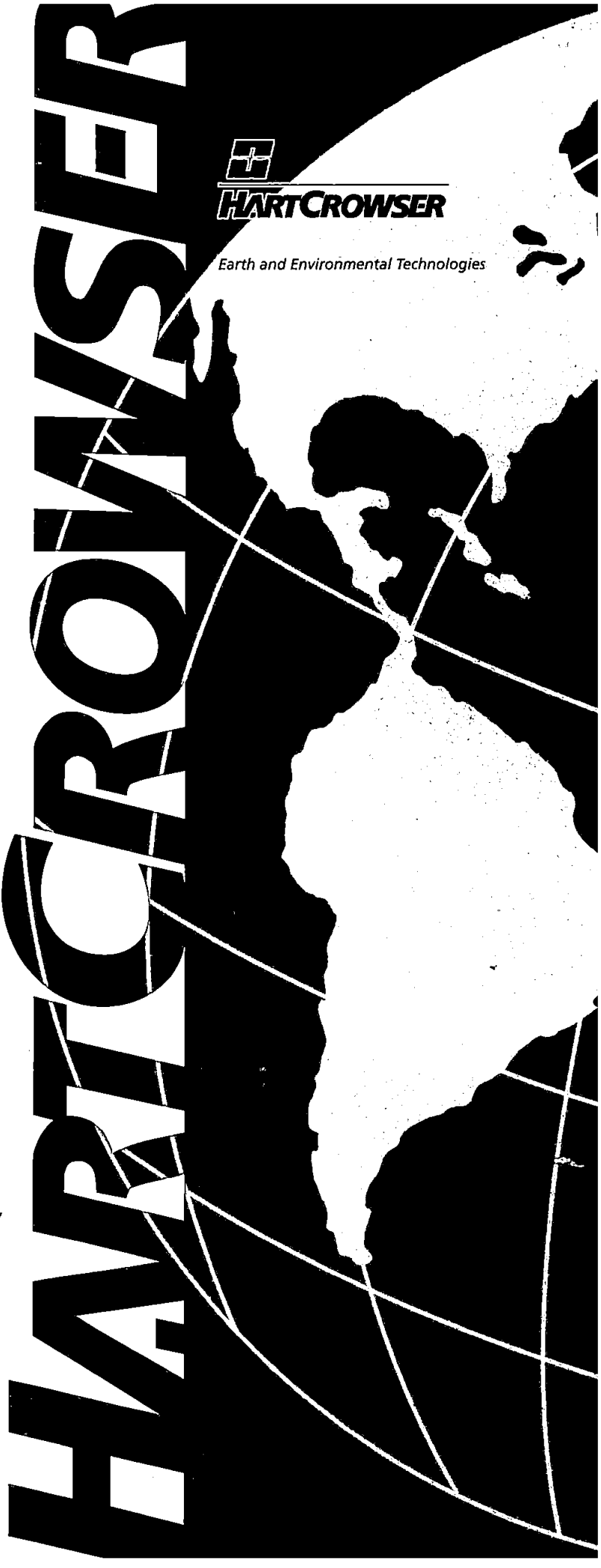

Voluntary Cleanup Report
Hudson Street Site
Seattle, Washington

Prepared for
The City of Seattle,
Holnam Inc., and
Mr. John McFarland

December 19, 1997
J-4628-02

VCP Voluntary Cleanup Program

Washington State - Department of Ecology - Toxics Cleanup Program

RECEIVED
JAN 07 1998
DEPT. OF ECOLOGY

Request For Assistance Form

Have you discussed this site with an Ecology representative in the past? YES
If yes, what is that person's name? Dan Cargill
and the approximate date? Aug-Sept 1997 Is this a leaking underground storage tank site? NO

Please submit the following with this form to the appropriate Ecology Office (see back of form)

X	Site Summary (ECY 020-73)		Any other existing reports on this site
X	A Check or Money Order for $500 made out to "Department of Ecology"		

Applicant completes this section:

Applicant Name: Hart Crowser, Inc.	Phone: (206) 324-9530
Applicant Address: 1910 Fairview Avenue E	Site Location: SW Edmunds and Puget WY SW
Site Name: Puget Park (#1) and McFarland Property (#2)	
Alternate Name: Hudson Street Site	
Site Owner Name: City of Seattle (#1) Jack McFarland (#2)	Phone: (206) 233-7938 (206) 938-4433
Site Owner Address: 2911 Second Avenue, Seattle (#1)	
9360 Forrest Court SW, Seattle (#2)	

I, Chuck Whittlesey, request the assistance of the Department of Ecology. With this Application I have enclosed $500. I understand that: this payment is the equivalent of approximately eight (8) hours of staff review and/or assistance on the cleanup of my contaminated site; actual charges will depend on specific staff and charge-out rates of that staff; if total charges are greater than $500, I will be billed for and I agree to pay the remainder; and any excess payments will be refunded to me.

Signature of Applicant — January 6, 1998 (Date)

For Office Use Only:

Date:	Hours:	Rate:	Staff Name:
Date:	Hours:	Rate:	Staff Name:
Date:	Hours:	Rate:	Staff Name:
Date:	Hours:	Rate:	Staff Name:

For Office Use Only: RECEIPTS

Amount	Date Pd	Rec. #
500 00	12/22/97	—

For FISCAL USE ONLY

173-02-94-005000-5000- 20 - 40
(LUST/Non-LUST) (Office)

LUST/Non-LUST: LUST - 30 Non-LUST - 20

OFFICE: NWRO - 40 SWRO - 50 ERO - 60 CRO - 70 IND - 80 HDQR - 90

N-17-5252-000 #1

TCP I.D. # N-17-5378-000 #2
(SIS, LUST, VC)

Where to Submit Your Forms, Reports, and Fees

COUNTY:	ECOLOGY REGIONAL OFFICE:
Benton, Chelan, Douglas, Kittitas, Klickitat, Okanogan, Yakima	**Central Region** 15 West Yakima Ave., Suite 200 Yakima, WA 98902-3401 Phone: (509) 575-2490 (voice) (509) 454-7673 (TDD)
Adams, Asotin, Columbia, Ferry, Franklin, Garfield, Grant, Lincoln, Pend Orielle, Spokane, Stevens, Walla Walla, Whitman	**Eastern Region** N. 4601 Monroe, Suite 100 Spokane, WA 99205-1295 Phone: (509) 456-2926 (voice) (509) 458-2055 (TDD)
Island, King, Kitsap, San Juan, Skagit, Snohomish, Whatcom	**Northwest Region** 3190 160th Ave SE Bellevue, WA 98008-5452 Phone: (425) 649-7000 (voice) (425) 649-4259 (TDD)
Clallam, Clark, Cowlitz, Grays Harbor, Jefferson, Lewis, Mason, Pacific, Pierce, Skamania, Thurston, Wahkiakum	**Southwest Region** P.O. Box 47775 Olympia, WA 98504-7775 Phone: (360) 407-6300 (voice) (360) 407-6306 (TDD)
- **OR** - if your site is part of a major pulp or paper mill, aluminum smelter, or oil refinery,	**Industrial Section** P.O. Box 47706 Olympia, WA 98504-7706 Phone: (360) 407-6916 (voice) (360) 407-6006 (TDD)

VCP Voluntary Cleanup Program

Washington State - Department of Ecology - Toxics Cleanup Program

Site Summary

This summary is a required component of your request for assistance under the Voluntary Cleanup Program

Which of the following apply?

____ Requesting assistance on a planned cleanup.
____ Requesting assistance on a ongoing cleanup.
__X__ Requesting review of a completed cleanup.

Note: If you submitted your Request for Assistance (ECY 020-74) previously without a Site Summary (this form) or this is a revised Site Summary, please provide this completed form to Ecology at least five (5) working days prior to the meeting/site visit/documentation review (whichever comes first).

A) Site Identification:

Name of Site: Puget Park (#1) and McFarland Property. (#2)
Alternate Name(s) for Site: Hudson Street Site

Street Address of Site: SW Edmunds Street and Puget Way SW
City: Seattle State: WA Zip: 98106
County: King UBI Number:
Mailing Address (if different from above): City Parks Dept; 2911 2nd Ave, 4th Floor
City: Seattle State: WA Zip: 98121-1079

Township 24N Range 3E/4E Section 13/18 Quarter-Quarter ____
If known:
Latitude: Degree____ Minute____ Second____
Longitude: Degree____ Minute____ Second____
Method Used tp calculate Lat/Long:
How large (in Acres) is the site? Approx. 4

Please attach two maps to this form.

See Figures 1,2, & 3 of Voluntary Cleanup Report, Attached

1) An area map, showing general location of the site in relation to surrounding bodies of water, cities, highways, and streets. (Please mark site location.) See Figure 1

2) A site diagram showing surrounding cross-streets, labeled building outlines, sampling and well locations, etc..

See Figure 2

B) Person/Organization making request for Assistance/Review:

Name: Chuck Whittlesey and Mike Whelan
Firm: Hart Crowser, Inc.
Street Address: 1910 Fairview Avenue E
City: Seattle State: WA Zip: 98102-369
Telephone Number: (206) 324-9530 Extension:
Fax Number: (206) 328-5581 E-Mail Address: mpw@hartcrowser.

SITSU

Page 2

Which best describes your involvement with the site? (Check as many as apply.)

Current Owner __ Former Owner __ Potential Purchaser ___
Current Operator __ Former Operator __ Other (specify) _____
Environmental Consultant for City of Seattle/Holnam Inc./McFarland
Attorney for _____
Insurance Carrier for _____
Other (specify) _____ for _____

C) Release Information: 1969-1970. As referenced in report, CKD was placed on site as fill by an independant contractor.

Date of Release(if known): 69-70 Date of Discovery: _____

Drinking Water: Number of Drinking Water Supply Wells within 1/2 mile 0
Are there any drinking water systems affected? _____ yes X no
If yes, has alternate drinking water been provided? _____ yes _____ no
If Drinking Water systems are affected, are the systems public, private, or both?

Aquatics: Are there any creeks, streams, ponds, wetlands, or shorelands...
on or adjacent to the site? X yes _____ no
Within 1/4 mile of the site? X yes _____ no
Where are they located? South of site - See Figure 2
Are they impacted by contamination from the site? _____ yes X no _____ unknown

General Hazardous Substance Categories: Please complete the chart below. List the contaminants known or suspected at the site prior to cleanup, and mark the appropriate medium (i.e. soil) with: C (confirmed and above MTCA); B (confirmed but below MTCA); S (suspected); N/A (not-applicable); O (tested & not present); or U (unknown).

Contaminant	*Class (for Office Use)*	Affected Media: Soil	Ground-Water	Surface Water	Air	Sediment	Date of Release (if known)
Example: lead		C	O	S	U	S	*1967-82*
1) Lead		C					1969-70
2) Arsenic		C					1969-70
3) Cadmium		C					1969-70
4)							
5)							
6)							

D) Report Information of Assessment or Remediation Work Done to Date

Assessment:

Has site assessment work been done at this site? Yes X No _____ In-progress _____
If Yes, when? June 1997 Were results reported to Ecology? Yes X No __ Date _____
Desc be: (list reports in "E" below)
Limited environmental assessment was performed by Agra, Inc., in July 1994. This work was commissioned and reported to Ecology by another party. Additional environmental sampling and analysis was performed by Hart Crowser in September 1996, reported in the Remedial Evaluation Report.

Remediation:

Has any site cleanup work been done at the site? Yes X No _____ In-progress _____
If yes, please continue to answer the remaining questions in this section to the best of your ability.

When was the cleanup work done? Sept - Nov 1997
Were results reported to Ecology? Yes X No _____ Date With this submittal in Dec 1997
Describe: (list reports in "E" below) Voluntary cleanup using enhanced soil cap, precipitate management, and drainage improvements.

Does contamination remain on-site after cleanup activities? Yes X No _____
If yes, describe: (list reports in "E" below)
Existing cement kiln dust (CKD) was capped with a soil cover; CKD precipitate ares were excavated, placed as fill elsewhere on site, and improved with a gravel chamber.

