Appendix E

Upland Soil Chemical Data Screening and Figures

Appendix E – Upland Soil Chemical Data Screening and Figures

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E-2d Upland Soil Summed Exceedance Ratios – Birds (Provided as Electronic File)

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E-19 Maximum ERs – Human Health PRGs – Antimony in Surface Soil

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Table E-1
Upland Soil Preliminary Remediation Goals and Oregon High Concentration Hot Spot Values – Ecological Receptors
Willamette Cove Upland Facility
Portland, Oregon

Chemical of Concern	Receptor Specific Screening Levels and RBCs								Ecological PRGs			
	Plant		Invertebrate		Birds		Mammal		Sample Type			
									Discrete/Composite		ISM	
	Screening Level	Hot Spot	Screening Level	Hot Spot	RBC	Hot Spot	RBC	Hot Spot	PRG	Hot Spot	PRG	Hot Spot
Concentration in mg/kg												
Antimony	5	50	78	780	--	--	2.7	27	2.7	27	2.7	27
Arsenic	18	180	--	--	--	--	--	--	18	180	18	180
Chromium	1	10	0.4	4	--	--	--	--	76	76	39	39
Copper	70	700	80	800	87.7	877	82	820	70	700	70	700
Lead	120	1,200	1,700	17,000	33	330	122	1,220	79	330	33	330
Mercury	0.3	3	0.1	1	0.015	0.15	3.53	35.3	0.23	0.23	0.073	0.15
Nickel	38	380	280	2800	--	--	20	200	47	200	23	200
Selenium	0.52	5.2	--	--	--	--	--	--	0.71	5.2	0.52	5.2
Zinc	160	1,600	120	1,200	--	--	201	2010	180	1,200	120	1,200
HPAH	--	--	18	180	--	--	5.6	56	5.6	56	5.6	56
LPAH	--	--	29	290	--	--	--	--	29	290	29	290
Dibenzofuran	--	--	--	--	--	--	0.01	0.10	0.01	0.1	0.01	0.1
Total PCBs	40	400	--	--	0.734	7.34	0.098	0.98	0.098	0.98	0.098	0.98
Dioxin/Furan TEQ	--	--	--	--	8.90E-05	8.90E-04	6.10E-06	6.10E-05	6.10E-06	6.10E-05	6.10E-06	6.10E-05

Notes:

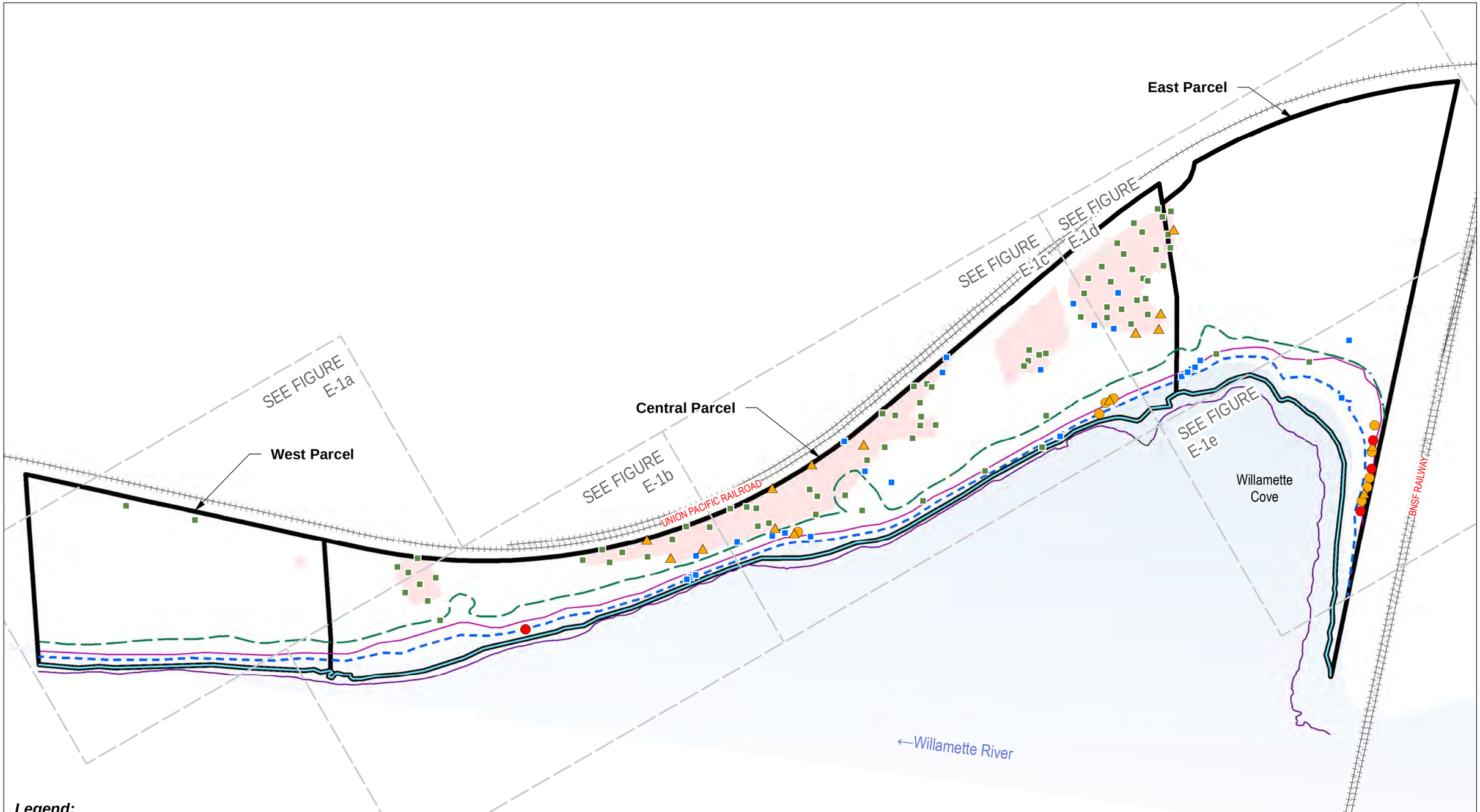
1. RBC = Risk Based Concentration
2. PRG = Preliminary Remediation Goal
3. ISM = Incremental Sampling Methodology
4. mg/kg = milligrams per kilogram
5. HPAH = high molecularl weight polycyclic aromatic hydrocarbons
6. LPAH = low molecular weight polycyclic aromatic hydrocarbons
7. PCBs = polychlorinated biphenyls
8. Dioxin/Furan TEQ = 2,3,7,8-TCDD toxicity equivalent
8. Upland Soil includes all samples located within the site boundary above mean high water
9. Data screened against ecological screening levels includes samples from the surface to three feet below the surface.

Table E-3
Upland Soil Preliminary Remediation Goals and Oregon High Concentration Hot Spot Values – Human Health
Willamette Cove Upland Facility
Portland, Oregon

Chemical of Concern	Receptor Specific RBCs												Human Health PRGs			
	Recreatoinal Trespaser/Park User				Transient Trespasser				Construction Worker				Sample Type			
	Cancer		Non-Cancer		Cancer		Non-Cancer		Cancer		Non-Cancer		Discrete/Composite		ISM	
	RBC	Hot Spot	RBC	Hot Spot	RBC	Hot Spot	RBC	Hot Spot	RBC	Hot Spot	RBC	Hot Spot	PRG	Hot Spot	PRG	Hot Spot
Concentration in mg/kg																
Antimony	--	--	24.3	243	--	--	--	--	--	--	31	310	24.3	243	24.3	243
Arsenic	1.4	140	74	740	--	--	--	--	--	--	--	--	8.8	140	4.4	140
Copper	--	--	11,000	110,000	--	--	--	--	--	--	14,000	140,000	11,000	110,000	11,000	110,000
Lead	--	--	400	4,000	--	--	--	--	--	--	--	--	400	4,000	400	4,000
Total PCBs	0.74	74	4	40	14	1,400	220	2,200	8.4	840	4.9	49	0.74	40	0.74	40
Dioxin/Furan TEQ	1.50E-05	1.50E-03	1.70E-04	1.70E-03	3.20E-04	3.20E-02	1.10E-02	1.10E-01	1.70E-04	1.70E-02	2.30E-04	2.30E-03	1.10E-05	1.10E-03	1.50E-05	1.50E-03
BaP Eq	0.55	55	--	--	--	--	--	--	--	--	--	--	0.55	55	0.55	55

Notes:

1. RBC = Risk Based Concentration
2. PRG = Preliminary Remediation Goal
3. ISM = Incremental Sampling Methodology
4. mg/kg = milligrams per kilogram
5. PCBs = polychlorinated biphenyls
6. Dioxin/Furan TEQ = 2,3,7,8-TCDD toxicity equivalent
7. BaP Eq = benzo(a)pyrene equivalents
8. Upland Soil includes all samples located within the site boundary above mean high water
9. Data screened against the Recreational Trespasser/Park User and Transient Trespasser PRGs include samples from the surface to three feet below the surface.
10. Data screened against the Construction Worker PRG includes samples from the surface to ten feet below the surface.



Legend:

- Composite Sample Concentration Above Mammal Hot Spot Concentration
- Discrete Sample Concentration Above Mammal Hot Spot Concentration
- Composite Sample Concentration Above Mammal PRG
- Discrete Sample Concentration Above Mammal PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Mammal).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 200 400

Approximate Scale in Feet

N

Maximum ERs - Ecological - Antimony in Surface Soil

Revised Feasibility Study and Source Control Evaluation
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Portland, Oregon

APEX

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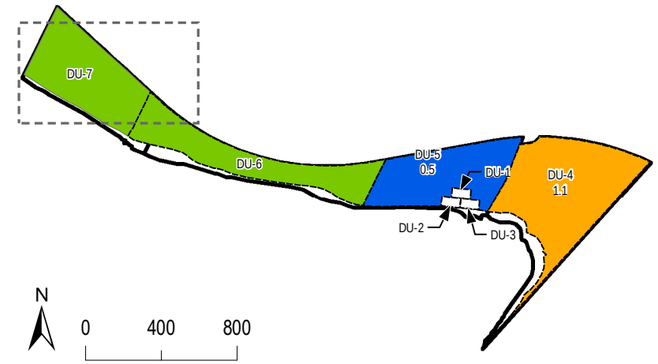
Project Number	1056-10	Figure
March 2019		E-1

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Concentration Above Mammal Hot Spot Concentration
- Discrete Sample Concentration Above Mammal Hot Spot Concentration
- Composite Sample Concentration Above Mammal PRG
- Discrete Sample Concentration Above Mammal PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
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Notes:

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5. ERs calculated using lowest applicable PRG (Mammal).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - Antimony in Surface Soil - 1 of 5

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Project Number	1056-10	Figure
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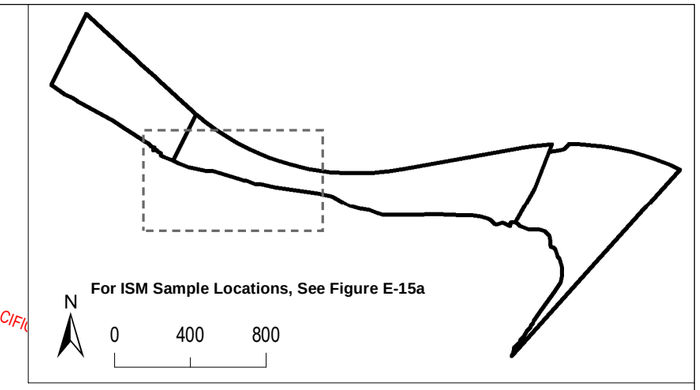

UNION PACIFIC

Legend:

- Composite Sample Concentration Above Mammal Hot Spot Concentration
- Discrete Sample Concentration Above Mammal Hot Spot Concentration
- Composite Sample Concentration Above Mammal PRG
- Discrete Sample Concentration Above Mammal PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
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6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - Antimony in Surface Soil - 2 of 5

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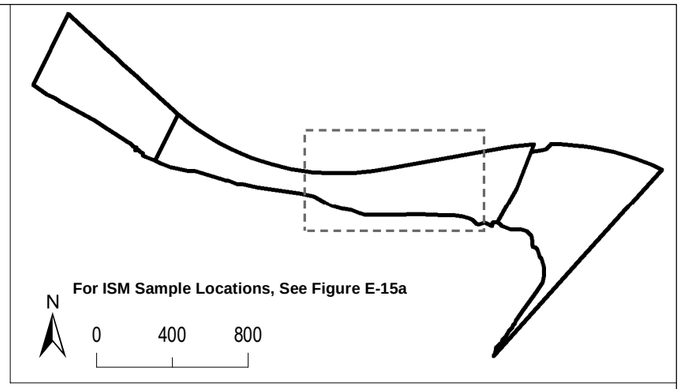

UNION PACIFIC RAILROAD

Legend:

- Composite Sample Concentration Above Mammal Hot Spot Concentration
- Discrete Sample Concentration Above Mammal Hot Spot Concentration
- Composite Sample Concentration Above Mammal PRG
- Discrete Sample Concentration Above Mammal PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
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- Ordinary Low Water Line (6.9NAVD88)
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Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Mammal).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - Antimony in Surface Soil - 3 of 5

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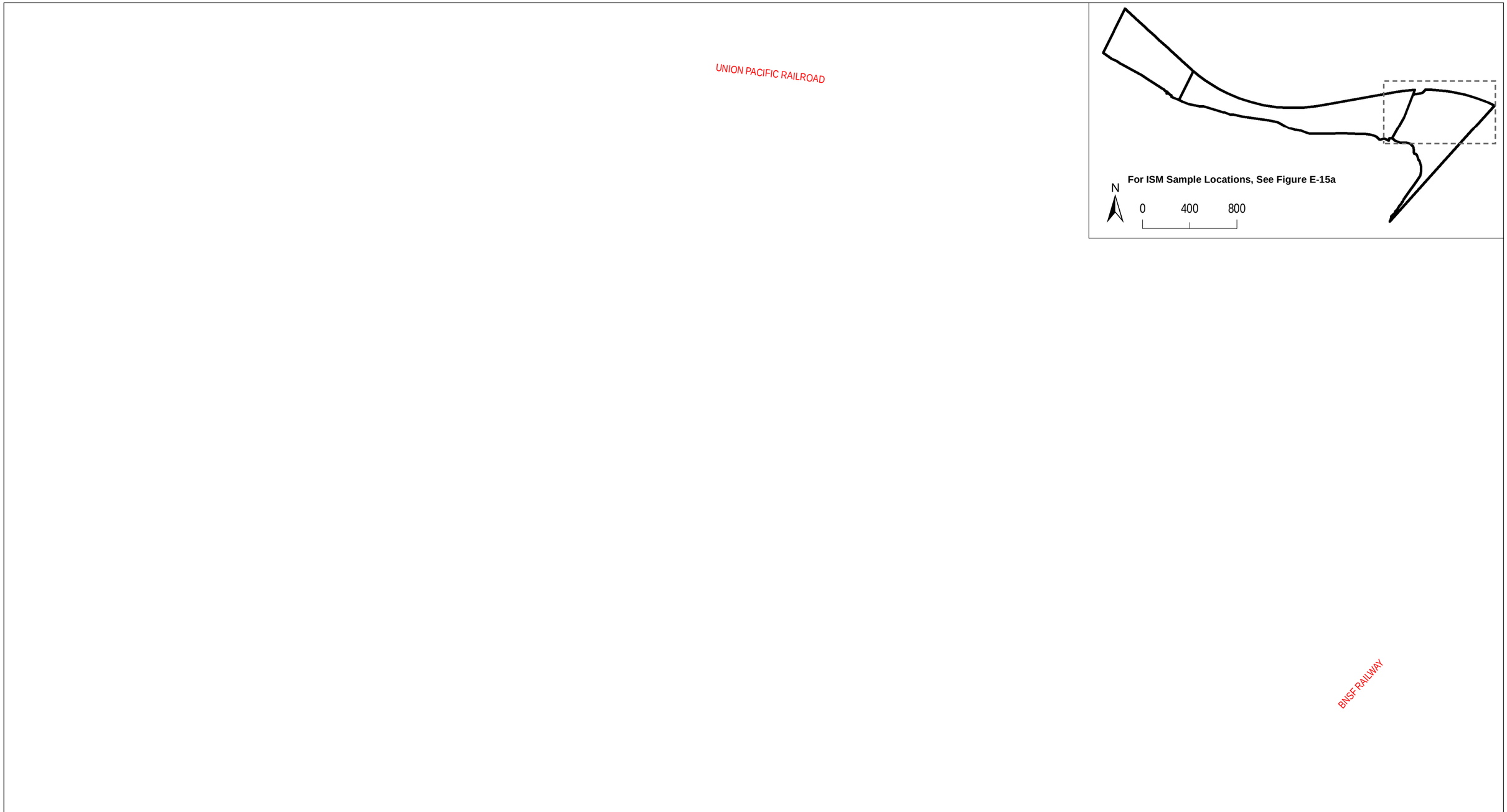

Legend:

- Composite Sample Concentration Above Mammal Hot Spot Concentration
- Discrete Sample Concentration Above Mammal Hot Spot Concentration
- Composite Sample Concentration Above Mammal PRG
- Discrete Sample Concentration Above Mammal PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
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Notes:

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2. mg/kg = Milligrams Per Kilogram
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6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - Antimony in Surface Soil - 4 of 5

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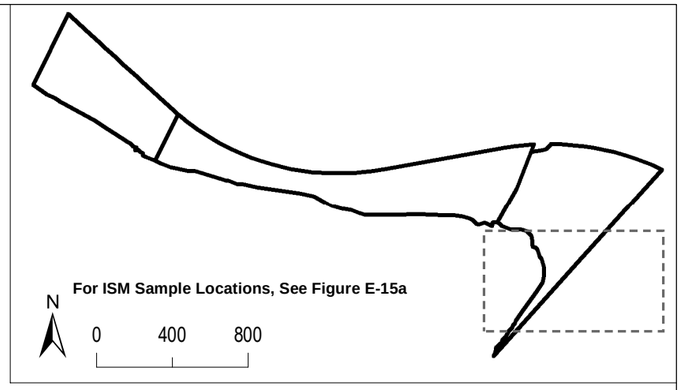
Figure E-1d



BNSF RAILWAY

Legend:

- Composite Sample Concentration Above Mammal Hot Spot Concentration
- Discrete Sample Concentration Above Mammal Hot Spot Concentration
- Composite Sample Concentration Above Mammal PRG
- Discrete Sample Concentration Above Mammal PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
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Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Mammal).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - Antimony in Surface Soil - 5 of 5

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Project Number	1056-10	Figure
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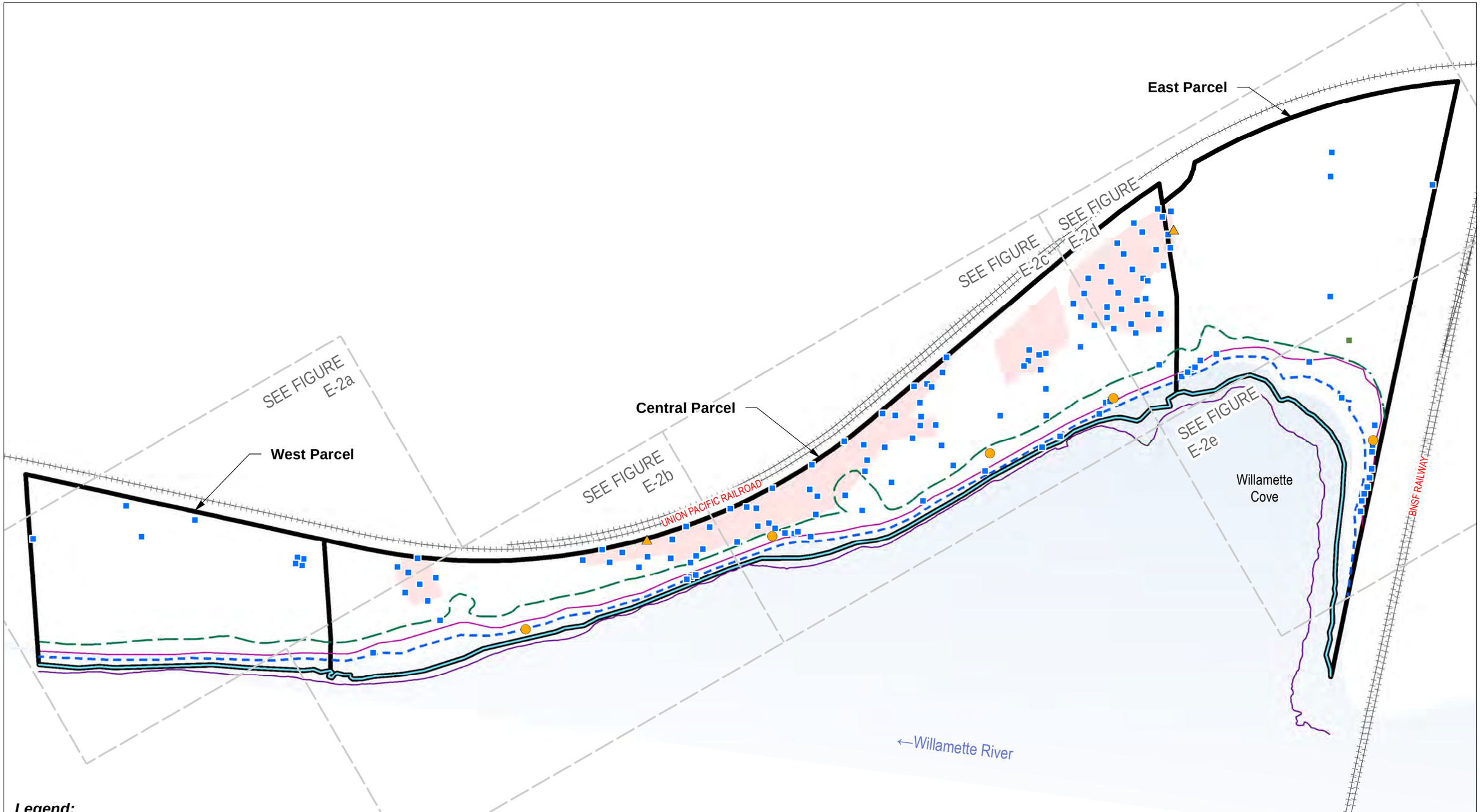

Legend:

- Composite Sample Concentration Above Plant Hot Spot Concentration
- Discrete Sample Concentration Above Plant Hot Spot Concentration
- Composite Sample Concentration Above Plant PRG
- Discrete Sample Concentration Above Plant PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
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- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Plant).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 200 400

Approximate Scale in Feet

N

Maximum ERs - Ecological - Arsenic in Surface Soil

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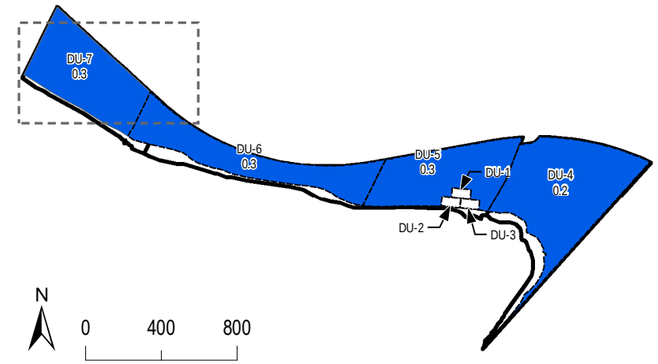

UNION PACIFIC RAILROAD

Legend:

- Composite Sample Concentration Above Plant Hot Spot Concentration
- Discrete Sample Concentration Above Plant Hot Spot Concentration
- Composite Sample Concentration Above Plant PRG
- Discrete Sample Concentration Above Plant PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
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- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Plant).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - Arsenic in Surface Soil - 1 of 5

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Project Number	1056-10	Figure
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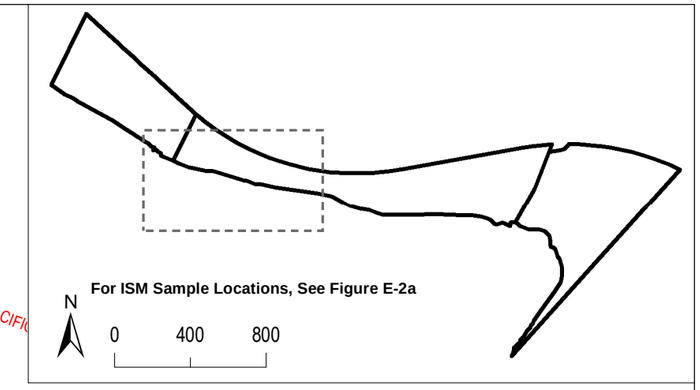

UNION PACIFIC

Legend:

- Composite Sample Concentration Above Plant Hot Spot Concentration
- Discrete Sample Concentration Above Plant Hot Spot Concentration
- Composite Sample Concentration Above Plant PRG
- Discrete Sample Concentration Above Plant PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
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- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Plant).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

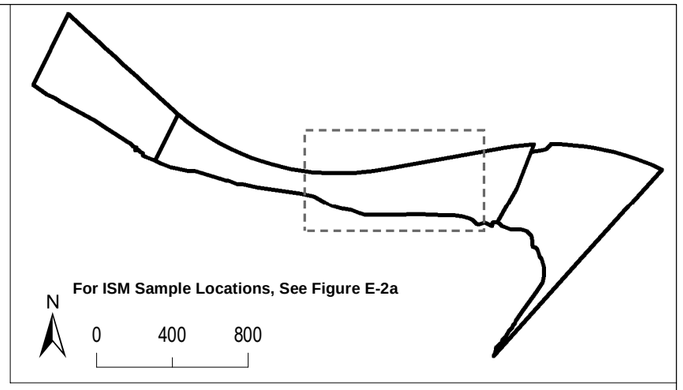
Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - Arsenic in Surface Soil - 2 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-2b



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Concentration Above Plant Hot Spot Concentration
- Discrete Sample Concentration Above Plant Hot Spot Concentration
- Composite Sample Concentration Above Plant PRG
- Discrete Sample Concentration Above Plant PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

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2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Plant).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

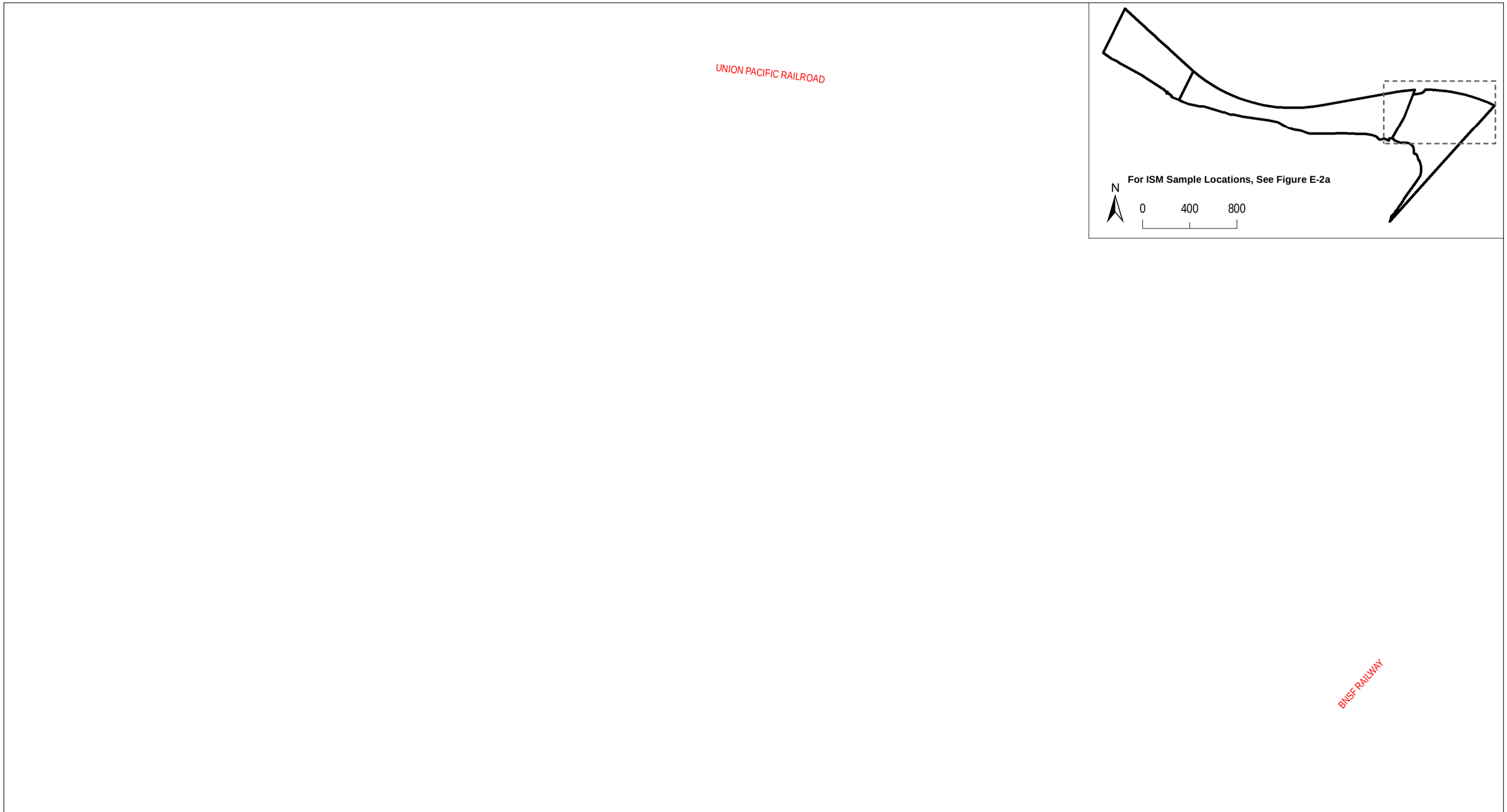
Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - Arsenic in Surface Soil - 3 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-2c



Legend:

- Composite Sample Concentration Above Plant Hot Spot Concentration
- Discrete Sample Concentration Above Plant Hot Spot Concentration
- Composite Sample Concentration Above Plant PRG
- Discrete Sample Concentration Above Plant PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Plant).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - Arsenic in Surface Soil - 4 of 5

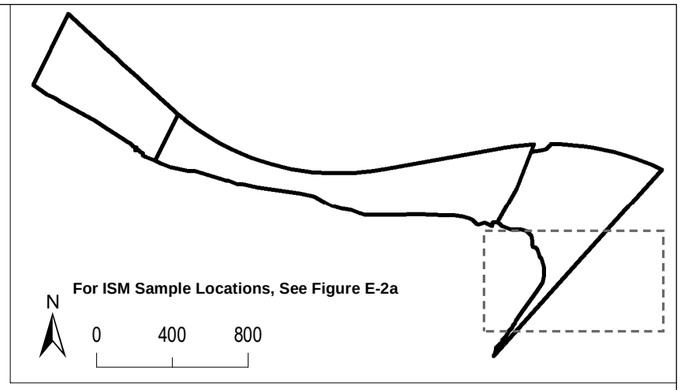
Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number 1056-10

March 2019

Figure E-2d



BNSF RAILWAY

Legend:

- Composite Sample Concentration Above Plant Hot Spot Concentration
- Discrete Sample Concentration Above Plant Hot Spot Concentration
- Composite Sample Concentration Above Plant PRG
- Discrete Sample Concentration Above Plant PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Plant).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

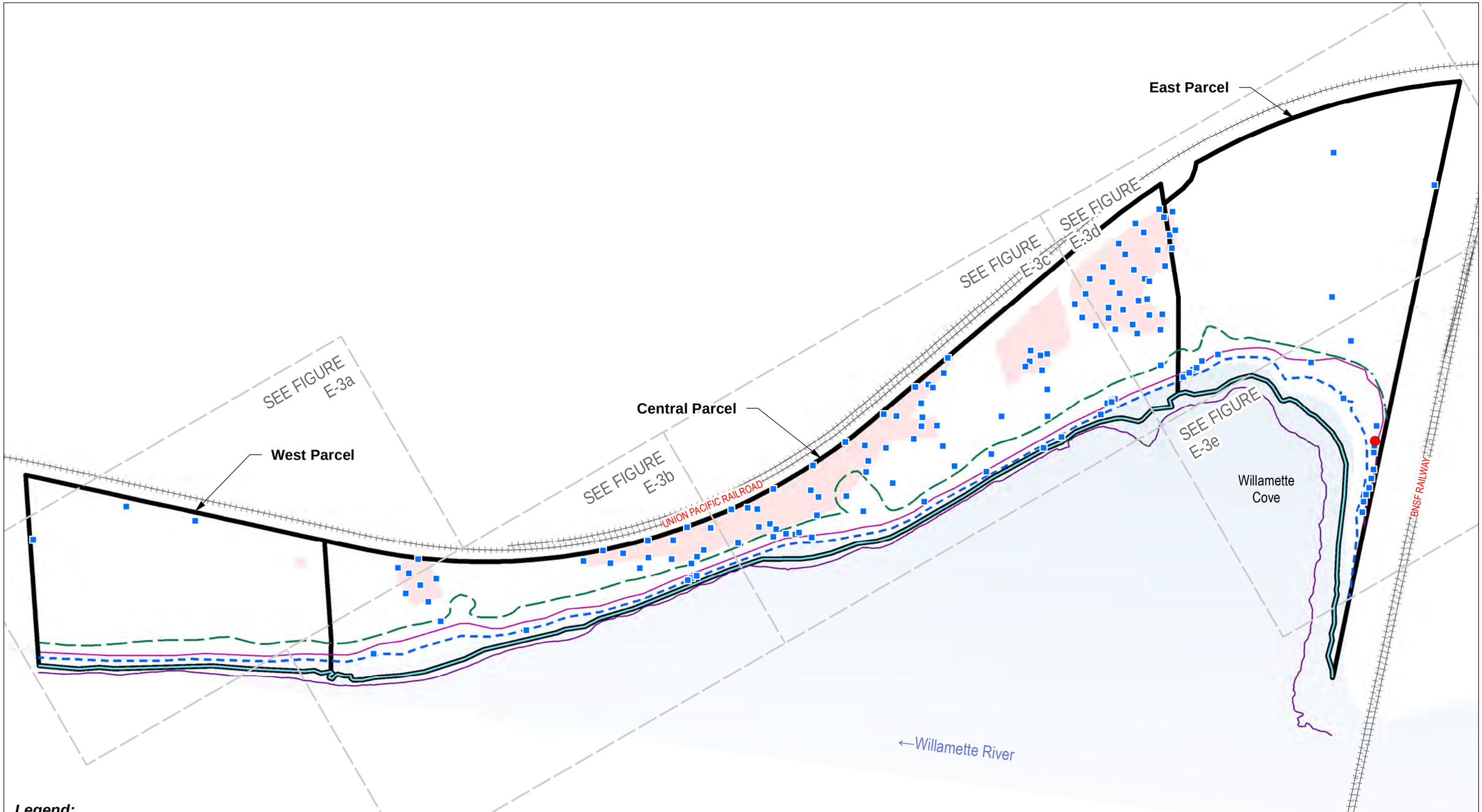
Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - Arsenic in Surface Soil - 5 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-2e



Legend:

- Composite Sample Concentration Above Ecological Hot Spot Concentration
- Discrete Sample Concentration Above Ecological Hot Spot Concentration
- Composite Sample Concentration Above Ecological PRG
- Discrete Sample Concentration Above Ecological PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
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- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG.
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 200 400

Approximate Scale in Feet

N

Maximum ERs - Ecological - Chromium in Surface Soil

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX

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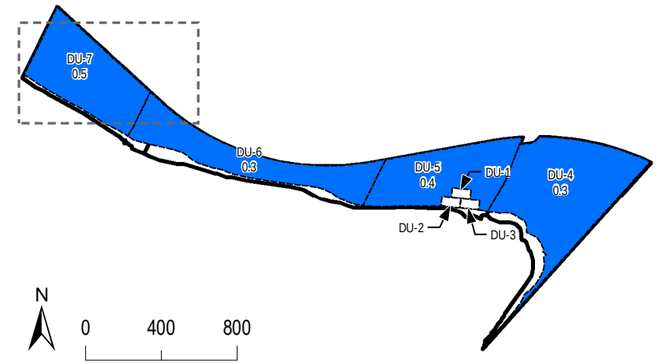
Project Number	1056-10	Figure
March 2019		E-3

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Concentration Above Ecological Hot Spot Concentration
- Discrete Sample Concentration Above Ecological Hot Spot Concentration
- Composite Sample Concentration Above Ecological PRG
- Discrete Sample Concentration Above Ecological PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
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- Ordinary Low Water Line (6.9NAVD88)
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Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG.
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

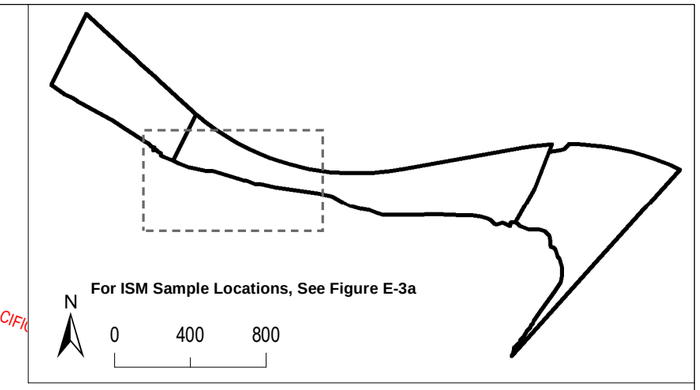
Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - Chromium in Surface Soil - 1 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-3a



UNION PACIFIC

Legend:

- Composite Sample Concentration Above Ecological Hot Spot Concentration
- Discrete Sample Concentration Above Ecological Hot Spot Concentration
- Composite Sample Concentration Above Ecological PRG
- Discrete Sample Concentration Above Ecological PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
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Notes:

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4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG.
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - Chromium in Surface Soil - 2 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
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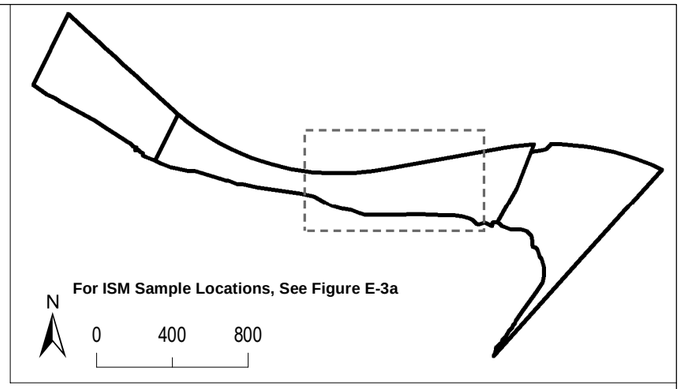
Project Number	1056-10	Figure
March 2019		E-3b



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Concentration Above Ecological Hot Spot Concentration
- Discrete Sample Concentration Above Ecological Hot Spot Concentration
- Composite Sample Concentration Above Ecological PRG
- Discrete Sample Concentration Above Ecological PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
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- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
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Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG.
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

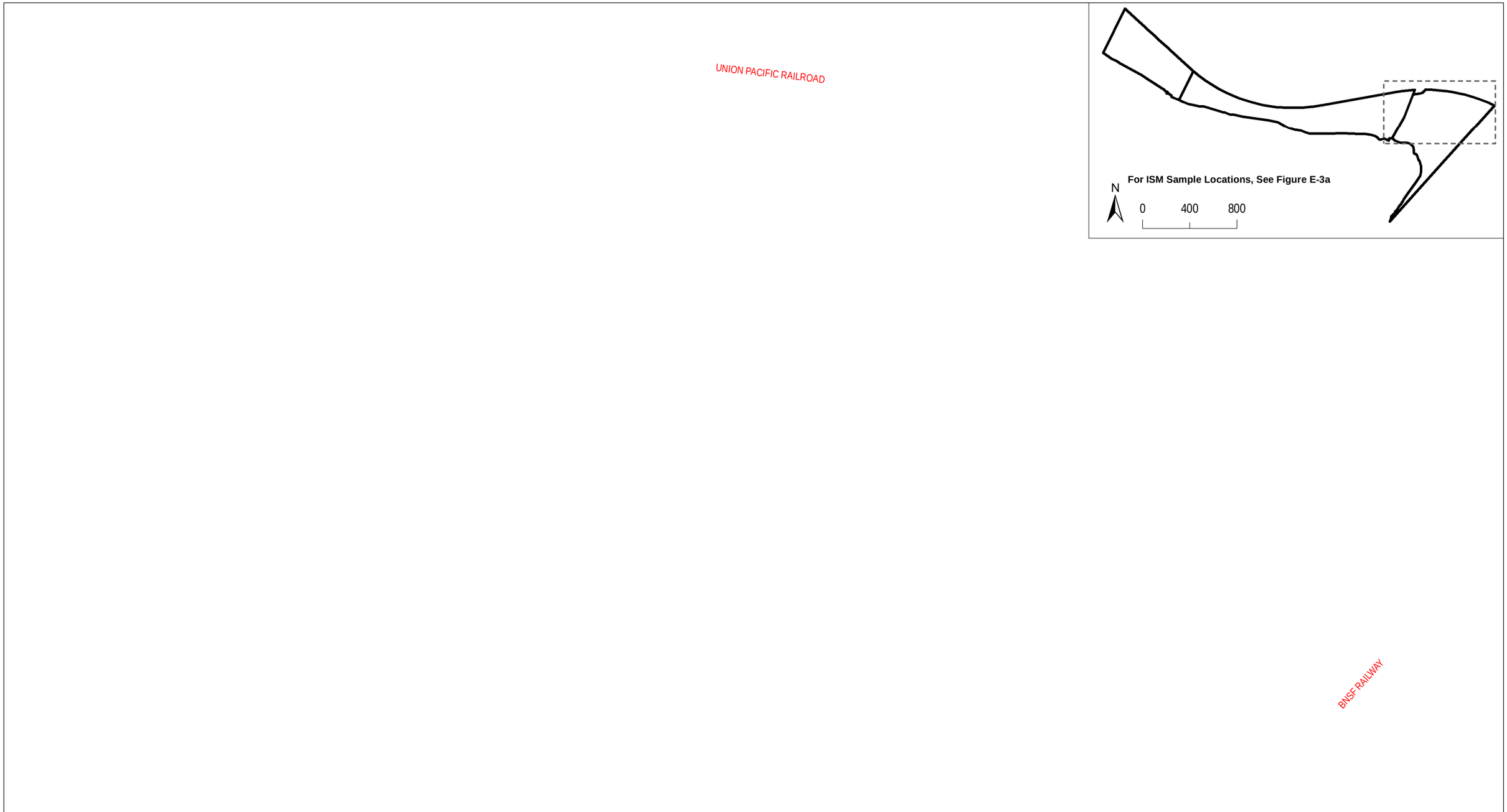
Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - Chromium in Surface Soil - 3 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-3c



Legend:

- Composite Sample Concentration Above Ecological Hot Spot Concentration
- Discrete Sample Concentration Above Ecological Hot Spot Concentration
- Composite Sample Concentration Above Ecological PRG
- Discrete Sample Concentration Above Ecological PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
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Notes:

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3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG.
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - Chromium in Surface Soil - 4 of 5

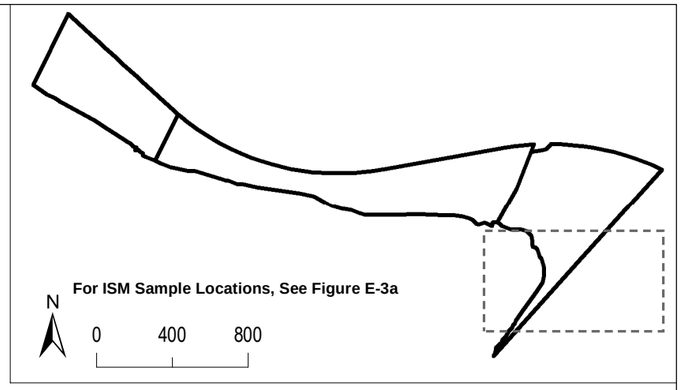
Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number 1056-10

March 2019

Figure E-3d



BNSF RAILWAY

Legend:

- Composite Sample Concentration Above Ecological Hot Spot Concentration
- Discrete Sample Concentration Above Ecological Hot Spot Concentration
- Composite Sample Concentration Above Ecological PRG
- Discrete Sample Concentration Above Ecological PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
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Notes:

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4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG.
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7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

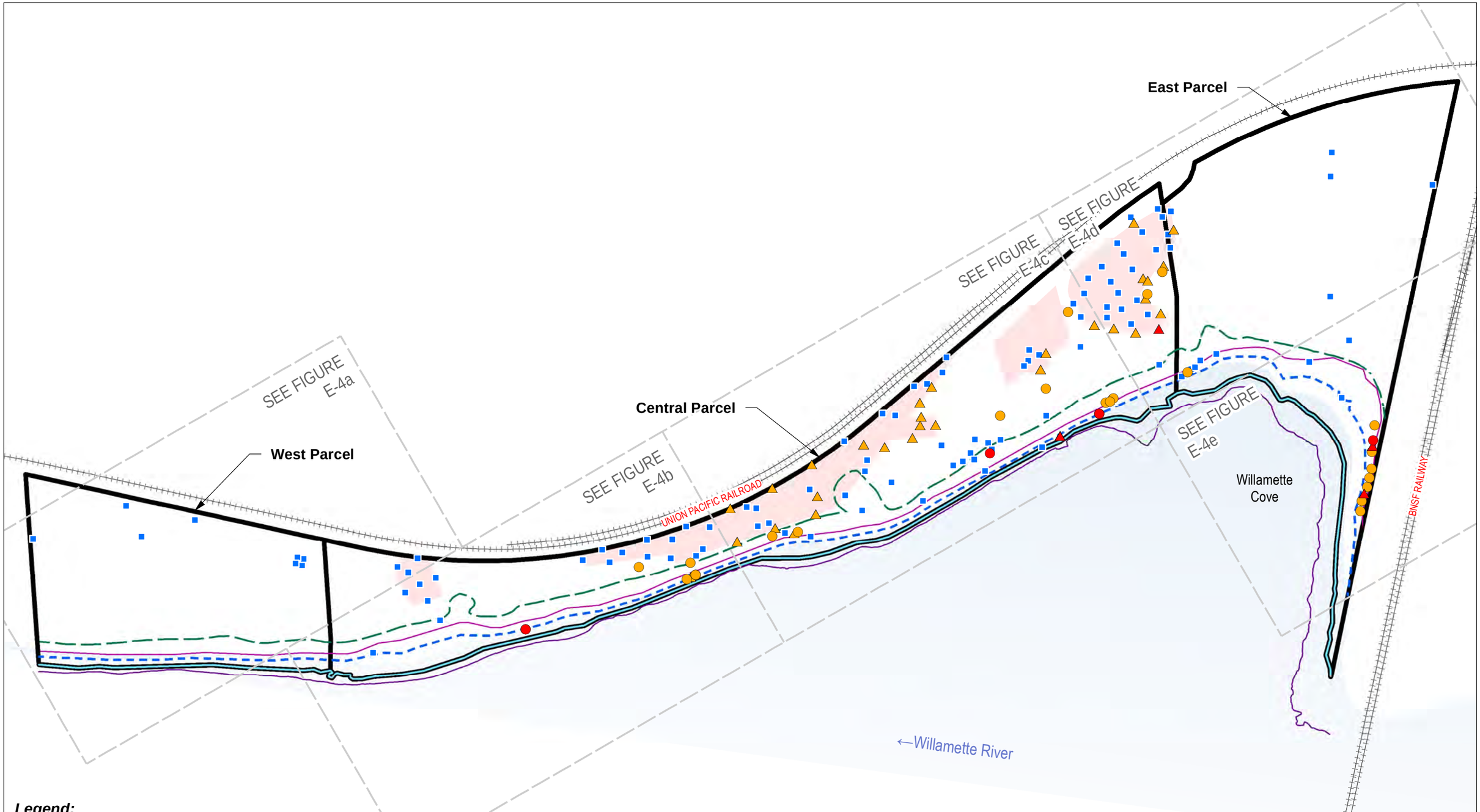
Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - Chromium in Surface Soil - 5 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-3e



Legend:

- Composite Sample Concentration Above Plant Hot Spot Concentration
- Discrete Sample Concentration Above Plant Hot Spot Concentration
- Composite Sample Concentration Above Plant PRG
- Discrete Sample Concentration Above Plant PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
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Notes:

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2. mg/kg = Milligrams Per Kilogram
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5. ERs calculated using lowest applicable PRG (Plant).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 200 400

Approximate Scale in Feet

N

Maximum ERs - Ecological - Copper in Surface Soil

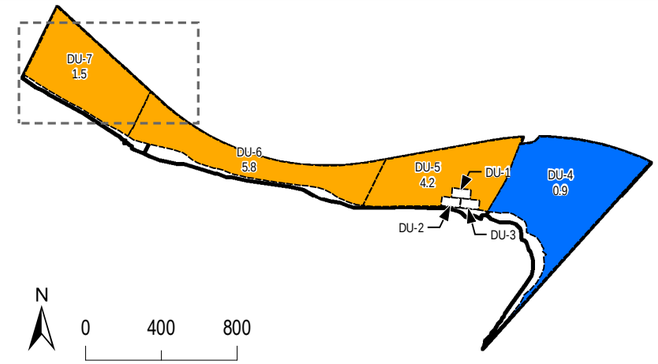
Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX

Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-4

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Concentration Above Plant Hot Spot Concentration
- Discrete Sample Concentration Above Plant Hot Spot Concentration
- Composite Sample Concentration Above Plant PRG
- Discrete Sample Concentration Above Plant PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
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Notes:

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7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - Copper in Surface Soil - 1 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
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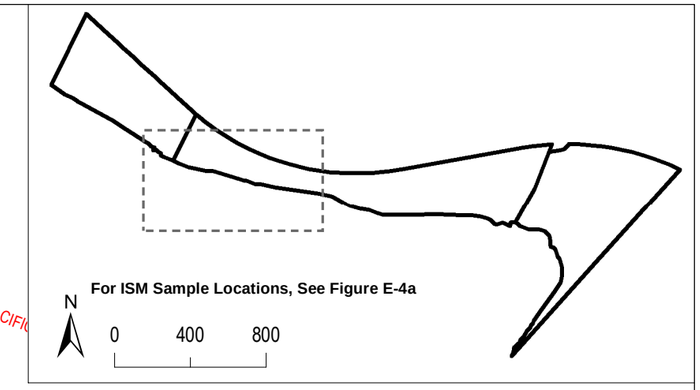
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-4a



UNION PACIFIC

Legend:

- Composite Sample Concentration Above Plant Hot Spot Concentration
- Discrete Sample Concentration Above Plant Hot Spot Concentration
- Composite Sample Concentration Above Plant PRG
- Discrete Sample Concentration Above Plant PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
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- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

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4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Plant).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

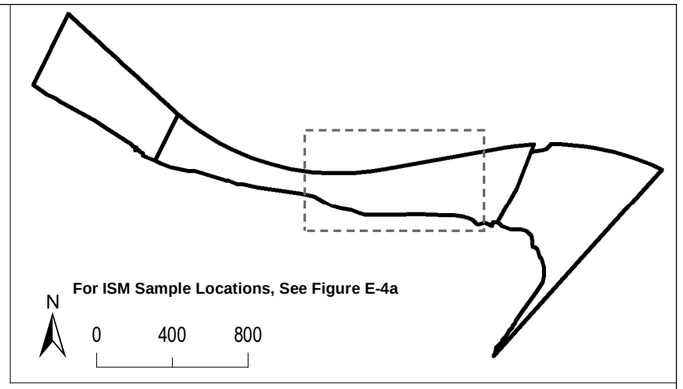
Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - Copper in Surface Soil - 2 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-4b



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Concentration Above Plant Hot Spot Concentration
- Discrete Sample Concentration Above Plant Hot Spot Concentration
- Composite Sample Concentration Above Plant PRG
- Discrete Sample Concentration Above Plant PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
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Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Plant).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - Copper in Surface Soil - 3 of 5

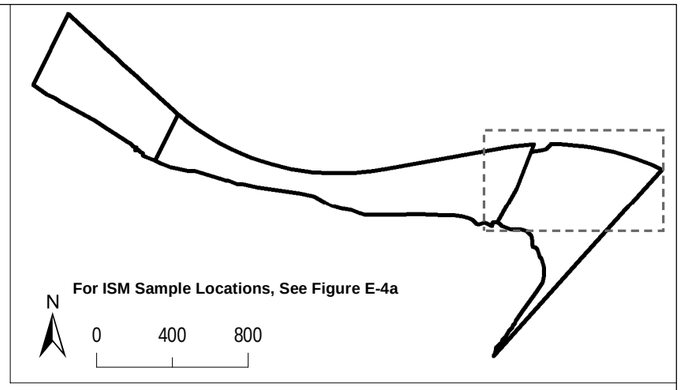
Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX

Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-4c

UNION PACIFIC RAILROAD



BNSF RAILWAY

Legend:

- Composite Sample Concentration Above Plant Hot Spot Concentration
- Discrete Sample Concentration Above Plant Hot Spot Concentration
- Composite Sample Concentration Above Plant PRG
- Discrete Sample Concentration Above Plant PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Plant).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

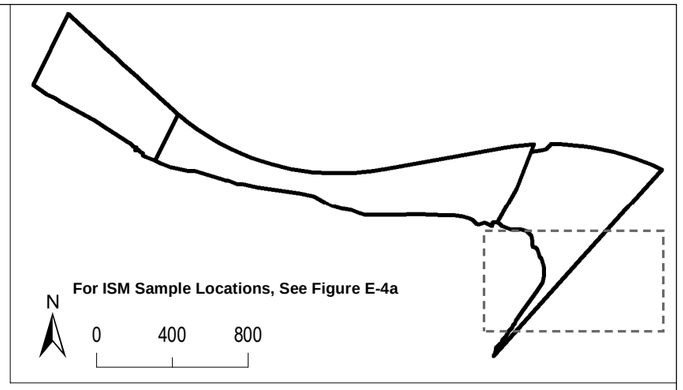
Maximum ERs - Ecological - Copper in Surface Soil - 4 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX

Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-4d



BNSF RAILWAY

Legend:

- Composite Sample Concentration Above Plant Hot Spot Concentration
- Discrete Sample Concentration Above Plant Hot Spot Concentration
- Composite Sample Concentration Above Plant PRG
- Discrete Sample Concentration Above Plant PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Plant).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

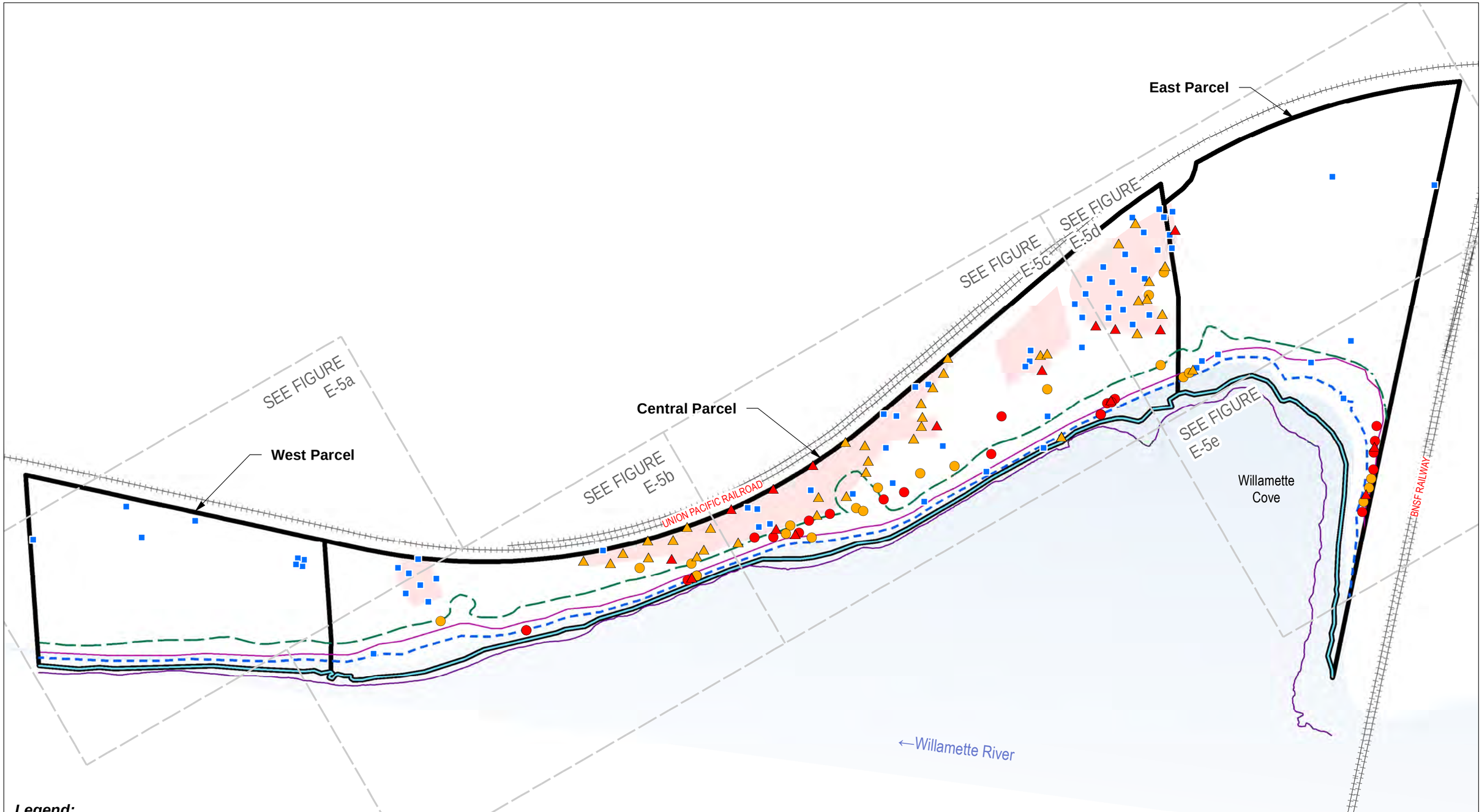
Maximum ERs - Ecological - Copper in Surface Soil - 5 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX

Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-4e



Legend:

- Composite Sample Concentration Above Bird Hot Spot Concentration
- Discrete Sample Concentration Above Bird Hot Spot Concentration
- Composite Sample Concentration Above Bird PRG
- Discrete Sample Concentration Above Bird PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Bird).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 200 400

Approximate Scale in Feet

N

Maximum ERs - Ecological - Lead in Surface Soil

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

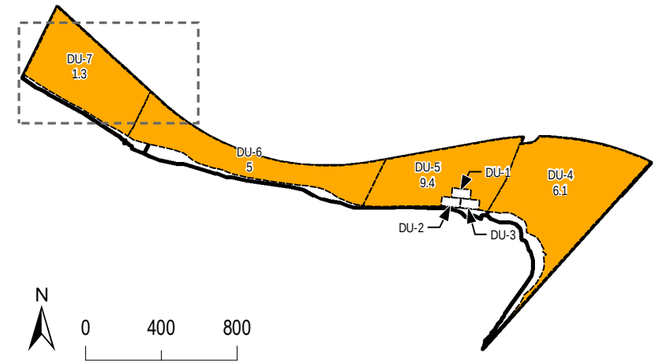
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number 1056-10

March 2019

Figure E-5

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Concentration Above Bird Hot Spot Concentration
- Discrete Sample Concentration Above Bird Hot Spot Concentration
- Composite Sample Concentration Above Bird PRG
- Discrete Sample Concentration Above Bird PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Bird).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

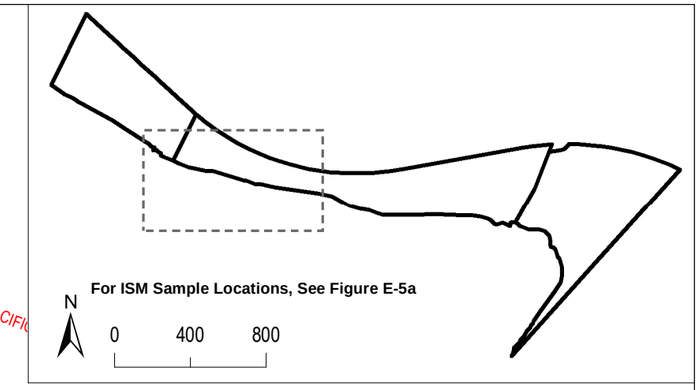
Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - Lead in Surface Soil - 1 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-5a



UNION PACIFIC

Legend:

- Composite Sample Concentration Above Bird Hot Spot Concentration
- Discrete Sample Concentration Above Bird Hot Spot Concentration
- Composite Sample Concentration Above Bird PRG
- Discrete Sample Concentration Above Bird PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
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Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Bird).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - Lead in Surface Soil - 2 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
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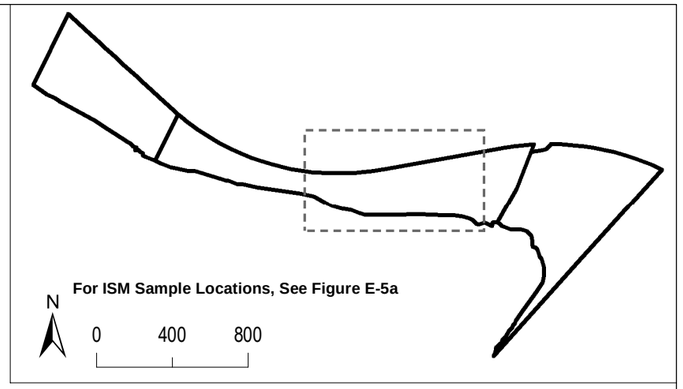
Project Number	1056-10	Figure
March 2019		E-5b



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Concentration Above Bird Hot Spot Concentration
- Discrete Sample Concentration Above Bird Hot Spot Concentration
- Composite Sample Concentration Above Bird PRG
- Discrete Sample Concentration Above Bird PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
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- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

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2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Bird).
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7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - Lead in Surface Soil - 3 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
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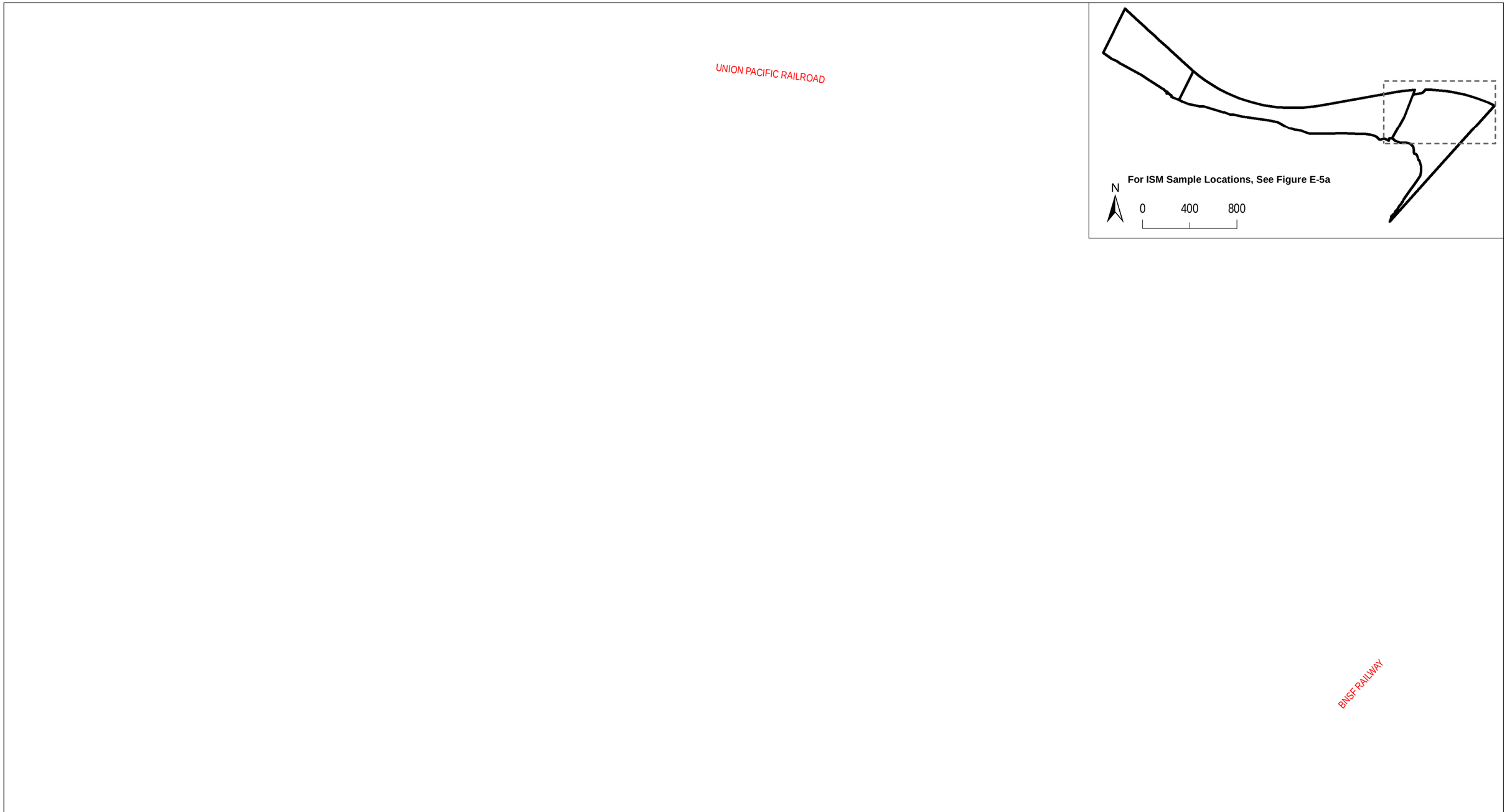
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-5c



Legend:

- Composite Sample Concentration Above Bird Hot Spot Concentration
- Discrete Sample Concentration Above Bird Hot Spot Concentration
- Composite Sample Concentration Above Bird PRG
- Discrete Sample Concentration Above Bird PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
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- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

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3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Bird).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - Lead in Surface Soil - 4 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX

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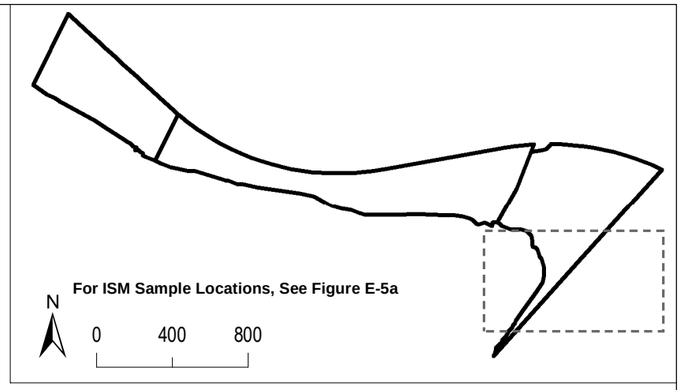
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-5d



BNSF RAILWAY

Legend:

- Composite Sample Concentration Above Bird Hot Spot Concentration
- Discrete Sample Concentration Above Bird Hot Spot Concentration
- Composite Sample Concentration Above Bird PRG
- Discrete Sample Concentration Above Bird PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
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Notes:

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3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Bird).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

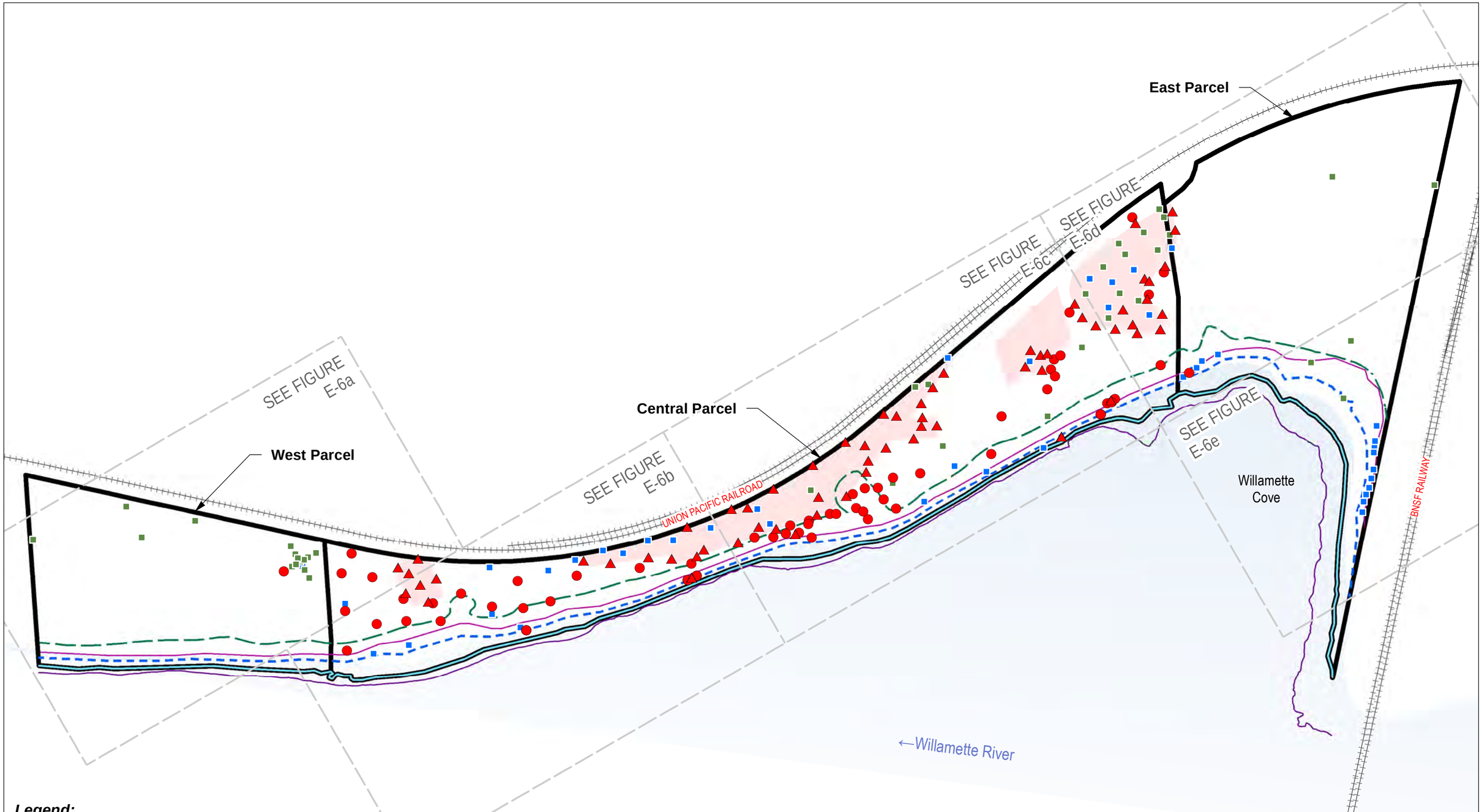
Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - Lead in Surface Soil - 5 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-5e



Legend:

- Composite Sample Concentration Above Ecological Hot Spot Concentration
- Discrete Sample Concentration Above Ecological Hot Spot Concentration
- Composite Sample Concentration Above Ecological PRG
- Discrete Sample Concentration Above Ecological PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
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- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

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2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG.
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 200 400

Approximate Scale in Feet

N

Maximum ERs - Ecological - Mercury in Surface Soil

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX

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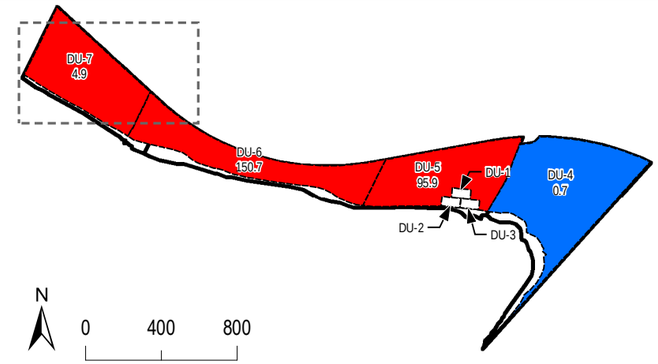
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-6

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Concentration Above Ecological Hot Spot Concentration
- Discrete Sample Concentration Above Ecological Hot Spot Concentration
- Composite Sample Concentration Above Ecological PRG
- Discrete Sample Concentration Above Ecological PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG.
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - Mercury in Surface Soil - 1 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
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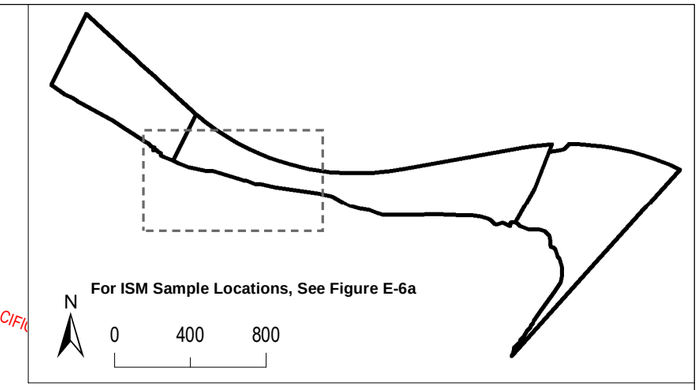
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-6a



UNION PACIFIC

Legend:

- Composite Sample Concentration Above Ecological Hot Spot Concentration
- Discrete Sample Concentration Above Ecological Hot Spot Concentration
- Composite Sample Concentration Above Ecological PRG
- Discrete Sample Concentration Above Ecological PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
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Notes:

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2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG.
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - Mercury in Surface Soil - 2 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
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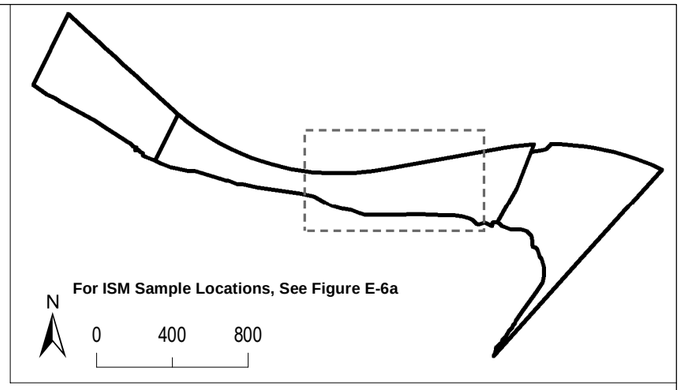
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-6b



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Concentration Above Ecological Hot Spot Concentration
- Discrete Sample Concentration Above Ecological Hot Spot Concentration
- Composite Sample Concentration Above Ecological PRG
- Discrete Sample Concentration Above Ecological PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
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- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG.
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

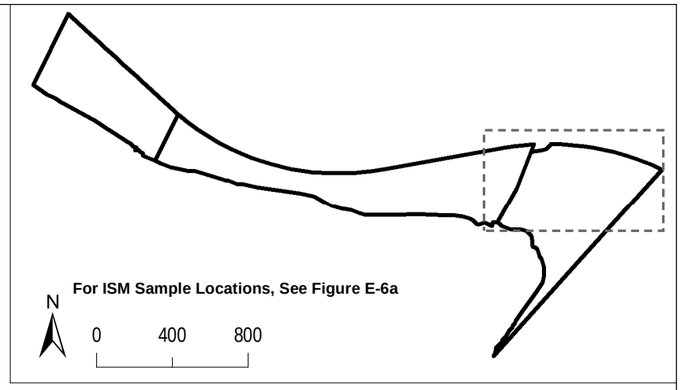
Maximum ERs - Ecological - Mercury in Surface Soil - 3 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-6c

UNION PACIFIC RAILROAD



BNSF RAILWAY

Legend:

- Composite Sample Concentration Above Ecological Hot Spot Concentration
- Discrete Sample Concentration Above Ecological Hot Spot Concentration
- Composite Sample Concentration Above Ecological PRG
- Discrete Sample Concentration Above Ecological PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
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- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
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Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG.
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - Mercury in Surface Soil - 4 of 5

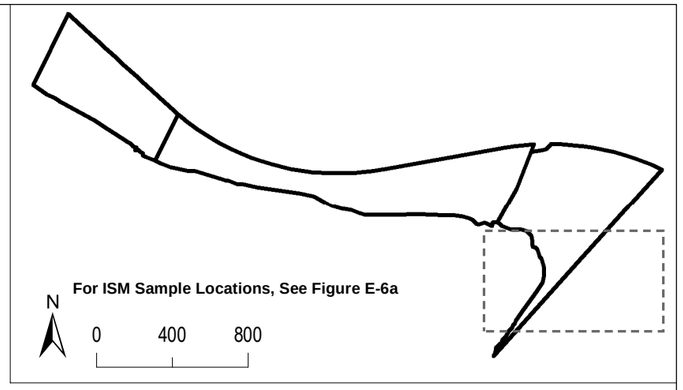
Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number 1056-10

March 2019

Figure E-6d



BNSF RAILWAY

Legend:

- Composite Sample Concentration Above Ecological Hot Spot Concentration
- Discrete Sample Concentration Above Ecological Hot Spot Concentration
- Composite Sample Concentration Above Ecological PRG
- Discrete Sample Concentration Above Ecological PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG.
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - Mercury in Surface Soil - 5 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
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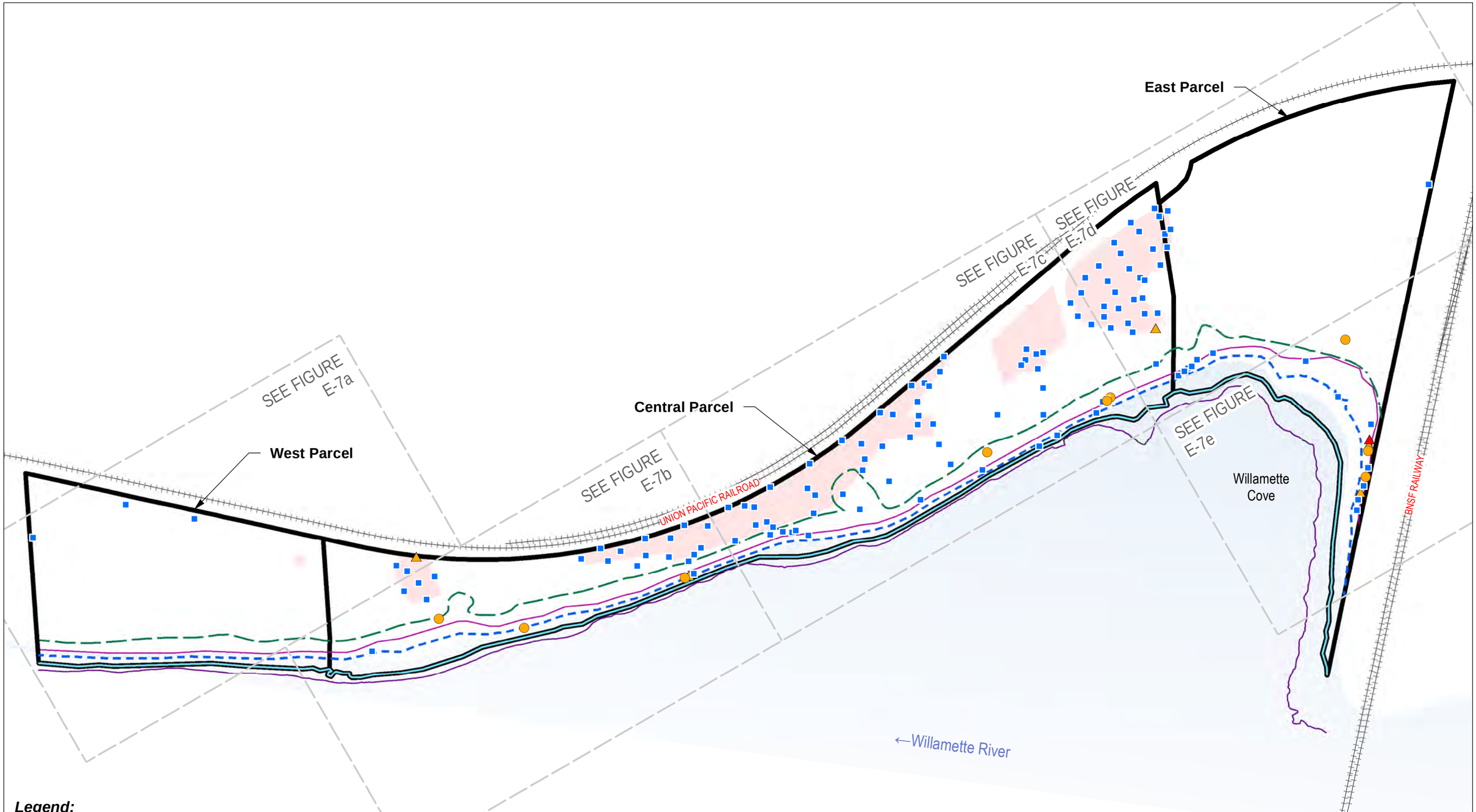
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-6e



Legend:

- Composite Sample Concentration Above Mammal Hot Spot Concentration
- Discrete Sample Concentration Above Mammal Hot Spot Concentration
- Composite Sample Concentration Above Mammal PRG
- Discrete Sample Concentration Above Mammal PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Mammal).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 200 400

Approximate Scale in Feet

N

Maximum ERs - Ecological - Nickel in Surface Soil

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

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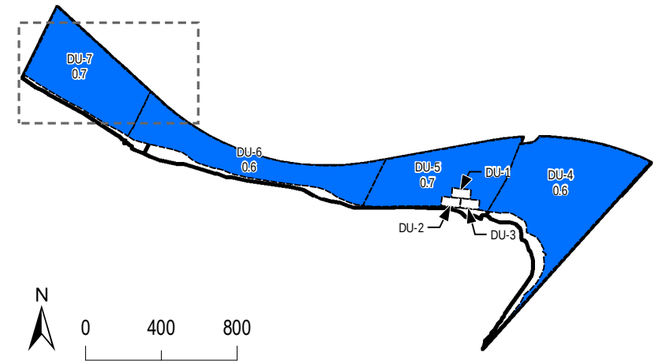
Project Number	1056-10	Figure
March 2019		E-7

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Concentration Above Mammal Hot Spot Concentration
- Discrete Sample Concentration Above Mammal Hot Spot Concentration
- Composite Sample Concentration Above Mammal PRG
- Discrete Sample Concentration Above Mammal PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Mammal).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - Nickel in Surface Soil - 1 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

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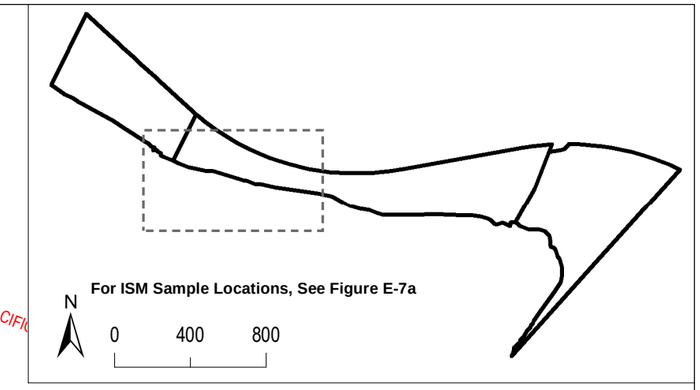
Project Number	1056-10	Figure
March 2019		E-7a



UNION PACIFIC

Legend:

- Composite Sample Concentration Above Mammal Hot Spot Concentration
- Discrete Sample Concentration Above Mammal Hot Spot Concentration
- Composite Sample Concentration Above Mammal PRG
- Discrete Sample Concentration Above Mammal PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
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- Ordinary Low Water Line (6.9NAVD88)
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Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Mammal).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - Nickel in Surface Soil - 2 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

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Portland, Oregon 97201

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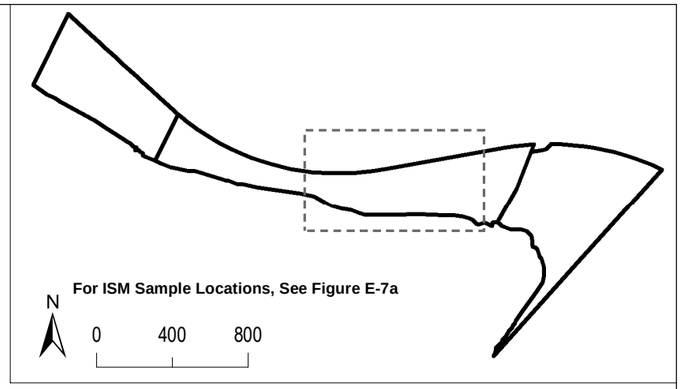
Figure E-7b



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Concentration Above Mammal Hot Spot Concentration
- Discrete Sample Concentration Above Mammal Hot Spot Concentration
- Composite Sample Concentration Above Mammal PRG
- Discrete Sample Concentration Above Mammal PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
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- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Mammal).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - Nickel in Surface Soil - 3 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
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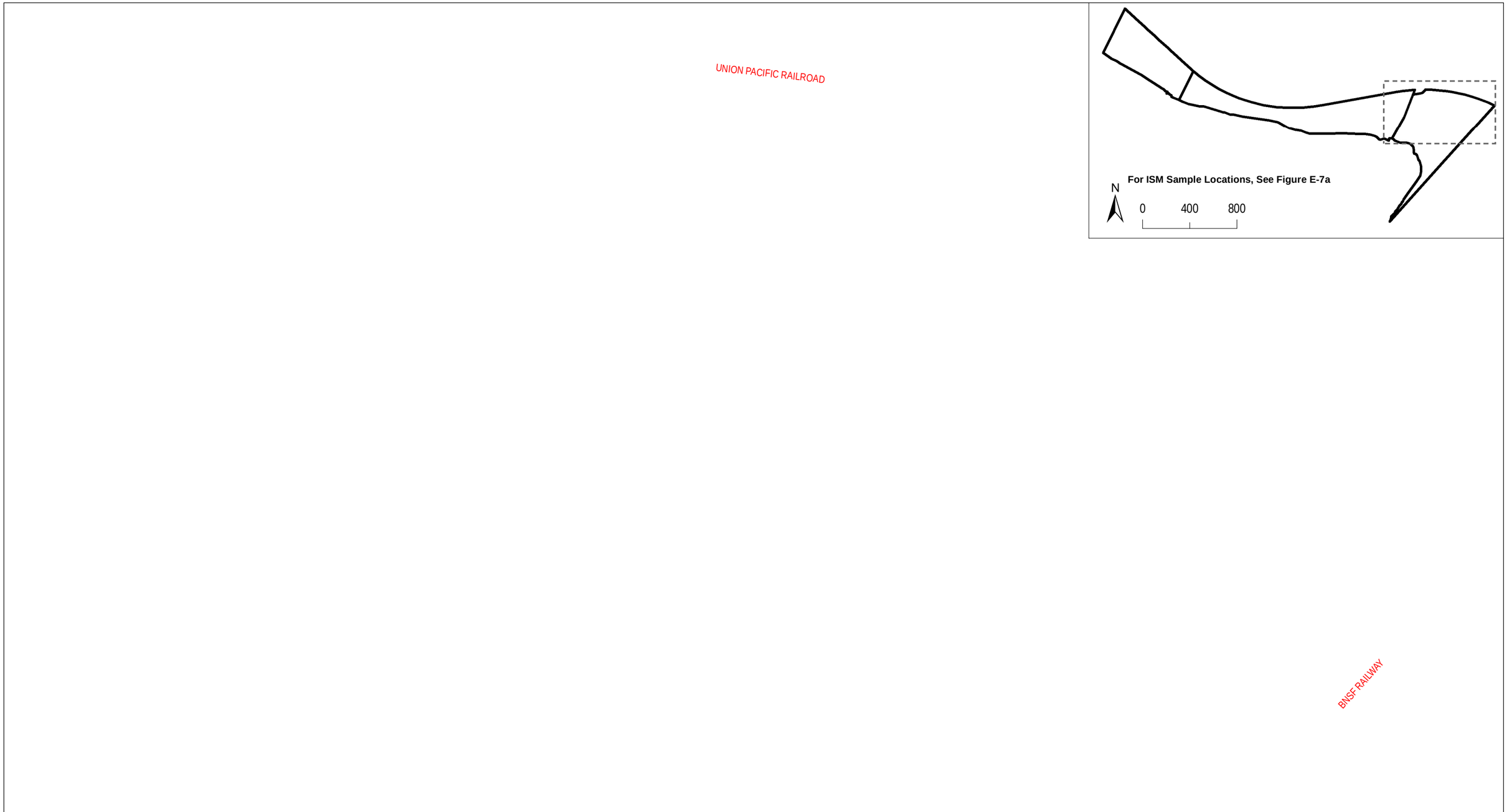
Project Number	1056-10	Figure
March 2019		E-7c



Legend:

- Composite Sample Concentration Above Mammal Hot Spot Concentration
- Discrete Sample Concentration Above Mammal Hot Spot Concentration
- Composite Sample Concentration Above Mammal PRG
- Discrete Sample Concentration Above Mammal PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
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- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Mammal).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - Nickel in Surface Soil - 4 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
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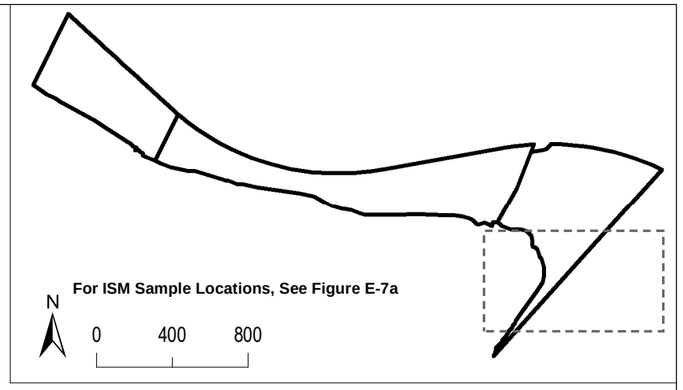
Project Number	1056-10	Figure
March 2019		E-7d



BNSF RAILWAY

Legend:

- Composite Sample Concentration Above Mammal Hot Spot Concentration
- Discrete Sample Concentration Above Mammal Hot Spot Concentration
- Composite Sample Concentration Above Mammal PRG
- Discrete Sample Concentration Above Mammal PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
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- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Mammal).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - Nickel in Surface Soil - 5 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
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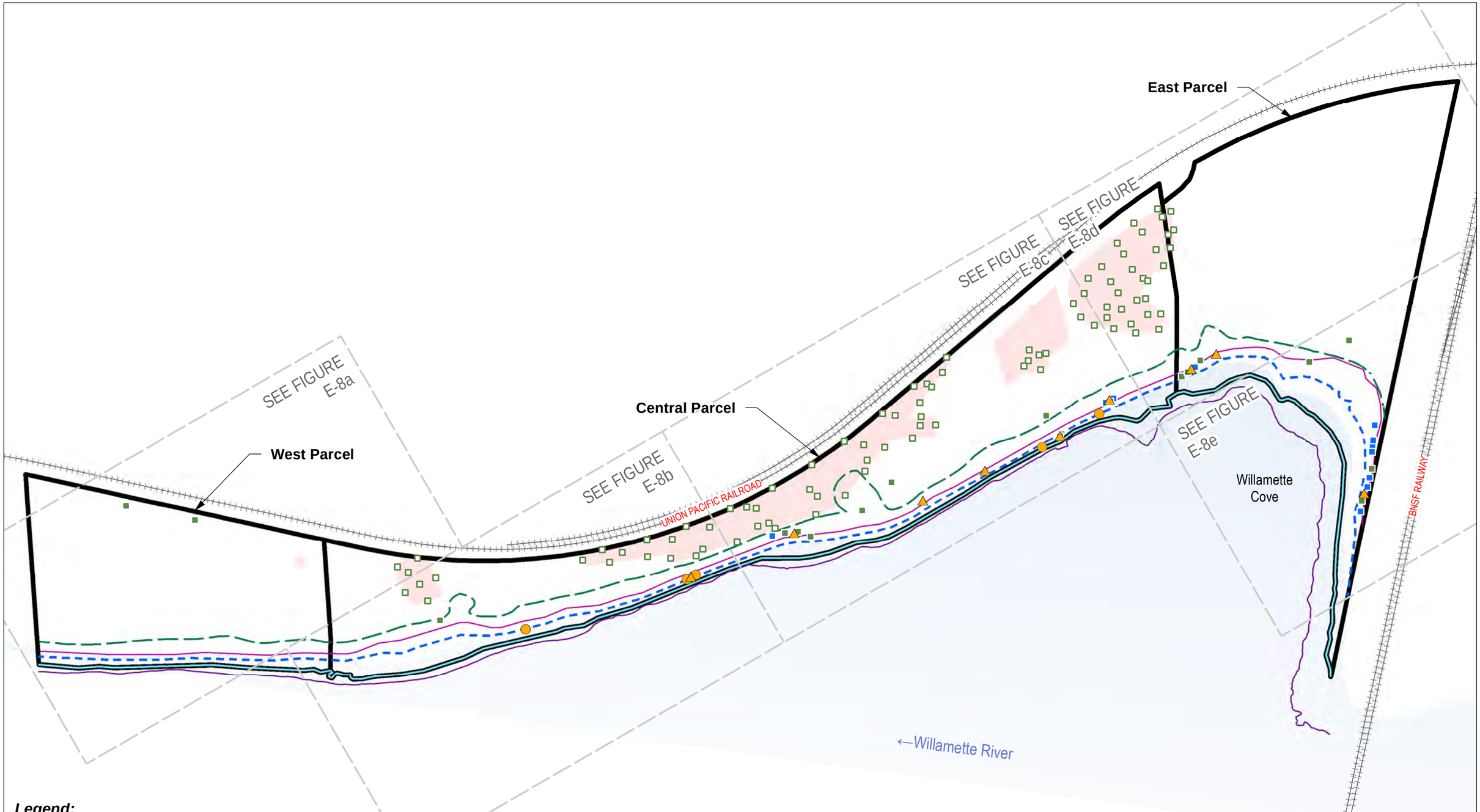
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-7e



Legend:

- Composite Sample Concentration Above Plant Hot Spot Concentration
- Discrete Sample Concentration Above Plant Hot Spot Concentration
- Composite Sample Concentration Above Plant PRG
- Discrete Sample Concentration Above Plant PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
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Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Plant).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 200 400

Approximate Scale in Feet

N

Maximum ERs - Ecological - Selenium in Surface Soil

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX

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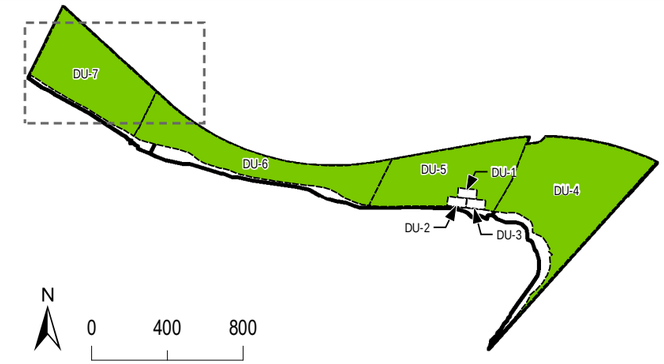
Project Number	1056-10	Figure
March 2019		E-8

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Concentration Above Plant Hot Spot Concentration
- Discrete Sample Concentration Above Plant Hot Spot Concentration
- Composite Sample Concentration Above Plant PRG
- Discrete Sample Concentration Above Plant PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
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- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Plant).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - Selenium in Surface Soil - 1 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

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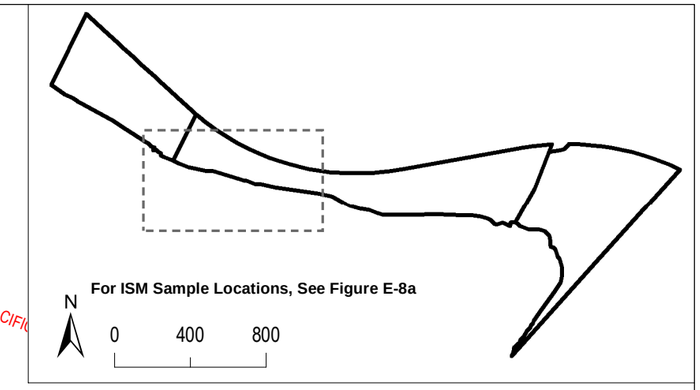
Project Number	1056-10	Figure
March 2019		E-8a



UNION PACIFIC

Legend:

- Composite Sample Concentration Above Plant Hot Spot Concentration
- Discrete Sample Concentration Above Plant Hot Spot Concentration
- Composite Sample Concentration Above Plant PRG
- Discrete Sample Concentration Above Plant PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
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- Ordinary Low Water Line (6.9NAVD88)
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Notes:

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2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Plant).
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7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - Selenium in Surface Soil - 2 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
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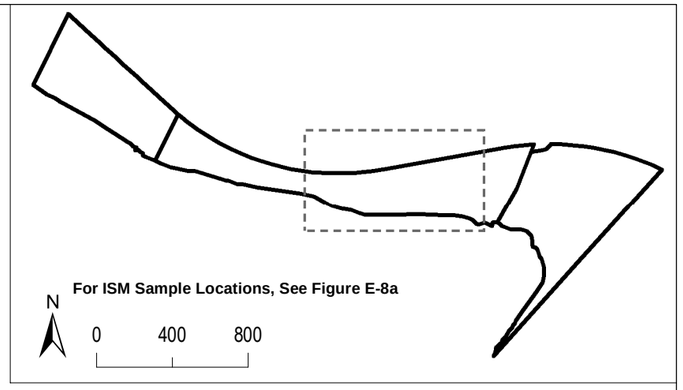
Project Number	1056-10	Figure
March 2019		E-8b



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Concentration Above Plant Hot Spot Concentration
- Discrete Sample Concentration Above Plant Hot Spot Concentration
- Composite Sample Concentration Above Plant PRG
- Discrete Sample Concentration Above Plant PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
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Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Plant).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - Selenium in Surface Soil - 3 of 5

Revised Feasibility Study and Source Control Evaluation
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Project Number	1056-10	Figure
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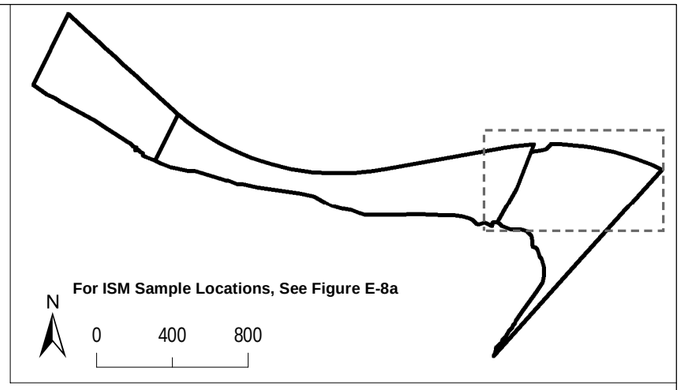
UNION PACIFIC RAILROAD



BNSF RAILWAY

Legend:

- Composite Sample Concentration Above Plant Hot Spot Concentration
- Discrete Sample Concentration Above Plant Hot Spot Concentration
- Composite Sample Concentration Above Plant PRG
- Discrete Sample Concentration Above Plant PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
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Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Plant).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - Selenium in Surface Soil - 4 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

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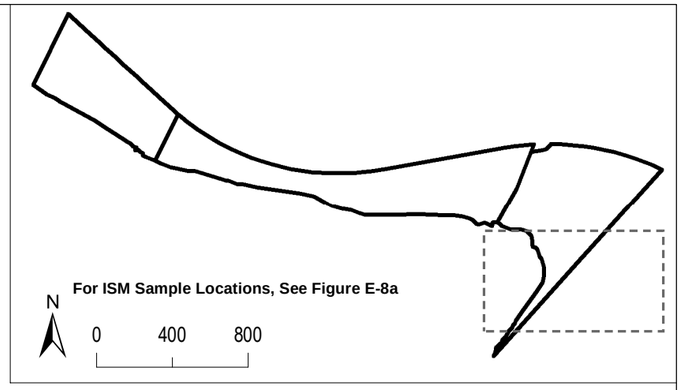
March 2019

Figure E-8d



BNSF RAILWAY

Legend:

- Composite Sample Concentration Above Plant Hot Spot Concentration
- Discrete Sample Concentration Above Plant Hot Spot Concentration
- Composite Sample Concentration Above Plant PRG
- Discrete Sample Concentration Above Plant PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
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- Mean High Water Line (13.3NAVD88)
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- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

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2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Plant).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

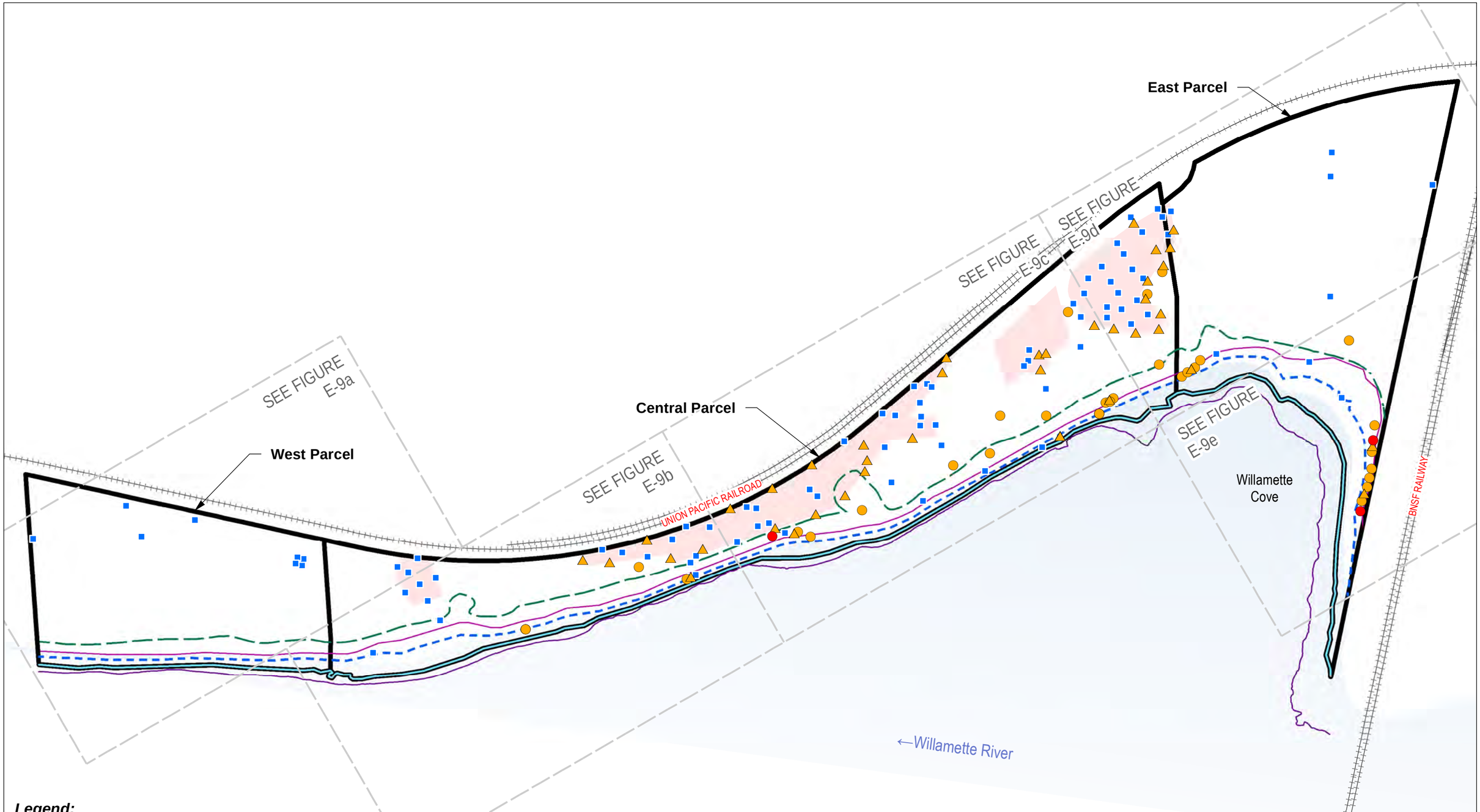
Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - Selenium in Surface Soil - 5 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-8e



Legend:

- Composite Sample Concentration Above Ecological Hot Spot Concentration
- Discrete Sample Concentration Above Ecological Hot Spot Concentration
- Composite Sample Concentration Above Ecological PRG
- Discrete Sample Concentration Above Ecological PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG.
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 200 400

Approximate Scale in Feet

N

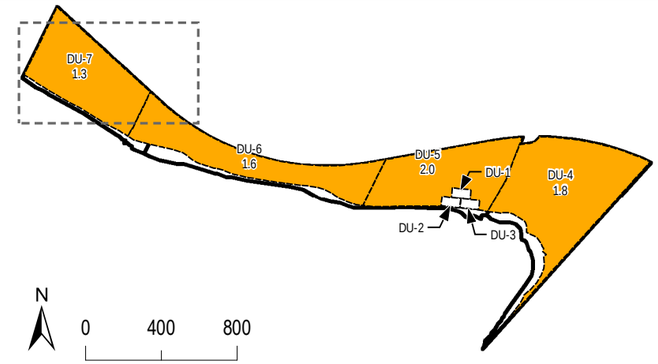
Maximum ERs - Ecological - Zinc in Surface Soil

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-9

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Concentration Above Ecological Hot Spot Concentration
- Discrete Sample Concentration Above Ecological Hot Spot Concentration
- Composite Sample Concentration Above Ecological PRG
- Discrete Sample Concentration Above Ecological PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG.
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

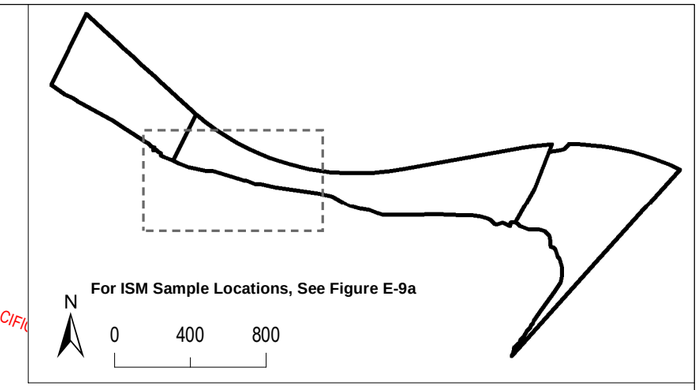
Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - Zinc in Surface Soil - 1 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-9a



UNION PACIFIC

Legend:

- Composite Sample Concentration Above Ecological Hot Spot Concentration
- Discrete Sample Concentration Above Ecological Hot Spot Concentration
- Composite Sample Concentration Above Ecological PRG
- Discrete Sample Concentration Above Ecological PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG.
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

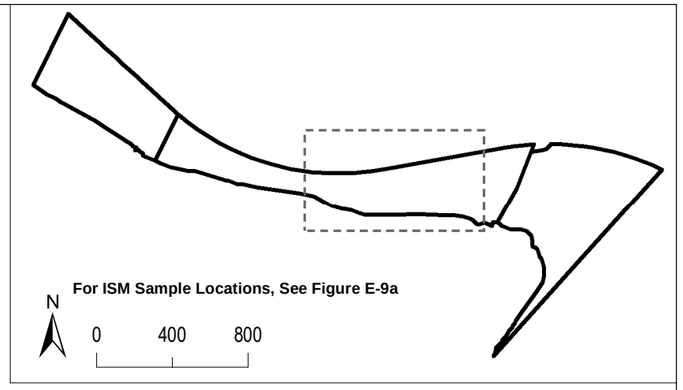
Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - Zinc in Surface Soil - 2 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-9b



