SITE HAZARD ASSESSMENT
Worksheet 1
Summary Score Sheet

SITE INFORMATION:

Cleanup Site ID: 12573

Hangar 5 KCIA

Facility/Site ID: 8137128

7585 Perimeter Rd S

Seattle, King County, WA 98108

Section:	28	Latitude:	47.53417
Township:	24N	Longitude:	-122.30042
Range:	4E	Tax/Parcel ID:	2824049007

Site scored/ranked for the Hazardous Sites List Publication: August 2015

SITE DESCRIPTION:

The Hangar 5 KCIA site (Site) is a former airplane maintenance hangar located in Seattle, King County, Washington. The 2-acre property is located approximately 3,300 feet from Lower Duwamish Waterway, and zoned for general industrial (IG2 U/85) use.

Adjacent properties include parking lots to the east, between the Site and Perimeter Road. These properties, to the east and southeast of the Site, were formerly operated as service stations. Railroad tracks and Interstate 5 are located to the east of Perimeter Road. King County International Airport (KCIA) runways adjoin the Site to the west, and a former FedEx warehouse adjoins the Site to the south (the building appears to have been removed based on a July 2014 aerial photograph). Storage/parking areas are located to the north of the Site.

Other KCIA cleanup sites located in the vicinity of the Hangar 5 Site inlcude Standard Oil [Cleanup Site Identification (CSID) 12223)] to the north, and Hangar Holdings (CSID 6574) and Galvin Quad 7 (CSID 1836) to the south. In addition, the Site is located approximately 250 feet south of an area of VOC-impacted groundwater associated with the Boeing A&M Electronic Manufacturing Facility site (CSID 981; main site is located approximatley 2,000 feet north of the Hangar 5 Site).

The Site is currently operated as a vacant property undergoing redevelopment by King County International Airport.

The site was previously used as a hangar for aircraft maintenance, loading, unloading, and parking. Site structures (hangar building and related office building) were demolished in 2013 but the concrete slab foundations were not removed at the time. The site is currently vacant pending remediation and redevelopment by KCIA.

Note: Tax parcel #2824049007 includes the entire KCIA property; the Site is located in the east-central portion of the KCIA parcel.

SITE BACKGROUND:

A summary of prior operations/tenants at the subject property is presented below.

From	To	Operator/Tenant	Activity
1942	2013	King County International Airport	Aircraft Maintenance Hangar
2013	2015	King County International Airport	Vacant Awaiting Redevelopment

SITE CONTAMINATION:

In 2013 the Hangar 5 KCIA site was reported to Washington State Department of Ecology (Ecology) and placed on the Confirmed and Suspected Contaminated Site (CSCSL) list with ID number 12573.

The release was first reported to Ecology in 2013 following confirmation of a release of petroleum hydrocarbons to soil, and halogenated volatile organic compounds (VOCs) to soil and groundwater. An Ecology Early Notice Letter, dated March 18, 2015, indicated that the Site was added to the CSCSL in 2015.

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Potential sources for contaminants include a hazardous material storage area previously located in the central portion of the main hangar building, and historical use of solvents and petroleum products at the site, but specific contaminant source areas and/or site activities have not been identified.

No current or historical underground storage tanks (USTs) are listed for the site.

Impacts to site soil and groundwater were identified during a series of Phase II Environmental Site Assessments (ESAs) performed in 2013 (Hart Crowser 2013a, 2013b). An initial Phase II ESA performed in April 2013 included installation of 17 direct-push soil borings and collection of soil and reconnaissance groundwater samples. A supplemental Phase II ESA was performed in August 2013, based on the results for the April 2013 samples, and included installation of 14 additional direct-push borings, installation of three hollow-stem auger borings which were subsequently completed as groundwater monitoring wells, and collection of soil and groundwater (from reconnaissance borings and monitoring wells) samples. Soil and groundwater samples were submitted for analysis of gasoline-, diesel-, and oil-range total petroleum hydrocarbons (TPH), benzene, toluene, ethylbenzene, and xylenes (BTEX), VOCs, and metals. Soil samples collected in April 2013 were also analyzed for polychlorinated biphenyls (PCBs).