For each contaminant listed in ***Part C)Release Information (above),*** please describe the quantity of the contaminant (in pounds) which was removed or treated as a result of the cleanup activities:

Contaminant	*Class (for Office Use)*	Pounds of Contaminant: Incinerated	Washed	Removed	Treated	Contained
Example: lead		*10*	*20*	*40*	*10*	*60*
1) Lead						X
2) Arsenic						X
3) Cadmium						X
4)						
5)						
6)						
7)						
8)						
9)						
10)						
11)						
12)						

As a result of the cleanup:
How many acres of land were returned to ***unrestricted*** use? NA
How many acres of land were returned to ***restricted*** use ? 4 Acres*
How many cubic feet of contaminated soil was remediated or contained? Approx. 1,500,000 cf
How many gallons of contaminated groundwater was remediated or contained? 0
How many people are now at reduced risk as a result of the cleanup action? NA
How many pounds of potential pollution was prevented as a result of the cleanup action? NA

* See Voluntary Cleanup Report for details of Institutional Controls.

METHODS/TREATMENTS USED	SOIL	GROUNDWATER	SURFACE WATER	DRINKING WATER	AIR	WASTES	
Method A							
Method B							
Method C							
Have these levels been met throughout the site? Y or N	N		Y*				
Destruction or Detoxification							
Carbon Adsorption[1]	NA						
Biological Treatment						NA	
Chemical Destruction					NA		
Incineration		NA	NA	NA			

[1]Carbon followed by regeneration; use of granular activated carbon followed by landfilling would be classified in these tables as volume reduction and off-site landfill

Media Transfer							
Air Stripping/Air Sparging	NA						
Aeration/Vapor Extraction		NA	NA	NA	NA	NA	
Thermal Desorption		NA	NA	NA		NA	
Immobilization							
Vitrification		NA	NA	NA			
Solidification/Stabilization		NA	NA	NA			
Reuse/Recycling[2]							
Specify							

[2]For example, reuse of free petroleum product recovered in a pump and treat system.

Separation/Volume Reduction							
Solvent Extraction		NA	NA	NA			
Soil Washing		NA	NA	NA			
Physical Separation[3]							

[3]For example, oil/water separators.

Land Disposal/Containment							
Containment or On-site Landfill							
Off-site Landfill	Y		NA				
Institutional Controls		NA	NA	NA			
Specify Hydroseeding barrier planting, fencing, and deed restrictions	Y						
Others							
Specify Treatment Method							

E) Documentation:

Please list titles of all site reports below. Include name of consulting firm & year completed. (If there is not enough room for the entire list, please attach additional page(s) as necessary.)

Title: _____ By: _____ Date: _____

(See Attached)

Is additional information concerning the contaminants treated or removed, or cleanup or remediation methods used available in a database? Yes____ No__X__ If yes, what programming software is used?_____ Is a copy included for our use? Yes___ No____

F) Property Type: Commercial ___ Industrial ___ Residential ___ Other__X__(Please specify) Vegetated Greenbelt

Property currently being used? _____Yes __X__No

Plans for change in use? _____Yes __X__No If yes, please specify:_____

G) Standard Industrial Classification (SIC) Codes:

List all that apply. If none apply, or if you don't know your SIC code, list activities conducted at the site (i.e. automotive repair and maintenance, construction equipment storage. etc.).

No activity at site

H) Dangerous Waste Facilities:

Does the facility have a dangerous waste identification number? No__X__Yes _____

If Yes, What is the number? WAD_____

I) Tank Information:

Complete this table for ALL tanks, whether underground (UST) or aboveground (AST), including unregulated tanks.

(* Unleaded, leaded, diesel, bunker-C, waste oil, heating oil, aviation fuel, other (identify))

(**Tank status: Left in Place, Removed, Closed in Place)

Tank ID	AST/UST	Size	*Product	Was free product encountered? on GW	in excavation	**Tank status
NA						

J) Owner/Operator History

(Please photocopy and attach copies if additional owners and/or operators are known)

Type (code) of Owner/Operator (for below):
Private(1) Municipal(2) County (3) Federal (4) State(5) Tribal(6) Mixed(7) Other (8) Unknown (9) Public Entity Acquisition via Bankruptcy (10) Financial Institution Acquisition via Bankruptcy (11)

1) Current Site Owner: (#1) Seattle Department of Parks & Recreation Type: 2
Street Address: 2911 Second Avenue, 4th Floor
City: Seattle State: WA Zip: 98121
Contact Person (if different than owner, above): Robin Kordik
Street Address: Same as Above
City: State: Zip:
Telephone Number: (206) 233-7938 Extension:
Fax Number: (206) 233-3949 E-Mail Address:
Dates of Ownership: early 1900s to present

2) Current Site Owner (#2) Mr. Jack McFarland Type: 1
Street Address: 9360 Forrest Court SW
City: Seattle State: WA Zip: 98106
Contact Person (if different than operator, above):
Street Address:
City: State: Zip:
Telephone Number: ( ) Extension:
Fax Number: ( ) E-Mail Address:
Dates of Operation: to

3) Former Site Owner: Type:
Street Address:
City: State: Zip:
Contact Person (if different than owner, above):
Street Address:
City: State: Zip:
Telephone Number: ( ) Extension:
Fax Number: ( ) E-Mail Address:
Dates of Ownership: to

4) Former Facility Operator and Transporter John Yates, Yates Stables Co & Duwamish Excavating & Trucking Type: 1
Street Address: 1480 Locust Street
City: Reno State: NV Zip: 89502
Contact Person (if different than operator, above): Joel Wright
Street Address: 1325 Fourth Avenue
City: Seattle State: WA Zip: 98104
Telephone Number: (206) 624-7990 Extension:
Fax Number: (206) 624-5944 E-Mail Address:
Dates of Operation: 1969 to 1970

K) Other Involved Parties:
(Please photocopy and attach copies if additional parties are involved)

1) Environmental Consultant: Roy Kuroiwa, P.E. and Mike Whelan
Representing: City of Seattle/Holnam Inc,/McFarland
Firm: Hart Crowser, Inc.
Street Address: 1910 Fairview Avenue E.
City: Seattle State: WA Zip: 98102
Telephone Number: (206) 324-9530 Extension:
Fax Number: (206) 328-5581 E-Mail Address:

2) Site Control Person if other than Owner/Operator. (This must be a person who is on-site during normal working hours and is authorized and qualified to answer questions about the site, or a person who is available during normal business hours and has knowledge about the site and the remediations)
Name: Mike Whelan
Relation to site/owner/operator: Environmental Consultant
Firm: Hart Crowser, Inc.
Street Address: 1910 Fairview Avenue E.
City: Seattle State: WA Zip: 98102
Telephone Number: (206) 324-9530 Extension:
Fax Number: (206) 328-5581
Dates of Involvement with site: _____ to _____

3)Name: Ideal Cement Company
Relation to site/owner/operator: CKD from Ideal was placed on site by an independent Contractor
Firm: c/o William H. Chapman, Preston Gates & Ellis, LLP
Street Address: 701 Fifth Avenue, 5000 Columbia Tower
City: Seattle State: WA Zip: 98104
Telephone Number: (206) 623-7580 Extension:
Fax Number: (206) 623-7022
Dates of Involvement with site: _____ to _____

4)Name: RSR/Quemetco (Attn: Ted Millan)
Relation to site/owner/operator: Generator
Firm: Hacket, Beecher & Hart
Street Address: 1601 Fifth Avenue, Suite 2200
City: Seattle State: WA Zip: 98101
Telephone Number: (206) 624-2200 Extension:
Fax Number: (___)
Dates of Involvement with site: _____ to _____

CONTENTS

FIGURES

CONTENTS (Continued)

VOLUNTARY CLEANUP REPORT
HUDSON STREET SITE
SEATTLE, WASHINGTON

INTRODUCTION

This Voluntary Cleanup Report details the environmental investigation data, remedial design, and construction activities performed at the project site, known as the Hudson Street Site, located along Puget Way SW in Seattle, Washington. The site is located within a densely vegetated greenbelt on the east side of West Seattle, along West Marginal Way and the Duwamish River. Between 1969 and 1970, cement kiln dust (CKD) from the former Ideal Cement Company plant located on West Marginal Way was used by John Yates to fill in a ravine at the site, thereby creating two CKD fill areas. These areas are known as the Puget Park and McFarland CKD lobes (also known as the Puget Park and McFarland Property Sites within the Department of Ecology's Confirmed and Suspected Contaminated Sites report). Prior to remedial action, most of the site contained thick vegetative cover including grasses, shrubs, bushes, and alder trees.

The City of Seattle, Holnam Inc., and John McFarland have undertaken an independent remedial action at the site, which is intended to be a permanent remedy to protect human health and the environment, consistent with Ecology's Model Toxics Control Act (MTCA). The remedial action conducted at Hudson Street Site was performed in accordance with Ecology's MTCA Cleanup rules. The evaluation and selection of the appropriate remedial action for the site is described in the Remedial Evaluation Report, Hudson Street Site (Hart Crowser, 1997).

The City of Seattle, Holnam Inc., and John McFarland completed the remedial action in September through November of 1997. Linder Construction of Bellevue, Washington, served as the environmental contractor; Hart Crowser provided construction management and documentation services; as-built surveys were performed by W & H Pacific. Except for routine confirmational monitoring, the remedial activities planned for the Hudson Street Site are complete.

REPORT ORGANIZATION

This document is submitted in general accordance with Ecology's guidance for preparing an Independent Remedial Action Program (IRAP) report under MTCA (Ecology, 1994a). The main body of this report briefly reviews project site setting

and environmental data, details the completed remedial actions for the site, and sets forth a Confirmational Monitoring Plan. Institutional controls that will be used in conjunction with the completed actions are also presented.

Appendices compile additional project site setting and environmental data which support the main body of this report. References to these appendices are made in the text of the report where appropriate. The appendices also include the Ecology-required Voluntary Cleanup Program Summary Report (Appendix B). Copies of laboratory testing certificates were provided in the Remedial Evaluation Report (Hart Crowser, 1997).

Additional details regarding the physical setting of the site, including site hydrogeology and surface water drainages are provided in Appendix A. Below is a summary of the environmental conditions of the site, as determined during previous environmental investigations. Further details of the environmental investigation data are also provided in Appendix A of this report.

PROJECT BACKGROUND/SITE DESCRIPTION

This Voluntary Cleanup Report is submitted on behalf of The City of Seattle Department of Parks and Recreation; Mr. John McFarland; and Holnam, Inc. The portion of the site known as the McFarland CKD lobe is owned by Mr. McFarland; the portion of the site known as the Puget Park CKD lobe is owned by the City of Seattle. The site is located in Seattle, Washington, as shown on Figure 1.

Site Name:	Hudson Street Site (Puget Park/McFarland Site)
Street Address:	4800 16th Avenue SW (Intersection of SW Edmunds Street and Puget Way SW) Seattle, Washington

Mailing Addresses:	Seattle Department of Parks and Recreation 2911 Second Avenue, Fourth Floor Seattle, WA 98121-1079 Attn: Robin Kordik Mr. John McFarland 9360 Forrest Court SW Seattle, WA 98106 (206) 938-4433
Phone Number:	City of Seattle (206) 233-7938

Physical Setting

The project site consists of two CKD fill areas (or lobes), which extend directly off of Puget Way SW, within the densely vegetated greenbelt of West Seattle, along West Marginal Way. The two lobes of fill, known as the McFarland and Puget Park lobes, are approximately 0.7 and 2.3 acres, respectively. The top surface of each lobe is relatively flat and contains light to dense grass and brush cover. The slopes of the lobes are covered with small (4- to 8-inch-diameter) alders and dense brush, and are of varying grades ranging from 20 to 45 degrees.

Between approximately 1969 and 1970, approximately 11,000 and 40,000 cubic yards of CKD were used to create the McFarland and Puget Park lobes, respectively. The operator who conducted fill operations also placed battery chips within the fill areas to function as a temporary road base. The battery chips originated from a secondary lead smelter located on Harbor Island. Subsequently, the lobes were partially covered with soil. Vegetation has naturally recovered over the majority of the fill areas.