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Concentration Above Ecological Hot Spot Concentration
- Discrete Sample Concentration Above Ecological Hot Spot Concentration
- Composite Sample Concentration Above Ecological PRG
- Discrete Sample Concentration Above Ecological PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG.
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

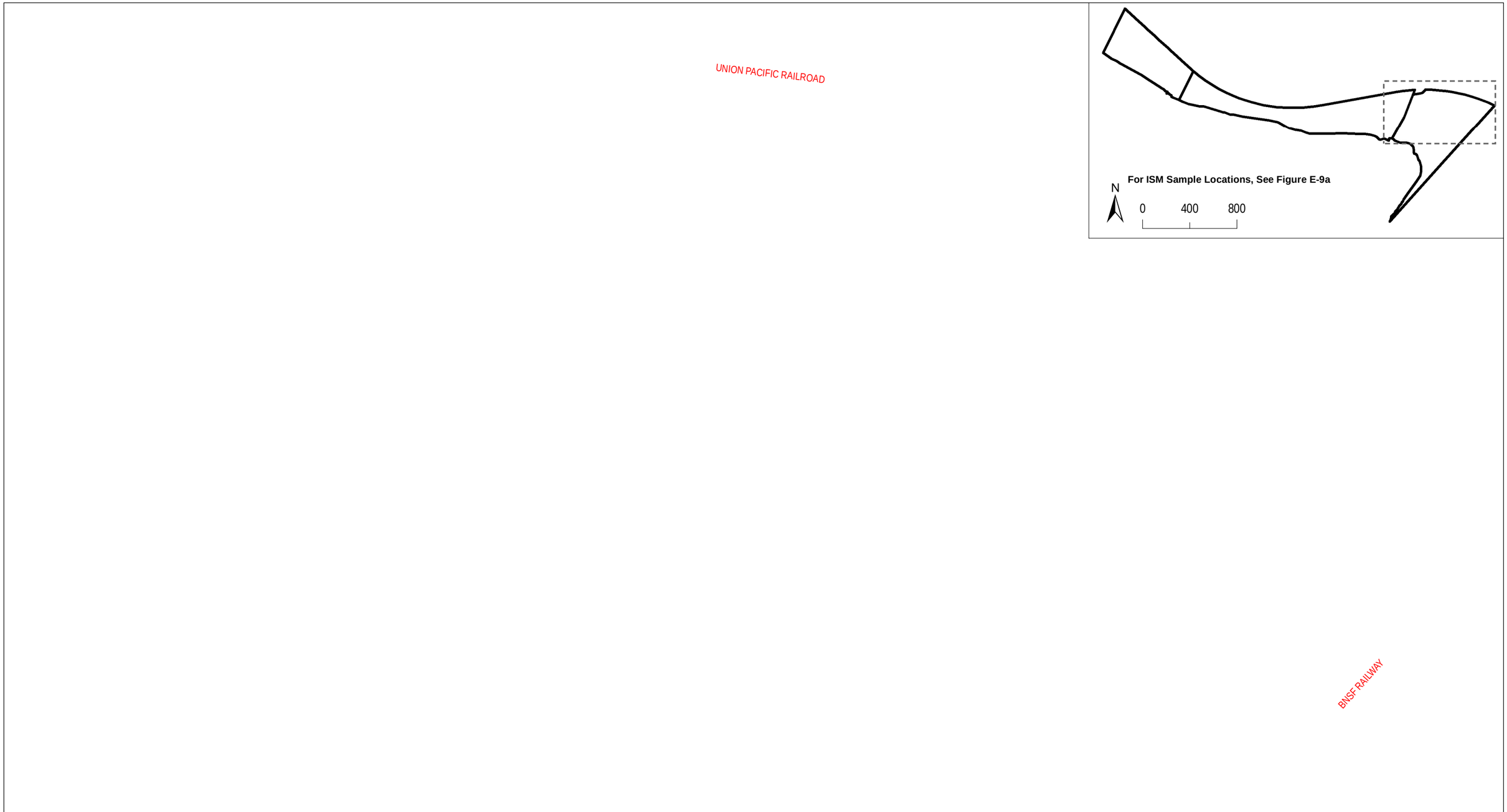
Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - Zinc in Surface Soil - 3 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-9c



Legend:

- Composite Sample Concentration Above Ecological Hot Spot Concentration
- Discrete Sample Concentration Above Ecological Hot Spot Concentration
- Composite Sample Concentration Above Ecological PRG
- Discrete Sample Concentration Above Ecological PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG.
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - Zinc in Surface Soil - 4 of 5

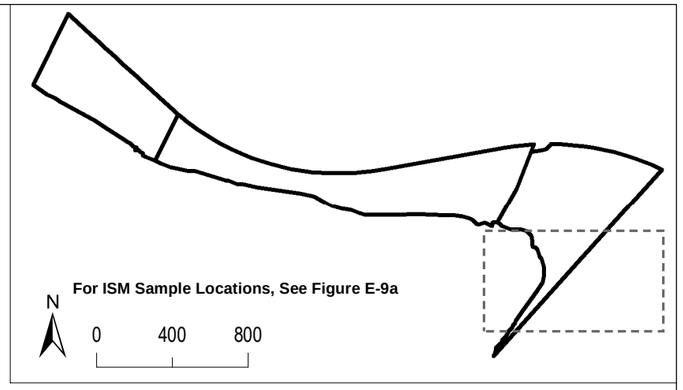
Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number 1056-10

March 2019

Figure E-9d



BNSF RAILWAY

Legend:

- Composite Sample Concentration Above Ecological Hot Spot Concentration
- Discrete Sample Concentration Above Ecological Hot Spot Concentration
- Composite Sample Concentration Above Ecological PRG
- Discrete Sample Concentration Above Ecological PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG.
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - Zinc in Surface Soil - 5 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
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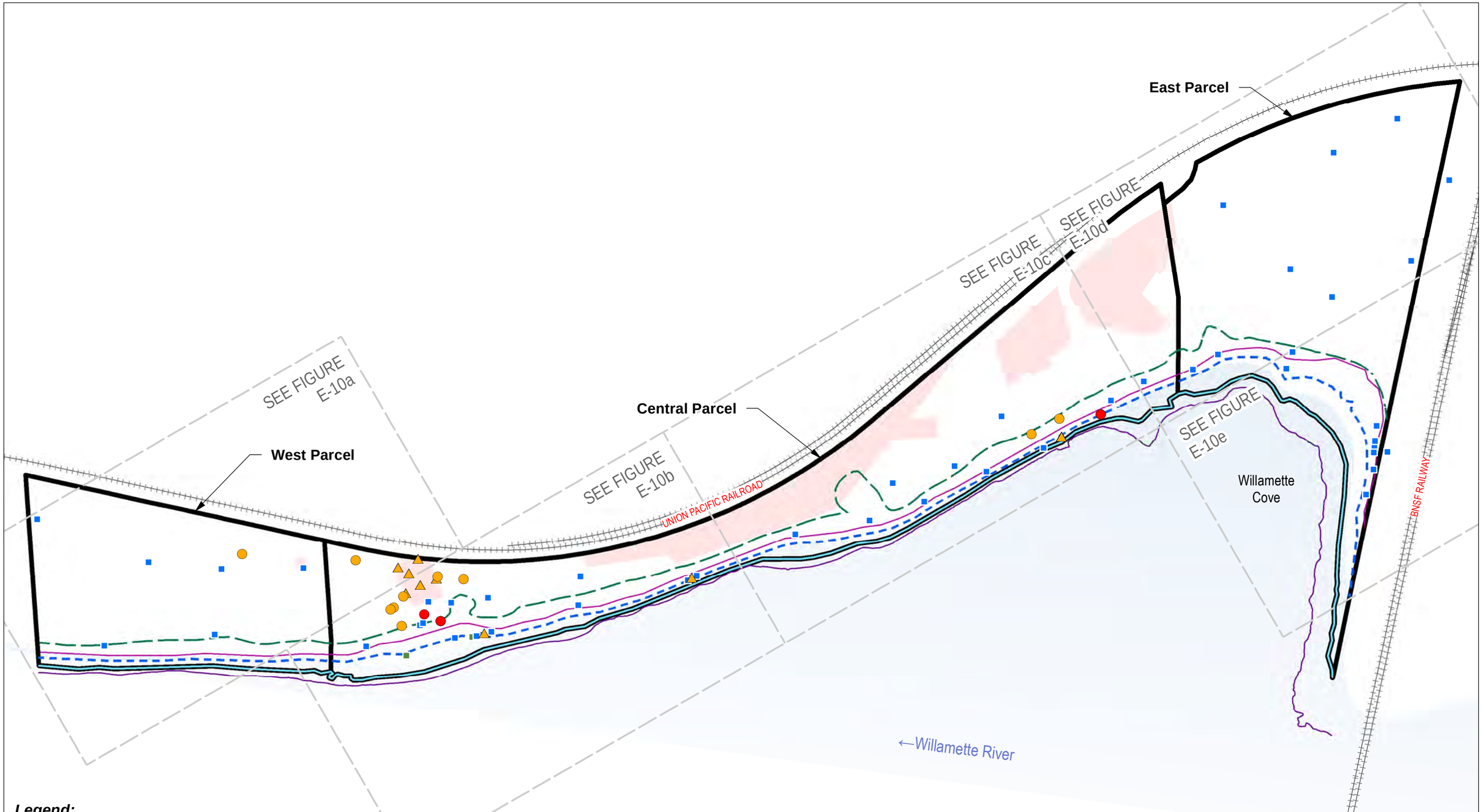
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-9e



Legend:

- Composite Sample Concentration Above Mammal Hot Spot Concentration
- Discrete Sample Concentration Above Mammal Hot Spot Concentration
- Composite Sample Concentration Above Mammal PRG
- Discrete Sample Concentration Above Mammal PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Mammal).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 200 400

Approximate Scale in Feet

N

Maximum ERs - Ecological - HPAH in Surface Soil

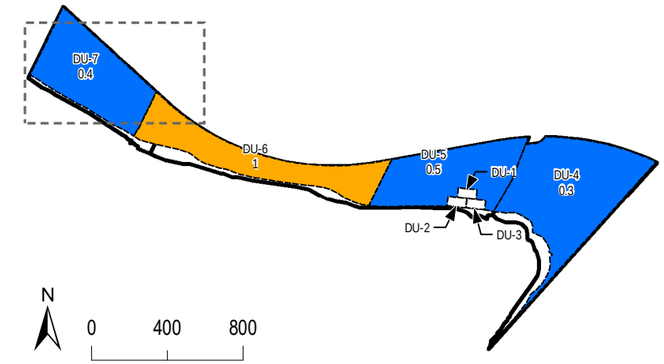
Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX

Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-10

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Concentration Above Mammal Hot Spot Concentration
- Discrete Sample Concentration Above Mammal Hot Spot Concentration
- Composite Sample Concentration Above Mammal PRG
- Discrete Sample Concentration Above Mammal PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Mammal).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

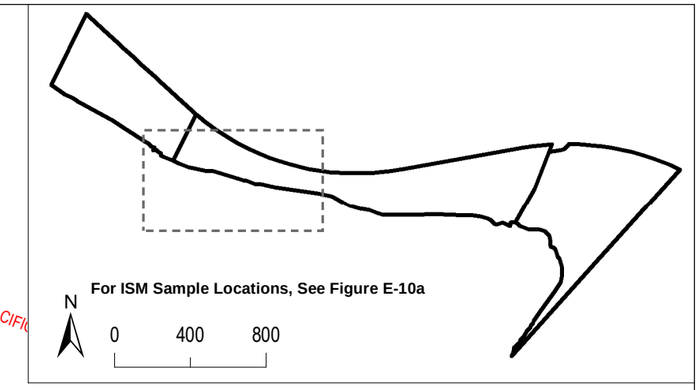
Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - HPAH in Surface Soil - 1 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-10a



UNION PACIFIC

Legend:

- Composite Sample Concentration Above Mammal Hot Spot Concentration
- Discrete Sample Concentration Above Mammal Hot Spot Concentration
- Composite Sample Concentration Above Mammal PRG
- Discrete Sample Concentration Above Mammal PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Mammal).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - HPAH in Surface Soil - 2 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
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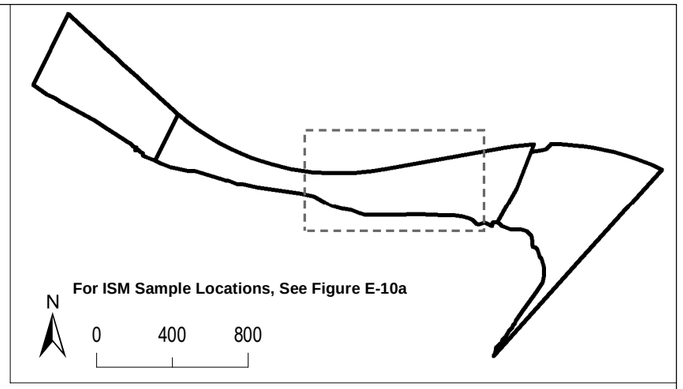
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-10b



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Concentration Above Mammal Hot Spot Concentration
- Discrete Sample Concentration Above Mammal Hot Spot Concentration
- Composite Sample Concentration Above Mammal PRG
- Discrete Sample Concentration Above Mammal PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
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- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Mammal).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - HPAH in Surface Soil - 3 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
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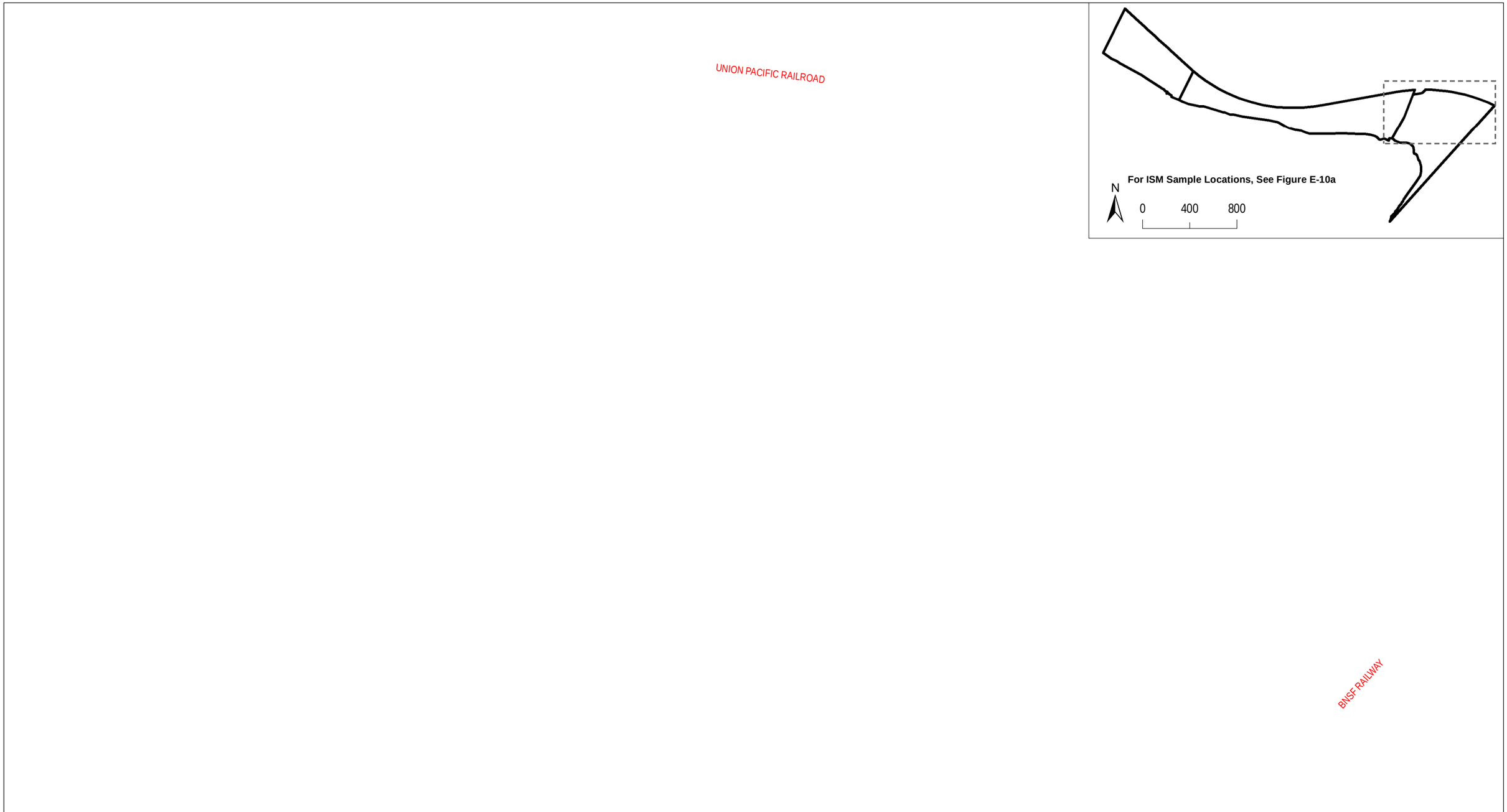
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-10c



Legend:

- Composite Sample Concentration Above Mammal Hot Spot Concentration
- Discrete Sample Concentration Above Mammal Hot Spot Concentration
- Composite Sample Concentration Above Mammal PRG
- Discrete Sample Concentration Above Mammal PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
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- Ordinary Low Water Line (6.9NAVD88)
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Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Mammal).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - HPAH in Surface Soil - 4 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
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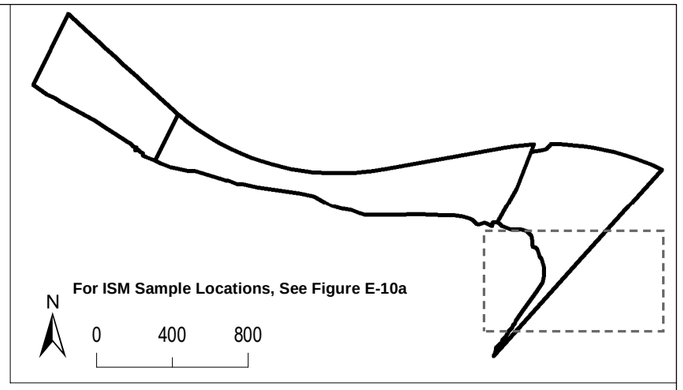
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-10d



BNSF RAILWAY

Legend:

- Composite Sample Concentration Above Mammal Hot Spot Concentration
- Discrete Sample Concentration Above Mammal Hot Spot Concentration
- Composite Sample Concentration Above Mammal PRG
- Discrete Sample Concentration Above Mammal PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
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- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Mammal).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

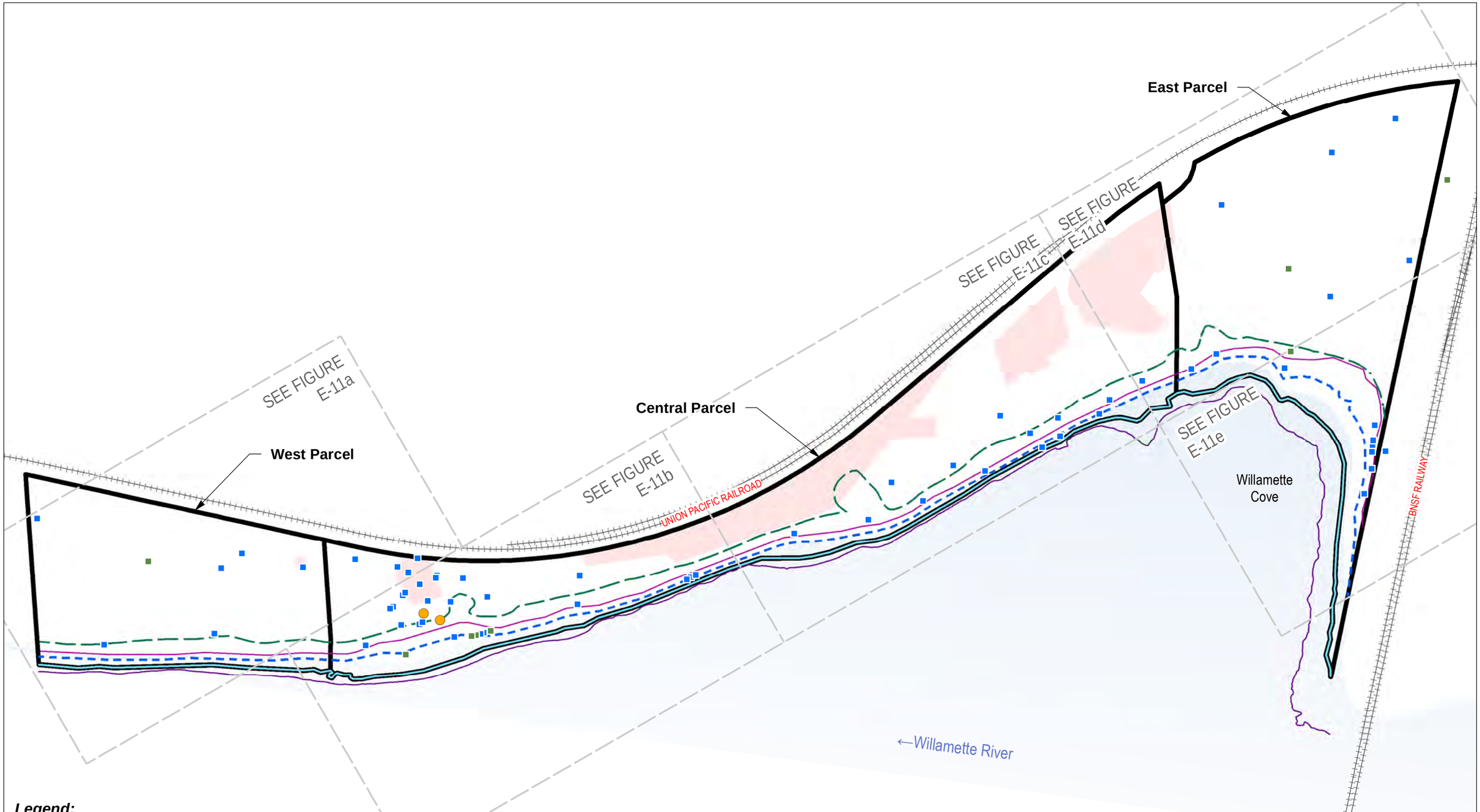
Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - HPAH in Surface Soil - 5 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-10e



Legend:

- Composite Sample Concentration Above Invertebrate Hot Spot Concentration
- Discrete Sample Concentration Above Invertebrate Hot Spot Concentration
- Composite Sample Concentration Above Invertebrate PRG
- Discrete Sample Concentration Above Invertebrate PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
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- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Invertebrate).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 200 400

Approximate Scale in Feet

N

Maximum ERs - Ecological - LPAH in Surface Soil

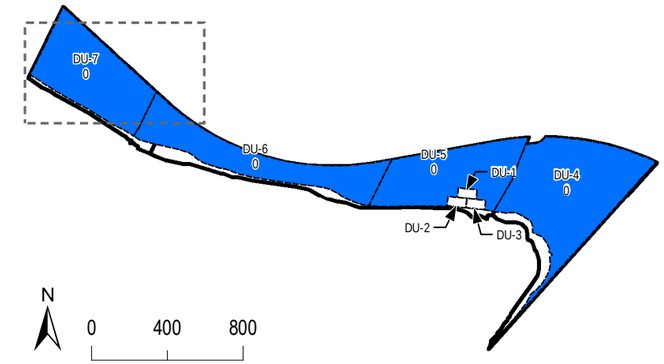
Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX

Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-11

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Concentration Above Invertebrate Hot Spot Concentration
- Discrete Sample Concentration Above Invertebrate Hot Spot Concentration
- Composite Sample Concentration Above Invertebrate PRG
- Discrete Sample Concentration Above Invertebrate PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Invertebrate).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

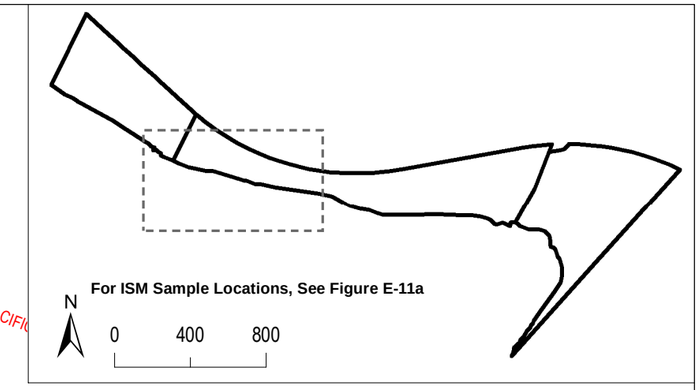
Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - LPAH in Surface Soil - 1 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-11a



UNION PACIFIC

Legend:

- Composite Sample Concentration Above Invertebrate Hot Spot Concentration
- Discrete Sample Concentration Above Invertebrate Hot Spot Concentration
- Composite Sample Concentration Above Invertebrate PRG
- Discrete Sample Concentration Above Invertebrate PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Invertebrate).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - LPAH in Surface Soil - 2 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
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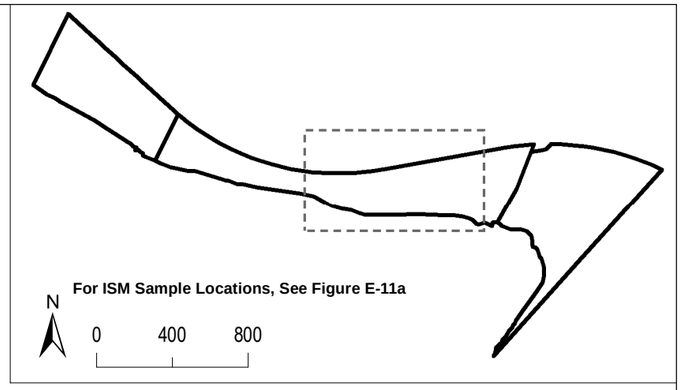
Portland, Oregon 97201

Project Number 1056-10

March 2019

Figure E-11b



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Concentration Above Invertebrate Hot Spot Concentration
- Discrete Sample Concentration Above Invertebrate Hot Spot Concentration
- Composite Sample Concentration Above Invertebrate PRG
- Discrete Sample Concentration Above Invertebrate PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Invertebrate).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - LPAH in Surface Soil - 3 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
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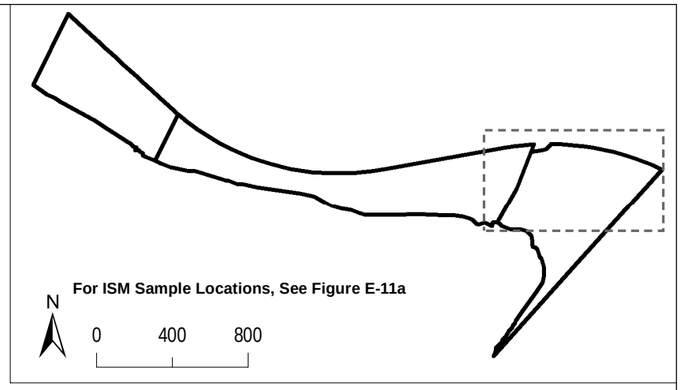
Project Number	1056-10	Figure
March 2019		E-11c

UNION PACIFIC RAILROAD



BNSF RAILWAY

Legend:

- Composite Sample Concentration Above Invertebrate Hot Spot Concentration
- Discrete Sample Concentration Above Invertebrate Hot Spot Concentration
- Composite Sample Concentration Above Invertebrate PRG
- Discrete Sample Concentration Above Invertebrate PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
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- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Invertebrate).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - LPAH in Surface Soil - 4 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

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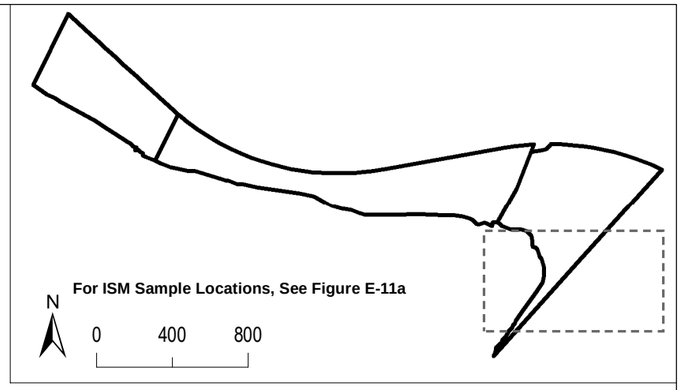
Project Number 1056-10

March 2019

Figure E-11d



BNSF RAILWAY

Legend:

- Composite Sample Concentration Above Invertebrate Hot Spot Concentration
- Discrete Sample Concentration Above Invertebrate Hot Spot Concentration
- Composite Sample Concentration Above Invertebrate PRG
- Discrete Sample Concentration Above Invertebrate PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
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- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Invertebrate).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - LPAH in Surface Soil - 5 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
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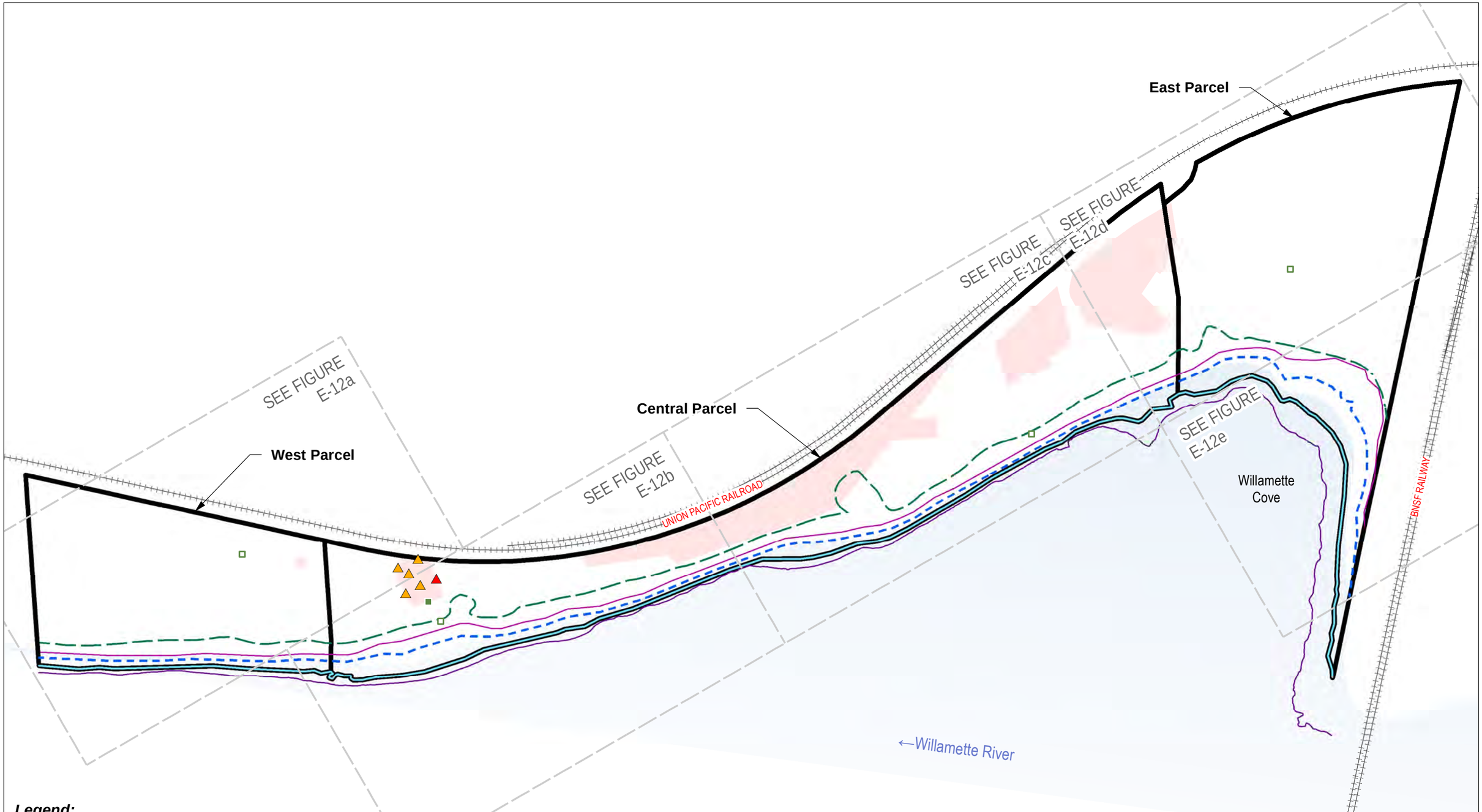
Project Number	1056-10	Figure
March 2019		E-11e



Legend:

- Composite Sample Concentration Above Mammal Hot Spot Concentration
- Discrete Sample Concentration Above Mammal Hot Spot Concentration
- Composite Sample Concentration Above Mammal PRG
- Discrete Sample Concentration Above Mammal PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
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- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Mammal).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 200 400

Approximate Scale in Feet

N

Maximum ERs - Ecological - Dibenzofuran in Surface Soil

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

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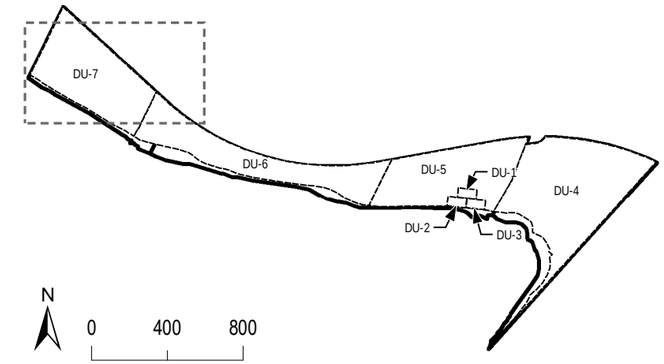
Project Number 1056-10

March 2019

Figure E-12

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Concentration Above Mammal Hot Spot Concentration
- Discrete Sample Concentration Above Mammal Hot Spot Concentration
- Composite Sample Concentration Above Mammal PRG
- Discrete Sample Concentration Above Mammal PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Mammal).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - Dibenzofuran in Surface Soil - 1 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
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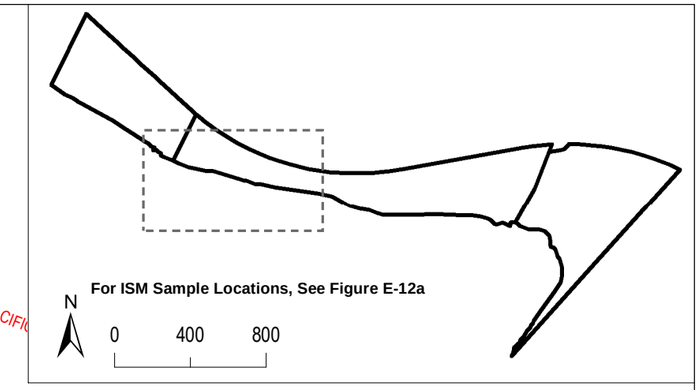
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-12a



UNION PACIFIC

Legend:

- Composite Sample Concentration Above Mammal Hot Spot Concentration
- Discrete Sample Concentration Above Mammal Hot Spot Concentration
- Composite Sample Concentration Above Mammal PRG
- Discrete Sample Concentration Above Mammal PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Mammal).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

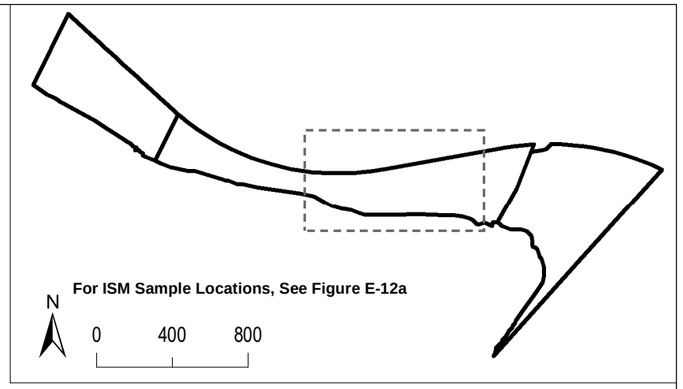
Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - Dibenzofuran in Surface Soil - 2 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-12b



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Concentration Above Mammal Hot Spot Concentration
- Discrete Sample Concentration Above Mammal Hot Spot Concentration
- Composite Sample Concentration Above Mammal PRG
- Discrete Sample Concentration Above Mammal PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Mammal).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - Dibenzofuran in Surface Soil - 3 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
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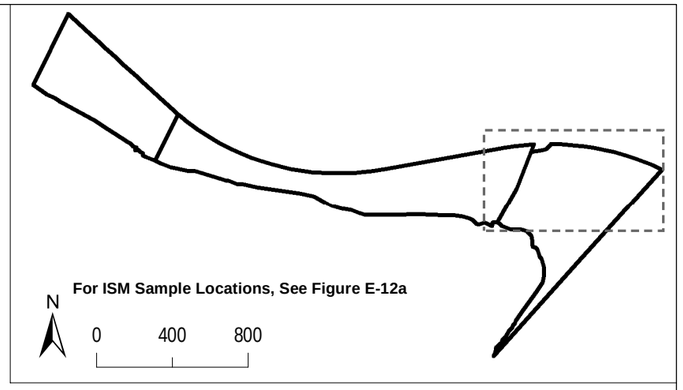
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-12c



UNION PACIFIC RAILROAD

BNSF RAILWAY

Legend:

- Composite Sample Concentration Above Mammal Hot Spot Concentration
- Discrete Sample Concentration Above Mammal Hot Spot Concentration
- Composite Sample Concentration Above Mammal PRG
- Discrete Sample Concentration Above Mammal PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
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- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Mammal).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - Dibenzofuran in Surface Soil - 4 of 5

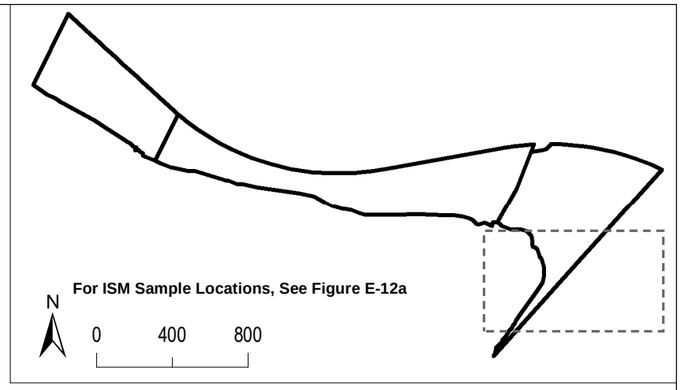
Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number 1056-10

March 2019

Figure E-12d



BNSF RAILWAY

Legend:

- Composite Sample Concentration Above Mammal Hot Spot Concentration
- Discrete Sample Concentration Above Mammal Hot Spot Concentration
- Composite Sample Concentration Above Mammal PRG
- Discrete Sample Concentration Above Mammal PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Mammal).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - Dibenzofuran in Surface Soil - 5 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
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3015 SW First Avenue
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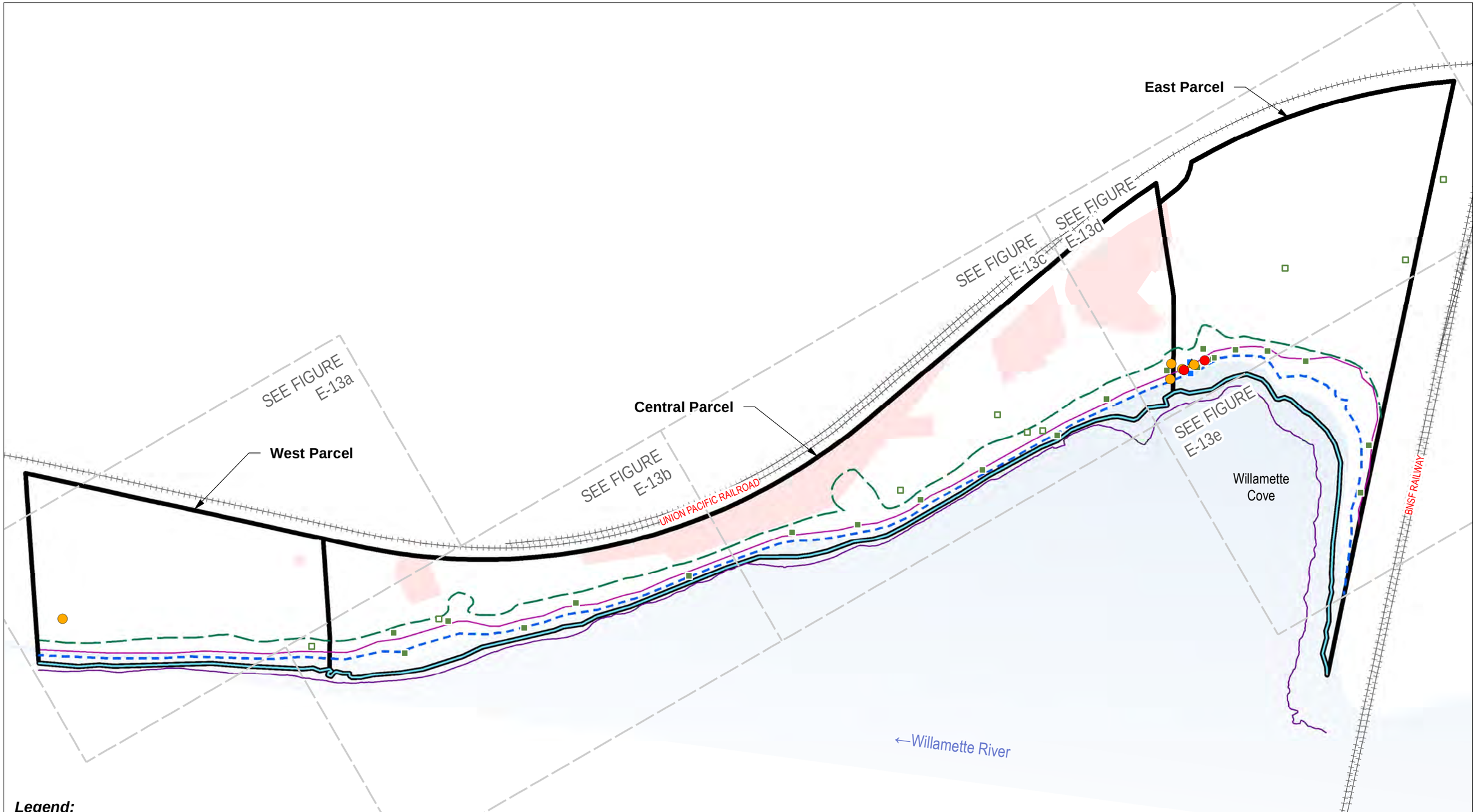
Project Number	1056-10	Figure
March 2019		E-12e



Legend:

- Composite Sample Concentration Above Mammal Hot Spot Concentration
- Discrete Sample Concentration Above Mammal Hot Spot Concentration
- Composite Sample Concentration Above Mammal PRG
- Discrete Sample Concentration Above Mammal PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
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- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Mammal).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology
8. PCB = Polychlorinated Biphenyl

0 200 400

Approximate Scale in Feet

N

Maximum ERs - Ecological - Total PCBs in Surface Soil

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX

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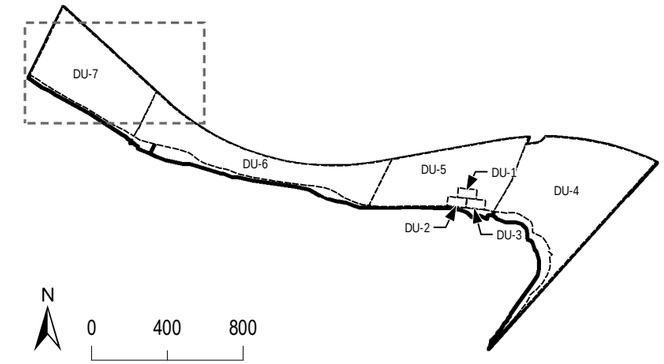
Project Number	1056-10	Figure
March 2019		E-13

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Concentration Above Mammal Hot Spot Concentration
- Discrete Sample Concentration Above Mammal Hot Spot Concentration
- Composite Sample Concentration Above Mammal PRG
- Discrete Sample Concentration Above Mammal PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Mammal).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology
8. PCB = Polychlorinated Biphenyl

0 60 120 N

Approximate Scale in Feet

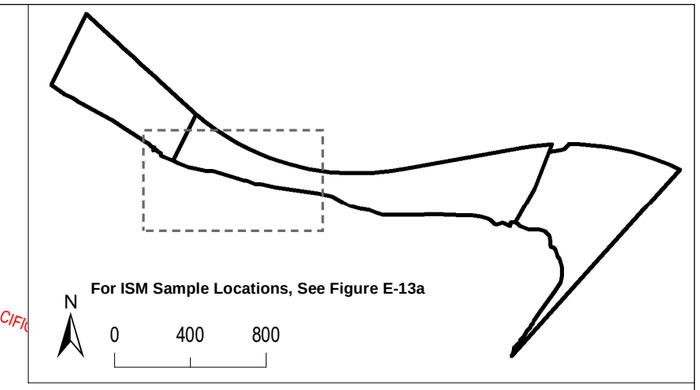
Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - Total PCBs in Surface Soil - 1 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-13a



UNION PACIFIC

Legend:

- Composite Sample Concentration Above Mammal Hot Spot Concentration
- Discrete Sample Concentration Above Mammal Hot Spot Concentration
- Composite Sample Concentration Above Mammal PRG
- Discrete Sample Concentration Above Mammal PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Mammal).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology
8. PCB = Polychlorinated Biphenyl

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - Total PCBs in Surface Soil - 2 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

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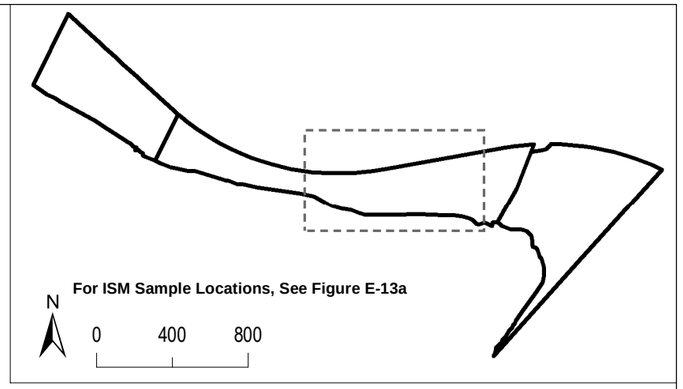
Project Number	1056-10	Figure
March 2019		E-13b



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Concentration Above Mammal Hot Spot Concentration
- Discrete Sample Concentration Above Mammal Hot Spot Concentration
- Composite Sample Concentration Above Mammal PRG
- Discrete Sample Concentration Above Mammal PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Mammal).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology
8. PCB = Polychlorinated Biphenyl

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - Total PCBs in Surface Soil - 3 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

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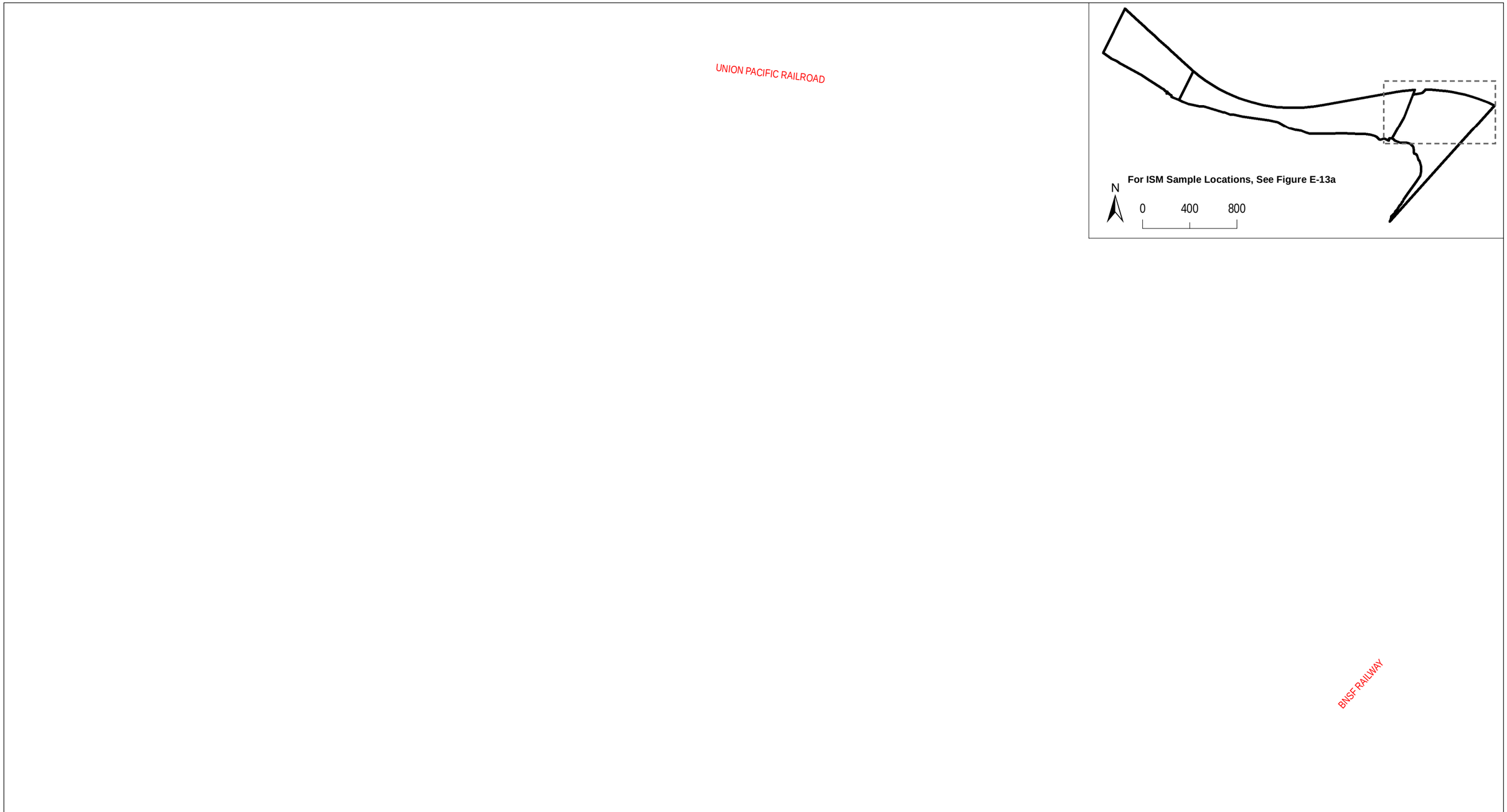
Project Number	1056-10	Figure
March 2019		E-13c



Legend:

- Composite Sample Concentration Above Mammal Hot Spot Concentration
- Discrete Sample Concentration Above Mammal Hot Spot Concentration
- Composite Sample Concentration Above Mammal PRG
- Discrete Sample Concentration Above Mammal PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Mammal).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology
8. PCB = Polychlorinated Biphenyl

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - Total PCBs in Surface Soil - 4 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
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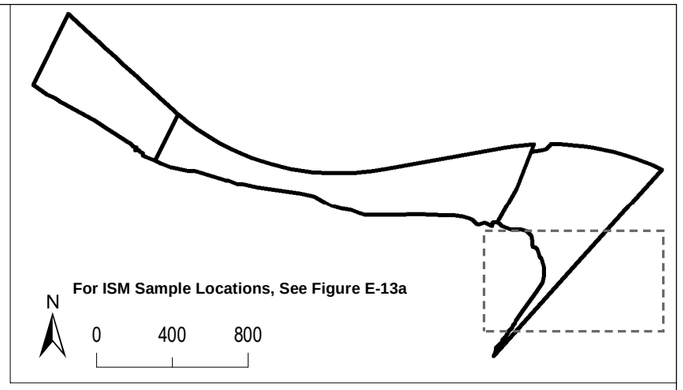
Project Number	1056-10	Figure
March 2019		E-13d



BNSF RAILWAY

Legend:

- Composite Sample Concentration Above Mammal Hot Spot Concentration
- Discrete Sample Concentration Above Mammal Hot Spot Concentration
- Composite Sample Concentration Above Mammal PRG
- Discrete Sample Concentration Above Mammal PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Mammal).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology
8. PCB = Polychlorinated Biphenyl

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - Total PCBs in Surface Soil - 5 of 5

Revised Feasibility Study and Source Control Evaluation
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Portland, Oregon