Contaminants present at concentrations above MTCA Method A soil cleanup levels in soil samples collected in 2013 included: Tetrachloroethene (PCE) in borings HC1, HC2, HC6, HC17 and HMW1 at a maximum concentration of 1,100 micrograms per kilogram (ug/kg); trichloroethene (TCE) in borings HC25 and HMW1 at a maximum concentration of 200 ug/kg; gasoline-range TPH in borings HC1 and HC11 at a maximum concentration of 68 milligrams per kilogram (mg/kg); benzene in borings HC1, HC18, HC22 and HC26 at a maximum concentration of 190 ug/kg; and oil-range TPH in borings HC8 and HC11 at a maximum concentration of 3,100 mg/kg.

Most of the soil samples with one or more contaminants at concentrations above MTCA soil cleanup levels were collected from borings located in the western portion of the former hangar building footprint (PCE, TCE, gasoline-range TPH, benzene). Soil samples collected from borings located in the northeastern portion of the former hangar building footprint also contained contaminants at concentrations above MTCA cleanup levels (PCE, TCE, gasoline- and oil- range TPH). Specific sources for the soil impacts, and whether soil impacts in the two areas are from the same source, have not been identified. The estimated lateral extent of impacted soil (from Hart Crowser 2013b) for both areas is shown on the attached Site Overview Map, and covers a total area of approximately 14,000 square feet primarily beneath the former hangar area footprint.

Groundwater samples collected at the site in 2013 from wells HMW-2 and HMW-3 contained vinyl chloride at concentrations above the MTCA Method A groundwater cleanup level (maximum concentration of 1.0 ug/L). TCE was detected at concentrations below the Method A cleanup level in groundwater samples collected from borings HC4, HC6, HC8, HC10, HC18, HC19, HC20, HC21, HC22, HC23, HC25, and well HMW1 (maximum concentration of 1.9 ug/L). TPH, BTEX, and other VOCs, including PCE, were not detected in groundwater samples at concentrations above MTCA cleanup levels.

PAST REMEDIATION ACTIVITIES:

Remedial activities were performed at the site in February 2015 and included excavation of soil around previous boring locations where one or more contaminants were identified at concentrations above the MTCA Method A soil cleanup level, and placement of an oxygen-releasing compound in excavation areas prior to backfilling. Excavation was performed at eight separate areas of concern (AOCs) established by Hart Crowser based on previous investigation findings (refer to the attached site map). A total of approximately 420 tons of soil and debris was removed from the AOCs and disposed offsite at a Subtitle D landfill (Waste Management Wenatchee Regional Landfill).

A total of 52 confirmatory soil samples were collected from the AOC excavations and submitted for laboratory analysis based on the contaminants previously identified at concentrations above MTCA Method A soil cleanup levels at each AOC. Samples were collected from excavation floors (11 samples) and sidewalls (41 samples), and submitted for analysis of VOCs (42 samples), gasoline-range TPH (4 samples), and diesel- and oil- range TPH (10 samples).

Gasoline-range TPH was not detected at concentrations above the laboratory reporting limits. Diesel-range TPH

was detected in three soil samples from AOC4 and AOC6 at a maximum concentration of 81 mg/kg, below the MTCA Method A soil cleanup level.

VOCs detected in soil samples at concentrations above the laboratory reporting limits included chloroform (AOC1, AOC3 and AOC8; maximum concentration of 36 ug/kg), carbon tetrachloride (AOC1, AOC2, AOC3 and AOC8; maximum concentration of 37 ug/kg), TCE (AOC3 and AOC8; maximum concentration of 5.7 ug/kg), PCE (AOC1, AOC2 and AOC3; maximum concentration of 16 ug/kg), and 2-chlorotoluene (AOC3; maximum concentration of 3.2 ug/kg). The detected VOC concentrations are below MTCA Method A/B soil cleanup levels.