Project Area Hydrogeology

Previous explorations completed on the site provide details on the local soil types and perched water. Both fill areas consist of up to 20-foot-thick layers of CKD, extending west from the roadway (Puget Way SW), following the natural slope of the area. Large portions of the CKD fill areas are covered with a compacted soil fill material, generally consisting of a gravelly, sandy silt. Both CKD fill areas were also observed to contain small quantities of debris, including crushed concrete and brick, wood, and plastic material. Beneath the fill, explorations encountered up to 1 foot of an organic, sandy silt layer, probably the former upper forest floor layer. This material is underlain by 5 to 10 feet of medium stiff to stiff, moist, weathered, silty clay/clayey silt underlain by stiff to

very stiff, unweathered, silty clay/clayey silt (Geo Group, 1993). This clayey silt material has a very limited permeability and is not likely to transmit surface or perched water to the underlying groundwater aquifer in the region.

No standing groundwater was encountered in the test pits or soil borings from previous explorations (AGRA, 1994). However, perched water was observed in one boring during a prior Geo Group (1993) investigation. Perched water is also indicated by the presence of seeps and formations of carbonate precipitates below both the Puget Park and McFarland lobes (see Figure 2) from water converging at the bottom of the slope and seeping onto the forest floor. During Hart Crowser's work, 4- to 6-inch-deep test pits were hand excavated into both precipitates; from the precipitate below the Puget Park lobe, some perched water was observed seeping through the test pit approximately 2 to 4 inches below the soil surface. The top 4 to 6 inches of soil of the test pit consisted of an organic sandy silt layer containing a calcium carbonate-like precipitate, underlain by a moist, weathered silty clay/clayey silt. Based on the condition of the underlying stiff clay as previously described, it is unlikely the perched water is capable of migrating downward into any lower water-bearing unit.

Surface Water Drainage

Surface water is controlled upstream of the fill lobes through a series of side street drainage ditches and culverts. Storm water generated topographically uphill of the fill lobes originates from an area consisting of wooded hillsides and a few residential homes. Prior to the completion of the remedial action described below, the storm water traveled down an open channel on the west side of Puget Way SW and through a 20-foot-long drainage culvert near the planned SW Edmunds Street intersection (see Figure 2). At the outlet of the drainage culvert, storm water emptied into a steep ravine which separates the two lobes. As observed in the field, a portion of the drainage turned southwest toward the precipitate area below the Puget Park lobe; the rest of the drainage continued south toward a second precipitate area below the McFarland lobe and eventually discharged into Puget Creek. No flowing surface water was observed during the summer period. No obvious drainage channels, erosion gullies, or slide areas as a result of surface water drainage were observed during Hart Crowser's investigation work. Pursuant to the independent remedial action, surface water drainage patterns have been modified to divert the water away from the CKD lobes.

ENVIRONMENTAL INVESTIGATION DATA

Previous environmental investigations at the Hudson Street Site determined that the site's CKD contains elevated concentrations of lead, arsenic, cadmium, and pH. Although the selected samples had total metals concentrations ranging between 140 to 370 ppm for arsenic, 3.2 and 10 ppm for cadmium, and 880 to 3,300 ppm for lead, none of the samples had leachable metals concentrations that exceeded the toxicity characteristic for state Dangerous Waste designation. The available data also indicate the CKD to be a cement kiln by-product with typical characteristics of a carbonate mineral residue with elevated alkalinity.

The limited environmental impacts resulting from the site-filled CKD fill are quantified as follows:

- **CKD Precipitate Material.** Soil samples collected from the shallow precipitate material indicate the environmental quality of the material is similar to the quality of CKD, described in the EPA nation-wide study (EPA, 1993) for total arsenic and lead. The cadmium values are generally lower than typical CKD. When compared to the site's CKD lobe material, the precipitate material exhibits the presence of similar chemical constituents; however, most values for total metals in the precipitate fall in the low end of the range for CKD.

- **Perched Water and Seeps.** As measured in a seep water sample collected directly within one of the precipitate areas, the seep water contained no detectable arsenic and cadmium, and a measurable amount of dissolved lead (1.0 mg/L). The pH of the sample was measured at 12.3 pH units. The seep sample also had elevated hardness (1,200 mg/L) and TDS (2,500 mg/L), values which reflect the saturated nature of the mineral content of the seep water.

Laboratory data for the seep water generally reflect the nature of perched water flowing within an organic sandy silt and the CKD fill and dissolving some carbonate mineral and associated lead.

- **Puget Creek Surface Water Quality.** Surface water samples collected from two locations within Puget Creek (one upstream and one downstream of the CKD lobes) indicate metal concentrations in the creek samples do not exceed freshwater acute or chronic ambient surface water quality criteria. Total and dissolved metals (arsenic, cadmium, and lead) were generally not detected except for lead (0.0037 mg/L) in the downstream sample. A slightly elevated pH (relative to a neutral range of 6.5 to 7.5) was also measured within the creek. However, field measurements fall within the state's surface

fresh water quality standards for pH (6.5 to 8.5). The values determined for hardness, suspended solids, dissolved solids, and pH fall within the normal range for surface water bodies.

The data results indicate that there is no significant impact to the environmental quality of Puget Creek surface water which is attributable to the presence of the CKD fill.

A more detailed discussion and presentation of the environmental data summarized above is provided in Appendix A.

SELECTED REMEDIAL MEASURE

The selection and implementation of the appropriate remedial action at the Hudson Street Site were based on the development of site-specific Remedial Action Objectives (RAOs) and the results of a limited feasibility evaluation of remedial alternatives. Details of both the RAOs and the feasibility evaluation are provided in Appendix A. The selected remedial action alternative, Enhanced Soil Cover, Precipitate Management, and Drainage Improvements, has been constructed and is complete; details of remedial action implementation and construction are provided within this section.

In summary, the selected remedial measure is intended to address the following RAOs:

- Eliminate the potential for human contact with CKD and precipitates;
- Eliminate potential dust generation and releases to the atmosphere from the CKD;
- Control runoff, further sedimentation, and precipitation of the CKD to the surrounding environment; and
- Provide a remedial measure that maintains/enhances the wooded greenbelt in and around the City of Seattle's Puget Park and the McFarland Property.

The RAOs for the site are intended to provide a remedy which protects human health and the environment (WAC 173-340-350). The following section documents remedial action construction activities and documents compliance with these RAOs.

Site Preparation, Erosion and Sediment Controls

Prior to initiating construction activities related to the remedial action, several site preparation efforts were performed to establish appropriate site controls, including erosion and sediment controls. These activities are highlighted below and shown on Figure 3, As-Built Remediation Plan.

- Approximately 7.5 tons of solid waste were collected and hauled off site to Waste Management, Inc. (October 7, 1997) for disposal at a solid waste landfill. The solid waste, consisting generally of used tires, appliances, and household items, were found mainly within the drainage ravine area. Upon completion of the remedial action, the two lobes are relatively free of large pieces of solid waste. Some scattered debris remains, hidden within the thick vegetative cover.

- Approximately 250 feet of hay bale sediment fences were installed directly downhill from haul road locations and precipitate excavation locations. The hay bale fences, installed side-by-side and staked through the center, were left in-place to provide long-term erosion control during the growth and development of the vegetative cover installed at the site. The approximate location of the hay bale fences is shown on Figure 3.

- Approximately 200 feet of geotextile silt fences were installed directly downhill from the precipitate chamber locations and the McFarland lobe soil cover. The continuous silt fences were left in-place to provide long-term erosion control during the growth and development of the vegetative cover. The approximate location of the silt fences is shown on Figure 3.

- The site entrances and perimeter haul road were reinforced with crushed gravel and quarry spalls to facilitate equipment access and transport and minimize sediment generation and transport. Upon completion of the remedial action, the entrances and haul roads were filled and graded with a soil cover. Hydroseeding was used to further stabilize the area.

Enhanced Soil Cover

Consistent with the greenbelt designation and the RAOs for the site, the installation of an enhanced soil cover at designated locations across both CKD lobes has been completed. As the enhanced soil cover was installed, Linder Construction was instructed to minimize disturbances to the existing 25 years of natural growth cover. An area of approximately 19,000 square feet within both CKD lobes was modified with the installation of the enhanced soil cover. The total actual area of cover was surveyed and is illustrated on Figure 3. Details

regarding the construction and sequence of the enhanced soil cover are provided below.

All areas within the CKD lobes receiving the enhanced soil cover were cleared of existing grasses, shrubs, and small alders. This includes the low-lying shrubs such as Himalayan blackberry and small (1- to 4-inch-diameter) alders. The larger diameter alder and others trees (some Madrones) were left in-place and undisturbed during soil cover installation. Cleared small alders were chipped and scattered on top of new soil cover areas to provide minor erosion control and additional nutrients to the area.

Once cleared of vegetation, an average 24-inch-thick soil layer was graded across the area to create a continuous soil cover. The soil cover area was graded to minimize deep ruts and then lightly compacted with a dozer and backhoe. The ends of the soil cover were graded to match the contours of the natural surroundings. The final limits of the constructed soil cover were surveyed by W & H Pacific. The material used to create the soil cover was provided from City of Seattle projects and consisted of slightly gravelly, sandy silt, containing minor amounts of cobbles and roots. Representative soil samples were collected and analyzed from the soil; no detectable concentrations of total petroleum hydrocarbons (TPH) were measured; background levels of lead and chromium (Ecology, October 1994) were detected in only two of the samples; no detectable concentrations of arsenic were measured.

Immediately following the installation of the soil cover, the site was hydroseeded with a standard soil erosion seed mixture (seed, mulch, tackifier, and fertilizer) to provide temporary erosion control within all newly disturbed areas (approximately 55,000 square feet). These areas included the soil cover, former temporary stockpile, equipment staging, haul roads, and former exploratory test pits. Additionally, approximately 800 square feet of soil cover within the steeper slope areas were protected with straw matting to provide additional erosion control.

After completion of all soil cover activities, the forested areas within the immediate area of remedial activities were visually inspected for any disturbances caused by construction equipment and other activities. Except for the temporary stockpile location and haul roads, the existing thick shrub and tree cover within the immediate area of the new soil cover was undisturbed. The final limits of the covers installed on the Puget Park and McFarland lobes are presented on Figure 3.

Puget Park Lobe Cover. In total, 6,200 square feet of the Puget Park lobe area were capped with the average 24-inch-thick soil cover, located mainly within the western tip of the lobe (Figure 3). Another 89,300 square feet were undisturbed, as most of this area supports an existing 18- to 24-inch-thick soil cover. Additionally, approximately 3,000 square feet of the lobe, primarily on the southern steep slopes of the lobe, contain a 2- to 4-inch-thick forest duff and dense vegetation. According to the Ecology representative responsible for review, this area supports an adequate protective cover, consisting of the existing forest duff and vegetative screen, and accordingly was not disturbed.

McFarland Lobe Cover. In total, 26,500 square feet of the McFarland lobe area were capped with the average 24-inch-thick soil cover; while approximately 2,000 square feet were capped with a thin (4- to 6-inch) soil cover. The remaining 12,800 square feet of the lobe were left undisturbed, as this area already supports a 12- to 18-inch-thick soil and vegetative cover.

Precipitate Management Features

During previous investigative work, two active precipitation locations at the site were identified, one below the Puget Park lobe and one below the McFarland lobe. The formations appear as a thin, hardened layer of material coating surficial soil and organic debris (roots, twigs, leaves) within its formation. The "travertine-like' deposits observed at the precipitation locations were likely produced by the dissolution and precipitation of carbonate materials associated with the CKD. As perched water (which had traveled downhill through the CKD) discharges at these locations, exposure to the atmosphere causes much of the dissolved carbonates and iron-containing materials to precipitate, forming the "travertine-like" carbonate deposits. The precipitate chambers are intended to create an environment that enhances the precipitation of dissolved carbonates and other inorganic components out of the seep waters, thus improving the quality of the seep water which appears at these locations. Because most of the surface water has been directed away from the CKD fill lobes (see ***Drainage Improvements*** section below), the current flow rate of the seep is expected to substantially decrease, while the water quality of the seep water improves. Seep water sampling and analysis performed as part of the Confirmational Monitoring Plan will confirm improvements to the seep water quality resulting from the remedial action.

Prior to constructing the precipitate chambers, the areas identified as an active precipitation location (see Figure 2) were excavated until all visible precipitate formations were removed. The excavated material was hauled and eventually placed within the McFarland lobe, under the 24-inch-thick soil cover. The

precipitate formations were generally 4 to 6 inches deep and represented a total area of approximately 5,000 square feet.