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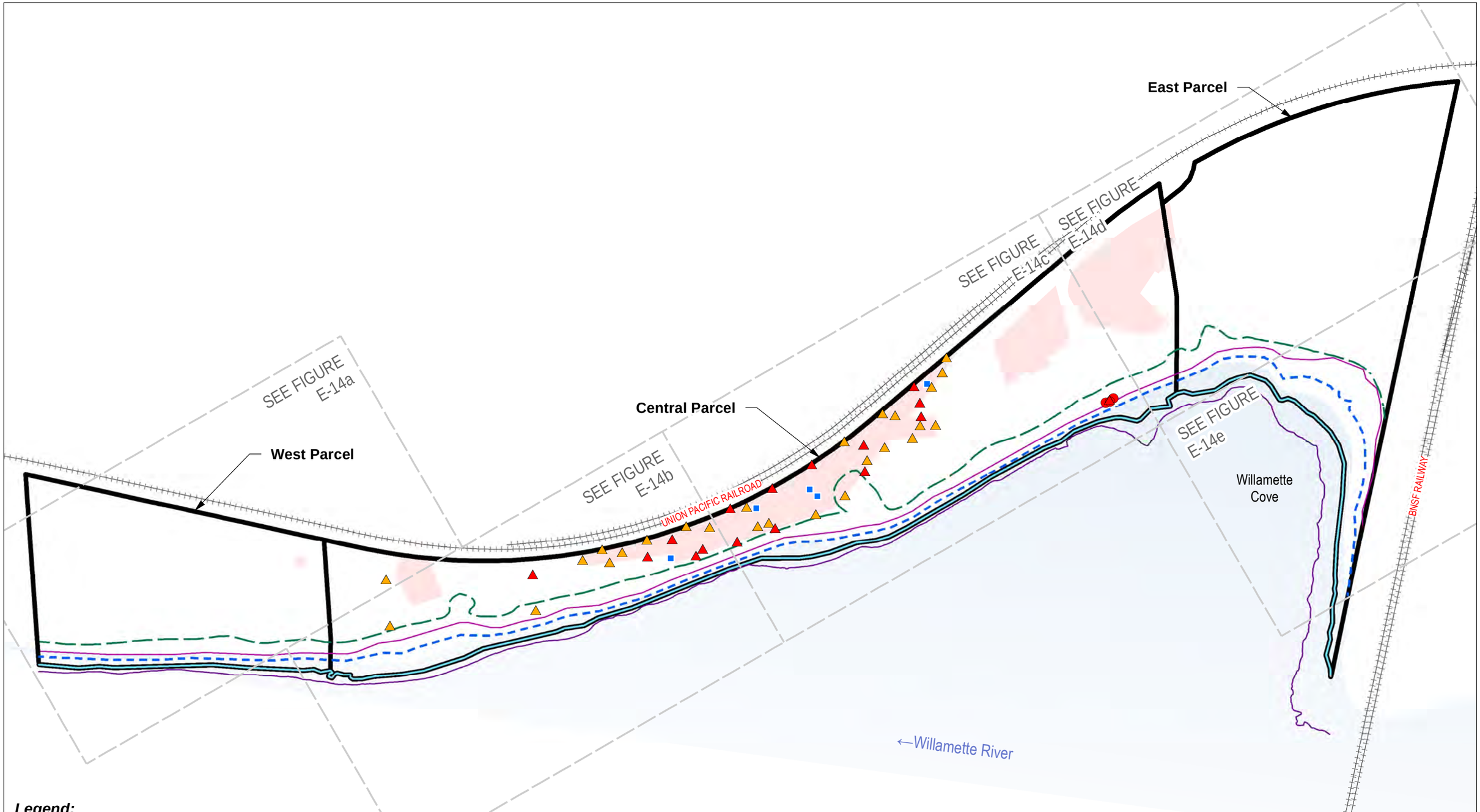
Project Number	1056-10	Figure
March 2019		E-13e



Legend:

- Composite Sample Concentration Above Mammal Hot Spot Concentration
- Discrete Sample Concentration Above Mammal Hot Spot Concentration
- Composite Sample Concentration Above Mammal PRG
- Discrete Sample Concentration Above Mammal PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
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- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Mammal).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 200 400

Approximate Scale in Feet

N

Maximum ERs - Ecological - Dioxin TEQ in Surface Soil

Revised Feasibility Study and Source Control Evaluation
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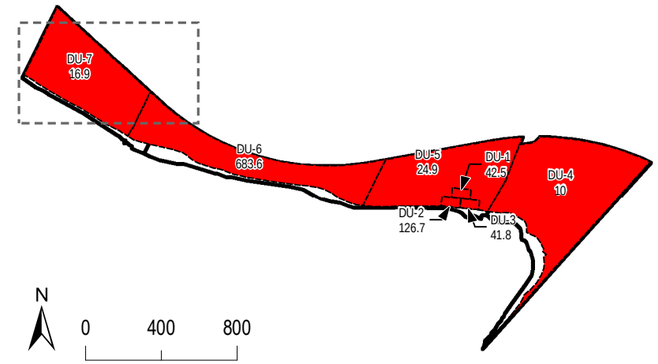
Project Number	1056-10	Figure
March 2019		E-14

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Concentration Above Mammal Hot Spot Concentration
- Discrete Sample Concentration Above Mammal Hot Spot Concentration
- Composite Sample Concentration Above Mammal PRG
- Discrete Sample Concentration Above Mammal PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Mammal).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - Dioxin TEQ in Surface Soil - 1 of 3

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

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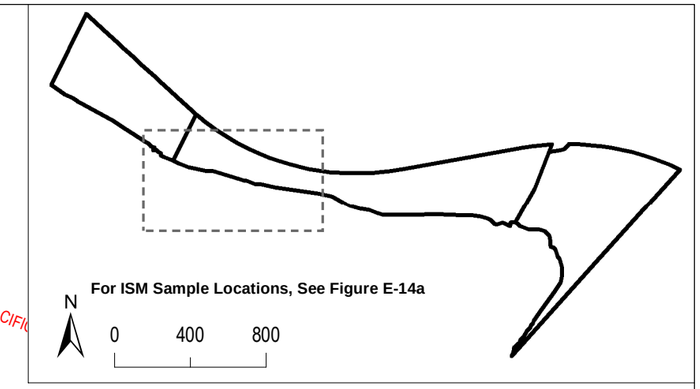
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-14a



UNION PACIFIC

Legend:

- Composite Sample Concentration Above Mammal Hot Spot Concentration
- Discrete Sample Concentration Above Mammal Hot Spot Concentration
- Composite Sample Concentration Above Mammal PRG
- Discrete Sample Concentration Above Mammal PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Mammal).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - Dioxin TEQ in Surface Soil - 2 of 3

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
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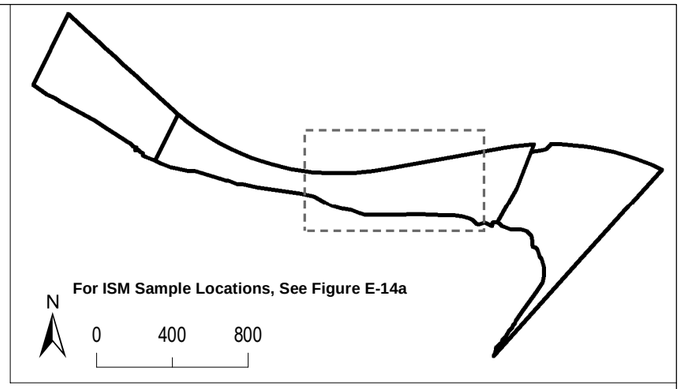
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-14b



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Concentration Above Mammal Hot Spot Concentration
- Discrete Sample Concentration Above Mammal Hot Spot Concentration
- Composite Sample Concentration Above Mammal PRG
- Discrete Sample Concentration Above Mammal PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Mammal).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - Dioxin TEQ in Surface Soil - 3 of 3

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX

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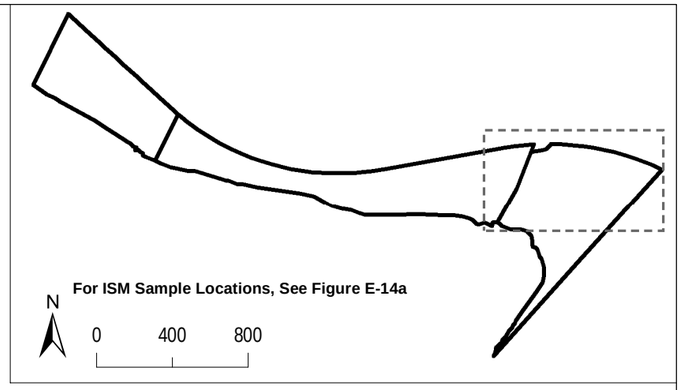
Project Number	1056-10	Figure
March 2019		E-14c

UNION PACIFIC RAILROAD



BNSF RAILWAY

Legend:

- Composite Sample Concentration Above Mammal Hot Spot Concentration
- Discrete Sample Concentration Above Mammal Hot Spot Concentration
- Composite Sample Concentration Above Mammal PRG
- Discrete Sample Concentration Above Mammal PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Mammal).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - Dioxin TEQ in Surface Soil - 4 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX

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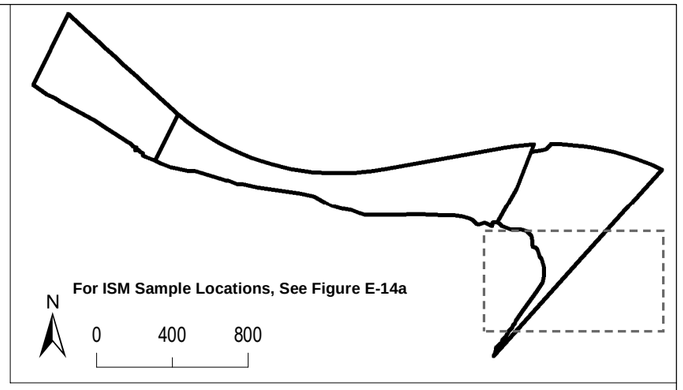
Project Number 1056-10

March 2019

Figure E-14d



BNSF RAILWAY

Legend:

- Composite Sample Concentration Above Mammal Hot Spot Concentration
- Discrete Sample Concentration Above Mammal Hot Spot Concentration
- Composite Sample Concentration Above Mammal PRG
- Discrete Sample Concentration Above Mammal PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG (Mammal).
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Ecological - Dioxin TEQ in Surface Soil - 5 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX

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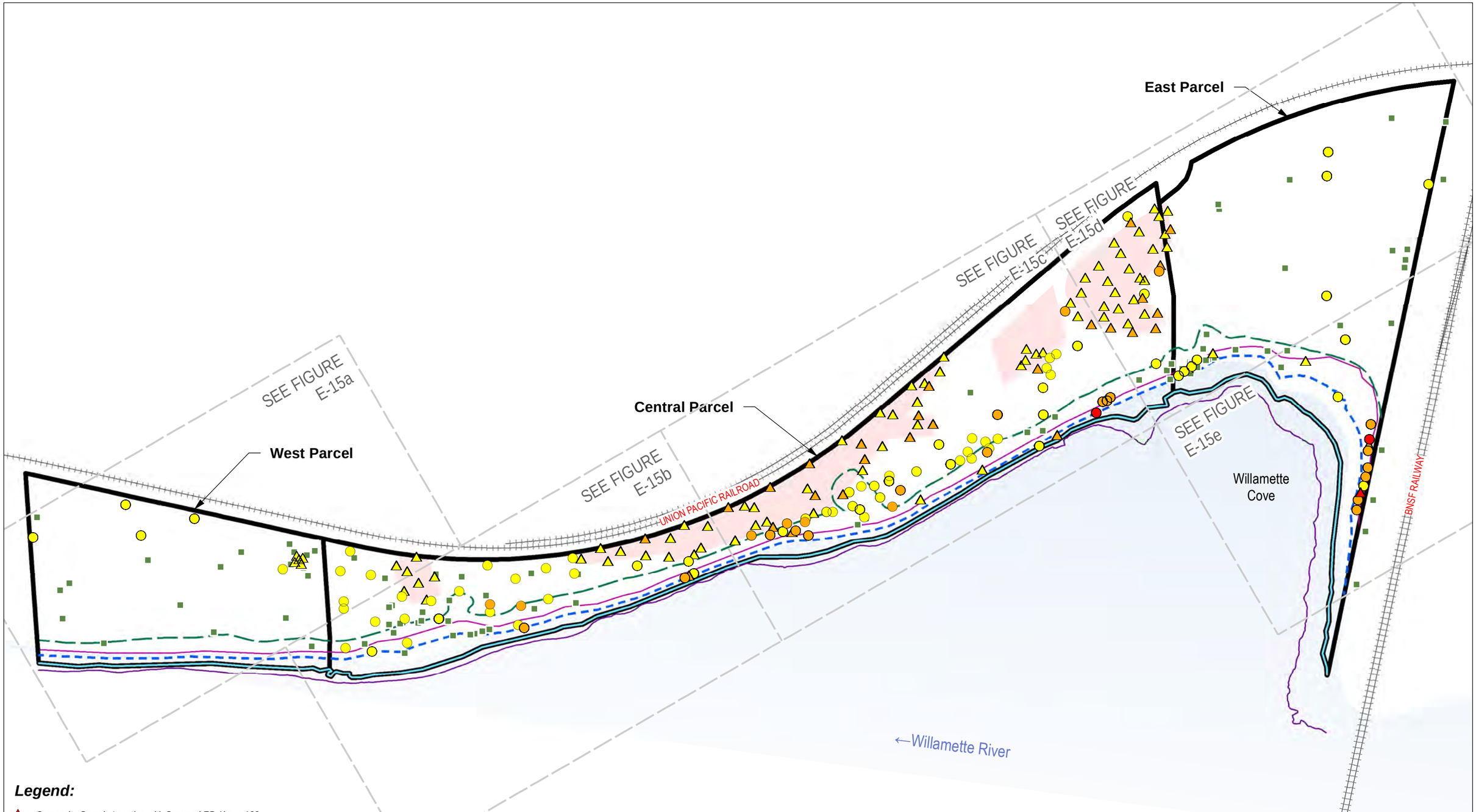
Project Number	1056-10	Figure
March 2019		E-14e



Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

RA1 S1
1.6 (ZINC 0.5)
Summed ER — Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology

0 200 400
Approximate Scale in Feet

N

Summed ERs - Upland Surface Soil Plant

Revised Feasibility Study and Source Control Evaluation
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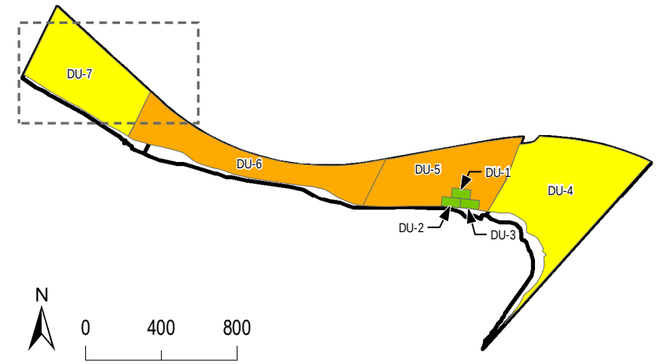
Project Number	1056-10	Figure
March 2019		E-15

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

RA1 S1
1.6 (ZINC 0.5)
Summed ER
Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology

0 60 120
Approximate Scale in Feet
N

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Summed ERs
Upland Surface Soil Plant - 1 of 5

Revised Feasibility Study and Source Control Evaluation
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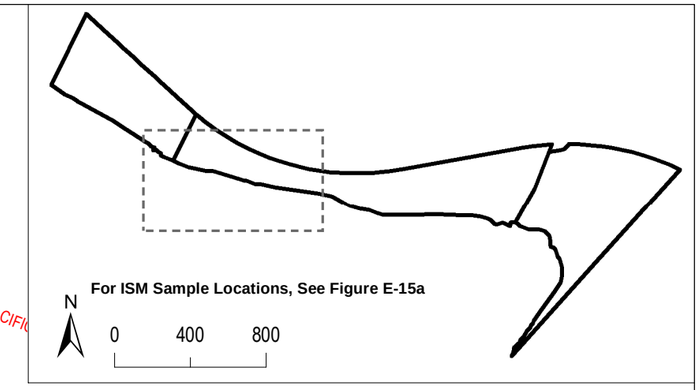
Project Number	1056-10	Figure
March 2019		E-15a



UNION PACIFIC

Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

RA1 S1
1.6 (ZINC 0.5)
Summed ER
Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology

0 60 120
Approximate Scale in Feet
N

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Summed ERs
Upland Surface Soil Plant - 2 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
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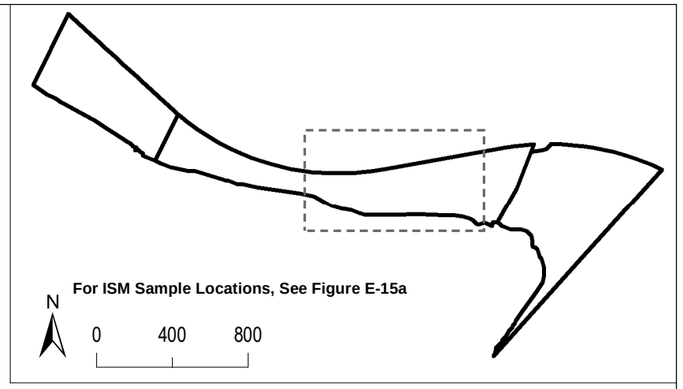
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-15b



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

RA1 S1
1.6 (ZINC 0.5)
Summed ER
Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology

0 60 120
Approximate Scale in Feet
N

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Summed ERs
Upland Surface Soil Plant - 3 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

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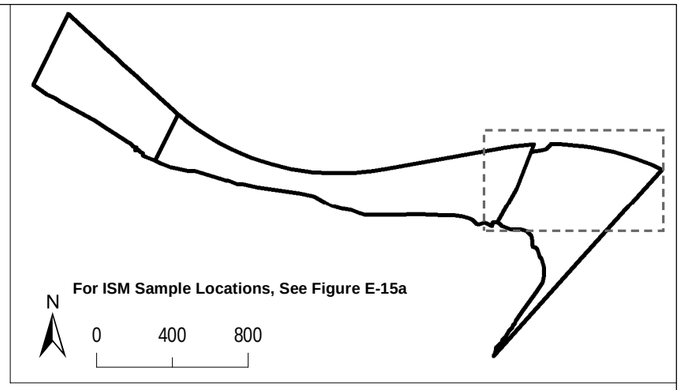
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-15c

UNION PACIFIC RAILROAD



BNSF RAILWAY

Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

RA1 S1
1.6 (ZINC 0.5)
Summed ER
Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology

0 60 120
Approximate Scale in Feet
N

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Summed ERs
Upland Surface Soil Plant - 4 of 5

Revised Feasibility Study and Source Control Evaluation
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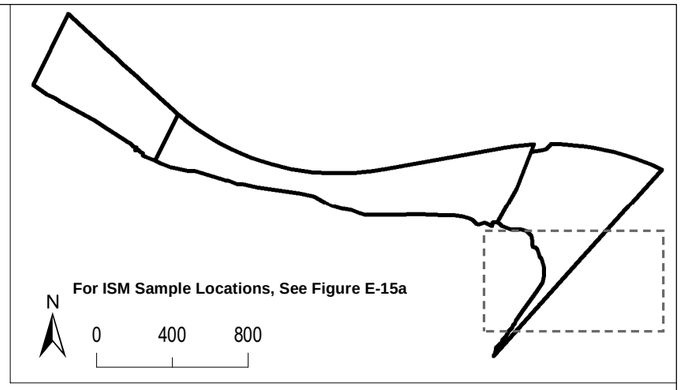
Project Number	1056-10	Figure
March 2019		E-15d



BNSF RAILWAY

Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

RA1 S1
1.6 (ZINC 0.5)
Summed ER
Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology

0 60 120
Approximate Scale in Feet
N

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Summed ERs
Upland Surface Soil Plant - 5 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
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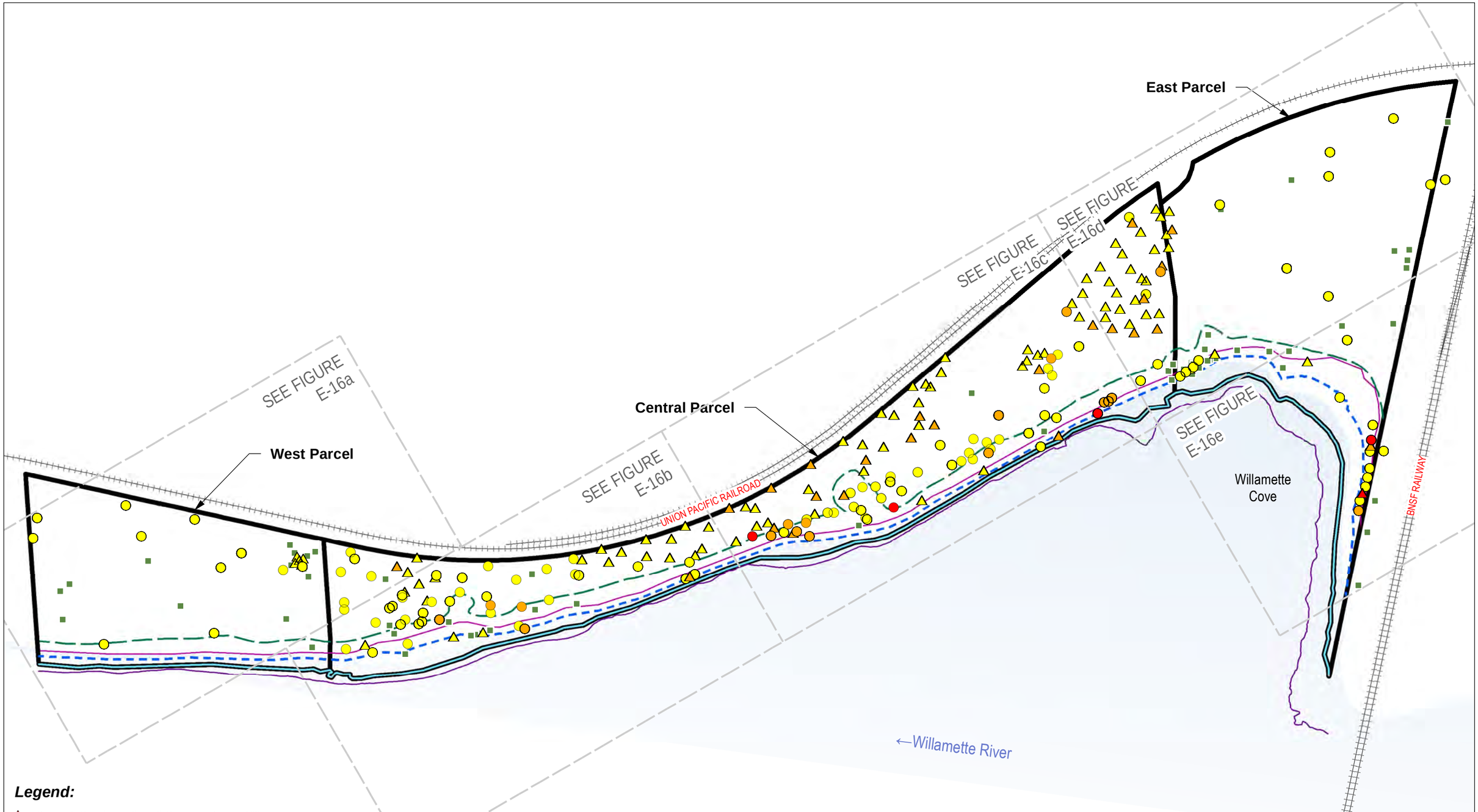
Project Number	1056-10	Figure
March 2019		E-15e



Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

RA1 S4
1.1 (ZINC 0.7)
Summed ER — Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology

0 200 400
Approximate Scale in Feet

N

Summed ERs
Upland Surface Soil Invertebrate

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

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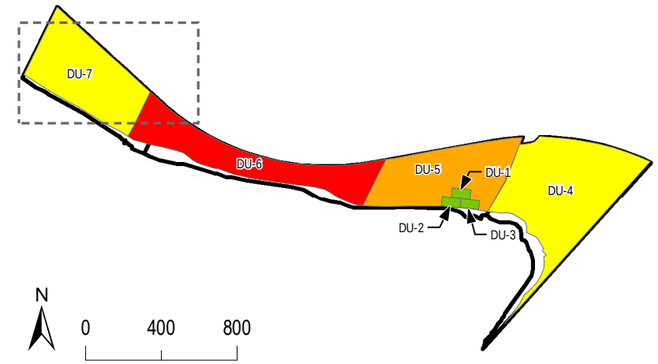
Project Number	1056-10	Figure
March 2019		E-16

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

RA1 S4
1.1 (ZINC 0.7)
Summed ER
Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology

0 60 120
Approximate Scale in Feet
N

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Summed ERs
Upland Surface Soil Invertebrate - 1 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

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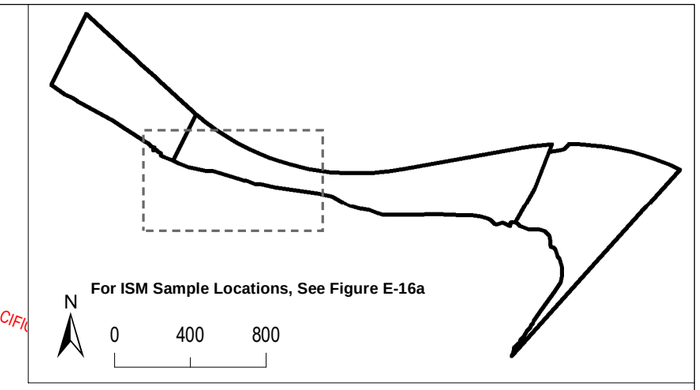
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-16a



UNION PACIFIC

Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

RA1 S4
1.1 (ZINC 0.7)
Summed ER
Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology

0 60 120
Approximate Scale in Feet
N

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Summed ERs
Upland Surface Soil Invertebrate - 2 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

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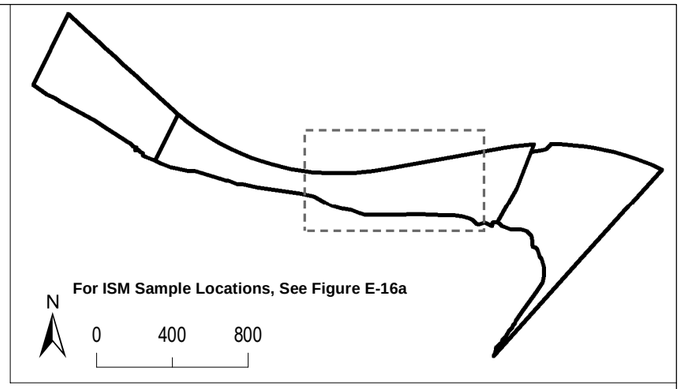
Project Number	1056-10	Figure
March 2019		E-16b



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

RA1 S4
1.1 (ZINC 0.7)
Summed ER
Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology

0 60 120
Approximate Scale in Feet
N

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Summed ERs
Upland Surface Soil Invertebrate - 3 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

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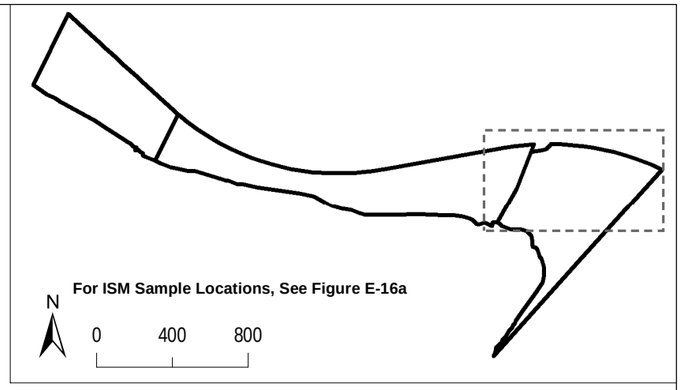
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-16c

UNION PACIFIC RAILROAD



BNSF RAILWAY

Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

RA1 S4
1.1 (ZINC 0.7)
Summed ER
Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology

0 60 120
Approximate Scale in Feet
N

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Summed ERs
Upland Surface Soil Invertebrate - 4 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

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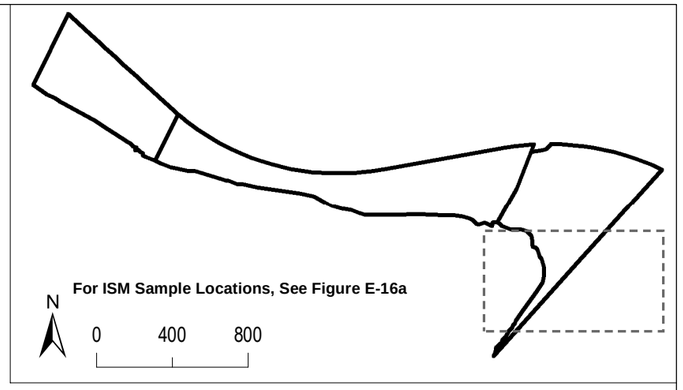
Project Number	1056-10	Figure
March 2019		E-16d



BNSF RAILWAY

Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

RA1 S4
1.1 (ZINC 0.7)
Summed ER
Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology

0 60 120
Approximate Scale in Feet
N

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Summed ERs
Upland Surface Soil Invertebrate - 5 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
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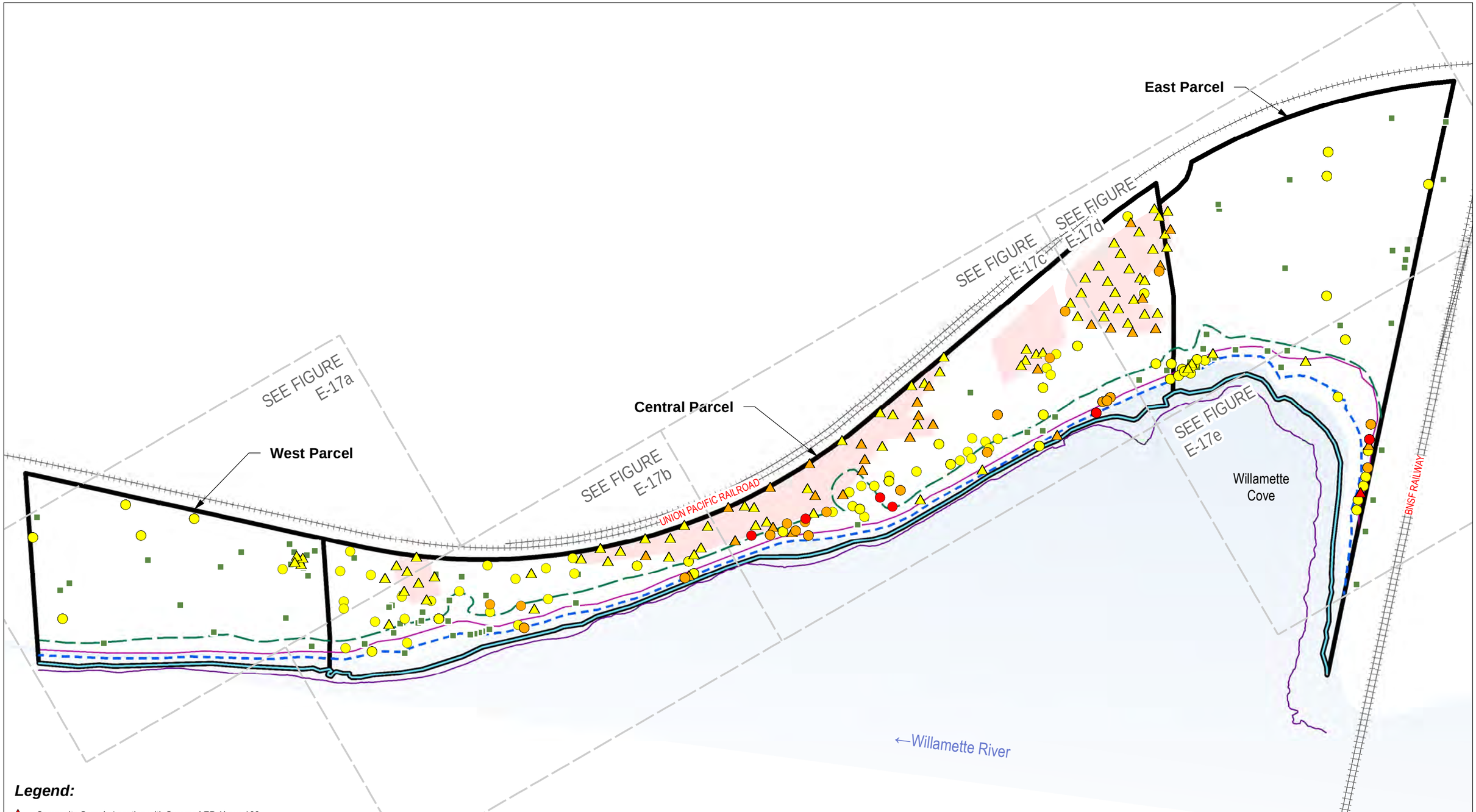
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-16e



Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

RA1 S4
1 (LEAD 0.6)
Summed ER — Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology

0 200 400
Approximate Scale in Feet

N

Summed ERs - Upland Surface Soil Bird

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

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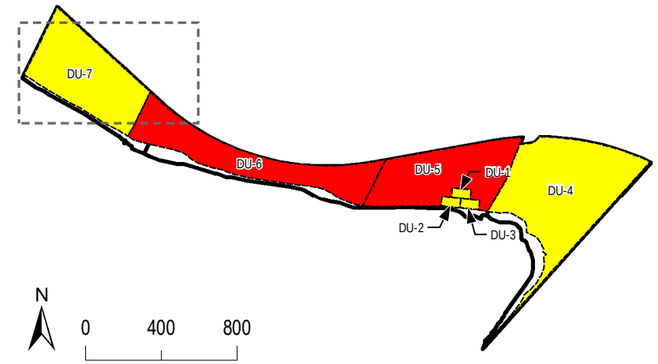
Project Number	1056-10	Figure
March 2019		E-17

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

RA1 S4
1 (LEAD 0.6)
Summed ER
Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology

0 60 120
Approximate Scale in Feet
N

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Summed ERs
Upland Surface Soil Bird - 1 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
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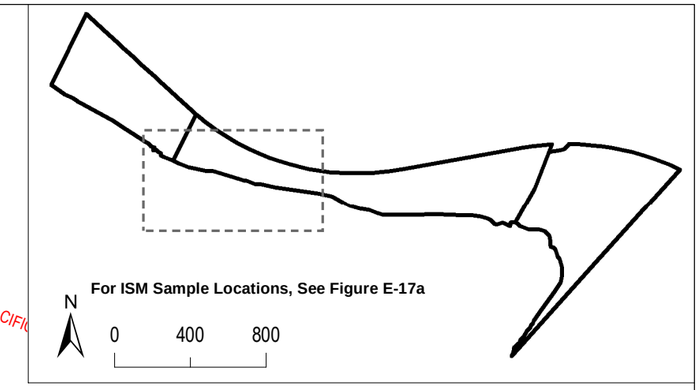
Project Number	1056-10	Figure
March 2019		E-17a



UNION PACIFIC

Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

RA1 S4
1 (LEAD 0.6)
Summed ER
Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology

0 60 120
Approximate Scale in Feet
N

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Summed ERs
Upland Surface Soil Bird - 2 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

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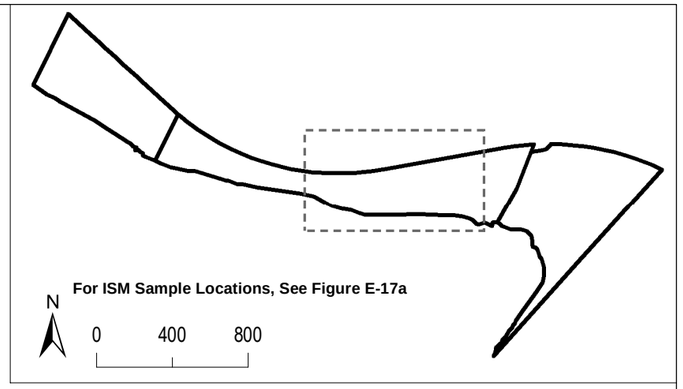
3015 SW First Avenue
Portland, Oregon 97201

Project Number 1056-10
March 2019

Figure E-17b



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

RA1 S4
1 (LEAD 0.6)
Summed ER
Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology

0 60 120
Approximate Scale in Feet
N

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Summed ERs
Upland Surface Soil Bird - 3 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

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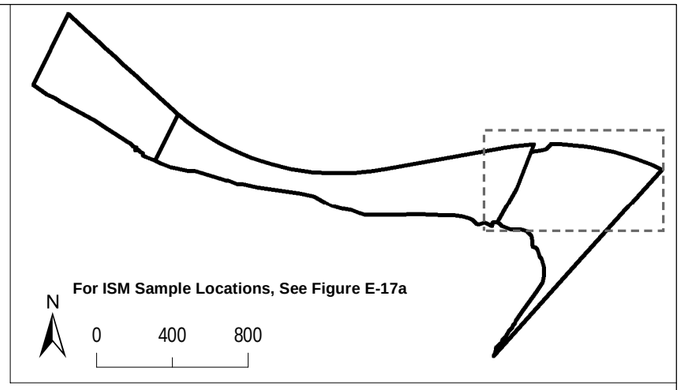
Project Number 1056-10
March 2019

Figure E-17c

UNION PACIFIC RAILROAD



BNSF RAILWAY

Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

RA1 S4
1 (LEAD 0.6)
Summed ER
Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology

0 60 120
Approximate Scale in Feet
N

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Summed ERs
Upland Surface Soil Bird - 4 of 5

Revised Feasibility Study and Source Control Evaluation
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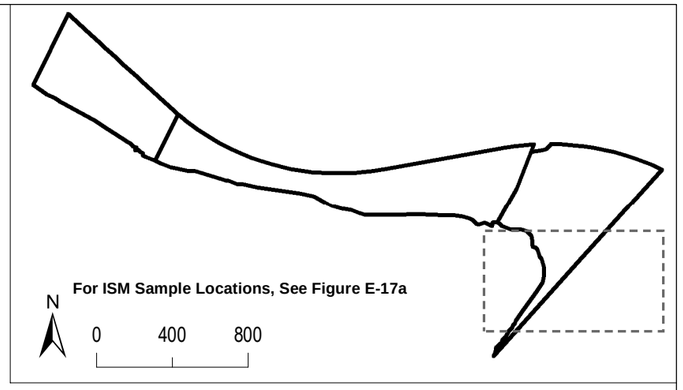
Project Number	1056-10	Figure
March 2019		E-17d



BNSF RAILWAY

Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

RA1 S4
1 (LEAD 0.6)
Summed ER
Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology

0 60 120
Approximate Scale in Feet
N

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Summed ERs
Upland Surface Soil Bird - 5 of 5

Revised Feasibility Study and Source Control Evaluation
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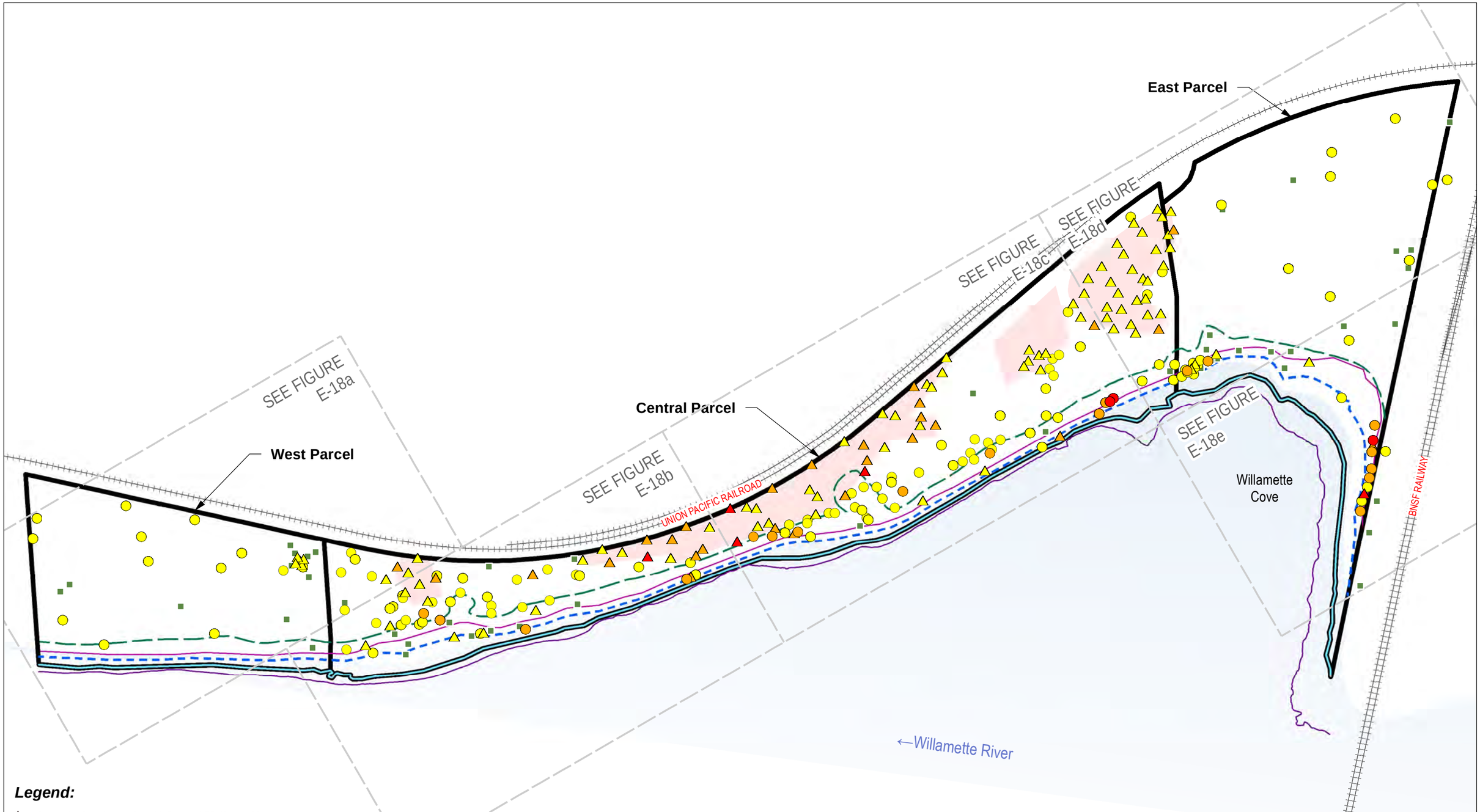
Project Number	1056-10	Figure
March 2019		E-17e



Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

RA1 S4
1.4 (ZINC 0.6)
Summed ER — Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology

0 200 400
Approximate Scale in Feet

N

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Summed ERs - Upland Surface Soil Mammal

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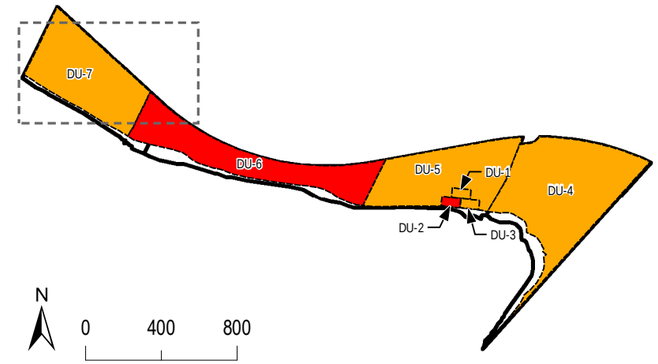

UNION PACIFIC RAILROAD

Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

RA1 S4
1.4 (ZINC 0.6)
Summed ER
Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology

0 60 120
Approximate Scale in Feet
N

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Summed ERs
Upland Surface Soil Mammal - 1 of 5

Revised Feasibility Study and Source Control Evaluation
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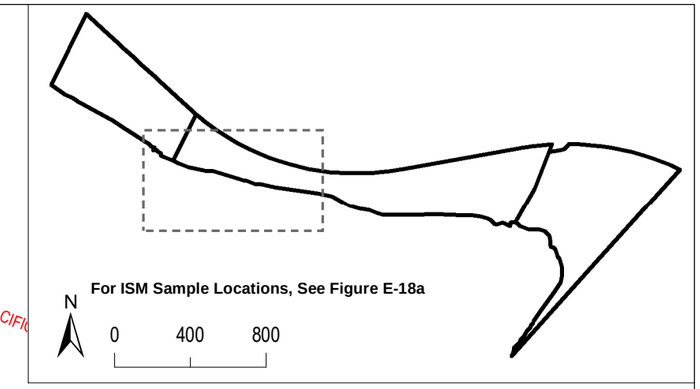
Project Number	1056-10	Figure
March 2019		E-18a



UNION PACIFIC

Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

RA1 S4
1.4 (ZINC 0.6)
Summed ER
Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology

0 60 120
Approximate Scale in Feet
N

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Summed ERs
Upland Surface Soil Mammal - 2 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

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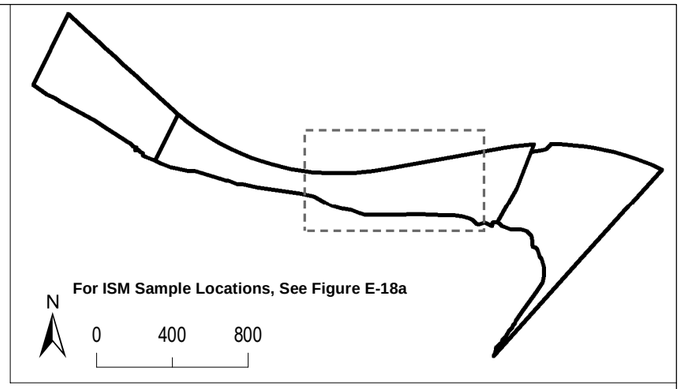
Project Number 1056-10
March 2019

Figure E-18b



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

RA1 S4
1.4 (ZINC 0.6)
Summed ER
Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology

0 60 120
Approximate Scale in Feet
N

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Summed ERs
Upland Surface Soil Mammal - 3 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

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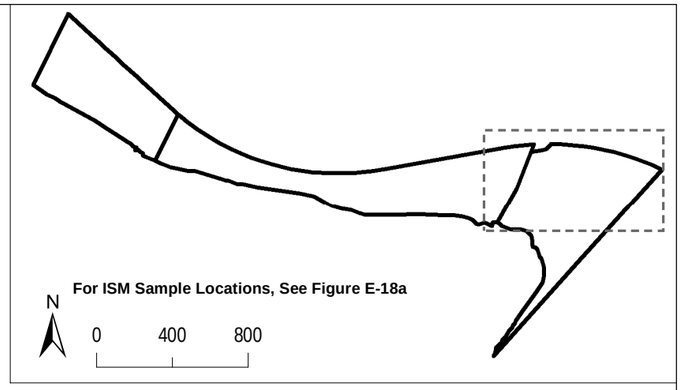
Project Number	1056-10	Figure
March 2019		E-18c

UNION PACIFIC RAILROAD



BNSF RAILWAY

Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

RA1 S4
1.4 (ZINC 0.6)
Summed ER
Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology

0 60 120
Approximate Scale in Feet
N

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Summed ERs
Upland Surface Soil Mammal - 4 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

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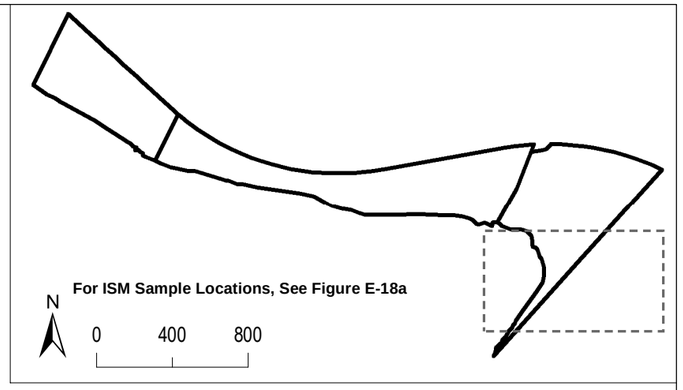
Project Number	1056-10	Figure
March 2019		E-18d



BNSF RAILWAY

Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

RA1 S4
1.4 (ZINC 0.6)
Summed ER
Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology

0 60 120
Approximate Scale in Feet
N

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Summed ERs
Upland Surface Soil Mammal - 5 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

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Project Number	1056-10	Figure
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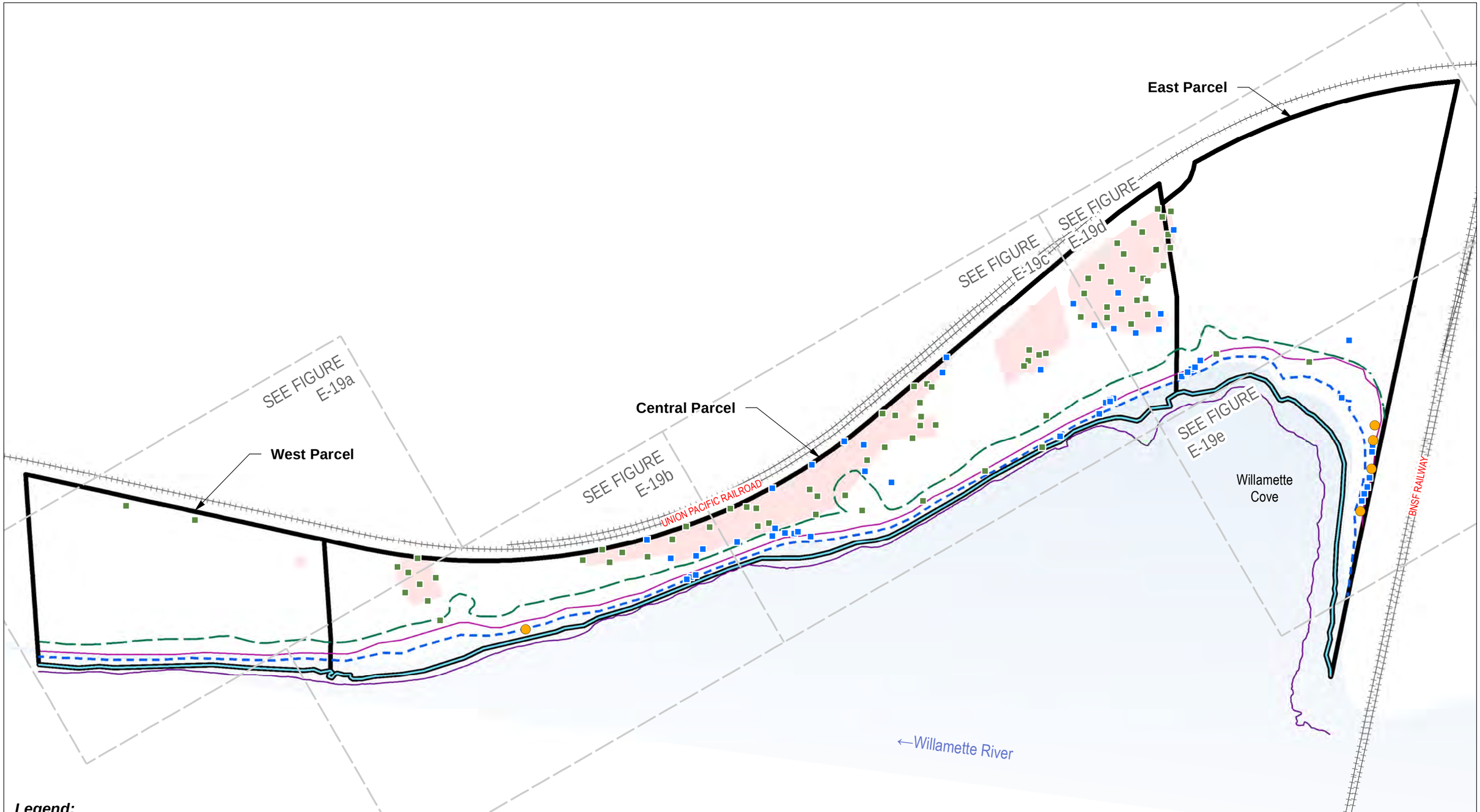

Legend:

- Composite Sample Concentration Above RT/PU Hot Spot Concentration
- Discrete Sample Concentration Above RT/PU Hot Spot Concentration
- Composite Sample Concentration Above RT/PU PRG
- Discrete Sample Concentration Above RT/PU PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. RT/PU = Recreational Trespasser/Park User
6. ERs calculated using lowest applicable PRG (RT/PU).
7. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
8. ISM = Incremental Sampling Methodology

0 200 400

Approximate Scale in Feet

N

Maximum ERs - Human Health - Antimony in Surface Soil

Revised Feasibility Study and Source Control Evaluation
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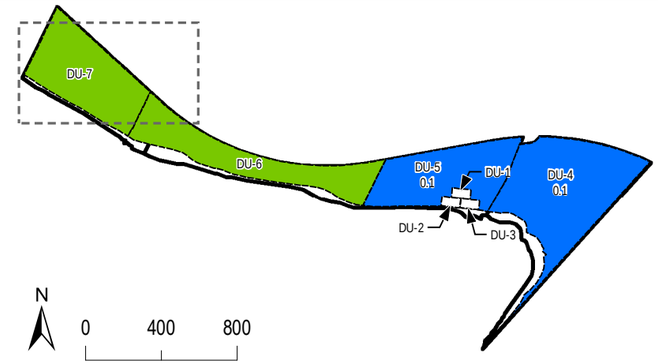
Project Number	1056-10	Figure
March 2019		E-19

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Concentration Above RT/PU Hot Spot Concentration
- Discrete Sample Concentration Above RT/PU Hot Spot Concentration
- Composite Sample Concentration Above RT/PU PRG
- Discrete Sample Concentration Above RT/PU PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. RT/PU = Recreational Trespasser/Park User
6. ERs calculated using lowest applicable PRG (RT/PU).
7. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
8. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Human Health - Antimony in Surface Soil - 1 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
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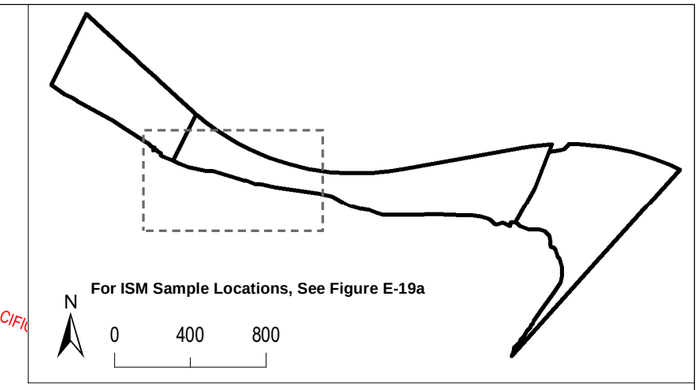
Project Number	1056-10	Figure
March 2019		E-19a



UNION PACIFIC

Legend:

- Composite Sample Concentration Above RT/PU Hot Spot Concentration
- Discrete Sample Concentration Above RT/PU Hot Spot Concentration
- Composite Sample Concentration Above RT/PU PRG
- Discrete Sample Concentration Above RT/PU PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. RT/PU = Recreational Trespasser/Park User
6. ERs calculated using lowest applicable PRG (RT/PU).
7. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
8. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Human Health - Antimony in Surface Soil - 2 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
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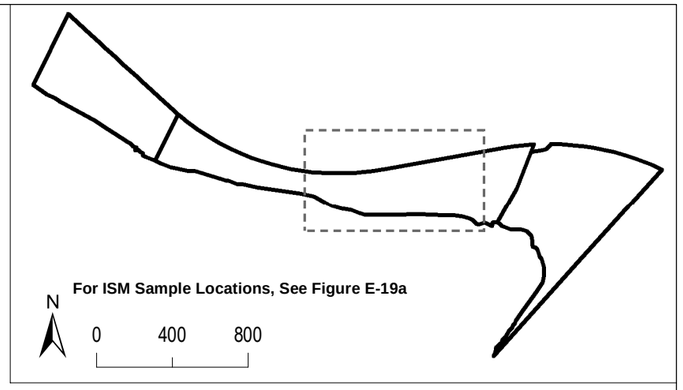
Project Number	1056-10	Figure
March 2019		E-19b



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Concentration Above RT/PU Hot Spot Concentration
- Discrete Sample Concentration Above RT/PU Hot Spot Concentration
- Composite Sample Concentration Above RT/PU PRG
- Discrete Sample Concentration Above RT/PU PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. RT/PU = Recreational Trespasser/Park User
6. ERs calculated using lowest applicable PRG (RT/PU).
7. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
8. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

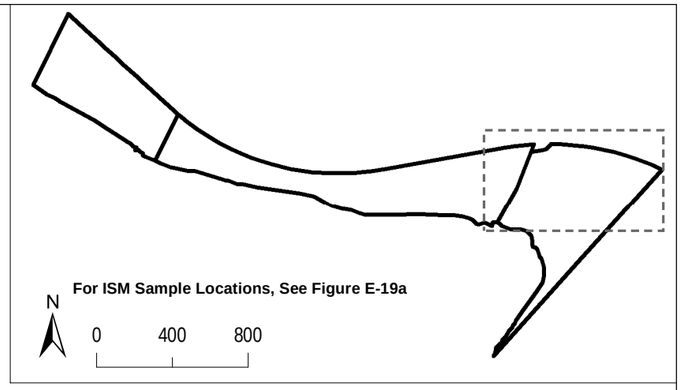
Maximum ERs - Human Health - Antimony in Surface Soil - 3 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-19c

UNION PACIFIC RAILROAD



BNSF RAILWAY

Legend:

- Composite Sample Concentration Above RT/PU Hot Spot Concentration
- Discrete Sample Concentration Above RT/PU Hot Spot Concentration
- Composite Sample Concentration Above RT/PU PRG
- Discrete Sample Concentration Above RT/PU PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. RT/PU = Recreational Trespasser/Park User
6. ERs calculated using lowest applicable PRG (RT/PU).
7. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
8. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Human Health - Antimony in Surface Soil - 4 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

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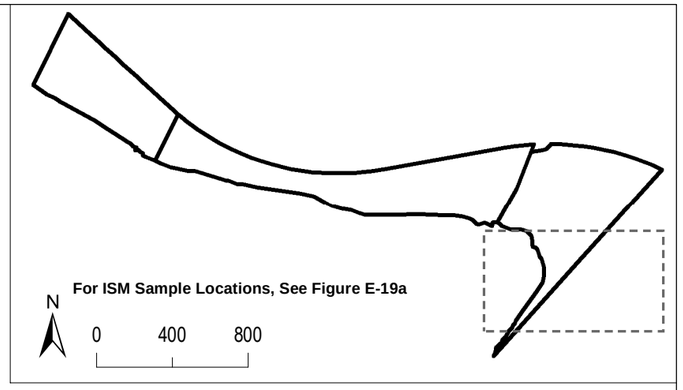
Project Number	1056-10	Figure
March 2019		E-19d



BNSF RAILWAY

Legend:

- Composite Sample Concentration Above RT/PU Hot Spot Concentration
- Discrete Sample Concentration Above RT/PU Hot Spot Concentration
- Composite Sample Concentration Above RT/PU PRG
- Discrete Sample Concentration Above RT/PU PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. RT/PU = Recreational Trespasser/Park User
6. ERs calculated using lowest applicable PRG (RT/PU).
7. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
8. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Human Health - Antimony in Surface Soil - 5 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
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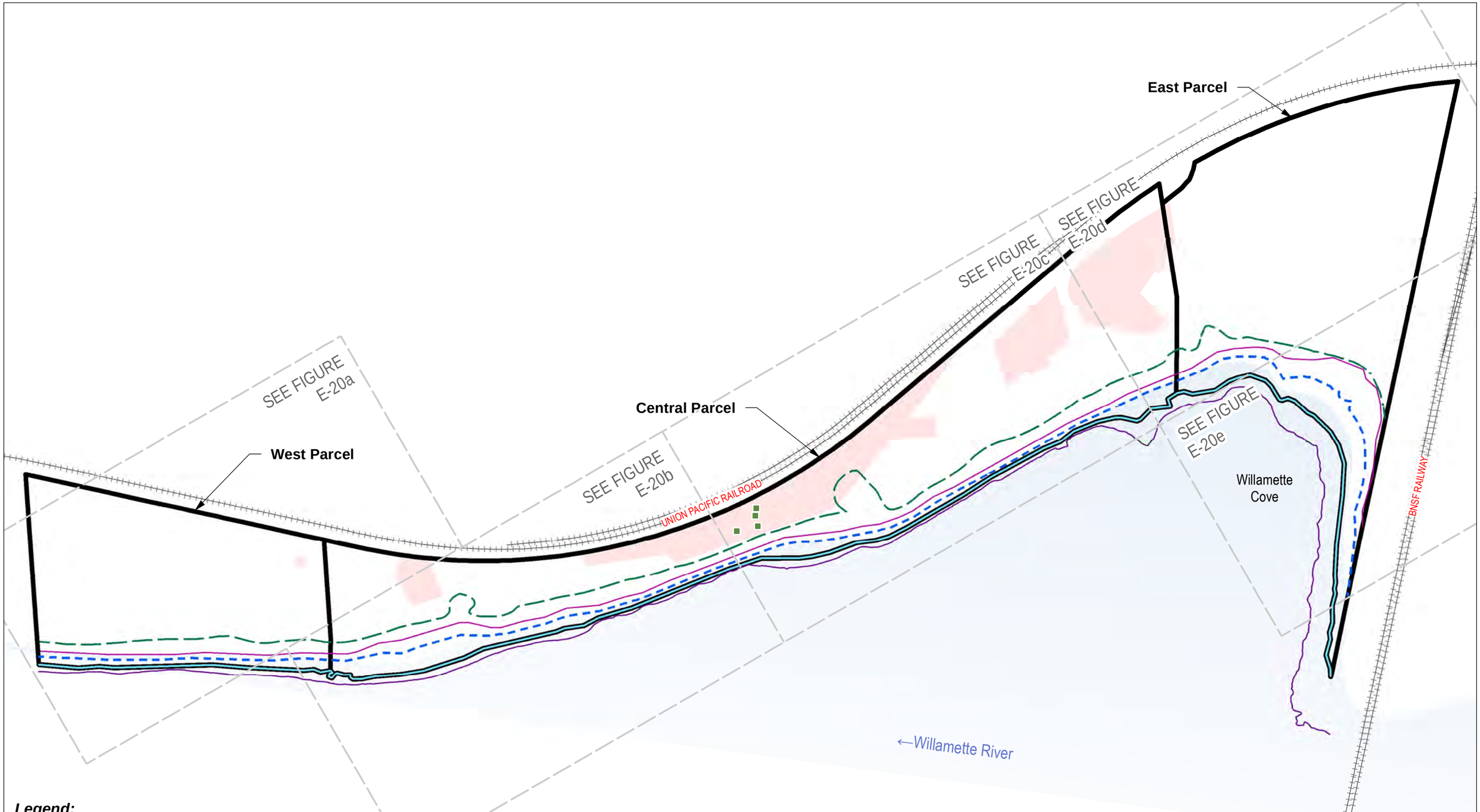
Project Number	1056-10	Figure
March 2019		E-19e



Legend:

- Composite Sample Concentration Above CW Hot Spot Concentration
- Discrete Sample Concentration Above CW Hot Spot Concentration
- Composite Sample Concentration Above CW PRG
- Discrete Sample Concentration Above CW PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
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- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. CW = Construction Worker
6. ERs calculated using lowest applicable PRG (CW).
7. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 3 to 10 feet below ground surface.
8. ISM = Incremental Sampling Methodology

0 200 400

Approximate Scale in Feet

N

Maximum ERs - Human Health - Antimony in Subsurface Soil

Revised Feasibility Study and Source Control Evaluation
Port of Portland
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APEX

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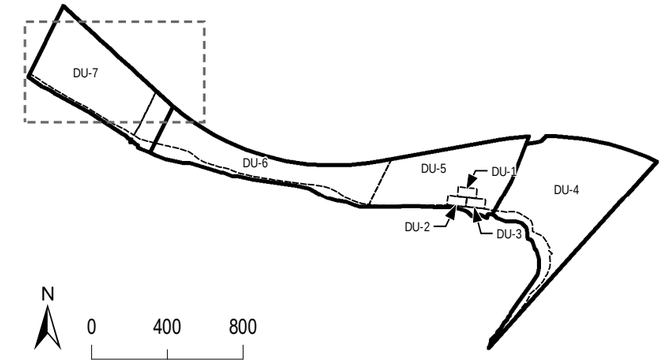
Project Number	1056-10	Figure
March 2019		E-20

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Concentration Above CW Hot Spot Concentration
- Discrete Sample Concentration Above CW Hot Spot Concentration
- Composite Sample Concentration Above CW PRG
- Discrete Sample Concentration Above CW PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
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- Ordinary Low Water Line (6.9NAVD88)
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Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. CW = Construction Worker
6. ERs calculated using lowest applicable PRG (CW).
7. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 3 to 10 feet below ground surface.
8. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Human Health - Antimony in Subsurface Soil - 1 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

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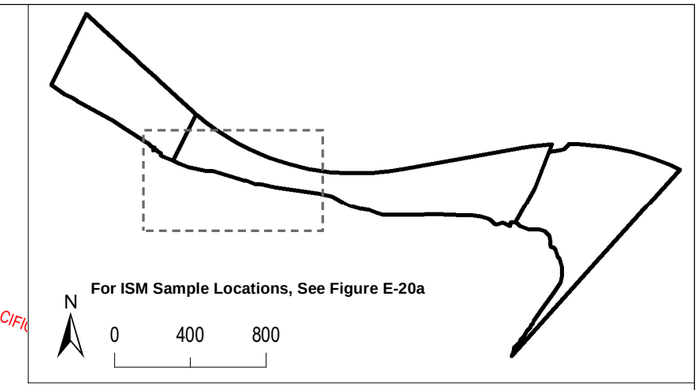
Project Number	1056-10	Figure
March 2019		E-20a



UNION PACIFIC

Legend:

- Composite Sample Concentration Above CW Hot Spot Concentration
- Discrete Sample Concentration Above CW Hot Spot Concentration
- Composite Sample Concentration Above CW PRG
- Discrete Sample Concentration Above CW PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
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Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. CW = Construction Worker
6. ERs calculated using lowest applicable PRG (CW).
7. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 3 to 10 feet below ground surface.
8. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Human Health - Antimony in Subsurface Soil - 2 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
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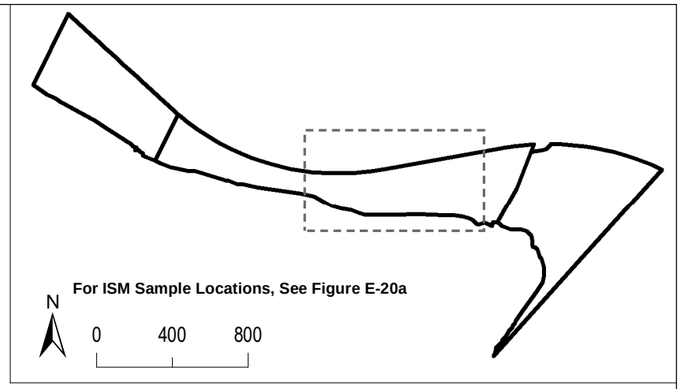
Project Number	1056-10	Figure
March 2019		E-20b



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Concentration Above CW Hot Spot Concentration
- Discrete Sample Concentration Above CW Hot Spot Concentration
- Composite Sample Concentration Above CW PRG
- Discrete Sample Concentration Above CW PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
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- Ordinary Low Water Line (6.9NAVD88)
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Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. CW = Construction Worker
6. ERs calculated using lowest applicable PRG (CW).
7. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 3 to 10 feet below ground surface.
8. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Human Health - Antimony in Subsurface Soil - 3 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

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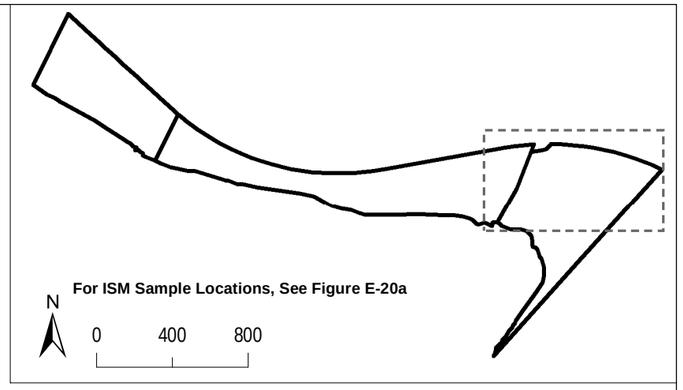
Portland, Oregon 97201

Project Number 1056-10

March 2019

Figure E-20c

UNION PACIFIC RAILROAD



BNSF RAILWAY

Legend:

- Composite Sample Concentration Above CW Hot Spot Concentration
- Discrete Sample Concentration Above CW Hot Spot Concentration
- Composite Sample Concentration Above CW PRG
- Discrete Sample Concentration Above CW PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
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Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. CW = Construction Worker
6. ERs calculated using lowest applicable PRG (CW).
7. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 3 to 10 feet below ground surface.
8. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Human Health - Antimony in Subsurface Soil - 4 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

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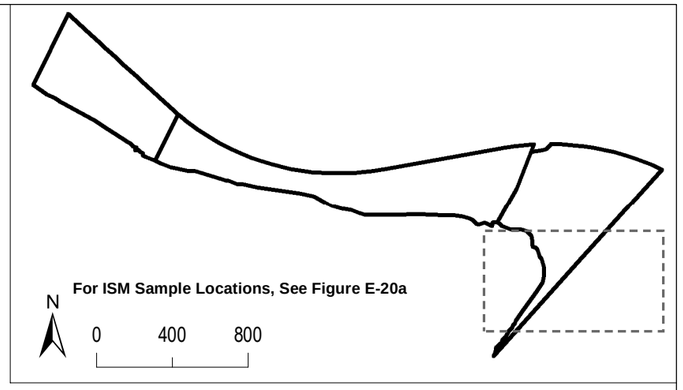
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-20d



BNSF RAILWAY

Legend:

- Composite Sample Concentration Above CW Hot Spot Concentration
- Discrete Sample Concentration Above CW Hot Spot Concentration
- Composite Sample Concentration Above CW PRG
- Discrete Sample Concentration Above CW PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
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- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. CW = Construction Worker
6. ERs calculated using lowest applicable PRG (CW).
7. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 3 to 10 feet below ground surface.
8. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

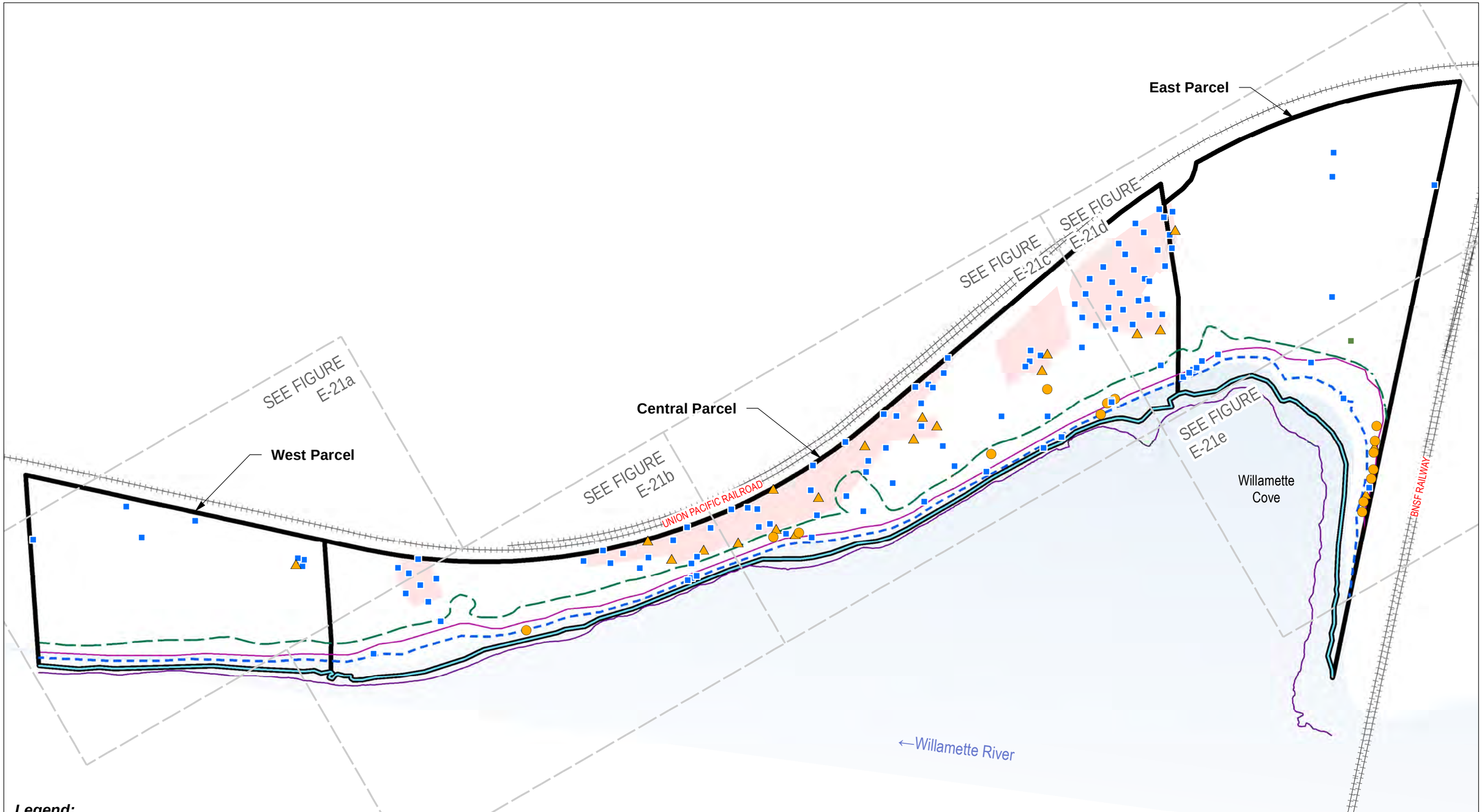
Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Human Health - Antimony in Subsurface Soil - 5 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-20e



Legend:

- Composite Sample Concentration Above Human Health Hot Spot Concentration
- Discrete Sample Concentration Above Human Health Hot Spot Concentration
- Composite Sample Concentration Above Human Health PRG
- Discrete Sample Concentration Above Human Health PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG.
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 200 400

Approximate Scale in Feet

N

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Human Health - Arsenic in Surface Soil

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX

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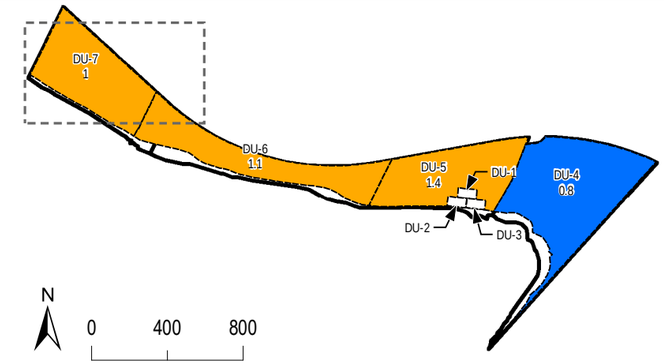
Project Number	1056-10	Figure
March 2019		E-21



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Concentration Above Human Health Hot Spot Concentration
- Discrete Sample Concentration Above Human Health Hot Spot Concentration
- Composite Sample Concentration Above Human Health PRG
- Discrete Sample Concentration Above Human Health PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG.
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Human Health - Arsenic in Surface Soil - 1 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
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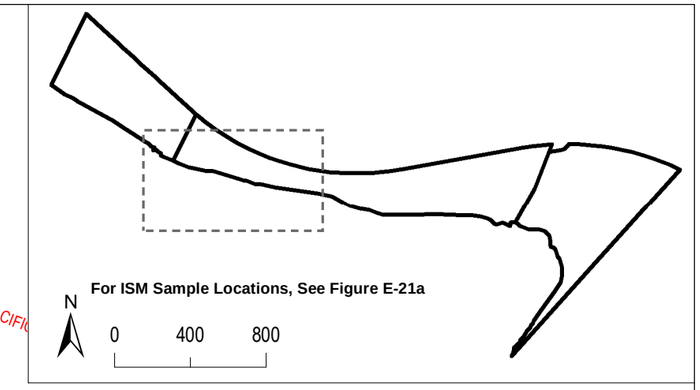
Project Number	1056-10	Figure
March 2019		E-21a



UNION PACIFIC

Legend:

- Composite Sample Concentration Above Human Health Hot Spot Concentration
- Discrete Sample Concentration Above Human Health Hot Spot Concentration
- Composite Sample Concentration Above Human Health PRG
- Discrete Sample Concentration Above Human Health PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
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- Mean High Water Line (13.3NAVD88)
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- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

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2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG.
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Human Health - Arsenic in Surface Soil - 2 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
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APEX
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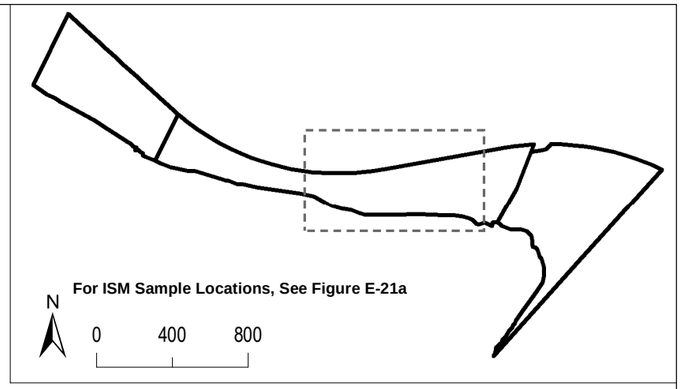
Project Number	1056-10	Figure
March 2019		E-21b



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Concentration Above Human Health Hot Spot Concentration
- Discrete Sample Concentration Above Human Health Hot Spot Concentration
- Composite Sample Concentration Above Human Health PRG
- Discrete Sample Concentration Above Human Health PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
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- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

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2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG.
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

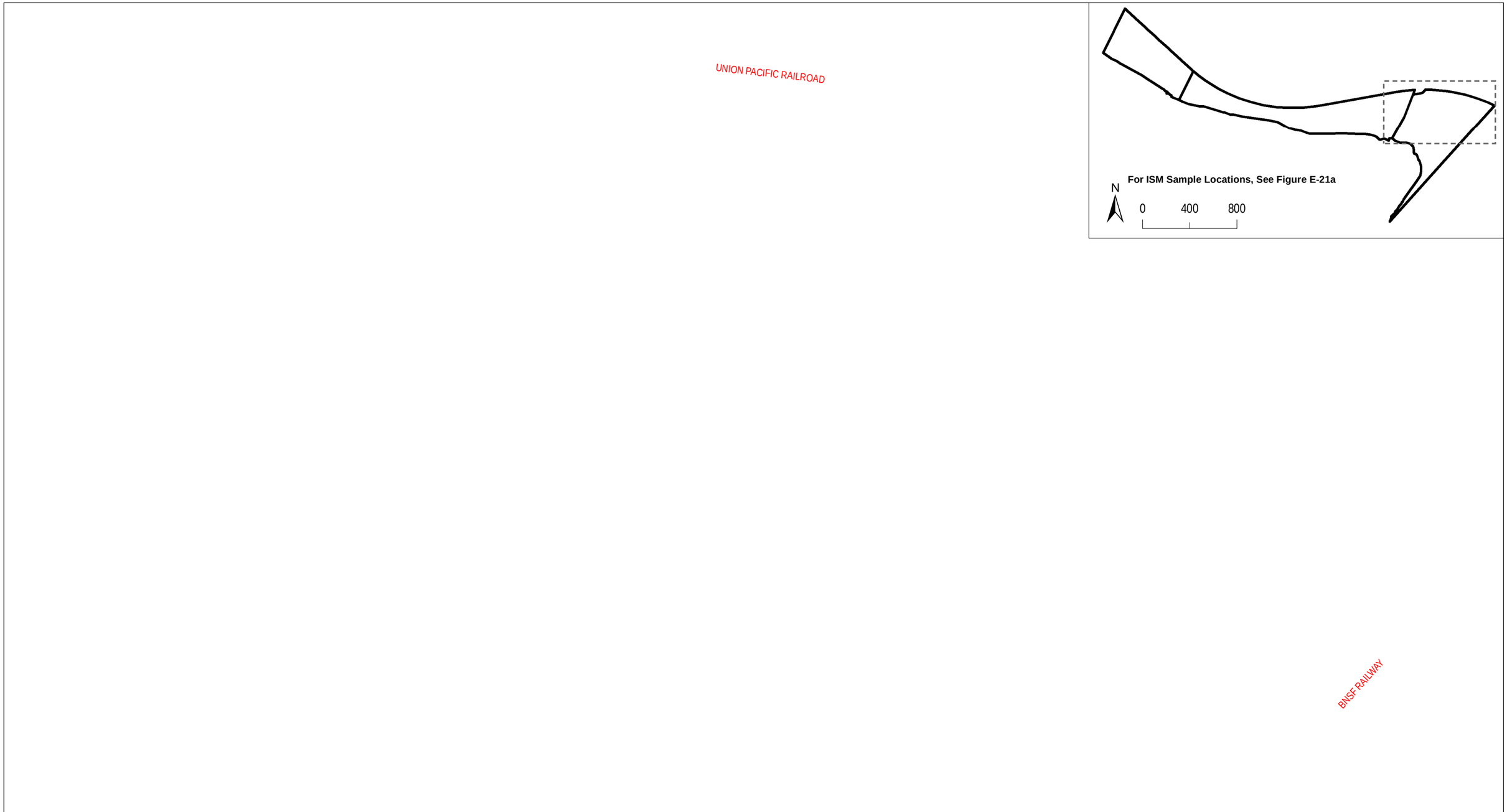
Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Human Health - Arsenic in Surface Soil - 3 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-21c



Legend:

- Composite Sample Concentration Above Human Health Hot Spot Concentration
- Discrete Sample Concentration Above Human Health Hot Spot Concentration
- Composite Sample Concentration Above Human Health PRG
- Discrete Sample Concentration Above Human Health PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG.
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Human Health - Arsenic in Surface Soil - 4 of 5

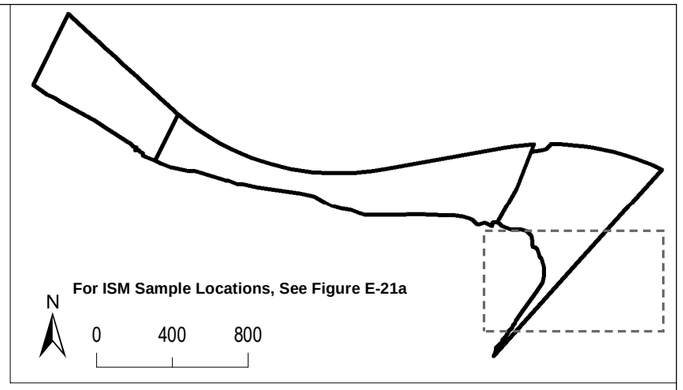
Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number 1056-10

March 2019

Figure E-21d



BNSF RAILWAY

Legend:

- Composite Sample Concentration Above Human Health Hot Spot Concentration
- Discrete Sample Concentration Above Human Health Hot Spot Concentration
- Composite Sample Concentration Above Human Health PRG
- Discrete Sample Concentration Above Human Health PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
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- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

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2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
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6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

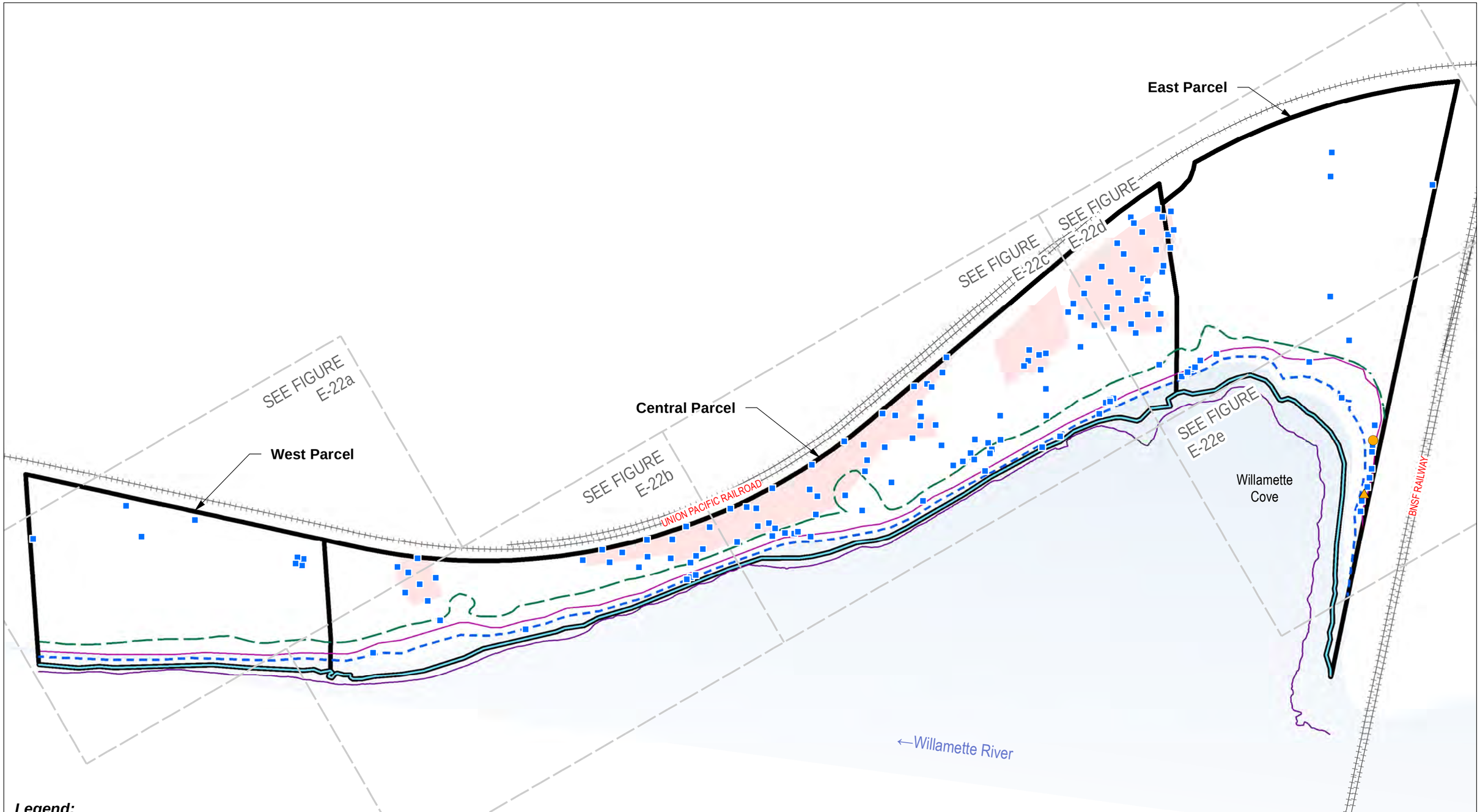
Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Human Health - Arsenic in Surface Soil - 5 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-21e



Legend:

- Composite Sample Concentration Above RT/PU Hot Spot Concentration
- Discrete Sample Concentration Above RT/PU Hot Spot Concentration
- Composite Sample Concentration Above RT/PU PRG
- Discrete Sample Concentration Above RT/PU PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
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Notes:

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2. mg/kg = Milligrams Per Kilogram
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4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG.
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology
8. RT/PU = Recreational Trespasser/Park User

0 200 400

Approximate Scale in Feet

N

Maximum ERs - Human Health - Copper in Surface Soil

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX

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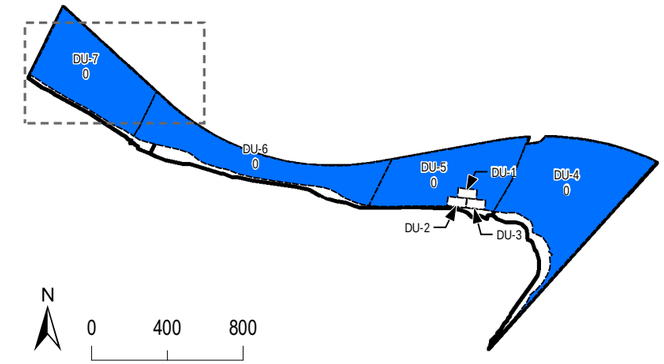
Project Number	1056-10	Figure
March 2019		E-22

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Concentration Above RT/PU Hot Spot Concentration
- Discrete Sample Concentration Above RT/PU Hot Spot Concentration
- Composite Sample Concentration Above RT/PU PRG
- Discrete Sample Concentration Above RT/PU PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
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Notes:

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2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG.
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology
8. RT/PU = Recreational Trespasser/Park User

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Human Health - Copper in Surface Soil - 1 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

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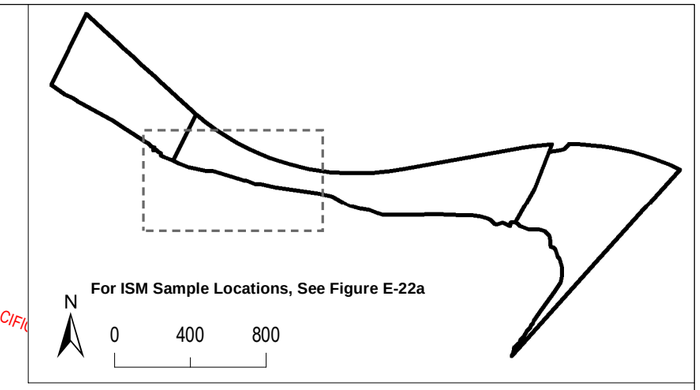
Project Number	1056-10	Figure
March 2019		E-22a



UNION PACIFIC

Legend:

- Composite Sample Concentration Above RT/PU Hot Spot Concentration
- Discrete Sample Concentration Above RT/PU Hot Spot Concentration
- Composite Sample Concentration Above RT/PU PRG
- Discrete Sample Concentration Above RT/PU PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
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Notes:

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2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
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5. ERs calculated using lowest applicable PRG.
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology
8. RT/PU = Recreational Trespasser/Park User

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Human Health - Copper in Surface Soil - 2 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
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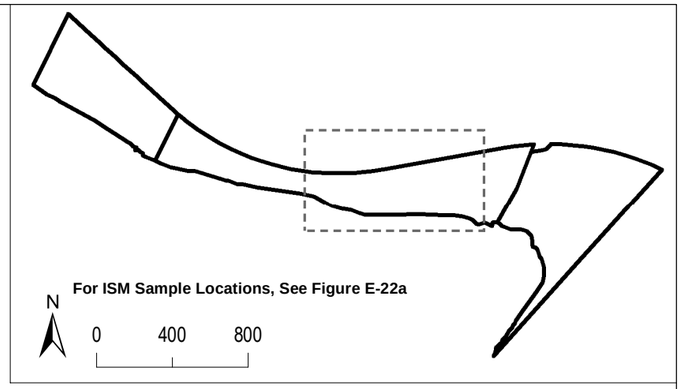
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-22b



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Concentration Above RT/PU Hot Spot Concentration
- Discrete Sample Concentration Above RT/PU Hot Spot Concentration
- Composite Sample Concentration Above RT/PU PRG
- Discrete Sample Concentration Above RT/PU PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
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Notes:

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2. mg/kg = Milligrams Per Kilogram
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4. MDL = Method Detection Limit
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6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology
8. RT/PU = Recreational Trespasser/Park User

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Human Health - Copper in Surface Soil - 3 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
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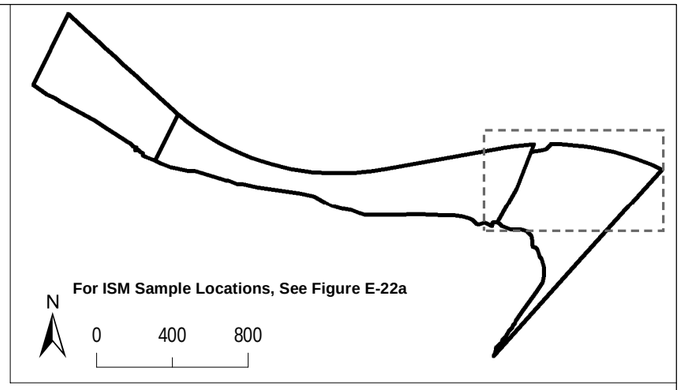
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-22c

UNION PACIFIC RAILROAD



BNSF RAILWAY

Legend:

- Composite Sample Concentration Above RT/PU Hot Spot Concentration
- Discrete Sample Concentration Above RT/PU Hot Spot Concentration
- Composite Sample Concentration Above RT/PU PRG
- Discrete Sample Concentration Above RT/PU PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
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Notes:

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2. mg/kg = Milligrams Per Kilogram
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4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG.
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology
8. RT/PU = Recreational Trespasser/Park User

0 60 120 N

Approximate Scale in Feet

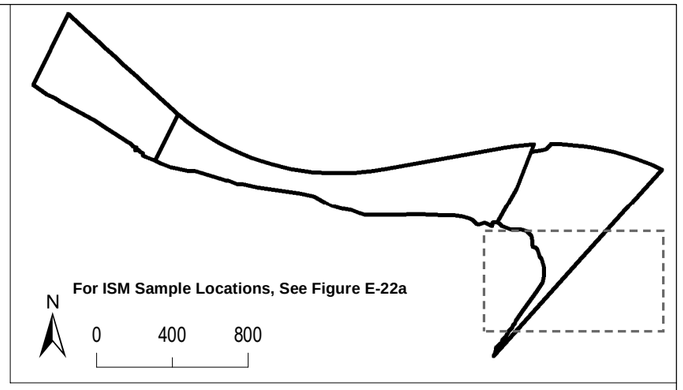
Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Human Health - Copper in Surface Soil - 4 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-22d



BNSF RAILWAY

Legend:

- Composite Sample Concentration Above RT/PU Hot Spot Concentration
- Discrete Sample Concentration Above RT/PU Hot Spot Concentration
- Composite Sample Concentration Above RT/PU PRG
- Discrete Sample Concentration Above RT/PU PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
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Notes:

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2. mg/kg = Milligrams Per Kilogram
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4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG.
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology
8. RT/PU = Recreational Trespasser/Park User

0 60 120 N

Approximate Scale in Feet

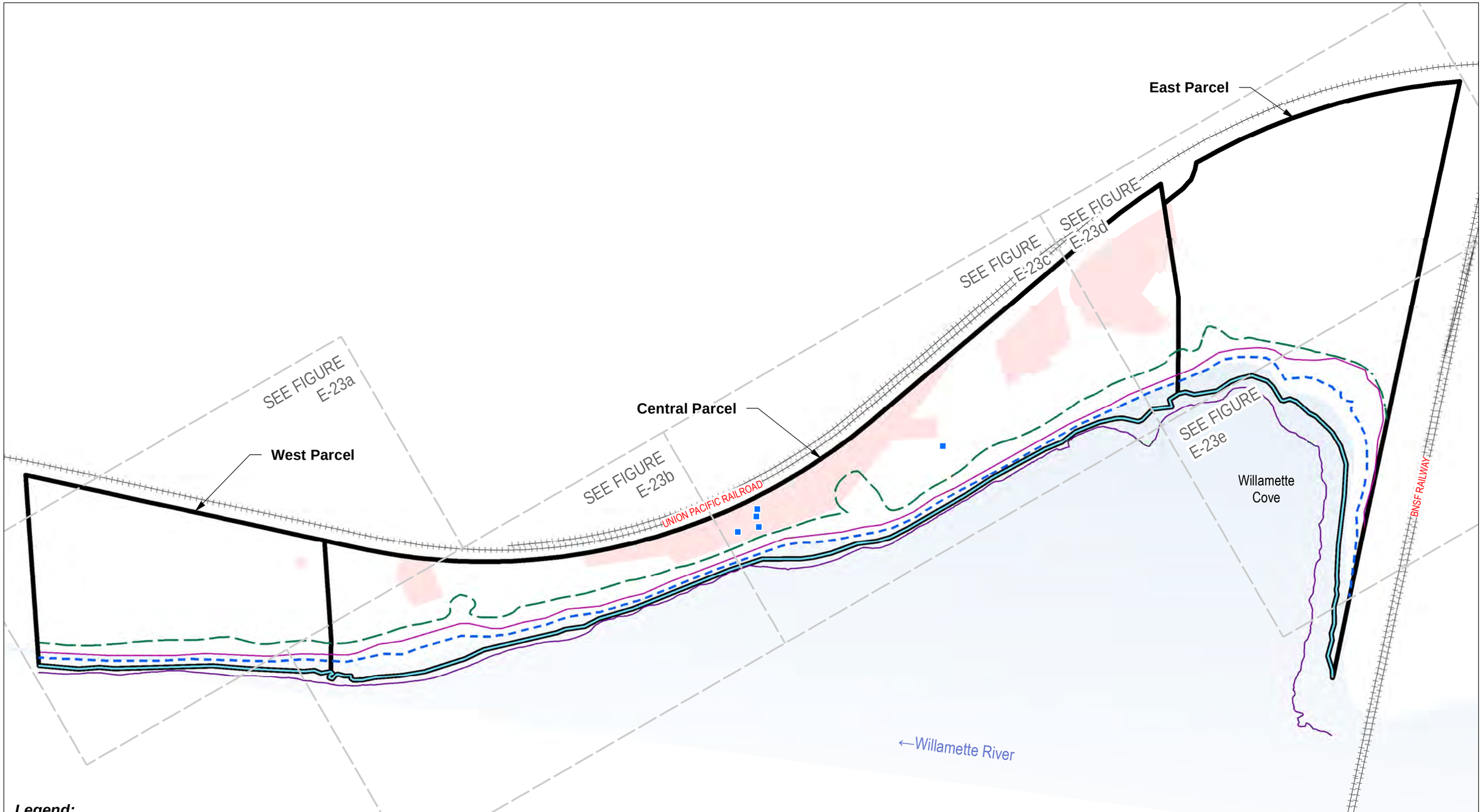
Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Human Health - Copper in Surface Soil - 5 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-22e



Legend:

- Composite Sample Concentration Above CW Hot Spot Concentration
- Discrete Sample Concentration Above CW Hot Spot Concentration
- Composite Sample Concentration Above CW PRG
- Discrete Sample Concentration Above CW PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
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- Ordinary Low Water Line (6.9NAVD88)
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Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. CW = Construction Worker
6. ERs calculated using lowest applicable PRG (CW).
7. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 3 to 10 feet below ground surface.
8. ISM = Incremental Sampling Methodology

0 200 400

Approximate Scale in Feet

N

Maximum ERs - Human Health - Copper in Subsurface Soil

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX

Apex Companies, LLC
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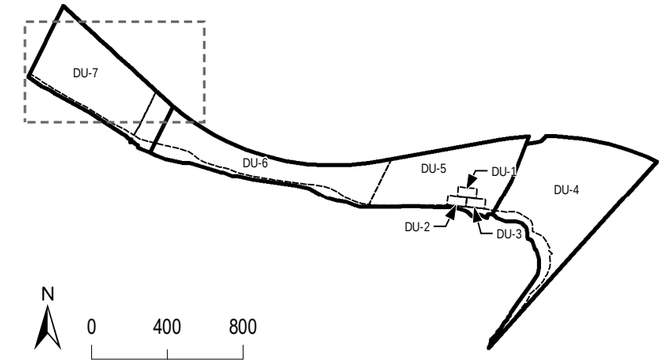
Project Number	1056-10	Figure
March 2019		E-23

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Concentration Above CW Hot Spot Concentration
- Discrete Sample Concentration Above CW Hot Spot Concentration
- Composite Sample Concentration Above CW PRG
- Discrete Sample Concentration Above CW PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
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0 60 120 N

Approximate Scale in Feet

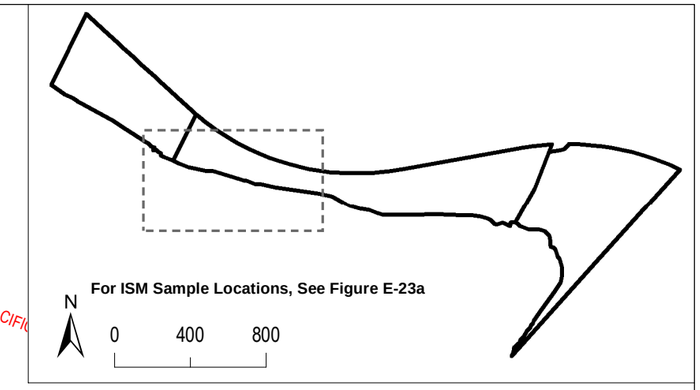
Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Human Health - Copper in Subsurface Soil - 1 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-23a



UNION PACIFIC

Legend:

- Composite Sample Concentration Above CW Hot Spot Concentration
- Discrete Sample Concentration Above CW Hot Spot Concentration
- Composite Sample Concentration Above CW PRG
- Discrete Sample Concentration Above CW PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
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0 60 120 N

Approximate Scale in Feet

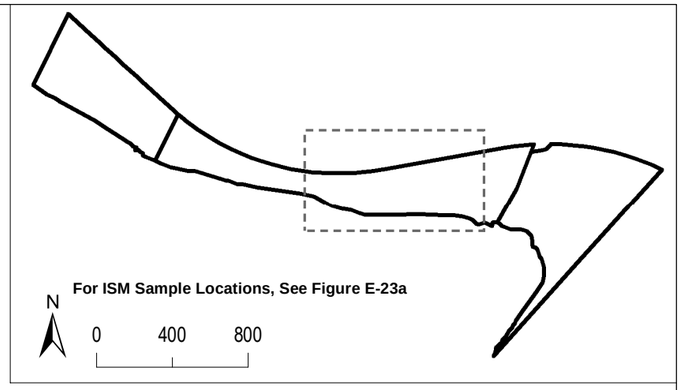
Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Human Health - Copper in Subsurface Soil - 2 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-23b



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Concentration Above CW Hot Spot Concentration
- Discrete Sample Concentration Above CW Hot Spot Concentration
- Composite Sample Concentration Above CW PRG
- Discrete Sample Concentration Above CW PRG
- Concentration Below Screening Level
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- Concentration Less Than MDL, MDL Above Screening Level
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Notes:

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0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

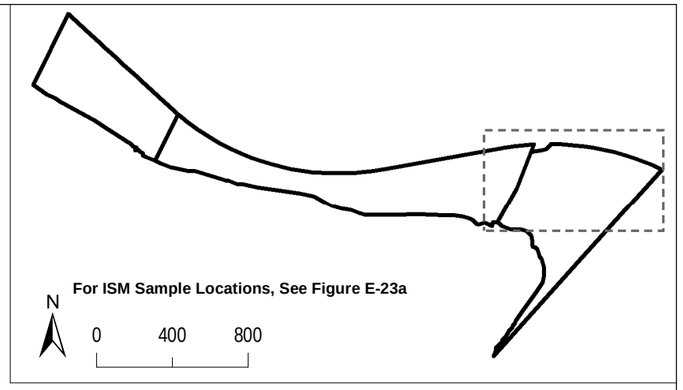
Maximum ERs - Human Health - Copper in Subsurface Soil - 3 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-23c

UNION PACIFIC RAILROAD



BNSF RAILWAY

Legend:

- Composite Sample Concentration Above CW Hot Spot Concentration
- Discrete Sample Concentration Above CW Hot Spot Concentration
- Composite Sample Concentration Above CW PRG
- Discrete Sample Concentration Above CW PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
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Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. CW = Construction Worker
6. ERs calculated using lowest applicable PRG (CW).
7. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 3 to 10 feet below ground surface.
8. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

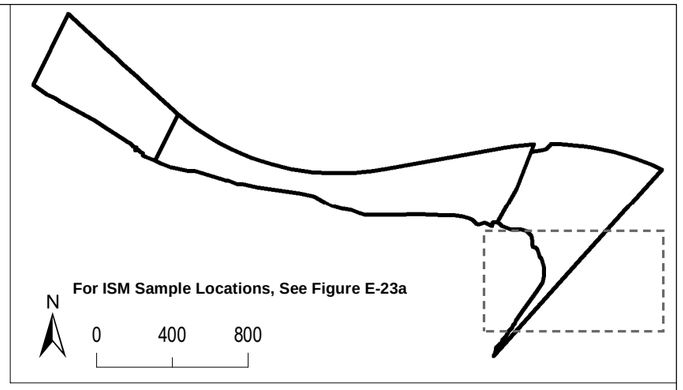
Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Human Health - Copper in Subsurface Soil - 4 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-23d



BNSF RAILWAY

Legend:

- Composite Sample Concentration Above CW Hot Spot Concentration
- Discrete Sample Concentration Above CW Hot Spot Concentration
- Composite Sample Concentration Above CW PRG
- Discrete Sample Concentration Above CW PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. CW = Construction Worker
6. ERs calculated using lowest applicable PRG (CW).
7. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 3 to 10 feet below ground surface.
8. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

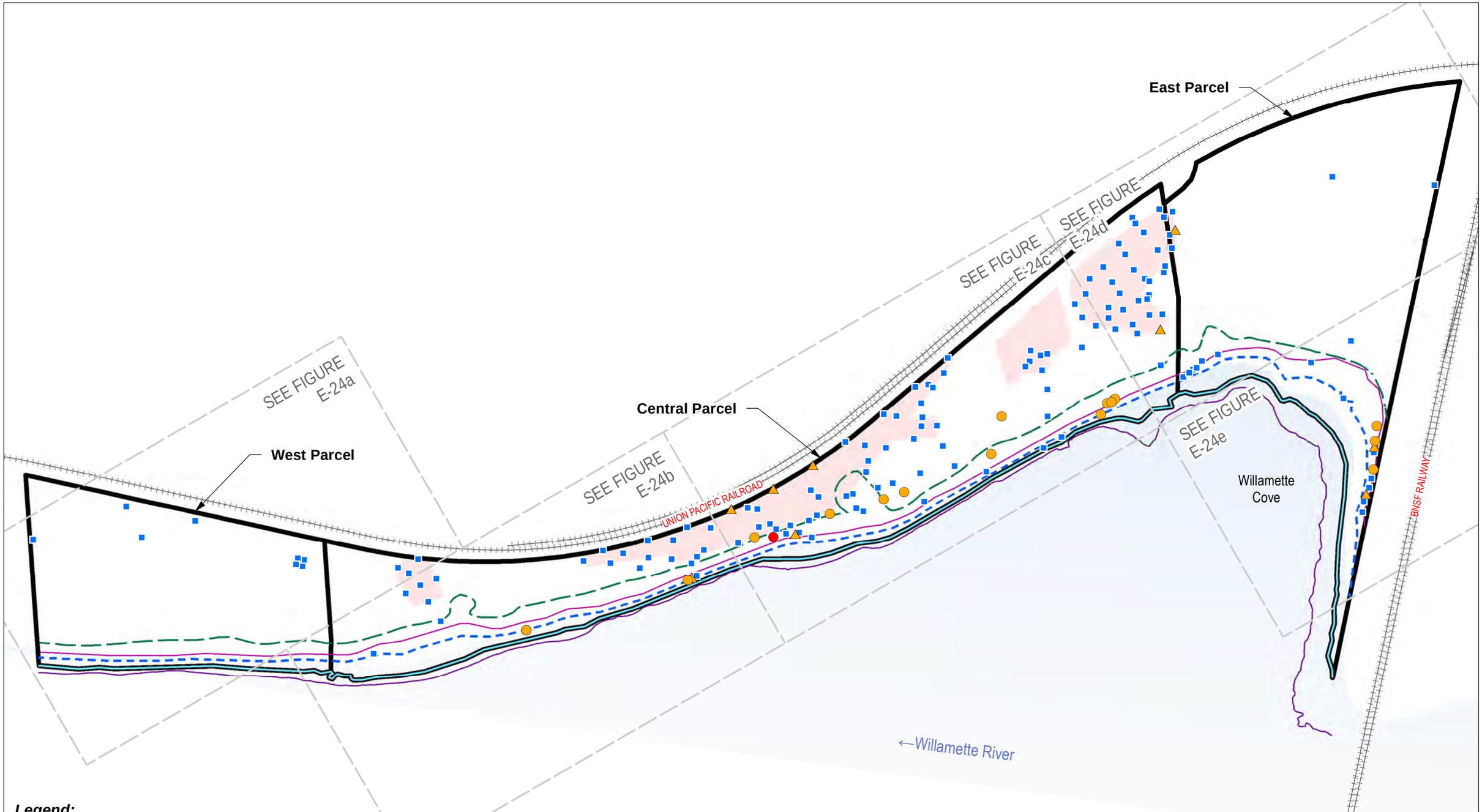
Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Human Health - Copper in Subsurface Soil - 5 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-23e



Legend:

- Composite Sample Concentration Above RT/PU Hot Spot Concentration
- Discrete Sample Concentration Above RT/PU Hot Spot Concentration
- Composite Sample Concentration Above RT/PU PRG
- Discrete Sample Concentration Above RT/PU PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG.
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology
8. RT/PU = Recreational Trespasser/Park User

0 200 400

Approximate Scale in Feet

N

Maximum ERs - Human Health - Lead in Surface Soil

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX

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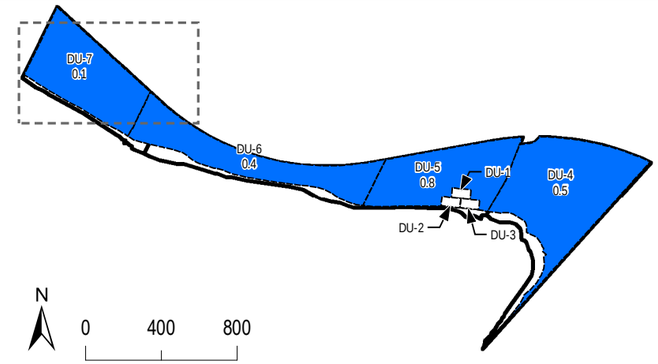
Project Number	1056-10	Figure
March 2019		E-24

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Concentration Above RT/PU Hot Spot Concentration
- Discrete Sample Concentration Above RT/PU Hot Spot Concentration
- Composite Sample Concentration Above RT/PU PRG
- Discrete Sample Concentration Above RT/PU PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG.
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology
8. RT/PU = Recreational Trespasser/Park User

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Human Health - Lead in Surface Soil - 1 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
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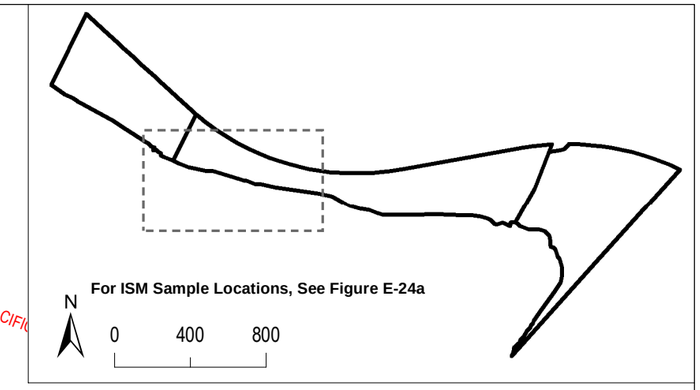
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-24a



UNION PACIFIC

Legend:

- Composite Sample Concentration Above RT/PU Hot Spot Concentration
- Discrete Sample Concentration Above RT/PU Hot Spot Concentration
- Composite Sample Concentration Above RT/PU PRG
- Discrete Sample Concentration Above RT/PU PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
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- Ordinary Low Water Line (6.9NAVD88)
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Notes:

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2. mg/kg = Milligrams Per Kilogram
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4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG.
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology
8. RT/PU = Recreational Trespasser/Park User

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Human Health - Lead in Surface Soil - 2 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
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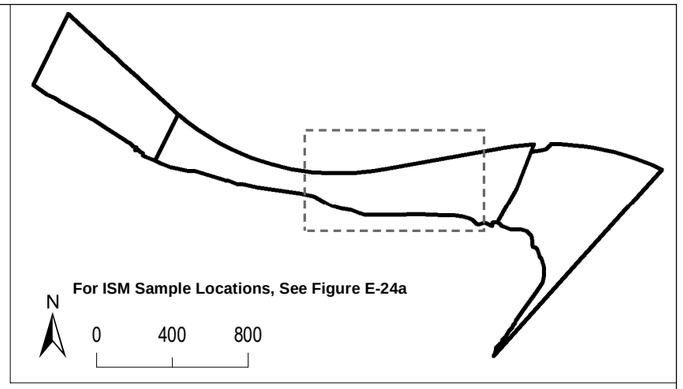
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-24b



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Concentration Above RT/PU Hot Spot Concentration
- Discrete Sample Concentration Above RT/PU Hot Spot Concentration
- Composite Sample Concentration Above RT/PU PRG
- Discrete Sample Concentration Above RT/PU PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
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- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

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2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG.
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology
8. RT/PU = Recreational Trespasser/Park User

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

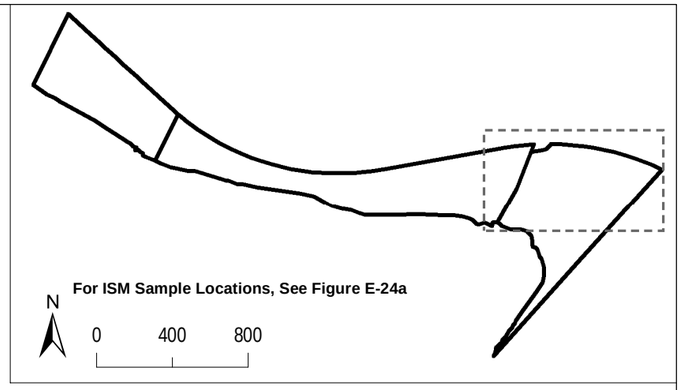
Maximum ERs - Human Health - Lead in Surface Soil - 3 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-24c

UNION PACIFIC RAILROAD



BNSF RAILWAY

Legend:

- Composite Sample Concentration Above RT/PU Hot Spot Concentration
- Discrete Sample Concentration Above RT/PU Hot Spot Concentration
- Composite Sample Concentration Above RT/PU PRG
- Discrete Sample Concentration Above RT/PU PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
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Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG.
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology
8. RT/PU = Recreational Trespasser/Park User

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Human Health - Lead in Surface Soil - 4 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
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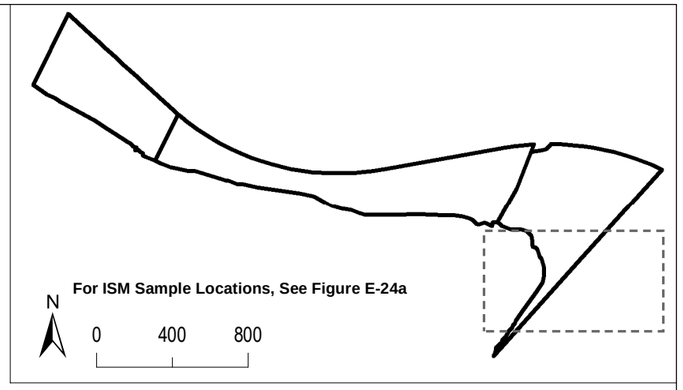
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-24d



BNSF RAILWAY

Legend:

- Composite Sample Concentration Above RT/PU Hot Spot Concentration
- Discrete Sample Concentration Above RT/PU Hot Spot Concentration
- Composite Sample Concentration Above RT/PU PRG
- Discrete Sample Concentration Above RT/PU PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
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Notes:

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2. mg/kg = Milligrams Per Kilogram
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4. MDL = Method Detection Limit
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6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology
8. RT/PU = Recreational Trespasser/Park User

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

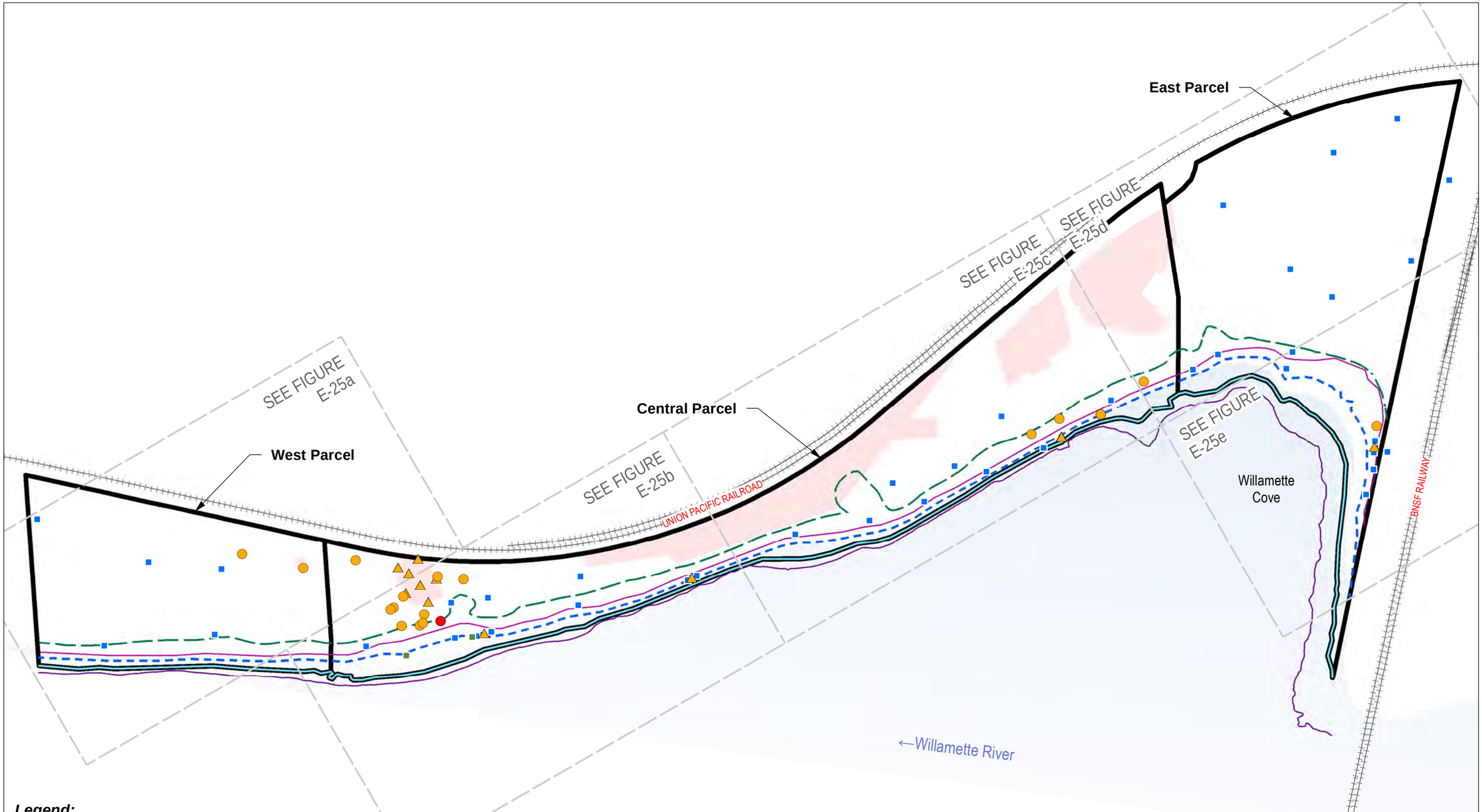
Maximum ERs - Human Health - Lead in Surface Soil - 5 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX

Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-24e



Legend:

- Composite Sample Concentration Above RT/PU Hot Spot Concentration
- Discrete Sample Concentration Above RT/PU Hot Spot Concentration
- Composite Sample Concentration Above RT/PU PRG
- Discrete Sample Concentration Above RT/PU PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
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- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
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Notes:

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2. mg/kg = Milligrams Per Kilogram
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4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG.
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology
8. RT/PU = Recreational Trespasser/Park User

0 200 400

Approximate Scale in Feet

N

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

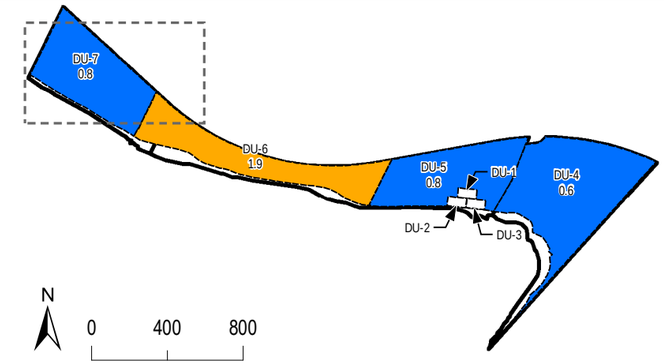
Maximum ERs - Human Health - BaP Eq in Surface Soil

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX

Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-25



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Concentration Above RT/PU Hot Spot Concentration
- Discrete Sample Concentration Above RT/PU Hot Spot Concentration
- Composite Sample Concentration Above RT/PU PRG
- Discrete Sample Concentration Above RT/PU PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
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Notes:

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2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG.
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology
8. RT/PU = Recreational Trespasser/Park User

0 60 120 N

Approximate Scale in Feet

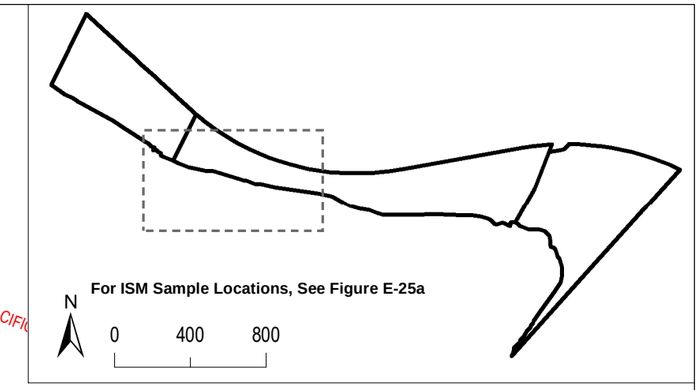
Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Human Health - BaP Eq in Surface Soil - 1 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-25a



UNION PACIFIC

Legend:

- Composite Sample Concentration Above RT/PU Hot Spot Concentration
- Discrete Sample Concentration Above RT/PU Hot Spot Concentration
- Composite Sample Concentration Above RT/PU PRG
- Discrete Sample Concentration Above RT/PU PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
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Notes:

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2. mg/kg = Milligrams Per Kilogram
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4. MDL = Method Detection Limit
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6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology
8. RT/PU = Recreational Trespasser/Park User

0 60 120 N

Approximate Scale in Feet

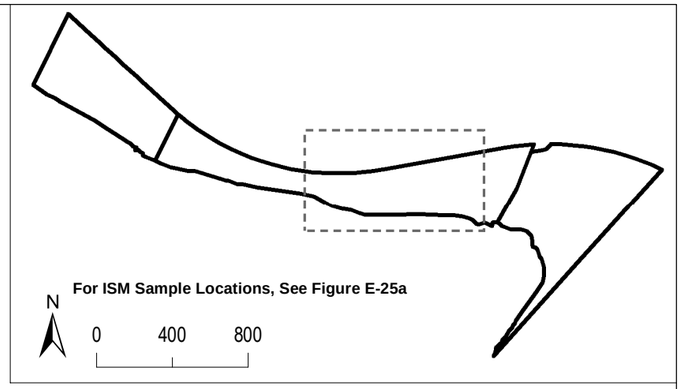
Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Human Health - BaP Eq in Surface Soil - 2 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-25b



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Concentration Above RT/PU Hot Spot Concentration
- Discrete Sample Concentration Above RT/PU Hot Spot Concentration
- Composite Sample Concentration Above RT/PU PRG
- Discrete Sample Concentration Above RT/PU PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
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- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
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Notes:

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2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG.
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology
8. RT/PU = Recreational Trespasser/Park User

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

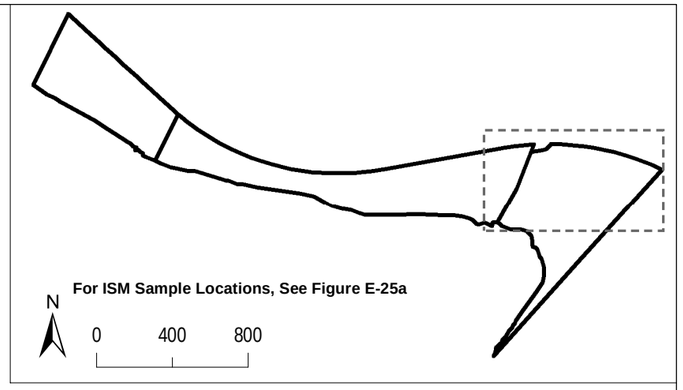
Maximum ERs - Human Health - BaP Eq in Surface Soil - 3 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-25c

UNION PACIFIC RAILROAD



BNSF RAILWAY

Legend:

- Composite Sample Concentration Above RT/PU Hot Spot Concentration
- Discrete Sample Concentration Above RT/PU Hot Spot Concentration
- Composite Sample Concentration Above RT/PU PRG
- Discrete Sample Concentration Above RT/PU PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
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- Ordinary High Water Line (20.1NAVD88)
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- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

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3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG.
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology
8. RT/PU = Recreational Trespasser/Park User

0 60 120 N

Approximate Scale in Feet

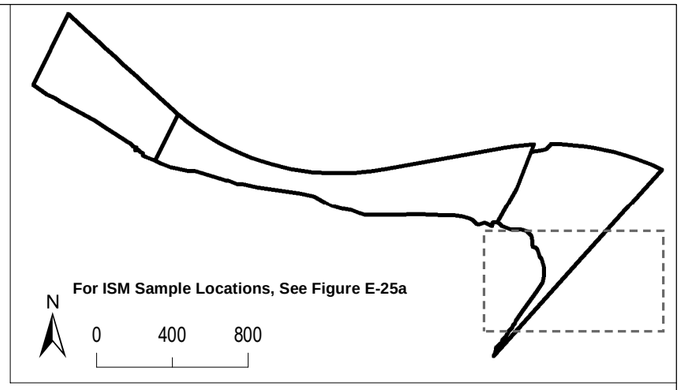
Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Human Health - BaP Eq in Surface Soil - 4 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-25d



BNSF RAILWAY

Legend:

- Composite Sample Concentration Above RT/PU Hot Spot Concentration
- Discrete Sample Concentration Above RT/PU Hot Spot Concentration
- Composite Sample Concentration Above RT/PU PRG
- Discrete Sample Concentration Above RT/PU PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG.
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology
8. RT/PU = Recreational Trespasser/Park User

0 60 120 N

Approximate Scale in Feet

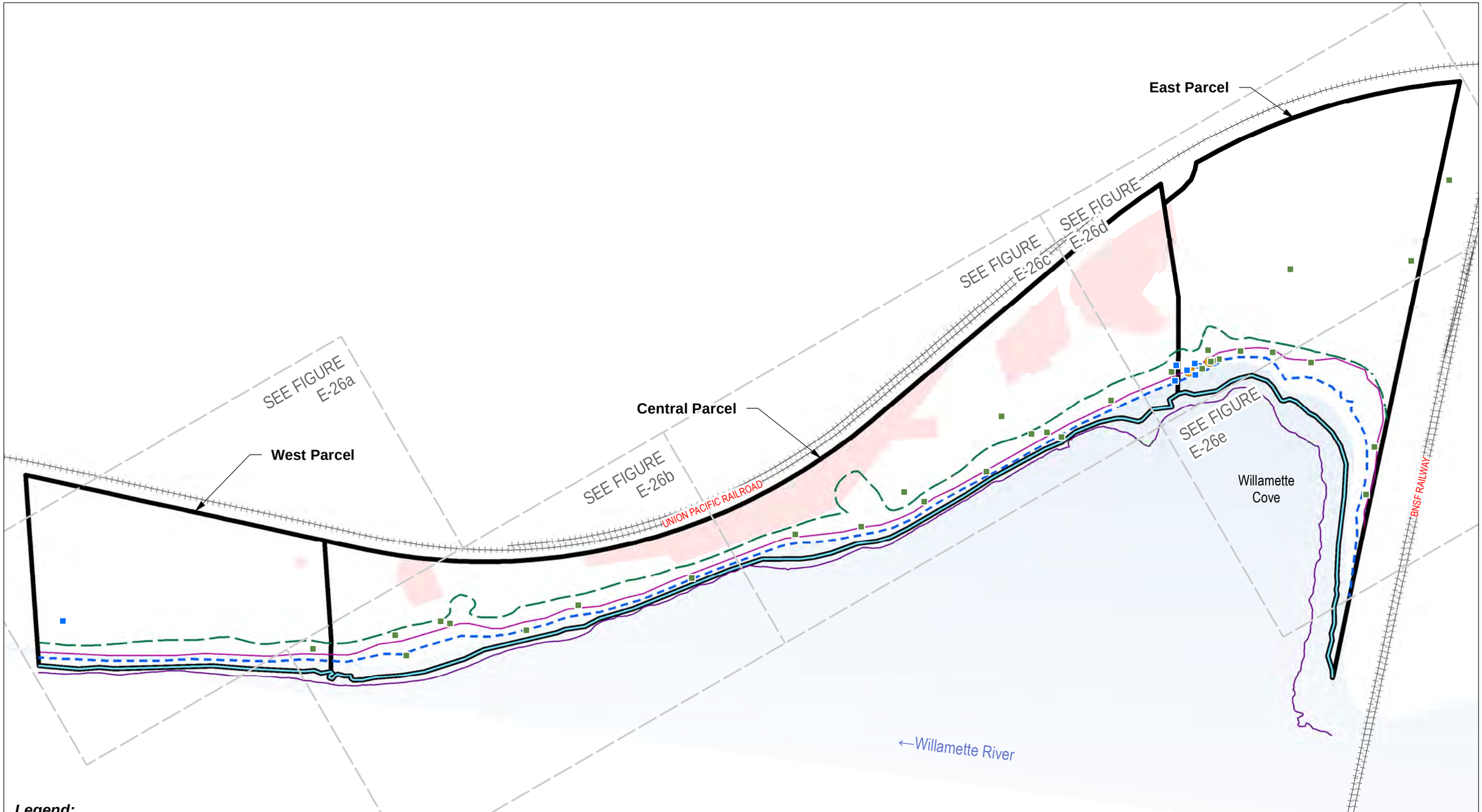
Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Human Health - BaP Eq in Surface Soil - 5 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-25e



Legend:

- Composite Sample Concentration Above RT/PU Hot Spot Concentration
- Discrete Sample Concentration Above RT/PU Hot Spot Concentration
- Composite Sample Concentration Above RT/PU PRG
- Discrete Sample Concentration Above RT/PU PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG.
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology
8. RT/PU = Recreational Trespasser/Park User
9. PCB = Polychlorinated Biphenyl

0 200 400

Approximate Scale in Feet

N

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

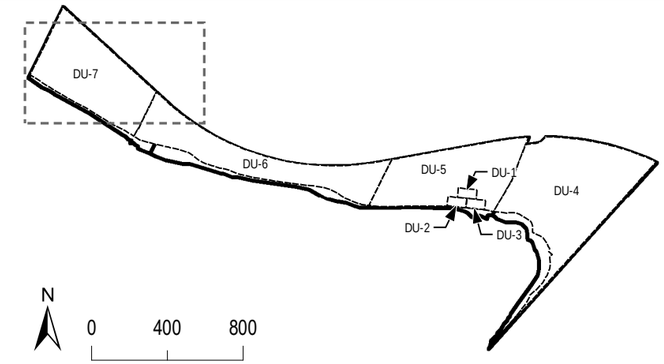
Maximum ERs - Human Health - Total PCBs in Surface Soil

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX

Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-26



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Concentration Above RT/PU Hot Spot Concentration
- Discrete Sample Concentration Above RT/PU Hot Spot Concentration
- Composite Sample Concentration Above RT/PU PRG
- Discrete Sample Concentration Above RT/PU PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG.
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology
8. RT/PU = Recreational Trespasser/Park User
9. PCB = Polychlorinated Biphenyl

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Human Health - Total PCBs in Surface Soil - 1 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
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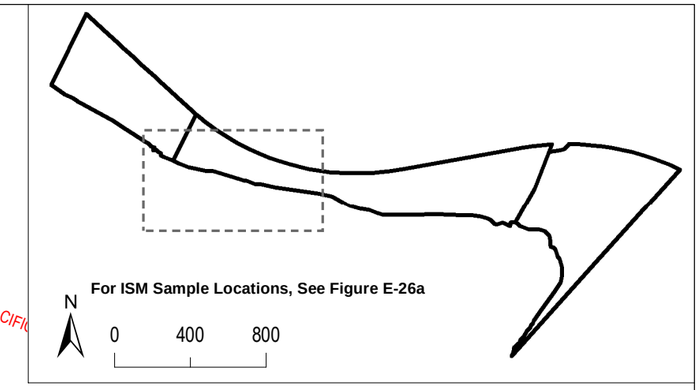
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-26a



UNION PACIFIC

Legend:

- Composite Sample Concentration Above RT/PU Hot Spot Concentration
- Discrete Sample Concentration Above RT/PU Hot Spot Concentration
- Composite Sample Concentration Above RT/PU PRG
- Discrete Sample Concentration Above RT/PU PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG.
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology
8. RT/PU = Recreational Trespasser/Park User
9. PCB = Polychlorinated Biphenyl

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Human Health - Total PCBs in Surface Soil - 2 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
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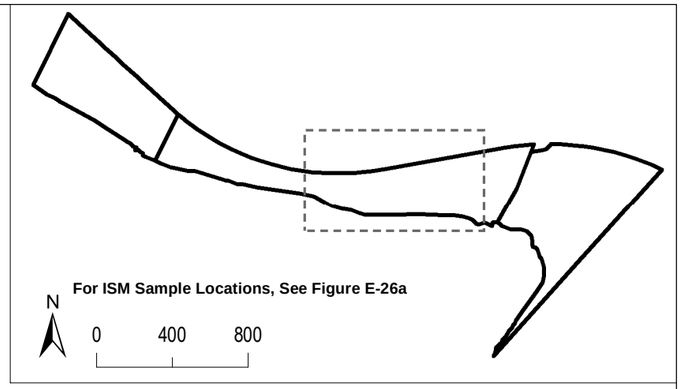
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-26b



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Concentration Above RT/PU Hot Spot Concentration
- Discrete Sample Concentration Above RT/PU Hot Spot Concentration
- Composite Sample Concentration Above RT/PU PRG
- Discrete Sample Concentration Above RT/PU PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG.
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology
8. RT/PU = Recreational Trespasser/Park User
9. PCB = Polychlorinated Biphenyl

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Human Health - Total PCBs in Surface Soil - 3 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

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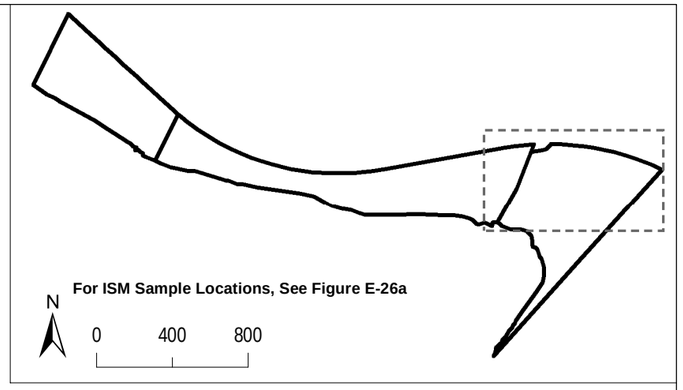
Project Number	1056-10	Figure
March 2019		E-26c

UNION PACIFIC RAILROAD



BNSF RAILWAY

Legend:

- Composite Sample Concentration Above RT/PU Hot Spot Concentration
- Discrete Sample Concentration Above RT/PU Hot Spot Concentration
- Composite Sample Concentration Above RT/PU PRG
- Discrete Sample Concentration Above RT/PU PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG.
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology
8. RT/PU = Recreational Trespasser/Park User
9. PCB = Polychlorinated Biphenyl

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Human Health - Total PCBs in Surface Soil - 4 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
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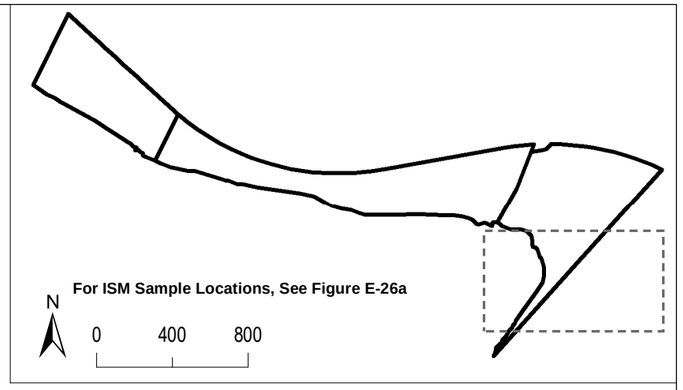
Project Number	1056-10	Figure
March 2019		E-26d



BNSF RAILWAY

Legend:

- Composite Sample Concentration Above RT/PU Hot Spot Concentration
- Discrete Sample Concentration Above RT/PU Hot Spot Concentration
- Composite Sample Concentration Above RT/PU PRG
- Discrete Sample Concentration Above RT/PU PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
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- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG.
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology
8. RT/PU = Recreational Trespasser/Park User
9. PCB = Polychlorinated Biphenyl

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Human Health - Total PCBs in Surface Soil - 5 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
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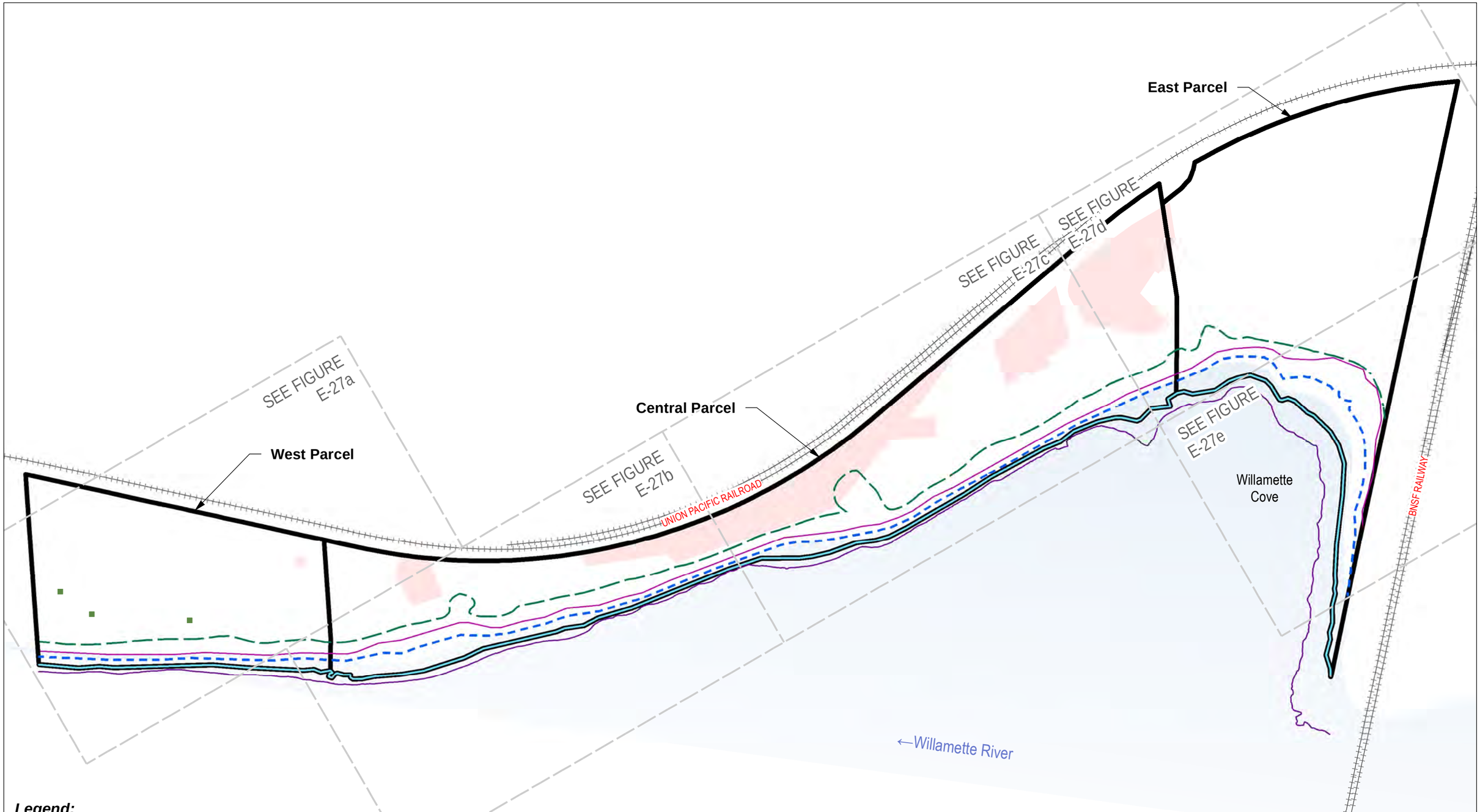
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-26e



Legend:

- Composite Sample Concentration Above CW Hot Spot Concentration
- Discrete Sample Concentration Above CW Hot Spot Concentration
- Composite Sample Concentration Above CW PRG
- Discrete Sample Concentration Above CW PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. CW = Construction Worker
6. ERs calculated using lowest applicable PRG (CW).
7. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 3 to 10 feet below ground surface.
8. ISM = Incremental Sampling Methodology
9. PCB = Polychlorinated Biphenyl

0 200 400
Approximate Scale in Feet

N

Maximum ERs - Human Health - Total PCBs in Subsurface Soil

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
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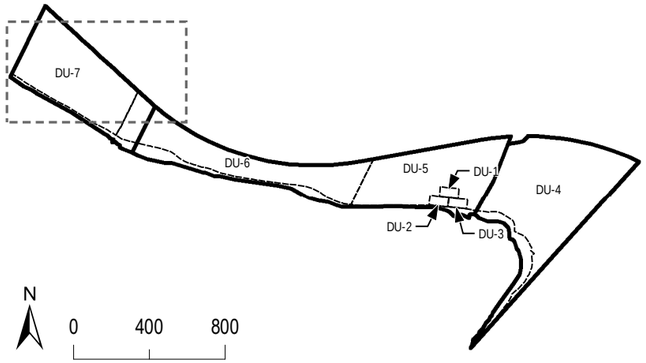
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-27

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Concentration Above CW Hot Spot Concentration
- Discrete Sample Concentration Above CW Hot Spot Concentration
- Composite Sample Concentration Above CW PRG
- Discrete Sample Concentration Above CW PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. CW = Construction Worker
6. ERs calculated using lowest applicable PRG (CW).
7. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 3 to 10 feet below ground surface.
8. ISM = Incremental Sampling Methodology
9. PCB = Polychlorinated Biphenyl

0 60 120 N

Approximate Scale in Feet

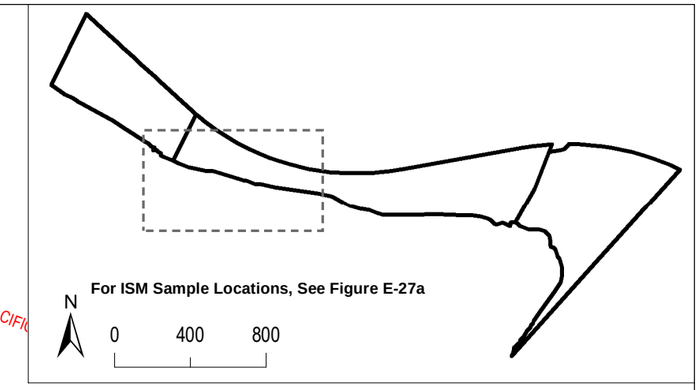
Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Human Health - Total PCBs in Subsurface Soil - 1 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-27a



UNION PACIFIC

Legend:

- Composite Sample Concentration Above CW Hot Spot Concentration
- Discrete Sample Concentration Above CW Hot Spot Concentration
- Composite Sample Concentration Above CW PRG
- Discrete Sample Concentration Above CW PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
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- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. CW = Construction Worker
6. ERs calculated using lowest applicable PRG (CW).
7. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 3 to 10 feet below ground surface.
8. ISM = Incremental Sampling Methodology
9. PCB = Polychlorinated Biphenyl

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Human Health - Total PCBs in Subsurface Soil - 2 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
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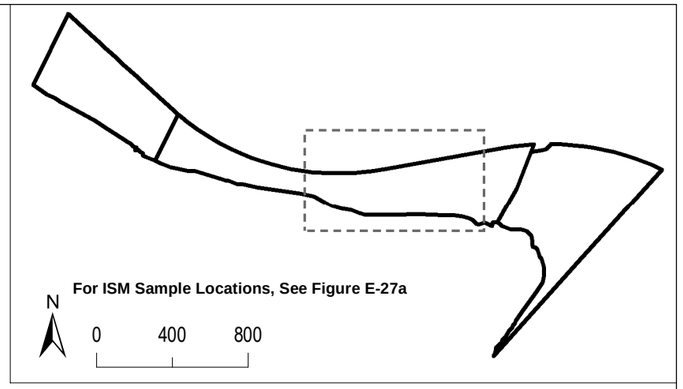
Project Number	1056-10	Figure
March 2019		E-27b



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Concentration Above CW Hot Spot Concentration
- Discrete Sample Concentration Above CW Hot Spot Concentration
- Composite Sample Concentration Above CW PRG
- Discrete Sample Concentration Above CW PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
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- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. CW = Construction Worker
6. ERs calculated using lowest applicable PRG (CW).
7. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 3 to 10 feet below ground surface.
8. ISM = Incremental Sampling Methodology
9. PCB = Polychlorinated Biphenyl

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Human Health - Total PCBs in Subsurface Soil - 3 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
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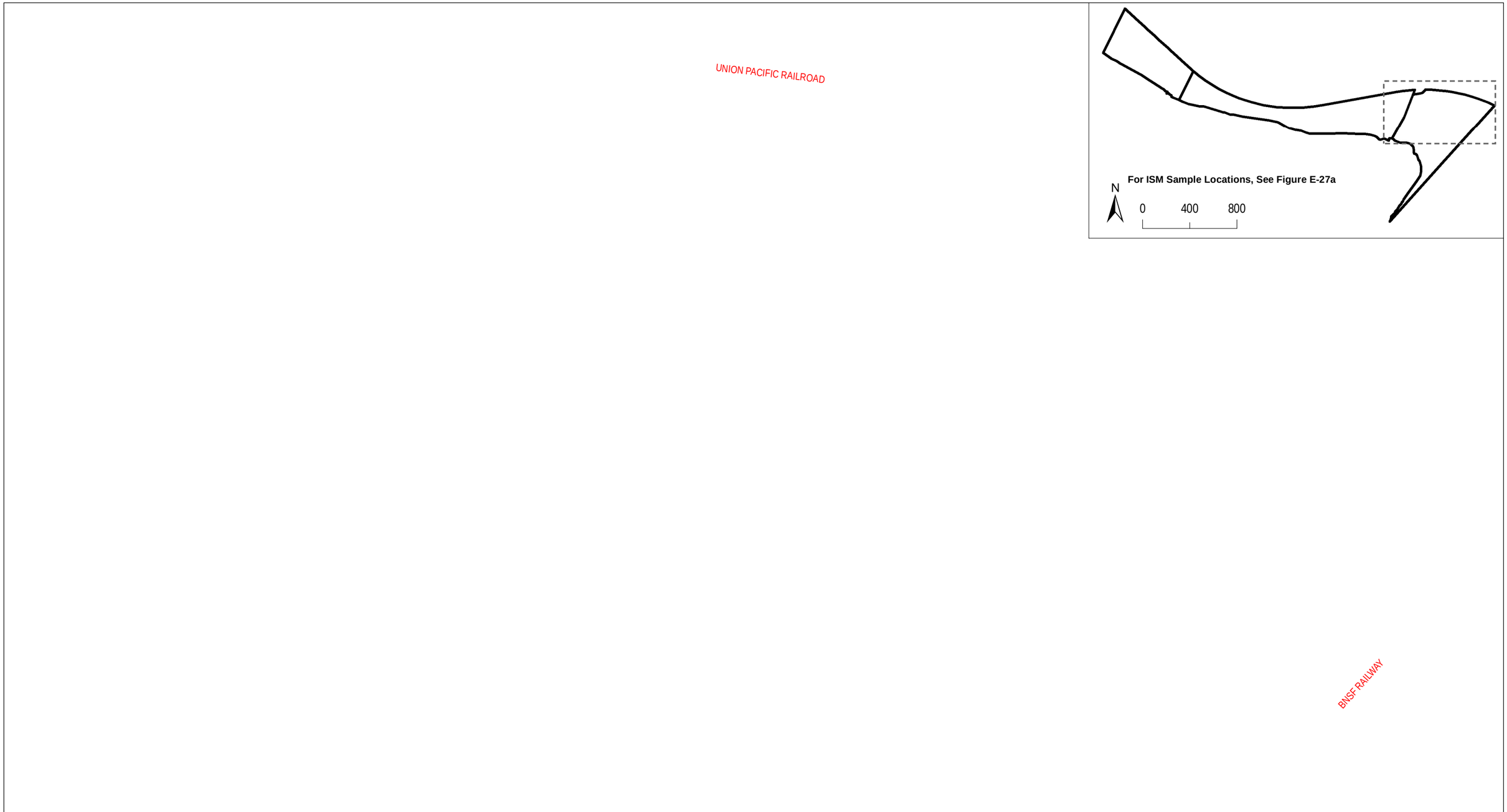
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-27c



Legend:

- Composite Sample Concentration Above CW Hot Spot Concentration
- Discrete Sample Concentration Above CW Hot Spot Concentration
- Composite Sample Concentration Above CW PRG
- Discrete Sample Concentration Above CW PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
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- Mean High Water Line (13.3NAVD88)
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Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. CW = Construction Worker
6. ERs calculated using lowest applicable PRG (CW).
7. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 3 to 10 feet below ground surface.
8. ISM = Incremental Sampling Methodology
9. PCB = Polychlorinated Biphenyl

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Human Health - Total PCBs in Subsurface Soil - 4 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
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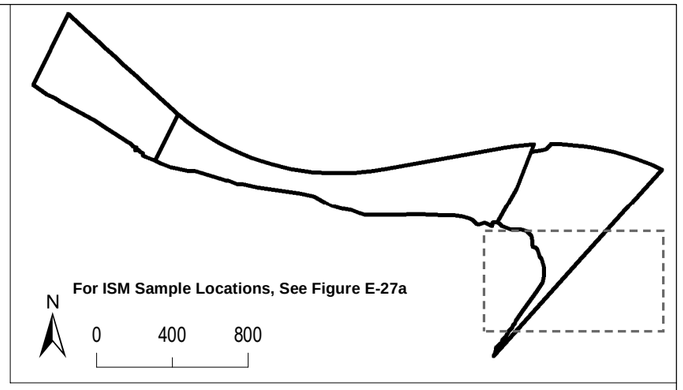
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-27d



BNSF RAILWAY

Legend:

- Composite Sample Concentration Above CW Hot Spot Concentration
- Discrete Sample Concentration Above CW Hot Spot Concentration
- Composite Sample Concentration Above CW PRG
- Discrete Sample Concentration Above CW PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
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- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. CW = Construction Worker
6. ERs calculated using lowest applicable PRG (CW).
7. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 3 to 10 feet below ground surface.
8. ISM = Incremental Sampling Methodology
9. PCB = Polychlorinated Biphenyl

0 60 120 N

Approximate Scale in Feet

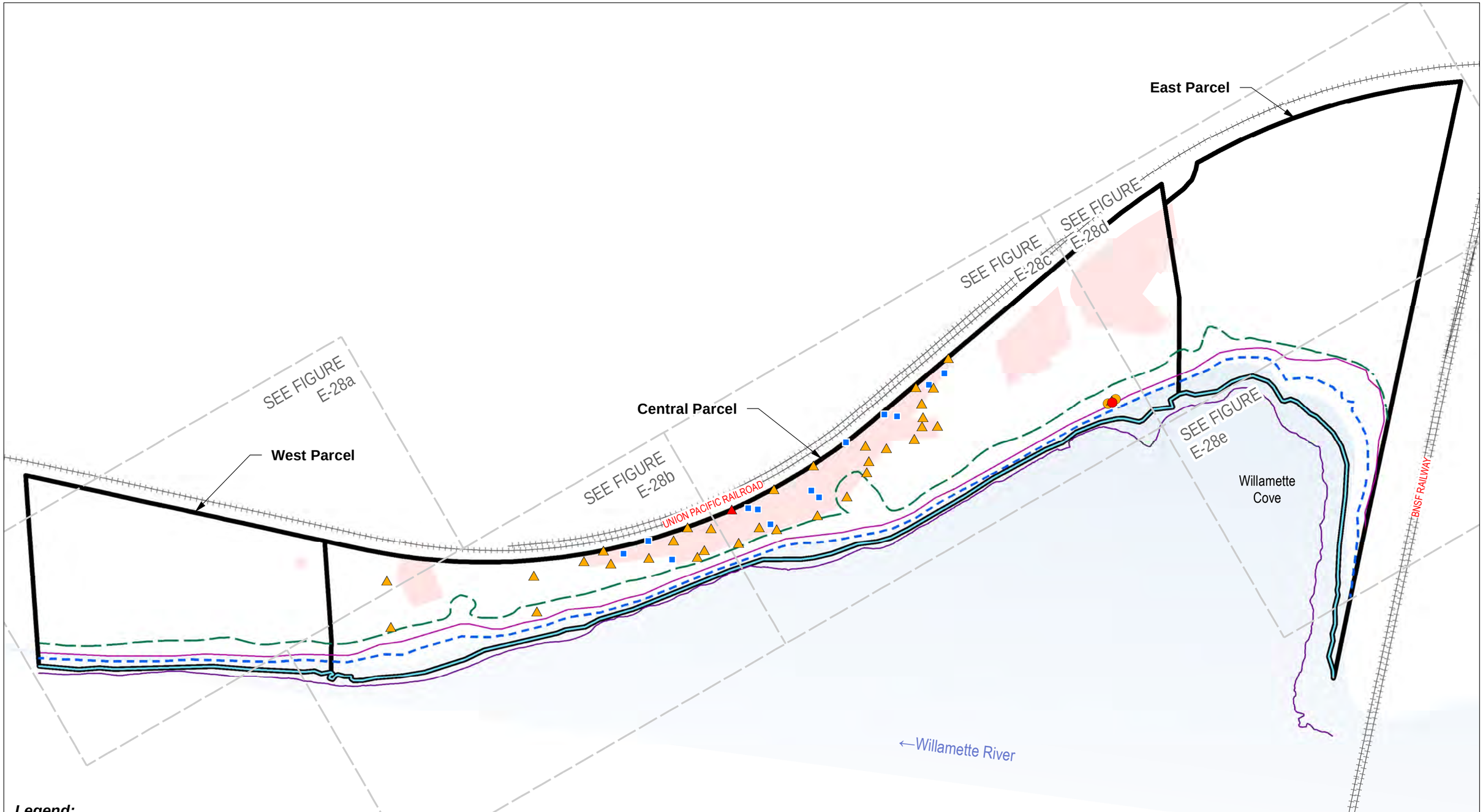
Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Human Health - Total PCBs in Subsurface Soil - 5 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-27e



Legend:

- Composite Sample Concentration Above RT/PU Hot Spot Concentration
- Discrete Sample Concentration Above RT/PU Hot Spot Concentration
- Composite Sample Concentration Above RT/PU PRG
- Discrete Sample Concentration Above RT/PU PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG.
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology
8. RT/PU = Recreational Trespasser/Park User

0 200 400

Approximate Scale in Feet

N

Maximum ERs - Human Health - Dioxin TEQ in Surface Soil

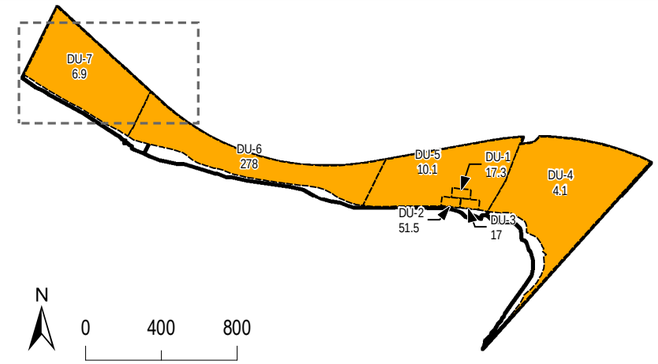
Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX

Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-28

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Concentration Above RT/PU Hot Spot Concentration
- Discrete Sample Concentration Above RT/PU Hot Spot Concentration
- Composite Sample Concentration Above RT/PU PRG
- Discrete Sample Concentration Above RT/PU PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG.
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology
8. RT/PU = Recreational Trespasser/Park User

0 60 120 N

Approximate Scale in Feet

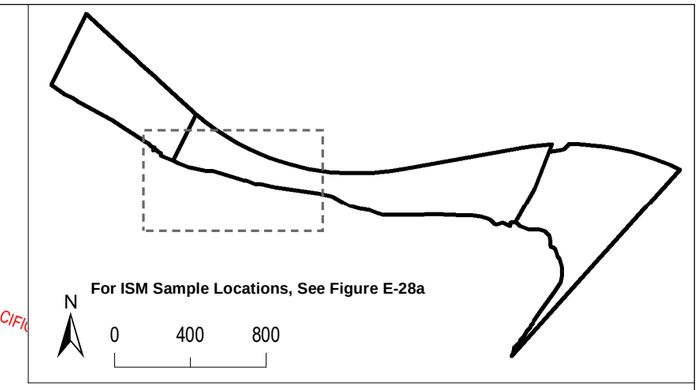
Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Human Health - Dioxin TEQ in Surface Soil - 1 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-28a



UNION PACIFIC

Legend:

- Composite Sample Concentration Above RT/PU Hot Spot Concentration
- Discrete Sample Concentration Above RT/PU Hot Spot Concentration
- Composite Sample Concentration Above RT/PU PRG
- Discrete Sample Concentration Above RT/PU PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG.
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology
8. RT/PU = Recreational Trespasser/Park User

0 60 120 N

Approximate Scale in Feet

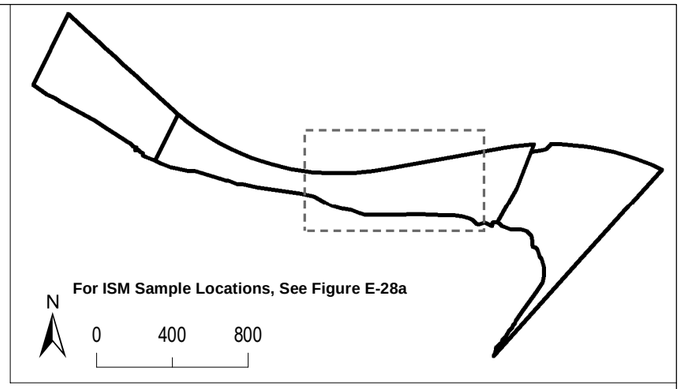
Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Human Health - Dioxin TEQ in Surface Soil - 2 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-28b



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Concentration Above RT/PU Hot Spot Concentration
- Discrete Sample Concentration Above RT/PU Hot Spot Concentration
- Composite Sample Concentration Above RT/PU PRG
- Discrete Sample Concentration Above RT/PU PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG.
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology
8. RT/PU = Recreational Trespasser/Park User

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

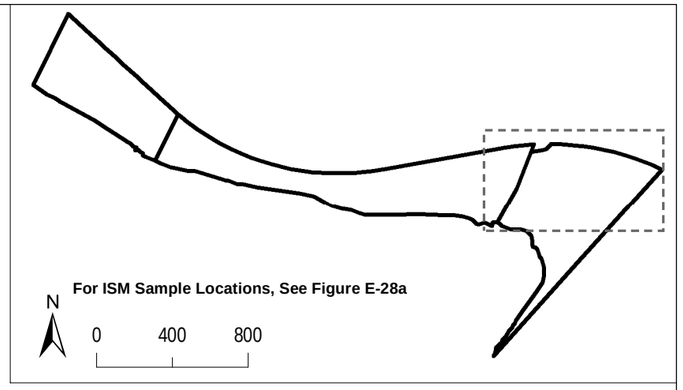
Maximum ERs - Human Health - Dioxin TEQ in Surface Soil - 3 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-28c

UNION PACIFIC RAILROAD



BNSF RAILWAY

Legend:

- Composite Sample Concentration Above RT/PU Hot Spot Concentration
- Discrete Sample Concentration Above RT/PU Hot Spot Concentration
- Composite Sample Concentration Above RT/PU PRG
- Discrete Sample Concentration Above RT/PU PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG.
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology
8. RT/PU = Recreational Trespasser/Park User

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Human Health - Dioxin TEQ in Surface Soil - 4 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
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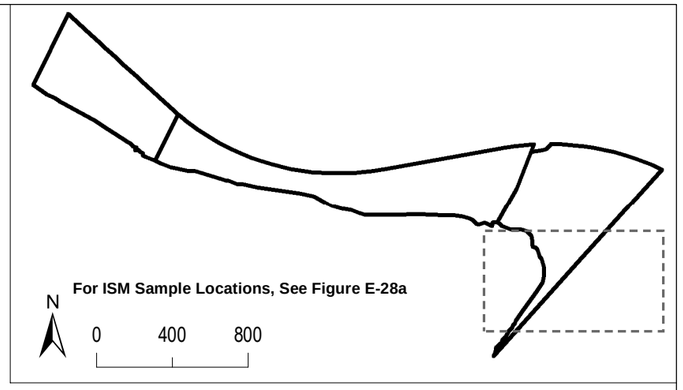
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-28d



BNSF RAILWAY

Legend:

- Composite Sample Concentration Above RT/PU Hot Spot Concentration
- Discrete Sample Concentration Above RT/PU Hot Spot Concentration
- Composite Sample Concentration Above RT/PU PRG
- Discrete Sample Concentration Above RT/PU PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. ERs calculated using lowest applicable PRG.
6. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
7. ISM = Incremental Sampling Methodology
8. RT/PU = Recreational Trespasser/Park User