Well HMW1, located in AOC8, was abandoned prior to excavation activities and replaced with a new well [designated HMW1(R)] approximately 10-15 feet southwest of the original well location. No groundwater sampling was performed during the 2015 remedial action; however, the 2014 Remedial Action Work Plan includes long-term monitoring of groundwater at the Site.

CURRENT SITE CONDITIONS:

The site is currently vacant and planned for redevelopment by KCIA. Soil and groundwater at the site have been impacted by a release of TPH and chlorinated solvents, which was reported to Ecology in 2013.

A remedial action (described above) was performed in Febuary 2015 and included soil removal and placement of an oxygen-releasing compound in excavations prior to backfilling. Groundwater sampling was not performed during the February 2015 remediation, but the 2014 Work Plan includes long-term monitoring of groundwater at the Site. The schedule for groundwater monitoring was not available.

Site contaminants include gasoline, benzene, oil/diesel, and vinyl chloride in soil, and vinyl chloride in groundwater. PCE and TCE were detected in soil at the Site prior to excavation.

The approximate depth to groundwater is 7 to 9 feet below ground surface, with groundwater flowing to the south to southwest (based on maps provided in Hart Crowser, 2014). Subsurface soils are primarily sand, silty sand, and sandy silt based on field descriptions and boring logs, but also locally include mixed debris such as terracotta pipes, bricks, and concrete fragments.

SPECIAL CONSIDERATIONS:

Checked boxes indicate routes applicable for Washington Ranking Method (WARM) scoring

☐ **Surface Water**

No confirmed release to surface water; nearest surface water body (LDW) is 3,300 feet from the Site.

☑ **Air**

Volatile compounds released to soil and groundwater may be available for transport via the air route.

☑ **Groundwater**

Confirmed presence of vinyl chloride above the MTCA groundwater cleanup level; other contaminants in soil may be available for transport via groundwater.

There are some discrepancies between the Phase II investigation reports and the Construction Completion Report with respect to some boring locations and designations. Borings HC6, HC18, and HC22 (all are located in AOC 3) are shown in the Construction Completion Report approximately 20-25 feet west of the locations shown in the Phase II reports (relative to the locations of the other borings and wells, which are depicted in the same approximate locations in all reports), and AOC3 does not appear to include the entire area of affected soil based on the boring locations as shown in the Phase II reports.

In addition, the locations for borings HC7 and HC8 are reversed between the Phase II reports and Construction Completion Report. In the Phase II reports, HC88 is shown within an estimated area of impacted soil along with HMW1 and HC11; however, the Construction Completion Report shows HC8 to the southwest of the location shown in the Phase II reports, approximately at the location of HC7 as shown in the Phase II reports (HC7 is shown in the Construction Completion Report at the approximate location of HC8 from the Phase II reports).

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It is unclear which locations and designations are correct because an explanation for these discrepancies is not apparent in the Construction Completion Report. Therefore, the Construction Completion Report does not provide verification that AOC3 and AOC 4 were located correctly with respect to the impacted soil locations described in the Phase II reports.

ROUTE SCORES:

Surface Water/ Human Health:		Surface Water/ Environment:	
Air/ Human Health:	24.6	Air/ Environment:	1.5
Groundwater/ Human Health:	36.8		

Overall Rank: 4

REFERENCES:

1 Ecology Water Resources Explorer, accessed May 2015. https://fortress.wa.gov/ecy/waterresources/map/WaterResourcesExplorer.aspx

2 Hart Crowser, 2013a, Phase II Environmental Site Assessment (Phase II), Hangar 5 Parcel, 7575 and 7585 Perimeter Road, Seattle, Washington, prepared for KPFF Consulting Engineers, May 30th, 2013.

3 Hart Crowser, 2013b, Supplemental Phase II Environmental Site Assessment, Hangar 5 Parcel, 7575 and 7585 Perimeter Road, Seattle, Washington, prepared for KPFF Consulting Engineers, September 24th, 2013.