The voids left after excavating the precipitate formations were lined with a nonwoven geotextile material possessing a permeability of approximately 0.25 cm/sec. The nonwoven geotextile will filter fines contained within passing seep water and prevent the fines from entering and clogging the precipitate chamber. The void or chamber was then filled with an 18-inch-deep section of 2-inch, crushed, angular rock (railroad ballast). The final limits of the precipitate chambers are shown on Figure 3. Note that as of the construction of the chambers and the date of this report, little to no seep water has been observed at the bottom of the chambers. This observation confirms the expectation and observation made above.

Drainage Improvements

A large quantity of surface water runoff originating from uphill residential sources flowed along the western side of Puget Way SW and discharged into a drainage ravine which divided the two CKD lobes (see Figure 2 for location of drainage ravine). The drainage ravine ran at a 25 to 30 percent slope for about 100 feet then split to terminate at the location of the two active precipitate locations. Prior to remedial action, field observations clearly showed surface water drainages leading from the split in the ravine to the precipitate locations.

As an element of remedial action at the site, the surface water entering the drainage ravine and eventually reaching the active precipitation locations was completely diverted away from the area of the two CKD lobes. Specifically, a culvert was installed under Puget Way SW that intercepts the flow on the west side of the road and conveys it to the east side of the road. The location and layout of the new surface water drainage culvert is shown on Figure 3.

Engineering Controls

Hydroseeding. As discussed above, immediately following the installation and completion of the enhanced soil cover and other remedial activities, disturbed areas across the entire site were hydroseeded with a standard soil erosion seed mixture (grass seed, mulch, tackifier, and fertilizer). The intent of the hydroseeding is to provide immediate and short-term erosion and sediment control on the recently disturbed areas on the site (see Figure 4). This includes the new soil cover areas, haul roads, stockpile and equipment staging areas, and former test pit locations. A total area of approximately 55,000 square feet was hydroseeded within a week of completing the remedial action construction activities.

Barrier Plantings. To discourage public trespassing and access to the capped CKD fill areas, a selective planting scheme consisting of huckleberry and rapid growing, densely wooded red dogwood were planted along the perimeter of the fill areas, particularly along Puget Way SW (see Figure 4). Additionally, barrier plantings consisting of dogwood were established around the precipitate chambers to hide and exclude the chambers from passerbys. After two to three years of growth, the mature plantings are expected to provide both a complete visual screen and a physical barrier, discouraging the potential for nearby residents or others to access the site. See Figure 4 for the location and typical cross section of the road edge barrier plantings.

Wooded Plantings. A select scheme of wooded plantings was placed in open spaces created by the placement of the 24-inch-thick soil cover within both the Puget Park and McFarland lobes. The plantings selection and spacing were designed to create a diverse and dense vegetative cover, thereby discouraging any trespassers from damaging the soil cover. The wooded plantings are also intended to minimize unwanted digging into or erosion of the soil cap. The wooded plantings scheme includes big leaf maple, red alder, hazelnut, Indian plum, and snowberry.

Temporary Fencing. During the first two years of barrier and wooded plant development, a temporary, 6-foot-high chain-link fence will be maintained along portions of the McFarland Lobe and across the main entrance of the Puget Park lobe to discourage vehicle access into the site. Two- to three-foot-high soil berms (installed for barrier plantings) will prevent vehicle access to the other parts of the site.

CONFIRMATIONAL MONITORING

Effectiveness of the selected remedial action (Enhanced Soil Cover, Precipitate Management, and Drainage Improvements) will be ensured and demonstrated through a confirmational monitoring program. The monitoring program will consist of periodic site visits for a minimum of 10 years. During each site visit, the condition and operation of the enhanced soil cover, precipitate chambers, and drainage improvements will be inspected and documented. If necessary, repairs or improvements to the soil cover or vegetation will be made immediately. If seep water is observed discharging from a precipitate chamber into Puget Creek, water quality samples will be collected from the chambers at the point of compliance (location where surface water flows into Puget Creek), on the schedule provided below. Surface water samples will be analyzed for lead, arsenic, cadmium, and pH. If ambient surface water quality standards are

exceeded, a corrective action plan addressing surface water quality will be prepared and submitted to Ecology.

Results of periodic inspection and maintenance events will be reported annually to Ecology.

A proposed sampling and inspection schedule is as follows:

Year	Frequency	Activity
1	4 times	Visual inspection of soil cover and precipitate chambers
	2 times	(If observed) Seep water quality sampling from point of compliance
2	2 times	Visual inspection of soil cover and precipitate chambers
	1 time	(If observed) Seep water quality sampling from point of compliance
3	2 times	Visual inspection of soil cover and precipitate chambers
4	1 time	Visual inspection of soil cover and precipitate chambers
5	1 time	Visual inspection of soil cover and precipitate chambers
6, 8, 10	1 time	Visual inspection of soil cover and precipitate chambers

INSTITUTIONAL CONTROLS

A restrictive convenant will be recorded with the property deed to inform interested parties of the environmental status associated with the presence of CKD fill at the subject site. The covenant will provide for maintaining the enhanced soil cover and precipitate chambers and identify issues associated with any proposed excavation activities in the area of CKD fill.

LIMITATIONS

Work for this project was performed, and this report prepared, in accordance with generally accepted professional practices for the nature and conditions of the work completed in the same or similar localities, at the time the work was performed. It is intended for the exclusive use of The City of Seattle, Holnam Inc., and Mr. John McFarland, for specific application to the referenced property. This report is not meant to represent a legal opinion. No other warranty, express or implied, is made.

Any questions regarding our work and this report, the presentation of the information, and the interpretation of the data are welcome and should be referred to the undersigned.

We trust that this report meets your needs.

Sincerely,

HART CROWSER, INC.

Roy Kuroiwa

ROY K. KUROIWA, P.E.
Associate Engineer

Michael P. Whelan

MICHAEL P. WHELAN
Senior Staff Geotechnical Engineer

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Vicinity Map

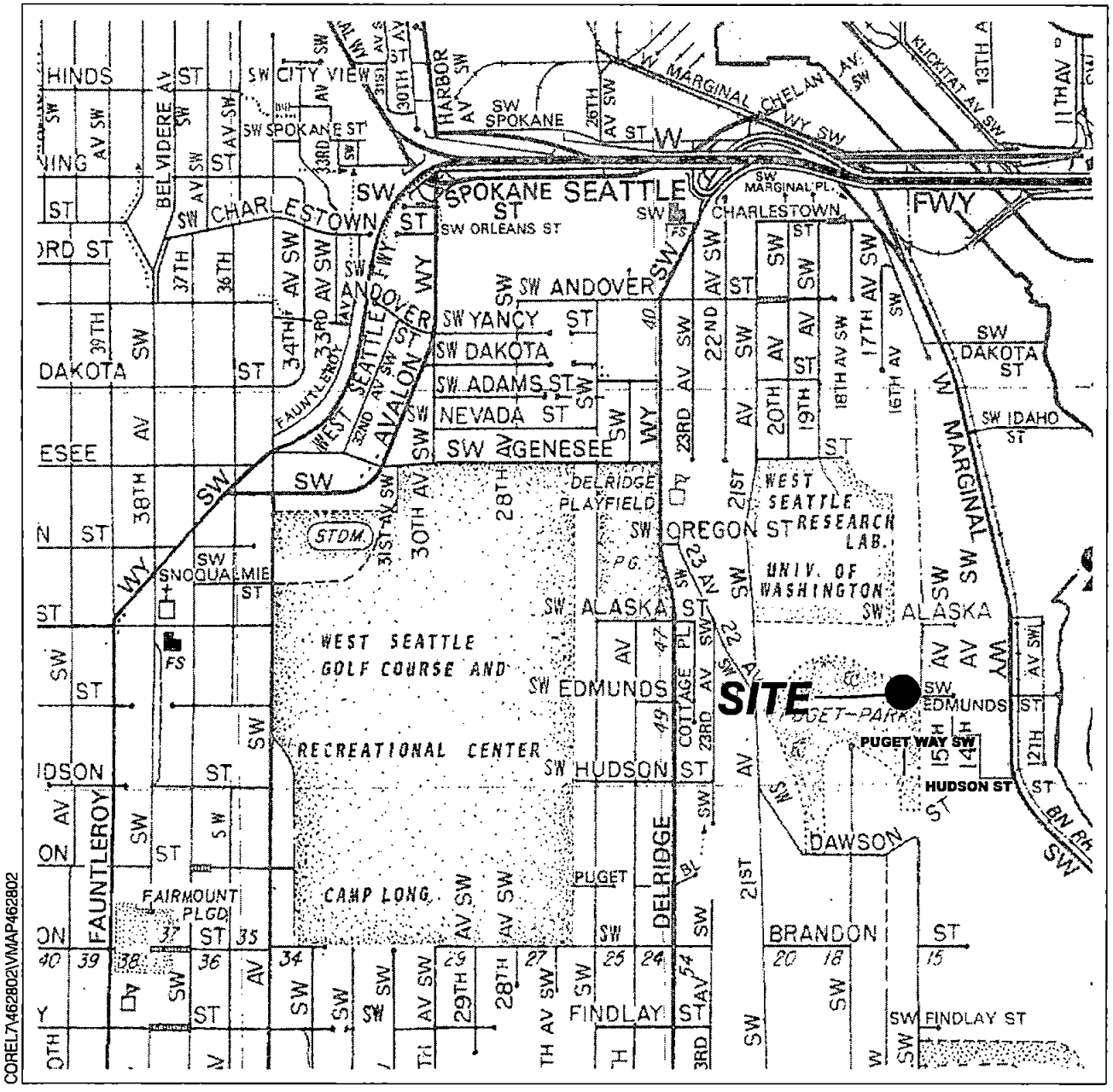

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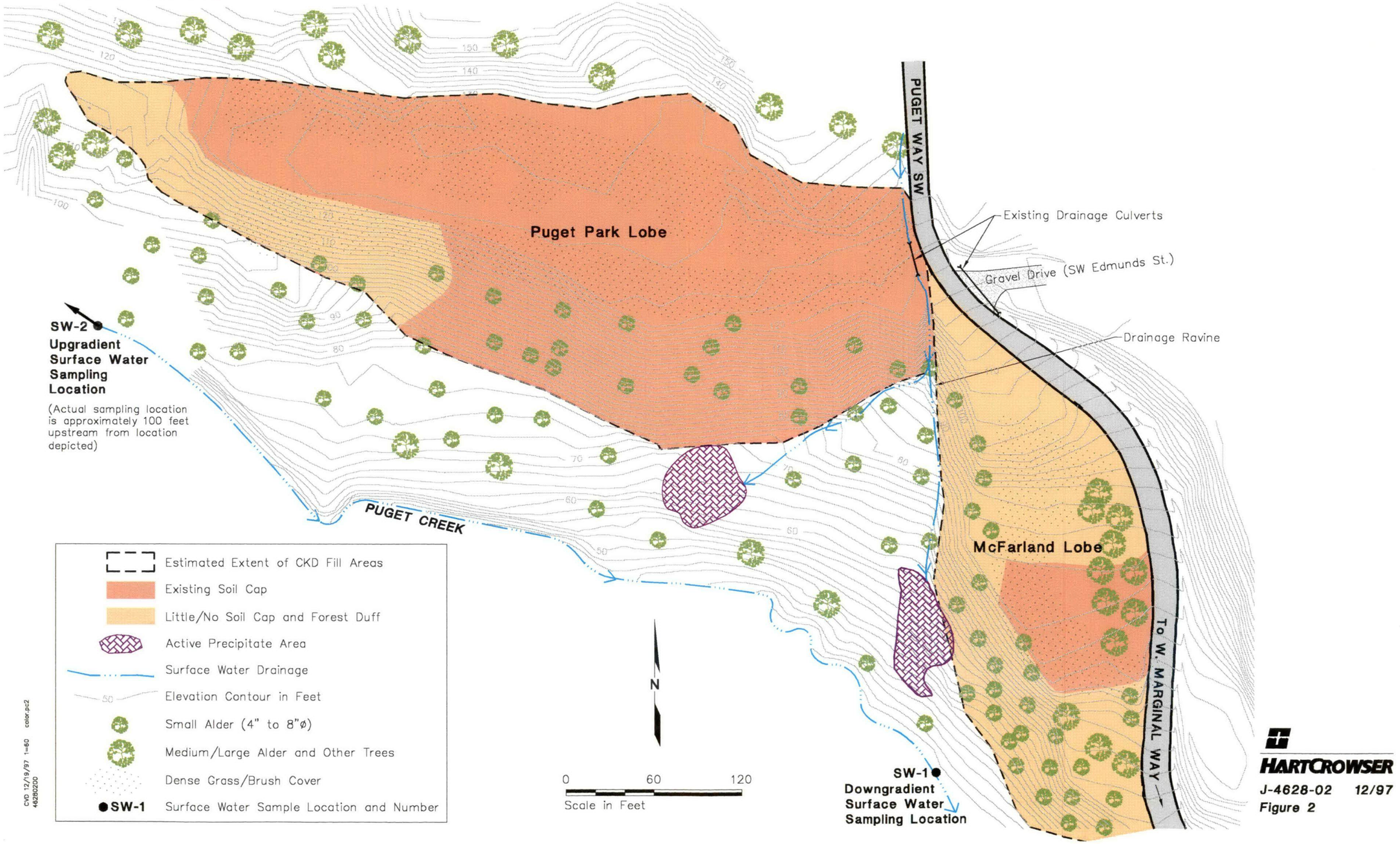
Figure 1

