | 2   |
| HB-TP01 S-1 | 0 - 1         | 3/8/2001      | 1                  | 8                | 17   |      | 2   |
| HB-TP01 S-2 | 6.5 - 8       | 3/8/2001      | 1                  | 8                | 17   |      | 2   |
| HB-TP01 S-3 | 8.5 - 10      | 3/8/2001      | 1                  | 8                | 17   |      | 2   |
| HB-TP02 S-1 | 0.5 - 1.5     | 3/8/2001      | 1                  | 8                | 17   |      | 2   |
| HB-TP02 S-2 | 6 - 7         | 3/8/2001      | 1                  | 8                | 17   |      | 2   |
| HB-TP03 S-1 | 0.5 - 1.5     | 3/7/2001      | 1                  | 8                | 17   |      | 2   |
| HB-TP03 S-2 | 7.5 - 8.5     | 3/7/2001      | 1                  | 8                | 17   |      | 2   |
| HB-TP04 S-1 | 1 - 2         | 3/7/2001      | 1                  | 8                | 17   |      | 2   |
| HB-TP04 S-2 | 5 - 6         | 3/7/2001      | 1                  | 8                | 17   |      | 2   |
| HB-TP05 S-1 | 0.5 - 2       | 3/8/2001      | 1                  | 8                | 17   |      | 2   |
| HB-TP05 S-2 | 3 - 5         | 3/8/2001      | 1                  | 8                | 17   |      | 2   |
| HB-TP05 S-3 | 5 - 7         | 3/8/2001      | 1                  | 8                | 17   |      | 2   |
| HB-TP06 S-1 | 0.5 - 1.5     | 3/8/2001      | 1                  | 8                | 17   |      | 2   |
| HB-TP06 S-2 | 6.5 - 8.5     | 3/8/2001      | 1                  | 8                | 17   |      | 2   |
| HB-TP07 S-1 | 0.5 - 1.5     | 3/7/2001      | 1                  | 8                | 17   |      | 2   |
| HB-TP07 S-2 | 9 - 10        | 3/7/2001      | 1                  | 8                | 17   |      | 2   |
| HB-TP08 S-1 | 0.5 - 1       | 3/7/2001      | 1                  | 8                | 17   |      | 2   |
| HB-TP08 S-2 | 9 - 10        | 3/7/2001      | 1                  | 8                | 17   |      | 2   |
| HB-TP09 S-1 | 1 - 2.5       | 3/7/2001      | 1                  | 8                | 17   |      | 2   |
| HB-TP09 S-2 | 4.5 - 6       | 3/7/2001      | 1                  | 8                | 17   |      | 2   |
| HB-TP09 S-3 | 8.5 - 9       | 3/7/2001      | 1                  | 8                | 17   |      | 2   |
| HB-TP10 S-1 | 1 - 2         | 3/8/2001      | 1                  | 8                | 17   |      | 2   |
| HB-TP10 S-2 | 8.5 - 9.5     | 3/8/2001      | 1                  | 8                | 17   |      | 2   |

Blank indicates sample not analyzed for specific analyte.

**Table 4 - Summary of Soil Exceedences  
Hick's-Bull**

| Analyte Group | Analyte Name    | Analyte Value<br>in mg/kg | Qualifier | Depth in<br>Feet | Sampling<br>Date | Sample ID   | Screening Level<br>Value in mg/kg |
|---------------|-----------------|---------------------------|-----------|------------------|------------------|-------------|-----------------------------------|
| Metals, Total | Arsenic         | 77.2                      |           | 3 - 5            | 3/8/2001         | HB-TP05 S-2 | 20                                |
| Metals, Total | Lead            | 694                       |           | 0.5 - 1.5        | 3/7/2001         | HB-TP03 S-1 | 250                               |
| Metals, Total | Lead            | 696                       |           | 1 - 2            | 3/7/2001         | HB-TP04 S-1 | 250                               |
| Metals, Total | Lead            | 2630                      |           | 3 - 5            | 3/8/2001         | HB-TP05 S-2 | 250                               |
| Metals, Total | Lead            | 297                       |           | 0.5 - 1.5        | 3/8/2001         | HB-TP06 S-1 | 250                               |
| Metals, Total | Lead            | 252                       |           | 1 - 2            | 3/8/2001         | HB-TP10 S-1 | 250                               |
| PAHs          | Total cPAHs BaP | 0.250                     |           | 3 - 4.5          | 3/9/2001         | HB-B02 S-1  | 0.137                             |
| PAHs          | Total cPAHs BaP | 0.387                     |           | 10.5 - 12        | 3/9/2001         | HB-B02 S-4  | 0.137                             |
| PAHs          | Total cPAHs BaP | 0.571                     |           | 10 - 11.5        | 3/9/2001         | HB-MW01 S-4 | 0.137                             |
| PAHs          | Total cPAHs BaP | 0.302                     |           | 3 - 4.5          | 3/9/2001         | HB-MW03 S-1 | 0.137                             |
| PAHs          | Total cPAHs BaP | 0.413                     |           | 0 - 1            | 3/8/2001         | HB-TP01 S-1 | 0.137                             |
| PAHs          | Total cPAHs BaP | 0.503                     |           | 8.5 - 10         | 3/8/2001         | HB-TP01 S-3 | 0.137                             |
| PAHs          | Total cPAHs BaP | 0.728                     |           | 0.5 - 1.5        | 3/8/2001         | HB-TP02 S-1 | 0.137                             |
| PAHs          | Total cPAHs BaP | 0.478                     |           | 6 - 7            | 3/8/2001         | HB-TP02 S-2 | 0.137                             |
| PAHs          | Total cPAHs BaP | 0.155                     |           | 0.5 - 1.5        | 3/7/2001         | HB-TP03 S-1 | 0.137                             |
| PAHs          | Total cPAHs BaP | 3.219                     |           | 1 - 2            | 3/7/2001         | HB-TP04 S-1 | 0.137                             |
| PAHs          | Total cPAHs BaP | 4.298                     |           | 0.5 - 2          | 3/8/2001         | HB-TP05 S-1 | 0.137                             |
| PAHs          | Total cPAHs BaP | 1.233                     |           | 3 - 5            | 3/8/2001         | HB-TP05 S-2 | 0.137                             |
| PAHs          | Total cPAHs BaP | 0.236                     |           | 0.5 - 1.5        | 3/8/2001         | HB-TP06 S-1 | 0.137                             |
| PAHs          | Total cPAHs BaP | 0.298                     |           | 0.5 - 1.5        | 3/7/2001         | HB-TP07 S-1 | 0.137                             |
| PAHs          | Total cPAHs BaP | 0.230                     |           | 1 - 2.5          | 3/7/2001         | HB-TP09 S-1 | 0.137                             |
| PAHs          | Total cPAHs BaP | 7.242                     |           | 4.5 - 6          | 3/7/2001         | HB-TP09 S-2 | 0.137                             |
| PAHs          | Total cPAHs BaP | 5.959                     |           | 8.5 - 9          | 3/7/2001         | HB-TP09 S-3 | 0.137                             |
| PAHs          | Total cPAHs BaP | 2.544                     |           | 1 - 2            | 3/8/2001         | HB-TP10 S-1 | 0.137                             |
| Petroleum     | Heavy Oil       | 4000                      |           | 0 - 1            | 3/8/2001         | HB-TP01 S-1 | 2000                              |

**Table 5 - Groundwater Chemistry Results Count  
Hick's-Bull**

| Sample ID                  | Sampling Date | Conven-<br>tionals | Metals,<br>Diss. | PAHs | BTEX | TPH |
|----------------------------|---------------|--------------------|------------------|------|------|-----|
| HB-MW01                    | 3/20/2001     | 1                  | 9                | 17   | 4    | 3   |
| HB-MW01-High               | 3/21/2001     | 1                  | 9                | 17   | 4    | 3   |
| HB-MW02                    | 3/20/2001     | 1                  | 9                | 17   |      | 2   |
| HB-MW02-High               | 3/21/2001     | 1                  | 9                | 17   |      | 2   |
| HB-MW02                    | 12/10/2001    |                    | 3                |      |      |     |
| HB-MW03                    | 3/20/2001     | 1                  | 9                | 17   | 4    | 3   |
| HB-MW03-High               | 3/21/2001     | 1                  | 9                | 17   | 4    | 3   |
| HB-MW03                    | 12/10/2001    |                    | 3                |      |      |     |
| HB-MWA (DUP of<br>HB-MW01) | 3/21/2001     | 1                  | 9                | 17   | 4    | 3   |
| HB-S01                     | 3/27/2001     | 1                  | 9                | 17   |      | 2   |
| HB-S01                     | 12/10/2001    |                    | 3                |      |      |     |
| OB-1                       | 12/10/2001    |                    | 3                |      |      |     |
| UMW2A                      | 3/20/2001     | 1                  | 9                | 17   |      | 2   |
| UMW2A-High                 | 3/21/2001     | 1                  | 9                | 17   |      | 2   |
| UMW2A                      | 12/10/2001    |                    | 3                |      |      |     |

Blank indicates sample not analyzed for specific analyte.

**Table 6 - Summary of Groundwater Exceedences  
Hick's-Bull**

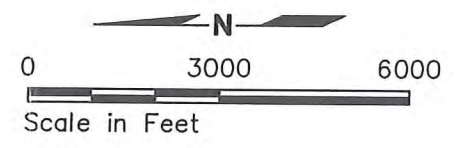
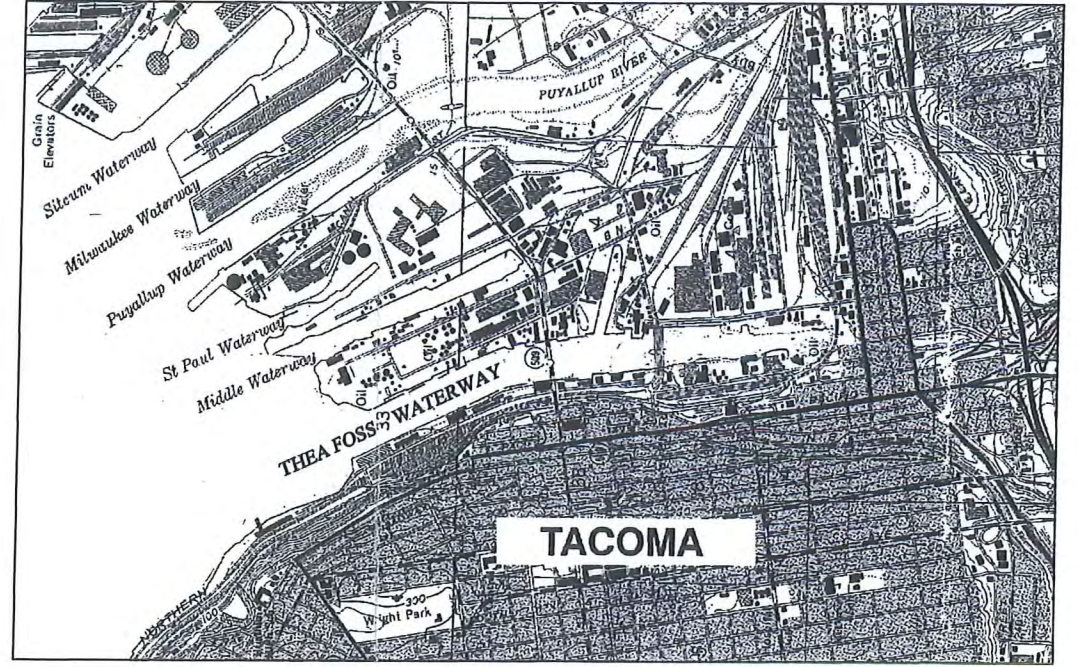
| Analyte Group     | Analyte | Analyte Value<br>in ug/L | Qualifier | Sampling<br>Date | Sample ID    | Screening Level<br>Value in ug/L |
|-------------------|---------|--------------------------|-----------|------------------|--------------|----------------------------------|
| Metals, Dissolved | Arsenic | 26                       |           | 3/20/2001        | HB-MW01      | 0.14                             |
| Metals, Dissolved | Arsenic | 16                       |           | 3/20/2001        | HB-MW01 High | 0.14                             |
| Metals, Dissolved | Arsenic | 26                       |           | 3/20/2001        | HB-MW02      | 0.14                             |
| Metals, Dissolved | Arsenic | 26                       |           | 3/20/2001        | HB-MW02-High | 0.14                             |
| Metals, Dissolved | Arsenic | 20.6                     |           | 12/10/2001       | HB-MW02      | 0.14                             |
| Metals, Dissolved | Arsenic | 28                       |           | 3/20/2001        | HB-MW03      | 0.14                             |
| Metals, Dissolved | Arsenic | 27                       |           | 3/20/2001        | HB-MW03-High | 0.14                             |
| Metals, Dissolved | Arsenic | 35.6                     |           | 12/10/2001       | HB-MW03      | 0.14                             |
| Metals, Dissolved | Arsenic | 19                       |           | 3/21/2001        | HB-MWA       | 0.14                             |
| Metals, Dissolved | Arsenic | 31                       |           | 3/27/2001        | HB-S01       | 0.14                             |
| Metals, Dissolved | Arsenic | 38.8                     |           | 12/10/2001       | HB-S01       | 0.14                             |
| Metals, Dissolved | Arsenic | 42.7                     |           | 12/10/2001       | OB-1         | 0.14                             |
| Metals, Dissolved | Arsenic | 26                       |           | 3/20/2001        | UMW2A        | 0.14                             |
| Metals, Dissolved | Arsenic | 28                       |           | 3/20/2001        | UMW2A-High   | 0.14                             |
| Metals, Dissolved | Arsenic | 15.6                     |           | 12/10/2001       | UMW2A        | 0.14                             |
| Metals, Dissolved | Copper  | 7.2                      |           | 3/20/2001        | HB-MW01      | 2.5                              |
| Metals, Dissolved | Copper  | 6.4                      |           | 3/20/2001        | HB-MW01-High | 2.5                              |
| Metals, Dissolved | Copper  | 9.1                      |           | 3/20/2001        | HB-MW02      | 2.5                              |
| Metals, Dissolved | Copper  | 8.2                      |           | 3/20/2001        | HB-MW02-High | 2.5                              |
| Metals, Dissolved | Copper  | 4.33 J                   |           | 12/10/2001       | HB-MW02      | 2.5                              |
| Metals, Dissolved | Copper  | 11                       |           | 3/20/2001        | HB-MW03      | 2.5                              |
| Metals, Dissolved | Copper  | 7.8                      |           | 3/20/2001        | HB-MW03-High | 2.5                              |
| Metals, Dissolved | Copper  | 6.24 J                   |           | 12/10/2001       | HB-MW03      | 2.5                              |
| Metals, Dissolved | Copper  | 5.9                      |           | 3/21/2001        | HB-MWA       | 2.5                              |
| Metals, Dissolved | Copper  | 6.3                      |           | 3/27/2001        | HB-S01       | 2.5                              |
| Metals, Dissolved | Copper  | 7.16 J                   |           | 12/10/2001       | HB-S01       | 2.5                              |
| Metals, Dissolved | Copper  | 9.05 J                   |           | 12/10/2001       | OB-1         | 2.5                              |
| Metals, Dissolved | Copper  | 5.1                      |           | 3/20/2001        | UMW2A        | 2.5                              |
| Metals, Dissolved | Copper  | 7.3                      |           | 3/20/2001        | UMW2A-High   | 2.5                              |
| Metals, Dissolved | Copper  | 3.79 J                   |           | 12/10/2001       | UMW2A        | 2.5                              |
| Metals, Dissolved | Nickel  | 13                       |           | 3/20/2001        | HB-MW01      | 7.9                              |
| Metals, Dissolved | Nickel  | 8.8                      |           | 3/20/2001        | HB-MW01 High | 7.9                              |
| Metals, Dissolved | Nickel  | 47                       |           | 3/20/2001        | HB-MW02      | 7.9                              |
| Metals, Dissolved | Nickel  | 45                       |           | 3/20/2001        | HB-MW02-High | 7.9                              |
| Metals, Dissolved | Nickel  | 25.8                     |           | 12/10/2001       | HB-MW02      | 7.9                              |
| Metals, Dissolved | Nickel  | 12                       |           | 3/20/2001        | HB-MW03      | 7.9                              |
| Metals, Dissolved | Nickel  | 11                       |           | 3/20/2001        | HB-MW03-High | 7.9                              |
| Metals, Dissolved | Nickel  | 11.2                     |           | 12/10/2001       | HB-MW03      | 7.9                              |
| Metals, Dissolved | Nickel  | 9.3                      |           | 3/21/2001        | HB-MWA       | 7.9                              |
| Metals, Dissolved | Nickel  | 13                       |           | 3/27/2001        | HB-S01       | 7.9                              |
| Metals, Dissolved | Nickel  | 10.7                     |           | 12/10/2001       | HB-S01       | 7.9                              |
| Metals, Dissolved | Nickel  | 10.8                     |           | 12/10/2001       | OB-1         | 7.9                              |
| Metals, Dissolved | Nickel  | 11                       |           | 3/20/2001        | UMW2A        | 7.9                              |
| Metals, Dissolved | Nickel  | 9.3                      |           | 3/20/2001        | UMW2A-High   | 7.9                              |

J = Estimated value.

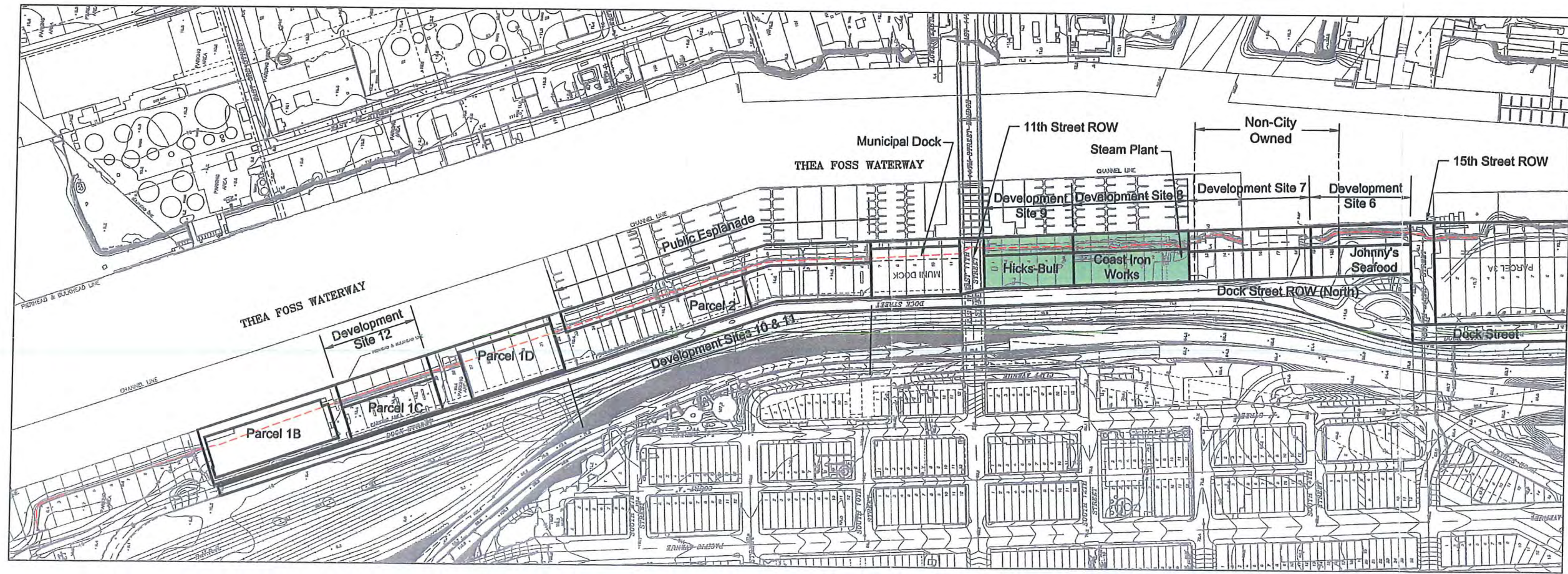
# Vicinity Map

## Hicks-Bull, Coast Iron Works, and Steam Plant

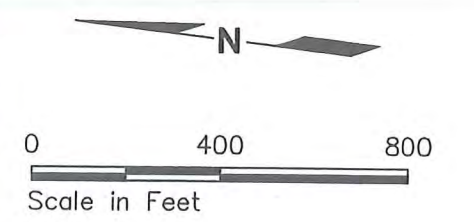
# Regional Vicinity Map



# Project Index Map



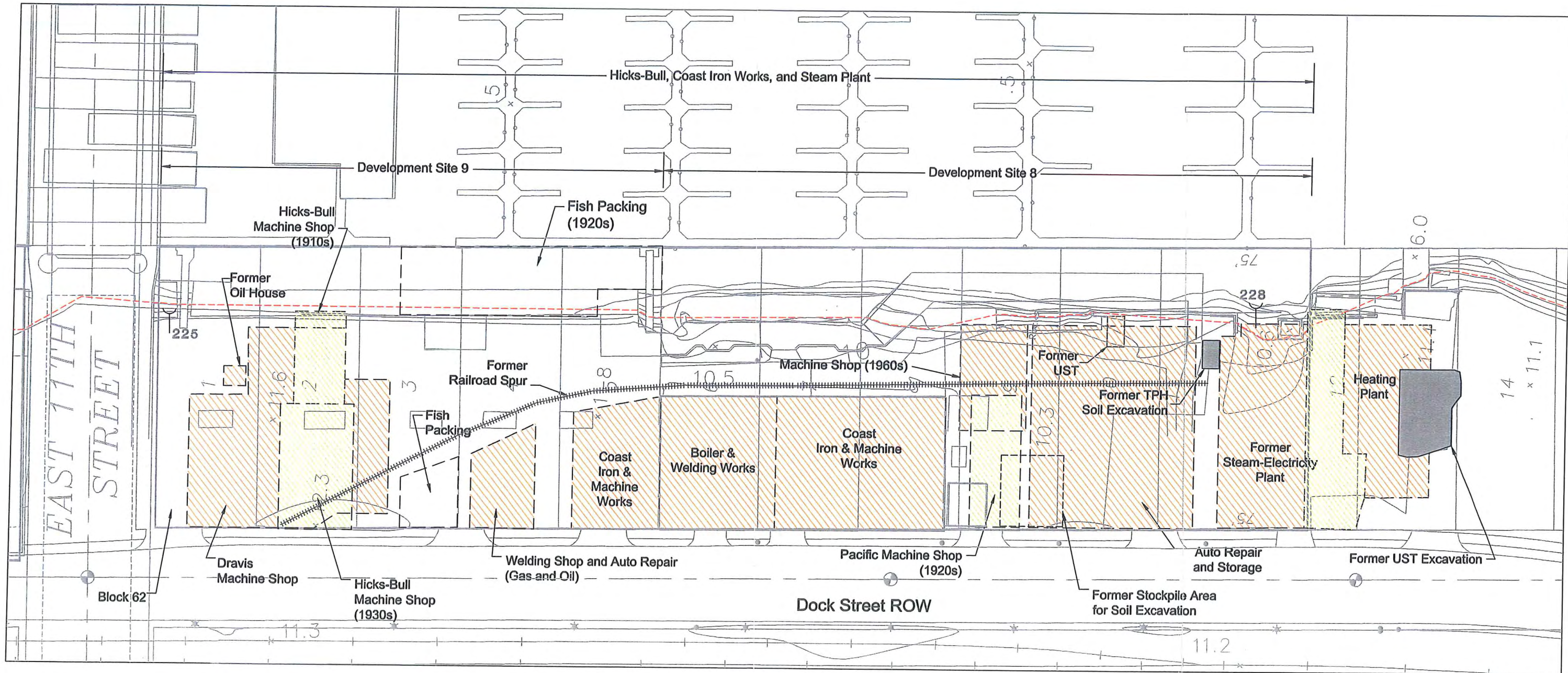
- Remedial Investigation Study Area with Development Site Boundary from City Map X\_SAP(12-99).dwg Dated December 1999
- █ Hicks-Bull, Coast Iron Works, and Steam Plant
- - - MHHW Line



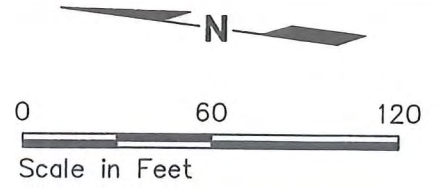
DTM 2/26/02 1=1 xref=BASE 13 and Composite color.pcz 46767222

# Significant Historical Features Map

## Hicks-Bull, Coast Iron Works, and Steam Plant

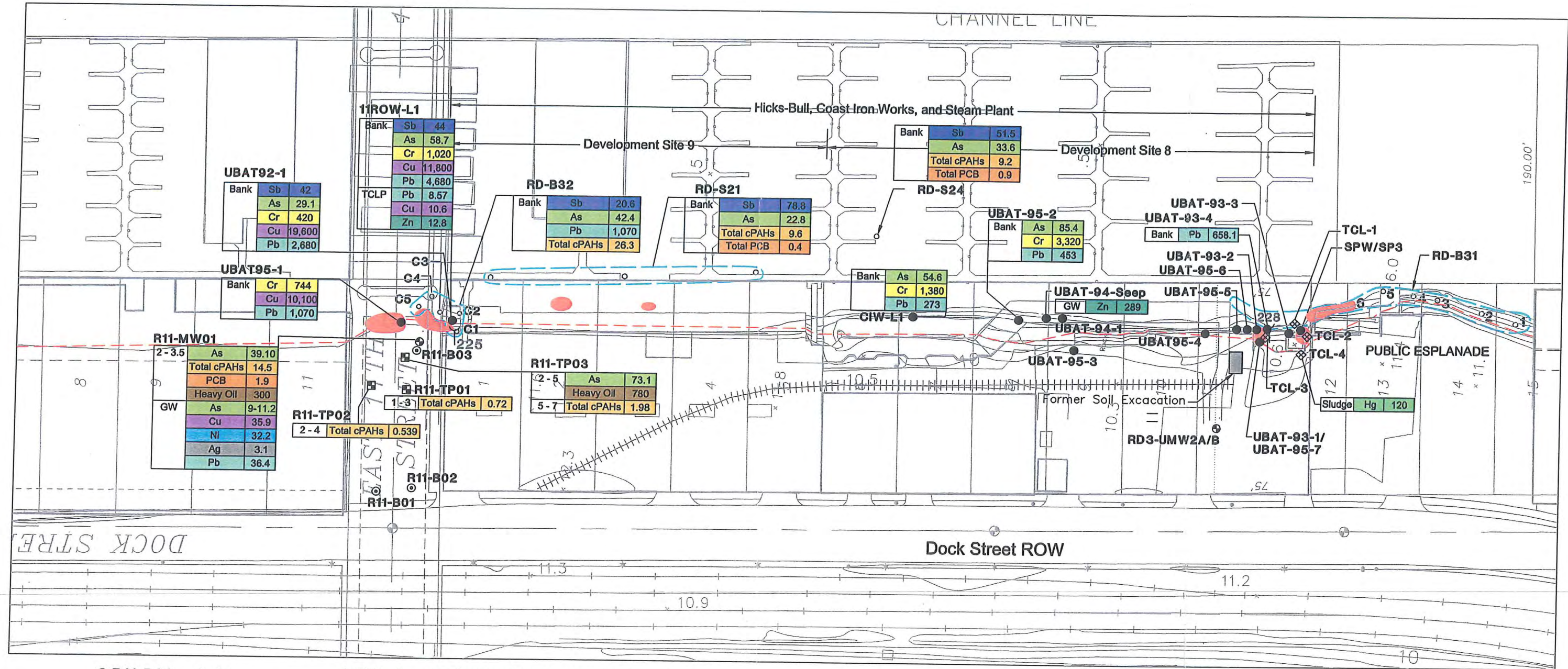


- 228 Stormwater Outfall Location and Number
- Former Building
- Mean Higher High Water
- Potentially Significant Historical Area
- Area of Completed Cleanup Action



DTN 2/26/02 1=1 xref=see drawing color.pc2 46767219

# Summary of Soil and Groundwater Exceedence Data from Previous Investigations Hicks-Bull, Coast Iron Works, and Steam Plant



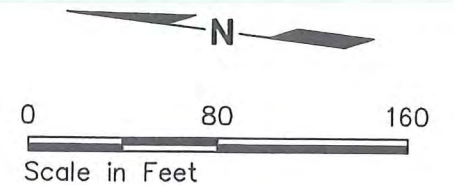
- ⊙ R11-B01 Boring
- R11-TP01 Test Pit
- ⊕ R11-MW01 Monitoring Well
- Slag or Metal Shavings Noted

- ◆ TCL-4 Soil/Sediment/Sludge Sample (TCL, 1987)
  - UBAT-95-2 Bank (Slag) (Ecology, 1992, 1994, and 1995)
  - 228 Stormwater Outfall Location and Number
  - C1 Composite Sample (Hart Crowser, 1994)
  - C2
  - C3
- Note: Explorations without soil or groundwater exceedences are shown in gray.

- Building Footprint
- - - - - Mean Higher High Water
- ↑ AA' Cross Section Location and Designation
- Leaching Test
- Analyte
- TCLP Pb 8.57 Concentration in mg/L

Chemical data identified where soil concentration exceeds Consent Decree cleanup levels. Note that Consent Decree cleanup levels are not applicable to cleanup of bank samples.

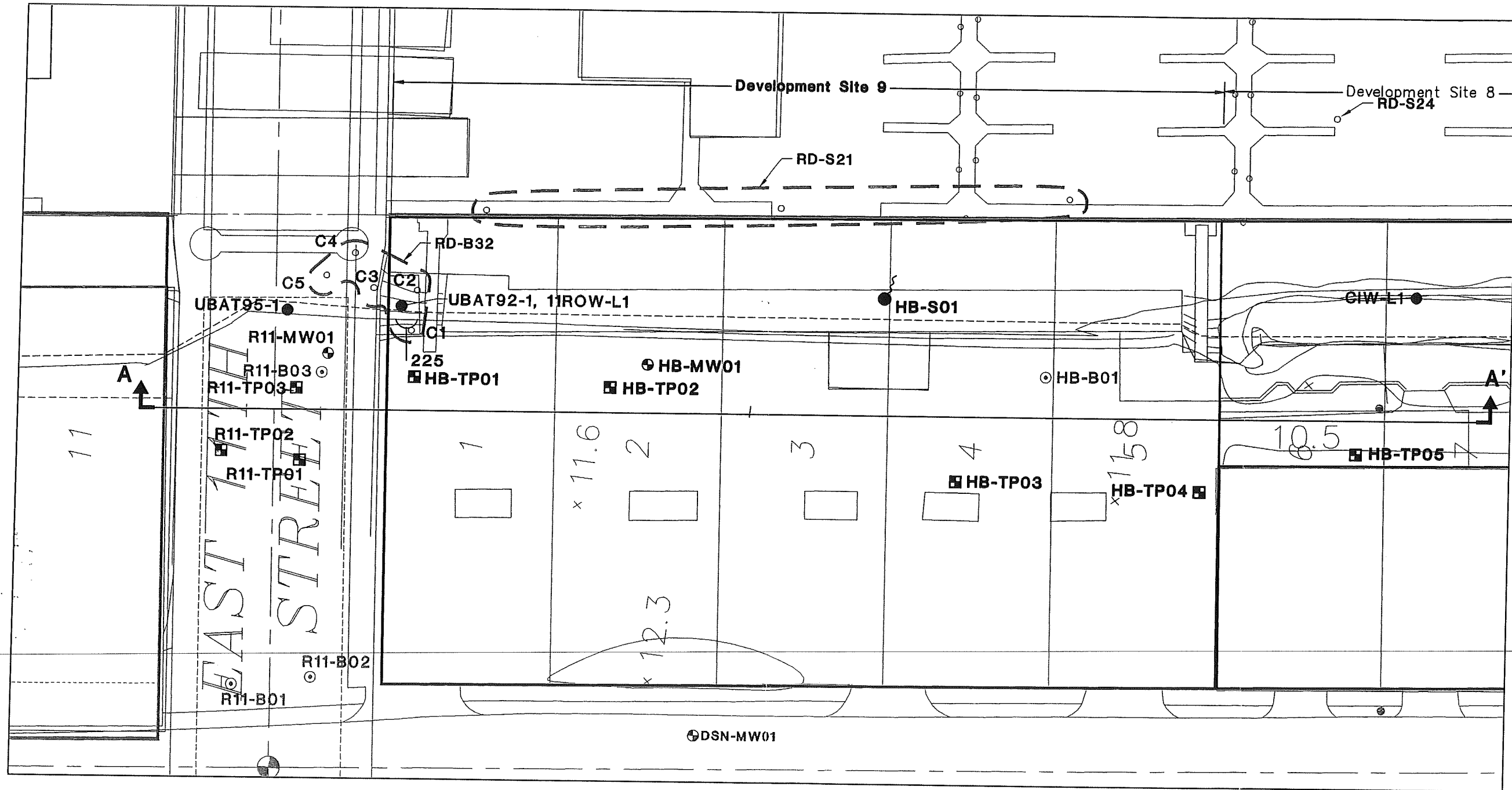
- Groundwater
- Analyte
- GW Zn 289 Concentration in µg/L
- Depth in Feet
- Analyte
- 2-3.5 As 39.10 Concentration in mg/kg



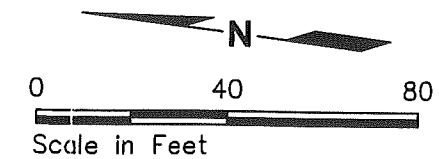


# Site Exploration Plan

## Development Site 9, Hicks-Bull Property

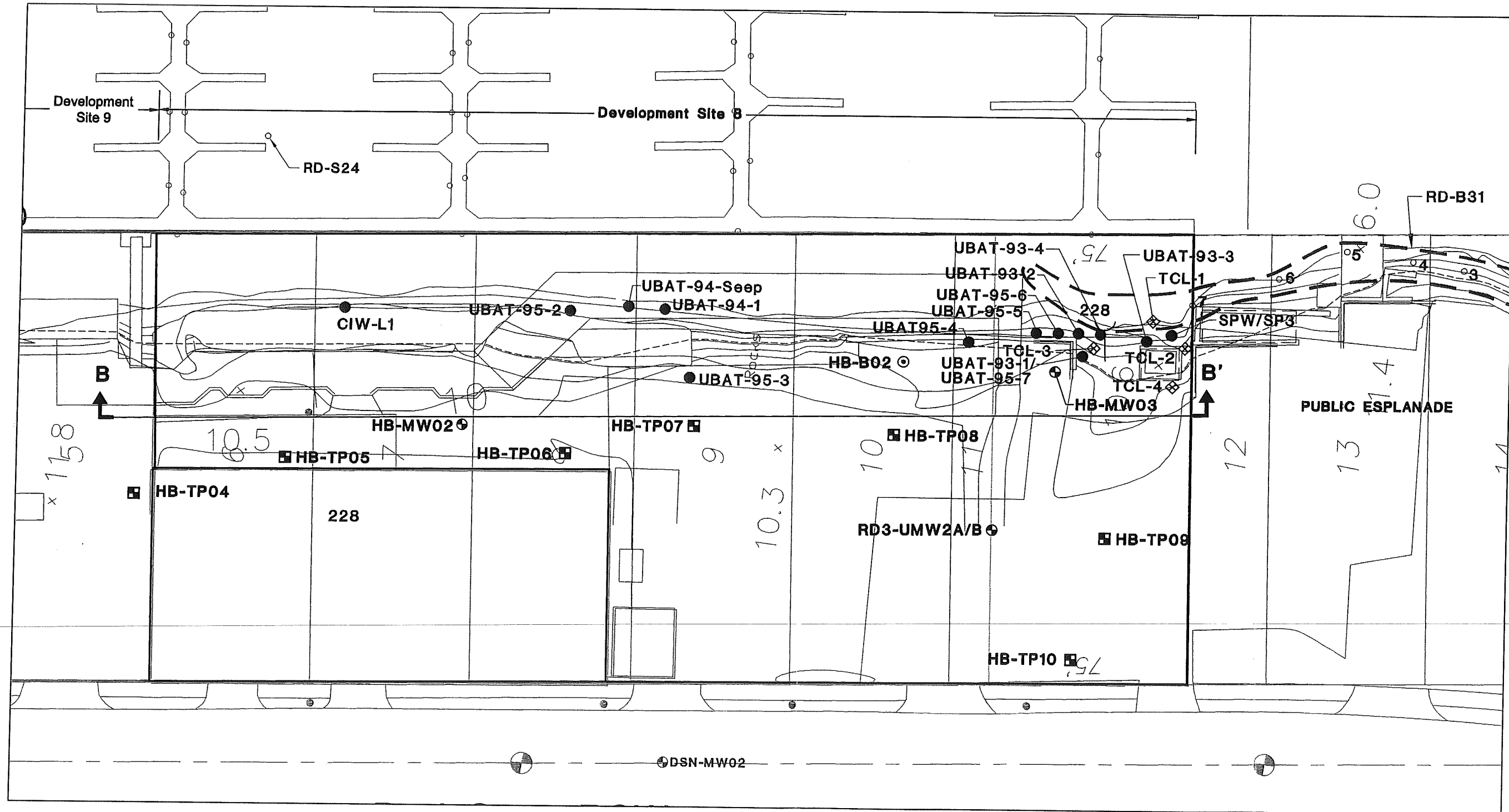


- |           |                 |             |  |         |  |
|-----------|-----------------|-------------|--|---------|--|
| ⊙ HB-B02  | Boring          | ◇ TCL-4     | Soil/Sediment/Sludge Sample (TCL, 1987)                            | —       | Building Footprint                     |
| ● HB-S01  | Seep            | ● UBAT-95-2 | Bank (Slag) (Ecology, 1992, 1994, and 1995)                        | - - -   | Mean Higher High Water                 |
| ▣ HB-TP05 | Test Pit        | 228         | Stormwater Outfall Location and Number                             | ↑ AA' ↓ | Cross Section Location and Designation |
| ⊙ HB-MW02 | Monitoring Well | C1          | Composite Sample (Hart Crowser, 1994)                              |         |  |
|           |                 | C2          |  |         |  |
|           |                 | C3          | Note: Explorations from previous investigations are shown in gray. |         |  |



# Site Exploration Plan

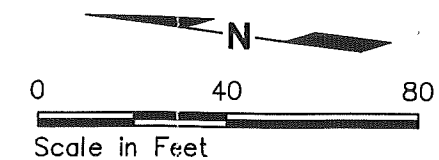
## Development Site 8, Coast Iron Works and Steam Plant



- ⊙ HB-B02 Boring
- ⊙ HB-S01 Seep
- ▣ HB-TP05 Test Pit
- ⊕ HB-MW02 Monitoring Well

- ⊕ TCL-4 Soil/Sediment/Sludge Sample (TCL, 1987)
  - UBAT-95-2 Bank (Slag) (Ecology, 1992, 1994, and 1995)
  - 228 Stormwater Outfall Location and Number
  - C1 Composite Sample (Hart Crowser, 1994)
  - C2
  - C3
- Note: Explorations from previous investigations are shown in gray.

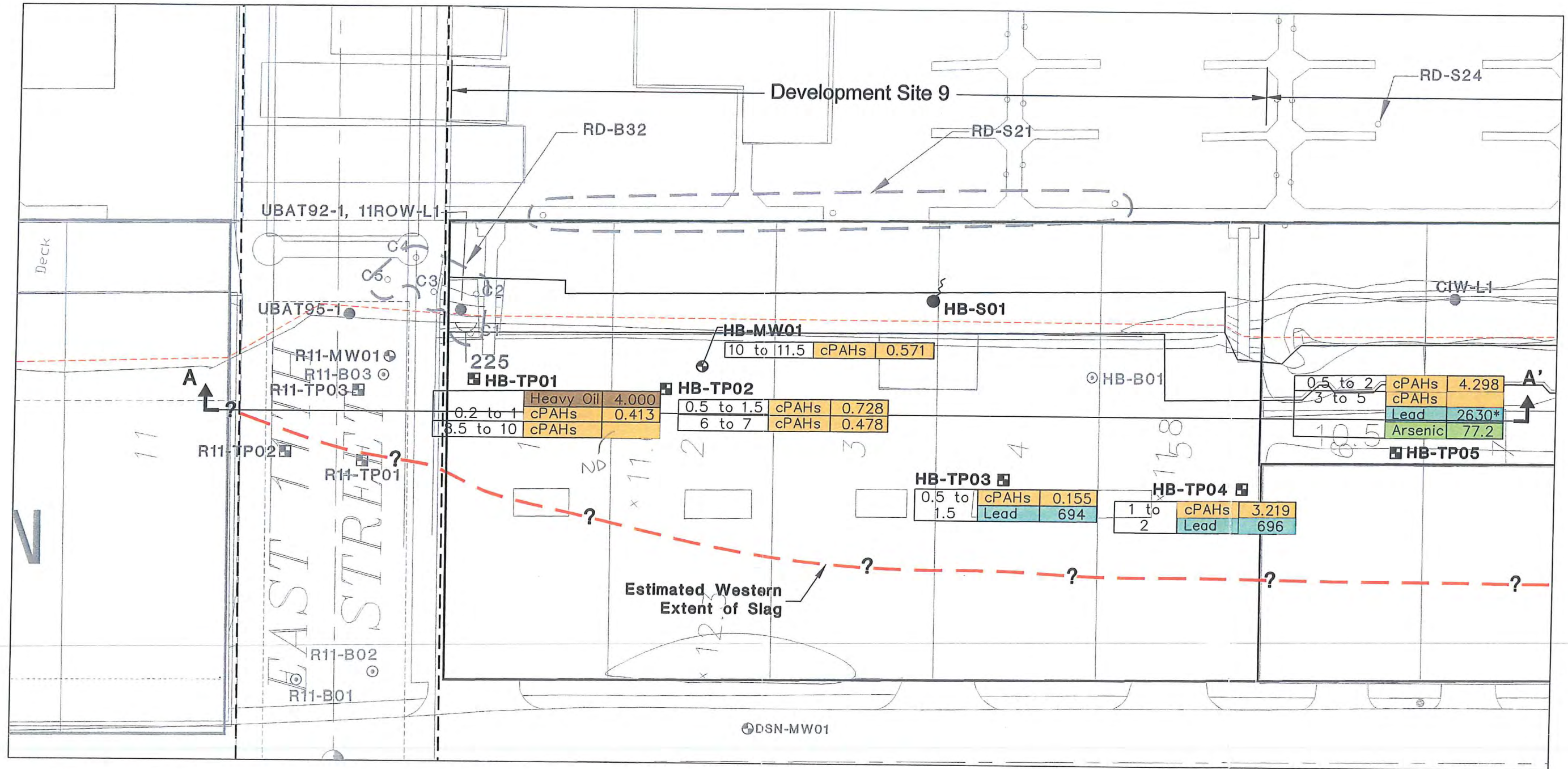
- Building Footprint
- - - - - Mean Higher High Water
- ↑ BB' Cross Section Location and Designation



DTN 2/26/02 1=1 xref=see drawing color.pc2 46767218

# Soil Exceedence Data Summary

## Development Site 9, Hicks-Bull Property

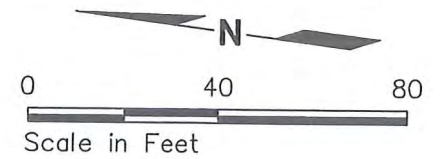


- ⊙ HB-B01 Boring
  - ⊙ HB-S01 Seep
  - HB-TP01 Test Pit
  - ⊙ HB-MW01 Monitoring Well
  - ⊙ TCL-1 Soil/Sediment/Sludge Sample (TCL, 1987)
  - ⊙ 228 Storm Water Outfall Location and Number
  - UBAT92-1 Bank (Slag) (Ecology, 1992, 1994, and 1995)
  - C1 Composite Sample (Hart Crowser, 1994)
  - C2 Composite Sample (Hart Crowser, 1994)
  - C3 Composite Sample (Hart Crowser, 1994)
- Note: Explorations from previous investigations are shown in gray.

- Building Footprint
- - - - - Mean Higher High Water
- AA' Cross Section Location and Designation

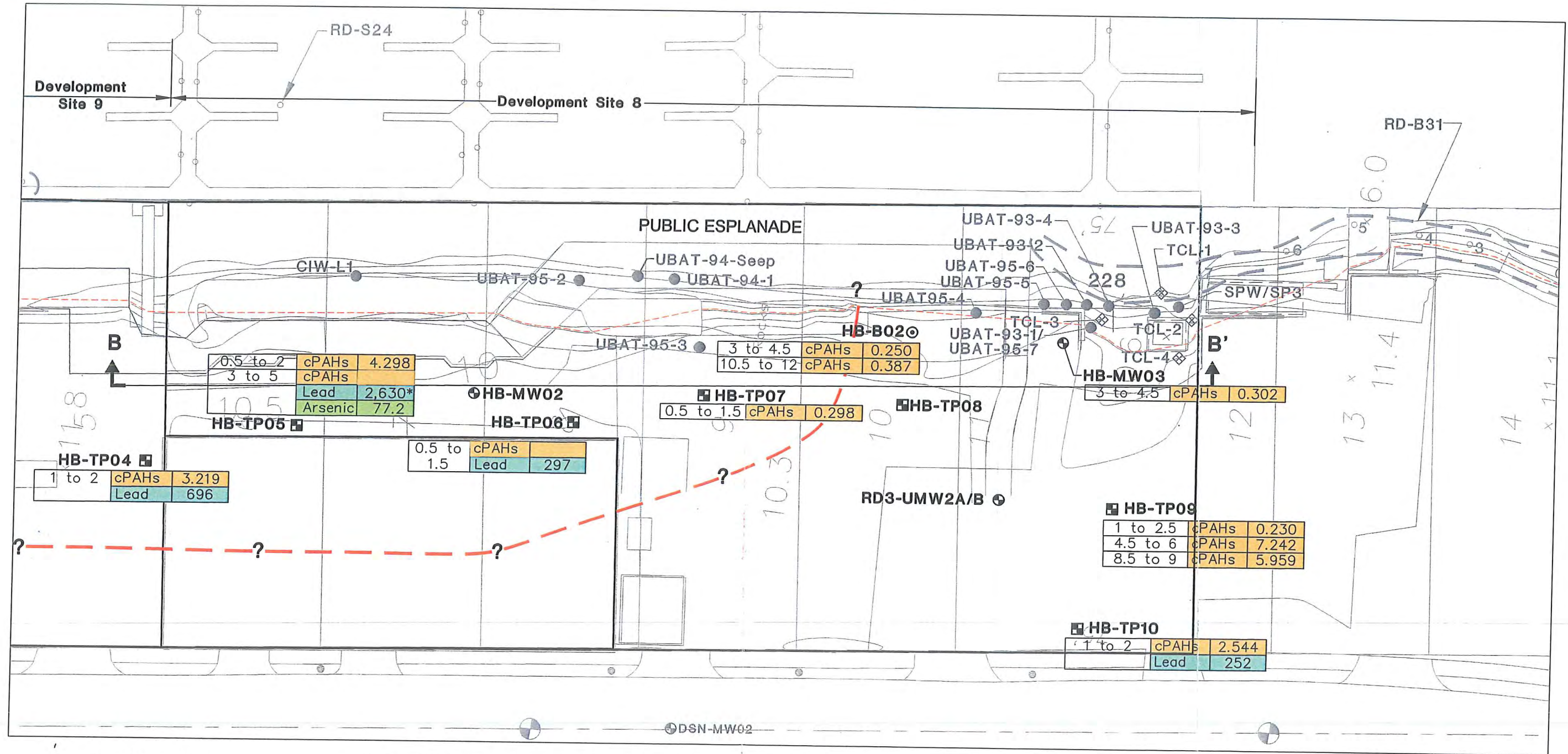
| Depth in Feet | Analyte | Concentration in mg/kg |
|---------------|---------|------------------------|
| 10 to 11.5    | Lead    | 2630*                  |

Indicates Concentration Exceeds Consent Decree Maximum Soil Concentration



# Soil Exceedence Data Summary

## Development Site 8, Coast Iron Works and Steam Plant



1158

|          |         |        |
|----------|---------|--------|
| 0.5 to 2 | cPAHs   | 4.298  |
| 3 to 5   | cPAHs   |        |
| 10.5     | Lead    | 2,630* |
|          | Arsenic | 77.2   |

HB-TP05

|        |       |       |
|--------|-------|-------|
| 1 to 2 | cPAHs | 3.219 |
|        | Lead  | 696   |

HB-TP04

|            |       |     |
|------------|-------|-----|
| 0.5 to 1.5 | cPAHs |     |
|            | Lead  | 297 |

HB-TP06

|            |       |       |
|------------|-------|-------|
| 3 to 4.5   | cPAHs | 0.250 |
| 10.5 to 12 | cPAHs | 0.387 |

HB-B02

|            |       |       |
|------------|-------|-------|
| 0.5 to 1.5 | cPAHs | 0.298 |
|------------|-------|-------|

HB-TP07

|          |       |       |
|----------|-------|-------|
| 3 to 4.5 | cPAHs | 0.302 |
|----------|-------|-------|

HB-MW03

|          |       |       |
|----------|-------|-------|
| 1 to 2.5 | cPAHs | 0.230 |
| 4.5 to 6 | cPAHs | 7.242 |
| 8.5 to 9 | cPAHs | 5.959 |

HB-TP09

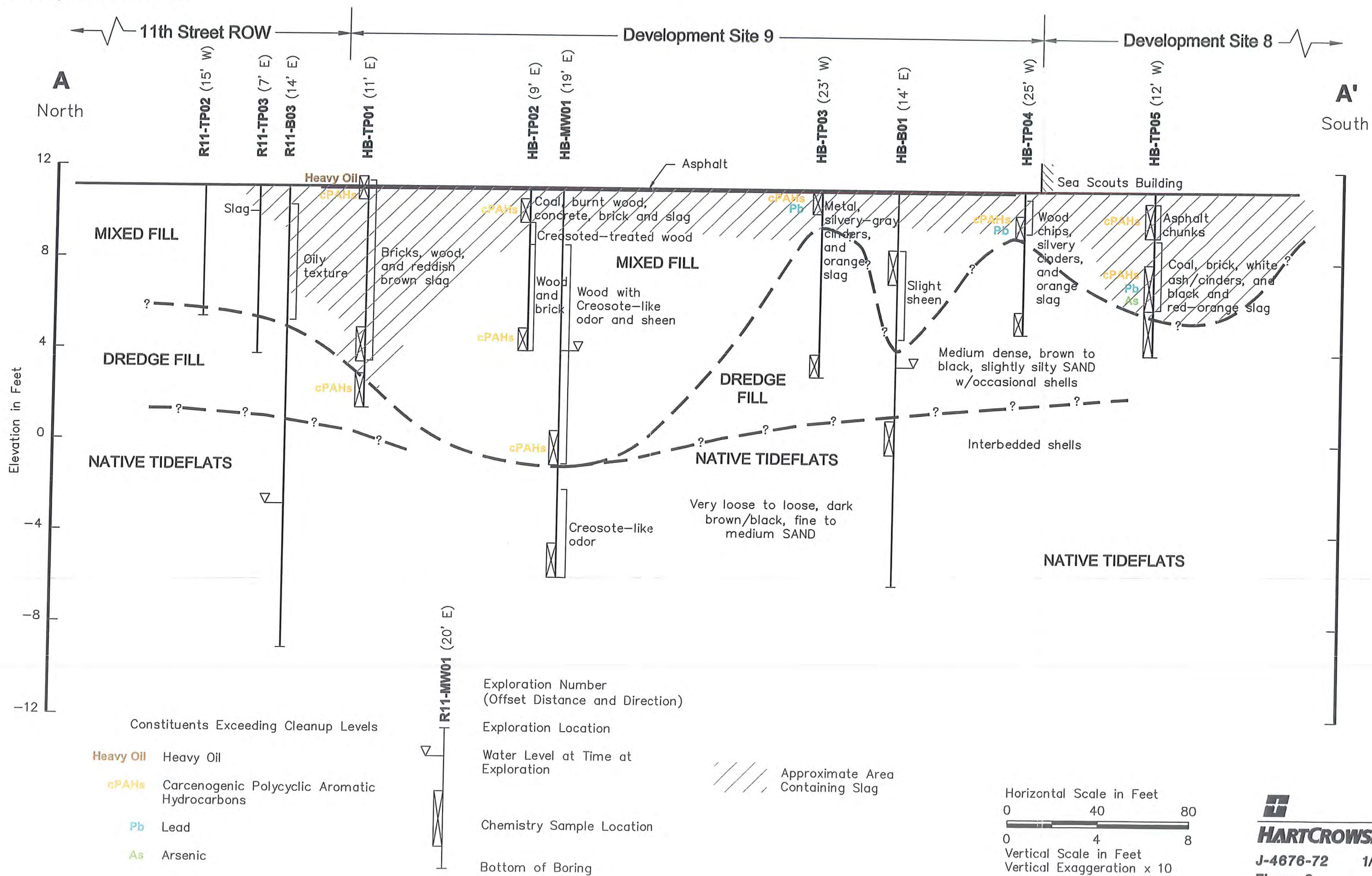
|        |       |       |
|--------|-------|-------|
| 1 to 2 | cPAHs | 2.544 |
|        | Lead  | 252   |

HB-TP10

DTN 2/25/02 1=1 46757216 xref=see drawing color.pc2

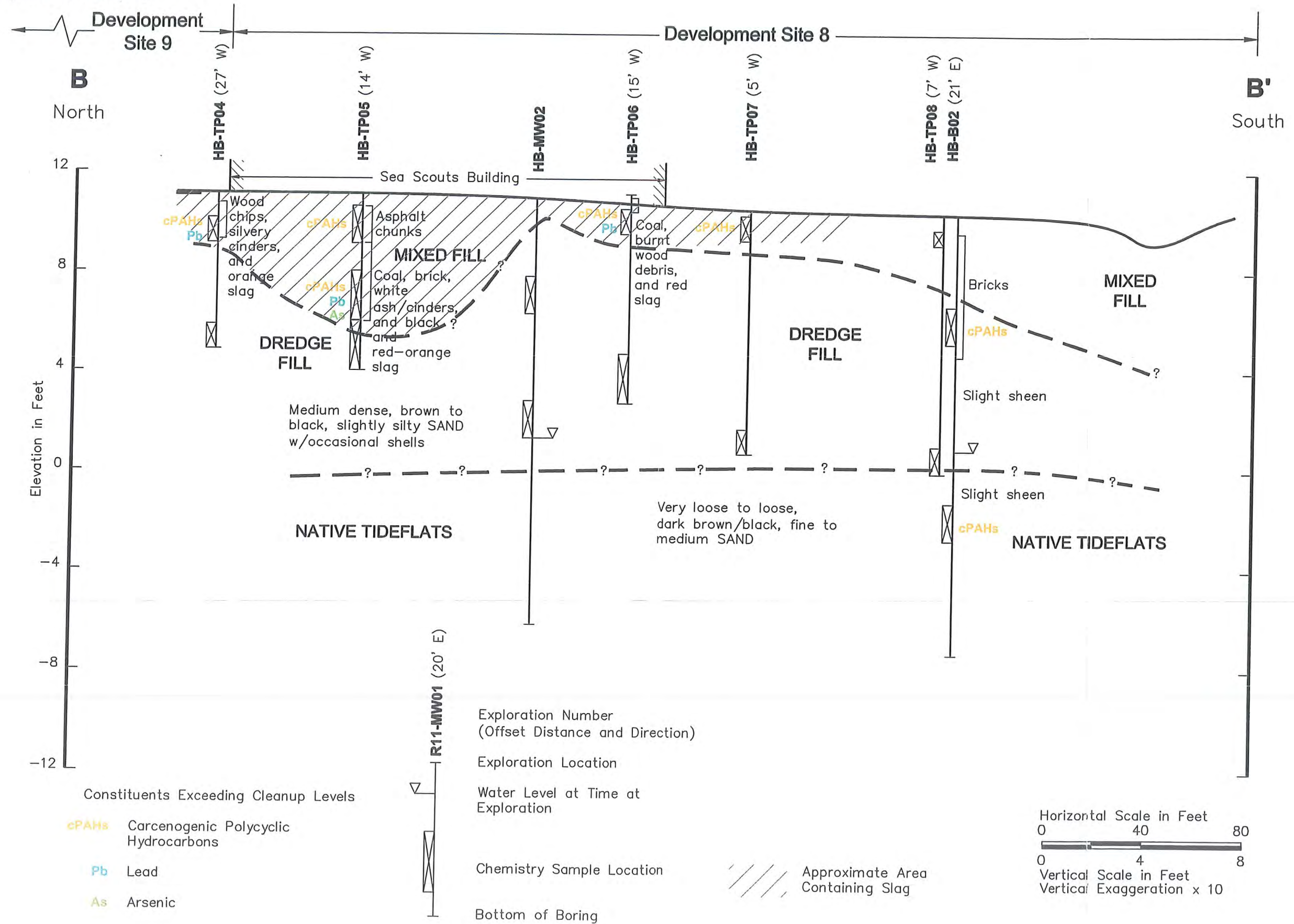
# Generalized Subsurface Cross Section

## Development Site 9



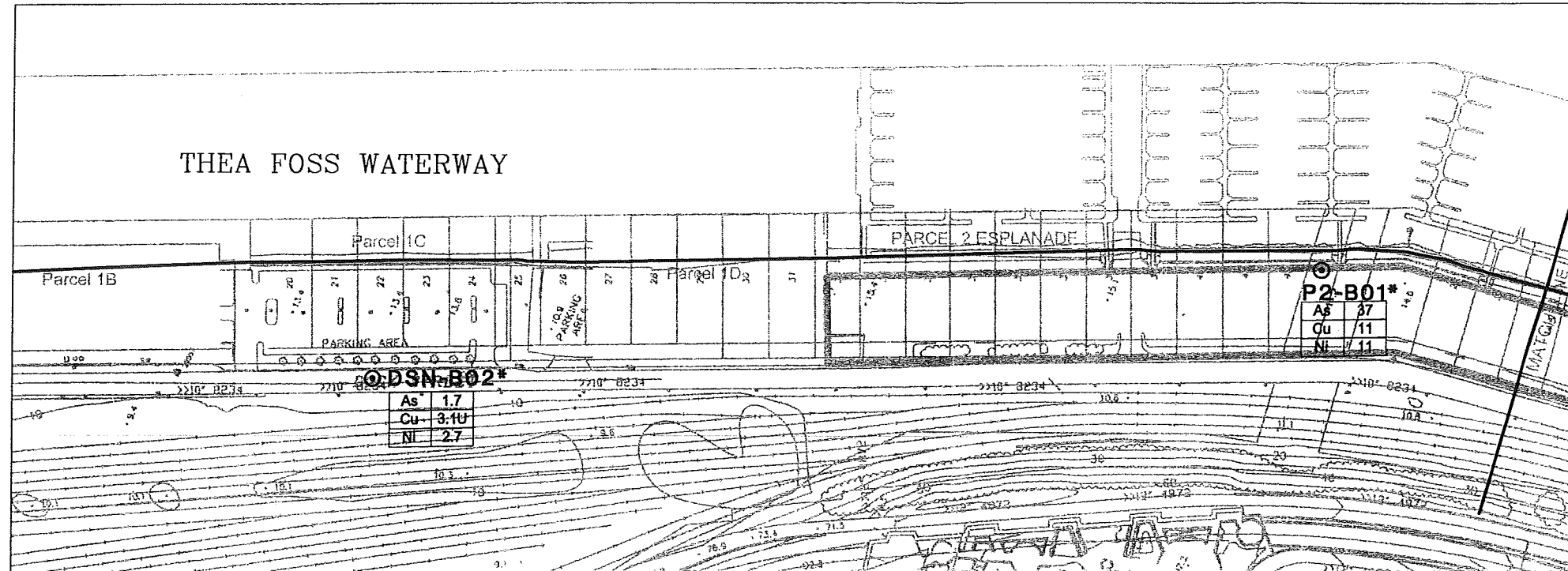
DTN 2/26/02 1=40 charlie.pc2  
46767210.dwg

# Generalized Subsurface Cross Section Development Site 8



DTN 2/26/02 1=40 charlie.pcz  
45757210.dwg

# Area-Wide Concentrations of Arsenic, Copper, and Nickel in Groundwater Properties North of South 15th Street



— Mean Higher High Water

Exploration Location and Number

⊙ DSN-B01\* Boring  
⊙ Indicates Groundwater Grab Sample Collected

⊙ HC-MW01 Monitoring Well

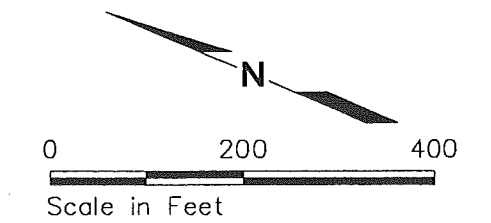
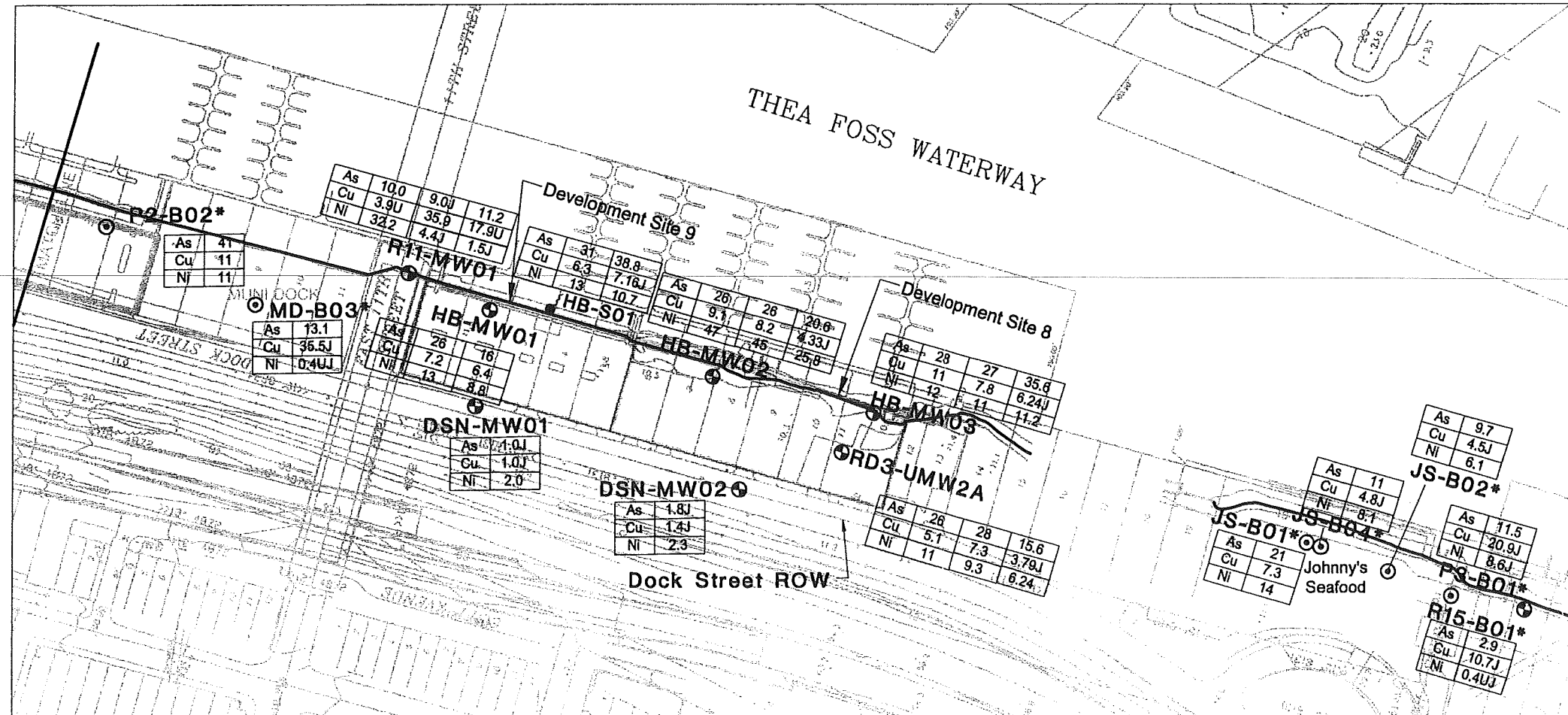
● HB-S01 Seep

As Arsenic  
Cu Copper  
Ni Nickel

Concentrations are in  $\mu\text{g/L}$

U Not Detected at Detection Limit Indicated

J Estimated Value



DTN 2/26/02 1=1 xref=See Dwg charlie.pc2 46767224.DWG

**APPENDIX A**  
**FIELD EXPLORATION PROCEDURES AND EXPLORATION LOGS**



## APPENDIX A FIELD EXPLORATION PROCEDURES AND EXPLORATION LOGS

At the Hicks-Bull Property, Coast Iron Works, and Steam Plant properties, Hart Crowser drilled six hollow-stem auger soil borings, completing three as monitoring wells, and excavated ten test pits. Three rounds of groundwater samples were collected from the monitoring wells. The field procedures and methods used for this work are described below. Volume II Appendix B of the Thea Foss Uplands RI Work Plan (Hart Crowser 1997) has additional discussion of field methods. Exploration locations are illustrated on Figures 4 and 5.