4 Hart Crowser, 2014, Remedial Action Work Plan, former Hangar 5 Site Remediation, King county International Airport, Seattle, Washington, prepared for KPFF Consulting Engineers, August 28th, 2014.

5 King County GIS Center iMAP application, Property Information, Groundwater Program, and Sensitive Areas mapsets. Accessed May 2015. http://www.kingcounty.gov/operations/GIS/Maps/iMAP.aspx

6 King County International Airport, 2014, SEPA Environmental Checklist, former Hangar 5 Site Remediation, submitted June 25th, 2014.

7 Missouri Census Data Center, Circular Area Profiles - 2010 census data around a point location. http://mcdc.missouri.edu/websas/caps10c.html. Accessed May 2015.

8 National Climatic Data Center 2011 Local Climatological Data for Seattle, Seattle Tacoma Airport. http://www1.ncdc.noaa.gov/pub/orders/IPS-90B1F39F-6CFA-4A6B-AA82-5ED1FF897CCC.pdf

9 WARM Scoring Manual

10 WARM Toxicological Database

11 Washington Department of Transportation 24-hour Isopluvial Maps, January 2006 update. http://www.wsdot.wa.gov/publications/fulltext/Hydraulics/Wa24hrIspoluvials.pdf

12 Washington State Department of Ecology, 2007, Model Toxics Control Act Cleanup Regulation, Chapter 173-340 WAC, Ecology Publication No. 94-06, amended October 12th, 2007.

13 Washington State Department of Ecology, 2014, Initial Investigation Field Report, Hangar 5 KCIA, January 31st, 2014.

14 Washington State Department of Ecology, 2015, Early Notice Letter: Facility Site #8137128, Hangar 5 KCIA, March 18th, 2015.

SITE HAZARD ASSESSMENT
Worksheet 2
Route Documentation

Cleanup Site ID: 12573 Hangar 5 KCIA

Facility/Site ID: 8137128

1. SURFACE WATER ROUTE

List those substances to be considered for scoring:

Not applicable

Explain the basis for choice of substances to be used in scoring:

No confirmed release to surface water; nearest surface water body (LDW) is 3,300 feet from the Site.

List those management units to be considered for scoring:

Explain basis for choice of unit to be used in scoring:

2. AIR ROUTE

List those substances to be considered for scoring:

Tetrachloroethene, trichloroethene, vinyl chloride, gasoline (as benzene).

Explain the basis for choice of substances to be used in scoring:

Volatile contaminants confirmed in soil and groundwater

List those management units to be considered for scoring:

Soil vapor

Explain basis for choice of unit to be used in scoring:

Potential for vapor transport

3. GROUNDWATER ROUTE

List those substances to be considered for scoring:

Tetrachloroethene, trichloroethene, vinyl chloride, gasoline (as benzene), diesel (oil-range TPH scored as diesel)

Explain the basis for choice of substances to be used in scoring:

Confirmed contaminants in groundwater and soil potentially in contact with groundwater

List those management units to be considered for scoring:

Groundwater

Explain basis for choice of unit to be used in scoring:

Prior detection in groundwater and/or soil at concentrations above MTCA soil cleanup levels

Worksheet 5

Air Route

CSID: 12573 **Site Name:** Hangar 5 KCIA

1.0 Substance Characteristics

1.1 Introduction (WARM Scoring Manual) - Please Review before scoring

1.2 Human Toxicity

Substance	Ambient Air Standard Value	Acute Toxicity Value	Chronic Toxicity Value	Carcinogenicity Value
Tetrachloroethene (PCE)	9	5	X	X
Trichloroethene (TCE)	10	3	X	4
Vinyl chloride	10	1	X	X
Gasoline (as benzene)	10	3	X	5

Highest Value 10

Bonus Points? +2

Toxicity Value 12

1.3 Mobility

Gaseous Mobility	Max Value:	4
Particulate Mobility	Soil Type:	
	Erodibility:	
	Climatic Factor:	