Site Conditions before Remedial Action

Hudson Street Site



CVD 12/19/97 1=60 color.pc2
46280200

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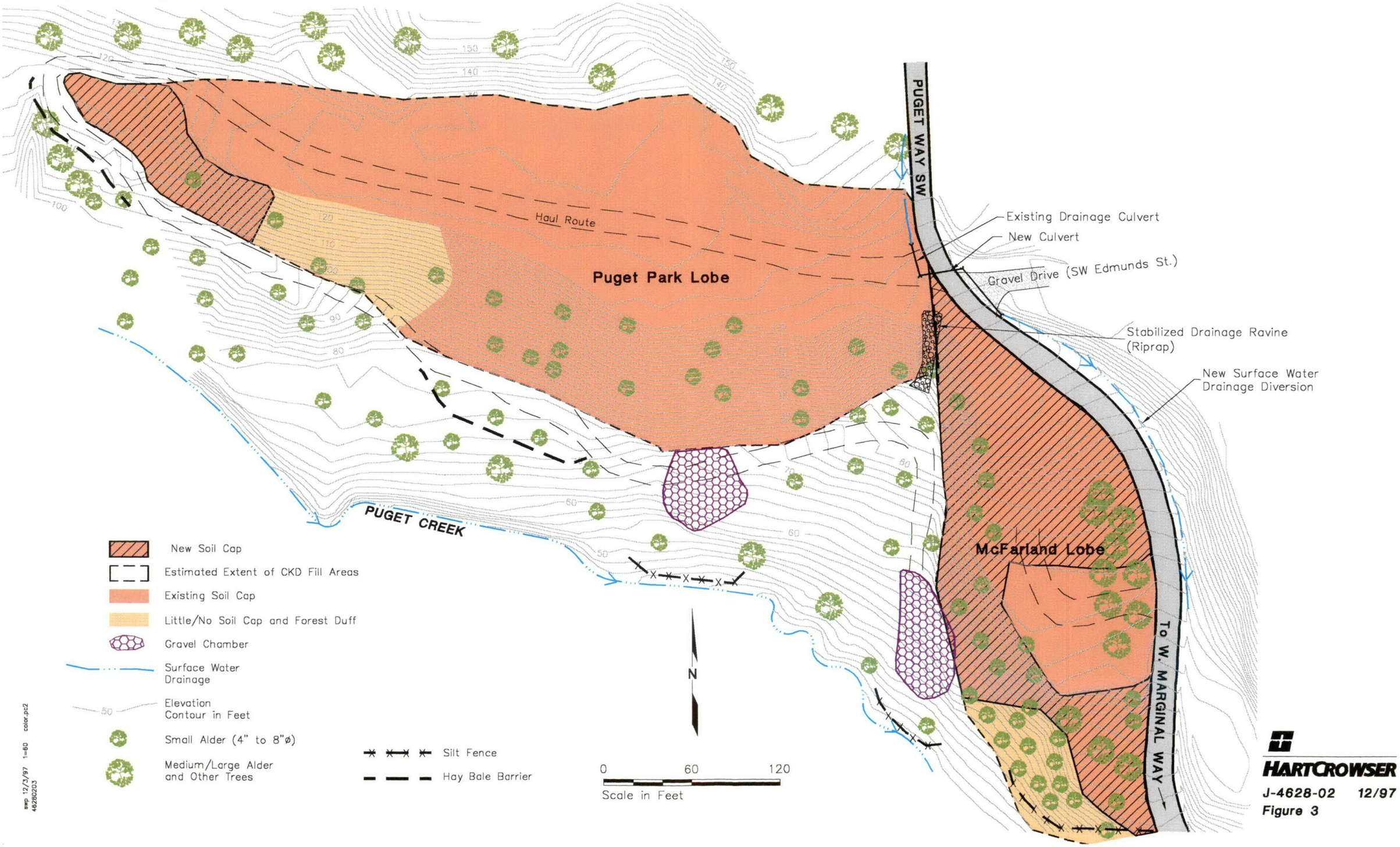
Figure 2

Site Conditions after Remedial Action - As-Built Construction Map

Hudson Street Site



swp 12/3/97 1=60 color.pc2
46280203

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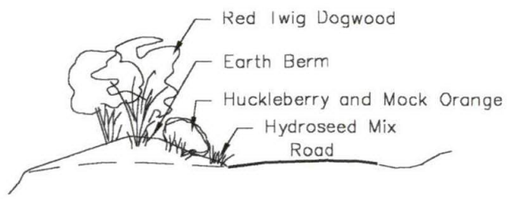
Figure 3

Site Condition after Remedial Action - As-Built Revegetation Plan

Hudson Street Site



SECTION: TYPICAL ROAD EDGE BARRIER

NOT TO SCALE

FORMER TEMPORARY STOCKPILE AREA

FORMER CONTRACTOR FACILITIES AND STAGING AREA

Former Haul Route

Puget Park Lobe

PUGET WAY SW

Existing Drainage Culvert

New Culvert

Gravel Drive (SW Edmunds St.)

Stabilized Drainage Ravine (Riprap)

ASPHALT ROAD

New Surface Water Drainage Diversion

ROAD EDGE BARRIER (TYP.)

McFarland Lobe

To W. MARGINAL WAY

PUGET CREEK

N

0 60 120

Scale in Feet

WOODED AREA PLANT SCHEDULE		
Symbol	Common Name	Scientific Name
	MOCK ORANGE EVERGREEN HUCKLEBERRY RED EDLERBERRY RED TWIG DOGWOOD	*PHILAEDELPHUS LEWISII* *VACCINIUM OVATUM* *SAMBUCUS RACEMOSA* *CORNUS STOLONIFERA*
ROAD EDGE BARRIER PLANT SCHEDULE		
⊗	RED TWIG DOGWOOD EVERGREEN HUCKLEBERRY MOCK ORANGE	*CORNUS STOLONIFERA* *VACCINIUM OVATUM* *PHILAEDELPHUS LEWISII*
PRECIPITATE AREA BARRIER PLANT SCHEDULE		
⊗	RED TWIG DOGWOOD	*CORNUS STOLONIFERA*

Hydroseed Only

Hydroseed and Wood Plants

Gravel Chambers

Temporary Chain-link Fence

Extent of CKD Fill Area

Silt Fence

Hay Bale Barrier

swp 12/3/97 1=60 color.pc2
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HARTCROWSER

J-4628-02 12/97

Figure 4

APPENDIX A
SUPPLEMENTAL PROJECT INFORMATION

APPENDIX A
SUPPLEMENTAL PROJECT INFORMATION

Site descriptions, analytical results, and other supporting data, provided in this appendix, are derived from Hart Crowser's Remedial Evaluation Report (Hart Crowser, 1997). This Appendix A is a summary of the significant findings and conclusions of that report. Copies of laboratory certificates are available in the Remedial Evaluation Report. Other report references and site figures referenced in this appendix are presented at the end of the main body of this report.

ENVIRONMENTAL INVESTIGATION DATA

Extent of CKD Fill

The Hudson Street Site consists of two separate and distinct CKD fill areas, identified as the Puget Park and McFarland lobes. As delineated on Figure 2, the Puget Park lobe, the larger of the two fill areas, extends east to west, while the McFarland lobe runs north to south, along Puget Way SW. From previous geotechnical investigations performed by others and our limited site assessment, we have developed estimates of relevant lobe features (e.g., total surface area). These features and other details are provided below.

McFarland Lobe

The McFarland lobe has been evaluated previously by Geo Group Northwest, Inc. (1993) and Dames and Moore through the installation of eight soil borings and five exploratory test pits. Hart Crowser also performed a visual survey of CKD fill material conditions in this area. As shown on Figure 2, the McFarland lobe follows Puget Way SW for approximately 350 feet; the CKD fill occurs along the west slope of Puget Way SW, reaching a maximum width of approximately 140 feet. The lobe has a relatively flat to shallow sloped top with steep side slopes, ranging from 20 to 45 degrees. The toe to the top of the slopes reaches elevation gains of 30 to 40 feet. The majority of the top of the lobe is covered with dense grass, blackberry bushes, and other shrubs. The side slopes are densely covered in bushes, shrubs, and small alders.

Using the John Miller survey prepared in 1991 (Geo Group, 1993), a 1970 aerial photograph of the site, and observations made during Hart Crowser's assessment, the estimated total surface area of this CKD fill area is approximately 30,000 square feet. Of this total, approximately 20,000 square feet contain a light to dense grass and shrub cover. The remaining areas of the McFarland lobe

are covered with well-compacted soil, ranging from 6 to 12 inches in thickness, as well as the dense vegetation described above.

Puget Park Lobe

No previous exploratory investigations have been reported for the Puget Park lobe area. As part of Hart Crowser's assessment, 21 test pits were excavated around the north and south sides of the lobe. Additionally, several shallow hand-pits were dug along the slope of the fill area. The Puget Park lobe runs predominantly east to west for approximately 550 feet, starting at the north end of the McFarland lobe and the intersection of Puget Way SW and SW Edmunds Street. The lobe has a relatively flat top and steep side slopes, ranging from 20 to 30 degrees. The toe to the top of the slopes reaches elevation gains of 30 to 40 feet. Nearly all of the top of the lobe is covered with grass and a dense covering of blackberry bushes. The side slopes are densely covered in bushes, shrubs, and small alders.

Using the 1970 aerial photograph of the site and observations made during Hart Crowser's assessment, the total surface area of the Puget Park CKD fill area is estimated at approximately 100,000 square feet. The entire 100,000 square feet of the lobe contain a 2- to 4-inch-thick layer of "forest duff" and is heavily vegetated. Of this total, approximately 65,000 square feet within the Puget Park lobe is covered with well-compacted soil, ranging from 6 to 24 inches in thickness, as well as the dense vegetation described above.

The estimated extents of the above-described CKD fill areas are shown on Figure 2.

CKD Chemical Data

The environmental characteristics of the CKD present in the fill have been evaluated by Agra Earth and Environmental, Inc. (Agra) in two studies completed in 1994 (July and December 1994). For the studies, Agra collected approximately 30 samples of fill material across the extent of the McFarland lobe from depths of between 0.5 and 4.0 feet below ground surface. The total metals content of 16 selected samples was determined using the EPA Method 6000/7000 series for arsenic, barium, cadmium, chromium, lead, selenium, silver, and mercury. In addition, four of the collected samples were also analyzed for leachability using EPA SW-846 Method 1311 (Toxicity Characteristic Leaching Procedure [TCLP]).

The total metals content of the fill is summarized as follows:

Metal	Range of Concentration in mg/kg	Mean Value in mg/kg
Arsenic	120 to 440	266
Barium	39 to 130	99
Cadmium	3.1 to 13	7.6
Chromium	10 to 35	14
Lead	880 to 3,600	2,104
Selenium	Not Detected	Not Detected
Silver	4.1 to 10	6.9
Mercury	Not Detected	Not Detected
pH	7.9 to 12.4	11.7

Although the selected samples had total metals concentrations ranging between 140 to 370 ppm for arsenic, 3.2 and 10 ppm for cadmium, and 880 to 3,300 ppm for lead, none of the samples had leachable metals concentrations that exceeded the TCLP criteria for state Dangerous Waste designation.