Exploration logs are presented on Figures A-2 through A-11 at the end of this appendix. The exploration logs show our interpretation of conditions encountered in the explorations. They indicate the depth where the soils change. In the field, we classified the samples taken from the explorations according to the methods presented on Figure A-1—Key to Explorations Logs. Figure A-1 also provides a legend explaining the symbols and abbreviations in the logs.

The following sections describe the specific methods used for drilling explorations, monitoring well installation, test pit excavation, soil classification, organic vapor detection, and groundwater sampling.

### ***Drilling and Soil Sampling***

Under subcontract to Hart Crowser, Holt Drilling of Puyallup, Washington, used a 4-inch-diameter hollow-stem auger on a truck-mounted drill rig to complete five soil borings (HB-B01, HB-B02, and HB-MW01 through HB-MW03) on March 8 and 9, 2001. A groundwater monitoring well was installed in three of the soil borings (HB-MW01 through HB-MW03). The borings were advanced to depths of approximately 17 feet below ground surface. Boring and monitoring well logs are presented on Figures A-2 through A-6.

During drilling, soil samples were obtained at 2.5-foot-depth intervals using a nominal 3-inch-diameter split-spoon sampler. After each sample drive, the sampler was retrieved and placed on a clean surface. The split-barrel of the sampler was then opened and the soil sample split, with a portion for laboratory analyses transferred to precleaned, labeled sample jars using a clean stainless steel spoon. Each sample jar was wiped clean, capped with a Teflon-lined lid, and then placed in an insulated cooler with ice. Each sample jar was packed tightly with minimal headspace. The remaining portion of each sample was then placed in a clean, sealed plastic sample container for PID organic vapor headspace measurements as discussed below.

Soil types were described on field logs and used to determine the occurrence and contacts between units.

### ***Groundwater Monitoring Well Installation***

Each groundwater monitoring well was installed in accordance with applicable state regulations listed in Chapter 173-160 WAC "Minimum Standards for Construction and Maintenance of Wells." The following procedure was used to install the wells:

- Following completion of each soil boring to the target depth, a 2-inch-diameter, flush-threaded, Schedule-40 PVC screen (0.020-inch slot size) and riser pipes were lowered through the hollow-stem auger casing. Ten-foot-long screens were placed in each of the borings.
- As the auger was pulled out, Colorado silica sand (No. 10-20) was placed around and approximately 2 feet above the screened section in each boring. The depth to the top of the sand pack was recorded by sounding inside the annular space with weighted measuring tape.
- The annular space of the well was sealed between the top of the sand pack to the bottom of the surface monument by placing bentonite chips in the hole.
- A concrete surface seal was then placed above the bentonite seal at the ground surface, and a flush-mounted set in concrete was placed over finished groundwater monitoring wells.

To increase the hydraulic connection between the well and surrounding soils, and to decrease the turbidity of the groundwater samples, the wells were developed using a submersible electric pump before sampling. A minimum of five casing volumes was removed during development of each well.

### ***Test Pit Excavation and Sampling***

Ten test pits (HB-TP01 through HB-TP10) were excavated between March 6 and 8, 2001, using a backhoe subcontracted to Hart Crowser. The test pit logs are presented on Figures A-7 through A-11. The objectives of the test pit excavations were to visually characterize stratigraphy, assess the soil for visual indications of potential contamination, collect soil samples for laboratory analysis, and evaluate the potential for contaminant migration.

The test pits varied in depth from 6 to 10 feet below grade. The depth at any given test pit was dependent on the tendency of the soils to cave in and the maximum reach of the backhoe. The test pits were typically 10 to 12 feet in length and 3 feet in width. Two to three soil samples were collected from each test pit for chemical analysis.

Each sample typically represented a 1-foot-square area (1 foot vertically by 1 foot horizontally) on the side of the test pit. Samples were taken from within the same stratigraphic unit or depth interval using long-handled stainless steel tools. Samples were collected and placed in a stainless steel bowl, inspected and described in the test pit log, and mixed thoroughly using a stainless steel spoon until the sample was relatively homogeneous. Sample jars were filled to obtain the sample volume required for the analyses. Soil samples were analyzed for constituents discussed in the main text. Additional soil was collected from each sample location and placed in a clean, sealed plastic sample container for PID organic vapor headspace measurements as discussed below.

Each test pit was logged by a Hart Crowser field representative, prior to being backfilled. Test pit excavations were backfilled with the excavated soil. The surface soils were piled separately and replaced on the surface of the backfill to minimize exposure potential. Care was taken to avoid placing suspected contaminated materials (i.e., debris fill) at the surface. The test pits were located in the field by hand taping from existing physical features.

### ***Soil Classification***

The field representative visually classified the soil samples in general accordance with ASTM Method D 2488 as depicted on Figure A-1, prepared a log of soils encountered in the exploration, and recorded pertinent observations regarding conditions, types of soils encountered, and the depth to water at time of drilling. Soil descriptions include the following properties: relative density of sands and gravels/consistency of silts and clays, moisture, color, minor constituents, and major constituents. The presence of non-soil substances (e.g., debris etc.) was also noted.

### ***Organic Vapor Detection***

Organic vapors were measured in soil sample jar headspace during the field investigation using a portable HNU photoionization detector (PID). These sample jar organic vapor readings are presented on the exploration logs. The PID has sealed ultraviolet light sources which emit photons that ionize trace organics but does not ionize the major components of air. PID measurements were made by piercing the foil-covered jar with the PID probe after the air in the

jar had been allowed to equilibrate with the soil. PID measurements were recorded on a field log relative to 0.2 PID unit background level for ambient air at the project site.

## **Groundwater Sampling**

Groundwater samples were collected from site monitoring wells on March 20, March 21, and December 10, 2001.

### **Sampling Equipment**

The equipment that was used for the collection of groundwater samples from boreholes included:

- pH, temperature, electrical conductivity, and salinity meters;
- Peristaltic pump with poly tubing;
- Laboratory-supplied pre-cleaned sample containers with appropriate preservatives added;
- Coolers with blue ice; and
- Hart Crowser Sample Custody Record.

### **Groundwater Sampling Procedures**

Groundwater samples were collected from site monitoring wells on March 20, March 21, and December 10, 2001. Upon arrival at the site, field personnel recorded site conditions, depth to water in the wells, and other requested information on the Groundwater Sampling Data form. Groundwater samples were collected using low-flow sampling techniques to minimize suspended solids in the samples. The wells were purged and sampled with a peristaltic pump. Clean sample tubing was used for each well and disposed of after use.

The field parameters temperature, pH, electrical conductivity, and salinity were measured and recorded periodically during purging of the well. Once the field parameters remained stable between measurements (i.e., specific conductivity 610 percent; pH 60.1 pH units, temperature 60.1° C, salinity 61 unit), the groundwater sample was collected. The final stabilized readings measured just before sampling were recorded on the Groundwater Sampling Data form and are presented in Table A-1. Samples to be analyzed for dissolved metals were

filtered using a clean 0.45 µm in-line filter, and placed in sample containers with preservative.

F:\docs\jobs\467672\HicksBullDraftRI.doc

**Table A-1 - Groundwater Field Parameters  
Hicks-Bull, Coast Iron Works, and Steam Plant Properties**

| Sample I.D. | Date Sampled | pH  | Temperature in °C | Specific Conductivity in µS | Salinity in o/oo |
|-------------|--------------|-----|-------------------|-----------------------------|------------------|
| HB-MW01     | 3/20/2001    | 7.0 | 10.7              | >19,900                     | 21.5             |
| HB-MW01     | 3/21/2001    | 7.1 | 11.3              | 17,300                      | 13.5             |
| HB-MW02     | 3/20/2001    | 7.4 | 10.7              | 18,100                      | 18.0             |
| HB-MW02     | 3/21/2001    | 7.5 | 10.5              | 18,400                      | 17.5             |
| HB-MW02     | 12/10/2001   | 6.9 | 11.5              | 10,000                      | 13.5             |
| HB-MW03     | 3/20/2001    | 7.0 | 10.8              | >19,900                     | 22.0             |
| HB-MW03     | 3/21/2001    | 7.1 | 11.3              | >19,900                     | 21.0             |
| HB-MW03     | 12/10/2001   | 7.1 | 12.0              | 11,000                      | 19.0             |
| HB-S01      | 3/27/2001    | 7.6 | 9.6               | >19,900                     | 24.0             |
| HB-S01      | 12/10/2001   | 7.5 | 10.4              | 10,400                      | 23.5             |
| OB-1        | 12/10/2001   | 6.4 | 9.1               | 10,500                      | 24.0             |
| UMW2A       | 3/20/2001    | 7.0 | 12.4              | >19,900                     | 22.0             |
| UMW2A       | 3/21/2001    | 7.1 | 11.7              | >19,900                     | 20.5             |
| UMW2A       | 12/10/2001   | 7.6 | 12.5              | NM                          | 16.0             |

NM - Not measured

# Key to Exploration Logs

## Sample Description

Classification of soils in this report is based on visual field and laboratory observations which include density/consistency, moisture condition, grain size, and plasticity estimates and should not be construed to imply field nor laboratory testing unless presented herein. Visual-manual classification methods of ASTM D 2488 were used as an identification guide.

Soil descriptions consist of the following:

Density/consistency, moisture, color, minor constituents, MAJOR CONSTITUENT, additional remarks.

### Density/Consistency

Soil density/consistency in borings is related primarily to the Standard Penetration Resistance. Soil density/consistency in test pits is estimated based on visual observation and is presented parenthetically on the test pit logs.

| SAND or GRAVEL | Standard Penetration Resistance (N) in Blows/Foot | SILT or CLAY | Standard Penetration Resistance (N) in Blows/Foot | Approximate Shear Strength in TSF |
|----------------|---|--------------|---|-----------------------------------|
| Density        |   | Consistency  |   |                                   |
| Very loose     | 0 - 4   | Very soft    | 0 - 2   | <0.125                            |
| Loose          | 4 - 10  | Soft         | 2 - 4   | 0.125 - 0.25                      |
| Medium dense   | 10 - 30   | Medium stiff | 4 - 8   | 0.25 - 0.5                        |
| Dense          | 30 - 50   | Stiff        | 8 - 15  | 0.5 - 1.0                         |
| Very dense     | >50   | Very stiff   | 15 - 30   | 1.0 - 2.0                         |
|                |   | Hard         | >30   | >2.0                              |

### Moisture

|       |   |
|-------|---|
| Dry   | Little perceptible moisture                       |
| Damp  | Some perceptible moisture, probably below optimum |
| Moist | Probably near optimum moisture content            |
| Wet   | Much perceptible moisture, probably above optimum |

### Minor Constituents

Estimated Percentage

|                                |         |
|--------------------------------|---------|
| Not identified in description  | 0 - 5   |
| Slightly (clayey, silty, etc.) | 5 - 12  |
| Clayey, silty, sandy, gravelly | 12 - 30 |
| Very (clayey, silty, etc.)     | 30 - 50 |

### Legends

#### Sampling Test Symbols

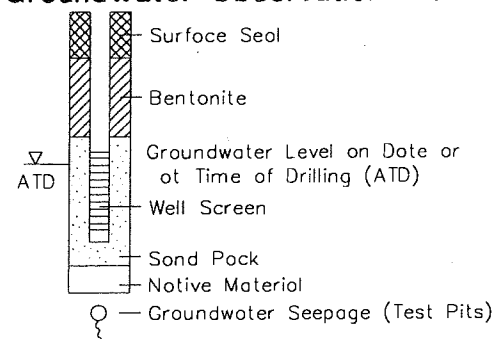
##### BORING SAMPLES

|   |                         |
|---|-------------------------|
|   | Split Spoon             |
|   | Shelby Tube             |
|   | Cuttings                |
|   | Core Run                |
| * | No Sample Recovery      |
| P | Tube Pushed, Not Driven |

##### TEST PIT SAMPLES

|  |             |
|--|-------------|
|  | Grab (Jar)  |
|  | Bag         |
|  | Shelby Tube |

#### Groundwater Observation Wells



### Test Symbols

|     |  |
|-----|--|
| GS  | Grain Size Classification                                      |
| CN  | Consolidation  |
| UU  | Unconsolidated Undrained Triaxial                              |
| CU  | Consolidated Undrained Triaxial                                |
| CD  | Consolidated Drained Triaxial                                  |
| QU  | Unconfined Compression   |
| DS  | Direct Shear   |
| K   | Permeability   |
| PP  | Pocket Penetrometer<br>Approximate Compressive Strength in TSF |
| TV  | Torvane<br>Approximate Shear Strength in TSF                   |
| CBR | California Bearing Ratio                                       |
| MD  | Moisture Density Relationship                                  |
| AL  | Atterberg Limits   |
|     | Water Content in Percent                                       |
| PID | Photoionization Detector Reading                               |
| CA  | Chemical Analysis  |
| DT  | In Situ Density Test   |



**HARTCROWSER**

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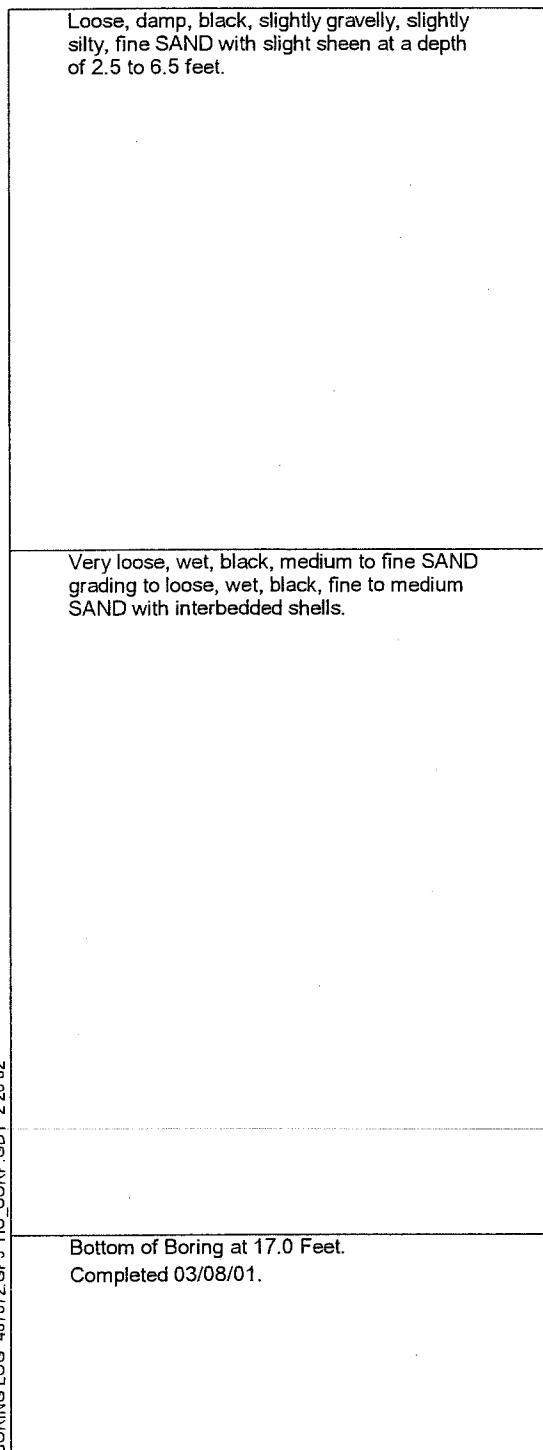
2/02

Figure A-1

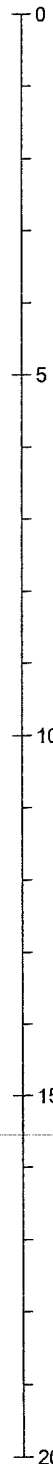
# Boring Log HB-B01

## Soil Descriptions

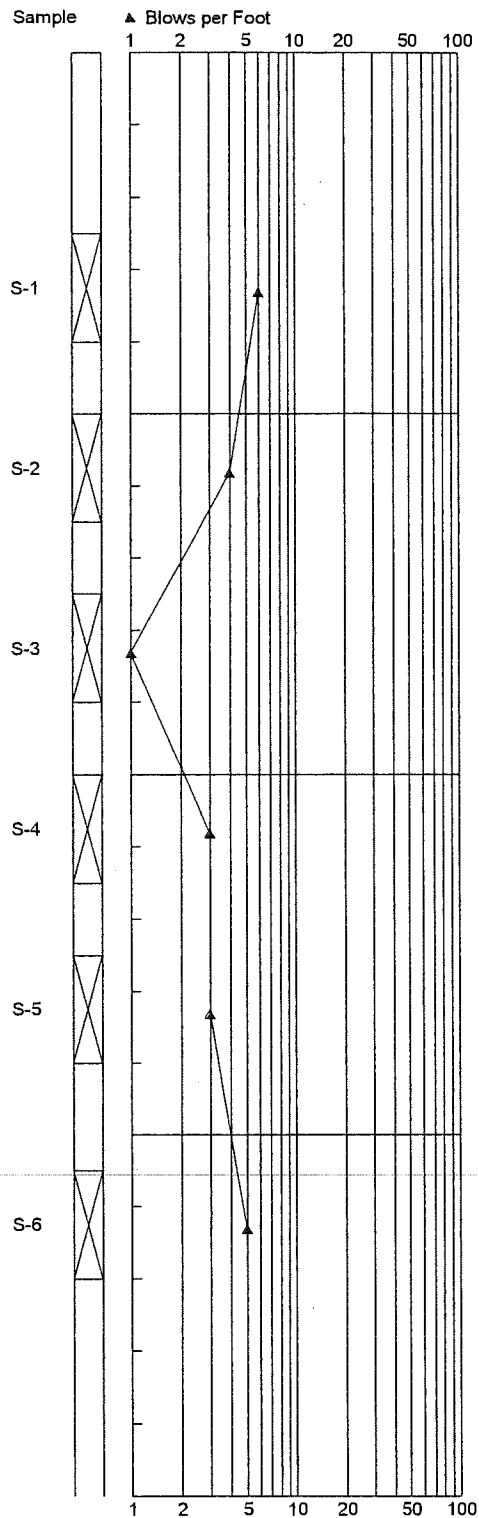
Approximate Ground Surface Elevation in Feet: 11.0



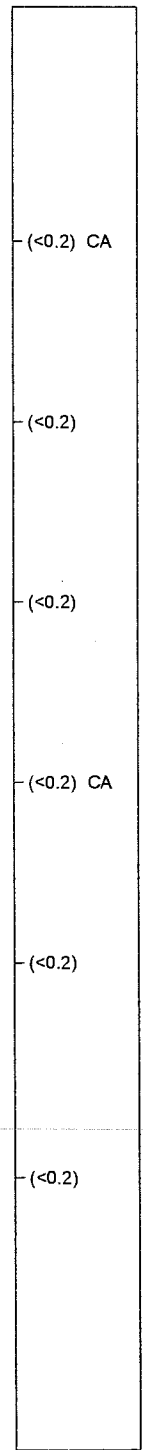
Depth in Feet



## STANDARD PENETRATION RESISTANCE



## LAB TESTS & (PID)



BORING LOG 467672.GPJ HC\_CORP.GDT 2.26.02

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.



J-4676-72

03/01

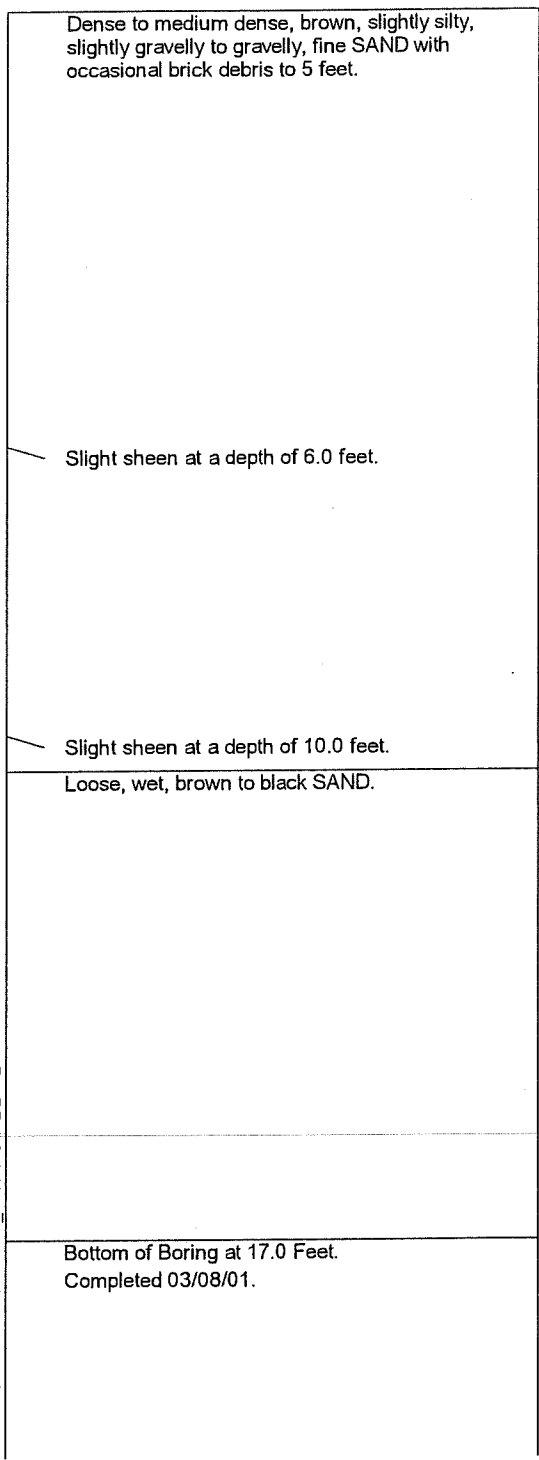
Figure A-2



# Boring Log HB-B02

## Soil Descriptions

Approximate Ground Surface Elevation in Feet: 9.5



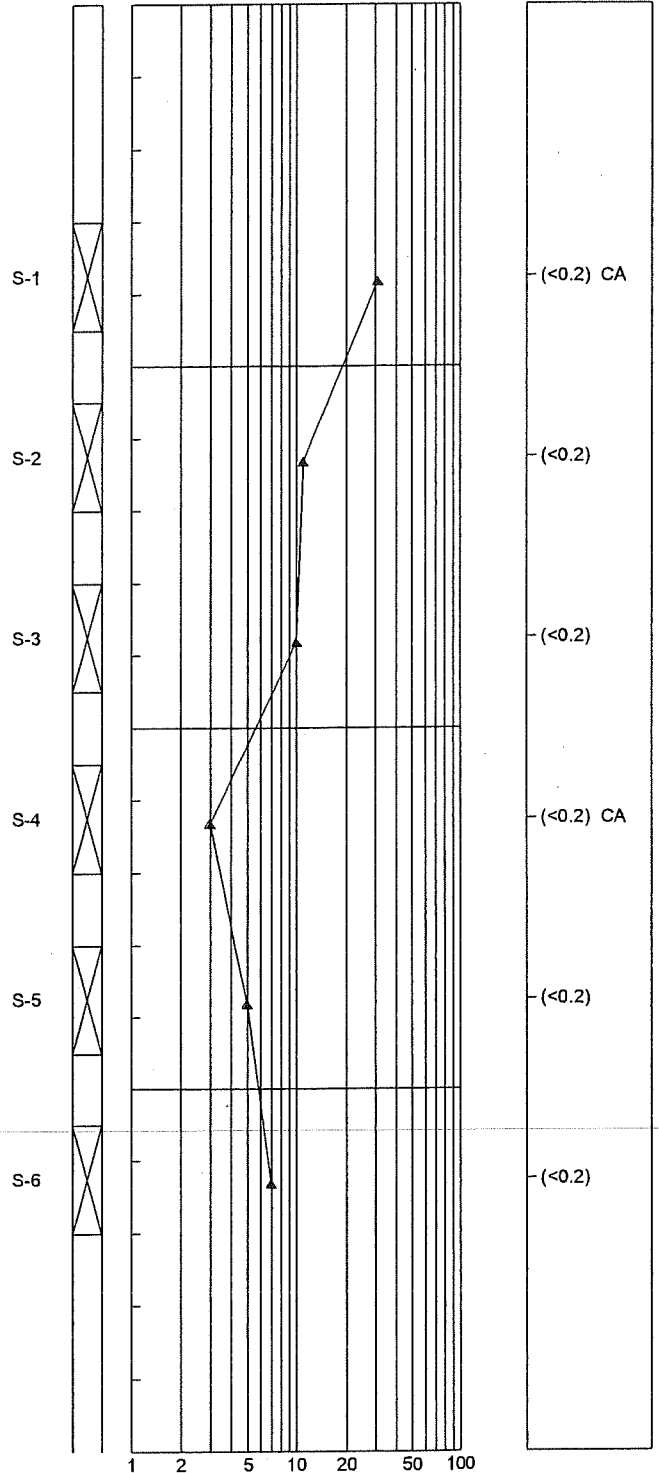
Depth  
in Feet

## STANDARD PENETRATION RESISTANCE

Sample

▲ Blows per Foot

1 2 5 10 20 50 100



LAB  
TESTS  
& (PID)

BORING LOG 487672.GPJ HC\_CORP.GDT 2 28 02



**HARTCROWSER**

J-4676-72

03/01

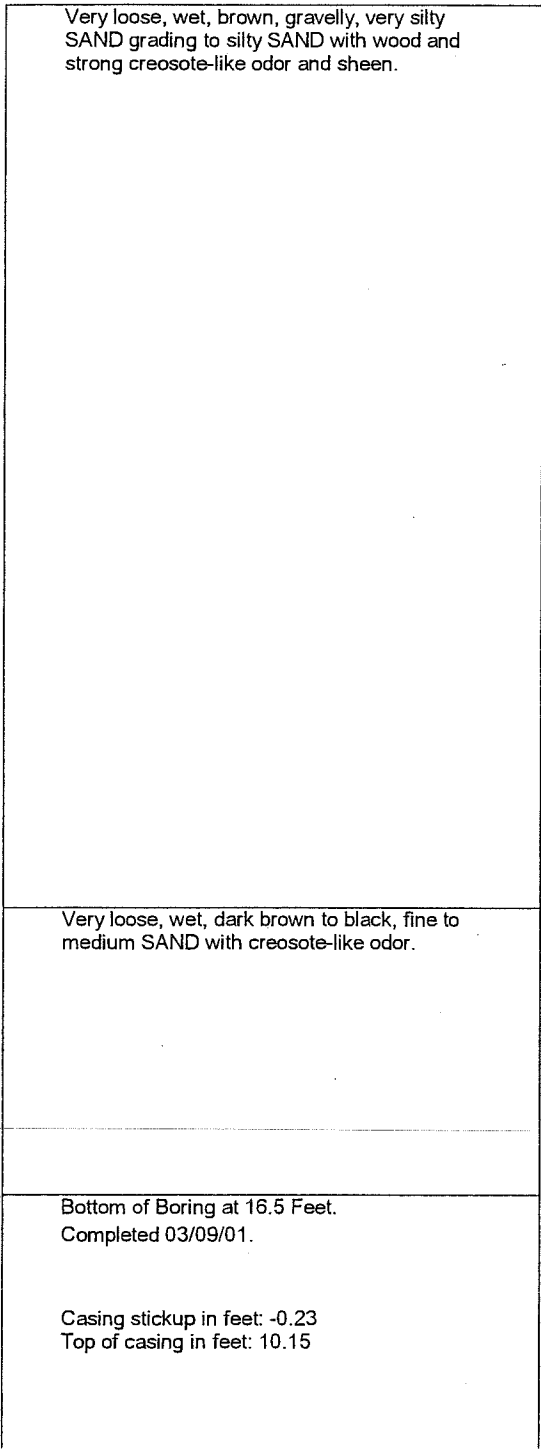
Figure A-3

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

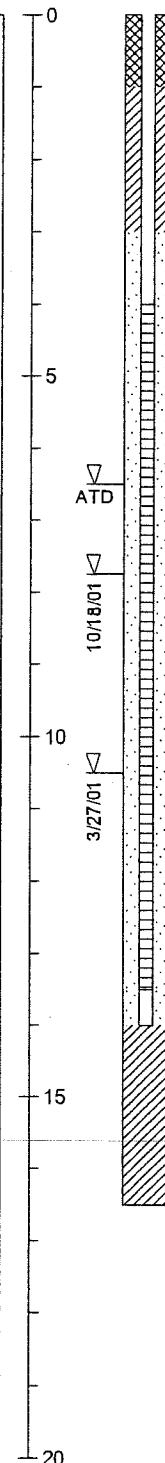
# Monitoring Well Log HB-MW01

## Soil Descriptions

Ground Surface Elevation in Feet: 10.38



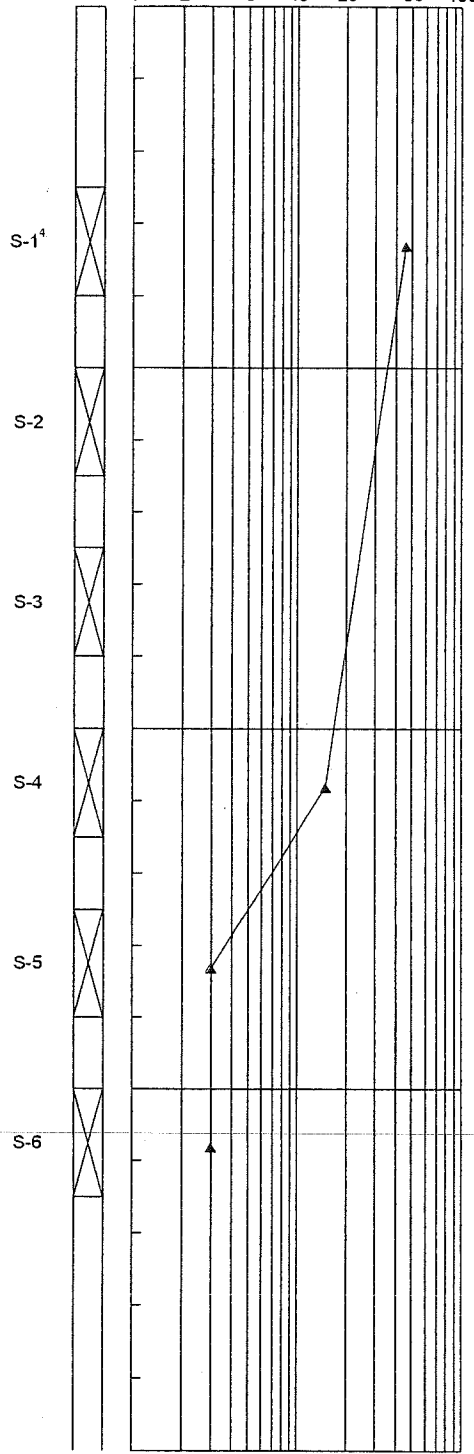
Depth  
in Feet



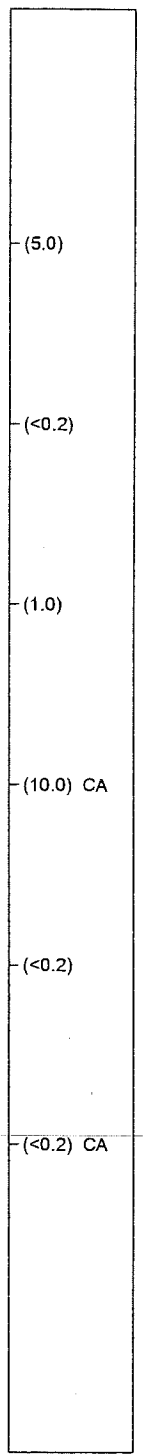
## STANDARD PENETRATION RESISTANCE

Sample

▲ Blows per Foot  
1 2 5 10 20 50 100



LAB  
TESTS  
& (PID)



BORING LOG 467672L.GPJ HC CORP.GDT 2.26.02

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
4. Blow counts are not representative of density due to wood in sampler.



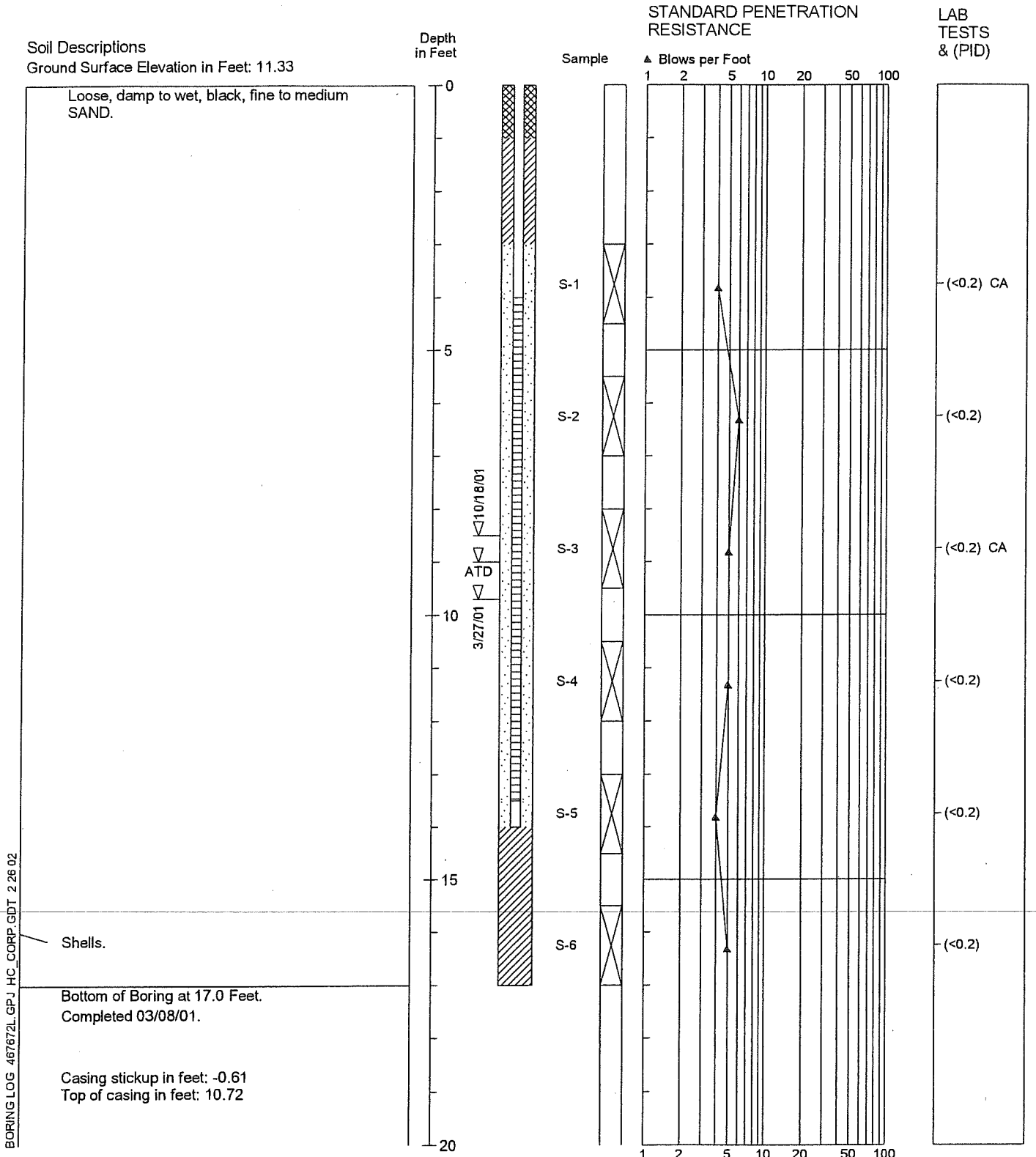
**HARTCROWSER**

J-4676-72

03/01

Figure A-4

# Monitoring Well Log HB-MW02



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

**HARTCROWSER**

J-4676-72

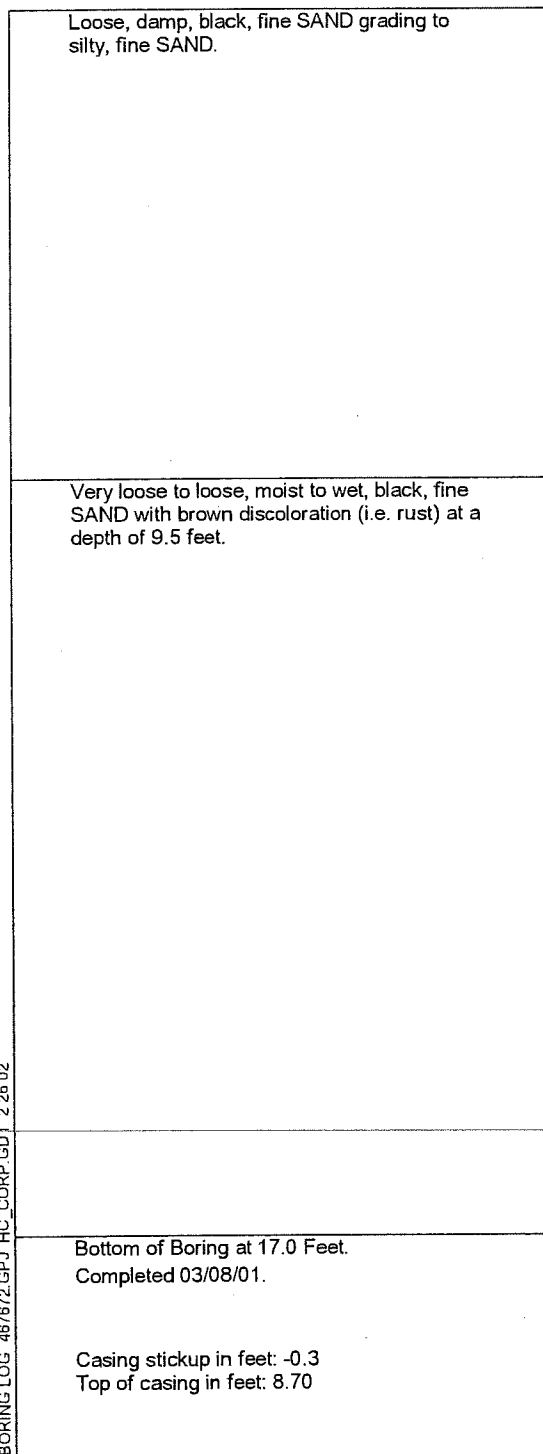
03/01

Figure A-5

# Monitoring Well Log HB-MW03

## Soil Descriptions

Approximate Ground Surface Elevation in Feet: 9.0



Depth in Feet

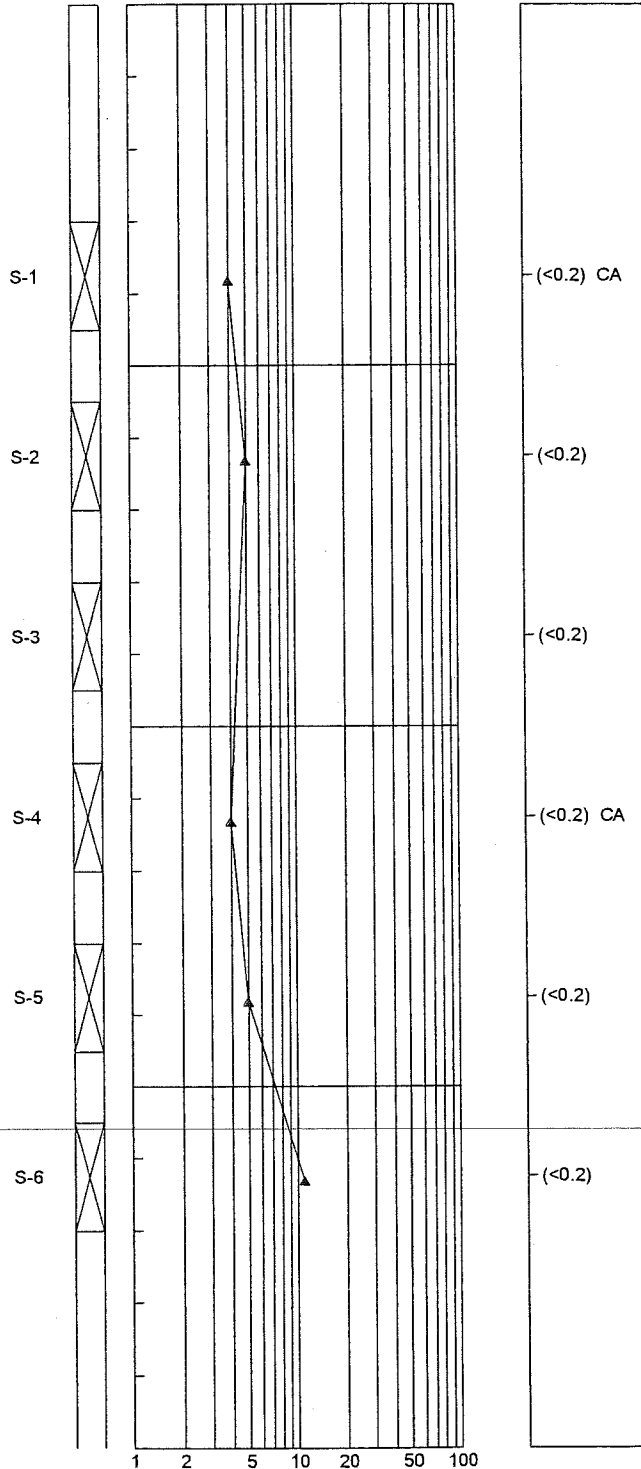
## STANDARD PENETRATION RESISTANCE

Sample

▲ Blows per Foot

1 2 5 10 20 50 100

LAB TESTS & (PID)



BORING LOG: 467672.GPJ\_HC\_CORP.GDT 2.26.02

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.



J-4676-72

03/01

Figure A-6

# Test Pit Log HB-TP01

| Sample | Lab Tests | Depth in Feet | SOIL DESCRIPTIONS   |
|--------|-----------|---------------|---|
|        |           |               | Approximate Ground Surface Elevation in Feet: 11.5  |
| S-1    | CA        | 0             | 2 inches of Asphalt.  |
|        |           | 1             | (Dense), moist, black, gravelly SAND with slag.   |
|        |           | 2             | (Medium dense), moist to wet, tan, slightly silty SAND with scattered bricks, wood, and reddish brown slag. |
|        |           | 3             |   |
|        |           | 4             |   |
|        |           | 5             |   |
|        |           | 6             |   |
| S-2    | CA        | 7             |   |
|        |           | 8             | (Medium dense), wet, gray, gravelly, sandy SILT.  |
| S-3    | CA        | 9             |   |
|        |           | 10            | Bottom of Exploration at 10.0 Feet.   |
|        |           | 11            | Completed 03/08/01.   |
|        |           | 12            |   |

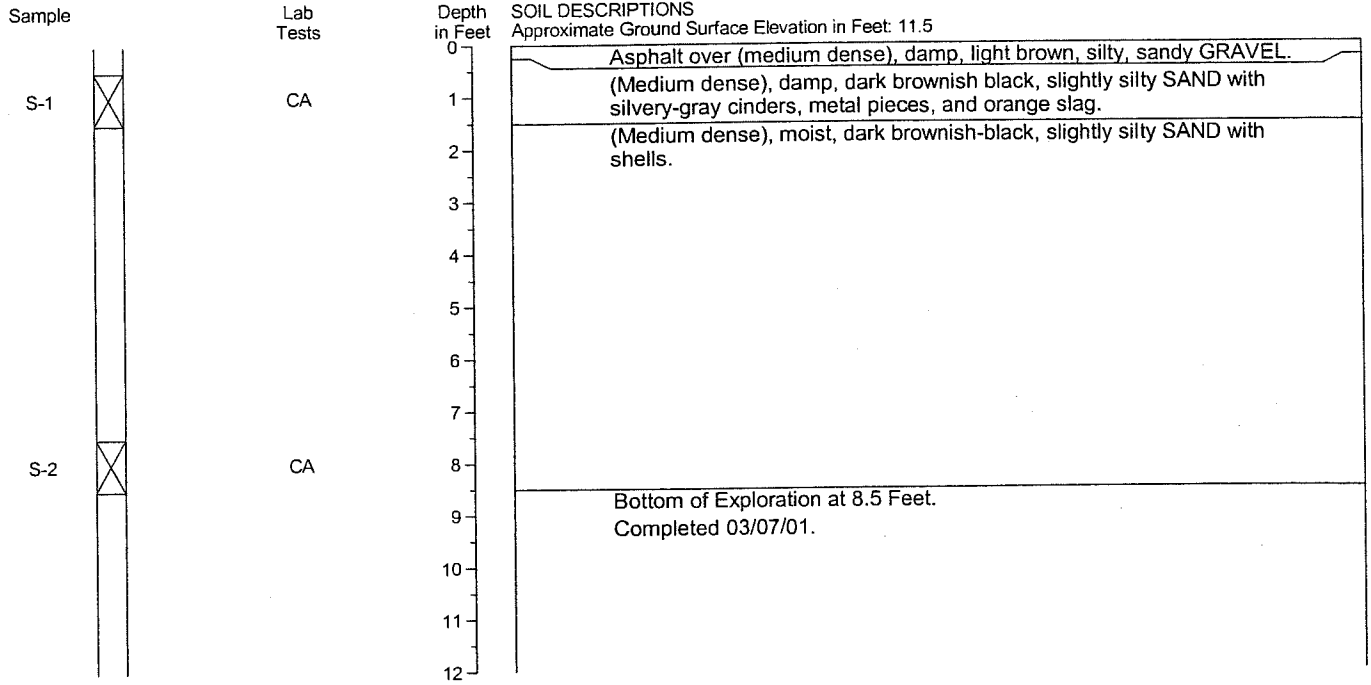
# Test Pit Log HB-TP02

| Sample | Lab Tests | Depth in Feet | SOIL DESCRIPTIONS  |
|--------|-----------|---------------|--|
|        |           |               | Approximate Ground Surface Elevation in Feet: 11.0   |
| S-1    | CA        | 0             | 2 inches of Asphalt.   |
|        |           | 1             | (Dense), moist, dark brown, slightly silty, gravelly SAND with coal, burnt wood, concrete, brick, and slag.  |
|        |           | 2             | Creosote-treated wood.   |
|        |           | 3             | (Medium dense), moist, brown, slightly gravelly, slightly silty SAND with scattered wood, brick, and shells. |
|        |           | 4             |  |
|        |           | 5             |  |
|        |           | 6             |  |
| S-2    | CA        | 7             |  |
|        |           | 8             | Bottom of Exploration at 7.0 Feet.   |
|        |           | 9             | Completed 03/08/01.  |
|        |           | 10            |  |
|        |           | 11            |  |
|        |           | 12            |  |

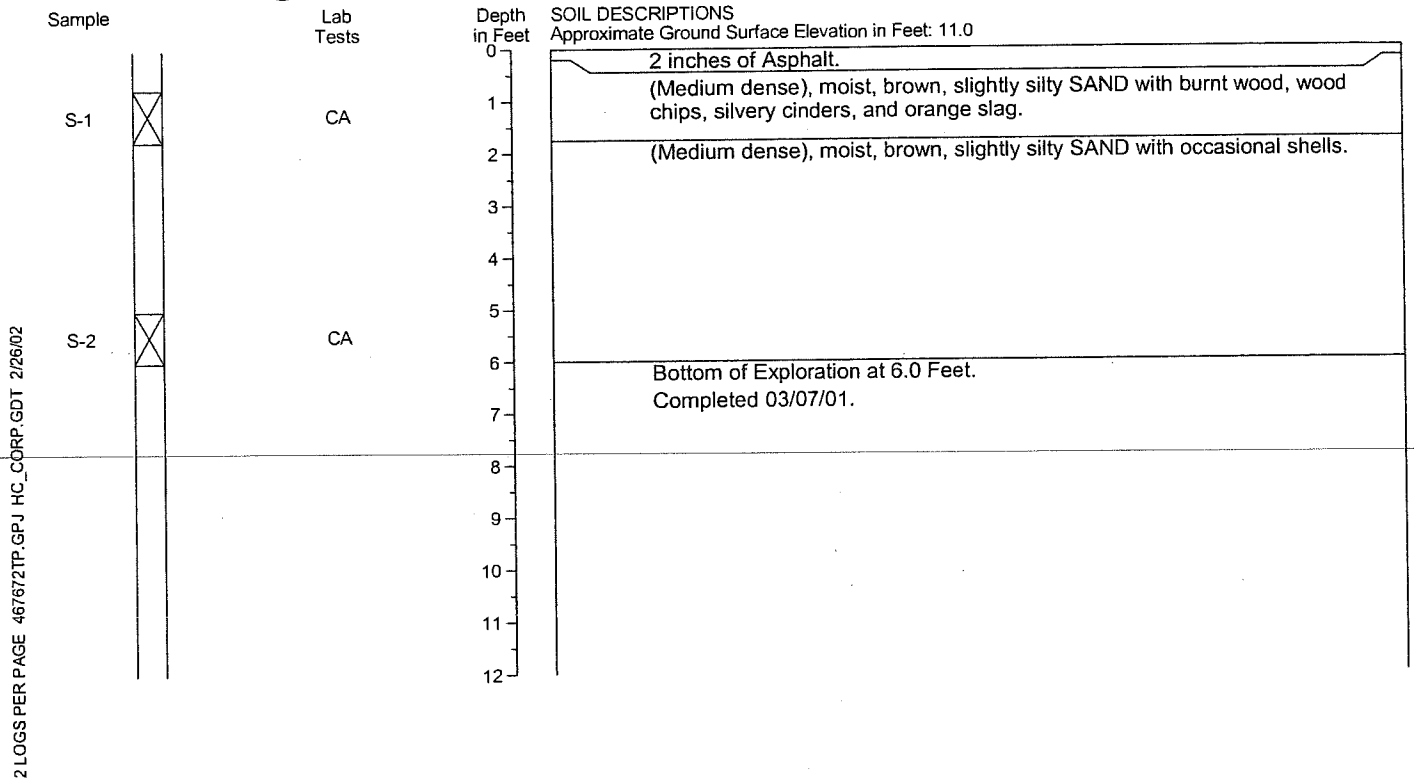
2 LOGS PER PAGE 467672TP.GPJ HC\_CORP.GDT 2/26/02

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater conditions, if indicated, are at time of excavation. Conditions may vary with time.

# Test Pit Log HB-TP03



# Test Pit Log HB-TP04



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater conditions, if indicated, are at time of excavation. Conditions may vary with time.



# Test Pit Log HB-TP05

| Sample | Lab Tests | Depth in Feet | SOIL DESCRIPTIONS<br>Approximate Ground Surface Elevation in Feet: 11.0      |
|--------|-----------|---------------|--|
|        |           | 0             | (Medium dense), damp, brown, slightly silty SAND.                            |
| S-1    | CA        | 1             | (Medium dense), damp, light brown, silty, sandy GRAVEL with asphalt chunks.  |
|        |           | 2             | Damp, black and reddish orange slag with coal, brick, and white ash/cinders. |
| S-2    | CA        | 3             |  |
|        |           | 4             | (Medium dense), moist, black, slightly silty SAND with shells.               |
| S-3    | CA        | 5             |  |
|        |           | 6             | Bottom of Exploration at 7.0 Feet.<br>Completed 03/08/01.                    |
|        |           | 7             |  |
|        |           | 8             |  |
|        |           | 9             |  |
|        |           | 10            |  |
|        |           | 11            |  |
|        |           | 12            |  |

# Test Pit Log HB-TP06

| Sample | Lab Tests | Depth in Feet | SOIL DESCRIPTIONS<br>Approximate Ground Surface Elevation in Feet: 11.0                                 |
|--------|-----------|---------------|---|
|        |           | 0             | Gravel on surface.  |
| S-1    | CA        | 1             | (Medium dense), moist, brown, slightly silty, gravelly SAND with red slag, coal, and burnt wood debris. |
|        |           | 2             | (Medium dense), moist, brown, slightly gravelly SAND.   |
|        |           | 3             | (Medium dense), moist, black, slightly silty SAND with shells.  |
|        |           | 4             | Bottom of Exploration at 8.5 Feet.<br>Completed 03/08/01.   |
|        |           | 5             |   |
|        |           | 6             |   |
|        |           | 7             |   |
| S-2    | CA        | 8             |   |
|        |           | 9             |   |
|        |           | 10            |   |
|        |           | 11            |   |
|        |           | 12            |   |

2 LOGS PER PAGE 467672TP.GPJ HC\_CORP.GDT 2/26/02

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater conditions, if indicated, are at time of excavation. Conditions may vary with time.