Mobility Value 4

1.4 Final Human Health Toxicity/Mobility Matrix Value **HH Final Matrix Value** 24

1.5 Environmental Toxicity/Mobility

Substance	Non-human Mammalian Inhalation Toxicity (mg/m3)	Acute Value	Mobility Value	Table A-7 Matrix Value
Tetrachloroethene (PCE)	4000	5	4	10
Trichloroethene (TCE)	15583	3	4	6
Vinyl chloride	460123	1	4	2
Gasoline (as benzene)	31947	3	4	6

Env. Final Matrix Value 10

1.6 Substance Quantity

Amount: 10,000 square feet

Basis: Approximate estimated aerial extent of impacts minus the excavation areas.

Substance Quantity Value 5

Worksheet 5

Air Route

CSID: 12573 **Site Name:** Hangar 5 KCIA

2.0 Migration Potential

2.1 Containment Containment Value: 5

Explain Basis: Spill/discharge to subsurface only with no vapor collection system.

3.0 Targets

3.1 Nearest Population Population Distance Value: 8

1,200 feet. Residences and school to east across I-5.

3.2 Distance to and name of nearest sensitive environments Sensitive Environment Value: 5

2,100 feet. VanAsselt community center and playground.

3.3 Population within 0.5 miles Population Value: 36

1285 population

4.0 Release Release to Air Value: 0

Explain basis for scoring a release to air:

No confirmed release to air.

Pathway Scoring - Air Route, Human Health Pathway

$AIR_H = (SUB_{AH}*60/329)*[REL_A+(TAR_{AH}*35/85)]/24$

Where:

SUB_{AH} =(Human toxicity + 5) * (Containment + 1) + Substance Qty	SUB_{AH}	179
REL_A = Release to Air	REL_A	0
TAR_{AH} = Nearest Population + Population within 1/2 mile	TAR_{AH}	43.8
	AIR_H	24.6

Pathway Scoring - Air Route, Environmental Pathway

$AIR_E = (SUB_{AE}*60/329)*[REL_A+(TAR_{AE}*35/85)]/24$

Where:

SUB_{AE} =(Environmental Toxicity Value +5)*(Containment +1) +Substance Qty	SUB_{AE}	95
REL_A = Release to Air	REL_A	0
TAR_{AE} = Nearest Sensitive Environment	TAR_{AE}	5.0
	AIR_E	1.5

Worksheet 6

Groundwater Route

CSID: 12573 **Site Name:** Hangar 5 KCIA

1.0 Substance Characteristics

1.1 Human Toxicity

Substance	Drinking Water Standard Value	Acute Toxicity Value	Chronic Toxicity Value	Carcinogenicity Value
Tetrachloroethene (PCE)	8	5	3	4
Trichloroethene (TCE)	8	3	X	4
Vinyl chloride	8	5	X	7
Gasoline (as benzene)	8	3	X	5
Diesel (for oil-range TPH)	4	5	3	X

Highest Value 8

Bonus Points? +2

Toxicity Value 10

1.2 Mobility

Cations/Anions Max Value:

Solubility Max Value: 3 Mobility Value 3

1.3 Substance Quantity

Amount: Approximately 3,000 cubic yards

Basis: Estimated quantity of impacted soil based on 8-foot depth (to groundwater) and original estimated footprint of impacted area minus the excavation areas.

Substance Quantity Value 4

2.0 Migration Potential

2.1 Containment Containment Value 10

Explain Basis: Contaminated soil present.