The data from Agra's investigation confirm the basic characteristics of CKD and show the fill material to be a cement kiln by-product with typical characteristics of a carbonate mineral residue with elevated alkalinity and the presence of some total metals, such as arsenic and lead.

Precipitate Areas

As shown on Figure 2, active formations of calcium carbonate (known as precipitates) were present at shallow depths in surface soil, downhill from the CKD fill lobes. The formations appear as a thin, hardened layer of material which coats the surficial soil and organic debris (roots, twigs, leaves) within its formation. The precipitate areas were observed to be physically located just downhill of the CKD fill lobes. The precipitate areas were observed to contain some saturated surface soil, evidence of perched, shallow water in the topsoil layer at the locations.

The "travertine-like' deposits observed at the seep discharge locations were likely produced by the dissolution and precipitation of carbonate materials associated with the CKD. Cement kiln dust typically contains high concentrations of carbonate materials. As the CKD-containing fill material is exposed to rainwater

infiltration and subsurface water flow, the carbonate materials (including carbonates containing iron and lead) dissolve into the water and are transported downgradient toward the creek. The amount of carbonates dissolved in the subsurface water is likely to be very high (supersaturated) based on the presence of alkaline conditions and high total dissolved solids concentrations. As the water discharges at the seep locations, exposure to the atmosphere causes much of the dissolved carbonates and iron-containing materials to precipitate forming the "travertine-like" carbonate deposits. As measured in a seep water sample collected from within one of the precipitates, the seep water contained no detectable arsenic and cadmium, and a measurable amount of dissolved lead (1.0 mg/L). The pH of the sample was measured at 12.3 pH units. (See discussion in ***Perched Groundwater Seeps from within Precipitate Areas*** section below.) Note that the selection of the precipitate seep sample location was directly from within the formation thereby resulting in sampling results that are likely higher than those measured at the future sampling location - Point of Compliance - that location where seep water, if any, would approach Puget Creek.

Soil samples were collected from the shallow precipitate material at eight locations around the two precipitate areas and analyzed for total metals (arsenic, cadmium, and lead) and pH. Sampling and analysis data for the precipitate material are similar to the quality of CKD evaluated in the EPA nation-wide study (EPA, 1993) for total arsenic and lead. The cadmium values are generally lower than typical CKD. When compared to the site's CKD lobe material, the precipitate material exhibits the presence of similar chemical constituents; however, most values for total metals in the precipitate fall in the low end of the range for CKD.

Perched Groundwater Seeps from within Precipitate Areas

As described above, two areas of precipitate formations contained surface seep water in the surface soils. These areas were examined by digging down through the surface soils and completing shallow trenches 4 to 6 inches below ground surface into the underlying clay. From visual observation, the saturated materials exist in a thin layer in organic/silt sandy soil which is approximately 4 to 6 inches thick. From the precipitate location below the McFarland lobe, there was no discernible free flow of water into the observation trench. From the precipitate location below the Puget Park lobe, a small trickle of surface flow (a seep of approximately 0.2 gallon per hour) was established within the northern (uphill) edge of the precipitate formation.

A sample was collected from the seep by allowing the seep water to flow freely and directly into a clean sampling jar placed below the trench. From the jar, a

water sample was extracted using a peristaltic pump. The seep sample was analyzed for total and dissolved arsenic, cadmium, and lead; for total suspended and dissolved solids; for pH; and for hardness. Data for the seep sample (PP-SEEP) are presented in the Remedial Evaluation Report.

The chemical data show no detectable concentrations of total or dissolved arsenic and cadmium. The seep sample does have measurable lead at concentrations of 1.3 mg/L (total) and 1.0 mg/L (dissolved).

The seep sample also has elevated hardness (1,200 mg/L) and TDS (2,500 mg/L) values which reflect the saturated nature of the mineral content of the seep water.

Laboratory data for the seep water generally reflect the nature of a perched groundwater flowing within an organic sandy silt and the CKD fill, which is dissolving some carbonate mineral and associated lead, as described in the previous section on precipitate formation.

Puget Creek Environmental Quality

Surface water samples from within Puget Creek were collected to determine whether the CKD fill and potential precipitates were potentially impacting environmental quality of the surface water receptor (creek). Two series of surface water samples from two locations (SW-1 and SW-2) were collected from the creek. Sample locations are shown on Figure 2. Sample SW-2 was collected from Puget Creek approximately 100 feet upstream from the western limit of the Puget Park CKD lobe to represent background surface water quality. At the time of the second round of sampling, Ecology representative Dan Cargill was present and confirmed this upgradient sampling location. Sample SW-1 was collected from Puget Creek just downstream from the eastern edge of the McFarland CKD lobe to represent potential surface water quality impacts from the CKD fill areas.

Water samples from SW-1 and SW-2 were analyzed for pH, hardness, total suspended solids, total dissolved solids, and total and dissolved arsenic, cadmium, and lead. The laboratory data are presented in the Remedial Evaluation Report for both rounds of the creek surface water samples. Metal concentrations in the creek samples do not exceed freshwater acute or chronic ambient surface water quality criteria. Total and dissolved metals (arsenic, cadmium, and lead) were generally not detected except for lead (0.0037 mg/L) in the second sample collected at SW-1. Note that the slightly elevated pH (relative to a neutral range of 6.5 to 7.5) measured within the creek falls within the state's Water Quality Standards for Surface Water for pH in Freshwater of

6.5 to 8.5. The values determined for hardness, suspended solids, dissolved solids, and pH fall within the normal range for surface water bodies.

The data results indicate that there is no significant impact to the environmental quality of Puget Creek surface water which is attributable to the presence of the CKD fill.

REMEDIAL ACTION OBJECTIVES

As determined from the findings of this study, the primary concerns associated with the Hudson Street Site are associated with portions of the CKD fill areas, which have little to no soil cover with only a forest duff and vegetative cover, and the precipitate areas. The CKD in such areas may be subject to the natural forces of weather (storm water and wind), and may present a direct contact risk to individuals who come onto the site. Significant rainfall events could erode the exposed surface material and carry it into drainage ravines and nearby Puget Creek.

However, as determined from observations and analytical data presented in this study, the impact of CKD to surrounding receptors has been minimal based on the following conditions:

- Although the entire area is well-vegetated and stable, only a fraction of both CKD fill areas have CKD surfaces with little to no soil cover which are susceptible to human contact or erosional effects, as opposed to areas which support up to 2 feet of soil fill cover. However, these areas are generally covered with a "forest duff" mat of leaves and compressed vegetative debris.

- Water samples were collected from Puget Creek (at both upstream and downstream locations of the CKD fill) and analyzed for the conventional parameters (pH, hardness, TDS, and TSS) and total and dissolved arsenic, cadmium, and lead. No measurable impacts to the creek from metals or pH were noted.

- Limited areas of calcium carbonate formations (precipitate areas) are present just below the CKD fill lobes as a result of perched water flowing through the CKD. The material forming the precipitates shows chemical characteristics similar to CKD for metals and alkalinity (pH).

- A localized perched groundwater seep was observed at one precipitate area just below the Puget Park lobe. Chemical analysis of the seep sample indicates elevated hardness and TDS which reflect the saturated nature of the mineral content in the sample. Additionally, even though the sample contained a measurable dissolved lead concentration of 1.0 mg/L, the volume of the seep is minimal and appears to be absorbed in the forest floor.

As described above, observed or measurable issues related to the CKD are in limited areas of the CKD lobes and the precipitate/perched groundwater seep areas just below the two CKD fill lobes.

The selection of an appropriate remedy for the areas of the CKD fill areas that do not support a soil cover and the identified precipitate areas at the Hudson Street Site were based principally on three factors: the potential environmental impacts related to CKD in the environment (based on potential direct contact, air emissions, and erosion); the appropriateness and suitability of the selected remedy on the site as it relates to its future use as a greenbelt; and the overall cleanup costs of the remedy relative to its incremental degree of protection and reduction in the site risk the remedial action would achieve over other alternatives.

Hart Crowser evaluated applicable remedial measures which would provide controls to the issues related to the exposed CKD. In summary, the evaluation focused on the design on the following Remedial Action Objectives (RAOs):

- Eliminate the potential for human contact with CKD and precipitates;
- Eliminate potential dust generation and releases to the atmosphere from the CKD fill;
- Control runoff, further sedimentation, and precipitation of the CKD to the surrounding environment; and
- Provide a remedial measure that maintains/enhances the wooded greenbelt in and around the City of Seattle's Puget Park.

The overall RAOs for the site are to provide a remedy which protects human health and the environment (WAC 173-340-350). The outcome of these RAOs is the development of four possible remedial alternatives. These alternatives and a screening-level feasibility evaluation of the alternatives are discussed below.

FEASIBILITY EVALUATION OF REMEDIAL ALTERNATIVES

Identification of Remedial Alternatives

This CKD feasibility evaluation describes the development and evaluation of alternatives to eliminate, reduce, or otherwise control the potential risks posed by the CKD at the Hudson Street Site. This feasibility evaluation follows a systematic, step-wise approach for developing and evaluating the possible remedial alternatives, in compliance with the requirements of MTCA.

To fulfill the remedial action objectives described in the previous section, four remedial action alternatives (including the Institutional Controls) were identified and screened for applicability. The remedial options were evaluated for short- and long-term effectiveness in eliminating the identified environmental risks of the CKD fill; for the ability to reduce mobility, toxicity, or volume of the CKD; implementability; and relative costs. The results of the preliminary screening efforts are summarized in Table 4 of the Remedial Evaluation Report. These alternatives range from simple to complex with low to high costs.

The four alternatives developed for detailed analysis are:

- Institutional Controls;
- Enhanced Soil Capping, Precipitate Management, and Drainage Improvements;
- Stabilization and Capping; and
- Excavation and Off-Site Disposal.

Institutional Controls

The Institutional Controls alternative provides the minimum acceptable approach for addressing environmental impacts from the CKD at the site. The Institutional Controls alternative provides a reasonable, low-cost option as a basis for remedial alternative evaluation. Institutional Controls consist of administrative and physical barriers to reduce public areas and contact with the site. For the Hudson Street Site, the appropriate institutional controls include deed restrictions and site access restrictions, including perimeter fencing and ingress/egress security. This alternative would rely on existing vegetation to reduce erosional effects. The fencing would be intended to prevent direct contact. This alternative also includes a long-term confirmational monitoring program for surface water and perched groundwater seeps.

The estimated cost of this option is $150,000. Details of this cost estimate are provided in Table B-1 in Appendix B of the Remedial Evaluation Report.

Enhanced Soil Capping, Precipitate Management, and Drainage Improvements

This remedial option reduces the potential for contact between any wildlife and the public with the CKD by placing an enhanced soil and vegetative cap over the CKD fill areas which contain little soil cover. Currently, nearly all of the Puget Park lobe and approximately half of the McFarland lobe areas are protected with a compacted, 6- to 24-inch-thick soil cover and a dense cover of vegetation. This remedial alternative would complete the soil cap for the remaining CKD fill areas. The majority of the CKD fill areas within the steep slopes of the Puget Park and McFarland lobes already support a dense vegetative cover and "forest duff" floor. In a small portion of these slopes, the vegetation cover is light. To minimize disturbances to surrounding vegetation cover and tree growth, these areas would only receive a thin layer (2 to 4 inches) of topsoil and a hydroseed cover, likely applied by hand. Areas with little or no grade changes (top, flat areas) would receive a 12- to 24-inch-thick soil cover and be revegetated with select grasses, shrubs, and trees.

This option would also address the precipitate areas below the CKD fill areas. Each precipitate area would be excavated and the material relocated to within the limits of the CKD fill below the soil cover. The excavated area would then be improved with a gravel precipitation chamber.

The estimated construction cost of this option is estimated at $350,000. Table B-2 within Appendix B of the Remedial Evaluation Report provides details of this cost estimate.