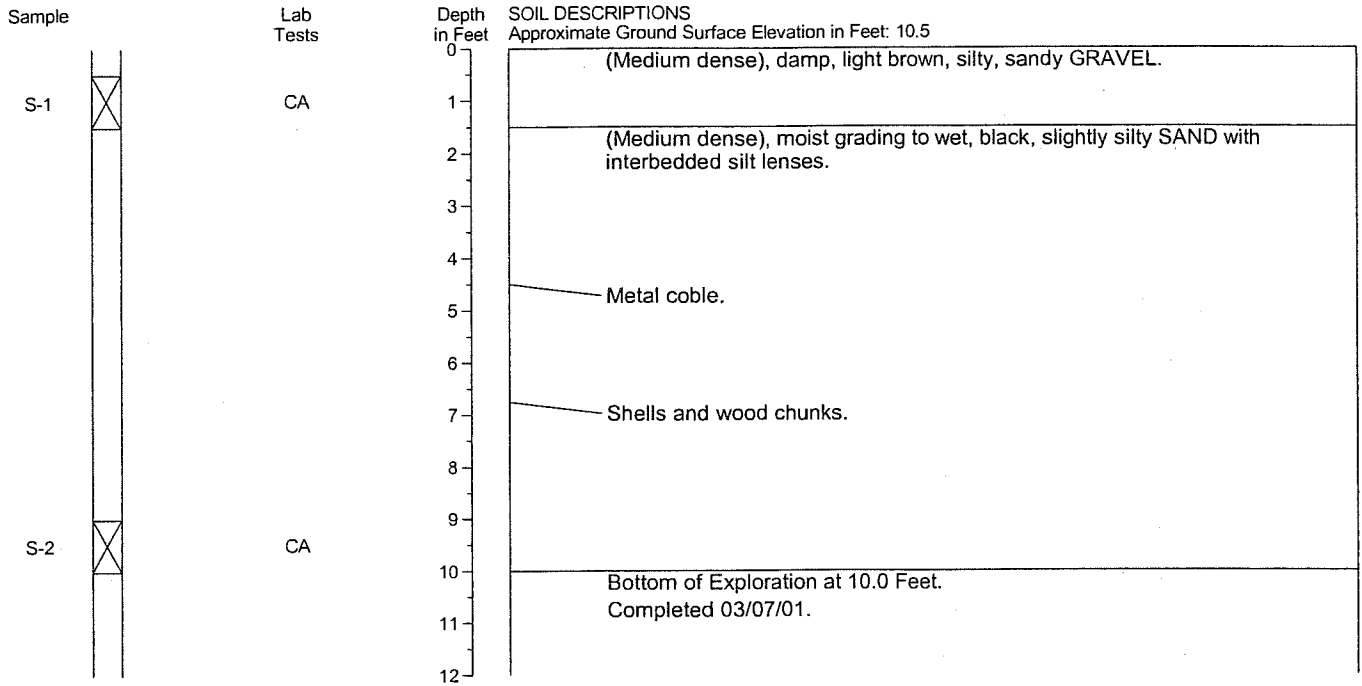
**HARTCROWSER**

J-4676-72

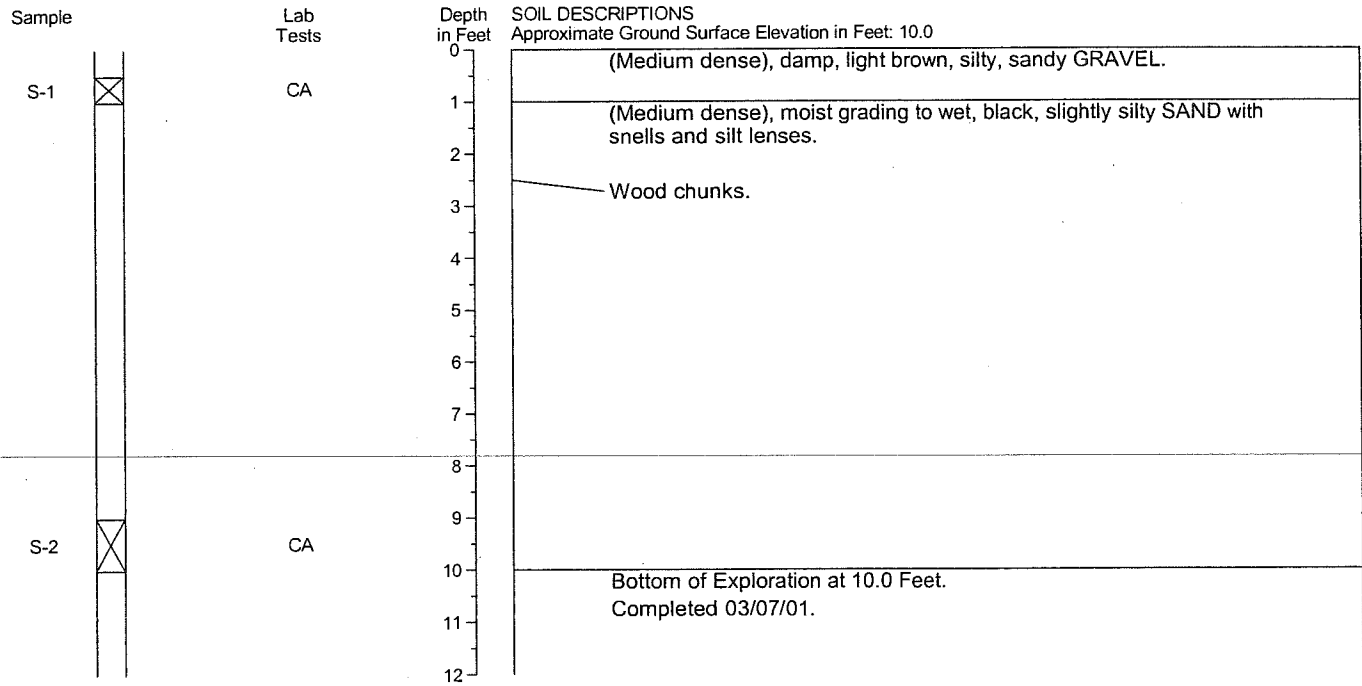
03/01

Figure A-9

# Test Pit Log HB-TP07



# Test Pit Log HB-TP08



2 LOGS PER PAGE 467672TP.GPJ HC\_CORP.GDT 2/26/02

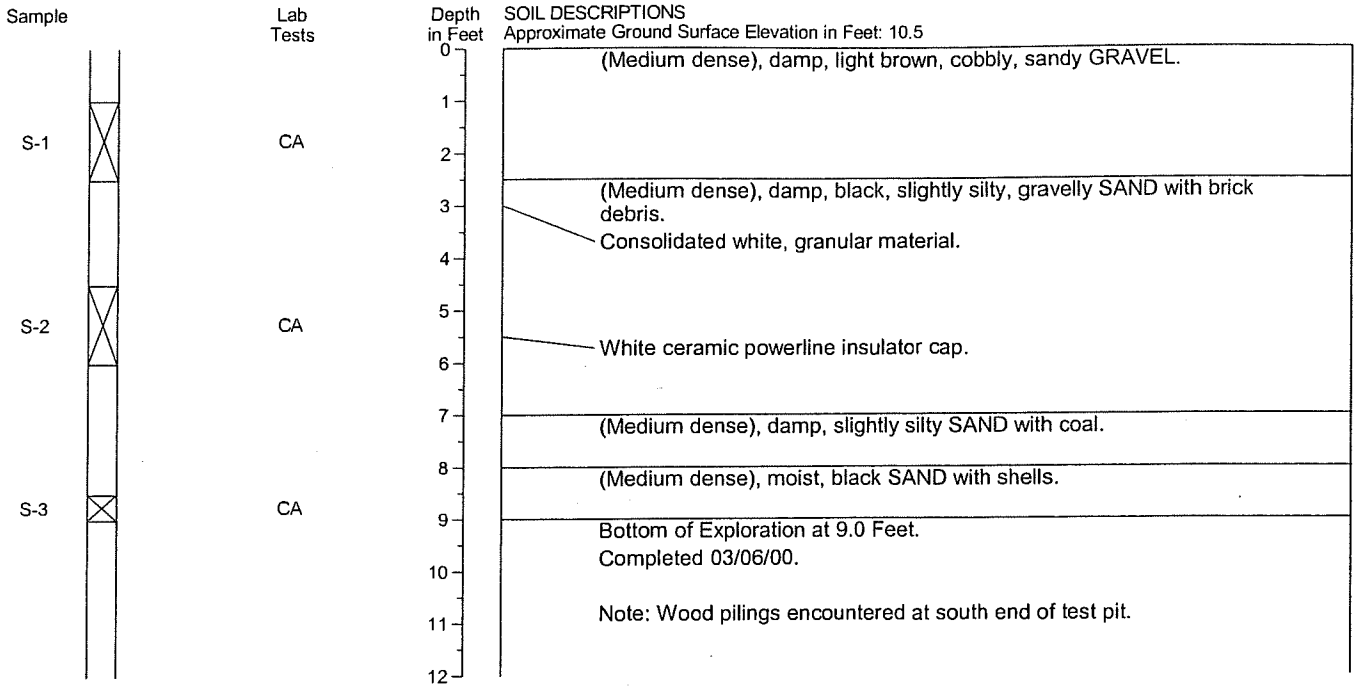
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater conditions, if indicated, are at time of excavation. Conditions may vary with time.



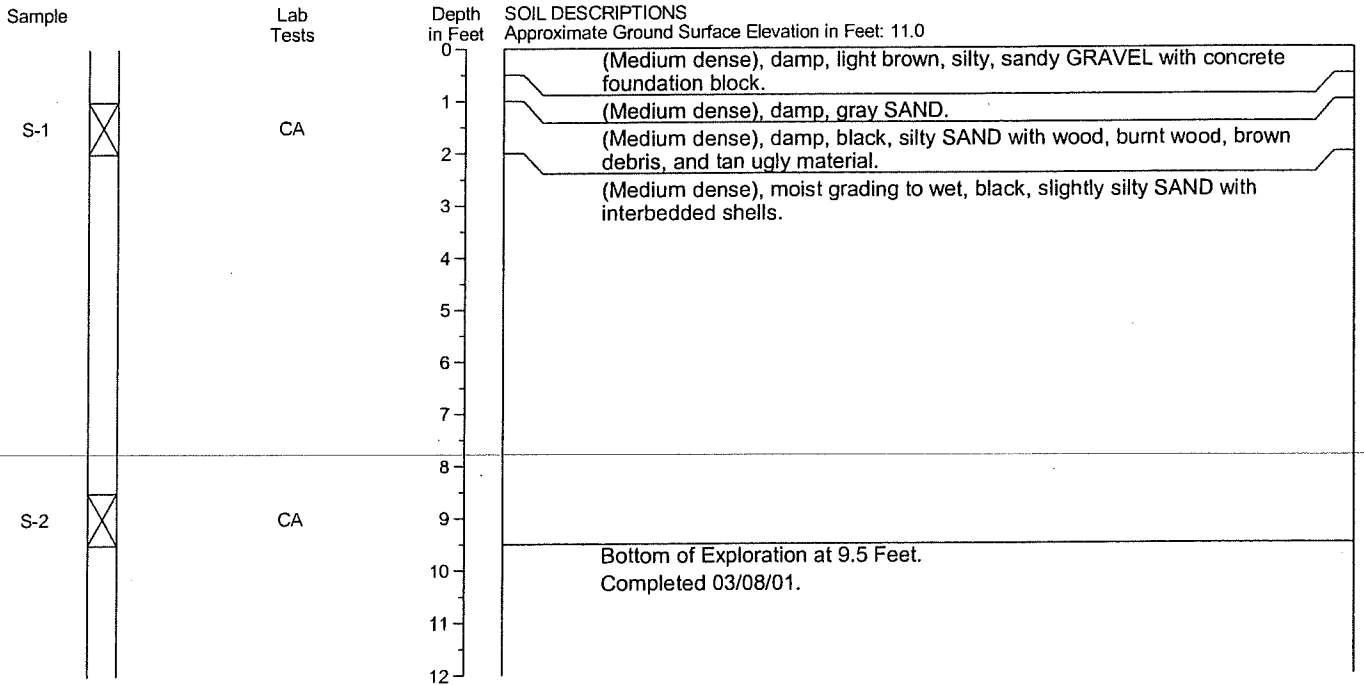
J-4676-72 03/01  
Figure A-10



# Test Pit Log HB-TP09



# Test Pit Log HB-TP10



2 LOGS PER PAGE 467672TP.GPJ HC\_CORP.GDT 2/26/02

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater conditions, if indicated, are at time of excavation. Conditions may vary with time.



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Figure A-11

**APPENDIX B**  
**SAMPLE RESULTS SUMMARY TABLES**

## **APPENDIX B SAMPLE RESULTS SUMMARY TABLES**

The following tables provide summaries of the available soil and groundwater quality data collected during the current investigations of the Hicks-Bull, Coast Iron Works, and Steam Plant properties. The soil quality tables are presented first, followed by the groundwater quality tables. The tables within each of these media are ordered by the following compound groups:

- Carcinogenic PAHs
- Non-Carcinogenic PAHs
- Metals
- Petroleum Hydrocarbons
- Conventionals

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**Table B-1 - Carcinogenic PAH Results for Soil Samples  
Hicks-Bull, Coast Iron Works, and Steam Plant Properties**

| Sample ID.  | Date Sampled | Units | Benzo(a) anthracene | Benzo(a) pyrene | Total Benzo-fluoranthenes | Chrysene | Dibenz(ah) anthracene | Indeno (1,2,3-cd)pyrene | Total cPAHs BaP |
|-------------|--------------|-------|---------------------|-----------------|---------------------------|----------|-----------------------|-------------------------|-----------------|
| HB-B01 S-1  | 3/9/2001     | µg/kg | 94.0 U              | 94.0 U          | 110.0                     | 94.0 U   | 94.0 U                | 94.0 U                  | 86.67           |
| HB-B01 S-4  | 3/9/2001     | µg/kg | 89.0 U              | 89.0 U          | 89.0 U                    | 89.0 U   | 89.0 U                | 89.0 U                  | 76.10 U         |
| HB-B02 S-1  | 3/9/2001     | µg/kg | 200.0               | 180.0           | 240.0                     | 220.0    | 96.0 U                | 96.0 U                  | 250.2           |
| HB-B02 S-4  | 3/9/2001     | µg/kg | 270.0               | 290.0           | 360.0                     | 290.0    | 97.0 U                | 120.0                   | 387.3           |
| HB-MW01 S-4 | 3/9/2001     | µg/kg | 1300.0              | 330.0           | 680.0                     | 1300.0   | 97.0 U                | 110.0                   | 571.4           |
| HB-MW01 S-6 | 3/9/2001     | µg/kg | 89.0 U              | 89.0 U          | 89.0 U                    | 89.0 U   | 89.0 U                | 89.0 U                  | 76.10 U         |
| HB-MW02 S-1 | 3/9/2001     | µg/kg | 96.0 U              | 96.0 U          | 96.0 U                    | 96.0 U   | 96.0 U                | 96.0 U                  | 82.08 U         |
| HB-MW02 S-3 | 3/9/2001     | µg/kg | 98.0 U              | 98.0 U          | 98.0 U                    | 98.0 U   | 98.0 U                | 98.0 U                  | 83.79 U         |
| HB-MW03 S-1 | 3/9/2001     | µg/kg | 210.0               | 220.0           | 340.0                     | 230.0    | 97.0 U                | 97.0 U                  | 301.6           |
| HB-MW03 S-4 | 3/9/2001     | µg/kg | 96.0 U              | 96.0 U          | 96.0 U                    | 96.0 U   | 96.0 U                | 96.0 U                  | 82.08 U         |
| HB-TP01 S-1 | 3/8/2001     | µg/kg | 94.0 J              | 310.0 J         | 700.0 J                   | 200.0 J  | 88.0 UJ               | 88.0 UJ                 | 413.4           |
| HB-TP01 S-2 | 3/8/2001     | µg/kg | 99.0 U              | 99.0 U          | 99.0 U                    | 99.0 U   | 99.0 U                | 99.0 U                  | 84.65 U         |
| HB-TP01 S-3 | 3/8/2001     | µg/kg | 430.0               | 370.0           | 490.0                     | 420.0    | 96.0 U                | 180.0                   | 503.4           |
| HB-TP02 S-1 | 3/8/2001     | µg/kg | 290.0               | 480.0           | 850.0                     | 780.0    | 190.0                 | 500.0                   | 727.8           |
| HB-TP02 S-2 | 3/8/2001     | µg/kg | 300.0               | 350.0           | 540.0                     | 400.0    | 97.0 U                | 210.0                   | 478.4           |
| HB-TP03 S-1 | 3/7/2001     | µg/kg | 120.0               | 100.0           | 210.0                     | 110.0    | 83.0 U                | 83.0 U                  | 154.9           |
| HB-TP03 S-2 | 3/7/2001     | µg/kg | 97.0 U              | 97.0 U          | 97.0 U                    | 97.0 U   | 97.0 U                | 97.0 U                  | 82.94 U         |
| HB-TP04 S-1 | 3/7/2001     | µg/kg | 1700.0              | 2300.0 J        | 4800.0 J                  | 2700.0   | 330.0 J               | 1100.0 J                | 3219.0          |
| HB-TP04 S-2 | 3/7/2001     | µg/kg | 76.0 U              | 76.0 U          | 76.0 U                    | 76.0 U   | 76.0 U                | 76.0 U                  | 64.98 U         |
| HB-TP05 S-1 | 3/8/2001     | µg/kg | 2600.0 J            | 3300.0 J        | 4400.0 J                  | 3200.0   | 340.0 J               | 1300.0 J                | 4298.0          |
| HB-TP05 S-2 | 3/8/2001     | µg/kg | 810.0               | 920.0           | 1400.0                    | 1100.0   | 110.0                 | 370.0                   | 1233.0          |
| HB-TP05 S-3 | 3/8/2001     | µg/kg | 72.0 U              | 72.0 U          | 72.0 U                    | 72.0 U   | 72.0 U                | 72.0 U                  | 61.56 U         |
| HB-TP06 S-1 | 3/8/2001     | µg/kg | 120.0               | 170.0           | 260.0                     | 220.0    | 86.0 U                | 88.0                    | 236.2           |
| HB-TP06 S-2 | 3/8/2001     | µg/kg | 97.0 U              | 97.0 U          | 97.0 U                    | 97.0 U   | 97.0 U                | 97.0 U                  | 82.94 U         |
| HB-TP07 S-1 | 3/7/2001     | µg/kg | 250.0               | 220.0           | 270.0                     | 270.0    | 95.0 U                | 95.0 U                  | 298.5           |
| HB-TP07 S-2 | 3/7/2001     | µg/kg | 93.0 U              | 93.0 U          | 93.0 U                    | 93.0 U   | 93.0 U                | 93.0 U                  | 79.52 U         |
| HB-TP08 S-1 | 3/7/2001     | µg/kg | 100.0 U             | 100.0 U         | 100.0 U                   | 100.0 U  | 100.0 U               | 100.0 U                 | 85.50 U         |
| HB-TP08 S-2 | 3/7/2001     | µg/kg | 93.0 U              | 93.0 U          | 93.0 U                    | 93.0 U   | 93.0 U                | 93.0 U                  | 79.52 U         |
| HB-TP09 S-1 | 3/7/2001     | µg/kg | 150.0               | 160.0           | 230.0                     | 150.0    | 94.0 U                | 120.0                   | 230.3           |
| HB-TP09 S-2 | 3/7/2001     | µg/kg | 6500.0              | 4900.0          | 11000.0                   | 7600.0   | 690.0                 | 2400.0                  | 7242.0          |
| HB-TP09 S-3 | 3/7/2001     | µg/kg | 3400.0              | 4600.0          | 6100.0                    | 4100.0   | 470.0                 | 1800.0                  | 5959.0          |
| HB-TP10 S-1 | 3/8/2001     | µg/kg | 2100.0              | 1900.0          | 2500.0                    | 2600.0   | 230.0                 | 660.0                   | 2544.0          |
| HB-TP10 S-2 | 3/8/2001     | µg/kg | 99.0 UJ             | 99.0 UJ         | 99.0 UJ                   | 99.0 UJ  | 99.0 UJ               | 99.0 UJ                 | 84.65 U         |

U - Indicates value was not detected at associated detection limit

J - Indicates value was estimated

**Table B-2 - Non-Carcinogenic PAH Results for Soil Samples  
Hicks-Bull, Coast Iron Works, and Steam Plant Properties**

| Sample I.D. | Date Sampled | Units | 2-Methyl-naphthalene | 2-Chloro-naphthalene | Benzo(g,h,i)perylene | Acenaphthene | Acenaphthylene | Anthracene | Fluoranthene | Fluorene | Naphthalene | Phenanthrene | Pyrene   |
|-------------|--------------|-------|----------------------|----------------------|----------------------|--------------|----------------|------------|--------------|----------|-------------|--------------|----------|
| HB-B01 S-1  | 3/9/2001     | µg/kg | 94.0 U               | 94.0 U               | 94.0 U               | 94.0 U       | 94.0 U         | 94.0 U     | 94.0 U       | 94.0 U   | 94.0 U      | 94.0 U       | 120.0    |
| HB-B01 S-4  | 3/9/2001     | µg/kg | 89.0 U               | 89.0 U               | 89.0 U               | 89.0 U       | 89.0 U         | 89.0 U     | 89.0 U       | 89.0 U   | 89.0 U      | 89.0 U       | 89.0 U   |
| HB-B02 S-1  | 3/9/2001     | µg/kg | 96.0 U               | 96.0 U               | 120.0                | 96.0 U       | 96.0 U         | 130.0      | 410.0        | 96.0 U   | 96.0 U      | 420.0        | 510.0    |
| HB-B02 S-4  | 3/9/2001     | µg/kg | 97.0 U               | 97.0 U               | 180.0                | 97.0 U       | 97.0 U         | 110.0      | 490.0        | 97.0 U   | 97.0 U      | 400.0        | 640.0    |
| HB-MW01 S-4 | 3/9/2001     | µg/kg | 1900.0               | 97.0 U               | 110.0                | 3500.0       | 97.0 U         | 2500.0     | 6700.0       | 3700.0   | 4700.0      | 12000.0      | 6300.0   |
| HB-MW01 S-6 | 3/9/2001     | µg/kg | 89.0 U               | 89.0 U               | 89.0 U               | 89.0 U       | 89.0 U         | 89.0 U     | 380.0        | 120.0    | 99.0        | 700.0        | 300.0    |
| HB-MW02 S-1 | 3/9/2001     | µg/kg | 96.0 U               | 96.0 U               | 96.0 U               | 96.0 U       | 96.0 U         | 96.0 U     | 96.0 U       | 96.0 U   | 96.0 U      | 96.0 U       | 96.0 U   |
| HB-MW02 S-3 | 3/9/2001     | µg/kg | 98.0 U               | 98.0 U               | 98.0 U               | 98.0 U       | 98.0 U         | 98.0 U     | 98.0 U       | 98.0 U   | 98.0 U      | 98.0 U       | 98.0 U   |
| HB-MW03 S-1 | 3/9/2001     | µg/kg | 97.0 U               | 97.0 U               | 97.0 U               | 97.0 U       | 97.0 U         | 97.0 U     | 420.0        | 97.0 U   | 97.0 U      | 320.0        | 530.0    |
| HB-MW03 S-4 | 3/9/2001     | µg/kg | 96.0 U               | 96.0 U               | 96.0 U               | 96.0 U       | 96.0 U         | 96.0 U     | 96.0 U       | 96.0 U   | 96.0 U      | 96.0 U       | 96.0 U   |
| HB-TP01 S-1 | 3/8/2001     | µg/kg | 88.0 U               | 88.0 U               | 88.0 UJ              | 88.0 U       | 88.0 U         | 88.0 U     | 180.0        | 88.0 U   | 88.0 U      | 200.0        | 210.0 P  |
| HB-TP01 S-2 | 3/8/2001     | µg/kg | 99.0 U               | 99.0 U               | 99.0 U               | 99.0 U       | 99.0 U         | 99.0 U     | 99.0 U       | 99.0 U   | 99.0 U      | 99.0 U       | 99.0 U   |
| HB-TP01 S-3 | 3/8/2001     | µg/kg | 96.0 U               | 96.0 U               | 220.0                | 96.0 U       | 96.0 U         | 190.0      | 710.0        | 96.0 U   | 96.0 U      | 550.0        | 1000.0   |
| HB-TP02 S-1 | 3/8/2001     | µg/kg | 99.0 U               | 99.0 U               | 1200.0               | 99.0 U       | 110.0          | 150.0      | 320.0        | 99.0 U   | 99.0 U      | 320.0        | 520.0    |
| HB-TP02 S-2 | 3/8/2001     | µg/kg | 97.0 U               | 97.0 U               | 320.0                | 97.0 U       | 97.0 U         | 97.0 U     | 370.0        | 97.0 U   | 97.0 U      | 280.0        | 490.0    |
| HB-TP03 S-1 | 3/7/2001     | µg/kg | 83.0 U               | 83.0 U               | 83.0 U               | 83.0 U       | 83.0 U         | 83.0 U     | 140.0        | 83.0 U   | 83.0 U      | 83.0 U       | 160.0    |
| HB-TP03 S-2 | 3/7/2001     | µg/kg | 97.0 U               | 97.0 U               | 97.0 U               | 97.0 U       | 97.0 U         | 97.0 U     | 97.0 U       | 97.0 U   | 97.0 U      | 97.0 U       | 97.0 U   |
| HB-TP04 S-1 | 3/7/2001     | µg/kg | 96.0 U               | 96.0 U               | 1800.0 J             | 96.0 U       | 310.0          | 140.0      | 3500.0       | 96.0 U   | 96.0 U      | 1600.0       | 6400.0   |
| HB-TP04 S-2 | 3/7/2001     | µg/kg | 76.0 U               | 76.0 U               | 76.0 U               | 76.0 U       | 76.0 U         | 76.0 U     | 76.0 U       | 76.0 U   | 76.0 U      | 76.0 U       | 76.0 U   |
| HB-TP05 S-1 | 3/8/2001     | µg/kg | 96.0 UJ              | 96.0 UJ              | 1800.0 J             | 410.0 J      | 96.0 UJ        | 620.0 J    | 5000.0 J     | 200.0 J  | 96.0 UJ     | 3800.0 J     | 6700.0 J |
| HB-TP05 S-2 | 3/8/2001     | µg/kg | 380.0                | 99.0 U               | 480.0                | 110.0        | 130.0          | 160.0      | 1100.0       | 99.0 U   | 170.0       | 1200.0       | 1400.0   |
| HB-TP05 S-3 | 3/8/2001     | µg/kg | 72.0 U               | 72.0 U               | 72.0 U               | 72.0 U       | 72.0 U         | 72.0 U     | 72.0 U       | 72.0 U   | 72.0 U      | 72.0 U       | 72.0 U   |
| HB-TP06 S-1 | 3/8/2001     | µg/kg | 86.0 U               | 86.0 U               | 100.0                | 86.0 U       | 86.0 U         | 86.0 U     | 150.0        | 86.0 U   | 86.0 U      | 140.0        | 200.0    |
| HB-TP06 S-2 | 3/8/2001     | µg/kg | 97.0 U               | 97.0 U               | 97.0 U               | 97.0 U       | 97.0 U         | 97.0 U     | 97.0 U       | 97.0 U   | 97.0 U      | 97.0 U       | 97.0 U   |
| HB-TP07 S-1 | 3/7/2001     | µg/kg | 95.0 U               | 95.0 U               | 120.0                | 95.0 U       | 95.0 U         | 110.0      | 370.0        | 95.0 U   | 95.0 U      | 470.0        | 600.0    |
| HB-TP07 S-2 | 3/7/2001     | µg/kg | 93.0 U               | 93.0 U               | 93.0 U               | 93.0 U       | 93.0 U         | 93.0 U     | 93.0 U       | 93.0 U   | 93.0 U      | 93.0 U       | 93.0 U   |
| HB-TP08 S-1 | 3/7/2001     | µg/kg | 100.0 U              | 100.0 U              | 100.0 U              | 100.0 U      | 100.0 U        | 100.0 U    | 100.0 U      | 100.0 U  | 100.0 U     | 100.0 U      | 100.0 U  |
| HB-TP08 S-2 | 3/7/2001     | µg/kg | 93.0 U               | 93.0 U               | 93.0 U               | 93.0 U       | 93.0 U         | 93.0 U     | 93.0 U       | 93.0 U   | 93.0 U      | 93.0 U       | 93.0 U   |
| HB-TP09 S-1 | 3/7/2001     | µg/kg | 94.0 U               | 94.0 U               | 160.0                | 94.0 U       | 94.0 U         | 94.0 U     | 270.0        | 94.0 U   | 94.0 U      | 160.0        | 390.0    |
| HB-TP09 S-2 | 3/7/2001     | µg/kg | 1200.0               | 96.0 U               | 2900.0               | 4000.0       | 96.0 U         | 4800.0     | 15000.0      | 2600.0   | 640.0       | 21000.0      | 19000.0  |
| HB-TP09 S-3 | 3/7/2001     | µg/kg | 96.0                 | 91.0 U               | 2300.0               | 1000.0       | 91.0 U         | 1600.0     | 6800.0       | 580.0    | 91.0 U      | 6100.0       | 9600.0   |
| HB-TP10 S-1 | 3/8/2001     | µg/kg | 270.0                | 98.0 U               | 740.0                | 710.0        | 98.0 U         | 950.0      | 4400.0       | 520.0    | 470.0       | 7300.0       | 6600.0   |
| HB-TP10 S-2 | 3/8/2001     | µg/kg | 99.0 UJ              | 99.0 UJ              | 99.0 UJ              | 99.0 UJ      | 99.0 UJ        | 99.0 UJ    | 99.0 UJ      | 99.0 UJ  | 99.0 UJ     | 99.0 UJ      | 99.0 UJ  |

U - Indicates value was not detected at associated detection limit

J - Indicates value was estimated

**Table B-3 - Metal Results for Soil Samples  
Hicks-Bull, Coast Iron Works, and Steam Plant Properties**

| Sample I.D. | Date Sampled | Basis | Units | Arsenic | Cadmium | Chromium | Copper  | Lead   | Mercury  | Nickel  | Zinc   |
|-------------|--------------|-------|-------|---------|---------|----------|---------|--------|----------|---------|--------|
| HB-B01 S-1  | 3/9/2001     | TOT   | mg/kg | 4.15    | 0.48 J  | 34.6     | 52.2 J  | 72.2   | 0.0897 J | 34.0    | 67.4   |
| HB-B01 S-4  | 3/9/2001     | TOT   | mg/kg | 2.79    | 0.25 U  | 5.73     | 8.82 J  | 5.64   | 0.0117 J | 6.73    | 15.9   |
| HB-B02 S-1  | 3/9/2001     | TOT   | mg/kg | 1.76    | 0.37 J  | 16.3     | 18.9 J  | 8.9 U  | 0.0201 J | 24.7    | 30.6   |
| HB-B02 S-4  | 3/9/2001     | TOT   | mg/kg | 4.72    | 0.25 U  | 6.67     | 14.5 J  | 29.6   | 0.0516 J | 7.54    | 42.2   |
| HB-MV01 S-4 | 3/9/2001     | TOT   | mg/kg | 2.07    | 0.48 U  | 14.7     | 28.2 J  | 21.6   | 0.0254 J | 18.4    | 46.5   |
| HB-MV01 S-6 | 3/9/2001     | TOT   | mg/kg | 2.33    | 0.26 U  | 5.34     | 11.8 J  | 2.86   | 0.0077 J | 6.32    | 196.0  |
| HB-MV02 S-1 | 3/9/2001     | TOT   | mg/kg | 2.04    | 0.24 U  | 6.99     | 7.1 UJ  | 2.7 U  | 0.0071 U | 6.17    | 14.4   |
| HB-MV02 S-3 | 3/9/2001     | TOT   | mg/kg | 4.02    | 0.25 U  | 5.87     | 6.5 UJ  | 2.1 U  | 0.0069 J | 7.86    | 31.0   |
| HB-MV03 S-1 | 3/9/2001     | TOT   | mg/kg | 3.23    | 0.55 J  | 14.4     | 22.0 J  | 33.3   | 0.11     | 15.4    | 156.0  |
| HB-MV03 S-4 | 3/9/2001     | TOT   | mg/kg | 4.3     | 0.26 U  | 6.62     | 7.98 J  | 5.2 U  | 0.0078 J | 6.54    | 26.0   |
| HB-TP01 S-1 | 3/8/2001     | TOT   | mg/kg | 3.0     | 0.51 U  | 14.9     | 18.5    | 15.3   | 0.0175 J | 35.3 J  | 46.3   |
| HB-TP01 S-2 | 3/8/2001     | TOT   | mg/kg | 3.59    | 0.35 J  | 27.5     | 10.9    | 5.11   | 0.0219 J | 39.9 J  | 31.4   |
| HB-TP01 S-3 | 3/8/2001     | TOT   | mg/kg | 8.81    | 0.49 J  | 25.8     | 23.0 J  | 36.5   | 0.159    | 34.1    | 55.9   |
| HB-TP02 S-1 | 3/8/2001     | TOT   | mg/kg | 3.11    | 0.9 J   | 23.0     | 115.0 J | 207.0  | 0.14     | 23.6    | 171.0  |
| HB-TP02 S-2 | 3/8/2001     | TOT   | mg/kg | 9.1     | 0.43 J  | 24.2     | 112.0 J | 60.0   | 0.072 J  | 34.9    | 70.2   |
| HB-TP03 S-1 | 3/7/2001     | TOT   | mg/kg | 2.6     | 1.16    | 11.4     | 498.0   | 694.0  | 0.179    | 14.7 J  | 398.0  |
| HB-TP03 S-2 | 3/7/2001     | TOT   | mg/kg | 13.0    | 0.23 U  | 14.4     | 5.9     | 2.54   | 0.0076 U | 7.6 J   | 15.7   |
| HB-TP04 S-1 | 3/7/2001     | TOT   | mg/kg | 2.2     | 4.42    | 17.9     | 232.0   | 696.0  | 0.231    | 32.3 J  | 542.0  |
| HB-TP04 S-2 | 3/7/2001     | TOT   | mg/kg | 3.92    | 0.26 U  | 8.56     | 4.6     | 1.95   | 0.0095 J | 8.1 J   | 12.1   |
| HB-TP05 S-1 | 3/8/2001     | TOT   | mg/kg | 77.2    | 0.57 J  | 25.9     | 53.8 J  | 53.9   | 0.0771 J | 36.3    | 80.8   |
| HB-TP05 S-2 | 3/8/2001     | TOT   | mg/kg | 18.2    | 5.29    | 51.1     | 869.0 J | 2630.0 | 0.52     | 72.1    | 1290.0 |
| HB-TP05 S-3 | 3/8/2001     | TOT   | mg/kg | 7.82    | 0.27 J  | 6.74     | 11.0 J  | 4.67   | 0.0162 J | 6.7     | 13.9   |
| HB-TP06 S-1 | 3/8/2001     | TOT   | mg/kg | 2.08    | 11.2    | 43.3     | 326.0 J | 297.0  | 0.168    | 103.0   | 306.0  |
| HB-TP06 S-2 | 3/8/2001     | TOT   | mg/kg | 4.8     | 0.29 U  | 15.7     | 8.5 J   | 2.56   | 0.0066 U | 10.1    | 13.1   |
| HB-TP07 S-1 | 3/7/2001     | TOT   | mg/kg | 2.6 U   | 6.94    | 49.0     | 179.0   | 130.0  | 0.0903 J | 168.0 J | 133.0  |
| HB-TP07 S-2 | 3/7/2001     | TOT   | mg/kg | 2.3 U   | 0.41 J  | 7.14     | 12.7    | 7.55   | 0.0124 J | 13.3 J  | 21.9   |
| HB-TP08 S-1 | 3/7/2001     | TOT   | mg/kg | 2.3     | 0.25 U  | 7.82     | 6.1     | 3.07   | 0.0066 J | 6.2 J   | 14.0   |
| HB-TP08 S-2 | 3/7/2001     | TOT   | mg/kg | 4.4     | 0.23 U  | 7.01     | 5.6     | 1.86   | 0.0057 J | 5.7 J   | 12.4   |
| HB-TP09 S-1 | 3/7/2001     | TOT   | mg/kg | 7.5     | 0.51 J  | 23.0     | 61.6    | 39.4   | 0.751    | 27.0 J  | 51.6   |
| HB-TP09 S-2 | 3/7/2001     | TOT   | mg/kg | 3.7     | 0.95 J  | 24.9     | 75.9    | 166.0  | 0.592    | 26.4 J  | 91.7   |
| HB-TP09 S-3 | 3/7/2001     | TOT   | mg/kg | 9.05    | 0.46 U  | 20.7     | 41.6    | 62.6   | 1.33     | 24.4 J  | 77.7   |
| HB-TP10 S-1 | 3/8/2001     | TOT   | mg/kg | 2.62    | 2.7     | 30.0     | 55.1 J  | 252.0  | 7.83     | 28.1    | 905.0  |
| HB-TP10 S-2 | 3/8/2001     | TOT   | mg/kg |         | 0.25 U  | 6.43     | 9.61 J  | 7.18   | 0.0356 J | 7.24    | 26.5   |

U - Indicates value was not detected at associated detection limit  
J - Indicates value was estimated

**Table B-4 - BTEX and TPH Results for Soil Samples  
Hicks-Bull, Coast Iron Works, and Steam Plant Properties**

| Sample I.D. | Date Sampled | Units | Benzene | Toluene | Ethylbenzene | Total Xylenes |
|-------------|--------------|-------|---------|---------|--------------|---------------|
| HB-MW01 S-4 | 3/9/2001     | µg/kg | 220.0 U | 220.0 U | 220.0 U      | 220.0 U       |

| Sample I.D. | Date Sampled | Units | Diesel  | Gasoline | Heavy Oil |
|-------------|--------------|-------|---------|----------|-----------|
| HB-B01 S-1  | 3/9/2001     | mg/kg | 19.0 U  |          | 130.0     |
| HB-B01 S-4  | 3/9/2001     | mg/kg | 18.0 U  |          | 35.0 U    |
| HB-B02 S-1  | 3/9/2001     | mg/kg | 19.0 U  |          | 93.0      |
| HB-B02 S-4  | 3/9/2001     | mg/kg | 19.0 U  |          | 100.0     |
| HB-MW01 S-4 | 3/9/2001     | mg/kg | 19.0 U  | 4.5 UJ   | 39.0 U    |
| HB-MW01 S-6 | 3/9/2001     | mg/kg | 18.0 U  |          | 36.0 U    |
| HB-MW02 S-1 | 3/9/2001     | mg/kg | 19.0 U  |          | 38.0 U    |
| HB-MW02 S-3 | 3/9/2001     | mg/kg | 20.0 U  |          | 39.0 U    |
| HB-MW03 S-1 | 3/9/2001     | mg/kg | 19.0 U  |          | 300.0     |
| HB-MW03 S-4 | 3/9/2001     | mg/kg | 19.0 U  |          | 38.0 U    |
| HB-TP01 S-1 | 3/8/2001     | mg/kg | 350.0 U |          | 4000.0    |
| HB-TP01 S-2 | 3/8/2001     | mg/kg | 20.0 U  |          | 40.0 U    |
| HB-TP01 S-3 | 3/8/2001     | mg/kg | 19.0 U  |          | 44.0      |
| HB-TP02 S-1 | 3/8/2001     | mg/kg | 19.0 U  |          | 510.0     |
| HB-TP02 S-2 | 3/8/2001     | mg/kg | 19.0 U  |          | 100.0     |
| HB-TP03 S-1 | 3/7/2001     | mg/kg | 17.0 U  |          | 82.0 J    |
| HB-TP03 S-2 | 3/7/2001     | mg/kg | 19.0 UJ |          | 39.0 UJ   |
| HB-TP04 S-1 | 3/7/2001     | mg/kg | 19.0 U  |          | 1000.0 J  |
| HB-TP04 S-2 | 3/7/2001     | mg/kg | 15.0 UJ |          | 31.0 UJ   |
| HB-TP05 S-1 | 3/8/2001     | mg/kg | 380.0 U |          | 1300.0    |
| HB-TP05 S-2 | 3/8/2001     | mg/kg | 43.0    |          | 250.0     |
| HB-TP05 S-3 | 3/8/2001     | mg/kg | 14.0 U  |          | 29.0 U    |
| HB-TP06 S-1 | 3/8/2001     | mg/kg | 17.0 U  |          | 250.0     |
| HB-TP06 S-2 | 3/8/2001     | mg/kg | 19.0 U  |          | 39.0 U    |
| HB-TP07 S-1 | 3/7/2001     | mg/kg | 19.0 UJ |          | 85.0 J    |
| HB-TP07 S-2 | 3/7/2001     | mg/kg | 19.0 UJ |          | 37.0 UJ   |
| HB-TP08 S-1 | 3/7/2001     | mg/kg | 20.0 UJ |          | 40.0 UJ   |
| HB-TP08 S-2 | 3/7/2001     | mg/kg | 19.0 UJ |          | 37.0 UJ   |
| HB-TP09 S-1 | 3/7/2001     | mg/kg | 19.0 UJ |          | 37.0 UJ   |
| HB-TP09 S-2 | 3/7/2001     | mg/kg | 19.0 U  |          | 59.0 J    |
| HB-TP09 S-3 | 3/7/2001     | mg/kg | 18.0 U  |          | 63.0 J    |
| HB-TP10 S-1 | 3/8/2001     | mg/kg | 20.0 U  |          | 55.0      |
| HB-TP10 S-2 | 3/8/2001     | mg/kg | 20.0 UJ |          | 40.0 UJ   |

U - Indicates value was not detected at associated detection limit

J - Indicates value was estimated

Blank indicates sample not analyzed for specific analyte.

**Table B-5 - Total Solids Results for Soil Samples  
Hicks-Bull, Coast Iron Works, and Steam Plant Properties**

| Sample I.D. | Date Sampled | Units | Total Solids |
|-------------|--------------|-------|--------------|
| HB-B01 S-1  | 3/9/2001     | %     | 86.2         |
| HB-B01 S-4  | 3/9/2001     | %     | 79.2         |
| HB-B02 S-1  | 3/9/2001     | %     | 92.5         |
| HB-B02 S-4  | 3/9/2001     | %     | 80.2         |
| HB-MW01 S-4 | 3/9/2001     | %     | 84.4         |
| HB-MW01 S-6 | 3/9/2001     | %     | 80.3         |
| HB-MW02 S-1 | 3/9/2001     | %     | 93.8         |
| HB-MW02 S-3 | 3/9/2001     | %     | 83.3         |
| HB-MW03 S-1 | 3/9/2001     | %     | 92.7         |
| HB-MW03 S-4 | 3/9/2001     | %     | 78.7         |
| HB-TP01 S-1 | 3/8/2001     | %     | 90.8         |
| HB-TP01 S-2 | 3/8/2001     | %     | 86.1         |
| HB-TP01 S-3 | 3/8/2001     | %     | 86.5         |
| HB-TP02 S-1 | 3/8/2001     | %     | 87.0         |
| HB-TP02 S-2 | 3/8/2001     | %     | 89.0         |
| HB-TP03 S-1 | 3/7/2001     | %     | 92.0         |
| HB-TP03 S-2 | 3/7/2001     | %     | 94.2         |
| HB-TP04 S-1 | 3/7/2001     | %     | 83.3         |
| HB-TP04 S-2 | 3/7/2001     | %     | 93.1         |
| HB-TP05 S-1 | 3/8/2001     | %     | 89.9         |
| HB-TP05 S-2 | 3/8/2001     | %     | 68.3         |
| HB-TP05 S-3 | 3/8/2001     | %     | 94.5         |
| HB-TP06 S-1 | 3/8/2001     | %     | 91.5         |
| HB-TP06 S-2 | 3/8/2001     | %     | 91.5         |
| HB-TP07 S-1 | 3/7/2001     | %     | 92.3         |
| HB-TP07 S-2 | 3/7/2001     | %     | 84.3         |
| HB-TP08 S-1 | 3/7/2001     | %     | 93.5         |
| HB-TP08 S-2 | 3/7/2001     | %     | 75.9         |
| HB-TP09 S-1 | 3/7/2001     | %     | 94.2         |
| HB-TP09 S-2 | 3/7/2001     | %     | 92.6         |
| HB-TP09 S-3 | 3/7/2001     | %     | 89.7         |
| HB-TP10 S-1 | 3/8/2001     | %     | 84.9         |
| HB-TP10 S-2 | 3/8/2001     | %     | 93.9         |



**Table B-6 - Carcinogenic PAH Results for Groundwater Samples  
Hicks-Bull, Coast Iron Works, and Steam Plant Properties**

| Sample I.D.             | Date Sampled | Units | Benzo(a)anthracene | Benzo(a)pyrene | Total Benzo-fluoranthenes | Chrysene | Dibenz(ah)anthracene | Indeno (1,2,3-cd)pyrene |
|-------------------------|--------------|-------|--------------------|----------------|---------------------------|----------|----------------------|-------------------------|
| HB-MW01                 | 3/20/2001    | µg/L  | 1.0 U              | 1.0 U          | 1.0 U                     | 1.0 U    | 1.0 U                | 1.0 U                   |
| HB-MW01-High            | 3/21/2001    | µg/L  | 1.0 U              | 1.0 U          | 1.0 U                     | 1.0 U    | 1.0 U                | 1.0 U                   |
| HB-MWA (DUP of HB-MW01) | 3/21/2001    | µg/L  | 1.0 U              | 1.0 U          | 1.0 U                     | 1.0 U    | 1.0 U                | 1.0 U                   |
| HB-MW02                 | 3/20/2001    | µg/L  | 1.0 U              | 1.0 U          | 1.0 U                     | 1.0 U    | 1.0 U                | 1.0 U                   |
| HB-MW02-High            | 3/21/2001    | µg/L  | 1.0 U              | 1.0 U          | 1.0 U                     | 1.0 U    | 1.0 U                | 1.0 U                   |
| HB-MW03                 | 3/20/2001    | µg/L  | 1.0 U              | 1.0 U          | 1.0 U                     | 1.0 U    | 1.0 U                | 1.0 U                   |
| HB-MW03-High            | 3/21/2001    | µg/L  | 1.0 U              | 1.0 U          | 1.0 U                     | 1.0 U    | 1.0 U                | 1.0 U                   |
| HB-S01                  | 3/27/2001    | µg/L  | 1.0 U              | 1.0 U          | 1.0 U                     | 1.0 U    | 1.0 U                | 1.0 U                   |
| UMW2A                   | 3/20/2001    | µg/L  | 1.0 U              | 1.0 U          | 1.0 U                     | 1.0 U    | 1.0 U                | 1.0 U                   |
| UMW2A-High              | 3/21/2001    | µg/L  | 1.0 U              | 1.0 U          | 1.0 U                     | 1.0 U    | 1.0 U                | 1.0 U                   |

U - Indicates value was not detected at associated detection limit

**Table B-7 - Non-Carcinogenic PAH Results for Groundwater Samples Hicks-Bull, Coast Iron Works, and Steam Plant Properties**

| Sample I.D.             | Date Sampled | Units | 2-Methyl-naphthalene | 2-Chloro-naphthalene | Benzo(g,h,i)perylene | Acenaphthene | Acenaphthylene | Anthracene | Fluoranthene | Fluorene | Naphthalene | Phenanthrene | Pyrene |
|-------------------------|--------------|-------|----------------------|----------------------|----------------------|--------------|----------------|------------|--------------|----------|-------------|--------------|--------|
| HB-MW01                 | 3/20/2001    | µg/L  | 1.0 U                | 1.0 U                | 1.0 U                | 12.0         | 1.0 U          | 1.7        | 9.1          | 3.5      | 1.0 U       | 1.0 U        | 1.0 U  |
| HB-MW01-High            | 3/21/2001    | µg/L  | 1.0 U                | 1.0 U                | 1.0 U                | 7.1          | 1.0 U          | 1.0 U      | 11.0         | 2.1      | 1.0 U       | 1.3          | 1.0 U  |
| HB-MWA (DUP of HB-MW01) | 3/21/2001    | µg/L  | 1.0 U                | 1.0 U                | 1.0 U                | 7.7          | 1.0 U          | 1.0 U      | 12.0         | 2.8      | 1.0 U       | 1.5          | 1.0 U  |
| HB-MW02                 | 3/20/2001    | µg/L  | 1.0 U                | 1.0 U                | 1.0 U                | 1.0 U        | 1.0 U          | 1.0 U      | 1.0 U        | 1.0 U    | 1.0 U       | 1.0 U        | 1.0 U  |
| HB-MW02-High            | 3/21/2001    | µg/L  | 1.0 U                | 1.0 U                | 1.0 U                | 1.0 U        | 1.0 U          | 1.0 U      | 1.0 U        | 1.0 U    | 1.0 U       | 1.0 U        | 1.0 U  |
| HB-MW03                 | 3/20/2001    | µg/L  | 1.0 U                | 1.0 U                | 1.0 U                | 1.0 U        | 1.0 U          | 1.0 U      | 1.0 U        | 1.0 U    | 1.0 U       | 1.0 U        | 1.0 U  |
| HB-MW03-High            | 3/21/2001    | µg/L  | 1.0 U                | 1.0 U                | 1.0 U                | 1.0 U        | 1.0 U          | 1.0 U      | 1.0 U        | 1.0 U    | 1.0 U       | 1.0 U        | 1.0 U  |
| HB-S01                  | 3/27/2001    | µg/L  | 1.0 U                | 1.0 U                | 1.0 U                | 1.0 U        | 1.0 U          | 1.0 U      | 1.0 U        | 1.0 U    | 1.0 U       | 1.0 U        | 1.0 U  |
| UMW2A                   | 3/20/2001    | µg/L  | 1.0 U                | 1.0 U                | 1.0 U                | 1.0 U        | 1.0 U          | 1.0 U      | 1.0 U        | 1.0 U    | 1.0 U       | 1.0 U        | 1.0 U  |
| UMW2A-High              | 3/21/2001    | µg/L  | 1.0 U                | 1.0 U                | 1.0 U                | 1.0 U        | 1.0 U          | 1.0 U      | 1.0 U        | 1.0 U    | 1.0 U       | 1.0 U        | 1.0 U  |

U - Indicates value was not detected at associated detection limit

**Table B-8 - Metal Results for Groundwater Samples  
Hicks-Bull, Coast Iron Works, and Steam Plant Properties**

| Sample I.D.             | Date Sampled | Basis | Units | Antimony | Arsenic | Cadmium | Chromium | Copper | Lead    | Mercury | Nickel | Zinc  |
|-------------------------|--------------|-------|-------|----------|---------|---------|----------|--------|---------|---------|--------|-------|
| HB-MW01                 | 3/20/2001    | DIS   | µg/L  | 2.6 J    | 26.0    | 0.083 U | 6.1      | 7.2    | 0.14 J  | 0.05 U  | 13.0   | 43.0  |
| HB-MW01-High            | 3/21/2001    | DIS   | µg/L  | 2.2 J    | 16.0    | 0.083 U | 5.4      | 6.4    | 0.047 J | 0.05 U  | 8.8    | 54.0  |
| HB-MW02                 | 3/20/2001    | DIS   | µg/L  | 1.9 J    | 26.0    | 0.083 U | 5.5      | 9.1    | 0.023 U | 0.05 U  | 47.0   | 7.7   |
| HB-MW02-High            | 3/21/2001    | DIS   | µg/L  | 1.6 J    | 26.0    | 0.083 U | 4.8      | 8.2    | 0.042 J | 0.05 U  | 45.0   | 6.7   |
| HB-MW02                 | 12/10/2001   | DIS   | µg/L  |          | 20.6    |         |          | 4.33 J |         |         | 25.8   |       |
| HB-MW03                 | 3/20/2001    | DIS   | µg/L  | 1.0 J    | 28.0    | 0.083 U | 6.0      | 11.0   | 0.042 J | 0.05 U  | 12.0   | 20.0  |
| HB-MW03-High            | 3/21/2001    | DIS   | µg/L  | 1.1 J    | 27.0    | 0.083 U | 5.6      | 7.8    | 0.041 J | 0.05 U  | 11.0   | 15.0  |
| HB-MW03                 | 12/10/2001   | DIS   | µg/L  |          | 35.6    |         |          | 6.24 J |         |         | 11.2   |       |
| HB-MWA (DUP of HB-MW01) | 3/21/2001    | DIS   | µg/L  | 2.2 J    | 19.0    | 0.083 U | 5.2      | 5.9    | 0.029 J | 0.05 U  | 9.3    | 53.0  |
| HB-S01                  | 3/27/2001    | DIS   | µg/L  | 0.44 J   | 31.0    | 0.083 U | 4.7      | 6.3    | 0.37 J  | 0.01 J  | 13.0   | 5.5   |
| HB-S01                  | 12/10/2001   | DIS   | µg/L  |          | 38.8    |         |          | 7.16 J |         |         | 10.7   |       |
| OB-1                    | 12/10/2001   | DIS   | µg/L  |          | 42.7    |         |          | 9.05 J |         |         | 10.8   |       |
| UMW2A                   | 3/20/2001    | DIS   | µg/L  | 0.24 J   | 26.0    | 0.083 U | 6.5      | 5.1    | 0.039 J | 0.05 U  | 11.0   | 4.9 J |
| UMW2A-High              | 3/21/2001    | DIS   | µg/L  | 0.22 J   | 28.0    | 0.083 U | 6.4      | 7.3    | 0.023 U | 0.05 U  | 9.3    | 3.5 J |
| UMW2A                   | 12/10/2001   | DIS   | µg/L  |          | 15.6    |         |          | 3.79 J |         |         | 6.24   |       |

U - Indicates value was not detected at associated detection limit

J - Indicates value was estimated

Blank indicates sample not analyzed for specific analyte.

**Table B-9 - BTEX and TPH Results for Groundwater Samples  
Hicks-Bull, Coast Iron Works, and Steam Plant Properties**

| Sample I.D.             | Date Sampled | Units | Benzene | Toluene | Ethylbenzene | Total Xylenes |
|-------------------------|--------------|-------|---------|---------|--------------|---------------|
| HB-MW01                 | 3/20/2001    | µg/L  | 0.5 U   | 0.5 U   | 0.5 U        | 0.5 U         |
| HB-MW01-High            | 3/21/2001    | µg/L  | 0.5 U   | 0.5 U   | 0.5 U        | 0.5 U         |
| HB-MWA (DUP of HB-MW01) | 3/21/2001    | µg/L  | 0.5 U   | 0.5 U   | 0.5 U        | 0.5 U         |
| HB-MW03                 | 3/20/2001    | µg/L  | 0.5 U   | 0.5 U   | 0.5 U        | 0.5 U         |
| HB-MW03-High            | 3/21/2001    | µg/L  | 0.5 U   | 0.5 U   | 0.5 U        | 0.5 U         |

| Sample I.D.             | Date Sampled | Units | Diesel  | Gasoline | Heavy Oil |
|-------------------------|--------------|-------|---------|----------|-----------|
| HB-MW01                 | 3/20/2001    | mg/L  | 0.25 U  | 0.5 U    | 0.5 U     |
| HB-MW01-High            | 3/21/2001    | mg/L  | 0.25 UJ | 0.5 U    | 0.5 UJ    |
| HB-MWA (DUP of HB-MW01) | 3/21/2001    | mg/L  | 0.25 U  | 0.5 U    | 0.5 U     |
| HB-MW02                 | 3/20/2001    | mg/L  | 0.25 UJ |          | 0.5 UJ    |
| HB-MW02-High            | 3/21/2001    | mg/L  | 0.25 UJ |          | 0.5 UJ    |
| HB-MW03                 | 3/20/2001    | mg/L  | 0.25 UJ | 0.5 U    | 0.5 UJ    |
| HB-MW03-High            | 3/21/2001    | mg/L  | 0.25 UJ | 0.5 U    | 0.5 UJ    |
| HB-S01                  | 3/27/2001    | mg/L  | 0.25 U  |          | 0.5 U     |
| UMW2A                   | 3/20/2001    | mg/L  | 0.25 UJ |          | 0.5 UJ    |
| UMW2A-High              | 3/21/2001    | mg/L  | 0.25 UJ |          | 0.5 UJ    |

U - Indicates value was not detected at associated detection limit

J - Indicates value was estimated

Blank indicates sample not analyzed for specific analyte.

**Table B-10 - Total Suspended Solids Results for Groundwater Samples  
Hicks-Bull, Coast Iron Works, and Steam Plant Properties**

| Sample I.D.             | Date Sampled | Total Suspended Solids in mg/L |
|-------------------------|--------------|--------------------------------|
| HB-MW01                 | 3/20/2001    | 2.9                            |
| HB-MW01-High            | 3/21/2001    | 0.5                            |
| HB-MWA (DUP of HB-MW01) | 3/21/2001    | 0.7                            |
| HB-MW02                 | 3/20/2001    | 7.8                            |
| HB-MW02-High            | 3/21/2001    | 5.0                            |
| HB-MW03                 | 3/20/2001    | 2.6                            |
| HB-MW03-High            | 3/21/2001    | 1.7                            |
| HB-S01                  | 3/27/2001    | 70.3                           |
| UMW2A                   | 3/20/2001    | 16.8                           |
| UMW2A-High              | 3/21/2001    | 10.5                           |

**APPENDIX C**  
**CHEMICAL DATA QUALITY REVIEW AND**  
**LABORATORY CERTIFICATES OF ANALYSIS**

## APPENDIX C CHEMICAL DATA QUALITY REVIEW AND LABORATORY CERTIFICATES OF ANALYSIS

### *Chemical Data Quality Review*

In general, the chemical analysis of the soil and groundwater samples met the data quality objectives presented in the Work Plan. Detailed summary tables of analytical data are presented in Tables B-1 through B-10.

#### **Soil**

**Organic Data Review.** The following deviations occurred during organic analyses and required qualification of soil data. The continuing calibration standards for Heavy Oil exceeded laboratory control limits for four intervals. Associated results (HB-TP03 S-1, HB-TP03 S-2, HB-TP04 S-1, HB-TP04 S-2, HB-TP07 S-1, HB-TP07 S-2, HB-TP08 S-1, HB-TP08 S-2, HB-TP09 S-1, HB-TP09 S-2, and HB-TP09 S-3) were qualified as estimated (J).

Surrogate recoveries were outside control limits in the NWTPH-Dx analysis for soil samples HB-TP03 S-2, HB-TP04 S-2, HB-TP07 S-1, HB-TP07 S-2, HB-TP08 S-1, HB-TP08 S-2, HB-TP09 S-1, and HB-TP10 S-2. Associated sample results with detections for Diesel and Heavy Oil were qualified as estimated (J). Surrogate recoveries were above control limits in the SVOA analysis for HB-TP05 S-1 and HB-TP10 S-2. Associated results were qualified as estimated (J). One surrogate was above control limits in the SVOA analysis for HB-TP01 S-1. This sample was not qualified based on one surrogate recovery. Matrix spike recoveries of pyrene were slightly above laboratory control standards. Results were not qualified based on matrix spike recoveries.

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Internal standard recoveries of perylene-d12 were below laboratory control limits for soil samples HB-TP01 S-1, HB-TP04 S-1, and HB-TP05 S-1. Associated results were qualified as estimated (J) for benzo(b,k)fluoranthenes, benzo(a)pyrene, indeno(1,2,3-c,d)pyrene, dibenz(a,h)anthracene, and benzo(g,h,i)perylene. Internal standard recoveries of chrysene-d12 were below laboratory control limits for soil sample HB-TP01 S-1. Results from HB-TP01 S-1 were qualified as estimated (J) for pyrene, benzo(a)anthracene, and chrysene. The pyrene value for HB-TP01 S-1 was qualified as estimated due to a change in the internal standard used to calculate the concentration.

Organic results were flagged 'B' by the laboratory to indicate results between the instrument detection limit and the contract reporting limits. The 'B' qualifier was modified to 'J' by the data quality reviewer.

**Inorganic Data Review.** The following deviations occurred during inorganic analyses and required qualification of the soil data. Due to method blank contamination, the following samples were qualified as non-detect for arsenic (As), cadmium (Cd), copper(Cu), and/or lead (Pb): HB-TP06 S-2(Cd), HB-TP07 S-2(As), HB-TP08 S-1(As), HB-TP10 S-2(Cd), HB-MW01 S-4(Cd), HB-MW02 S-1(Cu, Pb), HB-MW02 S-3(Cu, Pb), HB-MW03 S-4(Pb), and HB-B02 S-1(Pb).

Matrix spike recoveries of copper were above laboratory control standards. Associated results for soil samples HB-TP01 S-3, HB-TP02 S-1, HB-TP02 S-2, HB-TP05 S-1, HB-TP05 S-2, HB-TP05 S-3, HB-TP06 S-1, HB-TP06 S-2, HB-TP10 S-1, HB-TP10 S-2, HB-MW01 S-4, HB-MW01 S-6, HB-MW02 S-1, HB-MW02 S-3, HB-MW03 S-1, HB-MW03 S-4, HB-B01 S-1, HB-B01 S-4, HB-B02 S-1, and HB-B02 S-4 were qualified as estimated (J).

Metals results were flagged 'B' by the laboratory to indicate results between the instrument detection limit and the contract reporting limits. The 'B' qualifier was modified to a 'J' by the data quality reviewer.

## **Water**

**Organic Data Review.** The following deviations occurred during organic analyses and required qualification of data. One surrogate recovery was below control limits in the NWTPH-Dx analysis for groundwater sample HB-MW01 High (March 2001). This result was qualified as estimated (J). Surrogate recoveries from the March 2001 sampling event were outside control limits in the NWTPH-Dx analysis for samples UMW2A, HB-MW02, HB-MW03, HB-MW02 High, HB-MW03 High, and UMW2A High. Associated sample results for Diesel and Heavy Oil were qualified as estimated (J).

Organic results were flagged 'B' by the laboratory to indicate results between the instrument detection limit and the contract reporting limits. The 'B' qualifier was modified to 'J' by the data quality reviewer.

The data, as qualified, were deemed acceptable for use.

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**LABORATORY CERTIFICATES OF ANALYSIS  
CITY OF TACOMA LABORATORY**



City of Tacoma  
Environmental Services  
Science and Engineering  
Division

Memorandum

**TO:** Mark D'Andrea, P. E., Project Coordinator, Public Works Engineering  
**FROM:** Christopher L. Getchell, Source Control Supervisor  
**SUBJECT:** Foss Uplands – Hick's Bull WO# AJ212M TEC  
**DATE:** April 24, 2001

Attached are the sample analysis results for the soil and water samples collected by Hart Crowser, March 7, 8, 20, 21, and 27, 2001. The samples were collected in association with the Foss Uplands Investigation.

The Science and Engineering Division analyzed the samples for TSS, NWTPH-G, NWPTH-Dx, Volatile Organics, and Semi-Volatile Organics. Sound Analytical Services performed the ICP-MS analysis for Dissolved Metals. A detailed Quality Control Data Review report was prepared for these samples and is included with the sample reports.

The Heavy Oil values samples HB-TP07 S-1, HB-TP07 S-2, HB-TP08 S-1, HB-TP08 S-2, HB-TP09 S-1, HB-TP09 S-2, and HB-TP09 S-3 are qualified as estimated because of high %D of the continuing calibration standards.

Samples HB-TP07 S-2 and HB-TP08 S-1 are qualified as not detected for Arsenic; samples HB-MW02 S-1 and HB-MW02 S-3 are qualified as not detected for Copper; and samples HB-MW02 S-1, HB-MW02 S-3, HB-MW03 S-4, and HB-B02 S-1 are qualified as not detected for Lead based on the high concentrations in associated blanks. The detection limit goal of 1 mg/Kg for Arsenic in HB-TP07 S-2 and HB-TP08 S-1; Copper in HB-MW02 S-1 and HB-MW02 S-3; and Lead in HB-MW02 S-1, HB-MW02 S-3, HB-MW03 S-4, and HB-B02 S-1 was not met because of the blank concentrations.

Samples HB-TP07 S-1, HB-TP07 S-2, HB-TP08 S-1, HB-TP08 S-2, HB-TP09 S-1, UMW2A, HB-MW02, HB-MW03, HB-MW02 High, HB-MW03 High, and UMW2A High are qualified as estimated for Diesel and Heavy Oil based on surrogate compound recoveries outside of acceptance limits.