2.2 Net Precipitation >10-20 inches Net Precipitation Value 2

2.3 Subsurface Hydraulic Conductivity Conductivity Value 3

Primarily sand and silt

2.4 Vertical Depth to Groundwater 7 feet

Confirmed release: Yes Depth to Aquifer Value 8

3.0 Targets

3.1 Groundwater Usage Private supply with with alternate sources Aquifer Use Value 4

3.2 Distance to Nearest Drinking Water Well 5100 feet

Well Distance Value 1

3.3 Population Served within 2 Miles Population Served Value 2

3 people

Worksheet 6

Groundwater Route

CSID: 12573 **Site Name:** Hangar 5 KCIA

3.4 Area Irrigated by GW Wells within 2 miles Area Irrigated Value 1

2 acres

4.0 Release Release to Groundwater Value 5

Explain basis for scoring a release to groundwater:

Release to groundwater confirmed by analytical results

Pathway Scoring - Groundwater Route, Human Health Pathway

$GW_H = (SUB_{GH}*40/208)*[(MIG_G*25/17)+REL_G+(TAR_{GH}*30/165)]/24$

Where:

SUB_{GH} =(Human toxicity + mobility + 3) * (Containment + 1) + Substance Qty	SUB_{GH}	180
MIG_G=Depth to Aquifer+Net Precip + Hydraulic Conductivity	MIG_G	13
REL_G = Release to Groundwater	REL_G	5
TAR_{GH} = Aquifer Use + Well Distance + Population Served + Area Irrigated	TAR_{GH}	7.8
	GW_H	36.8

Washington Ranking Method

Route Scores Summary and Ranking Calculation Sheet

Site Name: Hangar 5 KCIA **CSID:** 12573

Site Address: 7585 Perimeter Road S, Seattle, WA 98108 **FSID:** 8137128

HUMAN HEALTH ROUTE SCORES

Enter Human Health Route Scores for all Applicable Routes:

Pathway	Route Score	Quintile Group
Surface Water		0
Air	24.6	4
Groundwater	36.8	3

H= 4
M= 3
L= 0

$$\frac{H^2 + 2M + L}{8} = \frac{16 + 6 + 0}{8}$$

Human Health Priority Bin Score: **3**

rounded up to next whole number

ENVIRONMENT ROUTE SCORES

Enter Environment Route Scores for all Applicable Routes:

Pathway	Route Score	Quintile Group
Surface Water		0
Air	1.5	1

H= 1
L= 0

$$\frac{H^2 + 2L}{7} = \frac{1 + 0}{7}$$

Environment Priority Bin Score: **1**

rounded up to next whole number

Comments/Notes:

FINAL MATRIX RANKING **4**

FOR REFERENCE:

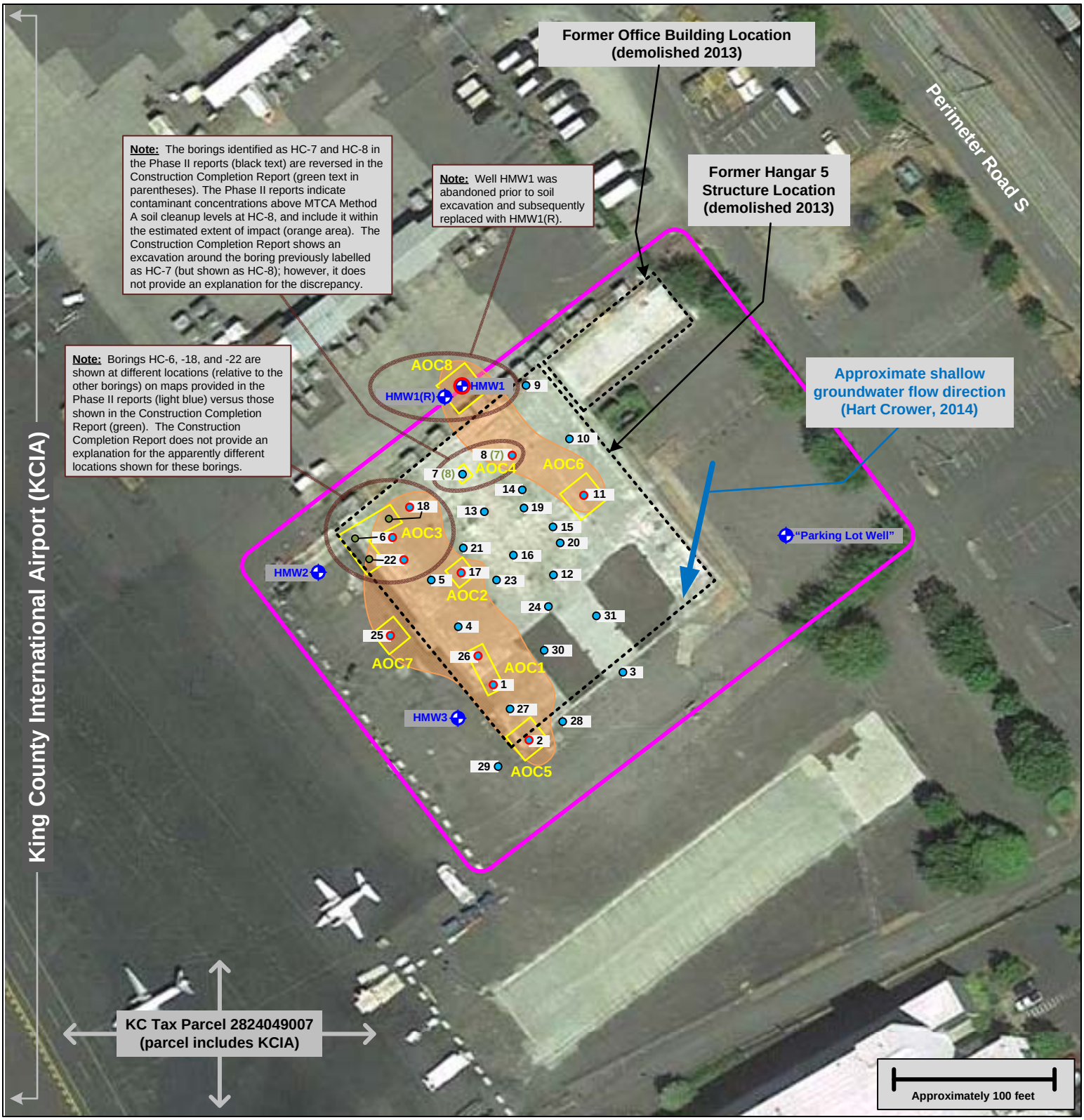
Final WARM Bin Ranking Matrix

Human Health Priority	Environment Priority 5	4	3	2	1	N/A
5	1	1	1	1	1	1
4	1	2	2	2	3	2
3	1	2	3	4	4	3
2	2	3	4	4	5	3
1	2	3	4	5	5	5
N/A	3	4	5	5	5	NFA

Quintile Values for Route Scores - February 2015 Values

Quintile	Human Health: Surface Water	Human Health: Air	Human Health: Ground Water	Environment: Surface Water	Environment: Air
5	>= 30.7	>= 37.6	>= 51.6	>= 50.9	>= 29.9
4	>= 23.1	>= 23.8	>= 40.9	>= 31.2	>= 22.5
3	>= 14.1	>= 15.5	>= 33.2	>= 23.6	>= 14.0
2	>= 7.0	>= 8.5	>= 23.5	>= 11.0	>= 1.6
1	<= 6.9	<= 8.4	<= 23.4	<= 10.9	<= 1.5

Quintile value associated with each route score entered above



Legend:

- Property location (approximate)
- Estimated approximate extent of impacted soil (Hart Crowser 2013)
- Approximate excavation areas (Hart Crowser 2015)
- Monitoring well (approximate)
- Approximate Hart Crowser soil boring location; red outline indicates one or more contaminants at concentrations above MTCA Method A soil cleanup levels ("HC" omitted from boring numbers)

Notes:

1. All locations are approximate. Scale is approximate.

N

Hangar 5 KCIA
7585 Perimeter Road S
Seattle, WA 98108

DEPARTMENT OF ECOLOGY
State of Washington

Site Overview Map

CSID 12573
CSID12573.vsd