Stabilization and Capping

This alternative includes surficial treatment of the top 12 to 18 inches of the CKD fill through soil-cement stabilization, in areas with little soil cover. The CKD would be stabilized with a mix of Portland cement, aggregate, and the surficial CKD. A honeycomb shaped geomembrane (Geoweb) would be anchored to the fill banks on sloped sections of the fill and filled with imported soil. The top of the fill areas in locations of little to no grade change would be covered with one foot of imported topsoil. The imported soil cover would be vegetated with native shrubs, grasses, and small trees.

This remedial option would also address the precipitate areas below the CKD fill areas. Each precipitate area would be excavated and the material relocated to within the limits of the CKD fill under the soil cover. The excavated area would be improved with a gravel precipitation and collection chamber. Collected seep water would then be hard piped (and possibly pumped) along Puget Creek and eventually discharged to the sanitary sewer located near West Marginal Way. The long-term effectiveness of the conveyance system is questionable, given the high alkalinity of the seep water. Likely operation and maintenance costs associated with the system would be high.

Because of the shallow depth to the stabilized CKD material, the stabilized area would not support large forest growth.

The estimated cost of this option is $550,000. This includes $180,000 for stabilization of the CKD and $200,000 for construction of the soil cover. Details of this cost estimate are provided in Table B-3 in Appendix B of the Remedial Evaluation Report.

Excavation and Off-Site Disposal

In this alternative, all CKD within both lobes of the Hudson Street Site would be excavated and disposed of in a permitted solid waste landfill. The McFarland lobe would be regraded to support the existing 16th Avenue Street roadway section. The site would be backfilled with sufficient topsoil to support vegetation. The topsoil will be revegetated with native trees, shrubs, and grasses.

It is estimated that within as few as 5 years, the park vegetation would recover and approach a natural state. In the interim, erosion control measures such as silt fencing and protected drainage channels would be required to reduce sediment loading on the stream during this time.

This alternative would provide a permanent solution by complete removal of the material of concern.

The estimated cost of this option is $5,500,000. This total includes $250,000 for excavating the CKD and $5,000,000 for landfill disposal (at a tipping fee of $55/ton). Details of this cost estimate are provided in Table B-4 in Appendix B of the Remedial Evaluation Report.

Evaluation and Screening of Remedial Alternatives

The purpose of the evaluation of remedial action alternatives is to compare relevant information and allow selection of a preferred site remedy. In this

section, the alternatives are compared against each other with respect to the MTCA criteria for selection of cleanup actions (WAC 173-340-360).

MTCA requires that all cleanup sections meet the following threshold requirements:

- Protect human health and the environment;
- Comply with state cleanup standards;
- Comply with all state and federal laws; and
- Provide for compliance monitoring.

In addition, MTCA requires that cleanup actions meet the following requirements:

- Use permanent solutions to the maximum extent practicable;
- Provide for a reasonable restoration time frame; and
- Consider public concerns.

As presented in Table 4 of the Remedial Evaluation Report, the remedial alternatives were screened to compare how well each alternative is able to control or eliminate risk from the site (e.g., meeting RAOs). Evaluation or screening criteria include short-and long-term effectiveness; reduction in toxicity, mobility, or volume; implementability; and cost. These criteria provide a means by which one alternative can be compared to another. With respect to the use of permanent solutions, Ecology recognizes that permanent solutions may not be practicable for all sites (WAC 173-340-360[5][d]. MTCA specifies that the screening criteria listed in this section should be considered in determining whether a cleanup action is permanent to the maximum extent practicable.

The referenced table presents a comparative analysis summary and identifies one alternative as the preferred remedial approach. The evaluation criteria for each alternative are defined as follows:

Short-Term Effectiveness. The effectiveness of the alternative in meeting RAOs during construction and implementation is assessed under a short-term time frame (3 to 6 months).

Long-Term Effectiveness (Permanence). The effectiveness of the alternative in maintaining RAOs after implementation is assessed under a long-term schedule. This criterion measures the permanence of the alternative and considers magnitude of residual risk and adequacy and reliability of any site controls.

Treatment for Reduction of Mobility, Toxicity, or Volume. The method of treatment, destruction, and removal are evaluated for each alternative to assess the reduction of mobility, toxicity, or volume.

Implementability. The technical and administrative feasibility of the alternative are evaluated to assess the remedy's implementability.

Cost. With respect to relative cost, WAC 173-340-360(5)(d)(vi) states "A cleanup action shall not be considered practicable if the incremental cost of the cleanup action is substantial and disproportionate to the incremental degree of protection it would achieve over a lower preference cleanup action." The regulation recognizes that there are different levels of site complexity and that practicability evaluations may vary from qualitative to quantitative.

Capital, operation, and maintenance costs are estimated and evaluated for each alternative. A cost analysis is based on engineering judgment and is evaluated as to whether costs are high, medium, or low relative to other remedial options. Details of the preparation of the estimated costs are provided in Appendix B of the Remedial Evaluation Report.

Selection of a Preferred Remedial Alternative

The systematic evaluation and ultimate selection of remedial alternatives, as performed herein and presented in Table 4 of the Remedial Evaluation Report (Hart Crowser, 1997), resulted in the selection of the Enhanced Soil Capping, Precipitate Management, and Drainage Improvements alternative for the Hudson Street site. This alternative provides protection and containment of the surfaces of both the Puget Park and McFarland CKD lobes. As compared to other alternatives, the technical and regulatory requirements of implementing Enhanced Soil Capping, Precipitate Management, and Drainage Improvements are readily and routinely performed. The low rating for reduction of toxicity and volume does not present an increased risk to human health and the environment since constituents of concern will be contained and not available to sensitive receptors. RAOs are met at the site and the cost is reasonable, especially when compared to higher cost alternatives whose implementability is questionable. Similarly, when compared to the other alternatives, construction of the Enhanced Soil Capping activities results in lesser risk by avoiding generation of CKD dust and erosion (expected during excavation or stabilization activities).

This alternative will also preserve much of the existing vegetation at the Site, an important benefit for Puget Park, one of the City's greenbelt.

The specific benefits realized by the selection of the Enhanced Soil Capping, Precipitate Management, and Drainage Improvements alternative are further presented below.

Enhanced Soil Capping and Revegetation

The selected remedial alternative provides a physical barrier (24 to 36 inches of dense, well-compacted soil) and thereby minimizes contact of the CKD with the public and wildlife. It also reduces contact between storm water and CKD by allowing surface water sheet and drainage flows created by rain storms to flow over the enhanced soil cover, not across CKD material.

New and select wooded plantings were planted in most areas that were disturbed during construction or that historically had not developed a dense variety of vegetation. These plantings contribute to the physical barrier from the capped CKD. In addition, the disturbed areas were hydroseed with a standard erosion control seed mix after construction to provide rapid but temporary erosion and sediment control.

Finally, a combination of red twig dogwood, evergreen huckleberry, and mock orange was strategically planted along obvious public access points to the site to discourage trespassing. The natural barrier fence was also planted along Puget Way SW and around the precipitate chambers.

Precipitate Management Features

This remedial alternative provides oversized precipitation chambers at the two identified locations of ongoing precipitation so that precipitation will occur more efficiently and within a protected area. This alternative recognizes the natural precipitation mechanism occurring at the site, and attempts to accommodate and accelerate this natural precipitation process with the chambers.

The constructed precipitation chambers are expected to accommodate continued precipitation at the site. By redirecting the majority of current storm water sources away from and around the CKD through the drainage improvements described below, the remedy will reduce or possibly even eliminate seeps and precipitation of dissolved carbonates at the bottom of the lobes. The existence of historical, inactive precipitate areas also suggests that perched water pathways through and under the CKD material have been cutoff over time due to the natural precipitation and cementation within these

pathways. Therefore, additional precipitate management is likely occurring naturally at the site.

The successful establishment, performance, and expected results of these precipitate management features will be monitored and confirmed during confirmational monitoring efforts, as detailed in the Operation and Maintenance (O&M) Plan.

Drainage Improvements

Surface water contact with the CKD is further reduced by the installation of an upgradient culvert beneath Puget Sound Way SW and drainage improvements to redirect surface waters before they enter the site.

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APPENDIX B
VOLUNTARY CLEANUP PROGRAM
SITE SUMMARY FORM

VCP Voluntary Cleanup Program

Washington State - Department of Ecology - Toxics Cleanup Program

RECEIVED
DEC 22 1997
DEPT. OF ECOLOGY

Request For Assistance Form

Have you discussed this site with an Ecology representative in the past? YES
If yes, what is that person's name? Dan Cargill
and the approximate date? Aug-Sept 1997 Is this a leaking underground storage tank site? NO

Please submit the following with this form to the appropriate Ecology Office (see back of form)

X	Site Summary (ECY 020-73)		Any other existing reports on this site
X	A Check or Money Order for $500 made out to "Department of Ecology"		

Applicant completes this section:

Applicant Name: Hart Crowser, Inc.	Phone: (206) 324-9530
Applicant Address: 1910 Fairview Avenue E	Site Location: SW Edmunds and Puget WY SW
Site Name: Puget Park (#1) and McFarland Property (#2)	
Alternate Name: Hudson Street Site	
Site Owner Name: City of Seattle (#1) Jack McFarland (#2)	Phone: (206) 233-7938 (206) 938-4433
Site Owner Address: 2911 Second Avenue, Seattle (#1)	
9360 Forrest Court SW, Seattle (#2)	

I, Robin Kordik, request the assistance of the Department of Ecology. With this Application I have enclosed $500. I understand that: this payment is the equivalent of approximately eight (8) hours of staff review and/or assistance on the cleanup of my contaminated site; actual charges will depend on specific staff and charge-out rates of that staff; if total charges are greater than $500, I will be billed for and I agree to pay the remainder; and any excess payments will be refunded to me.

Signature of Applicant Date

For Office Use Only:

Date:	Hours:	Rate:	Staff Name:
Date:	Hours:	Rate:	Staff Name:
Date:	Hours:	Rate:	Staff Name:
Date:	Hours:	Rate:	Staff Name:

For Office Use Only: RECEIPTS

Amount	Date Pd	Rec. #
500.00	12/22/97	—

For FISCAL USE ONLY

173-02-94-005000-5000- 20 - 40
(LUST/Non-LUST) (Office)

LUST/Non-LUST: LUST - 30 Non-LUST - 20

OFFICE: NWRO - 40 SWRO - 50 ERO - 60
CRO - 70 IND - 80 HDQR - 90

TCP I.D. # N-17-5252-000 N-17-5378-000 #2
(SIS, LUST, VC)

Where to Submit Your Forms, Reports, and Fees

COUNTY:	ECOLOGY REGIONAL OFFICE:
Benton, Chelan, Douglas, Kittitas, Klickitat, Okanogan, Yakima	**Central Region** 15 West Yakima Ave., Suite 200 Yakima, WA 98902-3401 Phone: (509) 575-2490 (voice) (509) 454-7673 (TDD)
Adams, Asotin, Columbia, Ferry, Franklin, Garfield, Grant, Lincoln, Pend Orielle, Spokane, Stevens, Walla Walla, Whitman	**Eastern Region** N. 4601 Monroe, Suite 100 Spokane, WA 99205-1295 Phone: (509) 456-2926 (voice) (509) 458-2055 (TDD)
Island, King, Kitsap, San Juan, Skagit, Snohomish, Whatcom	**Northwest Region** 3190 160th Ave SE Bellevue, WA 98008-5452 Phone: (425) 649-7000 (voice) (425) 649-4259 (TDD)
Clallam, Clark, Cowlitz, Grays Harbor, Jefferson, Lewis, Mason, Pacific, Pierce, Skamania, Thurston, Wahkiakum	**Southwest Region** P.O. Box 47775 Olympia, WA 98504-7775 Phone: (360) 407-6300 (voice) (360) 407-6306 (TDD)
- **OR** - if your site is part of a major pulp or paper mill, aluminum smelter, or oil refinery,	**Industrial Section** P.O. Box 47706 Olympia, WA 98504-7706 Phone: (360) 407-6916 (voice) (360) 407-6006 (TDD)

VCP Voluntary Cleanup Program

Washington State - Department of Ecology - Toxics Cleanup Program

Site Summary

This summary is a required component of your request for assistance under the Voluntary Cleanup Program

Which of the following apply?

____ Requesting assistance on a planned cleanup.
____ Requesting assistance on a ongoing cleanup.
__X__ Requesting review of a completed cleanup.