The Copper values samples HB-MW02 S-1, HB-MW02 S-3, HB-MW03 S-1, HB-MW03 S-4, HB-B02 S-1, and HB-B02 S-4 qualified as estimated for Copper based on high spike recovery.

If you have any questions concerning these results, call me at (253) 502-2130. Please note, the samples associated with this report will be discarded six months from the date of this report unless requested otherwise.

Christopher L. Getchell  
Source Control Supervisor,  
Science and Engineering Division.

CLG:LAZ

Thea Foss Uplands  
Hick's Bull  
Development Site 8 (AJ212M TEC)

| Sample ID    | Laboratory ID | Matrix      |
|--------------|---------------|-------------|
| HB-TP07 S-1  | 010307048     | Soil        |
| HB-TP07 S-2  | 010307049     | Soil        |
| HB-TP08 S-1  | 010307050     | Soil        |
| HB-TP08 S-2  | 010307051     | Soil        |
| HB-TP09 S-1  | 010307052     | Soil        |
| HB-TP09 S-2  | 010307053     | Soil        |
| HB-TP09 S-3  | 010307054     | Soil        |
| HB-MW02 S-1  | 010312100     | Soil        |
| HB-MW02 S-3  | 010312101     | Soil        |
| HB-MW03 S-1  | 010312102     | Soil        |
| HB-MW03 S-4  | 010312103     | Soil        |
| HB-B02 S-1   | 010312106     | Soil        |
| HB-B02 S-4   | 010312107     | Soil        |
| UMW2A        | 010320168     | Groundwater |
| HB-MW02      | 010320170     | Groundwater |
| HB-MW03      | 010320171     | Groundwater |
| HB-MW02 High | 010321201     | Groundwater |
| HB-MW03 High | 010321202     | Groundwater |
| UMW2A High   | 010321203     | Groundwater |
| HB-S01       | 010327227     | Groundwater |

## Quality Control Data Review

TO: Christopher L. Getchell, Source Control Supervisor  
FROM: Lori A. Zboralski, Senior Laboratory Analyst *LZ*  
DATE: May 4, 2001

### SAMPLES

This report concerns the following samples associated with the Foss Uplands WO# AJ212M:

| <u>Sample Description</u> | <u>Lab #</u> | <u>Sample Matrix</u> | <u>Date Sampled</u> |
|---------------------------|--------------|----------------------|---------------------|
| HB-TP07 S-1               | 010307048    | Soil                 | 03/07/01            |
| HB-TP07 S-2               | 010307049    | Soil                 | 03/07/01            |
| HB-TP08 S-1               | 010307050    | Soil                 | 03/07/01            |
| HB-TP08 S-2               | 010307051    | Soil                 | 03/07/01            |
| HB-TP09 S-1               | 010307052    | Soil                 | 03/07/01            |
| HB-TP09 S-2               | 010307053    | Soil                 | 03/07/01            |
| HB-TP09 S-3               | 010307054    | Soil                 | 03/07/01            |
| HB-MW02 S-1               | 010312100    | Soil                 | 03/08/01            |
| HB-MW02 S-3               | 010312101    | Soil                 | 03/08/01            |
| HB-MW03 S-1               | 010312102    | Soil                 | 03/08/01            |
| HB-MW03 S-4               | 010312103    | Soil                 | 03/08/01            |
| HB-B02 S-1                | 010312106    | Soil                 | 03/08/01            |
| HB-B02 S-4                | 010312107    | Soil                 | 03/08/01            |
| UMW2A                     | 010320168    | Groundwater          | 03/20/01            |
| HB-MW02                   | 010320170    | Groundwater          | 03/20/01            |
| HB-MW03                   | 010320171    | Groundwater          | 03/20/01            |
| HB-MW02 High              | 010321201    | Groundwater          | 03/21/01            |
| HB-MW03 High              | 010321202    | Groundwater          | 03/21/01            |
| UMW2A High                | 010321203    | Groundwater          | 03/21/01            |
| HB-S01                    | 010327227    | Groundwater          | 03/27/01            |

### HOLDING TIMES

The water samples were extracted within the 7-day holding time for Semi-Volatile Organics and NWTPH-Dx and analyzed within 7 days for TSS, 14 days for Volatile Organics, 28 days for Dissolved Mercury, 40 days for Semi-Volatile Organics and NWTPH-Dx, and 180 days for Dissolved Metals.

The soil samples were extracted within the 14-day holding time for Semi-Volatile Organics and NWTPH-Dx and analyzed within 7 days for Solids, 28 days for Mercury, 40 days for Semi-Volatile Organics and NWTPH-Dx, and 180 days for Total Metals.

### METHODS

The samples were analyzed according to NWTPH-G, NWTPH-Dx, CLP ILM04.0 for Metals, CLP OLM01.8 for Semi-Volatile Organics and Science and Engineering Division Standard Operating Procedures.

## DAILY INSTRUMENT PERFORMANCE STANDARDS

The criteria for the spectra of Decafluoro-triphenylphosphine (DFTPP) and Bromofluorobenzene (BFB) were met for the twelve-hour sequences when these samples were analyzed, except for mass 51 relative to mass 198 in the tunes performed 3/28 at 9:11 pm and 3/29 5:28 am. The relative abundance of mass 51 is not a critical indicator of the mass spectrometer's function and therefore no data is qualified. The spectra generated by the mass spectrometers can be considered in control for the analysis of these samples.

## CALIBRATION AND VERIFICATION

All reported compounds for Volatile and Semi-Volatile Organics had updated relative response factors (RRF) greater than or equal to 0.050 with relative standard deviations (%RSD) of less than 30% for the Initial Calibration and percent differences (%D) of less than 25% for the Continuing Calibration when compared to the average RRF.

The Initial Calibration for the NWTPH-G and NWPTH-Dx analyses were within the method limits with correlation coefficients of greater than 0.990. The continuing calibrations ranged from 0.7% to 30.0%. **The continuing calibration standards for Heavy Oil that exceeded the limits are listed in the table below:**

| Analysis  | Date             | %Difference | Associated Samples                                 |
|-----------|------------------|-------------|--|
| Heavy Oil | 03/19/01 9:42 am | 15.6        | HB-TP07 S-1, HB-TP07 S-2, HB-TP08 S-1              |
| Heavy Oil | 03/20/01 4:08 am | 30.0        | HB-TP08 S-2, HB-TP09 S-1, HB-TP09 S-2, HB-TP09 S-3 |

**The Heavy Oil values samples HB-TP07 S-1, HB-TP07 S-2, HB-TP08 S-1, HB-TP08 S-2, HB-TP09 S-1, HB-TP09 S-2, and HB-TP09 S-3 are qualified as estimated based on the high %D of the continuing calibration standards.**

The ICP and FIMS calibrations met method requirements for linearity and accuracy. ICP and FIMS sensitivities were verified by analysis of standards near the detection limits of the instruments. The recoveries ranged from 78 to 121% and all were within laboratory established 50-200% limits.

Independent mid-range standards were analyzed to monitor calibration accuracy for the ICP and FIMS (ICV and CCV). Acceptable recoveries for ICP must be within 90 to 110%. Recoveries for FIMS must be within 80 to 120%. All ICVs and CCVs had recoveries within acceptable limits.

Standards are required to be run to measure the accuracy of ICP interelement correction factors. These samples ICSA and ICSAB must be run at the beginning and end of each analytical run. The ICSAB recoveries for each element must be within 80 to 120% recovery. The recoveries of the ICSAB for the analysis of these samples ranged from 90 to 104%.

## METHOD AND CALIBRATION BLANKS

Method and calibration blanks were analyzed at the required frequencies for the methods. The concentrations of these blanks were less than 1/5<sup>th</sup> the amount found in the sample or the detection limit, **except for the following:**

| Parameter | Blank        | Concentration | MDL      | Associated Samples.      |
|-----------|--------------|---------------|----------|--------------------------|
| Arsenic   | 010306040PBS | 1.4 ug/L      | 1.0 ug/L | HB-TP07 S-2, HB-TP08 S-1 |
| Arsenic   | 010409CCB2   | 1.5 ug/L      | 1.0 ug/L | HB-TP07 S-2, HB-TP08 S-1 |
| Arsenic   | 010409CCB3   | 1.2 ug/L      | 1.0 ug/L | HB-TP07 S-2, HB-TP08 S-1 |
| Copper    | 010308080PBS | 4.7 ug/L      | 3.1 ug/L | HB-MW02 S-1, HB-MW02 S-3 |
| Lead      | 010308080PBS | 2.0 ug/L      | 0.8 ug/L | HB-MW02 S-1, HB-MW02 S-3 |
| Lead      | 010312102PBS | 4.7 ug/L      | 0.8 ug/L | HB-MW03 S-4, HB-B02 S-1  |

Samples HB-TP07 S-2 and HB-TP08 S-1 are qualified as not detected for Arsenic based on the high concentrations in the Method Blank and the two Calibration Blanks. Samples HB-MW02 S-1 and HB-MW02 S-3 are qualified as not detected for Copper and Lead based on the levels found in the associated Method Blank. Samples HB-MW03 S-4 and HB-B02 S-1 are qualified as not detected for Lead based on the level found in the Method Blank.

#### SURROGATE COMPOUNDS

Two Surrogate compounds were added to the NWTPH-Dx analysis, 2 Surrogate compounds were added to the NWTPH-G/BTEX, and 2 Surrogate compounds were added to the Semi-Volatile Organics analysis. The Surrogate compound recoveries ranged from 42.5 to 152%. All the recoveries were within the control limits of the methods, **except for the following:**

| Analysis | Sample       | Surrogate Compound | Recovery | Limits |
|----------|--------------|--------------------|----------|--------|
| NWTPH-Dx | HB-TP07 S-1  | 2-Fluorobiphenyl   | 44       | 50-150 |
| NWTPH-Dx | HB-TP07 S-2  | 2-Fluorobiphenyl   | 30       | 50-150 |
| NWTPH-Dx | HB-TP08 S-1  | 2-Fluorobiphenyl   | 34       | 50-150 |
| NWTPH-Dx | HB-TP08 S-2  | 2-Fluorobiphenyl   | 42       | 50-150 |
| NWTPH-Dx | HB-TP09 S-1  | 2-Fluorobiphenyl   | 33       | 50-150 |
| NWTPH-Dx | UMW2A        | 2-Fluorobiphenyl   | 47       | 50-150 |
| NWTPH-Dx | UMW2A        | p-Terphenyl-d14    | 45       | 50-150 |
| NWTPH-Dx | HB-MW02      | 2-Fluorobiphenyl   | 48       | 50-150 |
| NWTPH-Dx | HB-MW02      | p-Terphenyl-d14    | 44       | 50-150 |
| NWTPH-Dx | HB-MW03      | 2-Fluorobiphenyl   | 40       | 50-150 |
| NWTPH-Dx | HB-MW03      | p-Terphenyl-d14    | 42       | 50-150 |
| NWTPH-Dx | HB-MW02 High | 2-Fluorobiphenyl   | 35       | 50-150 |
| NWTPH-Dx | HB-MW02 High | p-Terphenyl-d14    | 37       | 50-150 |
| NWTPH-Dx | HB-MW03 High | 2-Fluorobiphenyl   | 44       | 50-150 |
| NWTPH-Dx | HB-MW03 High | p-Terphenyl-d14    | 45       | 50-150 |
| NWTPH-Dx | UMW2A High   | 2-Fluorobiphenyl   | 48       | 50-150 |
| NWTPH-Dx | UMW2A High   | p-Terphenyl-d14    | 46       | 50-150 |

Samples HB-TP07 S-1, HB-TP07 S-2, HB-TP08 S-1, HB-TP08 S-2, HB-TP09 S-1, UMW2A, HB-MW02, HB-MW03, HB-MW02 High, HB-MW03 High, and UMW2A High are qualified as estimated for Diesel and Heavy Oil based on the surrogate compound recoveries outside of acceptance limits.

#### LABORATORY CONTROL SAMPLES

Laboratory Control Samples (LCS) monitor the analytical system by carrying a standard through every step of the analytical method including extraction or digestion. All LCS recoveries were within laboratory established control limits.

## DUPLICATE SAMPLE ANALYSIS

All associated duplicate samples had differences of less than the reporting limits for analytes with concentrations less than 5 times the reporting limits and Relative Percent Differences (RPD) of less than 35% for metals analytes with concentrations greater than 5 times the reporting limits.

## MATRIX SPIKE AND MATRIX SPIKE DUPLICATE ANALYSIS

Matrix spike analysis was performed for the metals analysis. All recoveries were within the required CLP limits. Matrix spike and matrix spike duplicate analysis was performed for NWTPH-G, NWTPH-Dx, and Volatile and Semi-Volatile Organics with these samples. The spike recoveries were within the method recovery limits, **except for the following:**

| Spiked Sample | Analyte | % Recovery | Limits | Associated Samples   |
|---------------|---------|------------|--------|--|
| HB-TP02 S-2   | Copper  | 930        | 75-125 | HB-MW02 S-1, HB-MW02 S-3, HB-MW03 S-1, HB-MW03 S-4, HB-B02 S-1, HB-B02 S-4 |

The Copper values samples HB-MW02 S-1, HB-MW02 S-3, HB-MW03 S-1, HB-MW03 S-4, HB-B02 S-1, and HB-B02 S-4 qualified as estimated for Copper based on the high spike recovery. The RPDs for all of the MS/MSD pairs were within the method limits. No data is qualified based on Matrix Spike and Matrix Spike Duplicate analysis.

## ICP SERIAL DILUTIONS

Serial dilution of samples analyzed by ICP provides information about physical or chemical interferences that may exist due to sample matrix.

Associated sample HB-TP02 S-2 was analyzed at a five-fold dilution. All analytes had %D of the diluted sample compared to the undiluted sample of less than 10% for analytes greater than 50 times the IDL.

## INTERNAL STANDARDS

Performance of the Internal Standards (IS) monitors GC/MS sensitivity and stability during each analysis. Internal Standards must not vary more than -50% to +100% from the continuing calibration response and be within +/- 30 seconds from the continuing calibration retention time. All internal standard responses in the samples were within the required method limits.

## DATA ASSESSMENT

The qualifiers assigned to these samples include the following:

- U indicates that the analysis of the parameter did not detect a positive hit above the Reporting Limit.
- UJ indicates that the analysis of the parameter did not detect a positive hit above the Reporting Limit, however the value should be considered estimated.
- J the value should be considered estimated.

All data including qualified values are acceptable for use.



**- City of Tacoma -**  
**Science and Engineering Division**

To: Christopher L. Getchell, Source Control Supervisor

Foss Uplands

AJ212MTEC

Date: May 04, 2001

Lab#: 010307048

Sample ID: HB-TP07 S-1

Sample Type: Soil

Sample Date: 3/7/01

| Test                   | Result     | Units    |
|------------------------|------------|----------|
| CONVENTIONAL           |            |          |
| Solids                 | 92.3       | per cent |
| CV                     |            |          |
| Mercury                | 0.0903 B J | mg/Kg    |
| GC/MS-BNA              |            |          |
| 2-Chloronaphthalene    | 95 U       | ug/Kg    |
| 2-Methylnaphthalene    | 95 U       | ug/Kg    |
| Acenaphthene           | 95 U       | ug/Kg    |
| Acenaphthylene         | 95 U       | ug/Kg    |
| Anthracene             | 110        | ug/Kg    |
| Benzo(a)anthracene     | 250        | ug/Kg    |
| Benzo(a)pyrene         | 220        | ug/Kg    |
| Benzo(g,h,i)perylene   | 120        | ug/Kg    |
| Benzo(a)fluoranthene   | 270        | ug/Kg    |
| Chrysene               | 270        | ug/Kg    |
| Dibenz(a,h)anthracene  | 95 U       | ug/Kg    |
| Fluoranthene           | 370        | ug/Kg    |
| Fluorene               | 95 U       | ug/Kg    |
| Indeno(1,2,3-cd)pyrene | 95 U       | ug/Kg    |
| Naphthalene            | 95 U       | ug/Kg    |

*DL  
2/5/02*

- U indicates not detected at the associated value
- B indicates the value is greater than the detection limits of the method, however it is lower than the Contract Required Detection Limits
- J indicates the associated value is estimated
- UJ indicates not detected at the associated value, however the value should be considered estimated

Lab#: 010307048

Sample ID: HB-TP07 S-1

Sample Type: Soil

Sample Date: 3/7/01

|          | Test         | Result | Units |
|----------|--------------|--------|-------|
|          | Phenanthrene | 470    | ug/Kg |
|          | Pyrene       | 600    | ug/Kg |
| ICP      | Arsenic      | 4.8    | mg/Kg |
|          | Cadmium      | 6.94   | mg/Kg |
|          | Chromium     | 49.0   | mg/Kg |
|          | Copper       | 179    | mg/Kg |
|          | Lead         | 130    | mg/Kg |
|          | Nickel       | 168 J  | mg/Kg |
|          | Zinc         | 133    | mg/Kg |
| NWTPH-Dx | Diesel       | 19 U J | mg/Kg |
|          | Heavy Oil    | 85 J   | mg/Kg |

Reviewed By:

Lori A. Zboralsti 5/4/01

- U indicates not detected at the associated value
- B indicates the value is greater than the detection limits of the method, however it is lower than the Contract Required Detection Limits
- J indicates the associated value is estimated
- UJ indicates not detected at the associated value, however the value should be considered estimated

**- City of Tacoma -**  
**Science and Engineering Division**

To: Christopher L. Getchell, Source Control Supervisor

Foss Uplands  
 AJ212MTEC

Date: May 04, 2001

Lab#: 010307050

Sample ID: HB-TP08 S-1

Sample Type: Soil

Sample Date: 3/7/01

| Test                   | Result              | Units    |
|------------------------|---------------------|----------|
| CONVENTIONAL           |                     |          |
| Solids                 | 93.5                | per cent |
| CV                     |                     |          |
| Mercury                | 0.0066 <i>BJ</i>    | mg/Kg    |
| GC/MS-BNA              | <i>DLC</i>          |          |
| 2-Chloronaphthalene    | 100 U <i>245102</i> | ug/Kg    |
| 2-Methylnaphthalene    | 100 U               | ug/Kg    |
| Acenaphthene           | 100 U               | ug/Kg    |
| Acenaphthylene         | 100 U               | ug/Kg    |
| Anthracene             | 100 U               | ug/Kg    |
| Benzo(a)anthracene     | 100 U               | ug/Kg    |
| Benzo(a)pyrene         | 100 U               | ug/Kg    |
| Benzo(g,h,i)perylene   | 100 U               | ug/Kg    |
| Benzofluoranthenes     | 100 U               | ug/Kg    |
| Chrysene               | 100 U               | ug/Kg    |
| Dibenz(a,h)anthracene  | 100 U               | ug/Kg    |
| Fluoranthene           | 100 U               | ug/Kg    |
| Fluorene               | 100 U               | ug/Kg    |
| Indeno(1,2,3-cd)pyrene | 100 U               | ug/Kg    |
| Naphthalene            | 100 U               | ug/Kg    |

U indicates not detected at the associated value

B indicates the value is greater than the detection limits of the method, however it is lower than the Contract Required Detection Limits

J indicates the associated value is estimated

UJ indicates not detected at the associated value, however the value should be considered estimated

Lab#: 010307050

Sample ID: HB-TP08 S-1

Sample Type: Soil

Sample Date: 3/7/01

|          | Test         | Result | Units |
|----------|--------------|--------|-------|
|          | Phenanthrene | 100 U  | ug/Kg |
|          | Pyrene       | 100 U  | ug/Kg |
| ICP      | Arsenic      | 2.3 U  | mg/Kg |
|          | Cadmium      | 0.25 U | mg/Kg |
|          | Chromium     | 7.82   | mg/Kg |
|          | Copper       | 6.1    | mg/Kg |
|          | Lead         | 3.07   | mg/Kg |
|          | Nickel       | 6.2 J  | mg/Kg |
|          | Zinc         | 14.0   | mg/Kg |
| NWTPH-Dx | Diesel       | 20 U J | mg/Kg |
|          | Heavy Oil    | 40 U J | mg/Kg |

Reviewed By:

*Lori A. Zboralski 5/4/01*

U indicates not detected at the associated value

B indicates the value is greater than the detection limits of the method, however it is lower than the Contract Required Detection Limits

J indicates the associated value is estimated

UJ indicates not detected at the associated value, however the value should be considered estimated

**- City of Tacoma -**  
**Science and Engineering Division**

**To:** Christopher L. Getchell, Source Control Supervisor

Foss Uplands  
 AJ212MTEC

**Date:** May 04, 2001

**Lab#:** 010307051

**Sample ID:** HB-TP08 S-2

**Sample Type:** Soil

**Sample Date:** 3/7/01

| Test                   | Result                | Units    |
|------------------------|-----------------------|----------|
| CONVENTIONAL           |                       |          |
| Solids                 | 75.9                  | per cent |
| CV                     |                       |          |
| Mercury                | 0.0057 <sup>B J</sup> | mg/Kg    |
| GC/MS-BNA              |                       |          |
| 2-Chloronaphthalene    | 93 U                  | ug/Kg    |
| 2-Methylnaphthalene    | 93 U                  | ug/Kg    |
| Acenaphthene           | 93 U                  | ug/Kg    |
| Acenaphthylene         | 93 U                  | ug/Kg    |
| Anthracene             | 93 U                  | ug/Kg    |
| Benzo(a)anthracene     | 93 U                  | ug/Kg    |
| Benzo(a)pyrene         | 93 U                  | ug/Kg    |
| Benzo(g,h,i)perylene   | 93 U                  | ug/Kg    |
| Benzofluoranthenes     | 93 U                  | ug/Kg    |
| Chrysene               | 93 U                  | ug/Kg    |
| Dibenz(a,h)anthracene  | 93 U                  | ug/Kg    |
| Fluoranthene           | 93 U                  | ug/Kg    |
| Fluorene               | 93 U                  | ug/Kg    |
| Indeno(1,2,3-cd)pyrene | 93 U                  | ug/Kg    |
| Naphthalene            | 93 U                  | ug/Kg    |

- U indicates not detected at the associated value
- B indicates the value is greater than the detection limits of the method, however it is lower than the Contract Required Detection Limits
- J indicates the associated value is estimated
- UJ indicates not detected at the associated value, however the value should be considered estimated

Lab#: 010307051  
 Sample ID: HB-TP08 S-2  
 Sample Type: Soil  
 Sample Date: 3/7/01

|          | Test         | Result | Units |
|----------|--------------|--------|-------|
|          | Phenanthrene | 93 U   | ug/Kg |
|          | Pyrene       | 93 U   | ug/Kg |
| ICP      | Arsenic      | 2.3    | mg/Kg |
|          | Cadmium      | 0.23 U | mg/Kg |
|          | Chromium     | 7.01   | mg/Kg |
|          | Copper       | 5.6    | mg/Kg |
|          | Lead         | 1.86   | mg/Kg |
|          | Nickel       | 5.7 J  | mg/Kg |
|          | Zinc         | 12.4   | mg/Kg |
| NWTPH-Dx | Diesel       | 19 U J | mg/Kg |
|          | Heavy Oil    | 37 U J | mg/Kg |

Reviewed By: Lori A. Zboralski 5/4/01

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**- City of Tacoma -**  
**Science and Engineering Division**

**To:** Christopher L. Getchell, Source Control Supervisor

Foss Uplands

AJ212MTEC

**Date:** May 04, 2001

**Lab#:** 010307052

**Sample ID:** HB-TP09 S-1

**Sample Type:** Soil

**Sample Date:** 3/7/01

| Test                   | Result | Units    |
|------------------------|--------|----------|
| CONVENTIONAL           |        |          |
| Solids                 | 94.2   | per cent |
| CV                     |        |          |
| Mercury                | 0.751  | mg/Kg    |
| GC/MS-BNA              |        |          |
| 2-Chloronaphthalene    | 94 U   | ug/Kg    |
| 2-Methylnaphthalene    | 94 U   | ug/Kg    |
| Acenaphthene           | 94 U   | ug/Kg    |
| Acenaphthylene         | 94 U   | ug/Kg    |
| Anthracene             | 94 U   | ug/Kg    |
| Benzo(a)anthracene     | 150    | ug/Kg    |
| Benzo(a)pyrene         | 160    | ug/Kg    |
| Benzo(g,h,i)perylene   | 160    | ug/Kg    |
| Benzofluoranthenes     | 230    | ug/Kg    |
| Chrysene               | 150    | ug/Kg    |
| Dibenz(a,h)anthracene  | 94 U   | ug/Kg    |
| Fluoranthene           | 270    | ug/Kg    |
| Fluorene               | 94 U   | ug/Kg    |
| Indeno(1,2,3-cd)pyrene | 120    | ug/Kg    |
| Naphthalene            | 94 U   | ug/Kg    |

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Lab#: 010307052  
Sample ID: HB-TP09 S-1  
Sample Type: Soil  
Sample Date: 3/7/01

|          | Test         | Result                                | Units |
|----------|--------------|---------------------------------------|-------|
|          | Phenanthrene | 160                                   | ug/Kg |
|          | Pyrene       | 390                                   | ug/Kg |
| ICP      | Arsenic      | 4.4                                   | mg/Kg |
|          | Cadmium      | 0.51 B J                              | mg/Kg |
|          | Chromium     | 23.0 <sup>DLL</sup> <sub>2/5/02</sub> | mg/Kg |
|          | Copper       | 61.6                                  | mg/Kg |
|          | Lead         | 39.4                                  | mg/Kg |
|          | Nickel       | 27.0 J                                | mg/Kg |
|          | Zinc         | 51.6                                  | mg/Kg |
| NWTPH-Dx | Diesel       | 19 U J                                | mg/Kg |
|          | Heavy Oil    | 37 U J                                | mg/Kg |

Reviewed By: Lori A. Zboralski 5/4/01

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**- City of Tacoma -**  
**Science and Engineering Division**

**To:** Christopher L. Getchell, Source Control Supervisor

Foss Uplands  
 AJ212MTEC

**Date:** May 04, 2001

**Lab#:** 010307053

**Sample ID:** HB-TP09 S-2

**Sample Type:** Soil

**Sample Date:** 3/7/01

| Test                   | Result | Units    |
|------------------------|--------|----------|
| CONVENTIONAL           |        |          |
| Solids                 | 92.6   | per cent |
| CV                     |        |          |
| Mercury                | 0.592  | mg/Kg    |
| GC/MS-BNA              |        |          |
| 2-Chloronaphthalene    | 96 U   | ug/Kg    |
| 2-Methylnaphthalene    | 1200   | ug/Kg    |
| Acenaphthene           | 4000   | ug/Kg    |
| Acenaphthylene         | 96 U   | ug/Kg    |
| Anthracene             | 4800   | ug/Kg    |
| Benzo(a)anthracene     | 6500   | ug/Kg    |
| Benzo(a)pyrene         | 4900   | ug/Kg    |
| Benzo(g,h,i)perylene   | 2900   | ug/Kg    |
| Benzo(a)fluoranthene   | 11000  | ug/Kg    |
| Chrysene               | 7600   | ug/Kg    |
| Dibenz(a,h)anthracene  | 690    | ug/Kg    |
| Fluoranthene           | 15000  | ug/Kg    |
| Fluorene               | 2600   | ug/Kg    |
| Indeno(1,2,3-cd)pyrene | 2400   | ug/Kg    |
| Naphthalene            | 640    | ug/Kg    |

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**Lab#:** 010307053  
**Sample ID:** HB-TP09 S-2  
**Sample Type:** Soil  
**Sample Date:** 3/7/01

|          | Test         | Result                                | Units |
|----------|--------------|---------------------------------------|-------|
|          | Phenanthrene | 21000                                 | ug/Kg |
|          | Pyrene       | 19000                                 | ug/Kg |
| ICP      |              |                                       |       |
|          | Arsenic      | 7.5                                   | mg/Kg |
|          | Cadmium      | 0.95 <del>B</del> J                   | mg/Kg |
|          | Chromium     | 24.9 <sup>DCC</sup> <sub>2/5/02</sub> | mg/Kg |
|          | Copper       | 75.9                                  | mg/Kg |
|          | Lead         | 166                                   | mg/Kg |
|          | Nickel       | 26.4 J                                | mg/Kg |
|          | Zinc         | 91.7                                  | mg/Kg |
| NWTPH-Dx |              |                                       |       |
|          | Diesel       | 19 U                                  | mg/Kg |
|          | Heavy Oil    | 59 J                                  | mg/Kg |

Reviewed By: Lori A. Zboralski 5/4/01

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**- City of Tacoma -**  
**Science and Engineering Division**

**To:** Christopher L. Getchell, Source Control Supervisor

Foss Uplands

AJ212MTEC

**Date:** May 04, 2001

**Lab#:** 010307054

**Sample ID:** HB-TP09 S-3

**Sample Type:** Soil

**Sample Date:** 3/7/01

| Test                   | Result | Units    |
|------------------------|--------|----------|
| CONVENTIONAL           |        |          |
| Solids                 | 89.7   | per cent |
| CV                     |        |          |
| Mercury                | 1.33   | mg/Kg    |
| GC/MS-BNA              |        |          |
| 2-Chloronaphthalene    | 91 U   | ug/Kg    |
| 2-Methylnaphthalene    | 96     | ug/Kg    |
| Acenaphthene           | 1000   | ug/Kg    |
| Acenaphthylene         | 91 U   | ug/Kg    |
| Anthracene             | 1600   | ug/Kg    |
| Benzo(a)anthracene     | 3400   | ug/Kg    |
| Benzo(a)pyrene         | 4600   | ug/Kg    |
| Benzo(g,h,i)perylene   | 2300   | ug/Kg    |
| Benzo(a)fluoranthene   | 6100   | ug/Kg    |
| Chrysene               | 4100   | ug/Kg    |
| Dibenz(a,h)anthracene  | 470    | ug/Kg    |
| Fluoranthene           | 6800   | ug/Kg    |
| Fluorene               | 580    | ug/Kg    |
| Indeno(1,2,3-cd)pyrene | 1800   | ug/Kg    |
| Naphthalene            | 91 U   | ug/Kg    |

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Lab#: 010307054  
Sample ID: HB-TP09 S-3  
Sample Type: Soil  
Sample Date: 3/7/01

|          | Test         | Result | Units |
|----------|--------------|--------|-------|
|          | Phenanthrene | 6100   | ug/Kg |
|          | Pyrene       | 9600   | ug/Kg |
| ICP      | Arsenic      | 3.7    | mg/Kg |
|          | Cadmium      | 0.46 U | mg/Kg |
|          | Chromium     | 20.7   | mg/Kg |
|          | Copper       | 41.6   | mg/Kg |
|          | Lead         | 62.6   | mg/Kg |
|          | Nickel       | 24.4 J | mg/Kg |
|          | Zinc         | 77.7   | mg/Kg |
| NWTPH-Dx | Diesel       | 18 U   | mg/Kg |
|          | Heavy Oil    | 63 J   | mg/Kg |

Reviewed By:

*Lori A. Zboralski* 5/4/01

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**- City of Tacoma -**  
**Science and Engineering Division**

**To:** Christopher L. Getchell, Source Control Supervisor

Foss Uplands  
 AJ212MTEC

**Date:** May 04, 2001

**Lab#:** 010312100

**Sample ID:** HB-MW02 S-1

**Sample Type:** Soil

**Sample Date:** 3/9/01

| Test                   | Result   | Units    |
|------------------------|----------|----------|
| CONVENTIONAL           |          |          |
| Solids                 | 93.8     | per cent |
| CV                     |          |          |
| Mercury                | 0.0071 U | mg/Kg    |
| GC/MS-BNA              |          |          |
| 2-Chloronaphthalene    | 96 U     | ug/Kg    |
| 2-Methylnaphthalene    | 96 U     | ug/Kg    |
| Acenaphthene           | 96 U     | ug/Kg    |
| Acenaphthylene         | 96 U     | ug/Kg    |
| Anthracene             | 96 U     | ug/Kg    |
| Benzo(a)anthracene     | 96 U     | ug/Kg    |
| Benzo(a)pyrene         | 96 U     | ug/Kg    |
| Benzo(g,h,i)perylene   | 96 U     | ug/Kg    |
| Benzofluoranthenes     | 96 U     | ug/Kg    |
| Chrysene               | 96 U     | ug/Kg    |
| Dibenz(a,h)anthracene  | 96 U     | ug/Kg    |
| Fluoranthene           | 96 U     | ug/Kg    |
| Fluorene               | 96 U     | ug/Kg    |
| Indeno(1,2,3-cd)pyrene | 96 U     | ug/Kg    |
| Naphthalene            | 96 U     | ug/Kg    |

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Lab#: 010312100  
Sample ID: HB-MW02 S-1  
Sample Type: Soil  
Sample Date: 3/9/01

|           | Test         | Result | Units |
|-----------|--------------|--------|-------|
| ICP       | Phenanthrene | 96 U   | ug/Kg |
|           | Pyrene       | 96 U   | ug/Kg |
|           | Arsenic      | 2.33   | mg/Kg |
|           | Cadmium      | 0.24 U | mg/Kg |
|           | Chromium     | 6.99   | mg/Kg |
|           | Copper       | 7.1 UJ | mg/Kg |
|           | Lead         | 2.7 U  | mg/Kg |
|           | Nickel       | 6.17   | mg/Kg |
|           | Zinc         | 14.4   | mg/Kg |
|           | NWTPH-Dx     | Diesel | 19 U  |
| Heavy Oil |              | 38 U   | mg/Kg |

Reviewed By: Lori A. Zboralski 5/4/01

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**- City of Tacoma -**  
**Science and Engineering Division**

**To:** Christopher L. Getchell, Source Control Supervisor

Foss Uplands  
 AJ212MTEC

**Date:** May 04, 2001

**Lab#:** 010312101

**Sample ID:** HB-MW02 S-3

**Sample Type:** Soil

**Sample Date:** 3/9/01

| Test                   | Result                              | Units    |
|------------------------|-------------------------------------|----------|
| CONVENTIONAL           |                                     |          |
| Solids                 | 83.3                                | per cent |
| CV                     |                                     |          |
| Mercury                | 0.0069 B <sup>J</sup> DLL<br>4/5/02 | mg/Kg    |
| GC/MS-BNA              |                                     |          |
| 2-Chloronaphthalene    | 98 U                                | ug/Kg    |
| 2-Methylnaphthalene    | 98 U                                | ug/Kg    |
| Acenaphthene           | 98 U                                | ug/Kg    |
| Acenaphthylene         | 98 U                                | ug/Kg    |
| Anthracene             | 98 U                                | ug/Kg    |
| Benzo(a)anthracene     | 98 U                                | ug/Kg    |
| Benzo(a)pyrene         | 98 U                                | ug/Kg    |
| Benzo(g,h,i)perylene   | 98 U                                | ug/Kg    |
| Benzo(a)fluoranthene   | 98 U                                | ug/Kg    |
| Chrysene               | 98 U                                | ug/Kg    |
| Dibenz(a,h)anthracene  | 98 U                                | ug/Kg    |
| Fluoranthene           | 98 U                                | ug/Kg    |
| Fluorene               | 98 U                                | ug/Kg    |
| Indeno(1,2,3-cd)pyrene | 98 U                                | ug/Kg    |
| Naphthalene            | 98 U                                | ug/Kg    |

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Lab#: 010312101  
Sample ID: HB-MW02 S-3  
Sample Type: Soil  
Sample Date: 3/9/01

|          | Test         | Result | Units |
|----------|--------------|--------|-------|
|          | Phenanthrene | 98 U   | ug/Kg |
|          | Pyrene       | 98 U   | ug/Kg |
| ICP      | Arsenic      | 2.04   | mg/Kg |
|          | Cadmium      | 0.25 U | mg/Kg |
|          | Chromium     | 5.87   | mg/Kg |
|          | Copper       | 6.5 UJ | mg/Kg |
|          | Lead         | 2.1 U  | mg/Kg |
|          | Nickel       | 7.86   | mg/Kg |
|          | Zinc         | 31.0   | mg/Kg |
| NWTPH-Dx | Diesel       | 20 U   | mg/Kg |
|          | Heavy Oil    | 39 U   | mg/Kg |

Reviewed By: Lori A. Zboralski 5/4/01

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**- City of Tacoma -**  
**Science and Engineering Division**

**To:** Christopher L. Getchell, Source Control Supervisor

Foss Uplands

AJ212MTEC

**Date:** May 04, 2001

**Lab#:** 010312102

**Sample ID:** HB-MW03 S-1

**Sample Type:** Soil

**Sample Date:** 3/9/01

| Test                   | Result | Units    |
|------------------------|--------|----------|
| CONVENTIONAL           |        |          |
| Solids                 | 92.7   | per cent |
| CV                     |        |          |
| Mercury                | 0.110  | mg/Kg    |
| GC/MS-BNA              |        |          |
| 2-Chloronaphthalene    | 97 U   | ug/Kg    |
| 2-Methylnaphthalene    | 97 U   | ug/Kg    |
| Acenaphthene           | 97 U   | ug/Kg    |
| Acenaphthylene         | 97 U   | ug/Kg    |
| Anthracene             | 97 U   | ug/Kg    |
| Benzo(a)anthracene     | 210    | ug/Kg    |
| Benzo(a)pyrene         | 220    | ug/Kg    |
| Benzo(g,h,i)perylene   | 97 U   | ug/Kg    |
| Benzofluoranthenes     | 340    | ug/Kg    |
| Chrysene               | 230    | ug/Kg    |
| Dibenz(a,h)anthracene  | 97 U   | ug/Kg    |
| Fluoranthene           | 420    | ug/Kg    |
| Fluorene               | 97 U   | ug/Kg    |
| Indeno(1,2,3-cd)pyrene | 97 U   | ug/Kg    |
| Naphthalene            | 97 U   | ug/Kg    |

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Lab#: 010312102  
Sample ID: HB-MW03 S-1  
Sample Type: Soil  
Sample Date: 3/9/01

|          | Test         | Result   | Units |
|----------|--------------|----------|-------|
|          | Phenanthrene | 320      | ug/Kg |
|          | Pyrene       | 530      | ug/Kg |
| ICP      | Arsenic      | 4.02     | mg/Kg |
|          | Cadmium      | 0.55 B J | mg/Kg |
|          | Chromium     | 14.4     | mg/Kg |
|          | Copper       | 22.0 J   | mg/Kg |
|          | Lead         | 33.3     | mg/Kg |
|          | Nickel       | 15.4     | mg/Kg |
|          | Zinc         | 156      | mg/Kg |
| NWTPH-Dx | Diesel       | 19 U     | mg/Kg |
|          | Heavy Oil    | 300      | mg/Kg |

Reviewed By: *Lori A. Zboralski 5/4/01*

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**- City of Tacoma -**  
**Science and Engineering Division**

**To:** Christopher L. Getchell, Source Control Supervisor

Foss Uplands  
 AJ212MTEC

**Date:** May 04, 2001

**Lab#:** 010312103

**Sample ID:** HB-MW03 S-4

**Sample Type:** Soil

**Sample Date:** 3/9/01

| Test                   | Result           | Units    |
|------------------------|------------------|----------|
| CONVENTIONAL           |                  |          |
| Solids                 | 78.7             | per cent |
| CV                     |                  |          |
| Mercury                | 0.0078 <i>BJ</i> | mg/Kg    |
| GC/MS-BNA              |                  |          |
| 2-Chloronaphthalene    | 96 U             | ug/Kg    |
| 2-Methylnaphthalene    | 96 U             | ug/Kg    |
| Acenaphthene           | 96 U             | ug/Kg    |
| Acenaphthylene         | 96 U             | ug/Kg    |
| Anthracene             | 96 U             | ug/Kg    |
| Benzo(a)anthracene     | 96 U             | ug/Kg    |
| Benzo(a)pyrene         | 96 U             | ug/Kg    |
| Benzo(g,h,i)perylene   | 96 U             | ug/Kg    |
| Benzo(a)fluoranthene   | 96 U             | ug/Kg    |
| Chrysene               | 96 U             | ug/Kg    |
| Dibenz(a,h)anthracene  | 96 U             | ug/Kg    |
| Fluoranthene           | 96 U             | ug/Kg    |
| Fluorene               | 96 U             | ug/Kg    |
| Indeno(1,2,3-cd)pyrene | 96 U             | ug/Kg    |
| Naphthalene            | 96 U             | ug/Kg    |

*DL 2/5/02*

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Lab#: 010312103  
Sample ID: HB-MW03 S-4  
Sample Type: Soil  
Sample Date: 3/9/01

|          | Test         | Result | Units |
|----------|--------------|--------|-------|
|          | Phenanthrene | 96 U   | ug/Kg |
|          | Pyrene       | 96 U   | ug/Kg |
| ICP      | Arsenic      | 3.23   | mg/Kg |
|          | Cadmium      | 0.26 U | mg/Kg |
|          | Chromium     | 6.62   | mg/Kg |
|          | Copper       | 7.98 J | mg/Kg |
|          | Lead         | 5.2 U  | mg/Kg |
|          | Nickel       | 6.54   | mg/Kg |
|          | Zinc         | 26.0   | mg/Kg |
| NWTPH-Dx | Diesel       | 19 U   | mg/Kg |
|          | Heavy Oil    | 38 U   | mg/Kg |

Reviewed By: Lori A. Zboralski 5/4/01

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**- City of Tacoma -**  
**Science and Engineering Division**

**To:** Christopher L. Getchell, Source Control Supervisor

Foss Uplands  
 AJ212MTEC

**Date:** May 04, 2001

**Lab#:** 010312106

**Sample ID:** HB-B02 S-1

**Sample Type:** Soil

**Sample Date:** 3/9/01

| Test                   | Result                   | Units    |
|------------------------|--------------------------|----------|
| CONVENTIONAL           |                          |          |
| Solids                 | 92.5                     | per cent |
| CV                     |                          |          |
| Mercury                | 0.0201 <sup>BJ</sup>     | mg/Kg    |
| GC/MS-BNA              | <sup>DLL</sup><br>2/5/02 |          |
| 2-Chloronaphthalene    | 96 U                     | ug/Kg    |
| 2-Methylnaphthalene    | 96 U                     | ug/Kg    |
| Acenaphthene           | 96 U                     | ug/Kg    |
| Acenaphthylene         | 96 U                     | ug/Kg    |
| Anthracene             | 130                      | ug/Kg    |
| Benzo(a)anthracene     | 200                      | ug/Kg    |
| Benzo(a)pyrene         | 180                      | ug/Kg    |
| Benzo(g,h,i)perylene   | 120                      | ug/Kg    |
| Benzofluoranthenes     | 240                      | ug/Kg    |
| Chrysene               | 220                      | ug/Kg    |
| Dibenz(a,h)anthracene  | 96 U                     | ug/Kg    |
| Fluoranthene           | 410                      | ug/Kg    |
| Fluorene               | 96 U                     | ug/Kg    |
| Indeno(1,2,3-cd)pyrene | 96 U                     | ug/Kg    |
| Naphthalene            | 96 U                     | ug/Kg    |

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Lab#: 010312106  
Sample ID: HB-B02 S-1  
Sample Type: Soil  
Sample Date: 3/9/01

|          | Test         | Result                                | Units |
|----------|--------------|---------------------------------------|-------|
|          | Phenanthrene | 420                                   | ug/Kg |
|          | Pyrene       | 510                                   | ug/Kg |
| ICP      | Arsenic      | 2.29                                  | mg/Kg |
|          | Cadmium      | 0.37 <del>B</del> J                   | mg/Kg |
|          | Chromium     | 16.3 <sup>DLL</sup> <sub>215702</sub> | mg/Kg |
|          | Copper       | 18.9 J                                | mg/Kg |
|          | Lead         | 8.9 U                                 | mg/Kg |
|          | Nickel       | 24.7                                  | mg/Kg |
|          | Zinc         | 30.6                                  | mg/Kg |
| NWTPH-Dx | Diesel       | 19 U                                  | mg/Kg |
|          | Heavy Oil    | 93                                    | mg/Kg |

Reviewed By: Lori A. Zboralski 5/4/01

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**- City of Tacoma -**  
**Science and Engineering Division**

**To:** Christopher L. Getchell, Source Control Supervisor

Foss Uplands  
 AJ212MTEC

**Date:** May 04, 2001

**Lab#:** 010312107

**Sample ID:** HB-B02 S-4

**Sample Type:** Soil

**Sample Date:** 3/9/01

| Test                   | Result           | Units    |
|------------------------|------------------|----------|
| CONVENTIONAL           |                  |          |
| Solids                 | 80.2             | per cent |
| CV                     |                  |          |
| Mercury                | 0.0516 <i>BJ</i> | mg/Kg    |
| GC/MS-BNA              |                  |          |
| 2-Chloronaphthalene    | 97 U             | ug/Kg    |
| 2-Methylnaphthalene    | 97 U             | ug/Kg    |
| Acenaphthene           | 97 U             | ug/Kg    |
| Acenaphthylene         | 97 U             | ug/Kg    |
| Anthracene             | 110              | ug/Kg    |
| Benzo(a)anthracene     | 270              | ug/Kg    |
| Benzo(a)pyrene         | 290              | ug/Kg    |
| Benzo(g,h,i)perylene   | 180              | ug/Kg    |
| Benzo(a)fluoranthene   | 360              | ug/Kg    |
| Chrysene               | 290              | ug/Kg    |
| Dibenz(a,h)anthracene  | 97 U             | ug/Kg    |
| Fluoranthene           | 490              | ug/Kg    |
| Fluorene               | 97 U             | ug/Kg    |
| Indeno(1,2,3-cd)pyrene | 120              | ug/Kg    |
| Naphthalene            | 97 U             | ug/Kg    |

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Lab#: 010312107  
Sample ID: HB-B02 S-4  
Sample Type: Soil  
Sample Date: 3/9/01

|          | Test         | Result | Units |
|----------|--------------|--------|-------|
|          | Phenanthrene | 400    | ug/Kg |
|          | Pyrene       | 640    | ug/Kg |
| ICP      | Arsenic      | 1.76   | mg/Kg |
|          | Cadmium      | 0.25 U | mg/Kg |
|          | Chromium     | 6.67   | mg/Kg |
|          | Copper       | 14.5 J | mg/Kg |
|          | Lead         | 29.6   | mg/Kg |
|          | Nickel       | 7.54   | mg/Kg |
|          | Zinc         | 42.2   | mg/Kg |
| NWTPH-Dx | Diesel       | 19 U   | mg/Kg |
|          | Heavy Oil    | 100    | mg/Kg |

Reviewed By: Lori A. Zboralski 5/4/01

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**- City of Tacoma -**  
**Science and Engineering Division**

**To:** Christopher L. Getchell, Source Control Supervisor

Foss Uplands  
 AJ212MTEC

**Date:** May 04, 2001

**Lab#:** 010307048

**Sample ID:** HB-TP07 S-1

**Sample Type:** Soil

**Sample Date:** 3/7/01

| Test                   | Result                | Units    |
|------------------------|-----------------------|----------|
| CONVENTIONAL           |                       |          |
| Solids                 | 92.3                  | per cent |
| CV                     |                       |          |
| Mercury                | 0.0903 <del>B</del> J | mg/Kg    |
| GC/MS-BNA              |                       |          |
| 2-Chloronaphthalene    | 95 U                  | ug/Kg    |
| 2-Methylnaphthalene    | 95 U                  | ug/Kg    |
| Acenaphthene           | 95 U                  | ug/Kg    |
| Acenaphthylene         | 95 U                  | ug/Kg    |
| Anthracene             | 110                   | ug/Kg    |
| Benzo(a)anthracene     | 250                   | ug/Kg    |
| Benzo(a)pyrene         | 220                   | ug/Kg    |
| Benzo(g,h,i)perylene   | 120                   | ug/Kg    |
| Benzofluoranthenes     | 270                   | ug/Kg    |
| Chrysene               | 270                   | ug/Kg    |
| Dibenz(a,h)anthracene  | 95 U                  | ug/Kg    |
| Fluoranthene           | 370                   | ug/Kg    |
| Fluorene               | 95 U                  | ug/Kg    |
| Indeno(1,2,3-cd)pyrene | 95 U                  | ug/Kg    |
| Naphthalene            | 95 U                  | ug/Kg    |

*DLL 2/5/02*

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**Lab#:** 010307048  
**Sample ID:** HB-TP07 S-1  
**Sample Type:** Soil  
**Sample Date:** 3/7/01

|          | Test         | Result | Units |
|----------|--------------|--------|-------|
|          | Phenanthrene | 470    | ug/Kg |
|          | Pyrene       | 600    | ug/Kg |
| ICP      | Arsenic      | 4.8    | mg/Kg |
|          | Cadmium      | 6.94   | mg/Kg |
|          | Chromium     | 49.0   | mg/Kg |
|          | Copper       | 179    | mg/Kg |
|          | Lead         | 130    | mg/Kg |
|          | Nickel       | 168 J  | mg/Kg |
|          | Zinc         | 133    | mg/Kg |
| NWTPH-Dx | Diesel       | 19 U J | mg/Kg |
|          | Heavy Oil    | 85 J   | mg/Kg |

Reviewed By: *Lori A. Zboralski 5/4/01*

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**- City of Tacoma -**  
**Science and Engineering Division**

**To:** Christopher L. Getchell, Source Control Supervisor

Foss Uplands

AJ212MTEC

**Date:** May 04, 2001

**Lab#:** 010320168

**Sample ID:** UMW2A

**Sample Type:** Groundwater

**Sample Date:** 3/20/01

| Test                   | Result  | Units |
|------------------------|---------|-------|
| CONVENTIONAL           |         |       |
| TSS                    | 16.8    | mg/L  |
| CV-DISS                |         |       |
| Mercury, dissolved     | 0.050 U | ug/L  |
| GC/MS-PNA              |         |       |
| 2-Chloronaphthalene    | 1.0 U   | ug/L  |
| 2-Methylnaphthalene    | 1.0 U   | ug/L  |
| Acenaphthene           | 1.0 U   | ug/L  |
| Acenaphthylene         | 1.0 U   | ug/L  |
| Anthracene             | 1.0 U   | ug/L  |
| Benzo(a)anthracene     | 1.0 U   | ug/L  |
| Benzo(a)pyrene         | 1.0 U   | ug/L  |
| Benzo(g,h,i)perylene   | 1.0 U   | ug/L  |
| Benzofluoranthenes     | 1.0 U   | ug/L  |
| Chrysene               | 1.0 U   | ug/L  |
| Dibenz(a,h)anthracene  | 1.0 U   | ug/L  |
| Fluoranthene           | 1.0 U   | ug/L  |
| Fluorene               | 1.0 U   | ug/L  |
| Indeno(1,2,3-cd)pyrene | 1.0 U   | ug/L  |
| Naphthalene            | 1.0 U   | ug/L  |

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**Lab#:** 010320168  
**Sample ID:** UMW2A  
**Sample Type:** Groundwater  
**Sample Date:** 3/20/01

|          | Test                | Result               | Units |
|----------|---------------------|----------------------|-------|
|          | Phenanthrene        | 1.0 U                | ug/L  |
|          | Pyrene              | 1.0 U                | ug/L  |
| ICP-DISS | Antimony, dissolved | 0.24 <del>B</del> J  | ug/L  |
|          | Arsenic, dissolved  | 26                   | ug/L  |
|          | Cadmium, dissolved  | 0.083 U              | ug/L  |
|          | Chromium, dissolved | 6.5                  | ug/L  |
|          | Copper, dissolved   | 5.1                  | ug/L  |
|          | Lead, dissolved     | 0.039 <del>B</del> J | ug/L  |
|          | Nickel, dissolved   | 11                   | ug/L  |
|          | Zinc, dissolved     | 4.9 <del>B</del> J   | ug/L  |
| NWTPH-Dx | Diesel              | 0.25 U J             | mg/L  |
|          | Heavy Oil           | 0.50 U J             | mg/L  |

DLL  
2/5/02

Reviewed By: Lori A. Zboralski 5/4/01

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**- City of Tacoma -**  
**Science and Engineering Division**

**To:** Christopher L. Getchell, Source Control Supervisor

Foss Uplands  
 AJ212MTEC

**Date:** May 04, 2001

**Lab#:** 010320170

**Sample ID:** HB-MW02

**Sample Type:** Groundwater

**Sample Date:** 3/20/01

| Test                   | Result  | Units |
|------------------------|---------|-------|
| CONVENTIONAL           |         |       |
| TSS                    | 7.8     | mg/L  |
| CV-DISS                |         |       |
| Mercury, dissolved     | 0.050 U | ug/L  |
| GC/MS-PNA              |         |       |
| 2-Chloronaphthalene    | 1.0 U   | ug/L  |
| 2-Methylnaphthalene    | 1.0 U   | ug/L  |
| Acenaphthene           | 1.0 U   | ug/L  |
| Acenaphthylene         | 1.0 U   | ug/L  |
| Anthracene             | 1.0 U   | ug/L  |
| Benzo(a)anthracene     | 1.0 U   | ug/L  |
| Benzo(a)pyrene         | 1.0 U   | ug/L  |
| Benzo(g,h,i)perylene   | 1.0 U   | ug/L  |
| Benzofluoranthenes     | 1.0 U   | ug/L  |
| Chrysene               | 1.0 U   | ug/L  |
| Dibenz(a,h)anthracene  | 1.0 U   | ug/L  |
| Fluoranthene           | 1.0 U   | ug/L  |
| Fluorene               | 1.0 U   | ug/L  |
| Indeno(1,2,3-cd)pyrene | 1.0 U   | ug/L  |
| Naphthalene            | 1.0 U   | ug/L  |

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Lab#: 010320170  
Sample ID: HB-MW02  
Sample Type: Groundwater  
Sample Date: 3/20/01

|          | Test                | Result                  | Units |
|----------|---------------------|-------------------------|-------|
|          | Phenanthrene        | 1.0 U                   | ug/L  |
|          | Pyrene              | 1.0 U                   | ug/L  |
| ICP-DISS |                     |                         |       |
|          | Antimony, dissolved | 1.9 <del>B</del> J      | ug/L  |
|          | Arsenic, dissolved  | 26 <sup>DL 3/5/02</sup> | ug/L  |
|          | Cadmium, dissolved  | 0.083 U                 | ug/L  |
|          | Chromium, dissolved | 5.5                     | ug/L  |
|          | Copper, dissolved   | 9.1                     | ug/L  |
|          | Lead, dissolved     | 0.023 U                 | ug/L  |
|          | Nickel, dissolved   | 47                      | ug/L  |
|          | Zinc, dissolved     | 7.7                     | ug/L  |
| NWTPH-Dx |                     |                         |       |
|          | Diesel              | 0.25 U J                | mg/L  |
|          | Heavy Oil           | 0.50 U J                | mg/L  |

Reviewed By: *Lori A Zboralski* 5/4/01

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**- City of Tacoma -**  
**Science and Engineering Division**

**To:** Christopher L. Getchell, Source Control Supervisor

Foss Uplands  
 AJ212MTEC

**Date:** May 04, 2001

**Lab#:** 010320171

**Sample ID:** HB-MW03

**Sample Type:** Groundwater

**Sample Date:** 3/20/01

| Test                   | Result  | Units |
|------------------------|---------|-------|
| CONVENTIONAL           |         |       |
| TSS                    | 2.6     | mg/L  |
| CV-DISS                |         |       |
| Mercury, dissolved     | 0.050 U | ug/L  |
| GC/MS-PNA              |         |       |
| 2-Chloronaphthalene    | 1.0 U   | ug/L  |
| 2-Methylnaphthalene    | 1.0 U   | ug/L  |
| Acenaphthene           | 1.0 U   | ug/L  |
| Acenaphthylene         | 1.0 U   | ug/L  |
| Anthracene             | 1.0 U   | ug/L  |
| Benzo(a)anthracene     | 1.0 U   | ug/L  |
| Benzo(a)pyrene         | 1.0 U   | ug/L  |
| Benzo(g,h,i)perylene   | 1.0 U   | ug/L  |
| Benzofluoranthenes     | 1.0 U   | ug/L  |
| Chrysene               | 1.0 U   | ug/L  |
| Dibenz(a,h)anthracene  | 1.0 U   | ug/L  |
| Fluoranthene           | 1.0 U   | ug/L  |
| Fluorene               | 1.0 U   | ug/L  |
| Indeno(1,2,3-cd)pyrene | 1.0 U   | ug/L  |
| Naphthalene            | 1.0 U   | ug/L  |

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# Sample Custody Record

Samples Shipped to: DOT Labs



## HART CROWSER

Hart Crowser, Inc.  
1910 Fairview Avenue East  
Seattle, Washington 98102-3699  
Phone: 206-324-9530 FAX: 206-328-5581

JOB 4676-72 LAB NUMBER \_\_\_\_\_  
PROJECT NAME Ther Fass - Hertz Bull  
HART CROWSER CONTACT See Narrative

SAMPLED BY: SNM

| LAB NO. | SAMPLE ID          | DESCRIPTION | DATE        | TIME | MATRIX       |
|---------|--------------------|-------------|-------------|------|--------------|
|         | <u>UMW2A-H74</u>   |             | <u>3/24</u> |      | <u>water</u> |
|         | <u>HB MW02-H74</u> |             |             |      |              |
|         | <u>HB MW03-H74</u> |             |             |      |              |
|         | <u>HB MW01-H74</u> |             |             |      |              |
|         | <u>HB MW04</u>     |             |             |      |              |

| RELINQUISHED BY      | DATE           | RECEIVED BY          | DATE           |
|----------------------|----------------|----------------------|----------------|
| <u>See Narrative</u> | <u>3/24/01</u> | <u>Rick Fuller</u>   | <u>3-21-01</u> |
| <u>Hart Crowser</u>  |                | <u>Rick Fuller</u>   |                |
|                      |                | <u>See Narrative</u> | <u>1625</u>    |

| REQUESTED ANALYSIS    | NO. OF CONTAINERS | OBSERVATIONS/COMMENTS/<br>COMPOSITING INSTRUCTIONS |
|-----------------------|-------------------|--|
| DSS Metals            | 3                 |  |
| TPH-D8                | 3                 |  |
| PAHS                  | 6                 |  |
| TPH-C/DEK             | 6                 |  |
| TSS                   | 6                 |  |
| High Salinity samples | 6                 |  |

SPECIAL SHIPMENT HANDLING OR STORAGE REQUIREMENTS:  
Field f: Hered.  
Ss, As, Cd, Cu, Pb, Hg, Ni, Zn

COOLER NO.: \_\_\_\_\_ STORAGE LOCATION: \_\_\_\_\_

TURNAROUND TIME:  
 24 HOURS     1 WEEK  
 48 HOURS     STANDARD  
 72 HOURS     OTHER \_\_\_\_\_



# Sample Custody Record

Samples Shipped to: COT Lab

JOB 4676-72 LAB NUMBER \_\_\_\_\_  
 PROJECT NAME They Fess operands - Hesse Boff  
 HART CROWSER CONTACT Joe Morris  
 SAMPLED BY: ISW

Hart Crowser, Inc.  
 1910 Fairview Avenue East  
 Seattle, Washington 98102-3699  
 Phone: 206-324-9530 FAX: 206-328-5581



OBSERVATIONS/COMMENTS/  
 COMPOSITING INSTRUCTIONS

NO. OF CONTAINERS

## REQUESTED ANALYSIS

| LAB NO. | SAMPLE ID | DESCRIPTION  | DATE | TIME | MATRIX |
|---------|-----------|--------------|------|------|--------|
|         | ← HB-501  | 3/27/01 1300 |      |      | Water  |
|         |           |              |      |      |        |
|         |           |              |      |      |        |
|         |           |              |      |      |        |

DIS. Metals  
 PHAS  
 TCH-DA  
 TSS

Metals Sample B3  
 Sample - (23 ppt)  
 WO# AJ212M

3/27/01

RELIQUISHED BY: Joe Morris DATE: 3/27/01 TIME: 14:25  
 SIGNATURE: \_\_\_\_\_  
 PRINT NAME: Joe Morris  
 COMPANY: Hart Crowser

RECEIVED BY: Cheresh Ward DATE: 3/27/01 TIME: \_\_\_\_\_  
 SIGNATURE: \_\_\_\_\_  
 PRINT NAME: Cheresh Ward  
 COMPANY: City of Tacoma

SPECIAL SHIPMENT HANDLING OR STORAGE REQUIREMENTS:  
 Metals: Sb, As, Cd, Cr, Cu, Pb,  
 Hg, Ni, Zn

RELIQUISHED BY: \_\_\_\_\_ DATE: \_\_\_\_\_ TIME: \_\_\_\_\_  
 SIGNATURE: \_\_\_\_\_  
 PRINT NAME: \_\_\_\_\_  
 COMPANY: \_\_\_\_\_

RECEIVED BY: \_\_\_\_\_ DATE: \_\_\_\_\_ TIME: \_\_\_\_\_  
 SIGNATURE: \_\_\_\_\_  
 PRINT NAME: \_\_\_\_\_  
 COMPANY: \_\_\_\_\_