Note: If you submitted your Request for Assistance (ECY 020-74) previously without a Site Summary (this form) or this is a revised Site Summary, please provide this completed form to Ecology at least five (5) working days prior to the meeting/site visit/documentation review (whichever comes first).

A) Site Identification:

Name of Site: Puget Park (#1) and McFarland Property. (#2)
Alternate Name(s) for Site: Hudson Street Site

Street Address of Site: SW Edmunds Street and Puget Way SW
City: Seattle State: WA Zip: 98106
County: King UBI Number:
Mailing Address (if different from above): City Parks Dept; 2911 2nd Ave, 4th Floor
City: Seattle State: WA Zip: 98121-1079

Township 24N Range 3E/4E Section 13/18 Quarter-Quarter ____
If known:
Latitude: Degree____ Minute____ Second____
Longitude: Degree____ Minute____ Second____
Method Used tp calculate Lat/Long:
How large (in Acres) is the site? Approx. 4

Please attach two maps to this form.

See Figures 1,2, & 2 of Voluntary Cleanup Report, Attached

1) An area map, showing general location of the site in relation to surrounding bodies of water, cities, highways, and streets. (Please mark site location.) See Figure 1

2) A site diagram showing surrounding cross-streets, labeled building outlines, sampling and well locations, etc..

See Figure 2

B) Person/Organization making request for Assistance/Review:

Name: Roy Kuroiwa and Mike Whelan
Firm: Hart Crowser, Inc.
Street Address: 1910 Fairview Avenue E
City: Seattle State: WA Zip: 98102-3699
Telephone Number: (206) 324-9530 Extension:
Fax Number: (206) 328-5581 E-Mail Address: mpw@hartcrowser.com

Which best describes your involvement with the site? (Check as many as apply.)

Current Owner __ Former Owner __ Potential Purchaser ___
Current Operator __ Former Operator __ Other (specify) _____
Environmental Consultant for City of Seattle/Holnam Inc./McFarland
Attorney for _____
Insurance Carrier for _____
Other (specify) _____ for _____

C) Release Information: 1969-1970. As referenced in report, CKD was placed on site as fill by an independant contractor.

Date of Release(if known): 69-70 Date of Discovery: _____

Drinking Water: Number of Drinking Water Supply Wells within 1/2 mile 0
Are there any drinking water systems affected? _____ yes X no
If yes, has alternate drinking water been provided? _____ yes _____ no
If Drinking Water systems are affected, are the systems public, private, or both?

Aquatics: Are there any creeks, streams, ponds, wetlands, or shorelands...
on or adjacent to the site? X yes _____ no
Within 1/4 mile of the site? X yes _____ no
Where are they located? South of site - See Figure 2
Are they impacted by contamination from the site? _____ yes X no _____ unknown

General Hazardous Substance Categories: Please complete the chart below. List the contaminants known or suspected at the site prior to cleanup, and mark the appropriate medium (i.e. soil) with: **C** (confirmed and above MTCA); **B** (confirmed but below MTCA); **S** (suspected); **N/A** (not-applicable); **O** (tested & not present); or **U** (unknown).

Contaminant	*Class (for Office Use)*	Affected Media: Soil	Ground-Water	Surface Water	Air	Sediment	Date of Release (if known)
Example: lead		*C*	*O*	*S*	*U*	*S*	*1967-82*
1) Lead		C					1969-70
2) Arsenic		C					1969-70
3) Cadmium		C					1969-70
4)							
5)							
6)							

D) Report Information of Assessment or Remediation Work Done to Date

Assessment:

Has site assessment work been done at this site? Yes X No _____ In-progress _____
If Yes, when? June 1997 Were results reported to Ecology? Yes X No __ Date _____
Desc be: (list reports in "E" below)
Limited environmental assessment was performed by Agra, Inc., in July 1994. This work was commissioned and reported to Ecology by another party. Additional environmental sampling and analysis was performed by Hart Crowser in September of 1996, reported in the Remedial Evaluation Report.

Remediation:

Has any site cleanup work been done at the site? Yes X No _____ In-progress _____
If yes, please continue to answer the remaining questions in this section to the best of your ability.

When was the cleanup work done? Sept - Nov 1997
Were results reported to Ecology? Yes X No _____ Date With this submittal in Dec 1997
Describe: (list reports in "E" below) Voluntary cleanup using enhanced soil cap, precipitate management, and drainage improvements.

Does contamination remain on-site after cleanup activities? Yes X No _____
If yes, describe: (list reports in "E" below)
Existing cement kiln dust (CKD) was capped with a soil cover; CKD precipitate ares were excavated, placed as fill elsewhere on site, and improved with a gravel chamber.

For each contaminant listed in ***Part C)Release Information (above)***, please describe the quantity of the contaminant (in pounds) which was removed or treated as a result of the cleanup activities:

Contaminant	*Class (for Office Use)*	Pounds of Contaminant: Incinerated	Washed	Removed	Treated	Contained
Example: lead		*10*	*20*	*40*	*10*	*60*
1) Lead						X
2) Arsenic						X
3) Cadmium						X
4)						
5)						
6)						
7)						
8)						
9)						
10)						
11)						
12)						

As a result of the cleanup:
How many acres of land were returned to ***unrestricted*** use? NA
How many acres of land were returned to ***restricted*** use ? 4 Acres*
How many cubic feet of contaminated soil was remediated or contained? Approx. 1,500,000 cf
How many gallons of contaminated groundwater was remediated or contained? 0
How many people are now at reduced risk as a result of the cleanup action? NA
How many pounds of potential pollution was prevented as a result of the cleanup action? NA

* See Voluntary Cleanup Report for details of Institutional Controls.

METHODS/TREATMENTS USED	SOIL	GROUNDWATER	SURFACE WATER	DRINKING WATER	AIR	WASTES	
Method A							
Method B							
Method C							
Have these levels been met throughout the site? Y or N	N		Y*				
Destruction or Detoxification							
Carbon Adsorption[1]	NA					NA	
Biological Treatment					NA		
Chemical Destruction							
Incineration		NA	NA	NA			
[1]Carbon followed by regeneration; use of granular activated carbon followed by landfilling would be classified in these tables as volume reduction and off-site landfill							
Media Transfer							
Air Stripping/Air Sparging	NA					NA	
Aeration/Vapor Extraction		NA	NA	NA	NA		
Thermal Desorption		NA	NA	NA		NA	
Immobilization							
Vitrification		NA	NA	NA			
Solidification/Stabilization		NA	NA	NA			
Reuse/Recycling[2]							
Specify							
[2]For example, reuse of free petroleum product recovered in a pump and treat system.							
Separation/Volume Reduction							
Solvent Extraction		NA	NA	NA			
Soil Washing		NA	NA	NA			
Physical Separation[3]							
[3]For example, oil/water separators.							
Land Disposal/Containment							
Containment or On-site Landfill	Y		NA				
Off-site Landfill		NA	NA	NA			
Institutional Controls							
Specify Hydroseeding barrier planting, fencing, and deed restrictions	Y						
Others							
Specify Treatment Method							

* Surface water quality in Puget Creek. Future monitoring at Point of Compliance will be performed, if necessary.

E) Documentation:

Please list titles of all site reports below. Include name of consulting firm & year completed. (If there is not enough room for the entire list, please attach additional page(s) as necessary.)

Title: _____ By: _____ Date: _____

(See Attached)

Is additional information concerning the contaminants treated or removed, or cleanup or remediation methods used available in a database? Yes___ No__X__ If yes, what programming software is used?_____ Is a copy included for our use? Yes___ No____

F) Property Type: Commercial ___ Industrial ___ Residential ___ Other__X__(Please specify) Vegetated Greenbelt

Property currently being used? _____Yes __X__No

Plans for change in use? _____Yes __X__No If yes, please specify:_____

G) Standard Industrial Classification (SIC) Codes:

List all that apply. If none apply, or if you don't know your SIC code, list activities conducted at the site (i.e. automotive repair and maintenance, construction equipment storage. etc.).

No activity at site

H) Dangerous Waste Facilities:

Does the facility have a dangerous waste identification number? No__X__Yes _____

If Yes, What is the number? WAD_____

I) Tank Information:

Complete this table for ALL tanks, whether underground (UST) or aboveground (AST), including unregulated tanks.

(* Unleaded, leaded, diesel, bunker-C, waste oil, heating oil, aviation fuel, other (identify))

(**Tank status: Left in Place, Removed, Closed in Place)

Tank ID	AST/UST	Size	*Product	Was free product encountered? on GW	in excavation	**Tank status
NA						

J) Owner/Operator History

(Please photocopy and attach copies if additional owners and/or operators are known)

Type (code) of Owner/Operator (for below):
Private(1) Municipal(2) County (3) Federal (4) State(5) Tribal(6) Mixed(7) Other (8) Unknown (9) Public Entity Acquisition via Bankruptcy (10) Financial Institution Acquisition via Bankruptcy (11)

1) Current Site Owner: (#1) Seattle Department of Parks & Recreation Type: 2
Street Address: 2911 Second Avenue, 4th Floor
City: Seattle State: WA Zip: 98121
Contact Person (if different than owner, above): Robin Kordik
Street Address: Same as Above
City: State: Zip:
Telephone Number: (206) 233-7938 Extension:
Fax Number: (206) 233-3949 E-Mail Address:
Dates of Ownership: early 1900s to present

Site Owner
2) Current ~~Facility Operator~~ (#2) Mr. Jack McFarland Type: 1
Street Address: 9360 Forrest Court SW
City: Seattle State: WA Zip: 98106
Contact Person (if different than operator, above):
Street Address:
City: State: Zip:
Telephone Number: ( ) Extension:
Fax Number: ( ) E-Mail Address:
Dates of Operation: to

3) Former Site Owner: Type:
Street Address:
City: State: Zip:
Contact Person (if different than owner, above):
Street Address:
City: State: Zip:
Telephone Number: ( ) Extension:
Fax Number: ( ) E-Mail Address:
Dates of Ownership: to

and Transporter Excavating & Trucking
4) Former Facility Operator John Yates, Yates Stables Co & Duwamish Type: 1
Street Address: 1480 Locust Street
City: Reno State: NV Zip: 89502
Contact Person (if different than operator, above): Joel Wright
Street Address: 1325 Fourth Avenue
City: Seattle State: WA Zip: 98104
Telephone Number: (206) 624-7990 Extension:
Fax Number: (206) 624-5944 E-Mail Address:
Dates of Operation: 1969 to 1970

K) Other Involved Parties:
(Please photocopy and attach copies if additional parties are involved)

1) Environmental Consultant: Roy Kuroiwa, P.E. and Mike Whelan
Representing: City of Seattle/Holnam Inc,/McFarland
Firm: Hart Crowser, Inc.
Street Address: 1910 Fairview Avenue E.
City: Seattle State: WA Zip: 98102
Telephone Number: (206) 324-9530 Extension:
Fax Number: (206) 328-5581 E-Mail Address:

2) Site Control Person if other than Owner/Operator. (This must be a person who is on-site during normal working hours and is authorized and qualified to answer questions about the site, or a person who is available during normal business hours and has knowledge about the site and the remediations)
Name: Mike Whelan
Relation to site/owner/operator: Environmental Consultant
Firm: Hart Crowser, Inc.
Street Address: 1910 Fairview Avenue E.
City: Seattle State: WA Zip: 98102
Telephone Number: (206) 324-9530 Extension:
Fax Number: (206) 328-5581
Dates of Involvement with site: _____ to _____

3)Name: Ideal Cement Company
Relation to site/owner/operator: CKD from Ideal was placed on site by an independent Contractor
Firm: c/o William H. Chapman, Preston Gates & Ellis, LLP
Street Address: 701 Fifth Avenue, 5000 Columbia Tower
City: Seattle State: WA Zip: 98104
Telephone Number: (206) 623-7580 Extension:
Fax Number: (206) 623-7022
Dates of Involvement with site: _____ to _____

4)Name: RSR/Quemetco (Attn: Ted Millan)
Relation to site/owner/operator: Generator
Firm: Hacket, Beecher & Hart
Street Address: 1601 Fifth Avenue, Suite 2200
City: Seattle State: WA Zip: 98101
Telephone Number: (206) 624-2200 Extension:
Fax Number: (___)
Dates of Involvement with site: _____ to _____