SAMPLE RECEIPT INFORMATION:  
 CUSTODY SEALS:  YES  NO  
 GOOD CONDITION:  YES  NO  
 TEMPERATURE: \_\_\_\_\_  
 SHIPMENT METHOD:  HAND  OVERNIGHT

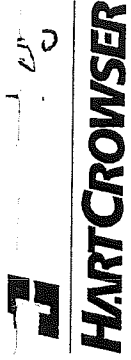
TURNAROUND TIME:  
 24 HOURS  1 WEEK  
 48 HOURS  STANDARD  
 72 HOURS  OTHER \_\_\_\_\_

COOLER NO.: \_\_\_\_\_ STORAGE LOCATION: \_\_\_\_\_  
 See Lab Work Order No. \_\_\_\_\_  
 for Other Contract Requirements

# Sample Custody Record

Samples Shipped to: Kearney City Lab

Hart Crowser Inc.  
1910 Fairview Avenue East  
Seattle, Washington 98102-3699  
Phone: 206-324-9530 FAX: 206-328-5581



| JOB             |           | PROJECT NAME |             | HART CROWSER CONTACT |  | SAMPLED BY: |                            | LAB NUMBER |   | REQUESTED ANALYSIS |  | OBSERVATIONS/COMMENTS/<br>COMPOSITING INSTRUCTIONS |  |  |
|-----------------|-----------|--------------|-------------|----------------------|--|-------------|----------------------------|------------|---|--------------------|--|--|--|--|
| LAB NO.         | SAMPLE ID | DESCRIPTION  | DATE        | TIME                 | MATRIX   | PH          | METALS                     | PH         | METALS  | PH                 | METALS   | NO. OF CONTAINERS                                  |  |  |
|                 | HB-m201   | S-4          | 03/07/01    |                      | SOIL   |             |                            |            |   |                    |  | 2  | AJ212N, Dev site 9   |  |
|                 | HB-m201   | S-4          |             |                      |  |             |                            |            |   |                    |  | 2  |  |  |
|                 | HB-m202   | S-1          | 03/08/01    |                      |  |             |                            |            |   |                    |  | 2  | AJ212M, Dev Sub 8  |  |
|                 | HB-m202   | S-3          |             |                      |  |             |                            |            |   |                    |  | 2  |  |  |
|                 | HB-m203   | S-1          |             |                      |  |             |                            |            |   |                    |  | 2  |  |  |
|                 | HB-m203   | S-4          |             |                      |  |             |                            |            |   |                    |  | 2  |  |  |
|                 | HB-D01    | S-1          |             |                      |  |             |                            |            |   |                    |  | 2  | AJ212N, Dev Site 9   |  |
|                 | HB-D01    | S-4          |             |                      |  |             |                            |            |   |                    |  | 2  |  |  |
|                 | HB-D02    | S-1          |             |                      |  |             |                            |            |   |                    |  | 2  | AJ212M, Dev site 8   |  |
|                 | HB-D02    | S-4          |             |                      |  |             |                            |            |   |                    |  | 2  |  |  |
|                 | PI-TP01   | S-1          | 03/07/01    |                      |  |             |                            |            |   |                    |  | 2  | AJ212R, Dev Site 12  |  |
|                 | PI-TP01   | S-3          |             |                      |  |             |                            |            |   |                    |  | 2  |  |  |
| RELINQUISHED BY |           | DATE         | RECEIVED BY | DATE                 | SPECIAL SHIPMENT HANDLING OR STORAGE REQUIREMENTS: |             | TOTAL NUMBER OF CONTAINERS |            | SAMPLE RECEIPT INFORMATION  |                    | SHIPMENT METHOD:   |  | TURNAROUND TIME:   |  |
| [Signature]     |           | 03/29/01     | [Signature] | 03/07/01             | PH 7.5   |             | 2                          |            | CUSTODY SEALS:<br><input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A |                    | <input type="checkbox"/> HAND <input type="checkbox"/> COURIER <input type="checkbox"/> OVERNIGHT                  |  | <input type="checkbox"/> 24 HOURS <input type="checkbox"/> 1 WEEK<br><input type="checkbox"/> 48 HOURS <input type="checkbox"/> STANDARD<br><input type="checkbox"/> 72 HOURS <input type="checkbox"/> OTHER |  |
| PRINT NAME      |           | TIME         | PRINT NAME  | TIME                 | PH 8.27  |             | 2                          |            | GOOD CONDITION<br><input type="checkbox"/> YES <input type="checkbox"/> NO                              |                    | SHIPMENT METHOD: <input type="checkbox"/> HAND <input type="checkbox"/> COURIER <input type="checkbox"/> OVERNIGHT |  | TEMPERATURE  |  |
| COMPANY         |           | 1700         | COMPANY     | 17:00                | PH 10  |             | 2                          |            | TEMPERATURE   |                    | SHIPMENT METHOD: <input type="checkbox"/> HAND <input type="checkbox"/> COURIER <input type="checkbox"/> OVERNIGHT |  | TURNAROUND TIME:   |  |
| RELINQUISHED BY |           | DATE         | RECEIVED BY | DATE                 | PH 10  |             | 2                          |            | TEMPERATURE   |                    | SHIPMENT METHOD: <input type="checkbox"/> HAND <input type="checkbox"/> COURIER <input type="checkbox"/> OVERNIGHT |  | TURNAROUND TIME:   |  |
| SIGNATURE       |           | TIME         | SIGNATURE   | TIME                 | PH 10  |             | 2                          |            | TEMPERATURE   |                    | SHIPMENT METHOD: <input type="checkbox"/> HAND <input type="checkbox"/> COURIER <input type="checkbox"/> OVERNIGHT |  | TURNAROUND TIME:   |  |
| PRINT NAME      |           | TIME         | PRINT NAME  | TIME                 | PH 10  |             | 2                          |            | TEMPERATURE   |                    | SHIPMENT METHOD: <input type="checkbox"/> HAND <input type="checkbox"/> COURIER <input type="checkbox"/> OVERNIGHT |  | TURNAROUND TIME:   |  |
| COMPANY         |           |              | COMPANY     |                      | PH 10  |             | 2                          |            | TEMPERATURE   |                    | SHIPMENT METHOD: <input type="checkbox"/> HAND <input type="checkbox"/> COURIER <input type="checkbox"/> OVERNIGHT |  | TURNAROUND TIME:   |  |



# Sample Custody Record

Samples Shipped to: COT Lab

JOB 4676-71 LAB NUMBER \_\_\_\_\_

PROJECT NAME Ther Fess - Hicks Bull

HART CROWSER CONTACT See Maurice

SAMPLED BY: SNW

| LAB NO. | SAMPLE ID | DESCRIPTION | DATE | TIME | MATRIX | REQUESTED ANALYSIS |      |      |           |     |   |   |   |   |   | NO. OF CONTAINERS | OBSERVATIONS/COMMENTS/<br>COMPOSITING INSTRUCTIONS |
|---------|-----------|-------------|------|------|--------|--------------------|------|------|-----------|-----|---|---|---|---|---|-------------------|--|
|         |           |             |      |      |        | DSS Metals         | TH-D | PAHs | TPH-G/Vol | TSS |   |   |   |   |   |                   |  |
|         | 01102A    |             | 3/20 | 755  | W      | X                  | X    | X    | X         | X   | X | X | X | X | 6 |                   |  |
|         | HD-1104   |             | ↓    | 850  | ↓      | ↓                  | ↓    | ↓    | ↓         | ↓   | ↓ | ↓ | ↓ | 6 |   |                   |  |
|         | HD-1103   |             | ↓    | 940  | ↓      | ↓                  | ↓    | ↓    | ↓         | ↓   | ↓ | ↓ | ↓ | 6 |   |                   |  |
|         | HD-1102   |             | ↓    | 1030 | ↓      | ↓                  | ↓    | ↓    | ↓         | ↓   | ↓ | ↓ | ↓ | 6 |   |                   |  |

|  |  |  |  |  |  |   |  |  |  |  |  |  |  |
|--|--|--|--|--|--|---|--|--|--|--|--|--|--|
| RELINQUISHED BY<br>SIGNATURE <u>See Maurice</u><br>PRINT NAME <u>Hart Crowser</u><br>COMPANY |  | DATE<br><u>3/24/01</u><br>TIME <u>2:25</u> |  | RECEIVED BY<br>SIGNATURE <u>Bill Edmeier</u><br>PRINT NAME <u>COY</u><br>COMPANY |  | DATE<br><u>3/20</u><br>TIME <u>2:30PM</u> |  | SPECIAL SHIPMENT HANDLING OR STORAGE REQUIREMENTS: |  | TOTAL NUMBER OF CONTAINERS<br><u>24</u>  |  | SAMPLE RECEIPT INFORMATION<br>CUSTODY SEALS<br><input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A<br>GOOD CONDITION<br><input type="checkbox"/> YES <input type="checkbox"/> NO<br>TEMPERATURE<br><input type="checkbox"/> COURIER <input type="checkbox"/> HAND <input type="checkbox"/> OVERNIGHT |  |
| RELINQUISHED BY<br>SIGNATURE _____<br>PRINT NAME _____<br>COMPANY _____                      |  | DATE<br>TIME                               |  | RECEIVED BY<br>SIGNATURE _____<br>PRINT NAME _____<br>COMPANY _____              |  | DATE<br>TIME                              |  | COOLER NO.: _____ STORAGE LOCATION: _____          |  | TURNAROUND TIME:<br><input type="checkbox"/> 24 HOURS <input type="checkbox"/> 1 WEEK<br><input type="checkbox"/> 48 HOURS <input type="checkbox"/> STANDARD<br><input type="checkbox"/> 72 HOURS <input type="checkbox"/> OTHER _____ |  |  |  |



City of Tacoma  
Environmental Services  
Science and Engineering  
Division

Memorandum

**To:** Mark D'Andrea, P. E., Project Coordinator, Public Works Engineering  
**FROM:** Christopher L. Getchell, Source Control Supervisor  
**SUBJECT:** Foss Uplands – Hick's Bull WO# AJ212N TEC  
**DATE:** April 24, 2001

Attached are the sample analysis results for the soil and water samples collected by Hart Crowser, March 7, 8, 9, 20, and 21, 2001. The samples were collected in association with the Foss Uplands Investigation.

The Science and Engineering Division analyzed the samples for TSS, NWTPH-G, NWPTH-Dx, Volatile Organics, and Semi-Volatile Organics. Sound Analytical Services performed the ICP-MS analysis for Dissolved Metals. A detailed Quality Control Data Review report was prepared for these samples and is included with the sample reports.

The Heavy Oil values samples HB-TP03 S-1, HB-TP03 S-2, HB-TP04 S-1, and HB-TP04 S-2 are qualified as estimated based on high %D of the continuing calibration standards.

The Cadmium value in sample HB-MW01 S-4 is qualified as not detected based on the high concentration in the Method Blank.

Samples HB-TP03 S-2, HB-TP04 S-2, and HB-MW01 High are qualified as estimated for Diesel and Heavy Oil based on the surrogate compound recoveries outside of acceptance limits.

The Copper values samples HB-TP01 S-3, HB-TP02 S-1, HB-TP02 S-2, HB-MW01 S-4, HB-MW01 S-6, HB-B01 S-1, and HB-B01 S-4 qualified as estimated for Copper based on the high spike recovery.

The values for Benzo(b,k)fluoranthenes, Benzo(a)Pyrene, Indeno(1,2,3-c,d)pyrene, Dibenz(a,h)anthracene, and Benzo(g,h,i)perylene associated with the low recovery of Perylene-d12 are qualified as estimated in samples HB-TP04 S-1 and HB-TP01 S-1. The Benzo(a)Anthracene and Chrysene values for sample HB-TP01 S-1 are qualified as estimated based on the low recovery of Chrysene-d12. The Pyrene value in HB-TP01 S-1 was quantitated from the Internal Standard Phenanthrene-d10 and is qualified with P.)

If you have any questions concerning these results, call me at (253) 502-2130. Please note, the samples associated with this report will be discarded six months from the date of this report unless requested otherwise.

Christopher L. Getchell  
Source Control Supervisor,  
Science and Engineering Division.

CLG:LAZ

Thea Foss Uplands  
Hick's Bull  
Development Site 9 (AJ212N TEC)

| Sample ID    | Laboratory ID | Matrix      |
|--------------|---------------|-------------|
| HB-TP03 S-1  | 010307044     | Soil        |
| HB-TP03 S-2  | 010307045     | Soil        |
| HB-TP04 S-1  | 010307046     | Soil        |
| HB-TP04 S-2  | 010307047     | Soil        |
| HB-TP01 S-1  | 010308072     | Soil        |
| HB-TP01 S-2  | 010308073     | Soil        |
| HB-TP01 S-3  | 010308074     | Soil        |
| HB-TP02 S-1  | 010308075     | Soil        |
| HB-TP02 S-2  | 010308076     | Soil        |
| HB-MW01 S-4  | 010312098     | Soil        |
| HB-MW01 S-6  | 010312099     | Soil        |
| HB-B01 S-1   | 010312104     | Soil        |
| HB-B01 S-4   | 010312105     | Soil        |
| HB-MW01      | 010320169     | Groundwater |
| HB-MWA       | 010321199     | Groundwater |
| HB-MW01 High | 010321200     | Groundwater |

## Quality Control Data Review

TO: Christopher L. Getchell, Source Control Supervisor  
FROM: Lori A. Zboralski, Senior Laboratory Analyst *LZ*  
DATE: May 11, 2001

### SAMPLES

This report concerns the following samples associated with the **Foss Uplands WO# AJ212M**:

| <u>Sample Description</u> | <u>Lab #</u> | <u>Sample Matrix</u> | <u>Date Sampled</u> |
|---------------------------|--------------|----------------------|---------------------|
| HB-TP03 S-1               | 010307044    | Soil                 | 03/07/01            |
| HB-TP03 S-2               | 010307045    | Soil                 | 03/07/01            |
| HB-TP04 S-1               | 010307046    | Soil                 | 03/07/01            |
| HB-TP04 S-2               | 010307047    | Soil                 | 03/07/01            |
| HB-TP01 S-1               | 010308072    | Soil                 | 03/08/01            |
| HB-TP01 S-2               | 010308073    | Soil                 | 03/08/01            |
| HB-TP01 S-3               | 010308074    | Soil                 | 03/08/01            |
| HB-TP02 S-1               | 010308075    | Soil                 | 03/08/01            |
| HB-TP02 S-2               | 010308076    | Soil                 | 03/08/01            |
| HB-MW01 S-4               | 010312098    | Soil                 | 03/09/01            |
| HB-MW01 S-6               | 010312099    | Soil                 | 03/09/01            |
| HB-B01 S-1                | 010312104    | Soil                 | 03/08/01            |
| HB-B01 S-4                | 010312105    | Soil                 | 03/08/01            |
| HB-MW01                   | 010320169    | Groundwater          | 03/20/01            |
| HB-MWA                    | 010321199    | Groundwater          | 03/21/01            |
| HB-MW01 High              | 010321200    | Groundwater          | 03/21/01            |

### HOLDING TIMES

The water samples were extracted within the 7-day holding time for Semi-Volatile Organics and NWTPH-Dx and analyzed within 7 days for TSS, 14 days for Volatile Organics, 28 days for Dissolved Mercury, 40 days for Semi-Volatile Organics and NWTPH-Dx, and 180 days for Dissolved Metals.

The soil samples were extracted within the 14-day holding time for Semi-Volatile Organics and NWTPH-Dx and analyzed within 7 days for Solids, 14 days for Volatile Organics, 28 days for Mercury, 40 days for Semi-Volatile Organics and NWTPH-Dx, and 180 days for Total Metals.

### METHODS

The samples were analyzed according to NWTPH-G, NWTPH-Dx, CLP ILM04.0 for Metals, CLP OLM01.8 for Volatile and Semi-Volatile Organics and Science and Engineering Division Standard Operating Procedures.

## DAILY INSTRUMENT PERFORMANCE STANDARDS

The criteria for the spectra of Decafluoro-triphenylphosphine (DFTPP) and Bromofluorobenzene (BFB) were met for the twelve-hour sequences when these samples were analyzed. The spectra generated by the mass spectrometers can be considered in control for the analysis of these samples.

### CALIBRATION AND VERIFICATION

All reported compounds for Volatile and Semi-Volatile Organics had updated relative response factors (RRF) greater than or equal to 0.050 with relative standard deviations (%RSD) of less than 30% for the Initial Calibration and percent differences (%D) of less than 25% for the Continuing Calibration when compared to the average RRF.

The Initial Calibration for the NWTPH-G and NWPTH-Dx analyses were within the method limits with correlation coefficients of greater than 0.990. The continuing calibrations ranged from 1.5% to 30.0%. **The continuing calibration standards for Heavy Oil that exceeded the limits are listed in the table below:**

| Analysis  | Date             | %Difference | Associated Samples                                    |
|-----------|------------------|-------------|---|
| Heavy Oil | 03/19/01 9:42 am | 15.6        | HB-TP03 S-1, HB-TP03 S-2,<br>HB-TP04 S-1, HB-TP04 S-2 |
| Heavy Oil | 03/20/01 4:08 am | 30.0        | HB-TP03 S-1, HB-TP03 S-2,<br>HB-TP04 S-1, HB-TP04 S-2 |

**The Heavy Oil values samples HB-TP03 S-1, HB-TP03 S-2, HB-TP04 S-1, and HB-TP04 S-2 are qualified as estimated based on the high %D of the continuing calibration standards.**

The ICP and FIMS calibrations met method requirements for linearity and accuracy. ICP and FIMS sensitivities were verified by analysis of standards near the detection limits of the instruments. The recoveries ranged from 78 to 121% and all were within laboratory established 50-200% limits.

Independent mid-range standards were analyzed to monitor calibration accuracy for the ICP and FIMS (ICV and CCV). Acceptable recoveries for ICP must be within 90 to 110%. Recoveries for FIMS must be within 80 to 120%. All ICVs and CCVs had recoveries within acceptable limits.

Standards are required to be run to measure the accuracy of ICP interelement correction factors. These samples ICSA and ICSAB must be run at the beginning and end of each analytical run. The ICSAB recoveries for each element must be within 80 to 120% recovery. The recoveries of the ICSAB for the analysis of these samples ranged from 90 to 104%.

### METHOD AND CALIBRATION BLANKS

Method and calibration blanks were analyzed at the required frequencies for the methods. The concentrations of these blanks were less than 1/5<sup>th</sup> the amount found in the sample or the detection limit, **except for the following:**

| Parameter | Blank        | Concentration | MDL       | Associated Samples. |
|-----------|--------------|---------------|-----------|---------------------|
| Cadmium   | 010308080PBS | 0.6 ug/L      | 0.52 ug/L | HB-MW01 S-4         |

The Cadmium value in sample HB-MW01 S-4 is qualified as not detected based on the high concentration in the Method Blank.

#### SURROGATE COMPOUNDS

Two Surrogate compounds were added to the NWTPH-Dx analysis, 2 Surrogate compounds were added to the NWTPH-G/BTEX, and 2 Surrogate compounds were added to the Semi-Volatile Organics analysis. The Surrogate compound recoveries ranged from 49 to 161%. All the recoveries were within the control limits of the methods, **except for the following:**

| Analysis | Sample       | Surrogate Compound | Recovery | Limits |
|----------|--------------|--------------------|----------|--------|
| Semi-VOA | HB-TP01 S-1  | Terphenyl-d14      | 161      | 18-137 |
| NWTPH-Dx | HB-TP03 S-2  | 2-Fluorobiphenyl   | 34       | 50-150 |
| NWTPH-Dx | HB-TP04 S-2  | 2-Fluorobiphenyl   | 42       | 50-150 |
| NWTPH-Dx | HB-MW01 High | 2-Fluorobiphenyl   | 48       | 50-150 |

The Semi-VOA compounds in sample HB-TP01 S-1 are not qualified based on one surrogate compound outside of limits.

Samples HB-TP03 S-2, HB-TP04 S-2, and HB-MW01 High are qualified as estimated for Diesel and Heavy Oil based on the surrogate compound recoveries outside of acceptance limits.

#### LABORATORY CONTROL SAMPLES

Laboratory Control Samples (LCS) monitor the analytical system by carrying a standard through every step of the analytical method including extraction or digestion. All LCS recoveries were within laboratory established control limits.

#### DUPLICATE SAMPLE ANALYSIS

All associated duplicate samples had differences of less than the reporting limits for analytes with concentrations less than 5 times the reporting limits and Relative Percent Differences (RPD) of less than 35% for metals analytes with concentrations greater than 5 times the reporting limits.

#### MATRIX SPIKE AND MATRIX SPIKE DUPLICATE ANALYSIS

Matrix spike analysis was performed for the metals analysis. All recoveries were within the required CLP limits. Matrix spike and matrix spike duplicate analysis was performed for NWTPH-G, NWTPH-Dx, and Volatile and Semi-Volatile Organics with these samples. The spike recoveries were within the method recovery limits, **except for the following:**

| Spiked Sample | Analyte | % Recovery | Limits | Associated Samples  |
|---------------|---------|------------|--------|---|
| HB-TP02 S-2   | Copper  | 930        | 75-125 | HB-TP01 S-3, HB-TP02 S-1, HB-TP02 S-2, HB-MW01 S-4, HB-MW01 S-6, HB-B01 S-1, HB-B01 S-4 |
| HB-TP02 S-1   | Pyrene  | 151        | 35-142 | HB-TP02 S-1, HB-TP02 S-2, HB-MW01 S-4, HB-MW01 S-6, HB-B01 S-1                          |



The Copper values samples HB-TP01 S-3, HB-TP02 S-1, HB-TP02 S-2, HB-MW01 S-4, HB-MW01 S-6, HB-B01 S-1, and HB-B01 S-4 qualified as estimated for Copper based on the high spike recovery.

Matrix Spike recovery for Pyrene is an indicator of matrix interferences in that sample and do not necessarily reflect the matrices of other samples in the batch. No data is qualified based on the high Pyrene recovery in sample HB-TP02 S-1.

The RPDs for all of the MS/MSD pairs were within the method limits. No data is qualified based on Matrix Spike Duplicate analysis.

#### ICP SERIAL DILUTIONS

Serial dilution of samples analyzed by ICP provides information about physical or chemical interferences that may exist due to sample matrix.

Associated sample HB-TP02 S-2 was analyzed at a five-fold dilution. All analytes had %D of the diluted sample compared to the undiluted sample of less than 10% for analytes greater than 50 times the IDL.

#### INTERNAL STANDARDS

Performance of the Internal Standards (IS) monitors GC/MS sensitivity and stability during each analysis. Internal Standards must not vary more than -50% to +100% from the continuing calibration response and be within +/- 30 seconds from the continuing calibration retention time. **Samples with Internal Standards that did not meet these criteria are listed in the following table with the associated compounds:**

| <u>Sample ID</u> | <u>Internal Standard</u> | <u>IS Recovery</u> | <u>Associated Compounds</u>   |
|------------------|--------------------------|--------------------|---|
| HB-TP04 S-1      | Perylene-d12             | 47                 | Benzo(b,k)fluoranthenes<br>Benzo(a)Pyrene<br>Indeno(1,2,3-c,d)pyrene<br>Dibenz(a,h)anthracene<br>Benzo(g,h,i)perylene |
| HB-TP01 S-1      | Chrysene-d12             | 41                 | Pyrene<br>Benzo(a)Anthracene<br>Chrysene  |
| HB-TP01 S-1      | Perylene-d12             | 46                 | Benzo(b,k)fluoranthenes<br>Benzo(a)Pyrene<br>Indeno(1,2,3-c,d)pyrene<br>Dibenz(a,h)anthracene<br>Benzo(g,h,i)perylene |

The values for Benzo(b,k)fluoranthenes, Benzo(a)Pyrene, Indeno(1,2,3-c,d)pyrene, Dibenz(a,h)anthracene, and Benzo(g,h,i)perylene associated with the low recovery of Perylene-d12 are qualified as estimated in samples HB-TP04 S-1 and HB-TP01 S-1. The Pyrene value in HB-TP01 S-1 was quantitated from the Internal Standard Phenanthrene-d10 and is qualified with P. The Benzo(a)Anthracene and Chrysene values for sample HB-TP01 S-1 are qualified as estimated based on the low recovery of Chrysene-d12.

## DATA ASSESSMENT

The qualifiers assigned to these samples include the following:

- P indicates that the value was calculated using the alternate internal standard Phenanthrene-d10
- U indicates that the analysis of the parameter did not detect a positive hit above the Reporting Limit.
- UJ indicates that the analysis of the parameter did not detect a positive hit above the Reporting Limit, however the value should be considered estimated.
- J the value should be considered estimated.

All data including qualified values are acceptable for use.

**- City of Tacoma -**  
**Science and Engineering Division**

**To:** Christopher L. Getchell, Source Control Supervisor

Foss Uplands  
 AJ212NTEC

**Date:** May 11, 2001

**Lab#:** 010307044

**Sample ID:** HB-TP03 S-1

**Sample Type:** Soil

**Sample Date:** 3/7/01

| Test                   | Result | Units    |
|------------------------|--------|----------|
| CONVENTIONAL           |        |          |
| Solids                 | 92.0   | per cent |
| CV                     |        |          |
| Mercury                | 0.179  | mg/Kg    |
| GC/MS-BNA              |        |          |
| 2-Chloronaphthalene    | 83 U   | ug/Kg    |
| 2-Methylnaphthalene    | 83 U   | ug/Kg    |
| Acenaphthene           | 83 U   | ug/Kg    |
| Acenaphthylene         | 83 U   | ug/Kg    |
| Anthracene             | 83 U   | ug/Kg    |
| Benzo(a)anthracene     | 120    | ug/Kg    |
| Benzo(a)pyrene         | 100    | ug/Kg    |
| Benzo(g,h,i)perylene   | 83 U   | ug/Kg    |
| Benzo(a)fluoranthene   | 210    | ug/Kg    |
| Chrysene               | 110    | ug/Kg    |
| Dibenz(a,h)anthracene  | 83 U   | ug/Kg    |
| Fluoranthene           | 140    | ug/Kg    |
| Fluorene               | 83 U   | ug/Kg    |
| Indeno(1,2,3-cd)pyrene | 83 U   | ug/Kg    |
| Naphthalene            | 83 U   | ug/Kg    |

U indicates not detected at the associated value

B indicates the value is greater than the detection limits of the method, however it is lower than the Contract Required Detection Limits

J indicates the associated value is estimated

UJ indicates not detected at the associated value, however the value should be considered estimated

Lab#: 010307044  
Sample ID: HB-TP03 S-1  
Sample Type: Soil  
Sample Date: 3/7/01

|          | Test         | Result | Units |
|----------|--------------|--------|-------|
|          | Phenanthrene | 83 U   | ug/Kg |
|          | Pyrene       | 160    | ug/Kg |
| ICP      |              |        |       |
|          | Arsenic      | 9.1    | mg/Kg |
|          | Cadmium      | 1.16   | mg/Kg |
|          | Chromium     | 11.4   | mg/Kg |
|          | Copper       | 498    | mg/Kg |
|          | Lead         | 694    | mg/Kg |
|          | Nickel       | 14.7 J | mg/Kg |
|          | Zinc         | 398    | mg/Kg |
| NWTPH-Dx |              |        |       |
|          | Diesel       | 17 U   | mg/Kg |
|          | Heavy Oil    | 82 J   | mg/Kg |

Reviewed By: Lori A. Zboralski 5/11/01

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- J indicates the associated value is estimated
- UJ indicates not detected at the associated value, however the value should be considered estimated

**- City of Tacoma -**  
**Science and Engineering Division**

**To:** Christopher L. Getchell, Source Control Supervisor

Foss Uplands  
 AJ212NTEC

**Date:** May 11, 2001

**Lab#:** 010307045

**Sample ID:** HB-TP03 S-2

**Sample Type:** Soil

**Sample Date:** 3/7/01

| Test                   | Result   | Units    |
|------------------------|----------|----------|
| CONVENTIONAL           |          |          |
| Solids                 | 94.2     | per cent |
| CV                     |          |          |
| Mercury                | 0.0076 U | mg/Kg    |
| GC/MS-BNA              |          |          |
| 2-Chloronaphthalene    | 97 U     | ug/Kg    |
| 2-Methylnaphthalene    | 97 U     | ug/Kg    |
| Acenaphthene           | 97 U     | ug/Kg    |
| Acenaphthylene         | 97 U     | ug/Kg    |
| Anthracene             | 97 U     | ug/Kg    |
| Benzo(a)anthracene     | 97 U     | ug/Kg    |
| Benzo(a)pyrene         | 97 U     | ug/Kg    |
| Benzo(g,h,i)perylene   | 97 U     | ug/Kg    |
| Benzofluoranthenes     | 97 U     | ug/Kg    |
| Chrysene               | 97 U     | ug/Kg    |
| Dibenz(a,h)anthracene  | 97 U     | ug/Kg    |
| Fluoranthene           | 97 U     | ug/Kg    |
| Fluorene               | 97 U     | ug/Kg    |
| Indeno(1,2,3-cd)pyrene | 97 U     | ug/Kg    |
| Naphthalene            | 97 U     | ug/Kg    |

U indicates not detected at the associated value

B indicates the value is greater than the detection limits of the method, however it is lower than the Contract Required Detection Limits

J indicates the associated value is estimated

UJ indicates not detected at the associated value, however the value should be considered estimated

Lab#: 010307045  
Sample ID: HB-TP03 S-2  
Sample Type: Soil  
Sample Date: 3/7/01

|          | Test         | Result | Units |
|----------|--------------|--------|-------|
|          | Phenanthrene | 97 U   | ug/Kg |
|          | Pyrene       | 97 U   | ug/Kg |
| ICP      | Arsenic      | 2.6    | mg/Kg |
|          | Cadmium      | 0.23 U | mg/Kg |
|          | Chromium     | 14.4   | mg/Kg |
|          | Copper       | 5.9    | mg/Kg |
|          | Lead         | 2.54   | mg/Kg |
|          | Nickel       | 7.6 J  | mg/Kg |
|          | Zinc         | 15.7   | mg/Kg |
| NWTPH-Dx | Diesel       | 19 U J | mg/Kg |
|          | Heavy Oil    | 39 U J | mg/Kg |

Reviewed By: Lori A. Zboralski 5/11/01

- U indicates not detected at the associated value
- B indicates the value is greater than the detection limits of the method, however it is lower than the Contract Required Detection Limits
- J indicates the associated value is estimated
- UJ indicates not detected at the associated value, however the value should be considered estimated

**- City of Tacoma -**  
**Science and Engineering Division**

**To:** Christopher L. Getchell, Source Control Supervisor

Foss Uplands  
 AJ212NTEC

**Date:** May 11, 2001

**Lab#:** 010307046

**Sample ID:** HB-TP04 S-1

**Sample Type:** Soil

**Sample Date:** 3/7/01

| Test                   | Result | Units    |
|------------------------|--------|----------|
| CONVENTIONAL           |        |          |
| Solids                 | 83.3   | per cent |
| CV                     |        |          |
| Mercury                | 0.231  | mg/Kg    |
| GC/MS-BNA              |        |          |
| 2-Chloronaphthalene    | 96 U   | ug/Kg    |
| 2-Methylnaphthalene    | 96 U   | ug/Kg    |
| Acenaphthene           | 96 U   | ug/Kg    |
| Acenaphthylene         | 310    | ug/Kg    |
| Anthracene             | 140    | ug/Kg    |
| Benzo(a)anthracene     | 1700   | ug/Kg    |
| Benzo(a)pyrene         | 2300 J | ug/Kg    |
| Benzo(g,h,i)perylene   | 1800 J | ug/Kg    |
| Benzo(a)fluoranthene   | 4800 J | ug/Kg    |
| Chrysene               | 2700   | ug/Kg    |
| Dibenz(a,h)anthracene  | 330 J  | ug/Kg    |
| Fluoranthene           | 3500   | ug/Kg    |
| Fluorene               | 96 U   | ug/Kg    |
| Indeno(1,2,3-cd)pyrene | 1100 J | ug/Kg    |
| Naphthalene            | 96 U   | ug/Kg    |

U indicates not detected at the associated value

B indicates the value is greater than the detection limits of the method, however it is lower than the Contract Required Detection Limits

J indicates the associated value is estimated

UJ indicates not detected at the associated value, however the value should be considered estimated

Lab#: 010307046  
Sample ID: HB-TP04 S-1  
Sample Type: Soil  
Sample Date: 3/7/01

|          | Test         | Result | Units |
|----------|--------------|--------|-------|
|          | Phenanthrene | 1600   | ug/Kg |
|          | Pyrene       | 6400   | ug/Kg |
| ICP      | Arsenic      | 13.0   | mg/Kg |
|          | Cadmium      | 4.42   | mg/Kg |
|          | Chromium     | 17.9   | mg/Kg |
|          | Copper       | 232    | mg/Kg |
|          | Lead         | 696    | mg/Kg |
|          | Nickel       | 32.3 J | mg/Kg |
|          | Zinc         | 542    | mg/Kg |
| NWTPH-Dx | Diesel       | 19 U   | mg/Kg |
|          | Heavy Oil    | 1000 J | mg/Kg |

Reviewed By:

*Lori A. Zboralski* 5/11/01

U indicates not detected at the associated value

B indicates the value is greater than the detection limits of the method, however it is lower than the Contract Required Detection Limits

J indicates the associated value is estimated

UJ indicates not detected at the associated value, however the value should be considered estimated



**- City of Tacoma -**  
**Science and Engineering Division**

**To:** Christopher L. Getchell, Source Control Supervisor

Foss Uplands  
 AJ212NTEC

**Date:** May 11, 2001

**Lab#:** 010307047

**Sample ID:** HB-TP04 S-2

**Sample Type:** Soil

**Sample Date:** 3/7/01

| Test                   | Result                | Units    |
|------------------------|-----------------------|----------|
| CONVENTIONAL           |                       |          |
| Solids                 | 93.1                  | per cent |
| CV                     |                       |          |
| Mercury                | 0.0095 B <sup>5</sup> | mg/Kg    |
| GC/MS-BNA              |                       |          |
| 2-Chloronaphthalene    | 76 U                  | ug/Kg    |
| 2-Methylnaphthalene    | 76 U                  | ug/Kg    |
| Acenaphthene           | 76 U                  | ug/Kg    |
| Acenaphthylene         | 76 U                  | ug/Kg    |
| Anthracene             | 76 U                  | ug/Kg    |
| Benzo(a)anthracene     | 76 U                  | ug/Kg    |
| Benzo(a)pyrene         | 76 U                  | ug/Kg    |
| Benzo(g,h,i)perylene   | 76 U                  | ug/Kg    |
| Benzofluoranthenes     | 76 U                  | ug/Kg    |
| Chrysene               | 76 U                  | ug/Kg    |
| Dibenz(a,h)anthracene  | 76 U                  | ug/Kg    |
| Fluoranthene           | 76 U                  | ug/Kg    |
| Fluorene               | 76 U                  | ug/Kg    |
| Indeno(1,2,3-cd)pyrene | 76 U                  | ug/Kg    |
| Naphthalene            | 76 U                  | ug/Kg    |

DLL  
 2/5/02

- U indicates not detected at the associated value
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Lab#: 010307047  
Sample ID: HB-TP04 S-2  
Sample Type: Soil  
Sample Date: 3/7/01

|          | Test         | Result | Units |
|----------|--------------|--------|-------|
|          | Phenanthrene | 76 U   | ug/Kg |
|          | Pyrene       | 76 U   | ug/Kg |
| ICP      | Arsenic      | 2.2    | mg/Kg |
|          | Cadmium      | 0.26 U | mg/Kg |
|          | Chromium     | 8.56   | mg/Kg |
|          | Copper       | 4.6    | mg/Kg |
|          | Lead         | 1.95   | mg/Kg |
|          | Nickel       | 8.1 J  | mg/Kg |
|          | Zinc         | 12.1   | mg/Kg |
| NWTPH-Dx | Diesel       | 15 U J | mg/Kg |
|          | Heavy Oil    | 31 U J | mg/Kg |

Reviewed By: Lori A. Zboralski 5/11/01

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**- City of Tacoma -**  
**Science and Engineering Division**

**To:** Christopher L. Getchell, Source Control Supervisor

Foss Uplands  
 AJ212NTEC

**Date:** May 11, 2001

**Lab#:** 010308072

**Sample ID:** HB-TP01 S-1

**Sample Type:** Solids

**Sample Date:** 3/8/01

| Test                   | Result     | Units    |
|------------------------|------------|----------|
| CONVENTIONAL           |            |          |
| Solids                 | 90.8       | per cent |
| CV                     |            |          |
| Mercury                | 0.0175 B J | mg/Kg    |
| GC/MS-BNA              |            |          |
| 2-Chloronaphthalene    | 88 U       | ug/Kg    |
| 2-Methylnaphthalene    | 88 U       | ug/Kg    |
| Acenaphthene           | 88 U       | ug/Kg    |
| Acenaphthylene         | 88 U       | ug/Kg    |
| Anthracene             | 88 U       | ug/Kg    |
| Benzo(a)anthracene     | 94 J       | ug/Kg    |
| Benzo(a)pyrene         | 310 J      | ug/Kg    |
| Benzo(g,h,i)perylene   | 88 U J     | ug/Kg    |
| Benzofluoranthenes     | 700 J      | ug/Kg    |
| Chrysene               | 200 J      | ug/Kg    |
| Dibenz(a,h)anthracene  | 88 U J     | ug/Kg    |
| Fluoranthene           | 160        | ug/Kg    |
| Fluorene               | 88 U       | ug/Kg    |
| Indeno(1,2,3-cd)pyrene | 88 U J     | ug/Kg    |
| Naphthalene            | 88 U       | ug/Kg    |

DLC  
2/5/02

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Lab#: 010308072

Sample ID: HB-TP01 S-1

Sample Type: Solids

Sample Date: 3/8/01

|          | Test         | Result | Units |
|----------|--------------|--------|-------|
|          | Phenanthrene | 200    | ug/Kg |
|          | Pyrene       | 210 PJ | ug/Kg |
| ICP      | Arsenic      | 4.3    | mg/Kg |
|          | Cadmium      | 0.51 U | mg/Kg |
|          | Chromium     | 14.9   | mg/Kg |
|          | Copper       | 18.5   | mg/Kg |
|          | Lead         | 15.3   | mg/Kg |
|          | Nickel       | 35.3 J | mg/Kg |
|          | Zinc         | 46.3   | mg/Kg |
| NWTPH-Dx | Diesel       | 350 U  | mg/Kg |
|          | Heavy Oil    | 4000   | mg/Kg |

Reviewed By:

Lori A. Zboralski 5/11/01

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P indicates the value is quantitated on the alternate Internal Standard Phenanthrene-d10

**- City of Tacoma -**  
**Science and Engineering Division**

To: Christopher L. Getchell, Source Control Supervisor

Foss Uplands  
 AJ212NTEC

Date: May 11, 2001

Lab#: 010308073

Sample ID: HB-TP01 S-2

Sample Type: Soil

Sample Date: 3/8/01

| Test                   | Result     | Units    |
|------------------------|------------|----------|
| CONVENTIONAL           |            |          |
| Solids                 | 86.1       | per cent |
| CV                     |            |          |
| Mercury                | 0.0219 B J | mg/Kg    |
| GC/MS-BNA              |            |          |
| 2-Chloronaphthalene    | 99 U       | ug/Kg    |
| 2-Methylnaphthalene    | 99 U       | ug/Kg    |
| Acenaphthene           | 99 U       | ug/Kg    |
| Acenaphthylene         | 99 U       | ug/Kg    |
| Anthracene             | 99 U       | ug/Kg    |
| Benzo(a)anthracene     | 99 U       | ug/Kg    |
| Benzo(a)pyrene         | 99 U       | ug/Kg    |
| Benzo(g,h,i)perylene   | 99 U       | ug/Kg    |
| Benzofluoranthenes     | 99 U       | ug/Kg    |
| Chrysene               | 99 U       | ug/Kg    |
| Dibenz(a,h)anthracene  | 99 U       | ug/Kg    |
| Fluoranthene           | 99 U       | ug/Kg    |
| Fluorene               | 99 U       | ug/Kg    |
| Indeno(1,2,3-cd)pyrene | 99 U       | ug/Kg    |
| Naphthalene            | 99 U       | ug/Kg    |

DLC  
 2/5/02

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**Lab#:** 010308073  
**Sample ID:** HB-TP01 S-2  
**Sample Type:** Soil  
**Sample Date:** 3/8/01

|          | Test         | Result   | Units |
|----------|--------------|----------|-------|
|          | Phenanthrene | 99 U     | ug/Kg |
|          | Pyrene       | 99 U     | ug/Kg |
| ICP      | Arsenic      | 3.0      | mg/Kg |
|          | Cadmium      | 0.35 B J | mg/Kg |
|          | Chromium     | 27.5     | mg/Kg |
|          | Copper       | 10.9     | mg/Kg |
|          | Lead         | 5.11     | mg/Kg |
|          | Nickel       | 39.9 J   | mg/Kg |
|          | Zinc         | 31.4     | mg/Kg |
| NWTPH-Dx | Diesel       | 20 U     | mg/Kg |
|          | Heavy Oil    | 40 U     | mg/Kg |

DLC  
2/5/02

Reviewed By: Lori A. Zboralski 5/11/01

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**- City of Tacoma -**  
**Science and Engineering Division**

**To:** Christopher L. Getchell, Source Control Supervisor

Foss Uplands  
 AJ212NTEC

**Date:** May 11, 2001

**Lab#:** 010308074

**Sample ID:** HB-TP01 S-3

**Sample Type:** Soil

**Sample Date:** 3/8/01

| Test                   | Result | Units    |
|------------------------|--------|----------|
| CONVENTIONAL           |        |          |
| Solids                 | 86.5   | per cent |
| CV                     |        |          |
| Mercury                | 0.159  | mg/Kg    |
| GC/MS-BNA              |        |          |
| 2-Chloronaphthalene    | 96 U   | ug/Kg    |
| 2-Methylnaphthalene    | 96 U   | ug/Kg    |
| Acenaphthene           | 96 U   | ug/Kg    |
| Acenaphthylene         | 96 U   | ug/Kg    |
| Anthracene             | 190    | ug/Kg    |
| Benzo(a)anthracene     | 430    | ug/Kg    |
| Benzo(a)pyrene         | 370    | ug/Kg    |
| Benzo(g,h,i)perylene   | 220    | ug/Kg    |
| Benzo(a)fluoranthene   | 490    | ug/Kg    |
| Chrysene               | 420    | ug/Kg    |
| Dibenz(a,h)anthracene  | 96 U   | ug/Kg    |
| Fluoranthene           | 710    | ug/Kg    |
| Fluorene               | 96 U   | ug/Kg    |
| Indeno(1,2,3-cd)pyrene | 180    | ug/Kg    |
| Naphthalene            | 96 U   | ug/Kg    |

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Lab#: 010308074  
Sample ID: HB-TP01 S-3  
Sample Type: Soil  
Sample Date: 3/8/01

|          | Test         | Result   | Units |
|----------|--------------|----------|-------|
|          | Phenanthrene | 550      | ug/Kg |
|          | Pyrene       | 1000     | ug/Kg |
| ICP      | Arsenic      | 3.59     | mg/Kg |
|          | Cadmium      | 0.49 B J | mg/Kg |
|          | Chromium     | 25.8     | mg/Kg |
|          | Copper       | 23.0 J   | mg/Kg |
|          | Lead         | 36.5     | mg/Kg |
|          | Nickel       | 34.1     | mg/Kg |
|          | Zinc         | 55.9     | mg/Kg |
| NWTPH-Dx | Diesel       | 19 U     | mg/Kg |
|          | Heavy Oil    | 44       | mg/Kg |

DLC  
2/5/02

Reviewed By: Lori A. Zboralski 5/11/07

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**- City of Tacoma -**  
**Science and Engineering Division**

**To:** Christopher L. Getchell, Source Control Supervisor

Foss Uplands  
 AJ212NTEC

**Date:** May 11, 2001

**Lab#:** 010308075

**Sample ID:** HB-TP02 S-1

**Sample Type:** Soil

**Sample Date:** 3/8/01

| Test                   | Result | Units    |
|------------------------|--------|----------|
| CONVENTIONAL           |        |          |
| Solids                 | 87.0   | per cent |
| CV                     |        |          |
| Mercury                | 0.140  | mg/Kg    |
| GC/MS-BNA              |        |          |
| 2-Chloronaphthalene    | 99 U   | ug/Kg    |
| 2-Methylnaphthalene    | 99 U   | ug/Kg    |
| Acenaphthene           | 99 U   | ug/Kg    |
| Acenaphthylene         | 110    | ug/Kg    |
| Anthracene             | 150    | ug/Kg    |
| Benzo(a)anthracene     | 290    | ug/Kg    |
| Benzo(a)pyrene         | 480    | ug/Kg    |
| Benzo(g,h,i)perylene   | 1200   | ug/Kg    |
| Benzofluoranthenes     | 850    | ug/Kg    |
| Chrysene               | 780    | ug/Kg    |
| Dibenz(a,h)anthracene  | 190    | ug/Kg    |
| Fluoranthene           | 320    | ug/Kg    |
| Fluorene               | 99 U   | ug/Kg    |
| Indeno(1,2,3-cd)pyrene | 500    | ug/Kg    |
| Naphthalene            | 99 U   | ug/Kg    |

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J indicates the associated value is estimated

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Lab#: 010308075  
Sample ID: HB-TP02 S-1  
Sample Type: Soil  
Sample Date: 3/8/01

|          | Test         | Result   | Units |
|----------|--------------|----------|-------|
|          | Phenanthrene | 320      | ug/Kg |
|          | Pyrene       | 520      | ug/Kg |
| ICP      | Arsenic      | 8.81     | mg/Kg |
|          | Cadmium      | 0.90 B J | mg/Kg |
|          | Chromium     | 23.0     | mg/Kg |
|          | Copper       | 115 J    | mg/Kg |
|          | Lead         | 207      | mg/Kg |
|          | Nickel       | 23.6     | mg/Kg |
|          | Zinc         | 171      | mg/Kg |
| NWTPH-Dx | Diesel       | 19 U     | mg/Kg |
|          | Heavy Oil    | 510      | mg/Kg |

DLC  
2/5/02

Reviewed By: Lori A. Zboralsti 5/11/01

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**- City of Tacoma -**  
**Science and Engineering Division**

**To:** Christopher L. Getchell, Source Control Supervisor

Foss Uplands  
 AJ212NTEC

**Date:** May 11, 2001

**Lab#:** 010308076

**Sample ID:** HB-TP02 S-2

**Sample Type:** Soil

**Sample Date:** 3/8/01

| Test                   | Result                  | Units    |
|------------------------|-------------------------|----------|
| CONVENTIONAL           |                         |          |
| Solids                 | 89.0                    | per cent |
| CV                     |                         |          |
| Mercury                | 0.0720 B <sup>-</sup> J | mg/Kg    |
| GC/MS-BNA              |                         |          |
| 2-Chloronaphthalene    | 97 U                    | ug/Kg    |
| 2-Methylnaphthalene    | 97 U                    | ug/Kg    |
| Acenaphthene           | 97 U                    | ug/Kg    |
| Acenaphthylene         | 97 U                    | ug/Kg    |
| Anthracene             | 97 U                    | ug/Kg    |
| Benzo(a)anthracene     | 300                     | ug/Kg    |
| Benzo(a)pyrene         | 350                     | ug/Kg    |
| Benzo(g,h,i)perylene   | 320                     | ug/Kg    |
| Benzo(a)fluoranthene   | 540                     | ug/Kg    |
| Chrysene               | 400                     | ug/Kg    |
| Dibenz(a,h)anthracene  | 97 U                    | ug/Kg    |
| Fluoranthene           | 370                     | ug/Kg    |
| Fluorene               | 97 U                    | ug/Kg    |
| Indeno(1,2,3-cd)pyrene | 210                     | ug/Kg    |
| Naphthalene            | 97 U                    | ug/Kg    |

DCC  
 2/5/02

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Lab#: 010308076  
 Sample ID: HB-TP02 S-2  
 Sample Type: Soil  
 Sample Date: 3/8/01

|          | Test         | Result   | Units |
|----------|--------------|----------|-------|
|          | Phenanthrene | 280      | ug/Kg |
|          | Pyrene       | 490      | ug/Kg |
| ICP      | Arsenic      | 3.11     | mg/Kg |
|          | Cadmium      | 0.43 B J | mg/Kg |
|          | Chromium     | 24.2     | mg/Kg |
|          | Copper       | 112 J    | mg/Kg |
|          | Lead         | 60.0     | mg/Kg |
|          | Nickel       | 34.9     | mg/Kg |
|          | Zinc         | 70.2     | mg/Kg |
| NWTPH-Dx | Diesel       | 19 U     | mg/Kg |
|          | Heavy Oil    | 100      | mg/Kg |

DLC  
2/5/02

Reviewed By: Lori A. Zboralski 5/11/01

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**- City of Tacoma -**  
**Science and Engineering Division**

**To:** Christopher L. Getchell, Source Control Supervisor

Foss Uplands  
 AJ212NTEC

**Date:** May 11, 2001

**Lab#:** 010312098

**Sample ID:** HB-MW01 S-4

**Sample Type:** Soil

**Sample Date:** 3/9/01

| Test                   | Result      | Units    |
|------------------------|-------------|----------|
| CONVENTIONAL           |             |          |
| Solids                 | 84.4        | per cent |
| CV                     |             |          |
| Mercury                | 0.0254 B' J | mg/Kg    |
| GC/MS-BNA              |             |          |
| 2-Chloronaphthalene    | 97 U        | ug/Kg    |
| 2-Methylnaphthalene    | 1900        | ug/Kg    |
| Acenaphthene           | 3500        | ug/Kg    |
| Acenaphthylene         | 97 U        | ug/Kg    |
| Anthracene             | 2500        | ug/Kg    |
| Benzo(a)anthracene     | 1300        | ug/Kg    |
| Benzo(a)pyrene         | 330         | ug/Kg    |
| Benzo(g,h,i)perylene   | 110         | ug/Kg    |
| Benzo(a)fluoranthene   | 680         | ug/Kg    |
| Chrysene               | 1300        | ug/Kg    |
| Dibenz(a,h)anthracene  | 97 U        | ug/Kg    |
| Fluoranthene           | 6700        | ug/Kg    |
| Fluorene               | 3700        | ug/Kg    |
| Indeno(1,2,3-cd)pyrene | 110         | ug/Kg    |
| Naphthalene            | 4700        | ug/Kg    |

DLL  
 2/5/01

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Lab#: 010312098  
Sample ID: HB-MW01 S-4  
Sample Type: Soil  
Sample Date: 3/9/01

|           | Test            | Result  | Units |
|-----------|-----------------|---------|-------|
|           | Phenanthrene    | 12000   | ug/Kg |
|           | Pyrene          | 6300    | ug/Kg |
| GC/MS-VOA |                 |         |       |
|           | Benzene         | 220 U   | ug/Kg |
|           | Ethylbenzene    | 220 U   | ug/Kg |
|           | Gasoline        | 4.5 U J | mg/Kg |
|           | Toluene         | 220 U   | ug/Kg |
|           | Xylenes (Total) | 220 U   | ug/Kg |
| ICP       |                 |         |       |
|           | Arsenic         | 4.72    | mg/Kg |
|           | Cadmium         | 0.48 U  | mg/Kg |
|           | Chromium        | 14.7    | mg/Kg |
|           | Copper          | 28.2 J  | mg/Kg |
|           | Lead            | 21.6    | mg/Kg |
|           | Nickel          | 18.4    | mg/Kg |
|           | Zinc            | 46.5    | mg/Kg |
| NWTPH-Dx  |                 |         |       |
|           | Diesel          | 19 U    | mg/Kg |
|           | Heavy Oil       | 39 U    | mg/Kg |

Reviewed By: Lori A. Zbosalski 5/11/01

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**- City of Tacoma -**  
**Science and Engineering Division**

**To:** Christopher L. Getchell, Source Control Supervisor

Foss Uplands

AJ212NTEC

**Date:** May 11, 2001

**Lab#:** 010312099

**Sample ID:** HB-MW01 S-6

**Sample Type:** Soil

**Sample Date:** 3/9/01

| Test                   | Result            | Units    |
|------------------------|-------------------|----------|
| CONVENTIONAL           |                   |          |
| Solids                 | 80.3              | per cent |
| CV                     |                   |          |
| Mercury                | 0.0077 <i>B J</i> | mg/Kg    |
| GC/MS-BNA              |                   |          |
| 2-Chloronaphthalene    | 89 U              | ug/Kg    |
| 2-Methylnaphthalene    | 89 U              | ug/Kg    |
| Acenaphthene           | 89 U              | ug/Kg    |
| Acenaphthylene         | 89 U              | ug/Kg    |
| Anthracene             | 89 U              | ug/Kg    |
| Benzo(a)anthracene     | 89 U              | ug/Kg    |
| Benzo(a)pyrene         | 89 U              | ug/Kg    |
| Benzo(g,h,i)perylene   | 89 U              | ug/Kg    |
| Benzofluoranthenes     | 89 U              | ug/Kg    |
| Chrysene               | 89 U              | ug/Kg    |
| Dibenz(a,h)anthracene  | 89 U              | ug/Kg    |
| Fluoranthene           | 380               | ug/Kg    |
| Fluorene               | 120               | ug/Kg    |
| Indeno(1,2,3-cd)pyrene | 89 U              | ug/Kg    |
| Naphthalene            | 99                | ug/Kg    |

*DLC*  
*2/5/02*

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Lab#: 010312099  
Sample ID: HB-MW01 S-6  
Sample Type: Soil  
Sample Date: 3/9/01

|          | Test         | Result | Units |
|----------|--------------|--------|-------|
|          | Phenanthrene | 700    | ug/Kg |
|          | Pyrene       | 300    | ug/Kg |
| ICP      | Arsenic      | 2.07   | mg/Kg |
|          | Cadmium      | 0.26 U | mg/Kg |
|          | Chromium     | 5.34   | mg/Kg |
|          | Copper       | 11.8 J | mg/Kg |
|          | Lead         | 2.86   | mg/Kg |
|          | Nickel       | 6.32   | mg/Kg |
|          | Zinc         | 196    | mg/Kg |
| NWTPH-Dx | Diesel       | 18 U   | mg/Kg |
|          | Heavy Oil    | 36 U   | mg/Kg |

Reviewed By:

Lori A. Zboralski      5/11/01

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J indicates the associated value is estimated

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**- City of Tacoma -**  
**Science and Engineering Division**

To: Christopher L. Getchell, Source Control Supervisor

Foss Uplands  
 AJ212NTEC

Date: May 11, 2001

Lab#: 010312104

Sample ID: HB-B01 S-1

Sample Type: Soil

Sample Date: 3/9/01

| Test                   | Result     | Units    |
|------------------------|------------|----------|
| CONVENTIONAL           |            |          |
| Solids                 | 86.2       | per cent |
| CV                     |            |          |
| Mercury                | 0.0897 B'J | mg/Kg    |
| GC/MS-BNA              |            |          |
| 2-Chloronaphthalene    | 94 U       | ug/Kg    |
| 2-Methylnaphthalene    | 94 U       | ug/Kg    |
| Acenaphthene           | 94 U       | ug/Kg    |
| Acenaphthylene         | 94 U       | ug/Kg    |
| Anthracene             | 94 U       | ug/Kg    |
| Benzo(a)anthracene     | 94 U       | ug/Kg    |
| Benzo(a)pyrene         | 94 U       | ug/Kg    |
| Benzo(g,h,i)perylene   | 94 U       | ug/Kg    |
| Benzofluoranthenes     | 110        | ug/Kg    |
| Chrysene               | 94 U       | ug/Kg    |
| Dibenz(a,h)anthracene  | 94 U       | ug/Kg    |
| Fluoranthene           | 94 U       | ug/Kg    |
| Fluorene               | 94 U       | ug/Kg    |
| Indeno(1,2,3-cd)pyrene | 94 U       | ug/Kg    |
| Naphthalene            | 94 U       | ug/Kg    |

*DUC*  
*2/5/02*

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Lab#: 010312104

Sample ID: HB-B01 S-1

Sample Type: Soil

Sample Date: 3/9/01

|          | Test         | Result   | Units |
|----------|--------------|----------|-------|
|          | Phenanthrene | 94 U     | ug/Kg |
|          | Pyrene       | 120      | ug/Kg |
| ICP      | Arsenic      | 4.15     | mg/Kg |
|          | Cadmium      | 0.48 B J | mg/Kg |
|          | Chromium     | 34.6     | mg/Kg |
|          | Copper       | 52.2 J   | mg/Kg |
|          | Lead         | 72.2     | mg/Kg |
|          | Nickel       | 34.0     | mg/Kg |
|          | Zinc         | 67.4     | mg/Kg |
| NWTPH-Dx | Diesel       | 19 U     | mg/Kg |
|          | Heavy Oil    | 130      | mg/Kg |

DCC  
2/5/02

Reviewed By: Lori A. Zboralski 5/14/01

U indicates not detected at the associated value

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**- City of Tacoma -**  
**Science and Engineering Division**

**To:** Christopher L. Getchell, Source Control Supervisor

Foss Uplands  
 AJ212NTEC

**Date:** May 11, 2001

**Lab#:** 010312105

**Sample ID:** HB-B01 S-4

**Sample Type:** Soil

**Sample Date:** 3/9/01

| Test                   | Result           | Units    |
|------------------------|------------------|----------|
| CONVENTIONAL           |                  |          |
| Solids                 | 79.2             | per cent |
| CV                     |                  |          |
| Mercury                | 0.0117 <i>BJ</i> | mg/Kg    |
| GC/MS-BNA              |                  |          |
| 2-Chloronaphthalene    | 89 U             | ug/Kg    |
| 2-Methylnaphthalene    | 89 U             | ug/Kg    |
| Acenaphthene           | 89 U             | ug/Kg    |
| Acenaphthylene         | 89 U             | ug/Kg    |
| Anthracene             | 89 U             | ug/Kg    |
| Benzo(a)anthracene     | 89 U             | ug/Kg    |
| Benzo(a)pyrene         | 89 U             | ug/Kg    |
| Benzo(g,h,i)perylene   | 89 U             | ug/Kg    |
| Benzofluoranthenes     | 89 U             | ug/Kg    |
| Chrysene               | 89 U             | ug/Kg    |
| Dibenz(a,h)anthracene  | 89 U             | ug/Kg    |
| Fluoranthene           | 89 U             | ug/Kg    |
| Fluorene               | 89 U             | ug/Kg    |
| Indeno(1,2,3-cd)pyrene | 89 U             | ug/Kg    |
| Naphthalene            | 89 U             | ug/Kg    |

*DLL*  
*2/5/02*

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Lab#: 010312105  
Sample ID: HB-B01 S-4  
Sample Type: Soil  
Sample Date: 3/9/01

|          | Test         | Result | Units |
|----------|--------------|--------|-------|
|          | Phenanthrene | 89 U   | ug/Kg |
|          | Pyrene       | 89 U   | ug/Kg |
| ICP      | Arsenic      | 2.79   | mg/Kg |
|          | Cadmium      | 0.25 U | mg/Kg |
|          | Chromium     | 5.73   | mg/Kg |
|          | Copper       | 8.82 J | mg/Kg |
|          | Lead         | 5.64   | mg/Kg |
|          | Nickel       | 6.73   | mg/Kg |
|          | Zinc         | 15.9   | mg/Kg |
| NWTPH-Dx | Diesel       | 18 U   | mg/Kg |
|          | Heavy Oil    | 35 U   | mg/Kg |

Reviewed By: Lori A. Zboralski 5/11/01

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**- City of Tacoma -**  
**Science and Engineering Division**

**To:** Christopher L. Getchell, Source Control Supervisor

Foss Uplands  
 AJ212NTEC

**Date:** May 11, 2001

**Lab#:** 010320169

**Sample ID:** HB-MW01

**Sample Type:** Groundwater

**Sample Date:** 3/20/01

| Test                   | Result  | Units |
|------------------------|---------|-------|
| CONVENTIONAL           |         |       |
| TSS                    | 2.9     | mg/L  |
| CV-DISS                |         |       |
| Mercury, dissolved     | 0.050 U | ug/L  |
| GC/MS-PNA              |         |       |
| 2-Chloronaphthalene    | 1.0 U   | ug/L  |
| 2-Methylnaphthalene    | 1.0 U   | ug/L  |
| Acenaphthene           | 12      | ug/L  |
| Acenaphthylene         | 1.0 U   | ug/L  |
| Anthracene             | 1.7     | ug/L  |
| Benzo(a)anthracene     | 1.0 U   | ug/L  |
| Benzo(a)pyrene         | 1.0 U   | ug/L  |
| Benzo(g,h,i)perylene   | 1.0 U   | ug/L  |
| Benzo(a)fluoranthene   | 1.0 U   | ug/L  |
| Chrysene               | 1.0 U   | ug/L  |
| Dibenz(a,h)anthracene  | 1.0 U   | ug/L  |
| Fluoranthene           | 9.1     | ug/L  |
| Fluorene               | 3.5     | ug/L  |
| Indeno(1,2,3-cd)pyrene | 1.0 U   | ug/L  |
| Naphthalene            | 1.0 U   | ug/L  |

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**Lab#:** 010320169  
**Sample ID:** HB-MW01  
**Sample Type:** Groundwater  
**Sample Date:** 3/20/01

|           | Test                | Result   | Units |
|-----------|---------------------|----------|-------|
| GC/MS-VOA | Phenanthrene        | 1.0 U    | ug/L  |
|           | Pyrene              | 1.0 U    | ug/L  |
|           | Benzene             | 0.5 U    | ug/L  |
|           | Ethylbenzene        | 0.5 U    | ug/L  |
|           | Gasoline            | 0.5 U    | mg/L  |
|           | Toluene             | 0.5 U    | ug/L  |
| ICP-DISS  | Xylenes (Total)     | 0.5 U    | ug/L  |
|           | Antimony, dissolved | 2.6 B J  | ug/L  |
|           | Arsenic, dissolved  | 26       | ug/L  |
|           | Cadmium, dissolved  | 0.083 U  | ug/L  |
|           | Chromium, dissolved | 6.1      | ug/L  |
|           | Copper, dissolved   | 7.2      | ug/L  |
|           | Lead, dissolved     | 0.14 B J | ug/L  |
|           | Nickel, dissolved   | 13       | ug/L  |
| NWTPH-Dx  | Zinc, dissolved     | 43       | ug/L  |
|           | Diesel              | 0.25 U   | mg/L  |
|           | Heavy Oil           | 0.50 U   | mg/L  |

Reviewed By: Lori A. Zboralski 5/11/01

DCC  
 2/5/02

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**- City of Tacoma -**  
**Science and Engineering Division**

To: Christopher L. Getchell, Source Control Supervisor

Foss Uplands  
 AJ212NTEC

Date: May 11, 2001

Lab#: 010321199

Sample ID: HB-MWA

Sample Type: Groundwater

Sample Date: 3/21/01

| Test                   | Result  | Units |
|------------------------|---------|-------|
| CONVENTIONAL           |         |       |
| TSS                    | 0.7     | mg/L  |
| CV-DISS                |         |       |
| Mercury, dissolved     | 0.050 U | ug/L  |
| GC/MS-PNA              |         |       |
| 2-Chloronaphthalene    | 1.0 U   | ug/L  |
| 2-Methylnaphthalene    | 1.0 U   | ug/L  |
| Acenaphthene           | 7.7     | ug/L  |
| Acenaphthylene         | 1.0 U   | ug/L  |
| Anthracene             | 1.0 U   | ug/L  |
| Benzo(a)anthracene     | 1.0 U   | ug/L  |
| Benzo(a)pyrene         | 1.0 U   | ug/L  |
| Benzo(g,h,i)perylene   | 1.0 U   | ug/L  |
| Benzofluoranthenes     | 1.0 U   | ug/L  |
| Chrysene               | 1.0 U   | ug/L  |
| Dibenz(a,h)anthracene  | 1.0 U   | ug/L  |
| Fluoranthene           | 12      | ug/L  |
| Fluorene               | 2.8     | ug/L  |
| Indeno(1,2,3-cd)pyrene | 1.0 U   | ug/L  |
| Naphthalene            | 1.0 U   | ug/L  |

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**Lab#:** 010321199  
**Sample ID:** HB-MWA  
**Sample Type:** Groundwater  
**Sample Date:** 3/21/01

|           | Test                | Result    | Units |
|-----------|---------------------|-----------|-------|
|           | Phenanthrene        | 1.5       | ug/L  |
|           | Pyrene              | 1.0 U     | ug/L  |
| GC/MS-VOA |                     |           |       |
|           | Benzene             | 0.5 U     | ug/L  |
|           | Ethylbenzene        | 0.5 U     | ug/L  |
|           | Gasoline            | 0.5 U     | mg/L  |
|           | Toluene             | 0.5 U     | ug/L  |
|           | Xylenes (Total)     | 0.5 U     | ug/L  |
| ICP-DISS  |                     |           |       |
|           | Antimony, dissolved | 2.2 B J   | ug/L  |
|           | Arsenic, dissolved  | 19        | ug/L  |
|           | Cadmium, dissolved  | 0.083 U   | ug/L  |
|           | Chromium, dissolved | 5.2       | ug/L  |
|           | Copper, dissolved   | 5.9       | ug/L  |
|           | Lead, dissolved     | 0.029 B J | ug/L  |
|           | Nickel, dissolved   | 9.3       | ug/L  |
|           | Zinc, dissolved     | 53        | ug/L  |
| NWTPH-Dx  |                     |           |       |
|           | Diesel              | 0.25 U    | mg/L  |
|           | Heavy Oil           | 0.50 U    | mg/L  |

DLL  
2/5/02

Reviewed By: Lori A. Zboralski 5/11/01

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**- City of Tacoma -**  
**Science and Engineering Division**

**To:** Christopher L. Getchell, Source Control Supervisor

Foss Uplands  
 AJ212NTEC

**Date:** May 11, 2001

**Lab#:** 010321200

**Sample ID:** HB-MW01 High

**Sample Type:** Groundwater

**Sample Date:** 3/20/01

| Test                   | Result  | Units |
|------------------------|---------|-------|
| CONVENTIONAL           |         |       |
| TSS                    | 0.5     | mg/L  |
| CV-DISS                |         |       |
| Mercury, dissolved     | 0.050 U | ug/L  |
| GC/MS-PNA              |         |       |
| 2-Chloronaphthalene    | 1.0 U   | ug/L  |
| 2-Methylnaphthalene    | 1.0 U   | ug/L  |
| Acenaphthene           | 7.1     | ug/L  |
| Acenaphthylene         | 1.0 U   | ug/L  |
| Anthracene             | 1.0 U   | ug/L  |
| Benzo(a)anthracene     | 1.0 U   | ug/L  |
| Benzo(a)pyrene         | 1.0 U   | ug/L  |
| Benzo(g,h,i)perylene   | 1.0 U   | ug/L  |
| Benzofluoranthenes     | 1.0 U   | ug/L  |
| Chrysene               | 1.0 U   | ug/L  |
| Dibenz(a,h)anthracene  | 1.0 U   | ug/L  |
| Fluoranthene           | 11      | ug/L  |
| Fluorene               | 2.1     | ug/L  |
| Indeno(1,2,3-cd)pyrene | 1.0 U   | ug/L  |
| Naphthalene            | 1.0 U   | ug/L  |

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**Lab#:** 010321200  
**Sample ID:** HB-MW01 High  
**Sample Type:** Groundwater  
**Sample Date:** 3/20/01

|           | Test                | Result    | Units |
|-----------|---------------------|-----------|-------|
|           | Phenanthrene        | 1.3       | ug/L  |
|           | Pyrene              | 1.0 U     | ug/L  |
| GC/MS-VOA |                     |           |       |
|           | Benzene             | 0.5 U     | ug/L  |
|           | Ethylbenzene        | 0.5 U     | ug/L  |
|           | Gasoline            | 0.5 U     | mg/L  |
|           | Toluene             | 0.5 U     | ug/L  |
|           | Xylenes (Total)     | 0.5 U     | ug/L  |
| ICP-DISS  |                     |           |       |
|           | Antimony, dissolved | 2.2 B J   | ug/L  |
|           | Arsenic, dissolved  | 16        | ug/L  |
|           | Cadmium, dissolved  | 0.083 U   | ug/L  |
|           | Chromium, dissolved | 5.4       | ug/L  |
|           | Copper, dissolved   | 6.4       | ug/L  |
|           | Lead, dissolved     | 0.047 B J | ug/L  |
|           | Nickel, dissolved   | 8.8       | ug/L  |
|           | Zinc, dissolved     | 54        | ug/L  |
| NWTPH-Dx  |                     |           |       |
|           | Diesel              | 0.25 U J  | mg/L  |
|           | Heavy Oil           | 0.50 U J  | mg/L  |

DUC  
 2/5/02

Reviewed By: Lori A. Zboralski 5/11/01

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# Sample Custody Record

Samples Shipped to: City of Tacoma



# HARTCROWSER

1910 Fairview Avenue East  
Seattle, Washington 98102-3699  
Phone: 206-324-9530 FAX: 206-328-5581

JOB Ther Fore Upgrade LAB NUMBER \_\_\_\_\_  
PROJECT NAME to Hicks Bay  
HART CROWSER CONTACT Joe Morrice

SAMPLED BY: JAZ

| LAB NO. | SAMPLE ID | DESCRIPTION | DATE | TIME  | MATRIX |
|---------|-----------|-------------|------|-------|--------|
|         | HBTP09    | S-1         | 6/7  | 7:00  | S-1    |
|         | HBTP09    | S-2         |      | 9:05  |        |
|         | HBTP09    | S-3         |      | 9:15  |        |
|         | HBTP08    | S-1         |      | 10:30 |        |
|         | HBTP08    | S-2         |      | 10:35 |        |
|         | HBTP07    | S-1         |      | 11:30 |        |
|         | HBTP07    | S-2         |      | 11:35 |        |
|         | HBTP04    | S-1         |      | 14:45 |        |
|         | HBTP04    | S-2         |      | 14:50 |        |
|         | HBTP03    | S-1         |      | 14:05 |        |
|         | HBTP03    | S-2         |      | 14:10 |        |

### REQUESTED ANALYSIS

| Requested Analysis  | Metals | TH-D | PAHs | TH-G/VAH |
|---------------------|--------|------|------|----------|
| 1 Dew Site 8 A3212M | X      | X    | X    | X        |
| 1 Dew Site 8        | X      | X    | X    | X        |
| 1 Dew Site 8        | X      | X    | X    | X        |
| 1 Dew Site 8        | X      | X    | X    | X        |
| 1 Dew Site 8        | X      | X    | X    | X        |
| 1 Dew Site 8        | X      | X    | X    | X        |
| 1 Dew Site 8        | X      | X    | X    | X        |
| 1 Dew Site 9 A3212N | X      | X    | X    | X        |
| 1 Dew Site 9        | X      | X    | X    | X        |
| 1 Dew Site 9        | X      | X    | X    | X        |
| 1 Dew Site 9        | X      | X    | X    | X        |

OBSERVATIONS/COMMENTS/  
COMPOSITING INSTRUCTIONS

|   |   |  |   |
|---|---|--|---|
| RELINQUISHED BY<br><u>[Signature]</u><br>SIGNATURE<br><u>Jennifer Zwickel</u><br>PRINT NAME<br><u>Hart Crowser</u><br>COMPANY | DATE<br><u>3/7/01</u><br>TIME<br><u>10:00</u> | RECEIVED BY<br><u>[Signature]</u><br>SIGNATURE<br><u>Rick Fuller</u><br>PRINT NAME<br><u>City of Tacoma</u><br>COMPANY | DATE<br><u>3-7-01</u><br>TIME<br><u>1600hrs</u> |
| RELINQUISHED BY<br>SIGNATURE<br>PRINT NAME<br>COMPANY   | DATE<br>TIME                                  | RECEIVED BY<br>SIGNATURE<br>PRINT NAME<br>COMPANY  | DATE<br>TIME                                    |

SPECIAL SHIPMENT HANDLING OR STORAGE REQUIREMENTS:

TOTAL NUMBER OF CONTAINERS

SAMPLE RECEIPT INFORMATION:  
CUSTODY SEALS:  YES  NO  N/A  
GOOD CONDITION:  YES  NO  
TEMPERATURE:  HAND  OVERNIGHT  
SHIPMENT METHOD:  COURIER

TURNAROUND TIME:  
 24 HOURS  1 WEEK  
 48 HOURS  STANDARD  
 72 HOURS  OTHER

COOLER NO.: \_\_\_\_\_ STORAGE LOCATION: \_\_\_\_\_

See Lab Work Order No. \_\_\_\_\_  
for Other Contract Requirements

**HARTCROWSER**

**Empire Clonology Record**  
 Samples Shipped to: City of Tacoma

JOB Hicks Bull LAB NUMBER \_\_\_\_\_

PROJECT NAME Thea Foss Upland

HART CROWSER CONTACT See Maurice

SAMPLED BY: JAZ

OBSERVATIONS/COMMENTS/  
COMPOSITING INSTRUCTIONS

| LAB NO. | SAMPLE ID | DESCRIPTION | DATE   | TIME  | MATRIX | REQUESTED ANALYSIS |       |      |           |  | NO. OF CONTAINERS |
|---------|-----------|-------------|--------|-------|--------|--------------------|-------|------|-----------|--|-------------------|
|         |           |             |        |       |        | Meth               | TPH-D | PAHs | TPH-G/VDA |  |                   |
|         | HB-TP01   | S-1         | 3/8/01 | 11:20 | Soil   | X                  | X     | X    |           |  | 1                 |
|         | HB-TP01   | S-2         |        | 11:25 |        | X                  | X     | X    |           |  | 1                 |
|         | HB-TP01   | S-3         |        | 11:30 |        | X                  | X     | X    |           |  | 1                 |
|         | HB-TP02   | S-1         |        | 10:05 |        | X                  | X     | X    |           |  | 1                 |
|         | HB-TP02   | S-2         |        | 10:00 |        | X                  | X     | X    |           |  | 1                 |

REINQUISHED BY: [Signature] DATE: 3/8/01 TIME: 15:55

REINQUISHED BY: [Signature] DATE: \_\_\_\_\_ TIME: \_\_\_\_\_

SIGNATURE: [Signature] PRINT NAME: [Name] COMPANY: [Company]

SIGNATURE: \_\_\_\_\_ TIME: \_\_\_\_\_

PRINT NAME: \_\_\_\_\_ COMPANY: \_\_\_\_\_

SPECIAL SHIPMENT HANDLING OR STORAGE REQUIREMENTS:

COOLER NO.: \_\_\_\_\_ STORAGE LOCATION: \_\_\_\_\_

TURNAROUND TIME:  24 HOURS  1 WEEK  48 HOURS  STANDARD  72 HOURS  OTHER \_\_\_\_\_

# Sample Custody Record

Samples Shipped to: Frederick City Lab

JOB HXA Fass #4676 LAB NUMBER \_\_\_\_\_

PROJECT NAME \_\_\_\_\_

HART CROWSER CONTACT TDC - YSAR CARLSON

SAMPLED BY: TDC

| LAB NO. | SAMPLE ID | DESCRIPTION | DATE     | TIME | MATRIX |
|---------|-----------|-------------|----------|------|--------|
|         | HB-MWB01  | S-4         | 03/07/01 |      | Soil   |
|         | HB-MWB01  | S-4         |          |      |        |
|         | HB-MWB02  | S-1         | 03/08/01 |      |        |
|         | HB-MWB02  | S-3         |          |      |        |
|         | HB-MWB03  | S-1         |          |      |        |
|         | HB-MWB03  | S-4         |          |      |        |
|         | HB-D01    | S-1         |          |      |        |
|         | HB-D01    | S-4         |          |      |        |
|         | HB-D02    | S-1         |          |      |        |
|         | HB-D02    | S-4         |          |      |        |
|         | PI-TP01   | S-1         | 03/01/01 |      |        |
|         | PI-TP01   | S-3         |          |      |        |

RELINQUISHED BY: [Signature] DATE: \_\_\_\_\_

RECEIVED BY: Stephanie Seibert DATE: \_\_\_\_\_  
 SIGNATURE: \_\_\_\_\_ TIME: \_\_\_\_\_  
 PRINT NAME: \_\_\_\_\_ COMPANY: \_\_\_\_\_

RELINQUISHED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

SIGNATURE: \_\_\_\_\_ TIME: \_\_\_\_\_  
 PRINT NAME: \_\_\_\_\_ COMPANY: \_\_\_\_\_



Hart Crowser, Inc  
 1910 Fairview Avenue East  
 Seattle, Washington 98102-361  
 Phone: 206-324-9530 FAX: 206-329-551

| REQUESTED ANALYSIS | NO. OF CONTAINERS | OBSERVATIONS/COMMENTS/<br>COMPOSITING INSTRUCTIONS |
|--------------------|-------------------|--|
| PH-METALS<br>PH-12 | 2                 | AJ212M, Dew side 9                                 |
| PH-12              | 2                 | AJ212M, Dew side 9                                 |
| PH-12              | 2                 | AJ212M, Dew side 9                                 |
| PH-12              | 2                 | AJ212M, Dew side 8                                 |
| PH-12              | 2                 | AJ212M, Dew side 9                                 |
| PH-12              | 2                 | AJ212M, Dew side 8                                 |
| PH-12              | 2                 | AJ212M, Dew side 8                                 |
| PH-12              | 2                 | AJ212M, Dew side 8                                 |
| PH-12              | 2                 | AJ212M, Dew side 8                                 |
| PH-12              | 2                 | AJ212M, Dew side 8                                 |

SPECIAL SHIPMENT HANDLING OR STORAGE REQUIREMENTS:

TOTAL NUMBER OF CONTAINERS: \_\_\_\_\_

COOLER NO.: \_\_\_\_\_ STORAGE LOCATION: \_\_\_\_\_

TURNAROUND TIME:  
 24 HOURS  1 WEEK  
 48 HOURS  STANDARD  
 72 HOURS  OTHER

See Lab Work Order No. \_\_\_\_\_  
 for Other Contract Requirements

Samples Shipped to: COT Lab



15000 Airview Avenue East  
Seattle, Washington 98102-3695  
Phone: 206-324-9530 FAX: 206-328-5581

JOB 4676-71 LAB NUMBER \_\_\_\_\_  
PROJECT NAME Ther fess - Hicks Bull  
HART CROWSER CONTACT Joe Morris  
SAMPLED BY: SNM

OBSERVATIONS/COMMENTS/  
COMPOSITING INSTRUCTIONS

NO. OF CONTAINERS

REQUESTED ANALYSIS

| TH-D | PAHS | TPH-G/VOT | TSS |
|------|------|-----------|-----|
| X    | X    | X         | X   |
| ↓    | ↓    | ↓         | ↓   |
| ↓    | ↓    | ↓         | ↓   |
| ↓    | ↓    | ↓         | ↓   |

| LAB NO. | SAMPLE ID     | DESCRIPTION | DATE        | TIME         | MATRIX   |
|---------|---------------|-------------|-------------|--------------|----------|
|         | <u>UMW2A</u>  |             | <u>3/20</u> | <u>7:55</u>  | <u>W</u> |
|         | <u>HD-MW4</u> |             | ↓           | <u>8:50</u>  | ↓        |
|         | <u>HD-MW3</u> |             | ↓           | <u>9:40</u>  | ↓        |
|         | <u>HD-MW2</u> |             | ↓           | <u>10:50</u> | ↓        |

| RELINQUISHED BY   | DATE                                 | RECEIVED BY  | DATE                                 |
|---|--------------------------------------|--|--------------------------------------|
| <u>Joe Morris</u><br>SIGNATURE<br>Hart Crowser<br>COMPANY | <u>3/24-1</u><br>TIME<br><u>2:25</u> | <u>Bill Esamein</u><br>SIGNATURE<br>GOT<br>COMPANY | <u>3/20</u><br>TIME<br><u>2:30PM</u> |
| SIGNATURE   | DATE                                 | SIGNATURE  | DATE                                 |
| PRINT NAME  | TIME                                 | PRINT NAME   | TIME                                 |
| COMPANY   |                                      | COMPANY  |                                      |

SPECIAL SHIPMENT HANDLING OR STORAGE REQUIREMENTS:

TOTAL NUMBER OF CONTAINERS: 24  
SAMPLE RECEIPT INFORMATION  
 YES  NO  N/A  
CUSTODY SEALS  
GOOD CONDITION  
 YES  NO  
TEMPERATURE  
SHIPMENT METHOD:  HAND  COURIER  OVERNIGHT

COOLER NO.: \_\_\_\_\_ STORAGE LOCATION: \_\_\_\_\_  
TURNAROUND TIME:  
 24 HOURS  1 WEEK  
 48 HOURS  STANDARD  
 72 HOURS  OTHER \_\_\_\_\_

See Lab Work Order No. \_\_\_\_\_  
for Other Contract Requirements

# Sample Custody Record

Samples Shipped to: OT Lab

HART CROWSER, INC.  
1910 Fairview Avenue East  
Seattle, Washington 98102-3699  
Phone: 206-324-9530 FAX: 206-328-5581



## HART CROWSER

|  |                                       |   |                                      |   |   |  |  |
|--|---------------------------------------|---|--------------------------------------|---|---|--|--|
| JOB <u>4676-72</u> LAB NUMBER _____<br>PROJECT NAME <u>Then Fass - Hives Ball</u><br>HART CROWSER CONTACT <u>See Narrative</u><br>SAMPLED BY: <u>SUM</u> |                                       | REQUESTED ANALYSIS<br>TRH-DX<br>PHS<br>TSS<br>TRH-G/BTEX  |                                      | NO. OF CONTAINERS<br>3 }<br>3 }<br>6 }<br>6 }<br>6 }  |   | OBSERVATIONS/COMMENTS/<br>COMPOSITING INSTRUCTIONS<br>} NO# AJ2/2M<br>} NO# AJ2/2N   |  |
| LAB NO. _____<br>SAMPLE ID <u>UMW2A-H34</u><br><u>HB MW02-H34</u><br><u>HB MW03-H34</u><br><u>HB MW01-H34</u><br><u>HB MWNA</u>                          | DESCRIPTION<br><u>water</u><br>↓<br>↓ | DATE<br><u>3/24</u><br>↓<br>↓   | TIME<br>↓<br>↓                       | MATRIX<br><u>water</u><br>↓<br>↓  | SPECIAL SHIPMENT HANDLING OR STORAGE REQUIREMENTS:<br>Field filtered.<br>Sb, As, Cd, Cu, Pb, Hg, Ni, Zn | TOTAL NUMBER OF CONTAINERS<br>29   | SAMPLE RECEIPT INFORMATION<br>CUSTODY SEALS: YES <input type="checkbox"/> NO <input type="checkbox"/> N/A <input type="checkbox"/><br>GOOD CONDITION YES <input type="checkbox"/> NO <input type="checkbox"/><br>TEMPERATURE _____<br>SHIPMENT METHOD: <input type="checkbox"/> HAND <input type="checkbox"/> COURIER <input type="checkbox"/> OVERNIGHT |
| RELINQUISHED BY<br>SIGNATURE <u>[Signature]</u><br>PRINT NAME <u>See Narrative</u><br>COMPANY <u>Hart Crowser</u>  | DATE<br><u>3/24/01</u><br>TIME _____  | RECEIVED BY<br>SIGNATURE <u>[Signature]</u><br>PRINT NAME <u>Rick Fallow</u><br>COMPANY <u>TACOMA</u> | DATE<br><u>3-21-01</u><br>TIME _____ | SPECIAL SHIPMENT HANDLING OR STORAGE REQUIREMENTS:<br>Field filtered.<br>Sb, As, Cd, Cu, Pb, Hg, Ni, Zn | COOLER NO.: _____<br>STORAGE LOCATION: _____  | TURNAROUND TIME:<br><input type="checkbox"/> 24 HOURS <input type="checkbox"/> 1 WEEK<br><input type="checkbox"/> 48 HOURS <input type="checkbox"/> STANDARD<br><input type="checkbox"/> 72 HOURS <input type="checkbox"/> OTHER _____ |  |
| RELINQUISHED BY<br>SIGNATURE _____<br>PRINT NAME _____<br>COMPANY _____  | DATE _____<br>TIME _____              | RECEIVED BY<br>SIGNATURE _____<br>PRINT NAME _____<br>COMPANY _____                                   | DATE _____<br>TIME _____             | STORAGE REQUIREMENTS:<br>Field filtered.<br>Sb, As, Cd, Cu, Pb, Hg, Ni, Zn                              | COOLER NO.: _____<br>STORAGE LOCATION: _____  | TURNAROUND TIME:<br><input type="checkbox"/> 24 HOURS <input type="checkbox"/> 1 WEEK<br><input type="checkbox"/> 48 HOURS <input type="checkbox"/> STANDARD<br><input type="checkbox"/> 72 HOURS <input type="checkbox"/> OTHER _____ |  |



City of Tacoma  
Environmental Services  
Science and Engineering  
Division

Memorandum

**TO:** Mark D'Andrea, P. E., Project Coordinator, Public Works Engineering  
**FROM:** Christopher L. Getchell, Source Control Supervisor  
**SUBJECT:** Foss Uplands – Hick's Bull WO# AJ212M TEC  
**DATE:** May 14, 2001

Attached are the sample analysis results for the soil and water samples collected by Hart Crowser, March 8, 2001. The samples were collected in association with the Foss Uplands Investigation.

The Science and Engineering Division analyzed the samples for TSS, NWPTH-Dx, and Semi-Volatile Organics. A detailed Quality Control Data Review report was prepared for these samples and is included with the sample reports.

Samples HB-TP06 S-2 and HB-TP10 S-2 are qualified as not detected for Cadmium based on high cadmium concentration in the Method Blank.

The Semi-Volatile compounds in samples HB-TP05 S-1 and HB-TP10 S-2 are qualified as estimated based on the surrogate compound recoveries outside of acceptance limits. Sample HB-TP10 S-2 is qualified as estimated for Diesel and Heavy Oil based on the surrogate compound recoveries outside of acceptance limits.

The Copper values samples HB-TP05 S-1, HB-TP05 S-2, HB-TP05 S-3, HB-TP06 S-1, HB-TP06 S-2, HB-TP10 S-1, and HB-TP10 S-2 are qualified as estimated for Copper based on the high spike recovery.

The values for Benzo(b,k)fluoranthenes, Benzo(a)Pyrene, Indeno(1,2,3-c,d)pyrene, Dibenz(a,h)anthracene, and Benzo(g,h,i)perylene associated with the low recovery of Perylene-d12 are qualified as estimated in sample HB-TP05 S-1.

If you have any questions concerning these results, call me at (253) 502-2130. Please note, the samples associated with this report will be discarded six months from the date of this report unless requested otherwise.

Christopher L. Getchell  
Source Control Supervisor,  
Science and Engineering Division.

CLG:LAZ



Thea Foss Uplands  
Hick's Bull  
Development Site 8 (AJ212M TEC)

| <b>Sample ID</b> | <b>Laboratory ID</b> | <b>Matrix</b> |
|------------------|----------------------|---------------|
| HB-TP05 S-1      | 010308077            | Soil          |
| HB-TP05 S-2      | 010308078            | Soil          |
| HB-TP05 S-3      | 010308079            | Soil          |
| HB-TP06 S-1      | 010308080            | Soil          |
| HB-TP06 S-2      | 010308081            | Soil          |
| HB-TP10 S-1      | 010308082            | Soil          |
| HB-TP10 S-2      | 010308083            | Soil          |

## Quality Control Data Review

TO: Christopher L. Getchell, Source Control Supervisor  
FROM: Lori A. Zboralski, Senior Laboratory Analyst *LZ*  
DATE: May 14, 2001

### SAMPLES

This report concerns the following samples associated with the Foss Uplands WO# AJ212M:

| <u>Sample Description</u> | <u>Lab #</u> | <u>Sample Matrix</u> | <u>Date Sampled</u> |
|---------------------------|--------------|----------------------|---------------------|
| HB-TP05 S-1               | 010308077    | Soil                 | 03/08/01            |
| HB-TP05 S-2               | 010308078    | Soil                 | 03/08/01            |
| HB-TP05 S-3               | 010308079    | Soil                 | 03/08/01            |
| HB-TP06 S-1               | 010308080    | Soil                 | 03/08/01            |
| HB-TP06 S-2               | 010308081    | Soil                 | 03/08/01            |
| HB-TP10 S-1               | 010308082    | Soil                 | 03/08/01            |
| HB-TP10 S-2               | 010308083    | Soil                 | 03/08/01            |

### HOLDING TIMES

The samples were extracted within the 14-day holding time for Semi-Volatile Organics and NWTPH-Dx and analyzed within 7 days for Solids, 28 days for Mercury, 40 days for Semi-Volatile Organics and NWTPH-Dx, and 180 days for Total Metals.

### METHODS

The samples were analyzed according to NWTPH-Dx, CLP ILM04.0 for Metals, CLP OLM01.8 for Semi-Volatile Organics and Science and Engineering Division Standard Operating Procedures.

### DAILY INSTRUMENT PERFORMANCE STANDARDS

The criteria for the spectra of Decafluoro-triphenylphosphine (DFTPP) were met for the twelve-hour sequences when these samples were analyzed. The spectra generated by the mass spectrometers can be considered in control for the analysis of these samples.

### CALIBRATION AND VERIFICATION

All reported compounds for Semi-Volatile Organics had updated relative response factors (RRF) greater than or equal to 0.050 with relative standard deviations (%RSD) of less than 30% for the Initial Calibration and percent differences (%D) of less than 25% for the Continuing Calibration when compared to the average RRF.

The Initial Calibration for the NWPTH-Dx analyses were within the method limits with correlation coefficients of greater than 0.990. The continuing calibrations ranged from 1.5% to 13.2%.

The ICP and FIMS calibrations met method requirements for linearity and accuracy. ICP and FIMS sensitivities were verified by analysis of standards near the detection limits of the instruments. The recoveries ranged from 78 to 121% and all were within laboratory established 50-200% limits.

Independent mid-range standards were analyzed to monitor calibration accuracy for the ICP and FIMS (ICV and CCV). Acceptable recoveries for ICP must be within 90 to 110%. Recoveries for FIMS must be within 80 to 120%. All ICVs and CCVs had recoveries within acceptable limits.

Standards are required to be run to measure the accuracy of ICP interelement correction factors. These samples ICSA and ICSAB must be run at the beginning and end of each analytical run. The ICSAB recoveries for each element must be within 80 to 120% recovery. The recoveries of the ICSAB for the analysis of these samples ranged from 94 to 104%.

#### METHOD AND CALIBRATION BLANKS

Method and calibration blanks were analyzed at the required frequencies for the methods. The concentrations of these blanks were less than 1/5<sup>th</sup> the amount found in the sample or the detection limit, **except for the following:**

| Parameter | Blank        | Concentration | MDL       | Associated Samples.      |
|-----------|--------------|---------------|-----------|--------------------------|
| Cadmium   | 010308080PBS | 0.6 ug/L      | 0.52 ug/L | HB-TP06 S-2, HB-TP10 S-2 |

Samples HB-TP06 S-2 and HB-TP10 S-2 are qualified as not detected for Cadmium based on the high concentration in the Method Blank.

#### SURROGATE COMPOUNDS

Two Surrogate compounds were added to the NWTPH-Dx analysis and 2 Surrogate compounds were added to the Semi-Volatile Organics analysis. The Surrogate compound recoveries ranged from 35 to 152%. All the recoveries were within the control limits of the methods, **except for the following:**

| Analysis | Sample      | Surrogate Compound | Recovery | Limits |
|----------|-------------|--------------------|----------|--------|
| NWTPH-Dx | HB-TP10 S-2 | 2-Fluorobiphenyl   | 35       | 50-150 |
| NWTPH-Dx | HB-TP10 S-2 | Terphenyl-d14      | 38       | 50-150 |
| Semi-VOA | HB-TP05 S-1 | Terphenyl-d14      | 152      | 18-137 |
| Semi-VOA | HB-TP10 S-2 | Terphenyl-d14      | 147      | 18-137 |

The Semi-Volatile compounds in samples HB-TP05 S-1 and HB-TP10 S-2 are qualified as estimated based on the surrogate compound recoveries outside of acceptance limits. Sample HB-TP10 S-2 is qualified as estimated for Diesel and Heavy Oil based on the surrogate compound recoveries outside of acceptance limits.

#### LABORATORY CONTROL SAMPLES

Laboratory Control Samples (LCS) monitor the analytical system by carrying a standard through every step of the analytical method including extraction or digestion. All LCS recoveries were within laboratory established control limits.

## DUPLICATE SAMPLE ANALYSIS

All associated duplicate samples had differences of less than the reporting limits for analytes with concentrations less than 5 times the reporting limits and Relative Percent Differences (RPD) of less than 35% for metals analytes with concentrations greater than 5 times the reporting limits.

## MATRIX SPIKE AND MATRIX SPIKE DUPLICATE ANALYSIS

Matrix spike analysis was performed for the metals analysis. All recoveries were within the required CLP limits. Matrix spike and matrix spike duplicate analysis was performed for NWTPH-G, NWTPH-Dx, and Volatile and Semi-Volatile Organics with these samples. The spike recoveries were within the method recovery limits, **except for the following:**

| Spiked Sample | Analyte | % Recovery | Limits | Associated Samples  |
|---------------|---------|------------|--------|---|
| HB-TP02 S-2   | Copper  | 930        | 75-125 | HB-TP05 S-1, HB-TP05 S-2, HB-TP05 S-3, HB-TP06 S-1, HB-TP06 S-2, HB-TP10 S-1, HB-TP10 S-2 |

The Copper values samples HB-TP05 S-1, HB-TP05 S-2, HB-TP05 S-3, HB-TP06 S-1, HB-TP06 S-2, HB-TP10 S-1, and HB-TP10 S-2 are qualified as estimated for Copper based on the high spike recovery. The RPDs for all of the MS/MSD pairs were within the method limits. No data is qualified based on Matrix Spike and Matrix Spike Duplicate analysis.

## ICP SERIAL DILUTIONS

Serial dilution of samples analyzed by ICP provides information about physical or chemical interferences that may exist due to sample matrix.

Associated sample HB-TP02 S-2 was analyzed at a five-fold dilution. All analytes had %D of the diluted sample compared to the undiluted sample of less than 10% for analytes greater than 50 times the IDL.

## INTERNAL STANDARDS

Performance of the Internal Standards (IS) monitors GC/MS sensitivity and stability during each analysis. Internal Standards must not vary more than -50% to +100% from the continuing calibration response and be within +/- 30 seconds from the continuing calibration retention time. **Samples with Internal Standards that did not meet these criteria are listed in the following table with the associated compounds:**

| <u>Sample ID</u> | <u>Internal Standard</u> | <u>IS Recovery</u> | <u>Associated Compounds</u>   |
|------------------|--------------------------|--------------------|---|
| HB-TP05 S-1      | Perylene-d12             | 42                 | Benzo(b,k)fluoranthenes<br>Benzo(a)Pyrene<br>Indeno(1,2,3-c,d)pyrene<br>Dibenz(a,h)anthracene<br>Benzo(g,h,i)perylene |

The values for Benzo(b,k)fluoranthenes, Benzo(a)Pyrene, Indeno(1,2,3-c,d)pyrene, Dibenz(a,h)anthracene, and Benzo(g,h,i)perylene associated with the low recovery of Perylene-d12 are qualified as estimated in sample HB-TP05 S-1.

#### DATA ASSESSMENT

The qualifiers assigned to these samples include the following:

- U indicates that the analysis of the parameter did not detect a positive hit above the Reporting Limit.
- UJ indicates that the analysis of the parameter did not detect a positive hit above the Reporting Limit, however the value should be considered estimated.
- J the value should be considered estimated.

All data including qualified values are acceptable for use.

**- City of Tacoma -**  
**Science and Engineering Division**

**To:** Christopher L. Getchell, Source Control Supervisor

Foss Uplands  
 AJ212MTEC

**Date:** May 14, 2001

**Lab#:** 010308077

**Sample ID:** HB-TP05 S-1

**Sample Type:** Soil

**Sample Date:** 3/8/01

| Test                   | Result                | Units    |
|------------------------|-----------------------|----------|
| CONVENTIONAL           |                       |          |
| Solids                 | 89.9                  | per cent |
| CV                     |                       |          |
| Mercury                | 0.0771 <del>β</del> J | mg/Kg    |
| GC/MS-BNA              |                       |          |
| 2-Chloronaphthalene    | 96 U J                | ug/Kg    |
| 2-Methylnaphthalene    | 96 U J                | ug/Kg    |
| Acenaphthene           | 410 J                 | ug/Kg    |
| Acenaphthylene         | 96 U J                | ug/Kg    |
| Anthracene             | 620 J                 | ug/Kg    |
| Benzo(a)anthracene     | 2600 J                | ug/Kg    |
| Benzo(a)pyrene         | 3300 J                | ug/Kg    |
| Benzo(g,h,i)perylene   | 1800 J                | ug/Kg    |
| Benzo(a)fluoranthene   | 4400 J                | ug/Kg    |
| Chrysene               | 3200                  | ug/Kg    |
| Dibenz(a,h)anthracene  | 340 J                 | ug/Kg    |
| Fluoranthene           | 5000 J                | ug/Kg    |
| Fluorene               | 200 J                 | ug/Kg    |
| Indeno(1,2,3-cd)pyrene | 1300 J                | ug/Kg    |
| Naphthalene            | 96 U J                | ug/Kg    |

*DLC  
2/5/02*

- U indicates not detected at the associated value
- B indicates the value is greater than the detection limits of the method, however it is lower than the Contract Required Detection Limits
- J indicates the associated value is estimated
- UJ indicates not detected at the associated value, however the value should be considered estimated
- P indicates the value is quantitated on the alternate Internal Standard Phenanthrene-d10

**Lab#:** 010308077  
**Sample ID:** HB-TP05 S-1  
**Sample Type:** Soil  
**Sample Date:** 3/8/01

|          | Test         | Result                     | Units |
|----------|--------------|----------------------------|-------|
|          | Phenanthrene | 3800 J                     | ug/Kg |
|          | Pyrene       | 6700 J                     | ug/Kg |
| ICP      | Arsenic      | 3.92                       | mg/Kg |
|          | Cadmium      | 0.57 <del>P</del> J        | mg/Kg |
|          | Chromium     | 25.9 <sup>DLC</sup> 2/5/02 | mg/Kg |
|          | Copper       | 53.8 J                     | mg/Kg |
|          | Lead         | 53.9                       | mg/Kg |
|          | Nickel       | 36.3                       | mg/Kg |
|          | Zinc         | 80.8                       | mg/Kg |
| NWTPH-Dx | Diesel       | 380 U                      | mg/Kg |
|          | Heavy Oil    | 1300                       | mg/Kg |

Reviewed By: Lori A. Zboralski 5/14/01

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- UJ indicates not detected at the associated value, however the value should be considered estimated
- P indicates the value is quantitated on the alternate Internal Standard Phenanthrene-d10

**- City of Tacoma -**  
**Science and Engineering Division**

**To:** Christopher L. Getchell, Source Control Supervisor

Foss Uplands  
 AJ212MTEC

**Date:** May 14, 2001

**Lab#:** 010308078

**Sample ID:** HB-TP05 S-2

**Sample Type:** Soil

**Sample Date:** 3/8/01

| Test                   | Result | Units    |
|------------------------|--------|----------|
| CONVENTIONAL           |        |          |
| Solids                 | 68.3   | per cent |
| CV                     |        |          |
| Mercury                | 0.520  | mg/Kg    |
| GC/MS-BNA              |        |          |
| 2-Chloronaphthalene    | 99 U   | ug/Kg    |
| 2-Methylnaphthalene    | 380    | ug/Kg    |
| Acenaphthene           | 110    | ug/Kg    |
| Acenaphthylene         | 130    | ug/Kg    |
| Anthracene             | 160    | ug/Kg    |
| Benzo(a)anthracene     | 810    | ug/Kg    |
| Benzo(a)pyrene         | 920    | ug/Kg    |
| Benzo(g,h,i)perylene   | 460    | ug/Kg    |
| Benzo(a)fluoranthene   | 1400   | ug/Kg    |
| Chrysene               | 1100   | ug/Kg    |
| Dibenz(a,h)anthracene  | 110    | ug/Kg    |
| Fluoranthene           | 1100   | ug/Kg    |
| Fluorene               | 99 U   | ug/Kg    |
| Indeno(1,2,3-cd)pyrene | 370    | ug/Kg    |
| Naphthalene            | 170    | ug/Kg    |

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J indicates the associated value is estimated

UJ indicates not detected at the associated value, however the value should be considered estimated

P indicates the value is quantitated on the alternate Internal Standard Phenanthrene-d10



Lab#: 010308078  
Sample ID: HB-TP05 S-2  
Sample Type: Soil  
Sample Date: 3/8/01

|          | Test         | Result | Units |
|----------|--------------|--------|-------|
|          | Phenanthrene | 1200   | ug/Kg |
|          | Pyrene       | 1400   | ug/Kg |
| ICP      | Arsenic      | 77.2   | mg/Kg |
|          | Cadmium      | 5.29   | mg/Kg |
|          | Chromium     | 51.1   | mg/Kg |
|          | Copper       | 869 J  | mg/Kg |
|          | Lead         | 2630   | mg/Kg |
|          | Nickel       | 72.1   | mg/Kg |
|          | Zinc         | 1290   | mg/Kg |
| NWTPH-Dx | Diesel       | 43     | mg/Kg |
|          | Heavy Oil    | 250    | mg/Kg |

Reviewed By: Lori A. Zboralski 5/14/01

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- UJ indicates not detected at the associated value, however the value should be considered estimated
- P indicates the value is quantitated on the alternate Internal Standard Phenanthrene-d10

**- City of Tacoma -**  
**Science and Engineering Division**

To: Christopher L. Getchell, Source Control Supervisor

Foss Uplands  
 AJ212MTEC

Date: May 14, 2001

Lab#: 010308079

Sample ID: HB-TP05 S-3

Sample Type: Soil

Sample Date: 3/8/01

| Test                   | Result                                 | Units    |
|------------------------|--|----------|
| CONVENTIONAL           |  |          |
| Solids                 | 94.5                                   | per cent |
| CV                     |  |          |
| Mercury                | 0.0162 <del>B</del> J<br>DLC<br>2/5/02 | mg/Kg    |
| GC/MS-BNA              |  |          |
| 2-Chloronaphthalene    | 72 U                                   | ug/Kg    |
| 2-Methylnaphthalene    | 72 U                                   | ug/Kg    |
| Acenaphthene           | 72 U                                   | ug/Kg    |
| Acenaphthylene         | 72 U                                   | ug/Kg    |
| Anthracene             | 72 U                                   | ug/Kg    |
| Benzo(a)anthracene     | 72 U                                   | ug/Kg    |
| Benzo(a)pyrene         | 72 U                                   | ug/Kg    |
| Benzo(g,h,i)perylene   | 72 U                                   | ug/Kg    |
| Benzofluoranthenes     | 72 U                                   | ug/Kg    |
| Chrysene               | 72 U                                   | ug/Kg    |
| Dibenz(a,h)anthracene  | 72 U                                   | ug/Kg    |
| Fluoranthene           | 72 U                                   | ug/Kg    |
| Fluorene               | 72 U                                   | ug/Kg    |
| Indeno(1,2,3-cd)pyrene | 72 U                                   | ug/Kg    |
| Naphthalene            | 72 U                                   | ug/Kg    |

U indicates not detected at the associated value

B indicates the value is greater than the detection limits of the method, however it is lower than the Contract Required Detection Limits

J indicates the associated value is estimated

UJ indicates not detected at the associated value, however the value should be considered estimated

P indicates the value is quantitated on the alternate Internal Standard Phenanthrene-d10

Lab#: 010308079  
Sample ID: HB-TP05 S-3  
Sample Type: Soil  
Sample Date: 3/8/01

|          | Test         | Result                     | Units |
|----------|--------------|----------------------------|-------|
|          | Phenanthrene | 72 U                       | ug/Kg |
|          | Pyrene       | 72 U                       | ug/Kg |
| ICP      | Arsenic      | 18.2                       | mg/Kg |
|          | Cadmium      | 0.27 <sup>B</sup> J        | mg/Kg |
|          | Chromium     | 6.74 <sup>DUL</sup> 2/5/02 | mg/Kg |
|          | Copper       | 11.0 J                     | mg/Kg |
|          | Lead         | 4.67                       | mg/Kg |
|          | Nickel       | 6.70                       | mg/Kg |
|          | Zinc         | 13.9                       | mg/Kg |
| NWTPH-Dx | Diesel       | 14 U                       | mg/Kg |
|          | Heavy Oil    | 29 U                       | mg/Kg |

Reviewed By: Lou A. Zboralski 5/14/01

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- J indicates the associated value is estimated
- UJ indicates not detected at the associated value, however the value should be considered estimated
- P indicates the value is quantitated on the alternate Internal Standard Phenanthrene-d10

**- City of Tacoma -**  
**Science and Engineering Division**

**To:** Christopher L. Getchell, Source Control Supervisor

Foss Uplands  
 AJ212MTEC

**Date:** May 14, 2001

**Lab#:** 010308080

**Sample ID:** HB-TP06 S-1

**Sample Type:** Soil

**Sample Date:** 3/8/01

| Test                   | Result | Units    |
|------------------------|--------|----------|
| CONVENTIONAL           |        |          |
| Solids                 | 91.5   | per cent |
| CV                     |        |          |
| Mercury                | 0.168  | mg/Kg    |
| GC/MS-BNA              |        |          |
| 2-Chloronaphthalene    | 86 U   | ug/Kg    |
| 2-Methylnaphthalene    | 86 U   | ug/Kg    |
| Acenaphthene           | 86 U   | ug/Kg    |
| Acenaphthylene         | 86 U   | ug/Kg    |
| Anthracene             | 86 U   | ug/Kg    |
| Benzo(a)anthracene     | 120    | ug/Kg    |
| Benzo(a)pyrene         | 170    | ug/Kg    |
| Benzo(g,h,i)perylene   | 100    | ug/Kg    |
| Benzofluoranthenes     | 260    | ug/Kg    |
| Chrysene               | 220    | ug/Kg    |
| Dibenz(a,h)anthracene  | 86 U   | ug/Kg    |
| Fluoranthene           | 150    | ug/Kg    |
| Fluorene               | 86 U   | ug/Kg    |
| Indeno(1,2,3-cd)pyrene | 88     | ug/Kg    |
| Naphthalene            | 86 U   | ug/Kg    |

U indicates not detected at the associated value

B indicates the value is greater than the detection limits of the method, however it is lower than the Contract Required Detection Limits

J indicates the associated value is estimated

UJ indicates not detected at the associated value, however the value should be considered estimated

P indicates the value is quantitated on the alternate Internal Standard Phenanthrene-d10

Lab#: 010308080  
Sample ID: HB-TP06 S-1  
Sample Type: Soil  
Sample Date: 3/8/01

|          | Test         | Result | Units |
|----------|--------------|--------|-------|
|          | Phenanthrene | 140    | ug/Kg |
|          | Pyrene       | 200    | ug/Kg |
| ICP      | Arsenic      | 7.82   | mg/Kg |
|          | Cadmium      | 11.2   | mg/Kg |
|          | Chromium     | 43.3   | mg/Kg |
|          | Copper       | 326 J  | mg/Kg |
|          | Lead         | 297    | mg/Kg |
|          | Nickel       | 103    | mg/Kg |
|          | Zinc         | 306    | mg/Kg |
| NWTPH-Dx | Diesel       | 17 U   | mg/Kg |
|          | Heavy Oil    | 250    | mg/Kg |

Reviewed By: Lori A. Zboralski 5/14/01

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- B indicates the value is greater than the detection limits of the method, however it is lower than the Contract Required Detection Limits
- J indicates the associated value is estimated
- UJ indicates not detected at the associated value, however the value should be considered estimated
- P indicates the value is quantitated on the alternate Internal Standard Phenanthrene-d10

**- City of Tacoma -**  
**Science and Engineering Division**

**To:** Christopher L. Getchell, Source Control Supervisor

Foss Uplands  
 AJ212MTEC

**Date:** May 14, 2001

**Lab#:** 010308081

**Sample ID:** HB-TP06 S-2

**Sample Type:** Soil

**Sample Date:** 3/8/01

| Test                   | Result   | Units    |
|------------------------|----------|----------|
| CONVENTIONAL           |          |          |
| Solids                 | 91.5     | per cent |
| CV                     |          |          |
| Mercury                | 0.0066 U | mg/Kg    |
| GC/MS-BNA              |          |          |
| 2-Chloronaphthalene    | 97 U     | ug/Kg    |
| 2-Methylnaphthalene    | 97 U     | ug/Kg    |
| Acenaphthene           | 97 U     | ug/Kg    |
| Acenaphthylene         | 97 U     | ug/Kg    |
| Anthracene             | 97 U     | ug/Kg    |
| Benzo(a)anthracene     | 97 U     | ug/Kg    |
| Benzo(a)pyrene         | 97 U     | ug/Kg    |
| Benzo(g,h,i)perylene   | 97 U     | ug/Kg    |
| Benzo(a)fluoranthene   | 97 U     | ug/Kg    |
| Chrysene               | 97 U     | ug/Kg    |
| Dibenz(a,h)anthracene  | 97 U     | ug/Kg    |
| Fluoranthene           | 97 U     | ug/Kg    |
| Fluorene               | 97 U     | ug/Kg    |
| Indeno(1,2,3-cd)pyrene | 97 U     | ug/Kg    |
| Naphthalene            | 97 U     | ug/Kg    |

U indicates not detected at the associated value

B indicates the value is greater than the detection limits of the method, however it is lower than the Contract Required Detection Limits

J indicates the associated value is estimated

UJ indicates not detected at the associated value, however the value should be considered estimated

P indicates the value is quantitated on the alternate Internal Standard Phenanthrene-d10

Lab#: 010308081  
Sample ID: HB-TP06 S-2  
Sample Type: Soil  
Sample Date: 3/8/01

|          | Test         | Result | Units |
|----------|--------------|--------|-------|
|          | Phenanthrene | 97 U   | ug/Kg |
|          | Pyrene       | 97 U   | ug/Kg |
| ICP      | Arsenic      | 2.08   | mg/Kg |
|          | Cadmium      | 0.29 U | mg/Kg |
|          | Chromium     | 15.7   | mg/Kg |
|          | Copper       | 8.50 J | mg/Kg |
|          | Lead         | 2.56   | mg/Kg |
|          | Nickel       | 10.1   | mg/Kg |
|          | Zinc         | 13.1   | mg/Kg |
| NWTPH-Dx | Diesel       | 19 U   | mg/Kg |
|          | Heavy Oil    | 39 U   | mg/Kg |

Reviewed By:

*Lori A. Zboralski* 5/14/01

- U indicates not detected at the associated value
- B indicates the value is greater than the detection limits of the method, however it is lower than the Contract Required Detection Limits
- J indicates the associated value is estimated
- UJ indicates not detected at the associated value, however the value should be considered estimated
- P indicates the value is quantitated on the alternate Internal Standard Phenanthrene-d10

**- City of Tacoma -**  
**Science and Engineering Division**

**To:** Christopher L. Getchell, Source Control Supervisor

Foss Uplands  
 AJ212MTEC

**Date:** May 14, 2001

**Lab#:** 010308082

**Sample ID:** HB-TP10 S-1

**Sample Type:** Soil

**Sample Date:** 3/8/01

| Test                   | Result | Units    |
|------------------------|--------|----------|
| CONVENTIONAL           |        |          |
| Solids                 | 84.9   | per cent |
| CV                     |        |          |
| Mercury                | 7.83   | mg/Kg    |
| GC/MS-BNA              |        |          |
| 2-Chloronaphthalene    | 98 U   | ug/Kg    |
| 2-Methylnaphthalene    | 270    | ug/Kg    |
| Acenaphthene           | 710    | ug/Kg    |
| Acenaphthylene         | 98 U   | ug/Kg    |
| Anthracene             | 950    | ug/Kg    |
| Benzo(a)anthracene     | 2100   | ug/Kg    |
| Benzo(a)pyrene         | 1900   | ug/Kg    |
| Benzo(g,h,i)perylene   | 740    | ug/Kg    |
| Benzofluoranthenes     | 2500   | ug/Kg    |
| Chrysene               | 2600   | ug/Kg    |
| Dibenz(a,h)anthracene  | 230    | ug/Kg    |
| Fluoranthene           | 4400   | ug/Kg    |
| Fluorene               | 520    | ug/Kg    |
| Indeno(1,2,3-cd)pyrene | 660    | ug/Kg    |
| Naphthalene            | 470    | ug/Kg    |

U indicates not detected at the associated value

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J indicates the associated value is estimated

UJ indicates not detected at the associated value, however the value should be considered estimated

P indicates the value is quantitated on the alternate Internal Standard Phenanthrene-d10



Lab#: 010308082  
Sample ID: HB-TP10 S-1  
Sample Type: Soil  
Sample Date: 3/8/01

|          | Test         | Result | Units |
|----------|--------------|--------|-------|
|          | Phenanthrene | 7300   | ug/Kg |
|          | Pyrene       | 6600   | ug/Kg |
| ICP      | Arsenic      | 9.05   | mg/Kg |
|          | Cadmium      | 2.70   | mg/Kg |
|          | Chromium     | 30.0   | mg/Kg |
|          | Copper       | 55.1 J | mg/Kg |
|          | Lead         | 252    | mg/Kg |
|          | Nickel       | 28.1   | mg/Kg |
|          | Zinc         | 905    | mg/Kg |
| NWTPH-Dx | Diesel       | 20 U   | mg/Kg |
|          | Heavy Oil    | 55     | mg/Kg |

Reviewed By: Lori A. Zboralsti 5/14/01

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- J indicates the associated value is estimated
- UJ indicates not detected at the associated value, however the value should be considered estimated
- P indicates the value is quantitated on the alternate Internal Standard Phenanthrene-d10

**- City of Tacoma -**  
**Science and Engineering Division**

To: Christopher L. Getchell, Source Control Supervisor

Foss Uplands  
 AJ212MTEC

Date: May 16, 2001

Lab#: 010308083

Sample ID: HB-TP10 S-2

Sample Type: Soil

Sample Date: 3/8/01

| Test                   | Result                | Units    |
|------------------------|-----------------------|----------|
| CONVENTIONAL           |                       |          |
| Solids                 | 93.9                  | per cent |
| CV                     |                       |          |
| Mercury                | 0.0356 <del>B</del> J | mg/Kg    |
| GC/MS-BNA              |                       |          |
| 2-Chloronaphthalene    | 99 U J                | ug/Kg    |
| 2-Methylnaphthalene    | 99 U J                | ug/Kg    |
| Acenaphthene           | 99 U J                | ug/Kg    |
| Acenaphthylene         | 99 U J                | ug/Kg    |
| Anthracene             | 99 U J                | ug/Kg    |
| Benzo(a)anthracene     | 99 U J                | ug/Kg    |
| Benzo(a)pyrene         | 99 U J                | ug/Kg    |
| Benzo(g,h,i)perylene   | 99 U J                | ug/Kg    |
| Benzo(a)fluoranthene   | 99 U J                | ug/Kg    |
| Chrysene               | 99 U J                | ug/Kg    |
| Dibenz(a,h)anthracene  | 99 U J                | ug/Kg    |
| Fluoranthene           | 99 U J                | ug/Kg    |
| Fluorene               | 99 U J                | ug/Kg    |
| Indeno(1,2,3-cd)pyrene | 99 U J                | ug/Kg    |
| Naphthalene            | 99 U J                | ug/Kg    |

*DLC  
2/5/02*

- U indicates not detected at the associated value
- B indicates the value is greater than the detection limits of the method, however it is lower than the Contract Required Detection Limits
- J indicates the associated value is estimated
- UJ indicates not detected at the associated value, however the value should be considered estimated
- P indicates the value is quantitated on the alternate Internal Standard Phenanthrene-d10

**Lab#:** 010308083  
**Sample ID:** HB-TP10 S-2  
**Sample Type:** Soil  
**Sample Date:** 3/8/01

|          | Test         | Result | Units |
|----------|--------------|--------|-------|
|          | Phenanthrene | 99 U J | ug/Kg |
|          | Pyrene       | 99 U J | ug/Kg |
| ICP      | Arsenic      | 2.62   | mg/Kg |
|          | Cadmium      | 0.25 U | mg/Kg |
|          | Chromium     | 6.43   | mg/Kg |
|          | Copper       | 9.61 J | mg/Kg |
|          | Lead         | 7.18   | mg/Kg |
|          | Nickel       | 7.24   | mg/Kg |
|          | Zinc         | 26.5   | mg/Kg |
| NWTPH-Dx | Diesel       | 20 U J | mg/Kg |
|          | Heavy Oil    | 40 U J | mg/Kg |

Reviewed By: Lori A. Zboralski - 5/16/01

- U indicates not detected at the associated value
- B indicates the value is greater than the detection limits of the method, however it is lower than the Contract Required Detection Limits
- J indicates the associated value is estimated
- UJ indicates not detected at the associated value, however the value should be considered estimated
- P indicates the value is quantitated on the alternate Internal Standard Phenanthrene-d10

# Sample Custody Record

Samples Shipped to: City of Tacoma

Hart Crowser, Inc.  
1910 Fairview Avenue East  
Seattle, Washington 98102-3699  
Phone: 206-324-9530 FAX: 206-328-5581



## HART CROWSER

JOB Hicks Bull LAB NUMBER \_\_\_\_\_  
PROJECT NAME The Tess Uplands  
HART CROWSER CONTACT Jac Morrice

SAMPLED BY: JAZ

### REQUESTED ANALYSIS

| Requested Analysis | TPH-D | TPH-D PATHS | TPH-6/WDF |
|--------------------|-------|-------------|-----------|
| metals             | X     | X           | X         |
|                    | X     | X           | X         |
|                    | X     | X           | X         |
|                    | X     | X           | X         |
|                    | X     | X           | X         |
|                    | X     | X           | X         |
|                    | X     | X           | X         |

NO. OF CONTAINERS

OBSERVATIONS/COMMENTS/  
COMPOSITING INSTRUCTIONS

Dev. Site 8  
AJ212M

| LAB NO. | SAMPLE ID | DESCRIPTION | DATE   | TIME  | MATRIX |
|---------|-----------|-------------|--------|-------|--------|
|         | H0-TP05   | S-1         | 3/8/01 | 14:25 | Soil   |
|         | H0-TP05   | S-2         |        | 14:20 |        |
|         | H0-TP05   | S-3         |        | 14:35 |        |
|         | H0-TR06   | S-1         |        | 13:15 |        |
|         | H0-TR06   | S-2         |        | 13:20 |        |
|         | H0-TR0    | S-1         |        | 8:45  |        |
|         | H0-TR0    | S-2         |        | 8:50  |        |

| RELINQUISHED BY     | DATE   | RECEIVED BY        | DATE   |
|---------------------|--------|--------------------|--------|
| <u>[Signature]</u>  | 3/8/01 | <u>Rieggler</u>    | 3-8-01 |
| <u>[Signature]</u>  |        | <u>[Signature]</u> |        |
| <u>Hart Crowser</u> | 15:55  | <u>[Signature]</u> | 1555   |
|                     |        |                    |        |
|                     |        |                    |        |
|                     |        |                    |        |

SPECIAL SHIPMENT HANDLING OR STORAGE REQUIREMENTS:

COOLER NO.: \_\_\_\_\_ STORAGE LOCATION: \_\_\_\_\_

See Lab Work Order No. \_\_\_\_\_  
for Other Contract Requirements

TOTAL NUMBER OF CONTAINERS: 7

SAMPLE RECEIPT INFORMATION  
CUSTODY SEALS:  
 YES  NO  N/A  
GOOD CONDITION:  
 YES  NO  
TEMPERATURE:  
SHIPMENT METHOD:  HAND  OVERNIGHT  
 COURIER  NIGHT

TURNAROUND TIME:  
 24 HOURS  1 WEEK  
 48 HOURS  STANDARD  
 72 HOURS  OTHER \_\_\_\_\_



City of Tacoma  
Environmental Services  
Science and Engineering  
Division

RECEIVED *file copy*  
JAN 21 2002 *CC: Lori Heuman*

HART CROWSER, INC.  
HART CROWSER, INC.

Memorandum

*BUTIAH*  
To: Mark D'Andrea, P. E., Project Coordinator, Public Works Engineering  
FROM: Christopher L. Getchell, Source Control Supervisor  
SUBJECT: Foss Uplands – Hick's Bull WO# AJ212M  
DATE: January 3, 2002

Attached are the sample analysis results for the water samples collected by Hart Crowser on December 10, 2001. The samples were collected in association with the Foss Uplands Investigation.

The samples were analyzed at Severn-Trent Laboratories-Seattle (STL-Seattle, formerly known as Sound Analytical Services) by ICP-MS for Dissolved Metals. A detailed Quality Control Data Review report was prepared for these samples and is included with the sample reports.

The copper values for samples HB MW-02, HB MW-03, and UMW-02A are qualified as estimated because of high percent difference for the Serial Dilution matrix check.

If you have any questions concerning these results, call me at (253) 502-2130. Please note the samples associated with this report will be discarded six months from the date of this report unless requested otherwise.

Christopher L. Getchell  
Source Control Supervisor,  
Science and Engineering Division.

CLG:LAZ

Thea Foss Uplands  
Hick's Bull  
AJ212M

| <b>Sample ID</b> | <b>Laboratory ID</b> | <b>Matrix</b> |
|------------------|----------------------|---------------|
| HB MW02          | 20011213064          | Groundwater   |
| HB MW03          | 20011213065          | Groundwater   |
| UMW-02A          | 20011213066          | Groundwater   |

## Quality Control Data Review

TO: Christopher L. Getchell, Source Control Supervisor  
FROM: Lori A. Zboralski, Senior Laboratory Analyst *Laz*  
DATE: January 3, 2002

### SAMPLES

This report concerns the following samples associated with the **Foss Uplands WO# AJ212M**:

| <u>Sample Description</u> | <u>Lab #</u> | <u>Sample Matrix</u> | <u>Date Sampled</u> |
|---------------------------|--------------|----------------------|---------------------|
| HB MW02                   | 20011213064  | Groundwater          | 12/10/01            |
| HB MW03                   | 20011213065  | Groundwater          | 12/10/01            |
| UMW-02A                   | 20011213066  | Groundwater          | 12/10/01            |

### HOLDING TIMES

The samples were analyzed within 180 days for Dissolved Metals.

### METHODS

The samples were analyzed according to EPA Method 6020.

### CALIBRATION AND VERIFICATION

The ICP calibration met method requirements for linearity and accuracy. ICP sensitivities were verified by analysis of standards near the detection limits of the instrument. The recoveries ranged from 98.7 to 111% and all were within laboratory established 50-200% limits.

Independent mid-range standards were analyzed to monitor calibration accuracy for the ICP (ICV and CCV). Acceptable recoveries for ICP must be within 90 to 110%. All ICVs and CCVs had recoveries within acceptable limits.

Standards are required to be run to measure the accuracy of ICP interelement correction factors. These samples ICSA and ICSAB must be run at the beginning and end of each analytical run. The ICSAB recoveries for each element must be within 80 to 120% recovery. The recoveries of the ICSAB for the analysis of these samples ranged from 93.2 to 99.4%.

### METHOD AND CALIBRATION BLANKS

Method and calibration blanks were analyzed at the required frequencies for the methods. The concentrations of these blanks were less than 1/5<sup>th</sup> the amount found in the sample or less than the detection limit.

## LABORATORY CONTROL SAMPLES

Laboratory Control Samples (LCS) monitor the analytical system by carrying a standard through every step of the analytical method including extraction or digestion. All LCS recoveries were within laboratory established control limits.

## DUPLICATE SAMPLE ANALYSIS

All associated duplicate samples had differences of less than the reporting limits for analytes with concentrations less than 5 times the reporting limits and Relative Percent Differences (RPD) of less than 20% for metals analytes with concentrations greater than 5 times the reporting limits.

## MATRIX SPIKE AND MATRIX SPIKE DUPLICATE ANALYSIS

Matrix spike analysis was performed for the metals analysis. All recoveries were within the required CLP limits. The spike recoveries were within the method recovery limits.

## ICP SERIAL DILUTIONS

Serial dilution of samples analyzed by ICP provides information about physical or chemical interferences that may exist due to sample matrix.

Associated sample HB OB-1 was analyzed at a five-fold dilution. All analytes had %D of the diluted sample compared to the undiluted sample of less than 10% for analytes greater than 50 times the IDL, **except for Copper. The %D for copper was 13%. The copper values for samples HB MW-02, HB MW-03, and UMW-02A are qualified as estimated.**

## DATA ASSESSMENT

The following qualifier is assigned to the copper values for samples HB MW-02, HB MW-03, and UMW-02A:

J the value should be considered estimated.

All data including qualified values are acceptable for use.





# City of Tacoma

Science and Engineering Division

2201 Portland Avenue Tacoma WA 98421  
Phone: 253.591.5588 Fax: 253.502.2170

Lab#: 20011213064

Report Date: January 03, 2002

Sample ID: HB MW-02

Sample Type: Water

Sample Collect Date: 12/10/2001

Sample Receipt Date: 12/12/2001

| <u>Test</u>        | <u>Prep Method:</u> | <u>Analytical Method:</u> | <u>Result</u> | <u>Units</u> | <u>MDL</u> | <u>Lab</u> |
|--------------------|---------------------|---------------------------|---------------|--------------|------------|------------|
| ICP-DISS           |                     |                           |               |              |            |            |
| Arsenic, Dissolved |                     | 6020                      | 20.6          | ug/L         | 0.154      | STL        |
| Copper, Dissolved  |                     | 6020                      | 4.33 J        | ug/L         | 0.0812     | STL        |
| Nickel, Dissolved  |                     | 6020                      | 25.8          | ug/L         | 0.0735     | STL        |

### Contracted Laboratory

|     |                        |               |                  |
|-----|------------------------|---------------|------------------|
| STL | Severn Trent - Seattle | 5755 8th St E | Tacoma, WA 98424 |
|-----|------------------------|---------------|------------------|

- Flags: U: The value is less than detection limit  
 UJ: The value is less than detection limit and considered estimated  
 J: The value is considered estimated  
 B: The value is less than the reporting limit but greater than detection limit

Lori A. Zboralski      January 3, 2002  
 Reviewed By:                      Date



# City of Tacoma

*Science and Engineering Division*

2201 Portland Avenue Tacoma WA 98421

Phone: 253.591.5588 Fax: 253.502.2170

Lab#: 20011213065

Report Date: January 03, 2002

Sample ID: HB MW-03

Sample Type: Water

Sample Collect Date: 12/10/2001

Sample Receipt Date: 12/12/2001

| <u>Test</u>        | <u>Prep</u><br><u>Method:</u> | <u>Analytical</u><br><u>Method:</u> | <u>Result</u> | <u>Units</u> | <u>MDL</u> | <u>Lab</u> |
|--------------------|-------------------------------|-------------------------------------|---------------|--------------|------------|------------|
| ICP-DISS           |                               |                                     |               |              |            |            |
| Arsenic, Dissolved |                               | 6020                                | 35.6          | ug/L         | 0.154      | STL        |
| Copper, Dissolved  |                               | 6020                                | 6.24 J        | ug/L         | 0.0812     | STL        |
| Nickel, Dissolved  |                               | 6020                                | 11.2          | ug/L         | 0.0735     | STL        |

#### Contracted Laboratory

STL Severn Trent - Seattle 5755 8th St E Tacoma, WA 98424

Flags: U: The value is less than detection limit  
UJ: The value is less than detection limit and considered estimated  
J: The value is considered estimated  
B: The value is less than the reporting limit but greater than detection limit

*Lori A. Zboralski*

Reviewed By:

*January 3, 2002*

Date



# City of Tacoma

Science and Engineering Division

2201 Portland Avenue Tacoma WA 98421

Phone: 253.591.5588 Fax: 253.502.2170

Lab#: 20011213066

Report Date: January 03, 2002

Sample ID: UMW-02A

Sample Type: Water

Sample Collect Date: 12/10/2001

Sample Receipt Date: 12/13/2001

| <u>Test</u>        | <u>Prep Method:</u> | <u>Analytical Method:</u> | <u>Result</u> | <u>Units</u> | <u>MDL</u> | <u>Lab</u> |
|--------------------|---------------------|---------------------------|---------------|--------------|------------|------------|
| ICP-DISS           |                     |                           |               |              |            |            |
| Arsenic, Dissolved |                     | 6020                      | 15.6          | ug/L         | 0.154      | STL        |
| Copper, Dissolved  |                     | 6020                      | 3.79          | J ug/L       | 0.0812     | STL        |
| Nickel, Dissolved  |                     | 6020                      | 6.24          | ug/L         | 0.0735     | STL        |

### Contracted Laboratory

|     |                        |               |                  |
|-----|------------------------|---------------|------------------|
| STL | Severn Trent - Seattle | 5755 8th St E | Tacoma, WA 98424 |
|-----|------------------------|---------------|------------------|

- Flags: U: The value is less than detection limit  
 UJ: The value is less than detection limit and considered estimated  
 J: The value is considered estimated  
 B: The value is less than the reporting limit but greater than detection limit

Lori A. Zboralski      January 3, 2002  
 Reviewed By:                      Date

# Sample Custody Record

Hart Crowser, Inc.  
 1910 Fairview Avenue East  
 Seattle, Washington 98102-3699  
 Phone: 206-324-9530 FAX: 206-328-5581



## HARTCROWSER

Samples Shipped to: C&T Lab

| JOB <u>1026-22</u> LAB NUMBER _____<br>PROJECT NAME <u>Therapist Services Unit</u><br>HART CROWSER CONTACT <u>Joe Moline</u><br>SAMPLED BY: <u>IMD/PMC</u> |            | REQUESTED ANALYSIS<br>DIS METALS |            | NO. OF CONTAINERS<br>1 }<br>1 }<br>1 }<br>1 }      |        | OBSERVATIONS/COMMENTS<br>Sent to Severn-Trent Lab (Sound Analytical)<br>12/13/2001 Bill E   |  |
|--|------------|----------------------------------|------------|--|--------|---|--|
| LAB NO.  | SAMPLE ID  | DESCRIPTION                      | DATE       | TIME   | MATRIX | SPECIAL SHIPMENT HANDLING OR STORAGE REQUIREMENTS:  |  |
| 1213062  | DB-1       |                                  | 12/10/01   | 1720   | H30    | TOTAL NUMBER OF CONTAINERS: 5<br>SAMPLE RECEIPT INFORMATION: CUSTODY SEALS: YES <input type="checkbox"/> NO <input type="checkbox"/> N/A<br>GOOD CONDITION: YES <input type="checkbox"/> NO <input type="checkbox"/><br>TEMPERATURE: SHIPMENT METHOD: <input type="checkbox"/> HAND <input type="checkbox"/> COURIER <input type="checkbox"/> OVERNIGHT |  |
| 1213063  | HD 5-1     |                                  | 12/10/01   | 1735   |        | SPECIAL SHIPMENT HANDLING OR STORAGE REQUIREMENTS:<br>Metals: As, C, Ni   |  |
| 1213064  | HD MM-2    |                                  | 12/10/01   | 1945   |        | TURNAROUND TIME:<br><input type="checkbox"/> 24 HOURS <input type="checkbox"/> 1 WEEK<br><input type="checkbox"/> 48 HOURS <input checked="" type="checkbox"/> STANDARD<br><input type="checkbox"/> 72 HOURS <input type="checkbox"/> OTHER _____   |  |
| 1213066  | UMH-2A     |                                  | 12/10/01   | 1750   |        | COOLER NO.: _____ STORAGE LOCATION: _____<br>See Lab Work Order No. _____ for Other Contract Requirements   |  |
| RELINQUISHED BY  | DATE       | RECEIVED BY                      | DATE       | SPECIAL SHIPMENT HANDLING OR STORAGE REQUIREMENTS: |        |   |  |
| SIGNATURE _____  | 12/13/01   | SIGNATURE <u>C. Ketchell</u>     | 12/12/01   | Metals: As, C, Ni                                  |        |   |  |
| PRINT NAME _____   | TIME _____ | PRINT NAME <u>C. Ketchell</u>    | TIME _____ |  |        |   |  |
| COMPANY _____  |            | COMPANY <u>City of Tacoma</u>    | 1645       |  |        |   |  |
| RELINQUISHED BY  | DATE       | RECEIVED BY                      | DATE       | SPECIAL SHIPMENT HANDLING OR STORAGE REQUIREMENTS: |        |   |  |
| SIGNATURE <u>Bill Crowser</u>  | 12/13/01   | SIGNATURE <u>Joe Moline</u>      | 12/13/01   |  |        |   |  |
| PRINT NAME _____   | TIME _____ | PRINT NAME _____                 | TIME _____ |  |        |   |  |
| COMPANY _____  | 12:25      | COMPANY _____                    | 12:25      |  |        |   |  |



City of Tacoma  
Environmental Services  
Science and Engineering  
Division

file copy  
cc: Lori Hevman

**Memorandum**

*Bill D'Andrea*  
To: Mark D'Andrea, P. E., Project Coordinator, Public Works Engineering  
FROM: Christopher L. Getchell, Source Control Supervisor  
SUBJECT: Foss Uplands – Hick's Bull WO# AJ212N  
DATE: January 3, 2002

Attached are the sample analysis results for the water samples collected by Hart Crowser on December 10, 2001. The samples were collected in association with the Foss Uplands Investigation.

The samples were analyzed at Severn-Trent Laboratories-Seattle (STL-Seattle, formerly known as Sound Analytical Services) by ICP-MS for Dissolved Metals. A detailed Quality Control Data Review report was prepared for these samples and is included with the sample reports.

The copper values for samples OB-1 and HB S-1 are qualified as estimated because of high percent difference for the Serial Dilution matrix check.

If you have any questions concerning these results, call me at (253) 502-2130. Please note the samples associated with this report will be discarded six months from the date of this report unless requested otherwise.

Christopher L. Getchell  
Source Control Supervisor,  
Science and Engineering Division.

Thea Foss Uplands  
Hick's Bull  
AJ212N

| <b>Sample ID</b> | <b>Laboratory ID</b> | <b>Matrix</b> |
|------------------|----------------------|---------------|
| OB-1             | 20011213062          | Groundwater   |
| HB S-1           | 20011213063          | Groundwater   |

## Quality Control Data Review

TO: Christopher L. Getchell, Source Control Supervisor  
FROM: Lori A. Zboralski, Senior Laboratory Analyst *LAZ*  
DATE: January 3, 2002

### SAMPLES

This report concerns the following samples associated with the **Foss Uplands WO# AJ212N**:

| <u>Sample Description</u> | <u>Lab #</u> | <u>Sample Matrix</u> | <u>Date Sampled</u> |
|---------------------------|--------------|----------------------|---------------------|
| OB-1                      | 20011213062  | Groundwater          | 12/10/01            |
| HB S-1                    | 20011213063  | Groundwater          | 12/10/01            |

### HOLDING TIMES

The samples were analyzed within 180 days for Dissolved Metals.

### METHODS

The samples were analyzed according to EPA Method 6020.

### CALIBRATION AND VERIFICATION

The ICP calibration met method requirements for linearity and accuracy. ICP sensitivities were verified by analysis of standards near the detection limits of the instrument. The recoveries ranged from 98.7 to 111% and all were within laboratory established 50-200% limits.

Independent mid-range standards were analyzed to monitor calibration accuracy for the ICP (ICV and CCV). Acceptable recoveries for ICP must be within 90 to 110%. All ICVs and CCVs had recoveries within acceptable limits.

Standards are required to be run to measure the accuracy of ICP interelement correction factors. These samples ICSA and ICSAB must be run at the beginning and end of each analytical run. The ICSAB recoveries for each element must be within 80 to 120% recovery. The recoveries of the ICSAB for the analysis of these samples ranged from 93.2 to 99.4%.

### METHOD AND CALIBRATION BLANKS

Method and calibration blanks were analyzed at the required frequencies for the methods. The concentrations of these blanks were less than 1/5<sup>th</sup> the amount found in the sample or less than the detection limit.

### LABORATORY CONTROL SAMPLES

Laboratory Control Samples (LCS) monitor the analytical system by carrying a standard through every step of the analytical method including extraction or digestion. All LCS recoveries were within laboratory established control limits.

## DUPLICATE SAMPLE ANALYSIS

All associated duplicate samples had differences of less than the reporting limits for analytes with concentrations less than 5 times the reporting limits and Relative Percent Differences (RPD) of less than 20% for metals analytes with concentrations greater than 5 times the reporting limits.

## MATRIX SPIKE AND MATRIX SPIKE DUPLICATE ANALYSIS

Matrix spike analysis was performed for the metals analysis. All recoveries were within the required CLP limits. The spike recoveries were within the method recovery limits.

## ICP SERIAL DILUTIONS

Serial dilution of samples analyzed by ICP provides information about physical or chemical interferences that may exist due to sample matrix.

Sample HB OB-1 was analyzed at a five-fold dilution. All analytes had %D of the diluted sample compared to the undiluted sample of less than 10% for analytes greater than 50 times the IDL, **except for Copper. The %D for copper was 13%. The copper values for samples OB-1 and HB S-1 are qualified as estimated.**

## DATA ASSESSMENT

The following qualifier is assigned to the copper values for samples OB-1 and HB-S-1:

J the value should be considered estimated.

All data including qualified values are acceptable for use.





# City of Tacoma

Science and Engineering Division

2201 Portland Avenue Tacoma WA 98421  
Phone: 253.591.5588 Fax: 253.502.2170

Lab#: 20011213062

Report Date: January 03, 2002

Sample ID: OB-1

Sample Type: Water

Sample Collect Date: 12/10/2001

Sample Receipt Date: 12/12/2001

| <u>Test</u>        | <u>Prep Method:</u> | <u>Analytical Method:</u> | <u>Result</u> | <u>Units</u> | <u>MDL</u> | <u>Lab</u> |
|--------------------|---------------------|---------------------------|---------------|--------------|------------|------------|
| ICP-DISS           |                     |                           |               |              |            |            |
| Arsenic, Dissolved |                     | 6020                      | 42.7          | ug/L         | 0.154      | STL        |
| Copper, Dissolved  |                     | 6020                      | 9.05 J        | ug/L         | 0.0812     | STL        |
| Nickel, Dissolved  |                     | 6020                      | 10.8          | ug/L         | 0.0735     | STL        |

### Contracted Laboratory

STL      Severn Trent - Seattle      5755 8th St E      Tacoma, WA 98424

- Flags: U: The value is less than detection limit  
 UJ: The value is less than detection limit and considered estimated  
 J: The value is considered estimated  
 B: The value is less than the reporting limit but greater than detection limit

Lois A. Zboralski      January 3, 2002  
 Reviewed By:      Date



# City of Tacoma

Science and Engineering Division

2201 Portland Avenue Tacoma WA 98421

Phone: 253.591.5588 Fax: 253.502.2170

Lab#: 20011213063

Report Date: January 03, 2002

Sample ID: HB S-1

Sample Type: Water

Sample Collect Date: 12/10/2001

Sample Receipt Date: 12/12/2001

| <u>Test</u>        | <u>Prep Method:</u> | <u>Analytical Method:</u> | <u>Result</u> | <u>Units</u> | <u>MDL</u> | <u>Lab</u> |
|--------------------|---------------------|---------------------------|---------------|--------------|------------|------------|
| ICP-DISS           |                     |                           |               |              |            |            |
| Arsenic, Dissolved |                     | 6020                      | 38.8          | ug/L         | 0.154      | STL        |
| Copper, Dissolved  |                     | 6020                      | 7.16 J        | ug/L         | 0.0812     | STL        |
| Nickel, Dissolved  |                     | 6020                      | 10.7          | ug/L         | 0.0735     | STL        |

### Contracted Laboratory

|     |                        |               |                  |
|-----|------------------------|---------------|------------------|
| STL | Severn Trent - Seattle | 5755 8th St E | Tacoma, WA 98424 |
|-----|------------------------|---------------|------------------|

- Flags: U: The value is less than detection limit  
 UJ: The value is less than detection limit and considered estimated  
 J: The value is considered estimated  
 B: The value is less than the reporting limit but greater than detection limit

Lori A. Zboralski      January 3, 2002  
 Reviewed By:                      Date



City of Tacoma  
 Department of Public Works  
 Special Projects Section  
 747 Market Street, Room 644  
 Tacoma, WA 98402-3769

**RECEIVED**  
 JAN 21 2002  
 HART CROWSER, INC.

**LETTER OF TRANSMITTAL**

|   |                                      |                                 |
|---|--------------------------------------|---------------------------------|
| <b>TO:</b><br>Hart Crowser, Inc.<br>1910 Fairview Avenue East<br>Seattle, WA 98102-3699 | <b>DATE:</b> January 18, 2002        | <b>JOB NO.</b> AJ212M/N/SA 1336 |
|   | <b>ATTENTION:</b> Joseph Morrice     |                                 |
|   | <b>RE:</b> Foss Uplands              |                                 |
|   | Dock Street North<br>Sample Analysis |                                 |

WE ARE SENDING YOU  Attached  Under separate cover via \_\_\_\_\_ the following items:

- Shop drawings   
  Prints   
  Plans   
  Samples   
  Specifications  
 Copy of letter   
  Change order   
  \_\_\_\_\_

| COPIES | DATE              | NO. | DESCRIPTION  |
|--------|-------------------|-----|--|
| 1      | November 26, 2001 |     | Industrial Monitoring<br>October 26, 2002 samples - lab analysis |
| 1      | January 3, 2002   |     | Hicks-Bull<br>December 10, 2001 samples - lab analysis           |
| 1      | January 3, 2002   |     | Hicks-Bull<br>December 10, 2001 samples - lab analysis           |
|        |                   |     |  |
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THESE ARE TRANSMITTED as checked below:

- For approval   
  Approved as submitted   
  Resubmit \_\_\_\_\_ copies for approval  
 For your use   
  Approved as noted   
  Submit \_\_\_\_\_ copies for distribution  
 As requested   
  Returned for corrections   
  Return \_\_\_\_\_ corrected prints  
 For review and comments   
  \_\_\_\_\_  
 FOR BIDS DUE :   
  PRINTS RETURNED AFTER LOAN TO US

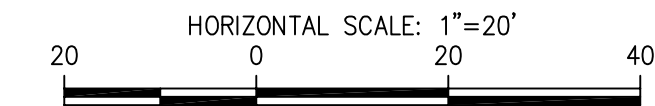
**REMARKS :**

Please contact me should you have any questions or comments at 591-5864.

**CC: File:**

**SIGNED:** *Bill Iyall*  
 For Bill Iyall

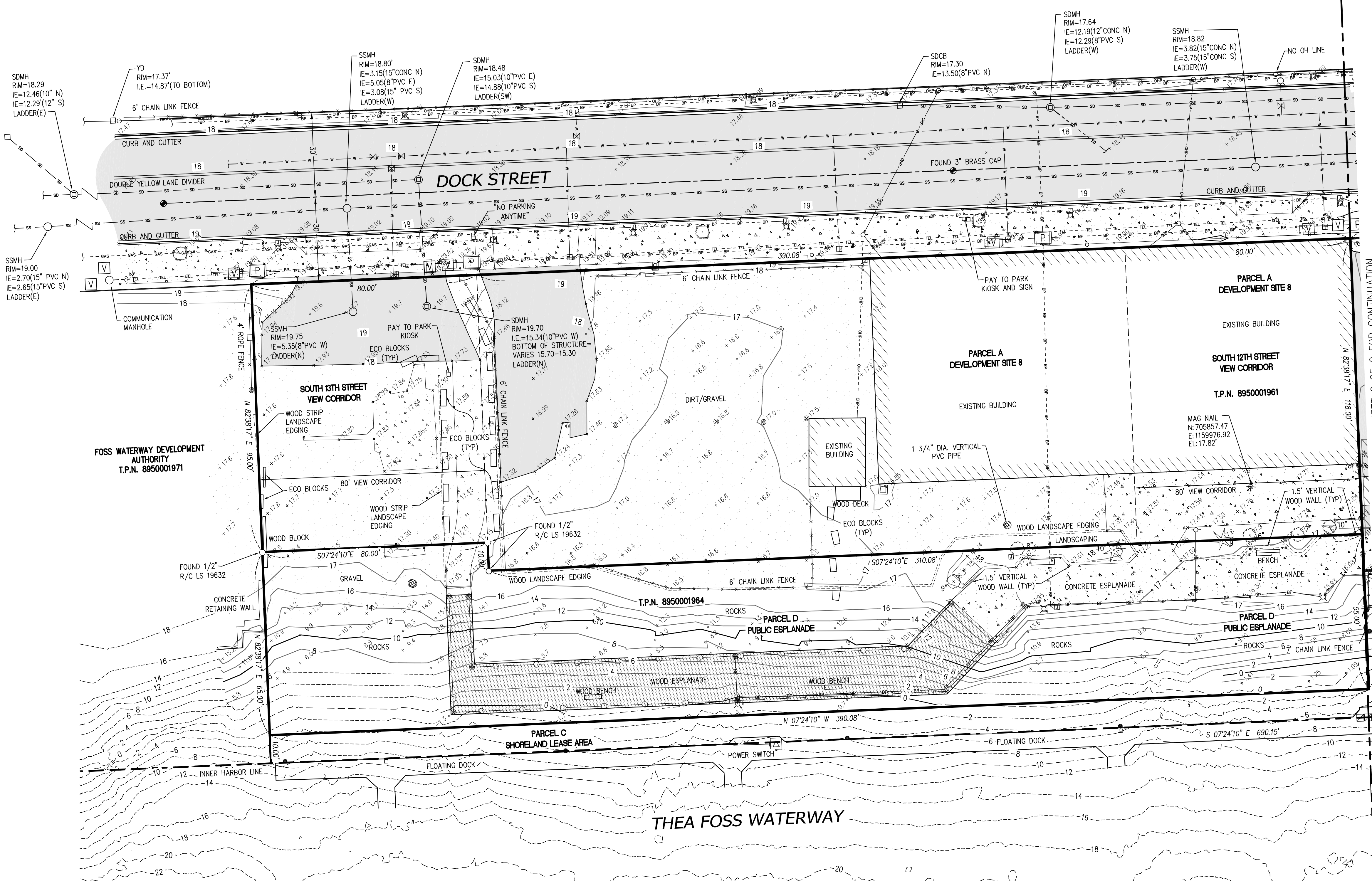
**APPENDIX C**  
**Sitts & Hill Survey Drawing**



**LEGEND**

- FOUND MONUMENT
- FOUND REBAR/CAP AS NOTED
- ⊕ SURVEY CONTROL POINT
- ⊙ TELEPHONE/TV RISER
- COMMUNICATION MANHOLE
- ⊕ UNKNOWN VAULT
- ⊕ POWER METER
- ⊕ JUNCTION BOX
- ⊕ LIGHT
- ⊕ UTILITY POLE
- ⊕ GUY ANCHOR
- ⊕ POWER TRANSFORMER
- ⊕ POWER VAULT
- ⊕ GAS METER
- ⊕ CATCH BASIN
- ⊕ STORM DRAIN MANHOLE
- ⊕ CLEAN OUT
- ⊕ SANITARY SEWER MANHOLE EXCEPT AS NOTED
- ⊕ WATER METER
- ⊕ WATER MANHOLE
- ⊕ FIRE HYDRANT
- ⊕ WATER VAULT
- ⊕ GATE VALVE
- ⊕ FIRE DEPARTMENT CONNECTION
- ⊕ BOLLARD
- ⊕ FENCE/GATE POST
- ⊕ MONITOR WELL
- ⊕ SIGN
- ⊕ COLUMN
- ⊕ HANDICAP PARKING
- ⊕ DECIDUOUS TREE
- ⊕ EVERGREEN TREE
- ⊕ SPOT ELEVATION
- BOUNDARY LINE
- MONUMENT LINE
- EASEMENT LINE
- RIGHT OF WAY LINE
- HARBOR LINE
- BURIED STORM DRAIN LINE (FIELD LOCATED)
- BURIED STORM DRAIN LINE (RECORD)
- BURIED SANITARY SEWER LINE
- BURIED POWER LINE (FIELD LOCATED)
- BURIED POWER LINE (RECORD)
- OVERHEAD POWER LINE (FIELD LOCATED)
- OVERHEAD POWER LINE (RECORD)
- BURIED WATER LINE
- BURIED COMMUNICATION LINE (FIELD LOCATED)
- BURIED COMMUNICATION LINE (RECORD)
- BURIED GAS LINE (RECORD)
- UNKNOWN UTILITY CONDUIT
- CHAIN LINK FENCE AS NOTED
- RAILING LINE
- ROPE FENCE AS NOTED
- MINOR CONTOUR
- MAJOR CONTOUR
- ASPHALT SURFACE
- CONCRETE SURFACE
- GRAVEL SURFACE
- WOOD ESPLANADE

MATCHLINE SEE SHEET 2 OF 2 FOR CONTINUATION



**HORIZONTAL DATUM**

WASHINGTON STATE PLANE COORDINATE SYSTEM NAD 83/91 SOUTH ZONE PER CITY OF TACOMA

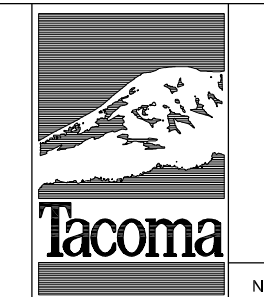
**VERTICAL DATUM**

PROJECT BM: CITY OF TACOMA MON NO. 2063 DESCRIPTION: BRASS SURFACE MONUMENT ON THE EAST SIDE OF DOCK STREET, IN FRONT OF 535 DOCK STREET. CITY OF TACOMA PUBLISHED ELEVATION: NGVD 29 = 10.21' CONVERSION TO MLLW = 16.19'

**NOTES**

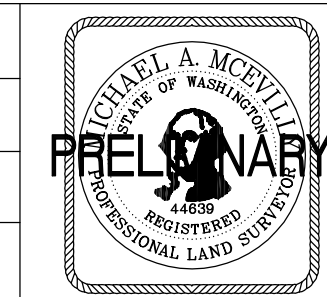
1. BOUNDARY AS SHOWN HEREON PER BOUNDARY LINE ADJUSTMENT FOR THE CITY OF TACOMA RECORDED UNDER PIERCE COUNTY RECORDING NUMBER 200112145005 WHICH IS A RE-RECORDING OF RECORDING NUMBER 200111025001. SITTS & HILL ENGINEERS PERFORMED NO ADDITIONAL BOUNDARY ANALYSIS AS PART OF THIS PROJECT. THIS SURVEY DOES NOT PURPORT TO SHOW ANY OR ALL EASEMENTS OF RECORD.
2. INITIAL FIELD WORK PERFORMED FOR THIS SURVEY IN MARCH 2011 AND COMPLETED IN APRIL 2013.
3. THIS SURVEY WAS PERFORMED BY FIELD TRAVERSE WITH THE FINAL RESULTS MEETING OR EXCEEDING THE CURRENT TRAVERSE STANDARDS CONTAINED IN W.A.C. 332-130-090. MEASUREMENTS WERE MADE WITH A TOPCON GS TOTAL STATION IN ACCORDANCE WITH THE EQUIPMENT MANUFACTURER'S SPECIFICATIONS.
4. THE PURPOSE OF THIS SURVEY IS TO PROVIDE A BASEMAP OF CURRENT CONDITIONS AS THEY APPEAR ON THE GROUND AS OF APRIL 2013.
5. UTILITY INFORMATION SHOWN HEREON IS BASED ON SURFACE EVIDENCE OBSERVED DURING FIELD SURVEY. DATA WAS SUPPLEMENTED WITH RECORD DATA FROM THE CITY OF TACOMA PUBLIC UTILITIES, PUGET SOUND ENERGY, CENTURY LINK AND CLICK NETWORK AND IS REPRESENTED BY DASHED UTILITY LINES.
6. NO SPOT ELEVATIONS ARE SHOWN ON THE EXISTING WOOD DECK UNLESS NOTED.
7. STORM MANHOLE AND DRAIN LOCATION APPROXIMATE UNDER PAVEMENT IN LOCATION SPECIFIED ON SHEET 2 OF 2.
8. TIDELAND CONTOURS (DASHED) FROM THE THEA FOSS POST CONSTRUCTION SURVEY.

**SITTS & HILL ENGINEERS, INC.**  
 CIVIL ■ STRUCTURAL ■ SURVEYING  
 4815 CENTER STREET • TACOMA, WA 98409 • (253) 474-9449



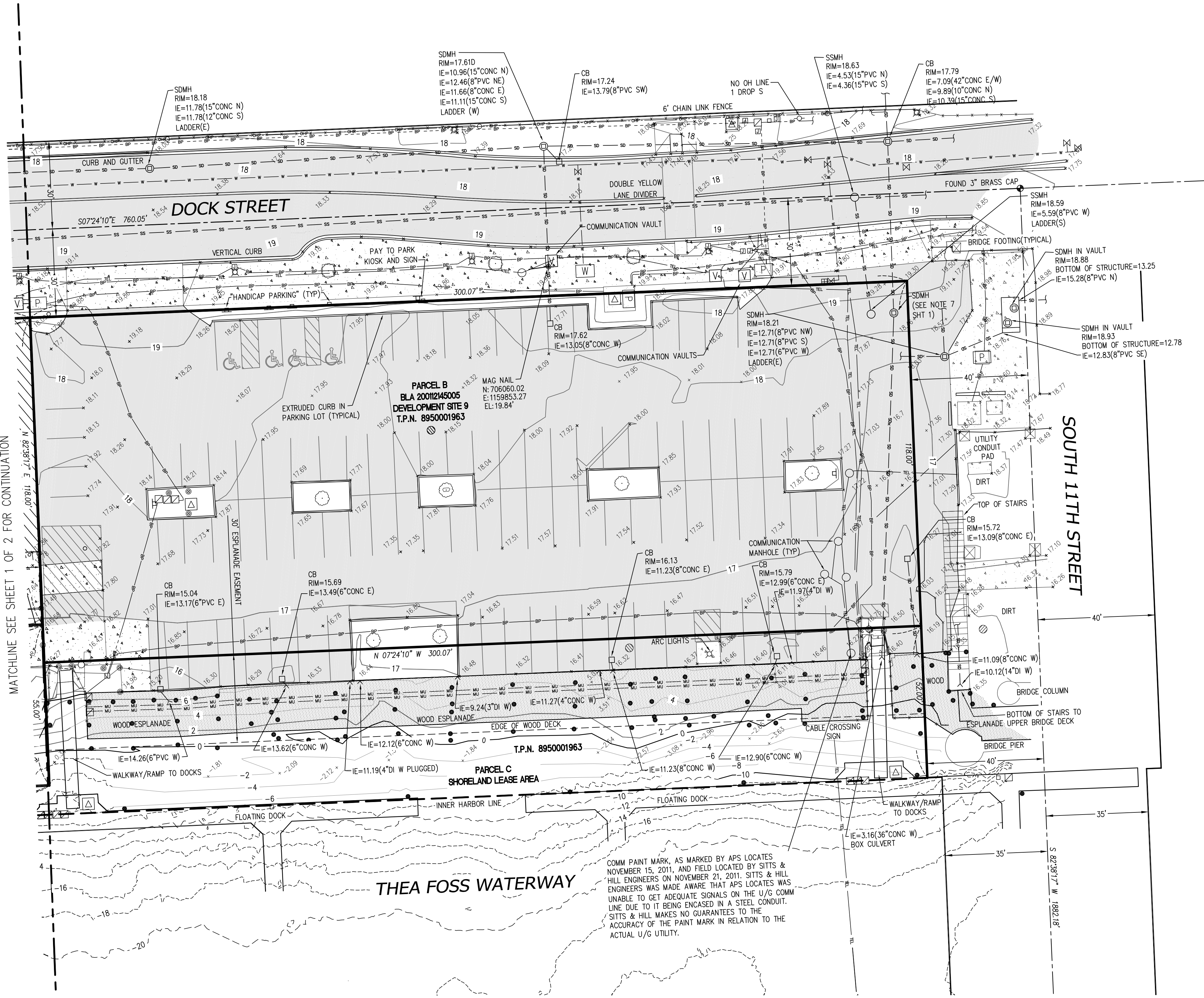
| NO. | REVISION | DATE | APPD. |
|-----|----------|------|-------|
|     |          |      |       |

|                            |                                  |                     |
|----------------------------|----------------------------------|---------------------|
| FINAL CONSTRUCTION CHECKED | DATE: 2013-04-24                 | SCALE: 1" = 20'     |
| DESIGNED                   | CHECKED: MAM                     | PROJECT NAME: 15603 |
| DRAWN: SLS                 | DRAWING NAME: TOPOGRAPHIC SURVEY |                     |



ENGINEERING DIVISION MANAGER

CITY OF TACOMA  
 DEPARTMENT OF PUBLIC WORKS  
 FOSS WATERWAY DEVELOPMENT AUTHORITY  
 TOPOGRAPHIC SURVEY  
 SITE 8 & 9 ESPLANADE



MATCHLINE SEE SHEET 1 OF 2 FOR CONTINUATION

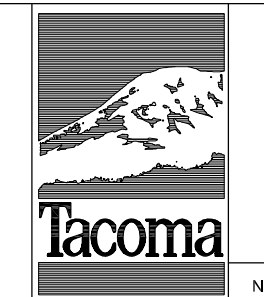


HORIZONTAL SCALE: 1"=20'  
 0 20 40

**LEGEND**

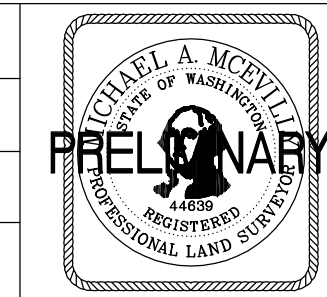
- |   |  |               |   |
|---|--|---------------|---|
| ● | FOUND MONUMENT                         | — — — — —     | BOUNDARY LINE                             |
| ○ | FOUND REBAR/CAP AS NOTED               | — · — · — · — | MONUMENT LINE                             |
| ⊕ | SURVEY CONTROL POINT                   | - - - - -     | EASEMENT LINE                             |
| □ | TELEPHONE/TV RISER                     | — — — — —     | RIGHT OF WAY LINE                         |
| ○ | COMMUNICATION MANHOLE                  | — — — — —     | HARBOR LINE                               |
| ⊕ | UNKNOWN VAULT                          | — — — — —     | BURIED STORM DRAIN LINE (FIELD LOCATED)   |
| ⊕ | POWER METER                            | — — — — —     | BURIED STORM DRAIN LINE (RECORD)          |
| ⊕ | JUNCTION BOX                           | — — — — —     | BURIED SANITARY SEWER LINE                |
| ⊕ | LIGHT                                  | — — — — —     | BURIED POWER LINE (FIELD LOCATED)         |
| ⊕ | UTILITY POLE                           | — — — — —     | BURIED POWER LINE (RECORD)                |
| ⊕ | GUY ANCHOR                             | — — — — —     | OVERHEAD POWER LINE (FIELD LOCATED)       |
| ⊕ | POWER TRANSFORMER                      | — — — — —     | OVERHEAD POWER LINE (RECORD)              |
| ⊕ | POWER VAULT                            | — — — — —     | BURIED WATER LINE                         |
| ⊕ | GAS METER                              | — — — — —     | BURIED COMMUNICATION LINE (FIELD LOCATED) |
| ⊕ | CATCH BASIN                            | — — — — —     | BURIED COMMUNICATION LINE (RECORD)        |
| ⊕ | STORM DRAIN MANHOLE                    | — — — — —     | BURIED GAS LINE (RECORD)                  |
| ⊕ | CLEAN OUT                              | — — — — —     | UNKNOWN UTILITY CONDUIT                   |
| ⊕ | SANITARY SEWER MANHOLE EXCEPT AS NOTED | — — — — —     | CHAIN LINK FENCE AS NOTED                 |
| ⊕ | WATER METER                            | — — — — —     | RAILING LINE                              |
| ⊕ | WATER MANHOLE                          | — — — — —     | ROPE FENCE AS NOTED                       |
| ⊕ | FIRE HYDRANT                           | — — — — —     | MINOR CONTOUR                             |
| ⊕ | WATER VAULT                            | — — — — —     | MAJOR CONTOUR                             |
| ⊕ | GATE VALVE                             | — — — — —     | ASPHALT SURFACE                           |
| ⊕ | FIRE DEPARTMENT CONNECTION             | — — — — —     | CONCRETE SURFACE                          |
| ⊕ | BOLLARD                                | — — — — —     | GRAVEL SURFACE                            |
| ⊕ | FENCE/GATE POST                        | — — — — —     | WOOD ESPLANADE                            |
| ⊕ | MONITOR WELL                           | — — — — —     |   |
| ⊕ | SIGN                                   | — — — — —     |   |
| ⊕ | COLUMN                                 | — — — — —     |   |
| ⊕ | HANDICAP PARKING                       | — — — — —     |   |
| ⊕ | DECIDUOUS TREE                         | — — — — —     |   |
| ⊕ | EVERGREEN TREE                         | — — — — —     |   |
| ⊕ | SPOT ELEVATION                         | — — — — —     |   |

**SITTS & HILL ENGINEERS, INC.**  
 CIVIL ■ STRUCTURAL ■ SURVEYING  
 4815 CENTER STREET • TACOMA, WA 98409 • (253) 474-9449



| NO | REVISION | DATE | APPD |
|----|----------|------|------|
|    |          |      |      |

|                            |                                  |                     |
|----------------------------|----------------------------------|---------------------|
| FINAL CONSTRUCTION CHECKED | DATE: 2013-04-26                 | SCALE: 1" = 20'     |
| BY: [Signature]            | DESIGNED: [Signature]            | CHECKED: MAM        |
| DATE: [Signature]          | DRAWN: SLS                       | PROJECT NAME: 15603 |
| FIELD BOOKS: [Signature]   | DRAWING NAME: TOPOGRAPHIC SURVEY |                     |



CITY OF TACOMA  
 DEPARTMENT OF PUBLIC WORKS  
**FOSS WATERWAY DEVELOPMENT AUTHORITY**  
**TOPOGRAPHIC SURVEY**  
**SITE 8 & 9 ESPLANADE**

**APPENDIX E**  
**Regulated Building Material Survey Report**



# PACIFIC RIM ENVIRONMENTAL, INC.

June 14, 2013

Layne Alfonso  
GeoEngineers  
1101 Fawcett Ave., Ste. 200  
Tacoma, WA 98402

**RE:** Regulated Material Abatement Scope of Work, Costs and Specifications, Project Management, Oversight and Clearance Inspections – Dock Street Property Tacoma WA.

Dear Layne,

This letter has been prepared to provide anticipated abatement costs and consulting costs for this project. Pacific Rim Environmental (PacRim) submitted initial service would include regulated materials inspection for asbestos, lead based paint and universal waste associated with the building materials. The intent of the initial inspection would be to determine the rough order of magnitude cost for abatement of the regulated materials

Based upon information in our report and assuming the roofing is asbestos (roofing has not been samples to date) the following abatement estimate is provided:

|   |                    |
|---|--------------------|
| Permits, Mobilization and Notifications for Abatement | \$ 1,500.00        |
| Window Abatement                                      | \$12,900.00        |
| Roofing Abatement (TBD)                               | \$26,250.00        |
| Universal Waste Recycling or Hazardous Disposal       | \$ 1,800.00        |
| Pacific Rim Fees (see details below)                  | \$12,360.00        |
| <b>Total Budget</b>                                   | <b>\$54,810.00</b> |

The fee for the Abatement scope of services is to develop an abatement/removal project specification and design documents to be used for project bidding to certified abatement contractors.

The Project Management service is anticipated to perform oversight and clearance inspection during future Abatement activities and to provide clearance inspections and authorization to Demo Letter.



**Scope of Remaining PacRim Services**

|   |                    |                    |
|---|--------------------|--------------------|
| <b>Scope of Work and Project Specification</b>            | Lump Sum           | <b>\$ 3,500.00</b> |
| Project Management Service:                               |                    |                    |
| On-site Air Sampling Professional (estimated) 10 shifts @ | \$680.00 per shift | \$ 6,800.00        |
| Sr. Project Manager 8 hours @                             | \$95.00 per hour   | \$ 760.00          |
| Air Samples 25 PCM @                                      | \$20.00 Ea.        | \$ 500.00          |
| Project Close Out Manuals                                 | Lump Sum           | <u>\$ 800.00</u>   |
| <b>Total Estimated Fee for onsite monitoring</b>          |                    | <b>\$ 8,860.00</b> |

The fee for Project Specifications includes a pre-bid project meeting and job walk with pre-qualified asbestos abatement contractors, preparation of all addenda as needed, bid evaluation and award recommendation. Abatement contractor will contract directly with client.

Fee for Project Management and Air Sampling is an estimate and will be billed according to the number of shifts the contractors need to complete the project.

Sincerely,



Jeff Lewis  
President  
Pacific Rim Environmental, Inc.



PACIFIC RIM ENVIRONMENTAL, INC.

## Regulated Building Material Survey

Foss Waterway Development – Sites 8 & 9  
1129 Dock Street  
Tacoma, WA



Performed for:  
**GeoEngineers, Inc.**  
1101 Fawcett Avenue, Suite 200  
Tacoma, WA 98402

Prepared By:

  
Todd P. Carter, AHERA Inspector  
WA State Lead Risk Assessor

Date Prepared: 04/22/2013  
PacRim#: 14867

**Table of Contents**

**Foss Waterway Development – 1129 Dock Street, Tacoma WA**

**Section 1.0 Scope of Work .....2**

**Section 2.0 Asbestos Survey Narrative .....4**

**Section 3.0 Abatement Cost Estimate .....5**

**Section 4.0 Statement of Compliance .....6**

**Section 5.0 Lead-Based Paint Screening Summary .....7**

**Section 6.0 Universal Waste Inventory .....8**

**Appendix A: Asbestos Sample Summary**

**Appendix B: Bulk Sample Analysis Report**

**Appendix C: Site Sketch**

**Appendix D: XRF Data Sheets**

**Appendix E: XRF Performance Characteristic Sheet**

**Appendix F: Universal Waste Rules for Dangerous Waste Lamps WAC 173-303-573**

**Appendix G: Inspector/Laboratory Certifications**

**Section 1.0 Scope of Work**  
**Foss Waterway Development – 1129 Dock Street, Tacoma WA**

On April 8, 2013 Todd P. Carter of Pacific Rim Environmental, Inc. (PacRim) performed the initial inspection for asbestos and lead-based paint at the subject Property located at 1129 Dock Street in Tacoma WA.

**Site:** The subject Property is occupied by two adjoining wood timber construction industrial buildings. The age of construction and square footage was not determined.

**Limitations:** The preliminary inspection and testing was limited to accessible interior building materials and finishes. No roof inspection or testing was performed.

Field inspection, data collection, and report generation were performed according to the following **Scope of Work:**

Provide AHERA Certified Building Inspector to perform a building inspection in accordance with Washington Administrative Code (WAC) 296-62-07721 and current PSCAA regulations. Provide a State of Washington Department of Commerce Lead Risk Assessor to perform a building inspection in accordance with WAC code 365-230-200.

***Asbestos-Containing Materials (ACM)***

1. Bulk sampling and analysis of suspect asbestos-containing materials (ACM).
2. Analysis of suspect ACM by a NVLAP accredited laboratory.
3. Quantity estimates of ACM.
4. Written report including recommendations based on the technician's observations, abatement (removal) cost estimates, sample descriptions, and sample location.
5. Statement of Compliance with W.A.C. 296-62-07721 Sign-off form.

***Lead-Based Paints (LBP)***

6. Perform screening of suspect lead-based paints both interior, utilizing a XRF portable sampling device.
7. Written report including: Sample descriptions, conditions, locations, analytical results, and recommendations.

***Universal Waste Inventory***

8. Inspect and inventory lights and equipment to identify fixture and lamp type to determine presence of PCB and/or mercury.

The survey was intended to identify possible asbestos-containing materials (ACM) on the interior and exterior of the building. This inspection covered only those areas, which were exposed and/or physically accessible to the inspector. Materials uncovered during the course of demolition, renovation, or maintenance activities that are not identified in this inspection report must be presumed to contain asbestos until PLM analysis proves that the material is not asbestos-containing.

This survey is not intended for, nor should be used as a design specification. The Asbestos in Schools Hazard Amendment and Reauthorization Act (ASHARA), effective November 20, 1990, expanded accreditation requirements to apply to persons who work with asbestos in public and commercial buildings as well as schools. Specifically, ASHARA expanded the Toxic Substances

**Section 1.0 Scope of Work - Continued**  
**Foss Waterway Development – 1129 Dock Street, Tacoma WA**

Control Act (TSCA) Section 206 (a) (1) and (3) to require accreditation for any person who designs or conducts a response action with respect to friable ACM in a building. TSCA Section 207 provides for civil penalties of \$5,000 for each day of a violation for not employing accredited individuals to design and conduct response actions. Sampling of suspect asbestos-containing materials was conducted as prescribed in 40 CFR 763.86.

Suspect asbestos-containing materials within the structure were identified and classified as a surfacing material, thermal system insulation, or miscellaneous materials. Surfacing materials are those, which are either spray applied or troweled-on for acoustical, decorative, or fireproofing purposes. Thermal system insulation (TSI) is insulation used to inhibit heat transfer or to prevent condensation on pipes, boilers, tanks, ducts and various other components. Miscellaneous materials include all other materials not included in the above categories such as floor tile, ceiling tile, roofing felt, cementitious materials, wallboard systems and products such as caulking, mastics and putties.

A total of fourteen (14) bulk samples were collected and submitted for PLM laboratory analysis. Two (2) of these samples were found to contain greater than 1% asbestos.

## Section 2.0 Asbestos Survey Narrative

### Foss Waterway Development – 1129 Dock Street, Tacoma WA

Bulk samples collected were submitted for sample analysis in accordance with method EPA-600/R-93/116: "Method for the Determination of Asbestos in Bulk building Materials". Analyses were performed in Pacific Rim Environmental Inc.'s NVLAP Accredited Laboratory (Lab Code 101631-0). Materials are positive for asbestos if they are found to contain greater than 1% or 1% asbestos.

#### ***Thermal Systems Insulation (TSI)***

No suspect asbestos-containing **TSI** material was identified on the subject property.

If during the course of work in the crawl space or wall, ceiling or floor demolition, any TSI materials that are not listed in this report are uncovered, sampling **must** be performed prior to disturbing these materials.

#### ***Surfacing Materials***

Suspect asbestos-containing **coating on concrete floor** was identified in the warehouse, east bay. The material was sampled and ***no asbestos was detected***. (Sample # 7)

If during the course of wall, ceiling or floor demolition, any surfacing materials not identified in this report are uncovered, sampling **must** be performed prior to disturbing these materials.

#### ***Miscellaneous Materials***

Suspect asbestos-containing **12"x12" ceiling tile and mastic** was identified in the mezzanine office. The material was sampled and ***no asbestos was detected***. (Sample # 1)

Suspect asbestos-containing **subfloor and mastic** was identified in the mezzanine office. The material was sampled and ***no asbestos was detected***. (Sample # 2)

Suspect asbestos-containing **window putty** was identified in the mezzanine office exterior and office interior. The materials were sampled and ***no asbestos was detected***. (Sample # 3, # 5)

Suspect asbestos-containing **window putty** was identified in the mezzanine office and east wall. The materials were sampled and found to contain ***1-3% Chrysotile asbestos***. (Sample # 4, # 6)

Suspect asbestos-containing **fire hose** was identified in the warehouse, south end, middle bay. The materials were sampled and ***no asbestos was detected***. (Sample # 8, # 9)

Suspect asbestos-containing **12"x12" ceiling tile** was identified in the office. The material was sampled and ***no asbestos was detected***. (Sample #10)

Suspect asbestos-containing **rolled roofing** (inventory) was identified in the warehouse, middle bay. The materials were sampled and ***no asbestos was detected***. (Sample #11, #12, #13, #14)

If during the course of wall, ceiling or floor demolition, any miscellaneous materials that are not listed in this report are uncovered, sampling **must** be performed prior to disturbing these materials.

**Section 3.0 Asbestos Abatement Cost Estimate**  
**Foss Waterway Development – 1129 Dock Street, Tacoma WA**

The following abatement costs are “best-effort” estimates and are based on current industry averages. The following estimates are subject to many variables beyond the control of PRE. Such variables include, but are not limited to: project duration, contractor work schedule, hours of work allowed by the owner, contractor performance, regulatory agency interpretation of changing regulations, logistics of removal of material and miscellaneous delays. The estimate is meant only as a guideline to assist in the selection of an abatement contractor and may not reflect the actual final costs of asbestos removal. They do not include owner costs such as abatement project oversight and monitoring for compliance to law, and compliance to project plans and/or specifications. These estimates assume that adequate, professional plans and specifications are prepared. Generally, abatement costs are minimized by professional project management as well as utilizing the same asbestos abatement contractor to remove all asbestos containing materials during a single project. It is in no way intended to serve as, or replace, a comprehensive abatement specification. Estimates include permitting, removal and disposal.

|   |            |   |                      |                     |
|---|------------|---|----------------------|---------------------|
| <b>Window Putty</b><br>Mezzanine office | 6 Windows  | @ | \$ 150.00 per window | \$ 900.00           |
| <b>Window Putty</b><br>East Wall        | 80 Windows | @ | \$ 150.00 per window | \$ 12,000.00        |
| <b>TOTAL</b>                            |            |   |                      | <b>\$ 12,900.00</b> |

**Section 4.0 Statement of Compliance**  
**Foss Waterway Development – 1129 Dock Street, Tacoma WA**

In accordance with W.A.C. 296-62-07721 and PSCAA Regulation III, Article 4, Pacific Rim Environmental, Inc. performed an asbestos survey of the subject Property located at 1129 Dock Street in Tacoma WA. Should employees or contract personnel encounter any suspect asbestos-containing materials (ACM) it is their responsibility to:

1. Contact a representative of the owner.
2. Consult the inspection report to determine whether or not the suspect material contains asbestos.
3. If the suspect material does not appear in the inspection report, then that material was not sampled and must be presumed to contain asbestos until proven otherwise by sampling and PLM analysis.
4. Ensure that all employees and contractors are informed and advised of the location and type of materials that contain asbestos.

- **Window putty (Mezzanine office and east wall)**

I Hereby Attest:

The inspection report has been made available to me. I will inform all subcontractors of the location and types of materials containing asbestos. I am authorized to sign on behalf of my company.

|                   |                    |
|-------------------|--------------------|
| Contractor: _____ | Owner's Rep: _____ |
| Signature: _____  | Signature: _____   |
| Print Name: _____ | Print Name: _____  |
| Title: _____      | Title: _____       |
| Date: _____       | Date: _____        |



**Section 5.0 Lead-Based Paint Screening Summary**  
**Foss Waterway Development – 1129 Dock Street, Tacoma WA**

The inspection and testing performed on the exterior and interior painted surfaces of the subject Property did identify lead-based paint at or above the EPA/HUD standard of 1.0 mg/m<sup>2</sup> on the following tested components.

| PRE# | Substrate | Component/<br>Side | Description / Location | Color | Result   | Pbc<br>mg/cm <sup>2</sup> |
|------|-----------|--------------------|------------------------|-------|----------|---------------------------|
| 4    | Wood      | Exterior siding    | East wall 1129         | Green | Positive | 7.8                       |
| 5    | Wood      | Exterior trim      | East wall 1129         | Green | Positive | 10.5                      |
| 6    | Wood      | Window trim        | East wall 1129         | Green | Positive | 9.2                       |
| 7    | Wood      | Exterior siding    | East wall 1131         | Green | Positive | 6.8                       |
| 8    | Wood      | Exterior trim      | East wall 1131         | Green | Positive | 6.7                       |
| 10   | Wood      | Exterior siding    | West wall 1129         | Green | Positive | 3.5                       |
| 11   | Wood      | Exterior siding    | West wall 1131         | Green | Positive | 10.1                      |
| 20   | Wood      | Cabinets           | Inside shed            | Ivory | Positive | 6.8                       |

The XRF sample results are provided in Appendix D.

If the building is to be renovated or remodeled there are procedures regarding the disturbance or removal of the lead-based paints that can be followed (i.e. initial air monitoring, clearance sampling, etc.). These procedures can be found in *HUD-0006700 Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing*. It is not required that these regulations/procedures be utilized on this project, however because these are the only available guidelines for the removal of lead-based paints PRE feels it necessary to inform you of these guidelines.

The only state rules or regulations that currently apply to lead-based paints are WAC 296-155-17603 Scope\* and WAC 296-155-17607 Permissible Exposure Limit\*\*. The WAC code states that if lead is detectable in the workplace in any quantity, initial air monitoring must be performed on employees doing demolition, renovation or remodeling work in areas found to have materials containing lead. Also, workers performing lead removal must be trained in accordance with WAC 296-155-17625.

The EPA/HUD standard uses a criterion of 5,000 parts per million (PPM) dry weight or 1.0 milligrams per square centimeter (1.0 mg/cm<sup>2</sup>) for lead-based paint. However, if lead is detected in any concentration, Federal OSHA and Washington State Department of Labor and Industries regulations will still apply, since neither agency has established a concentration of lead in paint below which the lead in construction standards do not apply.

### **Universal Waste Rules**

The Universal Waste Rule (UWR) establishes alternative, streamlined waste management standards in place of most of the Dangerous Waste Regulations, Chapter 173-303 WAC, except for, WAC 173-303-050, 173-303-145 and 173-303-960.

The following lamp types may be characterized as universal waste: fluorescent tubes, high intensity discharge (HID) lamps (mercury vapor, metal halide, high pressure sodium) and compact fluorescent.

**The following Universal Waste was identified:**

- **Approximately seventy-four (74) 4-foot fluorescent fixtures and ballasts**
- **Approximately ten (10) 8-foot fluorescent fixtures and ballasts**
- **Approximately eight (8) 4-foot mini fluorescent tubes**

**The universal waste must be removed and properly disposed of or recycled prior to building demolition.**

Disposal of individual lamps is not regulated. However disposal of large quantities of lamps is subject to dangerous waste regulations (WAC 173-303) and the waste stream must be subjected to TCLP (Toxicity Characteristic Leaching Procedure) analysis to determine the amount of mercury that could leach out of the waste. The TCLP limit for mercury is 0.2 mg/L.

A copy of the Washington State Department of Ecology *Universal Waste Rule for Dangerous Waste Lamps* WAC 173-303-573, Publication # 00-04-020 is provided in the Appendix F.

PCBs belong to a broad family of organic chemicals known as chlorinated hydrocarbons. PCBs are produced by the combination of one or more chlorine atoms and a biphenyl molecule. PCBs range in consistency from heavy oily liquids to waxy solids. Prior to 1979, PCBs were widely used in electrical equipment such as transformers, capacitors, switches, and voltage regulators.

# Appendix A: Asbestos Sample Summary

# Pacific Rim Environmental, Inc

# Asbestos Summary

Project Name / Address: Foss Waterway Development - Sites 8 & 9 / Dock Street Property, Tacoma

| Project ID | Sample # | Sample Location                    | AHERA Category | Sample Description               | Asbestos Type/%   | Approximate Quant. |
|------------|----------|------------------------------------|----------------|----------------------------------|---|--------------------|
| 14867      | 01       | Mezzanine office, ceiling          | Miscellaneous  | 12"x12" ceiling tile and mastic  | None Detected (Both Layers)   | N/A                |
| 14867      | 02       | Mezzanine office, floor            | Miscellaneous  | Subfloor and mastic under carpet | None Detected (All Layers)  | N/A                |
| 14867      | 03       | Mezzanine office, exterior windows | Miscellaneous  | Putty on window frames           | None Detected   | N/A                |
| 14867      | 04       | Mezzanine office, interior windows | Miscellaneous  | Putty on wood frames             | Layer 1 (Putty): None Detected,<br>Layer 2 (Putty): Chrysotile 1-3% | 6 Windows          |
| 14867      | 05       | Office, interior window            | Miscellaneous  | Putty on wood frames             | None Detected   | N/A                |
| 14867      | 06       | Warehouse windows, east wall       | Miscellaneous  | Putty on wood frames             | Chrysotile 1-3%   | 80 Windows         |
| 14867      | 07       | Warehouse, east bay                | Surfacing      | Coating on concrete floor        | None Detected   | N/A                |
| 14867      | 08       | Warehouse, south end, middle bay   | Miscellaneous  | Fire hose                        | None Detected   | N/A                |
| 14867      | 09       | Warehouse, south end, middle bay   | Miscellaneous  | Fire hose                        | None Detected   | N/A                |
| 14867      | 10       | Office ceiling                     | Miscellaneous  | 12"x12" tile, splined            | None Detected   | N/A                |
| 14867      | 11       | Warehouse, middle bay              | Miscellaneous  | Rolled roofing inventory         | None Detected   | N/A                |
| 14867      | 12       | Warehouse, middle bay              | Miscellaneous  | Rolled roofing inventory         | None Detected   | N/A                |
| 14867      | 13       | Warehouse, middle bay              | Miscellaneous  | Rolled roofing inventory         | None Detected   | N/A                |
| 14867      | 14       | Warehouse, middle bay              | Miscellaneous  | Rolled roofing inventory         | None Detected   | N/A                |

# Appendix B: Bulk Sample Analysis Report



# PACIFIC RIM ENVIRONMENTAL, INC.

## BULK SAMPLE ANALYSIS REPORT

|  |   |
|--|---|
| <b>CLIENT:</b> GeoEngineers Inc.<br>1101 Fawcett Avenue, Suite 200<br>Tacoma, WA 98402 | <b>PACRIM # :</b> 14867<br><b>REPORT # :</b> 2013-04-0073<br><b>DATE RECEIVED :</b> 4/9/2013<br><b>ANALYST :</b> William F. Golloway          |
| <b>PROJECT:</b> Foss Waterway Development<br>1129 Dock Street<br>Tacoma, WA            | <b>DATE ANALYZED :</b> 4/9/2013, 4/10/2013<br><b>REPORT BY :</b> Sarah Kreiner<br><b>REPORT DATE :</b> 4/10/2013<br><b>TURNAROUND:</b> 5 Days |
| <b>SAMPLE DATE:</b> 4/8/2013   | <b>PAGE :</b> 1 of 5  |

Attached are the results of analysis of 14 bulk samples submitted for asbestos identification: Lab ID #2013-04-0073 through 2013-04-0086.

Samples were analyzed in accordance with method EPA-600/R-93/116: "Method for the Determination of Asbestos in Bulk Building Materials".

Unless otherwise noted, samples were inhomogeneous; subsamples of components were analyzed to achieve representative analysis. Separate layers of layered samples are analyzed and reported separately. Unless otherwise stated, asbestos content was quantified by calibrated visual estimation (CVES). CVES concentrations are reported in 2 to 3 percent ranges for fiber concentrations ranging from 1-10%, and 5 percent ranges for concentrations greater than 10%. Samples in which asbestos was not observed are reported as "none detected".

### Limitations and Uncertainty:

Factors such as sample quality, sample size, interfering matrix material, fiber size, and fiber concentration contribute to the uncertainty of asbestos concentration measurements in bulk materials. Relative errors exceeding 100% may occur in samples containing <1-10% asbestos. Relative errors are typically below 30% in samples with greater than 10% asbestos, and approach zero as the asbestos concentration approaches 100%.

Asbestos fibers with diameters below approximately 0.25 micrometers are not detectable by PLM. These extremely fine fibers may occur in such products as floor tile, adhesives, and cement products. This limitation can be overcome, however, by the use of alternate analytical methods, such as Transmission Electron Microscopy (TEM).

This report cannot be represented by the client to claim product endorsement by NVLAP or any agency of the U.S. Government. Test results pertain only to the samples submitted for analysis.

This report shall not be reproduced except in full without written permission from the laboratory.

**NVLAP Accredited LAB #:** 101631-0  
**Samples submitted by:** PacRim

**Reports**

**Reviewed By:**

**Approved Signatory**

**Pacific Rim Environmental, Inc.**  
**BULK SAMPLE ANALYSIS REPORT**

|  |  |
|--|--|
| <p><b>CLIENT:</b> GeoEngineers Inc.<br/>1101 Fawcett Avenue, Suite 200<br/>Tacoma, WA 98402</p> <p><b>PROJECT:</b> Foss Waterway Development<br/>1129 Dock Street<br/>Tacoma, WA</p> <p><b>SAMPLE DATE:</b> 4/8/2013</p> | <p><b>PACRIM #:</b> 14867<br/><b>REPORT #:</b> 2013-04-0073<br/><b>DATE RECEIVED:</b> 4/9/2013<br/><b>ANALYST:</b> William F. Golloway<br/><b>DATE ANALYZED:</b> 4/9/2013, 4/10/2013<br/><b>REPORT BY:</b> Sarah Kreiner<br/><b>REPORT DATE:</b> 4/10/2013<br/><b>TURNAROUND:</b> 5 Days<br/><b>PAGE:</b> 2 of 5</p> |
|--|--|

| Client/Lab ID Number | Sample Location and Description  | Asbestos Type(s) / %   | Other Material(s)   | Date Analyzed |
|----------------------|--|--|---|---------------|
| 1<br>2013-04-0073    | <p><b>Mezzanine office, ceiling (12"x12" ceiling tile and mastic).</b></p> <p>White-painted, brown, fibrous ceiling tile (layer 1) with brown brittle mastic (layer 2).</p>                                | <p><b>Layer 1 (Ceiling tile):</b><br/>None Detected</p> <p><b>Layer 2 (Mastic):</b><br/>None Detected</p>  | <p><b>Layer 1:</b> Cellulose (90-95%), Binder, Paint.</p> <p><b>Layer 2:</b> Cellulose (&lt;1%), Adhesive, Mineral Aggregate.</p>   | 4/9/13        |
| 2<br>2013-04-0074    | <p><b>Mezzanine office, floor (Subfloor and mastic under carpet).</b></p> <p>Light brown foam (layer 1) on white mastic (layer 2) on brown fiber board material (layer 3) with brown mastic (layer 4).</p> | <p><b>Layer 1 (Foam):</b><br/>None Detected</p> <p><b>Layer 2 (Mastic):</b><br/>None Detected</p> <p><b>Layer 3 (Fiber board):</b><br/>None Detected</p> <p><b>Layer 4 (Mastic):</b><br/>None Detected</p> | <p><b>Layer 1:</b> Cellulose (&lt;1%), Foam, Mineral Aggregate.</p> <p><b>Layer 2:</b> Cellulose (1-3%), Adhesive, Mineral Aggregate.</p> <p><b>Layer 3:</b> Cellulose (80-85%), Binder.</p> <p><b>Layer 4:</b> Cellulose (1-3%), Adhesive.</p> | 4/9/13        |
| 3<br>2013-04-0075    | <p><b>Mezzanine office, exterior windows (Putty on window frames exterior).</b></p> <p>Light grey, brittle window putty with grey surface residue.</p>   | None Detected  | Cellulose (<1%), Binder, Mineral Aggregate.   | 4/9/13        |

**Pacific Rim Environmental, Inc.**  
**BULK SAMPLE ANALYSIS REPORT**

|  |   |
|--|---|
| <b>CLIENT: GeoEngineers Inc.</b><br>1101 Fawcett Avenue, Suite 200<br>Tacoma, WA 98402 | <b>PACRIM # : 14867</b><br><b>REPORT # : 2013-04-0073</b><br><b>DATE RECEIVED : 4/9/2013</b><br><b>ANALYST : William F. Golloway</b><br><b>DATE ANALYZED : 4/9/2013, 4/10/2013</b><br><b>REPORT BY : Sarah Kreiner</b><br><b>REPORT DATE : 4/10/2013</b><br><b>TURNAROUND: 5 Days</b> |
| <b>PROJECT: Foss Waterway Development</b><br>1129 Dock Street<br>Tacoma, WA            | <b>SAMPLE DATE: 4/8/2013</b><br><b>PAGE : 3 of 5</b>  |

| Client/Lab ID Number | Sample Location and Description  | Asbestos Type(s) / %   | Other Material(s)  | Date Analyzed |
|----------------------|--|--|--|---------------|
| 4<br>2013-04-0076    | <b>Mezzanine office, interior windows (Putty on wood frames).</b><br><br>Grey-blue-painted, light brown, brittle window putty (layer 1) and grey-blue-painted, light grey, brittle window putty (layer 2). | <b>Layer 1 (Putty):</b><br>None Detected<br><br><b>Layer 2 (Putty):</b><br>Chrysotile 1-3% | <b>Layer 1:</b> Cellulose (<1%), Binder, Mineral Aggregate, Paint.<br><br><b>Layer 2:</b> Cellulose (<1%), Binder, Mineral Aggregate, Paint. | 4/9/13        |
| 5<br>2013-04-0077    | <b>Office, interior window (Putty on wood frames).</b><br><br>Light brown-painted, light brown, brittle window putty.  | None Detected  | Cellulose (<1%), Binder, Mineral Aggregate, Paint, Wood.   | 4/10/13       |
| 6<br>2013-04-0078    | <b>Warehouse windows, east wall (Putty on wood frames).</b><br><br>White to light brown, brittle window putty.   | Chrysotile 1-3%  | Cellulose (<1%), Binder, Mineral Aggregate.  | 4/10/13       |
| 7<br>2013-04-0079    | <b>Warehouse, east bay (Coating on concrete floor).</b><br><br>White/red/blue/white paint with dark brown to black residue.  | None Detected  | Cellulose (<1%), Paint, Mineral Aggregate, Binder.   | 4/10/13       |



**Pacific Rim Environmental, Inc.**  
**BULK SAMPLE ANALYSIS REPORT**

|  |  |
|--|--|
| <p><b>CLIENT:</b> GeoEngineers Inc.<br/>         1101 Fawcett Avenue, Suite 200<br/>         Tacoma, WA 98402</p> <p><b>PROJECT:</b> Foss Waterway Development<br/>         1129 Dock Street<br/>         Tacoma, WA</p> <p><b>SAMPLE DATE:</b> 4/8/2013</p> | <p><b>PACRIM #:</b> 14867<br/> <b>REPORT #:</b> 2013-04-0073<br/> <b>DATE RECEIVED:</b> 4/9/2013<br/> <b>ANALYST:</b> William F. Golloway<br/> <b>DATE ANALYZED:</b> 4/9/2013, 4/10/2013<br/> <b>REPORT BY:</b> Sarah Kreiner<br/> <b>REPORT DATE:</b> 4/10/2013<br/> <b>TURNAROUND:</b> 5 Days<br/> <b>PAGE:</b> 4 of 5</p> |
|--|--|

| Client/Lab ID Number | Sample Location and Description   | Asbestos Type(s) / % | Other Material(s)   | Date Analyzed |
|----------------------|---|----------------------|---|---------------|
| 8<br>2013-04-0080    | Warehouse, south end, middle bay (Fire hose).<br><br>Light brown, fibrous material.<br><br><b>Note:</b> Sample appears homogeneous. | None Detected        | Cellulose (98%+), Binder.                                     | 4/10/13       |
| 9<br>2013-04-0081    | Warehouse, south end, middle bay (Fire hose).<br><br>Light brown, fibrous material with tar residue.                                | None Detected        | Cellulose (98%+), Binder, Tar.                                | 4/10/13       |
| 10<br>2013-04-0082   | Office ceiling (12"x12" tile, splined).<br><br>Brown/white-painted, light brown, fibrous ceiling tile material.                     | None Detected        | Cellulose (75-80%), Perlite, Binder, Paint.                   | 4/10/13       |
| 11<br>2013-04-0083   | Warehouse, middle bay (Rolled roofing inventory).<br><br>Black tar roofing with grey gravel.  | None Detected        | Cellulose (<1%), Fiberglass (7-10%), Mineral Aggregate, Tar.  | 4/10/13       |
| 12<br>2013-04-0084   | Warehouse, middle bay (Rolled roofing inventory).<br><br>Black tar roofing with grey gravel.  | None Detected        | Cellulose (<1%), Fiberglass (20-25%), Mineral Aggregate, Tar. | 4/10/13       |

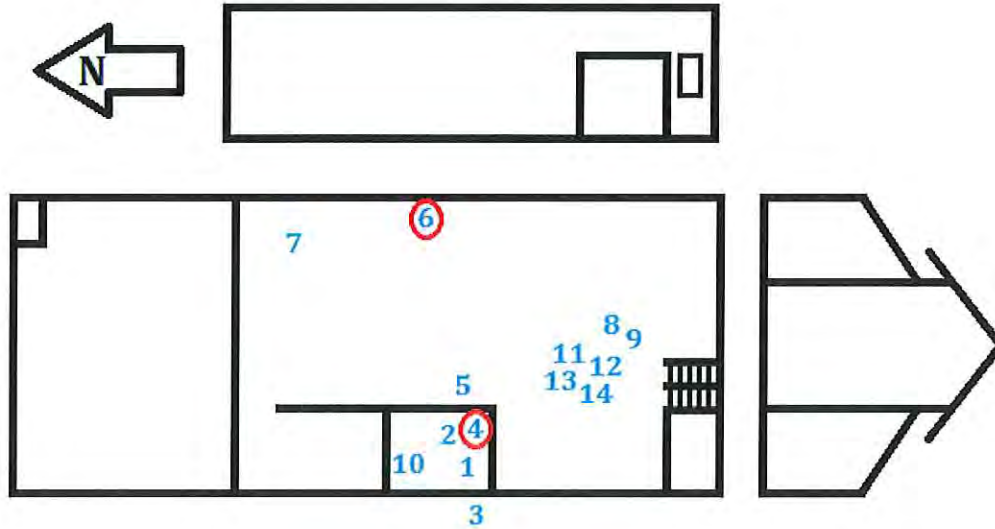
**Pacific Rim Environmental, Inc.**  
**BULK SAMPLE ANALYSIS REPORT**

|  |   |
|--|---|
| <b>CLIENT:</b> GeoEngineers Inc.<br>1101 Fawcett Avenue, Suite 200<br>Tacoma, WA 98402 | <b>PACRIM # :</b> 14867<br><b>REPORT # :</b> 2013-04-0073<br><b>DATE RECEIVED :</b> 4/9/2013<br><b>ANALYST :</b> William F. Golloway          |
| <b>PROJECT:</b> Foss Waterway Development<br>1129 Dock Street<br>Tacoma, WA            | <b>DATE ANALYZED :</b> 4/9/2013, 4/10/2013<br><b>REPORT BY :</b> Sarah Kreiner<br><b>REPORT DATE :</b> 4/10/2013<br><b>TURNAROUND:</b> 5 Days |
| <b>SAMPLE DATE:</b> 4/8/2013   | <b>PAGE :</b> 5 of 5  |

| Client/Lab ID Number | Sample Location and Description   | Asbestos Type(s) / % | Other Material(s)   | Date Analyzed |
|----------------------|---|----------------------|---|---------------|
| 13<br>2013-04-0085   | Warehouse, middle bay (Rolled roofing inventory).<br><br>Black tar roofing material.          | None Detected        | Cellulose (<1%),<br>Fiberglass (10-15%), Tar,<br>Mineral Aggregate. | 4/10/13       |
| 14<br>2013-04-0086   | Warehouse, middle bay (Rolled roofing inventory).<br><br>Black tar roofing with white gravel. | None Detected        | Cellulose (<1%),<br>Fiberglass (10-15%), Tar,<br>Mineral Aggregate. | 4/10/13       |

# Appendix C: Site Sketch

Site Sketch



Positive samples **circled in red on drawing** and **bold in table below**.

| Sample #  | Sample Location                           | Sample Description               |
|-----------|---|----------------------------------|
| 01        | Mezzanine office, ceiling                 | 12"x12" ceiling tile and mastic  |
| 02        | Mezzanine office, floor                   | Subfloor and mastic under carpet |
| 03        | Mezzanine office, exterior windows        | Putty on window frames exterior  |
| <b>04</b> | <b>Mezzanine office, interior windows</b> | <b>Putty on wood frames</b>      |
| 05        | Office, interior window                   | Putty on wood frames             |
| <b>06</b> | <b>Warehouse windows, east wall</b>       | <b>Putty on wood frames</b>      |
| 07        | Warehouse, east bay                       | Coating on concrete floor        |
| 08        | Warehouse, south end, middle bay          | Fire hose                        |
| 09        | Warehouse, south end, middle bay          | Fire hose                        |
| 10        | Office ceiling                            | 12"x12" tile, splined            |
| 11        | Warehouse, middle bay                     | Rolled roofing inventory         |
| 12        | Warehouse, middle bay                     | Rolled roofing inventory         |
| 13        | Warehouse, middle bay                     | Rolled roofing inventory         |
| 14        | Warehouse, middle bay                     | Rolled roofing inventory         |

|  |   |  |
|--|---|--|
| <p><b>GeoEngineers, Inc.</b><br/>Foss Waterway Development<br/>Sites 8 &amp; 9<br/>1129 Dock Street<br/>Tacoma, WA 98402</p> | <p><b><u>Pacific Rim Environmental, Inc.</u></b><br/>6510 Southcenter Boulevard, #4<br/>Tukwila, WA 98188<br/>Tel. (206) 244-8965      FAX (206) 244-9096</p> | <p>Project #: 14867<br/>Drawing #: 01 of 01<br/>Sampling Date: 04/08/2013<br/>Drawing By: Robin Sandstrom<br/>Drawing Not To Scale</p> |
|--|---|--|

# Appendix D: XRF Data Sheets



**Client:**

**GeoEngineers, Inc.**  
1101 Fawcett Avenue, Suite 200  
Tacoma, WA 98402

**XRF Serial #:** XLP300-80662

**Inspection Date:** 8-Apr-2013

**Inspection By:** Todd P. Carter

**Project:**

**Foss Waterway Development - Sites 8 & 9**  
1129 & 1131 Dock Street  
Tacoma, WA 98402

**PRE Job#:** 14867

| PRE# | Test # | Substrate               | Component / Side  | Description / Location | Color | Result   | Pbc<br>mg/cm2 |
|------|--------|-------------------------|-------------------|------------------------|-------|----------|---------------|
| 1    | 2280   | First calibration check |                   |                        |       | Positive | 1             |
| 2    | 2281   | First calibration check |                   |                        |       | Positive | 1.1           |
| 3    | 2282   | First calibration check |                   |                        |       | Positive | 1.1           |
| 4    | 2283   | Wood                    | Exterior siding   | East wall 1129         | Green | Positive | 7.8           |
| 5    | 2284   | Wood                    | Exterior trim     | East wall 1129         | Green | Positive | 10.5          |
| 6    | 2285   | Wood                    | Window trim       | East wall 1129         | Green | Positive | 9.2           |
| 7    | 2286   | Wood                    | Exterior siding   | East wall 1131         | Green | Positive | 6.8           |
| 8    | 2287   | Wood                    | Exterior trim     | East wall 1131         | Green | Positive | 6.7           |
| 9    | 2288   | Wood                    | Exterior sheeting | North wall 1129        | Green | Negative | 0.06          |
| 10   | 2289   | Wood                    | Exterior siding   | West wall 1129         | Green | Positive | 3.5           |
| 11   | 2290   | Wood                    | Exterior siding   | West wall 1131         | Green | Positive | 10.1          |
| 12   | 2291   | Brick                   | Interior wall     | North wall 1131        | White | Negative | 0.02          |
| 13   | 2292   | Wood                    | Column            | West wall 1131         | White | Negative | 0.01          |
| 14   | 2293   | Concrete                | Floor             | West bay 1131          | Gray  | Null     | 0.25          |
| 15   | 2294   | Wood                    | Interior wall     | East wall 1131         | White | Negative | 0.02          |
| 16   | 2295   | Wood                    | Interior wall     | Office wall 1131       | White | Negative | 0.5           |
| 17   | 2296   | Wood                    | Interior wall     | South wall 1129        | White | Negative | 0.6           |
| 18   | 2297   | Concrete                | Floor             |                        | Gray  | Negative | 0.09          |
| 19   | 2298   | Wood                    | Exterior siding   | Shed                   | Green | Negative | 0.02          |
| 20   | 2299   | Wood                    | Cabinets          | Inside shed            | Ivory | Positive | 6.8           |
| 21   | 2300   | Last calibration check  |                   |                        |       | Positive | 1.2           |
| 22   | 2301   | Last calibration check  |                   |                        |       | Positive | 1.1           |
| 23   | 2302   | Last calibration check  |                   |                        |       | Positive | 1.1           |

Report by: Robin K. Sandstrom

Date: 04/09/13

# Appendix E: XRF Performance Characteristic Sheet

## Performance Characteristic Sheet

EFFECTIVE DATE: September 24, 2004

EDITION NO.: 1

### MANUFACTURER AND MODEL:

Make: Niton LLC

Tested Model: XLP 300

Source:  $^{109}\text{Cd}$ 

Note: This PCS is also applicable to the equivalent model variations indicated below, for the Lead-in-Paint K+L variable reading time mode, in the XLI and XLP series:

XLI 300A, XLI 301A, XLI 302A and XLI 303A.

XLP 300A, XLP 301A, XLP 302A and XLP 303A.

XLI 700A, XLI 701A, XLI 702A and XLI 703A.

XLP 700A, XLP 701A, XLP 702A, and XLP 703A.

Note: The XLI and XLP versions refer to the shape of the handle part of the instrument. The differences in the model numbers reflect other modes available, in addition to Lead-in-Paint modes. The manufacturer states that specifications for these instruments are identical for the source, detector, and detector electronics relative to the Lead-in-Paint mode.

## FIELD OPERATION GUIDANCE

### OPERATING PARAMETERS:

Lead-in-Paint K+L variable reading time mode.

### XRF CALIBRATION CHECK LIMITS:

0.8 to 1.2 mg/cm<sup>2</sup> (inclusive)

The calibration of the XRF instrument should be checked using the paint film nearest 1.0 mg/cm<sup>2</sup> in the NIST Standard Reference Material (SRM) used (e.g., for NIST SRM 2579, use the 1.02 mg/cm<sup>2</sup> film).

If readings are outside the acceptable calibration check range, follow the manufacturer's instructions to bring the instruments into control before XRF testing proceeds.

### SUBSTRATE CORRECTION:

For XRF results using Lead-in-Paint K+L variable reading time mode, substrate correction is not needed for:

Brick, Concrete, Drywall, Metal, Plaster, and Wood

### INCONCLUSIVE RANGE OR THRESHOLD:

| K+L MODE<br>READING DESCRIPTION                           | SUBSTRATE | THRESHOLD<br>(mg/cm <sup>2</sup> ) |
|---|-----------|------------------------------------|
| Results not corrected for substrate bias on any substrate | Brick     | 1.0                                |
|   | Concrete  | 1.0                                |
|   | Drywall   | 1.0                                |
|   | Metal     | 1.0                                |
|   | Plaster   | 1.0                                |
|   | Wood      | 1.0                                |



## BACKGROUND INFORMATION

### EVALUATION DATA SOURCE AND DATE:

This sheet is supplemental information to be used in conjunction with Chapter 7 of the HUD *Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing* ("HUD Guidelines"). Performance parameters shown on this sheet are calculated from the EPA/HUD evaluation using archived building components. Testing was conducted in August 2004 on 133 testing combinations. The instruments that were used to perform the testing had new sources; one instrument's was installed in November 2003 with 40 mCi initial strength, and the other's was installed June 2004 with 40 mCi initial strength.

### OPERATING PARAMETERS:

Performance parameters shown in this sheet are applicable only when properly operating the instrument using the manufacturer's instructions and procedures described in Chapter 7 of the HUD Guidelines.

### SUBSTRATE CORRECTION VALUE COMPUTATION:

Substrate correction is not needed for brick, concrete, drywall, metal, plaster or wood when using Lead-in-Paint K+L variable reading time mode, the normal operating mode for these instruments. If substrate correction is desired, refer to Chapter 7 of the HUD Guidelines for guidance on correcting XRF results for substrate bias.

### EVALUATING THE QUALITY OF XRF TESTING:

Randomly select ten testing combinations for retesting from each house or from two randomly selected units in multifamily housing. Use the K+L variable time mode readings.

Conduct XRF retesting at the ten testing combinations selected for retesting.

Determine if the XRF testing in the units or house passed or failed the test by applying the steps below.

Compute the Retest Tolerance Limit by the following steps:

Determine XRF results for the original and retest XRF readings. Do not correct the original or retest results for substrate bias. In single-family housing a result is defined as the average of three readings. In multifamily housing, a result is a single reading. Therefore, there will be ten original and ten retest XRF results for each house or for the two selected units.

Calculate the average of the original XRF result and retest XRF result for each testing combination.

Square the average for each testing combination.

Add the ten squared averages together. Call this quantity C.

Multiply the number C by 0.0072. Call this quantity D.

Add the number 0.032 to D. Call this quantity E.

Take the square root of E. Call this quantity F.

Multiply F by 1.645. The result is the Retest Tolerance Limit.

Compute the average of all ten original XRF results.

Compute the average of all ten re-test XRF results.

Find the absolute difference of the two averages.

If the difference is less than the Retest Tolerance Limit, the inspection has passed the retest. If the difference of the overall averages equals or exceeds the Retest Tolerance Limit, this procedure should be repeated with ten new testing combinations. If the difference of the overall averages is equal to or greater than the Retest Tolerance Limit a second time, then the inspection should be considered deficient.

Use of this procedure is estimated to produce a spurious result approximately 1% of the time. That is, results of this procedure will call for further examination when no examination is warranted in approximately 1 out of 100 dwelling units tested.

**TESTING TIMES:**

For the Lead-in-Paint K+L variable reading time mode, the instrument continues to read until it is moved away from the testing surface, terminated by the user, or the instrument software indicates the reading is complete. The following table provides testing time information for this testing mode. The times have been adjusted for source decay, normalized to the initial source strengths as noted above. Source strength and type of substrate will affect actual testing times. At the time of testing, the instruments had source strengths of 26.6 and 36.6 mCi.

| Testing Times Using K+L Reading Mode (Seconds) |                             |        |                             |  |                 |          |
|--|-----------------------------|--------|-----------------------------|--|-----------------|----------|
| Substrate                                      | All Data                    |        |                             | Median for laboratory-measured lead levels (mg/cm <sup>2</sup> ) |                 |          |
|  | 25 <sup>th</sup> Percentile | Median | 75 <sup>th</sup> Percentile | Pb < 0.25  | 0.25 ≤ Pb < 1.0 | 1.0 ≤ Pb |
| Wood Drywall                                   | 4                           | 11     | 19                          | 11   | 15              | 11       |
| Metal  | 4                           | 12     | 18                          | 9  | 12              | 14       |
| Brick Concrete Plaster                         | 8                           | 16     | 22                          | 15   | 18              | 16       |

**CLASSIFICATION RESULTS:**

XRF results are classified as positive if they are greater than or equal to the threshold, and negative if they are less than the threshold.

**DOCUMENTATION:**

A document titled *Methodology for XRF Performance Characteristic Sheets* provides an explanation of the statistical methodology used to construct the data in the sheets, and provides empirical results from using the recommended inconclusive ranges or thresholds for specific XRF instruments. For a copy of this document call the National Lead Information Center Clearinghouse at 1-800-424-LEAD.

This XRF Performance Characteristic Sheet was developed by the Midwest Research Institute (MRI) and QuanTech, Inc., under a contract between MRI and the XRF manufacturer. HUD has determined that the information provided here is acceptable when used as guidance in conjunction with Chapter 7, Lead-Based Paint Inspection, of HUD's *Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing*.

**Appendix F: Universal Waste Rules for  
Dangerous Waste Lamps WAC 173-303-573**



## The Universal Waste Rule for Lamps WAC 173-303-573(5)

Any business that generates dangerous waste must follow the dangerous waste rules, Chapter 173-303 WAC. In Washington State the Universal Waste Rule allows less burdensome management of the following wastes:

- ▶ Batteries (#98-407.a)
- ▶ Thermostats (#98-407.b)
- ▶ Lamps (#98-407.c)
- ▶ Mercury-containing equipment (#98-407.b)

Businesses have the choice of managing these wastes as universal waste (UW) or dangerous waste. UW requirements for storage, transportation and collection are less stringent.

This publication focuses on the UW requirements for lamps. Publication number 98-407, *The Universal Waste Rule* provides more details on these requirements and the advantages of UW management.

### What types of lamps are considered Universal Waste?

The types of lamps that may be Universal Waste include:

- ▶ Fluorescent
- ▶ High Intensity Discharge (HID) (e.g., mercury vapor, metal halide, high pressure sodium)
- ▶ Compact fluorescent
- ▶ Neon<sup>1</sup>
- ▶ Any other lamps that are dangerous waste

### How can I tell if my lamps are dangerous waste?

The process of determining if a waste is hazardous is called designation. Through EPA test procedures, lamps have been shown to designate as dangerous waste because of their mercury and/or lead content. A generator has three choices when determining if their spent lamps are a dangerous waste:

1. Assume that their lamps are a dangerous waste;
2. Use manufacturer's information, MSDS and other available information to designate by knowledge;
3. Designate by sampling and testing.

<sup>1</sup> "Neon" lamp manufacturers sometimes use gases other than neon, and lamps have been manufactured that contained up to 600 milligrams of mercury per tube.

Certain “green tip” lamps pass the EPA test and are not dangerous waste. Ask your lamp manufacturer or supplier for product testing information that shows these particular lamps are not a dangerous waste.

Some local governments may have landfill bans on disposal of mercury-containing lamps or other mercury-containing items. Check with your local health department, solid waste agency, or landfill for specific requirements, as well as recycling or disposal options.

## **What are the requirements for Universal Waste management of lamps?**

Manage Universal Waste lamps the same as the other Universal Wastes, except for a few specific handling requirements. Because glass bulbs are easily broken, Universal Waste rules require specific handling procedures. Universal waste management requirements for lamps include:

### **Accumulation start date:**

Both used and unused lamps become waste on the date the handler decides to discard them.

### **Accumulation and dating of Universal Waste lamps:**

You can only accumulate lamps for one year from the date they are generated. To document this, the collection container or individual UW lamp is typically marked with the first date of accumulation. An extension to the one year accumulation limit is allowed if the facility needs more time to collect enough items to facilitate proper recovery, treatment, or disposal.

### **Labeling and Marking:**

Clearly label or mark individual lamps or containers with one of the following phrases:

- *Universal Waste – Lamps*
- *Waste Lamps*
- *Used Lamps*

### **Packaging:**

Contain lamps in structurally sound containers such as cardboard boxes or fiber drums. In addition, keep containers closed when not adding lamps.

### **Clean up procedures:**

Immediately clean up broken lamps and store debris in a closed container.

### **Large Quantity Handlers<sup>2</sup> of Universal Waste (LQHUW)**

When a handler exceeds 11,000 pounds (or 2,200 pounds for lamps), they become an LQHUW and are subject to extra requirements, including:

- Notification to Ecology of LQHUW status, and which specific types of UW they manage.
- Tracking type and quantity of universal wastes received and shipped.
- Obtaining a RCRA Site Identification Number.

---

<sup>2</sup> Handlers are either the original generators of the UW or businesses that receive and consolidate UW from other handlers before shipping to another handler or to a destination facility.

**Lamp crushing prohibited:**

Lamps cannot be crushed under Universal Waste regulations. Lamp crushing is allowed as a dangerous waste treatment-by-generator activity, but not as a Universal Waste option.

**Transporting Universal Waste lamps:**

You may self-transport UW lamps, complying with applicable U.S. Department of Transportation regulations. Refer to Ecology publication number 98-407 "The Universal Waste Rule" for details.

**Does the rule apply to me?**

The following types of businesses may generate dangerous waste lamps and can take advantage of the Universal Waste regulations:

- Regulated generators<sup>3</sup> of dangerous waste (Medium Quantity and Large Quantity Generators)
- Businesses that generate or accumulate dangerous waste lamps in regulated quantities (this category may include commercial building/property owners that maintain the lighting for tenants)
- Businesses that provide collection and management services (e.g., lighting contractors)

A dangerous waste generator has the choice of managing lamps as UW or under the more stringent dangerous waste requirements. In most cases UW management is much easier and the preferable alternative to dangerous waste management. Note that businesses that generate and manage dangerous wastes and UWs are considered both a dangerous waste generator and a UW handler. Regardless if you are a generator or a handler, you are liable for ensuring your waste is properly managed once it leaves your site.

**Where do I send them?**

Universal wastes may be sent to either another handler (acting as a collection point) or to a destination facility. Another handler could include any business that is already managing UW, government-sponsored collections, or hazardous waste management firms. Businesses that recycle or dispose of UW are called destination facilities. Ultimately, all UW must go to a destination facility. They are subject to dangerous waste regulations for recyclers and hazardous waste disposal facilities. A facility that only accumulates UW would not be a destination facility.

For a list of firms that offer waste management services, visit <http://www.ecy.wa.gov/apps/hwtr/hwsd/default.htm>.

**Why do we care about lamps?**

---

<sup>3</sup> Regulated generators of dangerous waste are those that generate over 220 pounds of dangerous waste per month or batch (or 2.2 pounds of extremely hazardous waste), or accumulate greater than 2,200 pounds of dangerous waste (or 2.2 pounds of extremely hazardous waste) at any time. As a point of reference, 4-four-foot long, linear fluorescent tubes weigh approximately 2.2 pounds. It would take about 400 of those tubes to equal 220 pounds and approximately 4,000 tubes to equal 2,200 pounds.

Nationally, about 680 million lamps are disposed of annually, most to solid waste disposal facilities, including landfills and solid waste incinerators. Fluorescent lamps contain a small amount of mercury which is released when the lamp is broken. During waste handling and disposal, many lamps break, releasing mercury vapor and potentially exposing waste handlers to inhalation of those vapors. Waste incineration (not common in Washington State) of mercury-containing lamps also releases the mercury into the atmosphere. Mercury in the atmosphere is ultimately deposited back to the earth, rivers and lakes. From that point, mercury is then available to enter the food chain and eventually accumulates in fish.

The mercury content in newer fluorescent tubes ranges from 3.5 milligrams to 8 milligrams or more. Some older fluorescent tubes (pre-1999) contain up to 50 milligrams of mercury. HID lamps may contain up to 250 milligrams, depending on the lamp wattage.

Some lamps contain lead in the glass and lead solder in the base. Lead is a toxic metal that may leach from solid waste landfills into the ground water. Manufacturers are eliminating the lead by using non-lead glass and solders in new lamps.

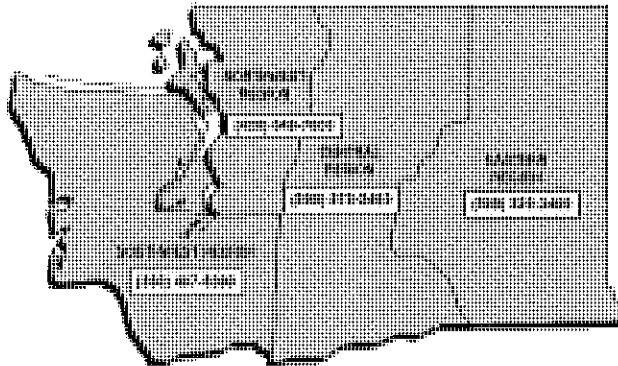
Although fluorescent and HID lamps contain toxic mercury and should be recycled, people are encouraged to continue using them because they use much less electricity and last much longer than other types of lighting. For this reason, fluorescents are a better long-term choice for the environment.

### **How do I manage lamps at home?**

Homeowners are not required to manage their lamps as Universal Waste. They are strongly encouraged to take them to a local household hazardous waste collection facility or other appropriate recycling alternative, if available.

### **For More Information**

Questions on this topic may be directed to your nearest regional office Dangerous Waste Specialist.



*If you need this information in an alternate format, please call the Hazardous Waste and Toxics Reduction Program at 360-407-6700. If you are a person with a speech or hearing impairment, call 711, or 800-833-6388 for TTY.*

# Appendix G: Inspector / Laboratory Certifications



# Certificate of Completion

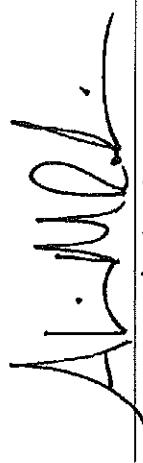
This is to certify that

**Todd P. Carter**

has satisfactorily completed  
4 hours of refresher training as an

**Asbestos Building Inspector**

to comply with the training requirements of  
TSCA Title II / 40 CFR 763 (AHERA)

  
Instructor

EPA Provider Cert. Number: 1085

137000  
Certificate Number



May 23, 2012

Date(s) of Training

Exam Score: NA

Expiration Date: May 23, 2013

Argus Pacific, Inc. • 1900 W. Nickerson, Suite 315 • Seattle, Washington • 98119 • 206.285.3373 • fax 206.285.3927

**STATE OF WASHINGTON**  
**Department of Commerce**  
**Lead-Based Paint Program**

**Todd P Carter**

*Has fulfilled the certification requirements of Washington Administrative code (WAC) 365-230 and has been certified to conduct lead-based paint activities pursuant to WAC 365-230-200 as a:*

**Risk Assessor**

| <b>Certification #</b> | <b>Issuance Date</b> | <b>Expiration Date</b> |
|------------------------|----------------------|------------------------|
| 0340                   | 4/12/2012            | 4/10/2015              |



# Certificate of Achievement

Todd Carter

Pacific Rim Environmental Inc

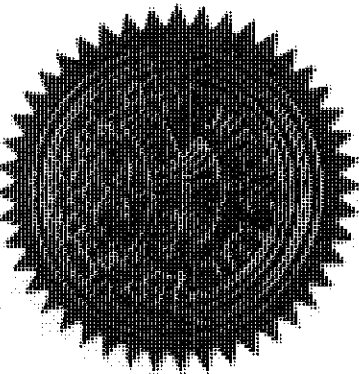
*has successfully completed the Manufacturer's Training Course  
for the NITON Spectrum Analyzer and is now certified  
in radiation safety and monitoring, measurement technology,  
and machine maintenance of the NITON XRF Spectrum Analyzer.  
(CIH's - The ABH Awards 1 CM point, approval # 05-396)*

A5030239600

Certificate Number

04/06/05 Seattle, WA

Date & Site of Course



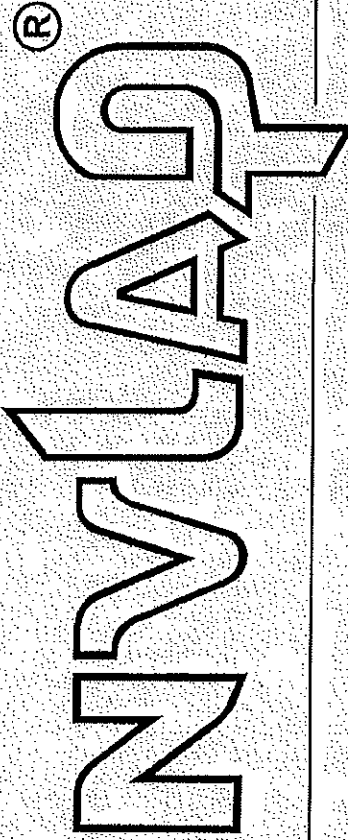
*Marianne Spychalski*

Training Coordinator

A handwritten signature in black ink, appearing to read "Marianne Spychalski".

Director of Training

United States Department of Commerce  
National Institute of Standards and Technology



---

# Certificate of Accreditation to ISO/IEC 17025:2005

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NVLAP LAB CODE: 101631-0

**Pacific Rim Environmental, Inc.**  
Tukwila, WA

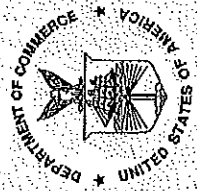
*is accredited by the National Voluntary Laboratory Accreditation Program for specific services,  
listed on the Scope of Accreditation, for.*

## **BULK ASBESTOS FIBER ANALYSIS**

*This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005.  
This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality  
management system (refer to joint ISO-ILAC-IAF Communiqué dated January 2009).*

2013-04-01 through 2014-03-31

*Effective dates*



A handwritten signature in black ink, appearing to read "R. M. L. D.", written over a horizontal line.

*For the National Institute of Standards and Technology*



**National Voluntary  
Laboratory Accreditation Program**



**SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005**

**Pacific Rim Environmental, Inc.**  
6510 Southcenter Boulevard  
Suite #4  
Tukwila, WA 98188  
Mr. William F. Golloway  
Phone: 206-244-8965 Fax: 206-244-9096  
E-Mail: fgolloway@pacrimenv.com

**BULK ASBESTOS FIBER ANALYSIS (PLM)**

**NVLAP LAB CODE 101631-0**

***NVLAP Code    Designation / Description***

|        |  |
|--------|--|
| 18/A01 | EPA 600/M4-82-020: Interim Method for the Determination of Asbestos in Bulk Insulation Samples |
| 18/A03 | EPA 600/R-93/116: Method for the Determination of Asbestos in Bulk Building Materials          |

2013-04-01 through 2014-03-31

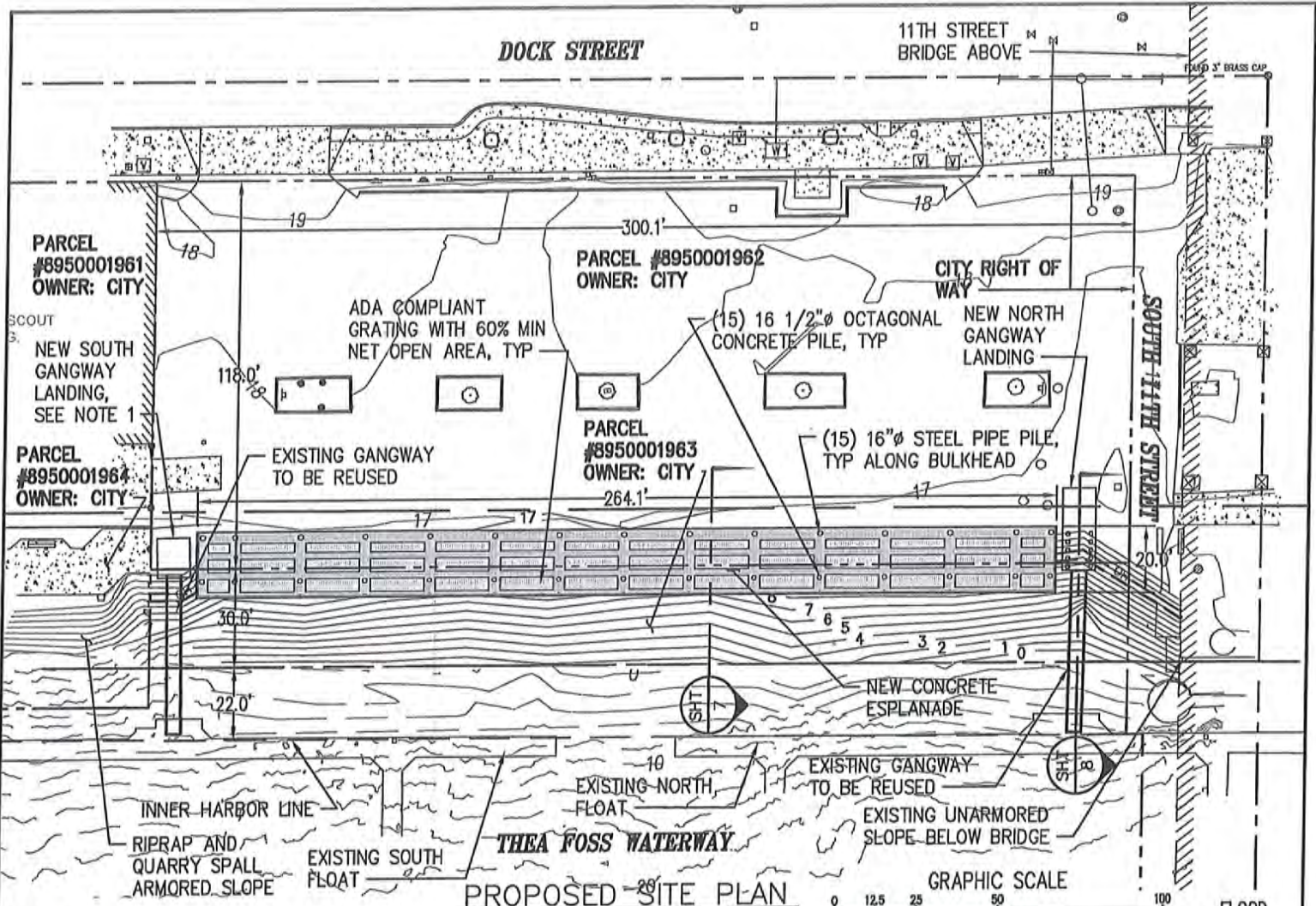
*Effective dates*

*For the National Institute of Standards and Technology*

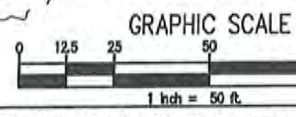
**APPENDIX F**  
**Replacement Esplanade Plans for**  
**Development Site 9**

**DOCK STREET**

11TH STREET  
BRIDGE ABOVE



**PROPOSED SITE PLAN**  
SCALE: 1" = 50'

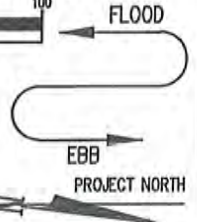


**LEGEND:**

- PROPOSED CONCRETE ESPLANADE
- PROPOSED MARINA FLOAT
- MHHW (EL = +11.85)
- OH OHWM (EL = +13.20)
- PROPOSED GRADING CONTOUR

**NOTES:**

1. THE NEW SOUTH GANGWAY LANDING IS POSITIONED ABOVE THE TOP OF THE SLOPE AND THEREFORE NOT CONSIDERED IN OVER WATER COVERAGE CALCULATIONS.



**PROPOSED QUANTITIES**

|                               | ABOVE MHHW          |                               | BELOW MHHW          |                               | ABOVE OHWM          |                               | BELOW OHWM          |                               |
|-------------------------------|---------------------|-------------------------------|---------------------|-------------------------------|---------------------|-------------------------------|---------------------|-------------------------------|
|                               | PROPOSED QUANTITIES | PROPOSED OVER WATER AREA (SF) | PROPOSED QUANTITIES | PROPOSED OVER WATER AREA (SF) | PROPOSED QUANTITIES | PROPOSED OVER WATER AREA (SF) | PROPOSED QUANTITIES | PROPOSED OVER WATER AREA (SF) |
| CONCRETE PILES                | 1                   |                               | 14                  |                               | 0                   |                               | 15                  |                               |
| STEEL PILES                   | 15                  |                               | 0                   |                               | 15                  |                               | 0                   |                               |
| STEEL PIN PILES               | 6                   |                               | 4                   |                               | 4                   |                               | 6                   |                               |
| NORTH LANDING                 |                     | 220                           |                     | 30                            |                     | 193                           |                     | 57                            |
| GROSS CONCRETE ESPLANADE AREA |                     | 3,253                         |                     | 2,028                         |                     | 2,377                         |                     | 2,904                         |
| GRATED AREA                   |                     | 1,351                         |                     | 923                           |                     | 742                           |                     | 1,532                         |
| TOTAL (SEE NOTE 1)            | 22                  | 2,662*                        | 18                  | 1,504*                        | 19                  | 2,125*                        | 21                  | 2,042*                        |

\*TOTAL AREA = (GROSS AREA) - 0.6(GRATED AREA) + NORTH LANDING AREA



US ARMY CORPS OF ENGINEERS PERMIT

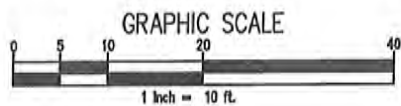
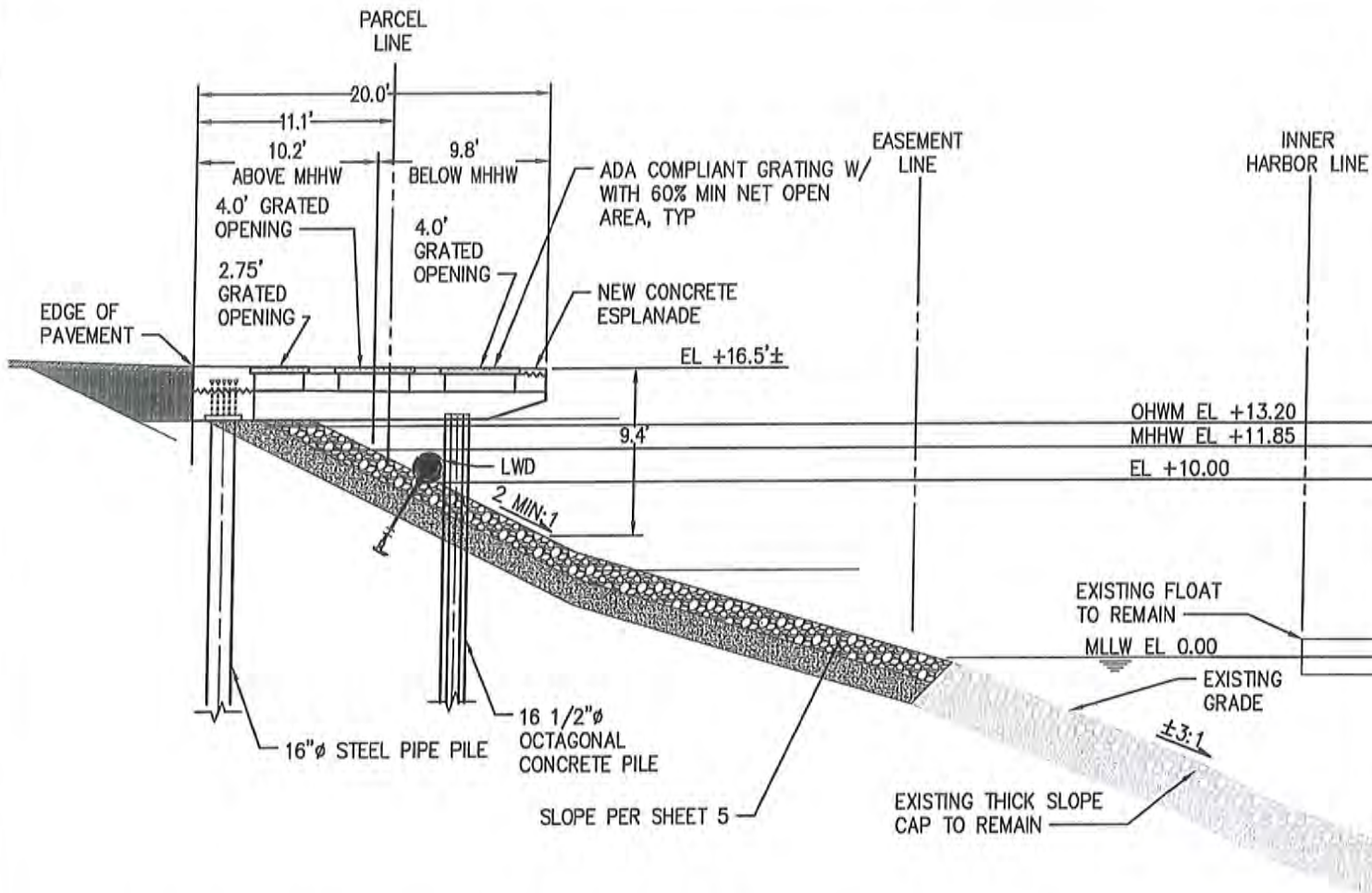
REFERENCE:  
APPLICANT: CITY OF TACOMA (CITY)

PROPOSED PROJECT:  
BULKHEAD REMOVAL & ESPLANADE CONSTRUCTION

PROPOSED SITE PLAN



LOCATION (PARCEL#):  
8950001962 & 8950001963

SHEET 6 OF 8 DATE: 10/29/13



**PROPOSED SECTION**  
SCALE: 1" = 10'

**LEGEND:**

-  CAP FILTER FILL MATERIAL
-  LIGHT RIPRAP FILL MATERIAL

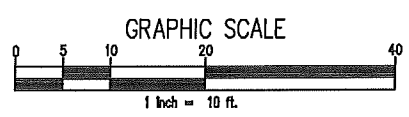
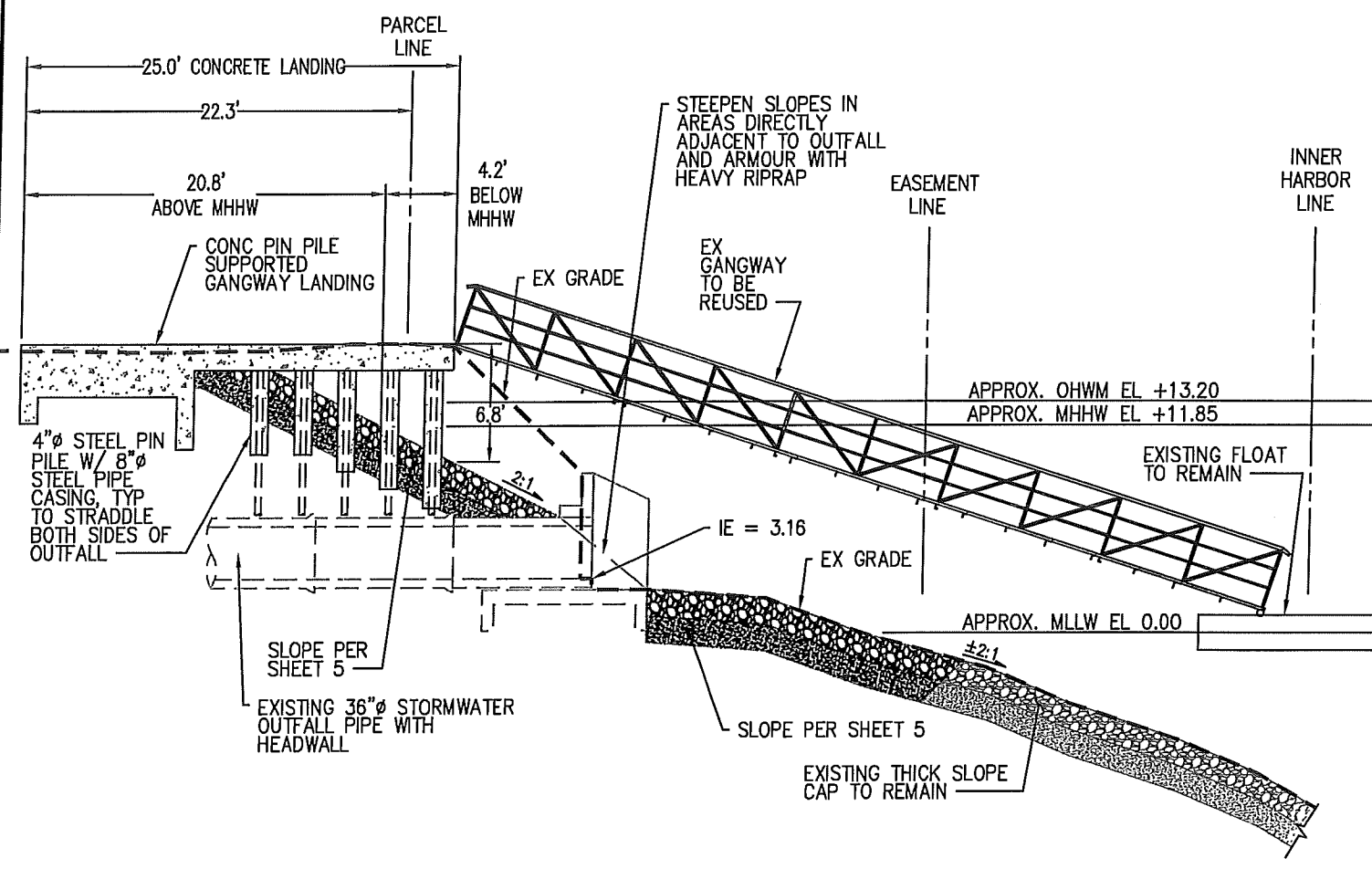


US ARMY CORPS OF ENGINEERS PERMIT  
  
PROPOSED SITE SECTION

REFERENCE:  
APPLICANT: CITY OF TACOMA (CITY)



PROPOSED PROJECT:  
BULKHEAD REMOVAL & ESPLANADE CONSTRUCTION  
  
LOCATION (PARCEL#):  
8950001962 & 8950001963  
  
SHEET 7 OF 8 DATE: 10/29/13





PROPOSED SECTION AT NORTH GANGWAY LANDING  
SCALE: 1" = 10'

**LEGEND:**

-  CAP FILTER FILL MATERIAL
-  LIGHT RIPRAP FILL MATERIAL



US ARMY CORPS OF ENGINEERS PERMIT

REFERENCE:  
APPLICANT: CITY OF TACOMA (CITY)

PROPOSED PROJECT:  
BULKHEAD REMOVAL & ESPLANADE CONSTRUCTION

PROPOSED GANGWAY LANDING SECTION

LOCATION (PARCEL#):  
8950001962 & 8950001963

SHEET 8 OF 8 DATE: 10/29/13

**APPENDIX G**  
**Report Limitations and Guidelines for Use**

## **APPENDIX G**

### **REPORT LIMITATIONS AND GUIDELINES FOR USE<sup>1</sup>**

This appendix provides information to help you manage your risks with respect to the use of this report. Please confer with GeoEngineers if you need to know more about how these “Report Limitations and Guidelines for Use” apply to your project or property.

#### **Read These Provisions Closely**

It is important to recognize that environmental engineering and geoscience practices (geotechnical engineering, geology and environmental science) are less exact than other engineering and natural science disciplines. GeoEngineers includes these explanatory “limitations” provisions in our reports to help reduce the risk of misunderstandings or unrealistic expectations that lead to disappointments, claims and disputes.

#### **Environmental Services Are Performed for Specific Purposes, Persons and Projects**

GeoEngineers has prepared this Site Specific Cleanup Action Plan for Development Sites 8 and 9 in Tacoma, Washington in general accordance with the scope and limitations of our proposal, dated February 28, 2013. This report has been prepared for the exclusive use of the Foss Waterway Development Authority. This report is not intended for use by others, and the information contained herein is not applicable to other properties.

GeoEngineers structures its services to meet the specific needs of its clients. For example, an ESA study conducted for a property owner may not fulfill the needs of a prospective purchaser of the same property. Because each environmental study is unique, each environmental report is unique, prepared solely for the specific client and property. Use of this report is not recommended for any purpose or project other than as expressly stated in this report.

#### **This Environmental Report is Based on a Unique Set of Project-Specific Factors**

This report has been prepared for the Foss Waterway Development Authority for Development Sites 8 and 9 in Tacoma, Washington. GeoEngineers considered a number of unique, project-specific factors when establishing the scope of services for this Project. Unless GeoEngineers specifically indicates otherwise, it is important not to rely on this report if it was:

- not prepared for you,
- not prepared for your Project,
- not prepared for the specific site explored, or
- completed before Project changes were made.

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<sup>1</sup> Developed based on material provided by ASFE, Professional Firms Practicing in the Geosciences; [www.asfe.org](http://www.asfe.org).

If changes to the Project or property occur after the date of this report, GeoEngineers cannot be responsible for any consequences of such changes in relation to this report unless we have been given the opportunity to review our interpretations and recommendations in the context of such changes. Based on that review, we can provide written modifications or confirmation, as appropriate.

### **Reliance Conditions for Third Parties**

This report was prepared for the exclusive use of the party(ies) to whom this report is addressed. No other party may rely on the product of our services unless we agree to such reliance in advance and in writing. Within the limitations of the agreed Project scope, schedule and budget, our services have been executed in accordance with our Agreement with the Client and generally accepted environmental practices in this area at the time this report was prepared.

### **Environmental Regulations Change and Evolve**

Some substances may be present in the vicinity of the subject property in quantities or under conditions that may have led, or may lead, to contamination of the subject property, but are not included in current local, state or federal regulatory definitions of hazardous substances or do not otherwise present current potential liability. GeoEngineers cannot be responsible if the standards for appropriate inquiry, or regulatory definitions of hazardous substances, change or if more stringent environmental standards are developed in the future.

### **Subsurface Conditions Can Change**

This environmental report is based on conditions that existed at the time the study was performed. The findings and conclusions of this report may be affected by the passage of time, by man-made events such as construction on or adjacent to the subject property, by new releases of hazardous substances, new information or technology that become available subsequent to the report date, or by natural events such as floods, earthquakes, slope instability or groundwater fluctuations. Please contact GeoEngineers before applying this report for its intended purpose so that GeoEngineers may evaluate whether changed conditions affect the continued applicability of the report.

### **Soil and Groundwater End Use**

The cleanup levels referenced in this report are site- and situation-specific. The cleanup levels may not be applicable for other properties or for other on-site uses of the affected soil and/or groundwater. Note that hazardous substances may be present in some of the on-site soil and/or groundwater at detectable concentrations that are less than the referenced cleanup levels. GeoEngineers should be contacted prior to the export of soil or groundwater from the subject property or reuse of the affected soil or groundwater on-site to evaluate the potential for associated environmental liabilities. GeoEngineers will not assume responsibility for potential environmental liability arising out of the transfer of soil and/or groundwater from the subject property to another location, or the reuse of such soil and/or groundwater on-site in any instances that we did not recommend, know of, or control.

### **Most Environmental Findings Are Professional Opinions**

Our interpretations of subsurface conditions are based on field observations and chemical analytical data from widely spaced sampling locations at the subject property. Site exploration identifies

subsurface conditions only at those points where subsurface tests are conducted or samples are taken. GeoEngineers reviewed previous reports and then applied its professional judgment to render an informed opinion about subsurface conditions throughout the property. Actual subsurface conditions may differ significantly from those indicated in this report. Our report, conclusions and interpretations should not be construed as a warranty of the subsurface conditions.

### **Biological Pollutants**

GeoEngineers' Scope of Work specifically excludes the investigation, detection, prevention or assessment of the presence of Biological Pollutants. Accordingly, this report does not include any interpretations, recommendations, findings or conclusions regarding the detecting, assessing, preventing or abating of Biological Pollutants, and no conclusions or inferences should be drawn regarding Biological Pollutants as they may relate to this Project. The term "Biological Pollutants" includes, but is not limited to, molds, fungi, spores, bacteria and viruses, and/or any of their byproducts.

A Client that desires these specialized services is advised to obtain them from a consultant who offers services in this specialized field.