0 60 120 N

Approximate Scale in Feet

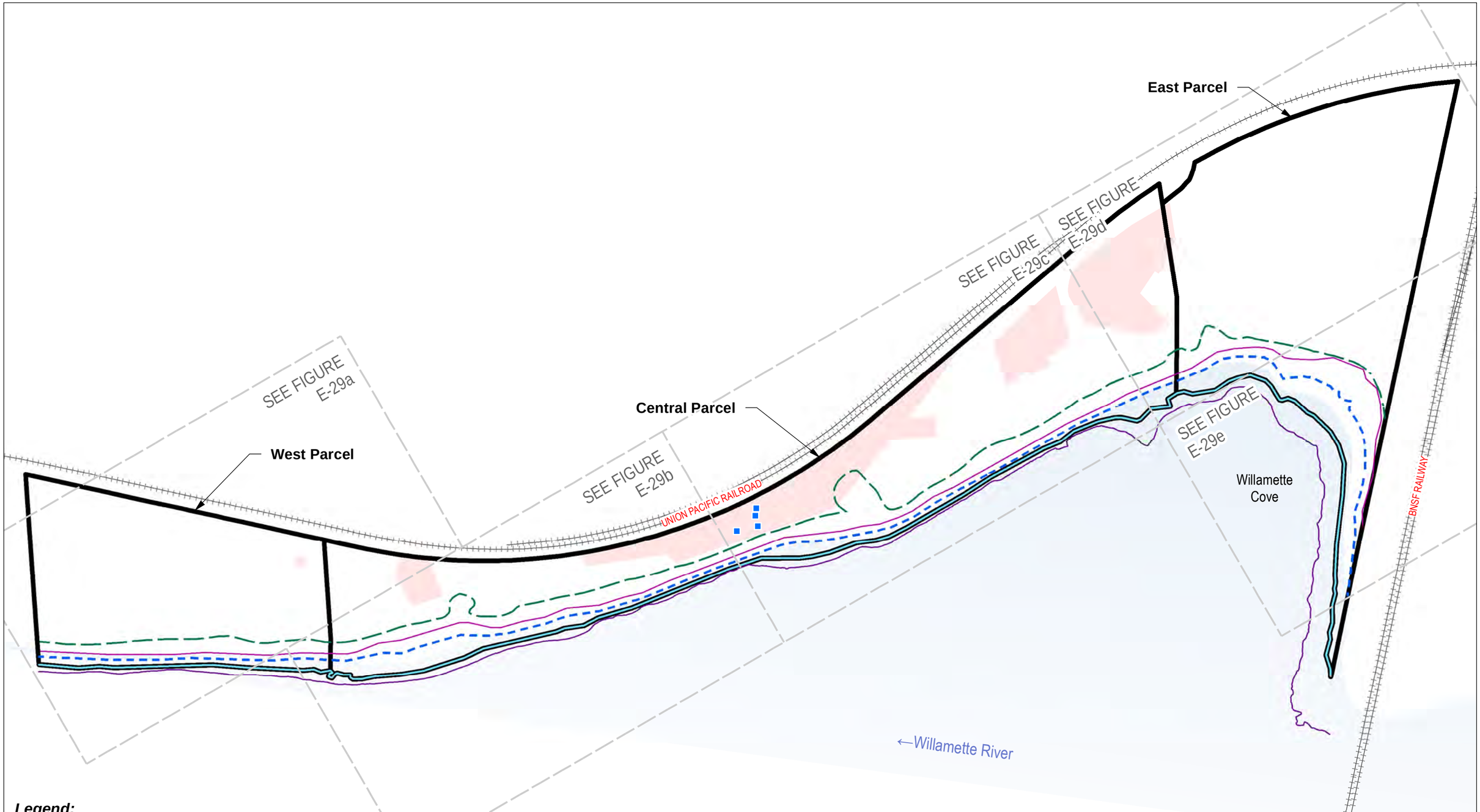
Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Human Health - Dioxin TEQ in Surface Soil - 5 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-28e



Legend:

- Composite Sample Concentration Above CW Hot Spot Concentration
- Discrete Sample Concentration Above CW Hot Spot Concentration
- Composite Sample Concentration Above CW PRG
- Discrete Sample Concentration Above CW PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. CW = Construction Worker
6. ERs calculated using lowest applicable PRG (CW).
7. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 3 to 10 feet below ground surface.
8. ISM = Incremental Sampling Methodology

0 200 400

Approximate Scale in Feet

N

Maximum ERs - Human Health - Dioxin TEQ in Subsurface Soil

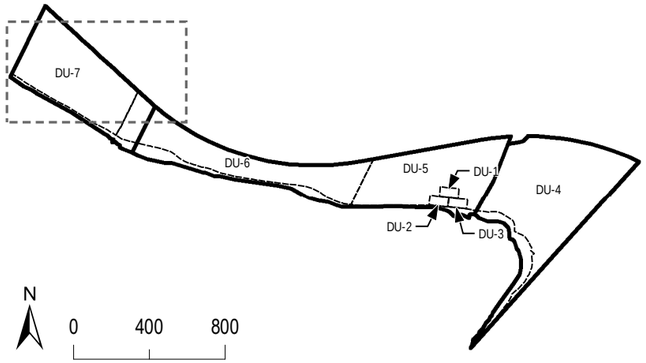
Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX

Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-29

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Concentration Above CW Hot Spot Concentration
- Discrete Sample Concentration Above CW Hot Spot Concentration
- Composite Sample Concentration Above CW PRG
- Discrete Sample Concentration Above CW PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. CW = Construction Worker
6. ERs calculated using lowest applicable PRG (CW).
7. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 3 to 10 feet below ground surface.
8. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

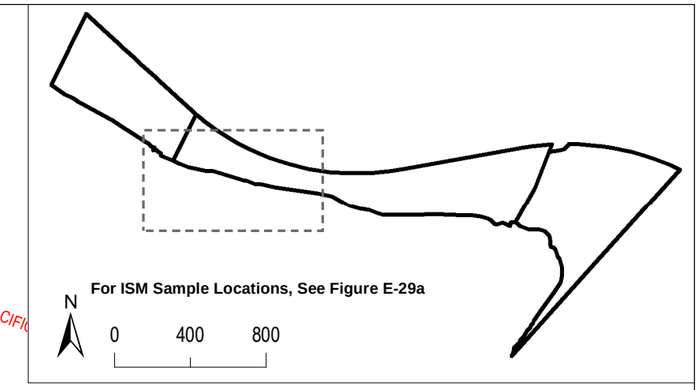
Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Human Health - Dioxin TEQ in Subsurface Soil - 1 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-29a



UNION PACIFIC

Legend:

- Composite Sample Concentration Above CW Hot Spot Concentration
- Discrete Sample Concentration Above CW Hot Spot Concentration
- Composite Sample Concentration Above CW PRG
- Discrete Sample Concentration Above CW PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. CW = Construction Worker
6. ERs calculated using lowest applicable PRG (CW).
7. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 3 to 10 feet below ground surface.
8. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

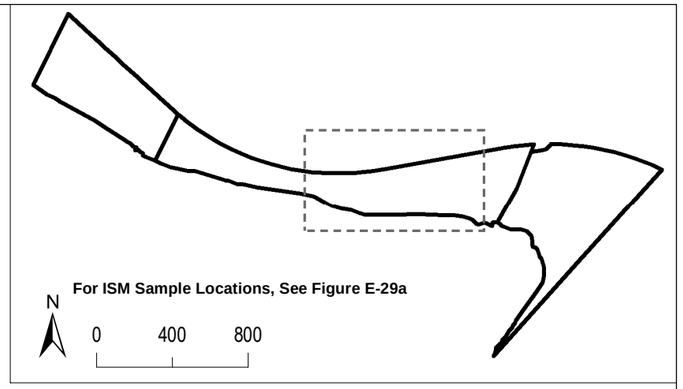
Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Human Health - Dioxin TEQ in Subsurface Soil - 2 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-29b



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Concentration Above CW Hot Spot Concentration
- Discrete Sample Concentration Above CW Hot Spot Concentration
- Composite Sample Concentration Above CW PRG
- Discrete Sample Concentration Above CW PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. CW = Construction Worker
6. ERs calculated using lowest applicable PRG (CW).
7. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 3 to 10 feet below ground surface.
8. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

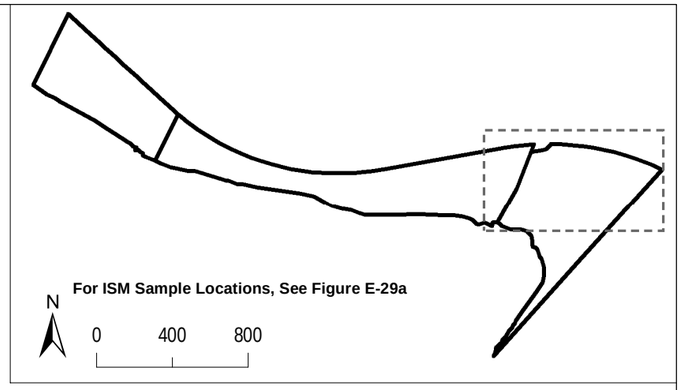
Maximum ERs - Human Health - Dioxin TEQ in Subsurface Soil - 3 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-29c

UNION PACIFIC RAILROAD



BNSF RAILWAY

Legend:

- Composite Sample Concentration Above CW Hot Spot Concentration
- Discrete Sample Concentration Above CW Hot Spot Concentration
- Composite Sample Concentration Above CW PRG
- Discrete Sample Concentration Above CW PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. CW = Construction Worker
6. ERs calculated using lowest applicable PRG (CW).
7. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 3 to 10 feet below ground surface.
8. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

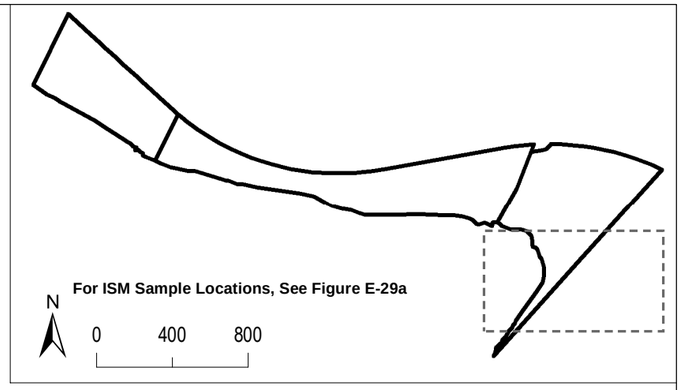
Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Human Health - Dioxin TEQ in Subsurface Soil - 4 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-29d



BNSF RAILWAY

Legend:

- Composite Sample Concentration Above CW Hot Spot Concentration
- Discrete Sample Concentration Above CW Hot Spot Concentration
- Composite Sample Concentration Above CW PRG
- Discrete Sample Concentration Above CW PRG
- Concentration Below Screening Level
- Concentration Less Than MDL, MDL Below Screening Level
- Concentration Less Than MDL, MDL Above Screening Level
- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. PRG = Preliminary Remediation Goal
4. MDL = Method Detection Limit
5. CW = Construction Worker
6. ERs calculated using lowest applicable PRG (CW).
7. Upland Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 3 to 10 feet below ground surface.
8. ISM = Incremental Sampling Methodology

0 60 120 N

Approximate Scale in Feet

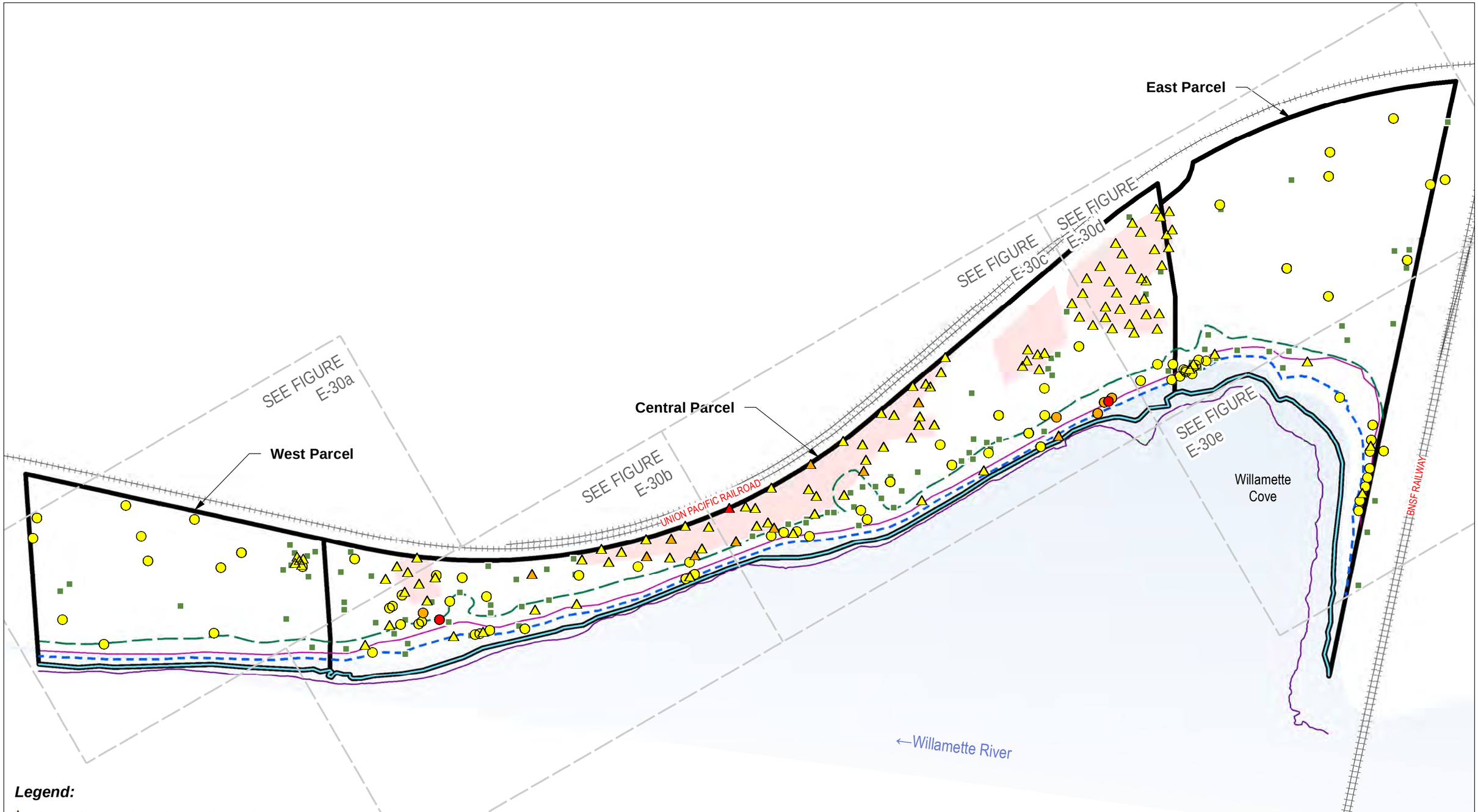
Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Maximum ERs - Human Health - Dioxin TEQ in Subsurface Soil - 5 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-29e



Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

RA1 S1
0.3 (ARSENIC 0.3)
Summed ER — Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology
6. RT/PU = Recreational Trespasser / Park User

0 200 400
Approximate Scale in Feet

N

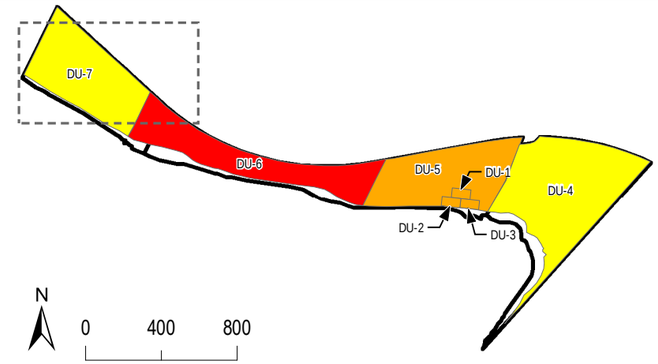
Summed ERs - Upland Surface Soil RT/PU

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-30

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

RA1 S1
0.3 (ARSENIC 0.3)
Summed ER — Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology
6. RT/PU = Recreational Trespasser / Park User

0 60 120
Approximate Scale in Feet
N

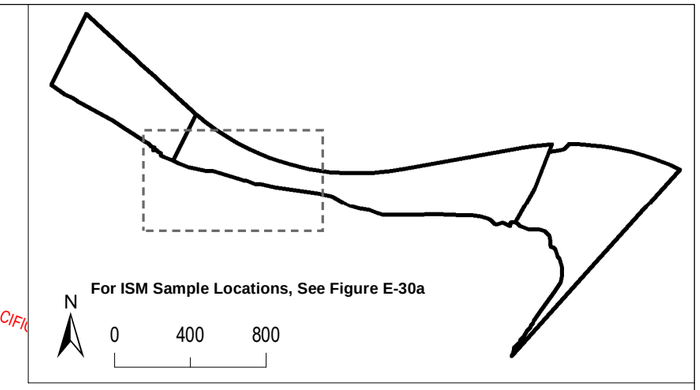
Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Summed ERs - Upland Surface Soil
RT/PU Carcinogen - 1 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-30a



UNION PACIFIC

Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

RA1 S1
0.3 (ARSENIC 0.3)
Summed ER
Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology
6. RT/PU = Recreational Trespasser / Park User

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Summed ERs - Upland Surface Soil
RT/PU Carcinogen - 2 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

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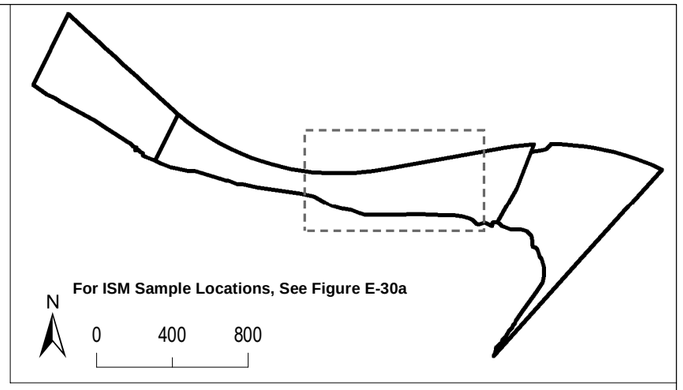
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-30b



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

RA1 S1
0.3 (ARSENIC 0.3)
Summed ER
Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology
6. RT/PU = Recreational Trespasser / Park User

0 60 120
Approximate Scale in Feet
N

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Summed ERs - Upland Surface Soil
RT/PU Carcinogen - 3 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

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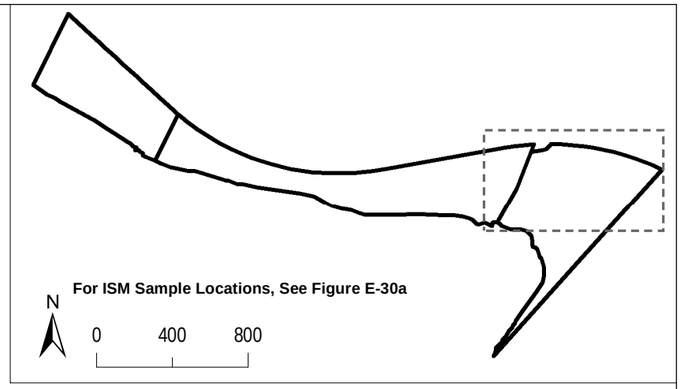
Project Number	1056-10	Figure
March 2019		E-30c

UNION PACIFIC RAILROAD



BNSF RAILWAY

Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

RA1 S1
0.3 (ARSENIC 0.3)
Summed ER
Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology
6. RT/PU = Recreational Trespasser / Park User

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Summed ERs - Upland Surface Soil
RT/PU Carcinogen - 4 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

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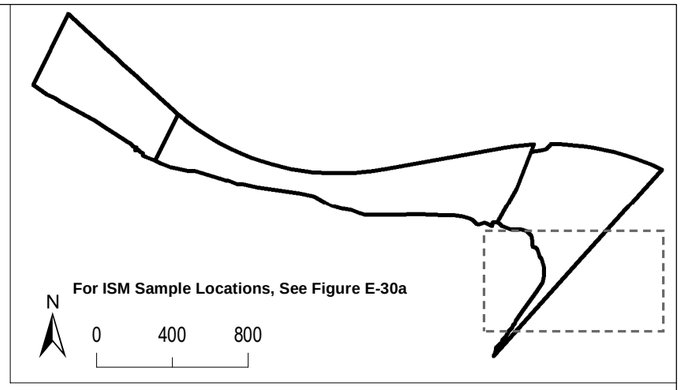
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-30d



BNSF RAILWAY

Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

RA1 S1
0.3 (ARSENIC 0.3)
Summed ER — Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology
6. RT/PU = Recreational Trespasser / Park User

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Summed ERs - Upland Surface Soil
RT/PU Carcinogen - 5 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

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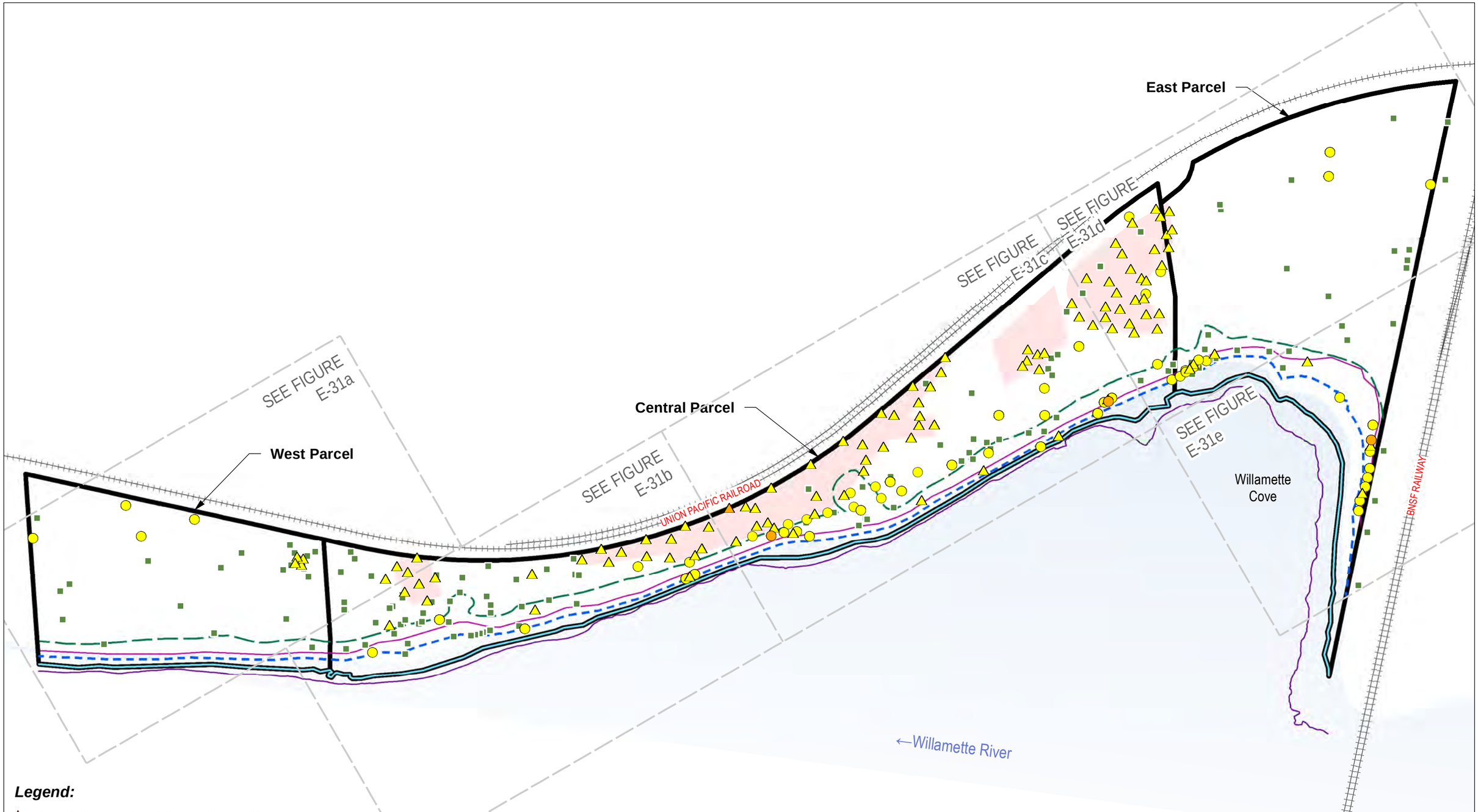
Project Number	1056-10	Figure
March 2019		E-30e



Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

RA1 S1
0.1 (LEAD 0)
Summed ER — Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology
6. RT/PU = Recreational Trespasser / Park User

0 200 400
Approximate Scale in Feet

N

Summed ERs - Upland Surface Soil RT/PU Non-Carcinogen

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
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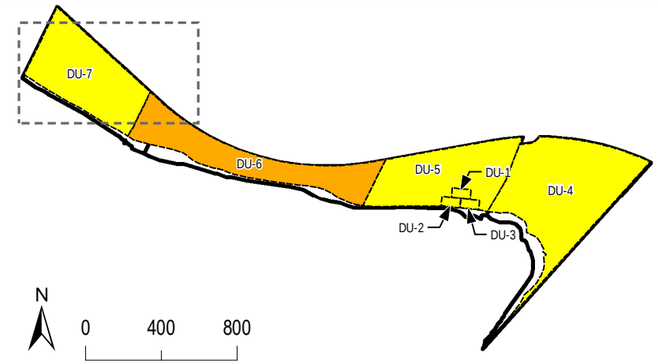
Project Number	1056-10	Figure
March 2019		E-31

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

RA1 S1
0.1 (LEAD 0)
Summed ER — Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology
6. RT/PU = Recreational Trespasser / Park User

0 60 120 N

Approximate Scale in Feet

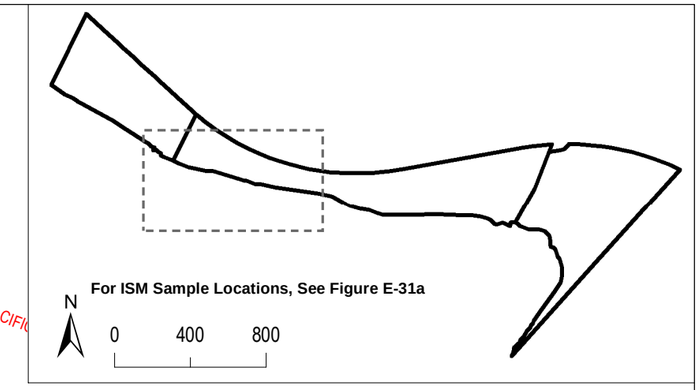
Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Summed ERs - Upland Surface Soil RT/PU Non-Carcinogen - 1 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-31a



UNION PACIFIC

Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

RA1 S1
0.1 (LEAD 0)
Summed ER — Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology
6. RT/PU = Recreational Trespasser / Park User

0 60 120
Approximate Scale in Feet
N

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Summed ERs - Upland Surface Soil RT/PU Non-Carcinogen - 2 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
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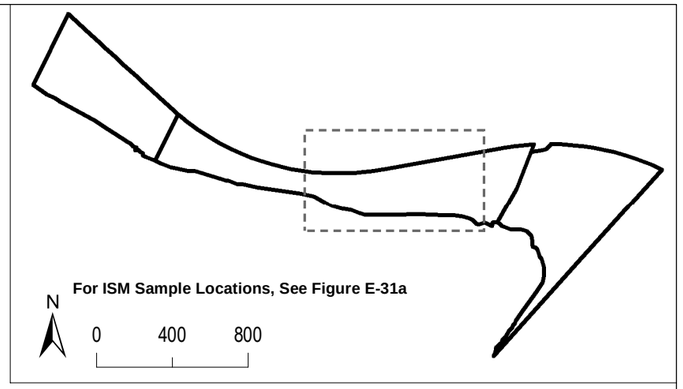
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-31b



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

RA1 S1
0.1 (LEAD 0)
Summed ER — Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology
6. RT/PU = Recreational Trespasser / Park User

0 60 120
Approximate Scale in Feet
N

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Summed ERs - Upland Surface Soil RT/PU Non-Carcinogen - 3 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
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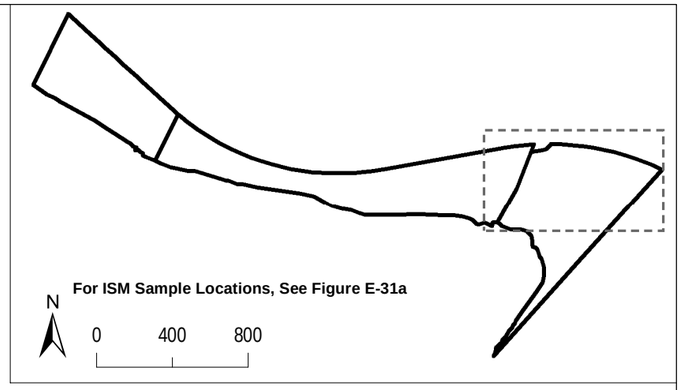
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-31c

UNION PACIFIC RAILROAD



BNSF RAILWAY

Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

RA1 S1
0.1 (LEAD 0)
Summed ER — Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology
6. RT/PU = Recreational Trespasser / Park User

0 60 120
Approximate Scale in Feet
N

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Summed ERs - Upland Surface Soil RT/PU Non-Carcinogen - 4 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
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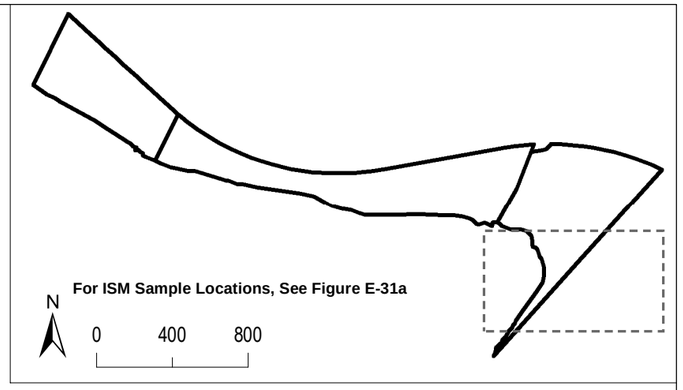
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-31d



BNSF RAILWAY

Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

RA1 S1
0.1 (LEAD 0)
Summed ER — Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology
6. RT/PU = Recreational Trespasser / Park User

0 60 120
Approximate Scale in Feet
N

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Summed ERs - Upland Surface Soil RT/PU Non-Carcinogen - 5 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
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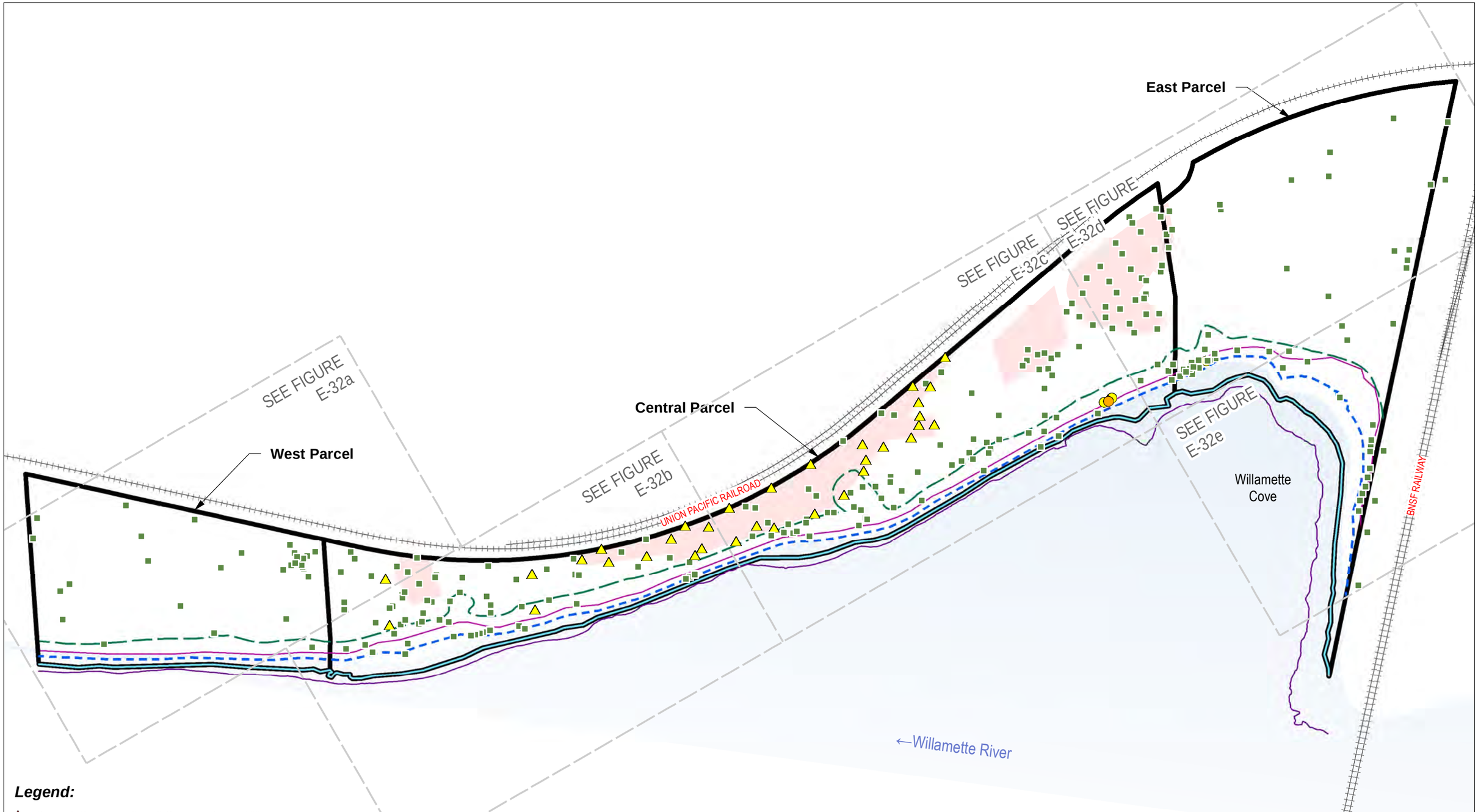
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-31e



Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

WC-SSH 0.1 (TOTAL PCBS 0.1) — Largest Individual Contribution to Summed ER

Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology
6. TT = Transient Trespasser

0 200 400

Approximate Scale in Feet

N

Summed ERs - Upland Surface Soil TT Carcinogen

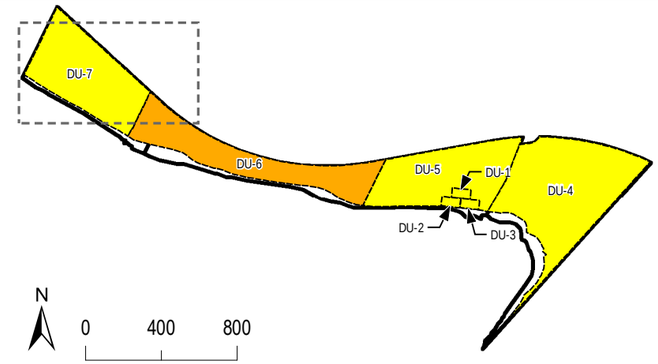
Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX

Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-32

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

WC-SSH
0.1 (TOTAL PCBS 0.1)
Summed ER
Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology
6. TT = Transient Trespasser

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Summed ERs - Upland Surface Soil
TT Carcinogen - 1 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

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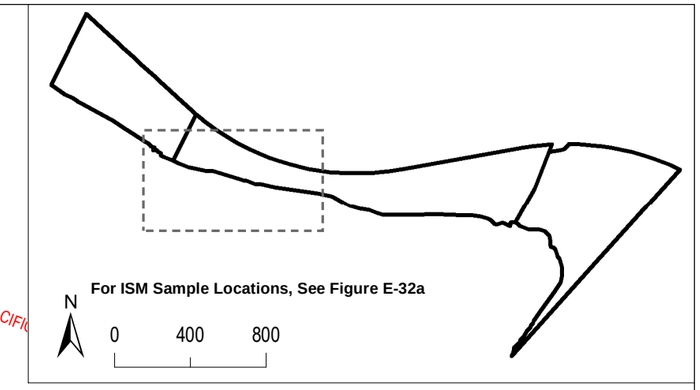
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-32a



UNION PACIFIC

Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

WC-SSH
0.1 (TOTAL PCBS 0.1)
Summed ER
Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology
6. TT = Transient Trespasser

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Summed ERs - Upland Surface Soil
TT Carcinogen - 2 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

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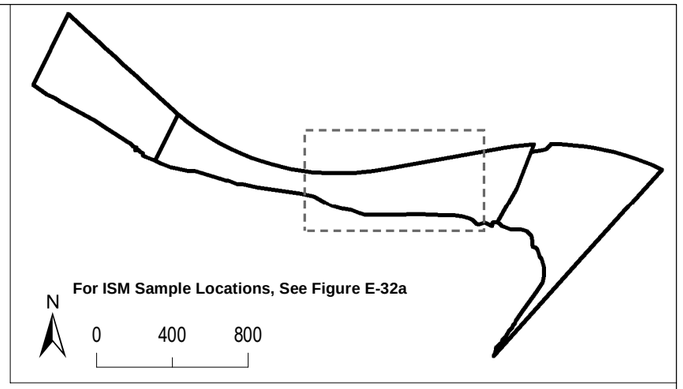
Project Number	1056-10	Figure
March 2019		E-32b



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

WC-SSH
0.1 (TOTAL PCBS 0.1)
Summed ER
Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology
6. TT = Transient Trespasser

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Summed ERs - Upland Surface Soil
TT Carcinogen - 3 of 5

Revised Feasibility Study and Source Control Evaluation
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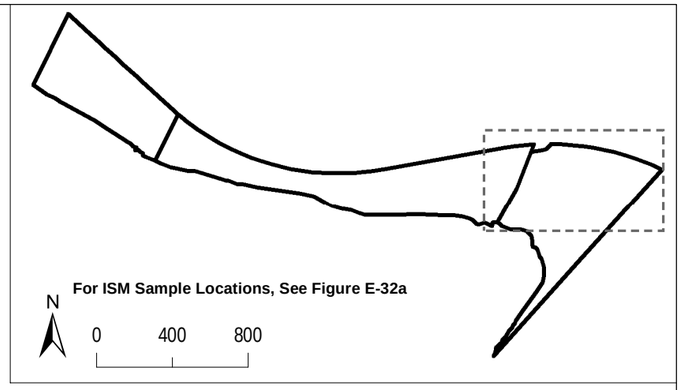
Project Number	1056-10	Figure
March 2019		E-32c

UNION PACIFIC RAILROAD



BNSF RAILWAY

Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

WC-SSH
0.1 (TOTAL PCBS 0.1)
Summed ER
Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology
6. TT = Transient Trespasser

0 60 120
Approximate Scale in Feet
N

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Summed ERs - Upland Surface Soil
TT Carcinogen - 4 of 5

Revised Feasibility Study and Source Control Evaluation
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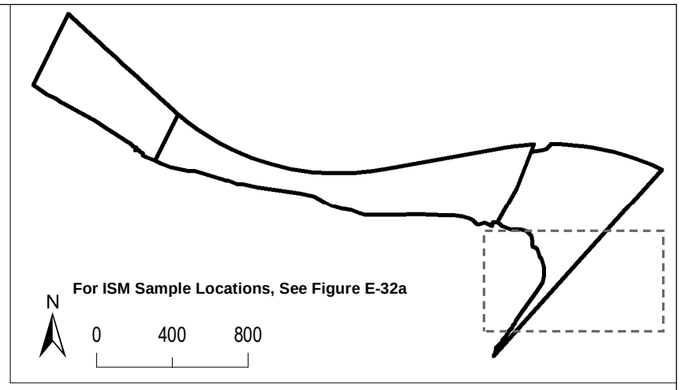
Project Number	1056-10	Figure
March 2019		E-32d



BNSF RAILWAY

Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

WC-SSH
0.1 (TOTAL PCBS 0.1)
Summed ER
Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology
6. TT = Transient Trespasser

0 60 120
Approximate Scale in Feet
N

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Summed ERs - Upland Surface Soil
TT Carcinogen - 5 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

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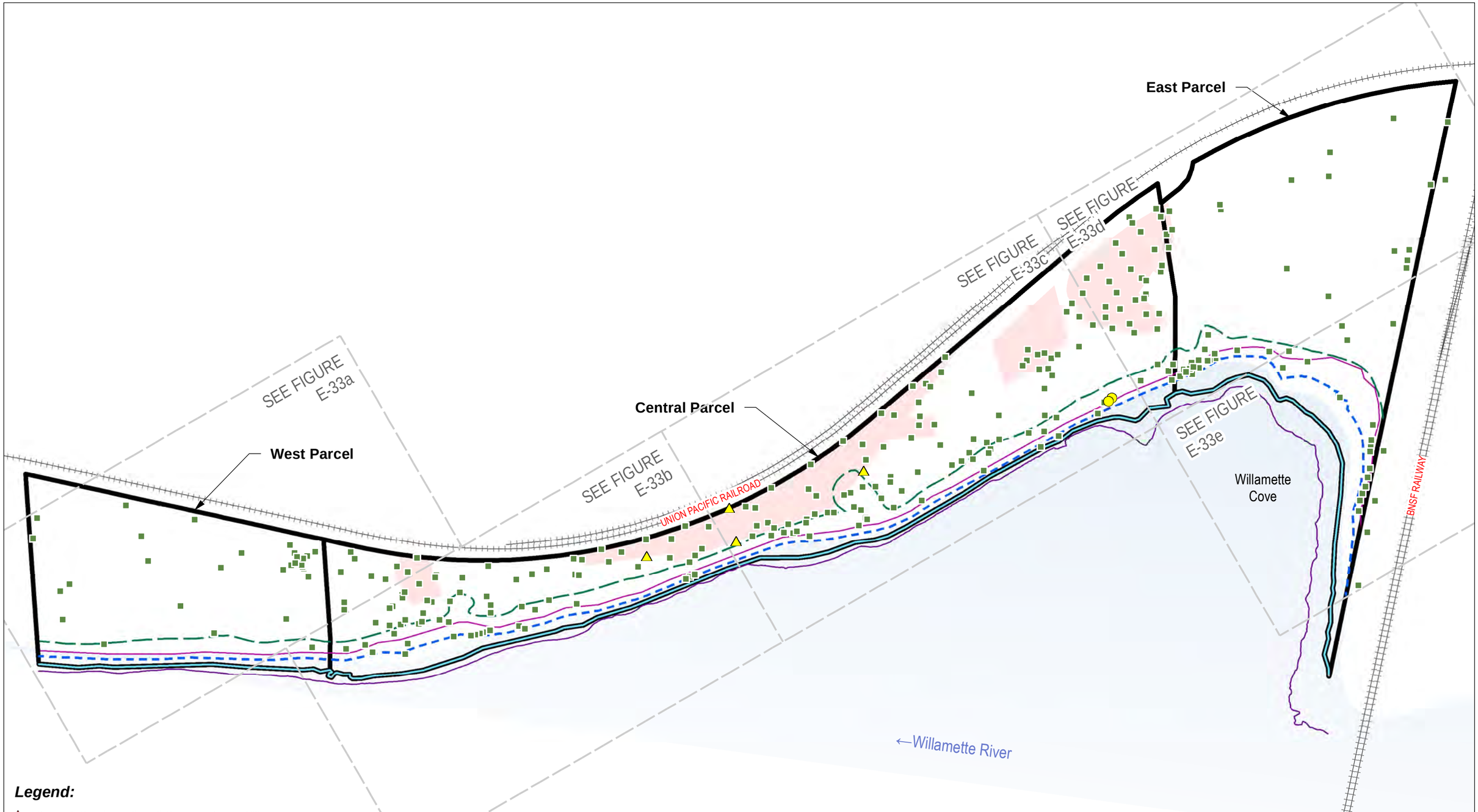
Project Number	1056-10	Figure
March 2019		E-32e



Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

RA3-S16
0.1 (DIOXIN/FURAN TEQ 0.1)
Summed ER — Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology
6. TT = Transient Trespasser

0 200 400
Approximate Scale in Feet

N

Summed ERs - Upland Surface Soil TT Non-Carcinogen

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

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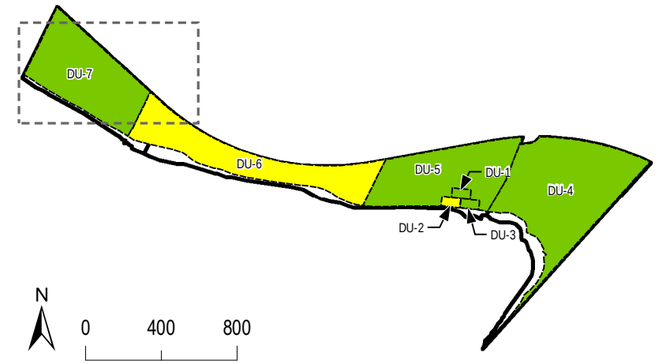
Project Number	1056-10	Figure
March 2019		E-33

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

RA3-S16
0.1 (DIOXIN/FURAN TEQ 0.1)
Summed ER
Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

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3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology
6. TT = Transient Trespasser

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Summed ERs - Upland Surface Soil
TT Non-Carcinogen - 1 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

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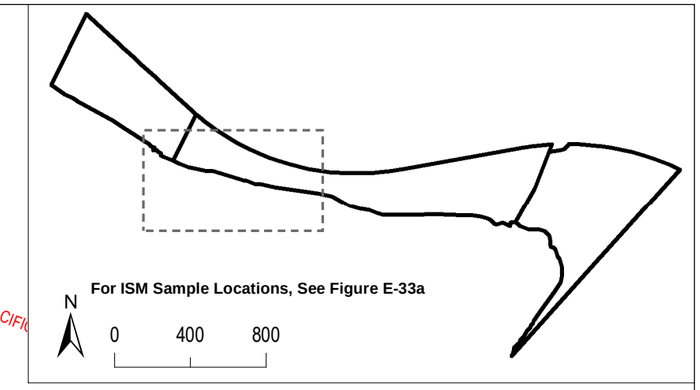
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-33a



UNION PACIFIC

Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

RA3-S16
0.1 (DIOXIN/FURAN TEQ 0.1)
Summed ER
Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

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2. mg/kg = Milligrams Per Kilogram
3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology
6. TT = Transient Trespasser

0 60 120 N
Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Summed ERs - Upland Surface Soil
TT Non-Carcinogen - 2 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

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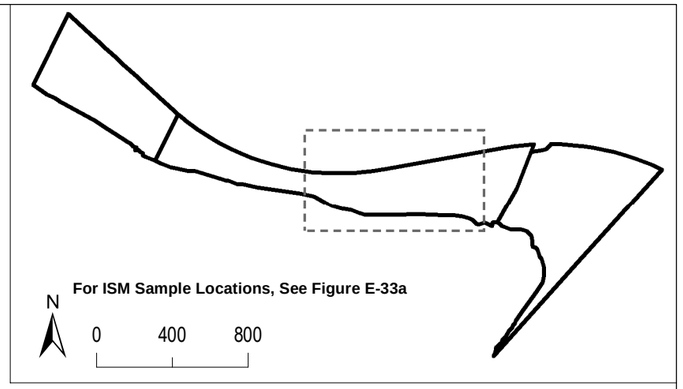
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-33b



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

RA3-S16
0.1 (DIOXIN/FURAN TEQ 0.1)
Summed ER
Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology
6. TT = Transient Trespasser

0 60 120 N
Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Summed ERs - Upland Surface Soil
TT Non-Carcinogen - 3 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
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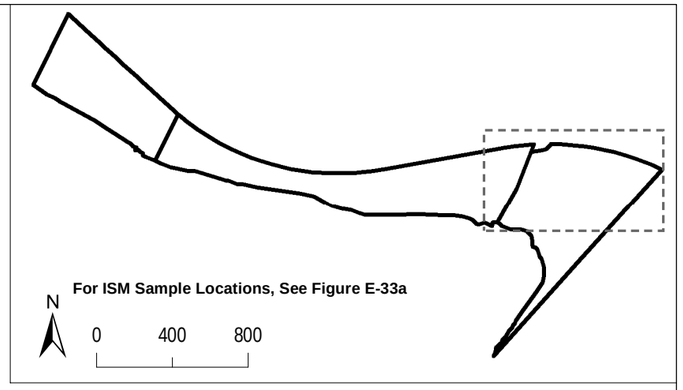
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-33c

UNION PACIFIC RAILROAD



BNSF RAILWAY

Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

RA3-S16
0.1 (DIOXIN/FURAN TEQ 0.1)
Summed ER
Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology
6. TT = Transient Trespasser

0 60 120
Approximate Scale in Feet
N

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Summed ERs - Upland Surface Soil
TT Non-Carcinogen - 4 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
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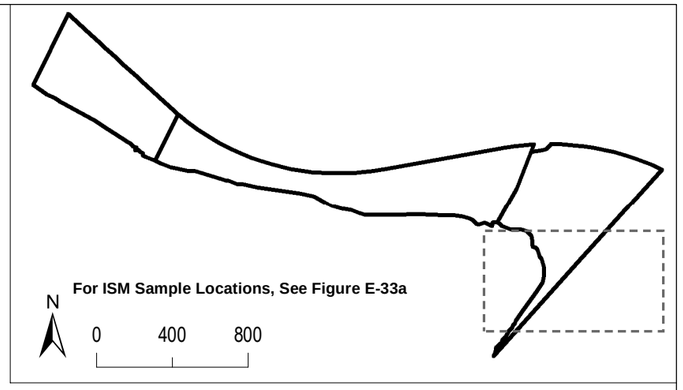
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-33d



BNSF RAILWAY

Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

RA3-S16
0.1 (DIOXIN/FURAN TEQ 0.1)
Summed ER
Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology
6. TT = Transient Trespasser

0 60 120
Approximate Scale in Feet
N

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Summed ERs - Upland Surface Soil
TT Non-Carcinogen - 5 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

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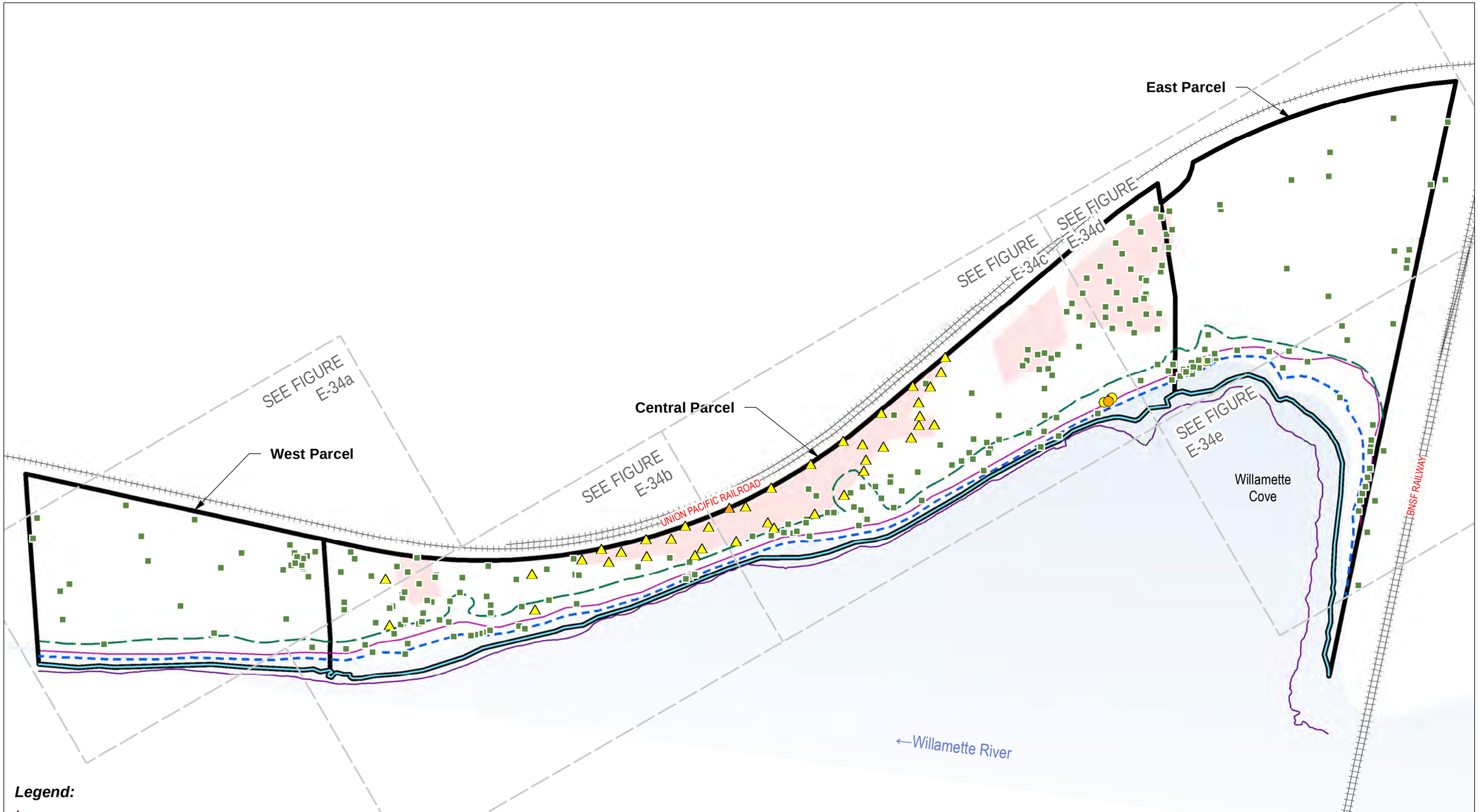
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-33e



Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

WC-SSH 0.1 (TOTAL PCBS 0.1) — Largest Individual Contribution to Summed ER

Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology
6. CW = Construction Worker

0 200 400

Approximate Scale in Feet

N

Summed ERs - Upland Surface Soil CW Carcinogen

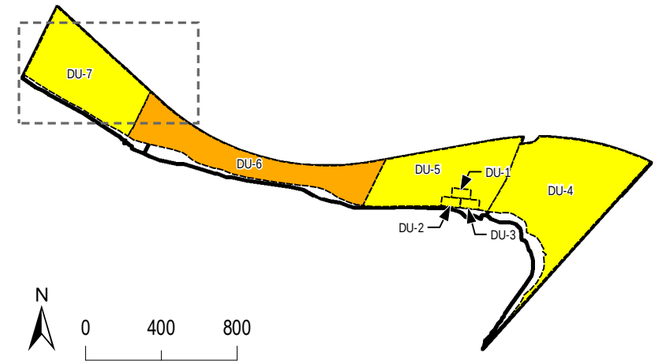
Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX

Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-34

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

WC-SSH
0.1 (TOTAL PCBS 0.1)
Summed ER
Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology
6. CW = Construction Worker

0 60 120 N

Approximate Scale in Feet

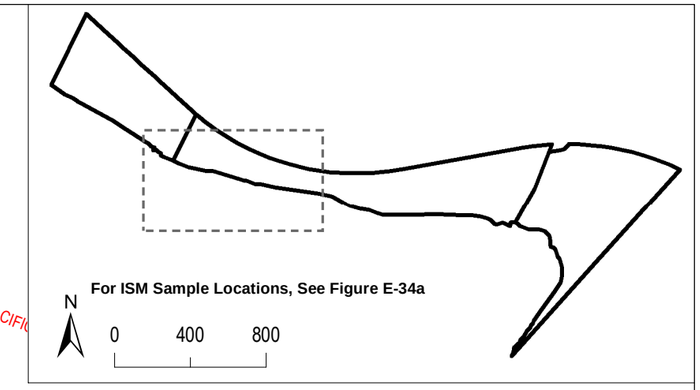
Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Summed ERs - Upland Surface Soil
CW Carcinogen - 1 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-34a



UNION PACIFIC

Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

WC-SSH
0.1 (TOTAL PCBS 0.1)
Summed ER
Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology
6. CW = Construction Worker

0 60 120
Approximate Scale in Feet
N

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Summed ERs - Upland Surface Soil
CW Carcinogen - 2 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
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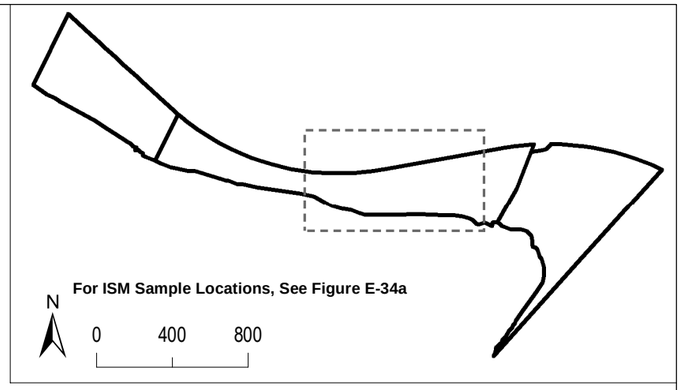
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-34b



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

WC-SSH
0.1 (TOTAL PCBS 0.1)
Summed ER
Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology
6. CW = Construction Worker

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Summed ERs - Upland Surface Soil
CW Carcinogen - 3 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

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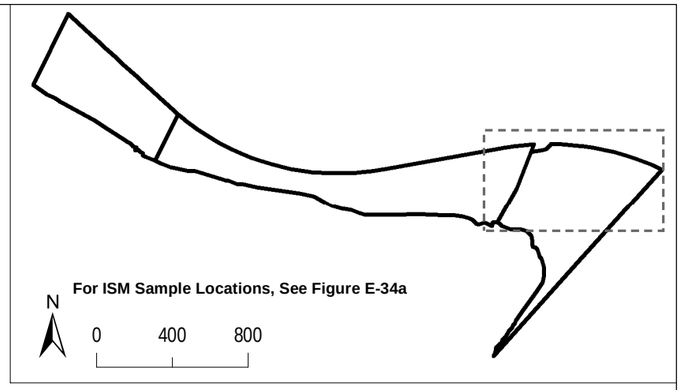
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-34c

UNION PACIFIC RAILROAD



BNSF RAILWAY

Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

WC-SSH
0.1 (TOTAL PCBS 0.1)
Summed ER
Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology
6. CW = Construction Worker

0 60 120
Approximate Scale in Feet
N

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Summed ERs - Upland Surface Soil
CW Carcinogen - 4 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

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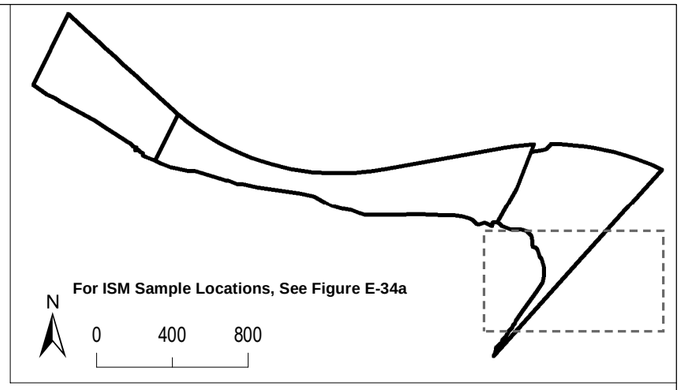
Project Number	1056-10	Figure
March 2019		E-34d



BNSF RAILWAY

Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

WC-SSH
0.1 (TOTAL PCBS 0.1)
Summed ER
Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology
6. CW = Construction Worker

0 60 120
Approximate Scale in Feet
N

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Summed ERs - Upland Surface Soil
CW Carcinogen - 5 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

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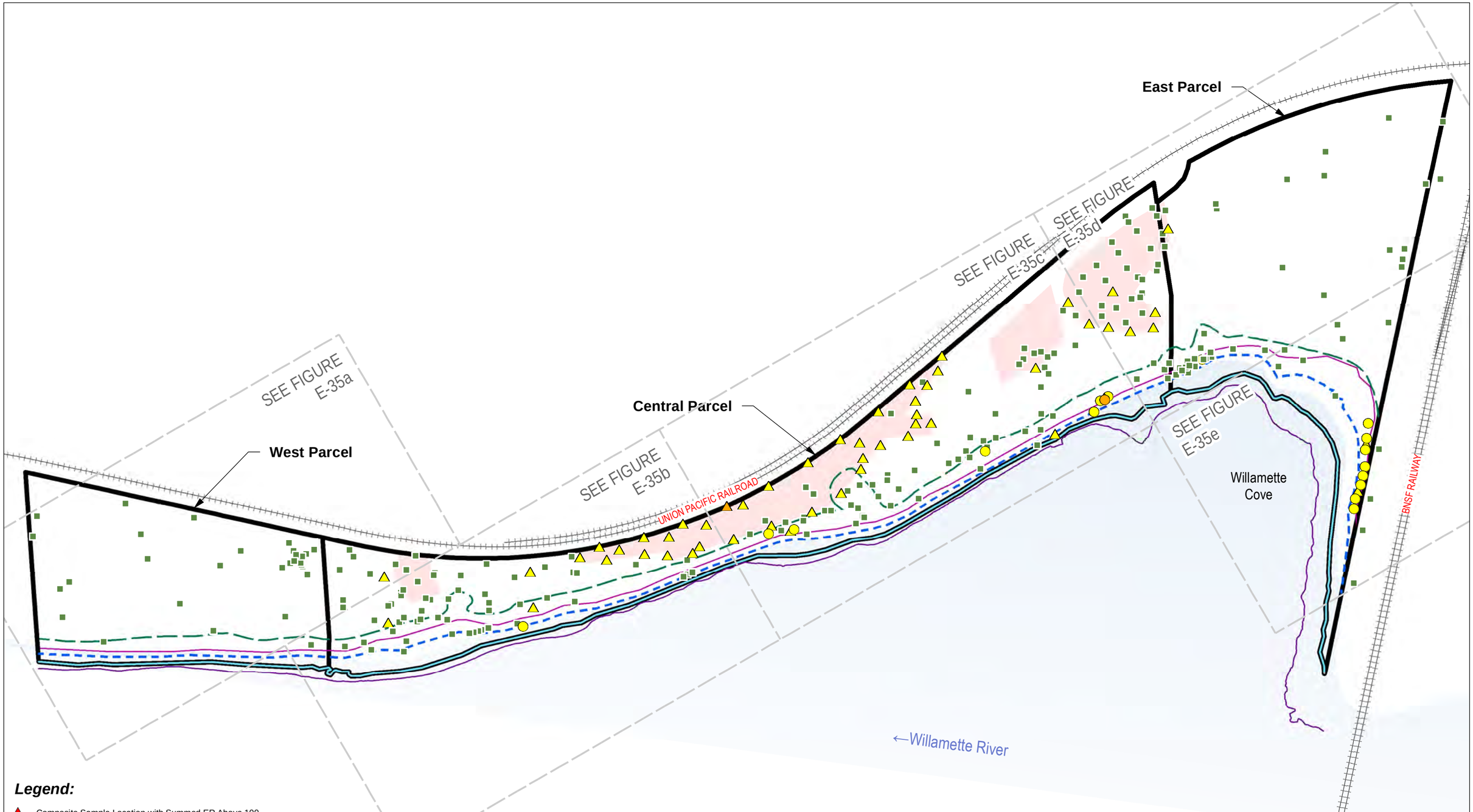
Project Number	1056-10	Figure
March 2019		E-34e



Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

WC-SSH 0.2 (TOTAL PCBS 0.2) — Largest Individual Contribution to Summed ER

Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology
6. CW = Construction Worker

0 200 400

Approximate Scale in Feet

N

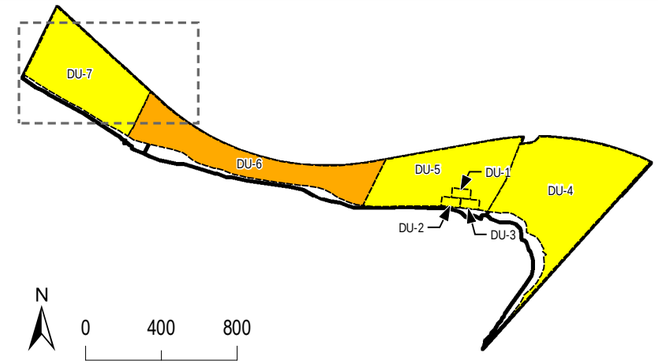
Summed ERs - Upland Surface Soil CW Non-Carcinogen

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-35

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

WC-SSH
0.2 (TOTAL PCBS 0.2)
Summed ER
Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology
6. CW = Construction Worker

0 60 120 N
Approximate Scale in Feet

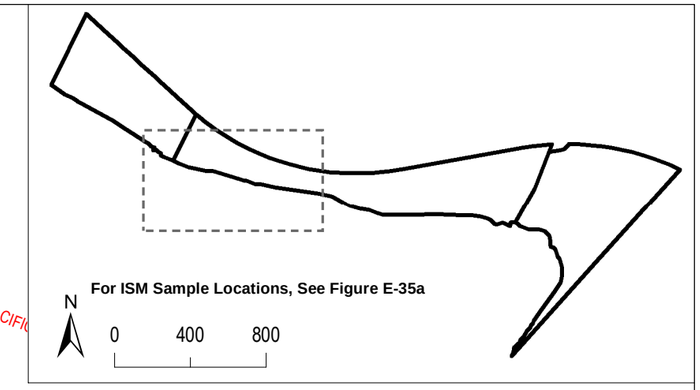
Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Summed ERs - Upland Surface Soil
CW Non-Carcinogen - 1 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-35a



UNION PACIFIC

Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

WC-SSH
0.2 (TOTAL PCBS 0.2)
Summed ER
Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology
6. CW = Construction Worker

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Summed ERs - Upland Surface Soil
CW Non-Carcinogen - 2 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
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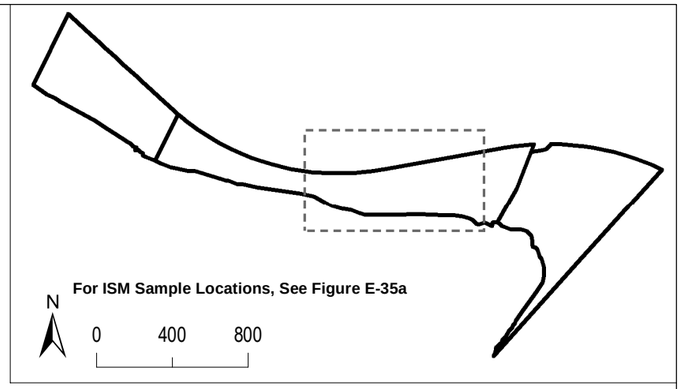
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-35b



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

WC-SSH
0.2 (TOTAL PCBS 0.2)
Summed ER
Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology
6. CW = Construction Worker

0 60 120
Approximate Scale in Feet
N

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

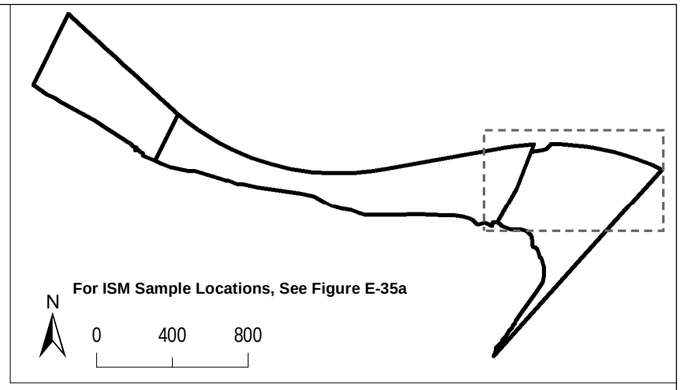
Summed ERs - Upland Surface Soil
CW Non-Carcinogen - 3 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-35c

UNION PACIFIC RAILROAD



BNSF RAILWAY

Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

WC-SSH
0.2 (TOTAL PCBS 0.2)
Summed ER
Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology
6. CW = Construction Worker

0 60 120 N

Approximate Scale in Feet

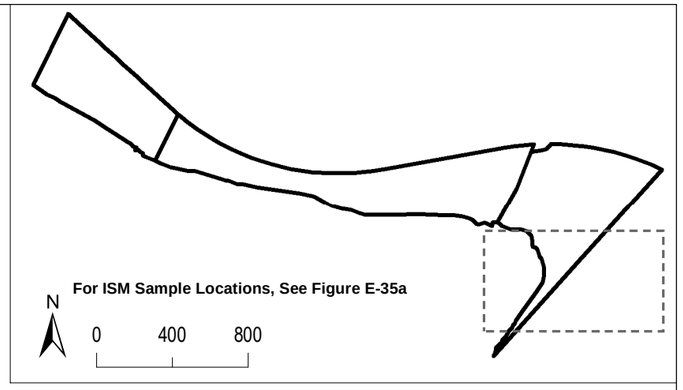
Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Summed ERs - Upland Surface Soil
CW Non-Carcinogen - 4 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-35d



BNSF RAILWAY

Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

WC-SSH
0.2 (TOTAL PCBS 0.2)
Summed ER
Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Surface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 0 to 3 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology
6. CW = Construction Worker

0 60 120
Approximate Scale in Feet
N

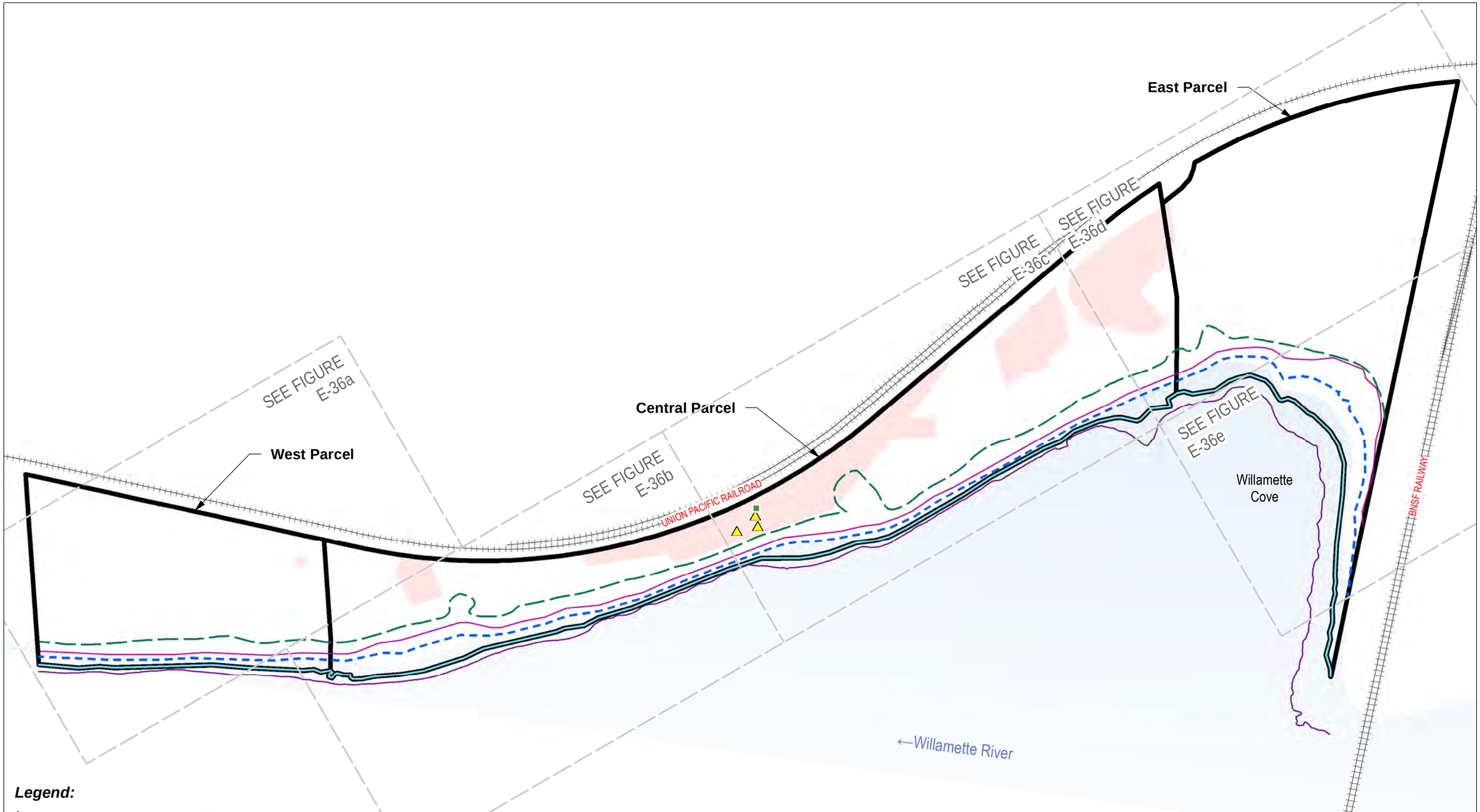
Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Summed ERs - Upland Surface Soil
CW Non-Carcinogen - 5 of 5

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-35e



Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

RA3-D-B1
0.8 (DIOXIN/FURAN TEQ 0.8) — Largest Individual Contribution to Summed ER
Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Subsurface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 3 to 10 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology
6. CW = Construction Worker

0 200 400
Approximate Scale in Feet

N

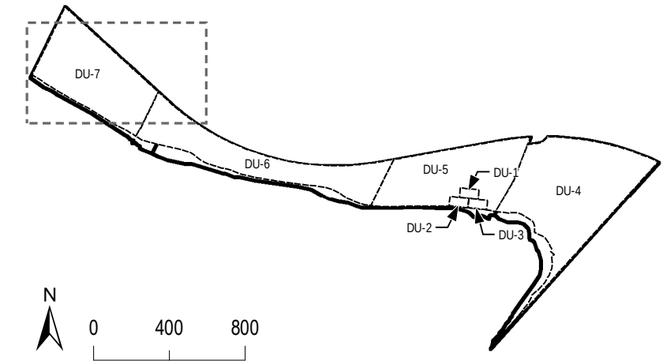
Summed ERs - Upland Subsurface Soil CW Carcinogen

Revised Feasibility Study and Source Control Evaluation
Port of Portland
Portland, Oregon

APEX
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2019		E-36

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).



UNION PACIFIC RAILROAD

Legend:

- Composite Sample Location with Summed ER Above 100
- Discrete Sample Location with Summed ER Above 100
- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

RA3-D-B1
0.8 (DIOXIN/FURAN TEQ 0.8)
Summed ER
Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

Notes:

1. ER = Exceedance Ratio
2. mg/kg = Milligrams Per Kilogram
3. Subsurface Soil includes all samples located within the Facility boundary above mean high water that were not removed during a removal action from 3 to 10 feet below ground surface.
4. Summed ER = Sum of all COC ERs at sample location.
5. ISM = Incremental Sampling Methodology
6. CW = Construction Worker

0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Summed ERs - Upland Subsurface Soil
CW Carcinogen - 1 of 5

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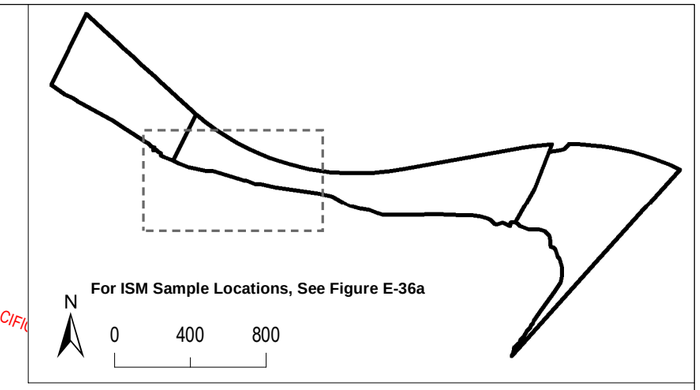
Project Number	1056-10	Figure
March 2019		E-36a



UNION PACIFIC

Legend:

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- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

RA3-D-B1
0.8 (DIOXIN/FURAN TEQ 0.8)
Summed ER
Largest Individual Contribution to Summed ER

- Parcel Boundary
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6. CW = Construction Worker

0 60 120
Approximate Scale in Feet
N

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Summed ERs - Upland Subsurface Soil
CW Carcinogen - 2 of 5

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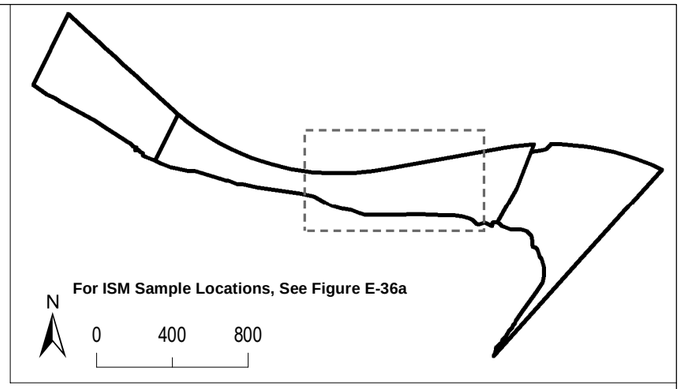
Project Number	1056-10	Figure
March 2019		E-36b



UNION PACIFIC RAILROAD

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- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

RA3-D-B1
0.8 (DIOXIN/FURAN TEQ 0.8)
Summed ER
Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
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6. CW = Construction Worker

0 60 120
Approximate Scale in Feet
N

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Summed ERs - Upland Subsurface Soil
CW Carcinogen - 3 of 5

Revised Feasibility Study and Source Control Evaluation
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Portland, Oregon

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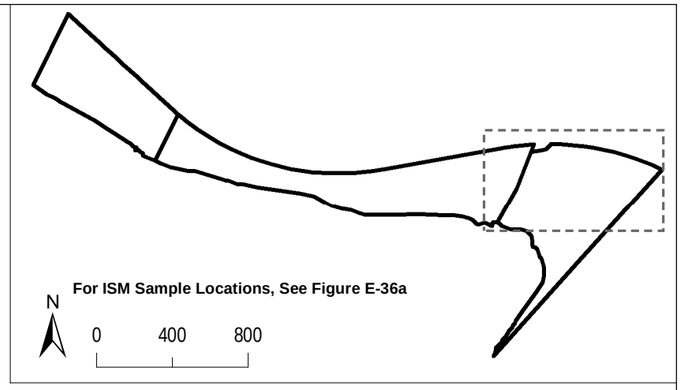
Project Number	1056-10	Figure
March 2019		E-36c

UNION PACIFIC RAILROAD



BNSF RAILWAY

Legend:

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- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

RA3-D-B1
0.8 (DIOXIN/FURAN TEQ 0.8)
Summed ER
Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
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6. CW = Construction Worker

0 60 120
Approximate Scale in Feet
N

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Summed ERs - Upland Subsurface Soil
CW Carcinogen - 4 of 5

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Portland, Oregon

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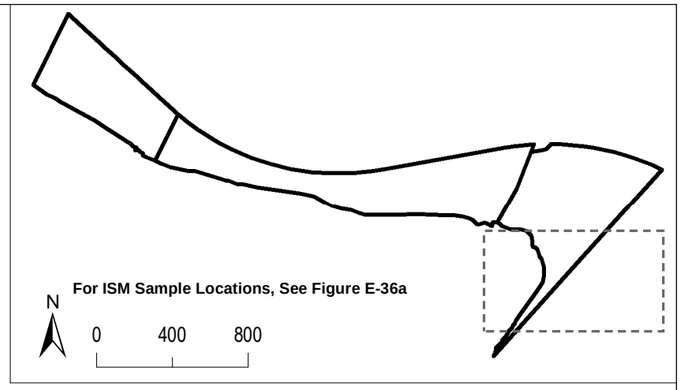
Project Number	1056-10	Figure
March 2019		E-36d



BNSF RAILWAY

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- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

RA3-D-B1
0.8 (DIOXIN/FURAN TEQ 0.8)
Summed ER
Largest Individual Contribution to Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
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6. CW = Construction Worker

0 60 120
Approximate Scale in Feet
N

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Summed ERs - Upland Subsurface Soil
CW Carcinogen - 5 of 5

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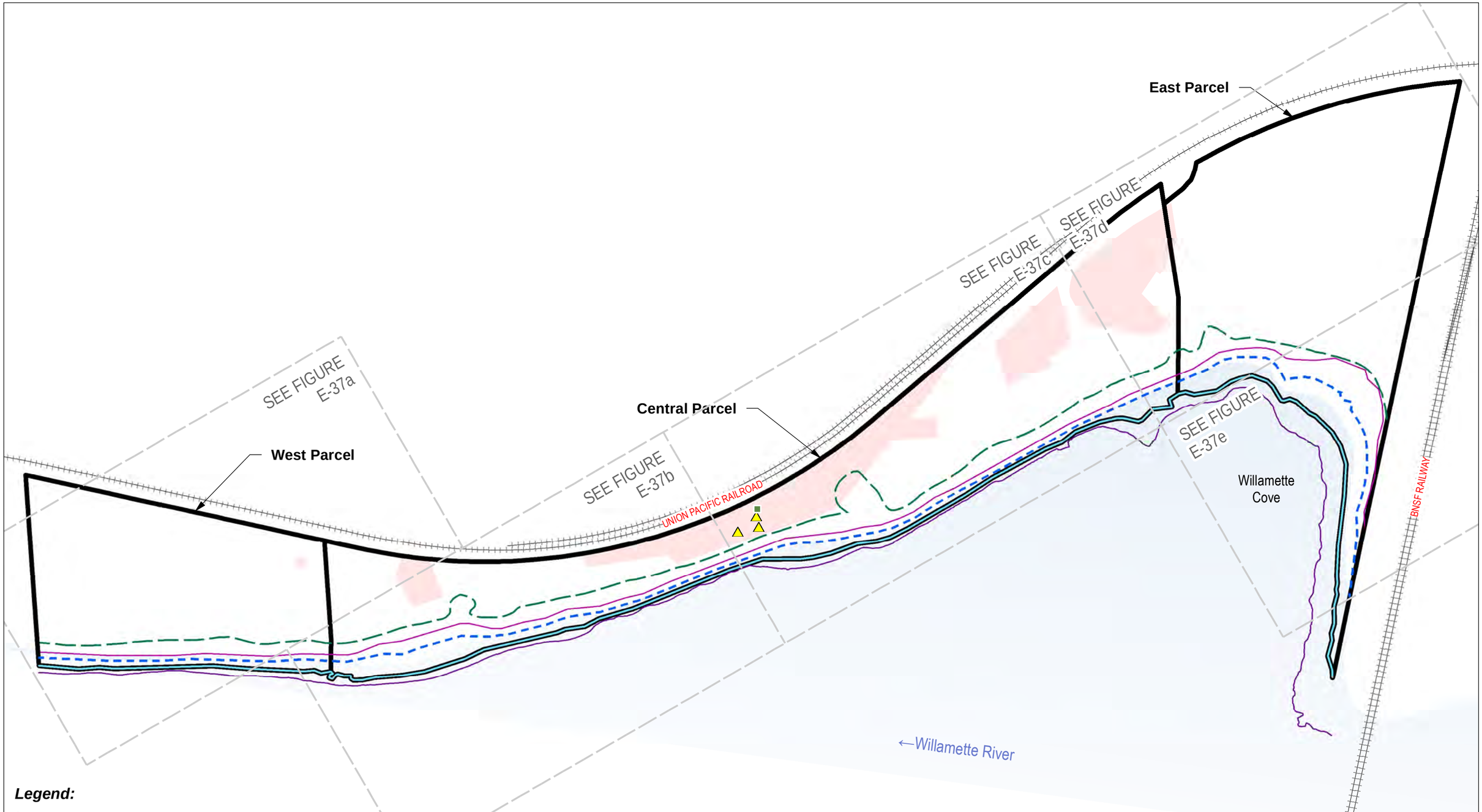
Project Number	1056-10	Figure
March 2019		E-36e



Legend:

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- Composite Sample Location with Summed ER Above 10
- Discrete Sample Location with Summed ER Above 10
- Composite Sample Location with Summed ER Above 0.1
- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

RA3-D-B1
0.6 (DIOXIN/FURAN TEQ 0.6) — Largest Individual Contribution to Summed ER
Summed ER

- Parcel Boundary
- Removal Action Area
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
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6. CW = Construction Worker

0 200 400
Approximate Scale in Feet

N

Summed ERs - Upland Subsurface Soil CW Non-Carcinogen

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Portland, Oregon

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March 2019		E-37

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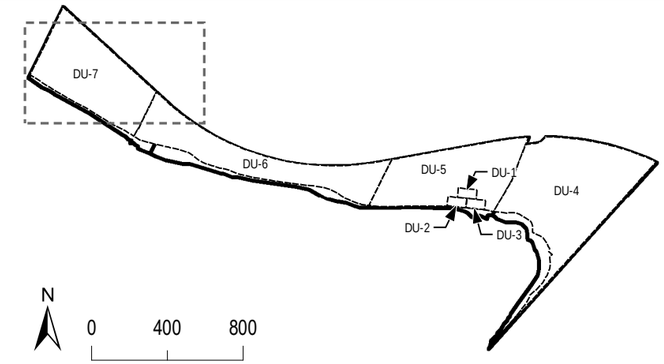

UNION PACIFIC RAILROAD

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- Discrete Sample Location with Summed ER Above 0.1
- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

RA3-D-B1
0.6 (DIOXIN/FURAN TEQ 0.6)
Summed ER
Largest Individual Contribution to Summed ER

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0 60 120 N

Approximate Scale in Feet

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

Summed ERs - Upland Subsurface Soil
CW Non-Carcinogen - 1 of 5

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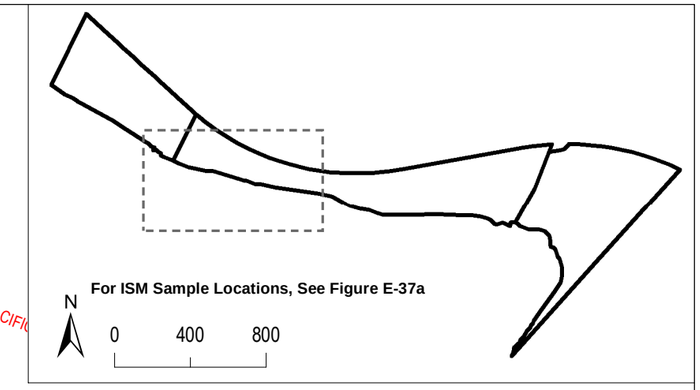
Project Number	1056-10	Figure
March 2019		E-37a



UNION PACIFIC

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- Sample Location with no Screening Level Exceedance or Summed ER Less Than 0.1

RA3-D-B1
0.6 (DIOXIN/FURAN TEQ 0.6) — Largest Individual Contribution to Summed ER
Summed ER

- Parcel Boundary
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0 60 120 N
Approximate Scale in Feet

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Summed ERs - Upland Subsurface Soil
CW Non-Carcinogen - 2 of 5

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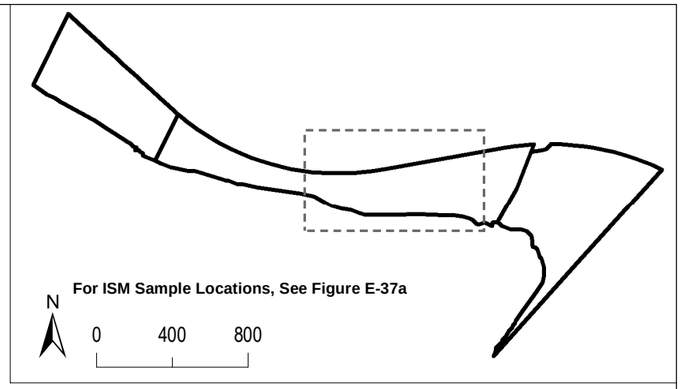
Project Number	1056-10	Figure
March 2019		E-37b



UNION PACIFIC RAILROAD

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RA3-D-B1
0.6 (DIOXIN/FURAN TEQ 0.6)
Summed ER
Largest Individual Contribution to Summed ER

- Parcel Boundary
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0 60 120
Approximate Scale in Feet
N

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Summed ERs - Upland Subsurface Soil
CW Non-Carcinogen - 3 of 5

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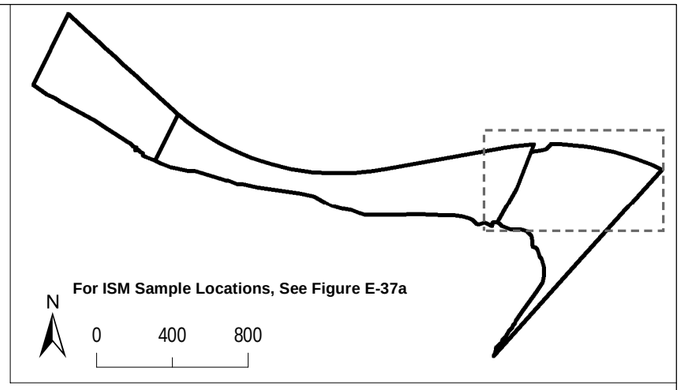
Project Number	1056-10	Figure
March 2019		E-37c

UNION PACIFIC RAILROAD



BNSF RAILWAY

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RA3-D-B1
0.6 (DIOXIN/FURAN TEQ 0.6)
Summed ER
Largest Individual Contribution to Summed ER

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Summed ERs - Upland Subsurface Soil
CW Non-Carcinogen - 4 of 5

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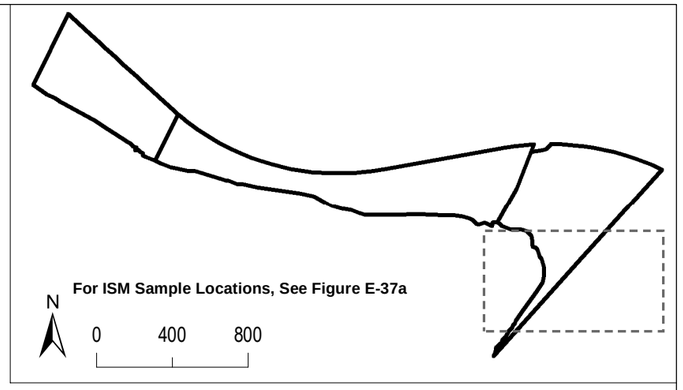

BNSF RAILWAY

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RA3-D-B1
0.6 (DIOXIN/FURAN TEQ 0.6)
Summed ER
Largest Individual Contribution to Summed ER

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Approximate Scale in Feet
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Summed ERs - Upland Subsurface Soil
CW Non-Carcinogen - 5 of 5

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Project Number	1056-10	Figure
March 2019		E-37e

Appendix F

Sediment Data

Willamette Cove Upland Chemicals of Concern in Sediments within 100 Feet of -2 Columbia River Datum (CRD)
Data from Portland Harbor Superfund Site Feasibility Study (USEPA 2013)

	Location	4901		4902		4903		4904		4905		4906		06R002 (a)		06R002 (b)		06R002 (c)		06R040		B015		G250-1		G254		C254		C254		G257		G260		C260		C260		C260	
	Depth Interval	0 - 12 cm		0 - 15 cm		0 - 15 cm		0 - 15 cm		0 - 15 cm		0 - 15 cm		0 - 15 cm		0 - 15 cm		0 - 15 cm		0 - 15 cm		0 - 15 cm		0 - 23 cm		0 - 29 cm		30 - 74 cm		74 - 104 cm		0 - 26 cm		0 - 20 cm		30 - 114 cm		114 - 163 cm		163 - 195 cm	
Chemical	**Units**	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Metals																																									
Antimony	mg/kg	0.183	T	0.228		0.326		0.225		0.491		0.182		1	J							0.2	J	0.22	J	0.2	J	0.401	JT	0.135	UJ	0.13	UJ	0.1	J	0.81	J	0.17	UJ		
Arsenic	mg/kg	2.22	T	2.4		2.62		1.95		3.74		1.7		4.35	T	3.3		3.7	T	4.4		2.95		3.91		2.58	J	4.14	T	0.99		2.62		2.6	J	3.8		2.75			
Chromium	mg/kg	14.5	T	12		19.3		17.7		19.5		9.75		22	T	28.1	T	22		40		11.3		17.2		25.2		30.4	T	14.9		19.3		18.1		17.5		15.2			
Copper	mg/kg	18.7	T	16.2		34.5		17.7		34.6		17		45.9	T	64.1	T	38.1		45.6		16.3	J	19.5		24.4		37.4	T	21.5		17.1		17.8		63.8		33.8			
Mercury	mg/kg	0.0869	T	0.162		0.918		0.45		0.893		0.0694		0.54	JT	0.94	JT	0.64	J	0.52		0.412		0.199		0.387		0.2	T	0.014	J	0.31	T	0.624		0.575		0.234		0.017	J
Nickel	mg/kg	17.5	T	15.8		21.9		19.9		22.4		13.8		20.5	T	32.5	T	20		28		16.4		16.1		25.4		27.2	T	11.3		19		22.8		19.4		17.7			
Selenium	mg/kg	0.381	UT	0.442	U	0.541	U	0.454	U	0.489	U	0.451	U	0.3	U	0.3	UT	0.3	UT	0.3	U	0.04	U	0.04	J	0.1	J	0.145	T	0.1	J	0.06	U	0.05	U	0.04	U	0.05	U		
Zinc	mg/kg	54.2	T	53.2		72.9		52.4		69.3		33.2		106	T	98.5	T	104		97.6		52.7		81.5		89.2		137	T	45.9		69.8		70.8		105		89.8			
Polychlorinated dibenzo-dioxins and furans																																									
LWG RA Total Dioxin/Furan TEQ 1998 (Avian) (Calculated U = 1/2)	ug/kg													0.15	NJT	0.053	NJT	0.0673	NJT			0.00041	JT											0.0037	JT	0.001	JT	0.00027	JT		
LWG RA Total Dioxin/Furan TEQ 2005 (Mammal) (Calculated U = 1/2)	ug/kg													0.089	NJT	0.041	NJT	0.0518	NJT			0.00051	JT											0.0022	JT	0.0011	JT	0.00018	JT		
Total Pentachlorodibenzo-p-dioxin (PeCDD)	ug/kg													0.124	NJT	0.141	NJ	0.114	NJT			0.0004												0.00092	T	0.00153		0.000318			
Polychlorinated Biphenyls																																									
LWG RA Total PCB Aroclors (Calculated U = 1/2)	ug/kg																			71	T	1.9	UT	16	JT	59	JT	230	JT	2.02	UT					2.34	UT	6.4	UT		
LWG RA Total PCB Congener (Calculated U = 1/2)	ug/kg													81	JT	48	JT	52	JT													8	JT	2.4	JT						
Pesticides																																									
LWG RA Total DDx (Calculated U = 1/2)	ug/kg	1.94	UT	2.16	UT	10.7	JT	2.31	UT	9.33	JT	2	UT	3.8	UT	5.8	UJT	8.9	UT	4.9	T	1.63	JNT	9.2	JNT	13.8	JNT	25	JNT	0.18	JT	5.24	NJT	7.73	JNT	74	JNT	65.9	JNT	2.2	JT
Phthalates																																									
Bis(2-ethylhexyl) phthalate	ug/kg	12.4	UT	16.3	U	17.9	UJ	17.1	U	175	U	16.3	U	82		140		85	T	84		8	U	9.3	UJ	56	U	180	U	140	U	26	U	15	U	8.8	U	6.7	U		
Dibutyl phthalate	ug/kg	12.4	UT	16.3	U	17.9	U	17.1	U	175	U	16.3	U	20	U	19	UT	19	U	20	U	4.2	J	3.9	UJ	85	U	9.9	U	3.2	U	5.3	J	5.5	J	8.1	U	6.5	U		
Diethyl phthalate	ug/kg	12.4	UT	16.3	U	17.9	U	17.9	J	175	U	16.3	U	20	U	19	UT	19	U	20	U	3.8	U	5.3	UJ	120	U	14	U	4.2	U	5.2	U	4.9	U	110		8.7	U		
Dimethyl phthalate	ug/kg	12.4	UT	16.3	U	17.9	U	17.1	U	175	U	16.3	U	19	U	19	UT	20	U	20	U	2	U	2.7	UJ	59	U	6.8	U	2.2	U	2.7	U	2.5	U	5.6	U	4.5	U		
Di-n-octyl phthalate	ug/kg	12.4	UT	16.3	U	17.9	U	17.1	U	175	U	16.3	U	20	U	19	U	31	T	20	UT	1.3	U	1.8	UJ	40	U	4.6	U	1.5	U	1.8	U	1.7	U	3.8	U	3	U		
Polynuclear Aromatic Hydrocarbons, Petroleum Hydrocarbons, Other																																									
Carbazole	ug/kg	12.4	UT	16.3	U	41.6		17.1	U	175	U	16.3	U	51	T	16	T	21.5	T	1300	T	4	J	19	J	75	J	39		1.6	U	17		15		13	J	4.1	J		
Dibenzofuran	ug/kg	12.4	UT	16.3	U	18.1	J	17.1	U	175	U	16.3	U	44	T	34	T	24.5	T	240	T	1.4	J	5.2		16		39		0.53	J	7.7		3		8.1		1.8	J		
LWG RA Total cPAH/BaPEq TEQ (EPA 1993) (Calculated U = 1/2)	ug/kg	44	T	250	T	858	T	67	T	1450	T	9.1	T	350	T	390	T	180	JT	12000	T	240	T	460	T	1700	T	450	T	9.2	JT	630	T	370	T	270	T	120	T		
LWG RA Total HPAH (Calculated U = 1/2)	ug/kg	250	T	1500	T	5420	T	370	T	9100	T	70	T	2700	JT	3100	JT	1300	JT	81000	T	1600	T	3100	T	9100	T	2900	T	58	JT	2600	T	2100	T	1800	T	840	T		
LWG RA Total LPAH (Calculated U = 1/2)	ug/kg	57	T	270	T	1850	T	90.9	T	2050	T	8.9	JT	780	JT	690	JT	480	JT	22000	T	240	T	600	T	950	T	690	T	11	JT	680	T	320	T	600	T	160	T		
LWG RA Total PAH (Calculated U = 1/2)	ug/kg	310	T	1800	T	7270	T	460	T	11100	T	79	JT	3500	JT	1800	JT	3800	JT	100000	T	1800	T	3700	T	10000	T	3500	T	70	JT	3200	T	2500	T	2400	T	999	T		
Diesel Range Hydrocarbons	mg/kg	3.38	JT	11.4		12.8		8.65		19.5		3.07																						63	JT	490	J	47	JT		

Willamette Cove Upland Chemicals of Concern in Sediments within 100 Feet of -2 Columbia River Datum (CRD)
Data from Portland Harbor Superfund Site Feasibility Study (USEPA 2013)

	Location	G267		C267		C267		G268		C268		C268		G277		G296		C296		C296		G303		C303		C303		SD066		SD071		SD071		SD073		SED01-03		SED099-05	
	Depth Interval	0 - 28 cm		30 - 88 cm		88 - 211 cm		0 - 26 cm		30 - 151 cm		151 - 252 cm		0 - 26 cm		0 - 27 cm		30 - 152 cm		152 - 216 cm		0 - 29 cm		30 - 86 cm		86 - 210 cm		0 - 10 cm		0 - 10 cm		0 - 90 cm		0 - 10 cm		0 - 38 cm		0 - 15 cm	
Chemical	**Units**	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Metals																																							
Antimony	mg/kg	0.14	J	0.495	J	0.087	UJ	0.16	J	0.061	UJ	0.059	UJ	0.12	UJ	0.22	UJ	0.42	JT	0.17	J	0.11	UJ	0.26	J	0.1	J					5	UJ						
Arsenic	mg/kg	3.69		4.56		2.27		4.64	J	0.8		1.07		2.8	J	4.3	J	5.45	T	4.05		4.34		4.68		2.24		5		5	U	5	U	6	U			5.3	
Chromium	mg/kg	34.9		32.7		12.5		35.1		11.8		9.29		25		29.9	J	35	T	28.9		33.1		32.2		19.4		34.8		34.2		41.3		37.8					
Copper	mg/kg	42.4		46.4		20.1		42.9		18		16.4		39.2		47.6	J	93.4	T	39.4		40.3		56.8		24.1		41.1		42.5		78.4		46.3					
Mercury	mg/kg	0.12		0.233		0.046		0.122		0.01	J	0.009	U	0.132	JT	0.077		0.967		0.219		0.235		0.404		0.027		0.23		0.15		0.1		0.09					
Nickel	mg/kg	29.7	J	29.9		14.2		24.3		11.1		11		21.9		22.2		25.5	T	27.1		26.5		26.6		21		28.7		28.2		36.2		29					
Selenium	mg/kg	0.16	J	0.12		0.05	U	0.18		0.04	U	0.04	U	0.04	UJ	0.13	U	0.15	UT	0.16	U	0.13		0.16	U	0.05	U	11		13		13		14					
Zinc	mg/kg	107		142		56.1		196		50.6		34.2		93.4		126		200	T	82		112		160		54		158		101		142		99.9					
Polychlorinated dibenzo-dioxins and furans																																							
LWG RA Total Dioxin/Furan TEQ 1998 (Avian) (Calculated U = 1/2)	ug/kg																																					0.016	JT
LWG RA Total Dioxin/Furan TEQ 2005 (Mammal) (Calculated U = 1/2)	ug/kg																																					0.013	JT
Total Pentachlorodibenzo-p-dioxin (PeCDD)	ug/kg																																					0.0056	
Polychlorinated Biphenyls																																							
LWG RA Total PCB Aroclors (Calculated U = 1/2)	ug/kg	3.86	UJT	150	JT	2.1	UT			2.4	UT	2	UT	55	JT			130	JT	1.8	UJT					1.5	UJT												
LWG RA Total PCB Congener (Calculated U = 1/2)	ug/kg							78	JT							160	JT					93	JT	74	JT														
Pesticides																																							
LWG RA Total DDx (Calculated U = 1/2)	ug/kg	7.05	JNT	68.6	JNT	5.27	JNT	16.6	JNT	1.53	JNT	0.049	UJT	4.9	JNT	11.8	JNT	32	JNT	0.23	UJT	6.12	JNT	150	JNT	1.1	UJT	7.5	AJT										
Phthalates																																							
Bis(2-ethylhexyl) phthalate	ug/kg	66	U	730	U	130	U	40	U	110	U	100	U	130		38	U	40	U	10	U	45	U	52	U	7.3	U	88	U	93	U	210		120	U				
Dibutyl phthalate	ug/kg	7	J	25		4.7	J	12	U	3.7	J	3.4	J	5.3	U	5.7	U	11	U	8.3	U	5.2	U	10	U	3.9	J	19	U	20	U	20	U	20	U				
Diethyl phthalate	ug/kg	6.8	U	12	U	4.2	U	16	U	3.8	U	3.9	U	7.1	U	7.7	U	14	U	12	U	7	U	14	U	4.5	U	19	U	20	U	20	U	20	U				
Dimethyl phthalate	ug/kg	3.5	U	6	U	2.2	U	7.8	U	2	U	2	U	3.7	U	4	U	7	U	5.7	U	3.6	U	7	U	2.4	U	19	U	20	U	20	U	20	U				
Di-n-octyl phthalate	ug/kg	2.4	U	4	U	1.5	U	5.2	U	1.4	U	1.4	U	2.5	U	2.7	U	4.7	U	3.8	U	2.4	U	4.7	U	1.6	U	19	U	20	U	20	U	20	U				
Polynuclear Aromatic Hydrocarbons, Petroleum Hydrocarbons, Other																																							
Carbazole	ug/kg	3.2	J	9.6	J	1.6	U	12	J	1.5	U	1.5	U	5.4	J	4.9	J	5.1	U	4.2	U	3.2	J	27		1.7	U	19	UJ	20	UJ	20	U	20	UJ				
Dibenzofuran	ug/kg	3.1		65		0.95	J	22		0.24	J	0.19	U	6.3		7.3		64		9.4		12		55		1.2	J	57		20	U	100		20	U				
LWG RA Total cPAH/BaPEq TEQ (EPA 1993) (Calculated U = 1/2)	ug/kg	54	T	160	T	4.6	JT	130	T	0.55	JT	0.29	UT	70	T	46	T	320	T	88	T	49	T	930	T	45	T	570	T	61	T	160	T	40	T	66	T	58	T
LWG RA Total HPAH (Calculated U = 1/2)	ug/kg	340	T	1400	T	41	JT	910	T	2.5	JT	0.53	UT	470	T	310	T	3000	T	710	T	400	T	6900	T	290	T	4500	T	480	T	1700	T	290	T	460	T	500	T
LWG RA Total LPAH (Calculated U = 1/2)	ug/kg	69	T	1200	T	22	JT	250	T	2.9	JT	2.2	JT	100	T	82	T	1400	T	240	T	120	T	2100	T	57	T	2100	T	150	T	1100	T	130	T	115	T	87	T
LWG RA Total PAH (Calculated U = 1/2)	ug/kg	410	T	2600	T	63	JT	1200	T	5.5	JT	3.9	JT	580	T	390	T	4300	T	960	T	520	T	9000	T	340	T	6600	T	620	T	2800	T	420	T	580	T	580	T
Diesel Range Hydrocarbons	mg/kg													62	J	66	J	800	J	120	J	68	J	500	J	5.85	JT												

Notes:

Data qualifier definitions from Portland Harbor Feasibility Study, Appendix A (EPA 2016):

A - Summed value based on limited number of analytes.
J - Estimated value.
JA - Combined qualifier.
JT - Combined qualifier.
N - Presumptive evidence of a compound.
NJ - Combined qualifier.
NJT - Combined qualifier.
NT - Combined qualifier.
T - Result calculated or selected from >1 reported value.
U - Analyte was analyzed for but not detected.
UA - Combined qualifier.
UJ - Not detected. Sample detection limit is estimated.
UJA - Combined qualifier.
UJT - Combined qualifier.
UT - Combined qualifier.

Willamette Cove Upland Chemicals of Concern in Sediments within 100 Feet of Elevation -2 feet Columbia River Datum (CRD)
Data from 2018 Pre-Remedial Design Investigation and Baseline Sampling (AECOM/GeoSyntec 2019)

	Location	B200		S111		S114		S115		S120		S122		S124		S130		S133	
	Depth Interval	0 - 30 cm		0 - 19 cm		0 - 13 cm		0 - 19 cm		0 - 11 cm		0 - 30 cm		0 - 30 cm		0 - 30 cm		0 - 30 cm	
	Date	4/19/2018		5/30/2018		6/18/2018		5/12/2018		6/3/2018		5/11/2018		5/12/2018		5/5/2018		5/5/2018	
Chemical	Units	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Metals																			
Arsenic	mg/kg	4.6																	
Cadmium	mg/kg	0.23	J																
Copper	mg/kg	40																	
Lead	mg/kg	14																	
Mercury	mg/kg	0.12																	
Zinc	mg/kg	99																	
Polychorinated dibenzo-dioxins and furans																			
1,2,3,7,8-PeCDD	ug/kg	0.0065	JN	0.00091	J	0.00058	J	0.00012	JN	0.00011	J	0.0018	J	0.91		0.009		0.0016	JN
Pesticides																			
2,4-DDD	ug/kg	0.32	J	1.2				2.2		< 0.26	U	< 0.91	U	< 0.95	U	< 1.1	UJ	18	J
2,4-DDE	ug/kg	< 0.37	U	< 0.80	U			< 0.79	U	< 0.26	U	< 0.91	U	< 0.95	U	< 1.1	UJ	< 1.2	UJ
2,4-DDT	ug/kg	< 0.37	U	< 0.94	U			1.7		< 0.26	U	< 0.94	U	< 0.95	U	< 1.1	UJ	5.1	J
4,4'-DDD	ug/kg	1.3		3.5				4.4		< 0.26	U	2		1		0.85	J	71	J
4,4'-DDE	ug/kg	1.7		2.6				0.74		< 0.26	UJ	3.6		2.2		1.9	J	43	J
4,4'-DDT	ug/kg	1		< 0.80	U			33	J	0.28		0.88	J	0.85	J	2	J	3	
Phthalates																			
Bis(2-ethylhexyl)phthalate	ug/kg	50	J																
Polynuclear Aromatic Hydrocarbons, Petroleum Hydrocarbons, Other																			
Benzo(a)pyrene	ug/kg	40		1100		2500		300		5.7		72		77		920		140	
TPH-Diesel Range Organics	mg/kg	38	J																

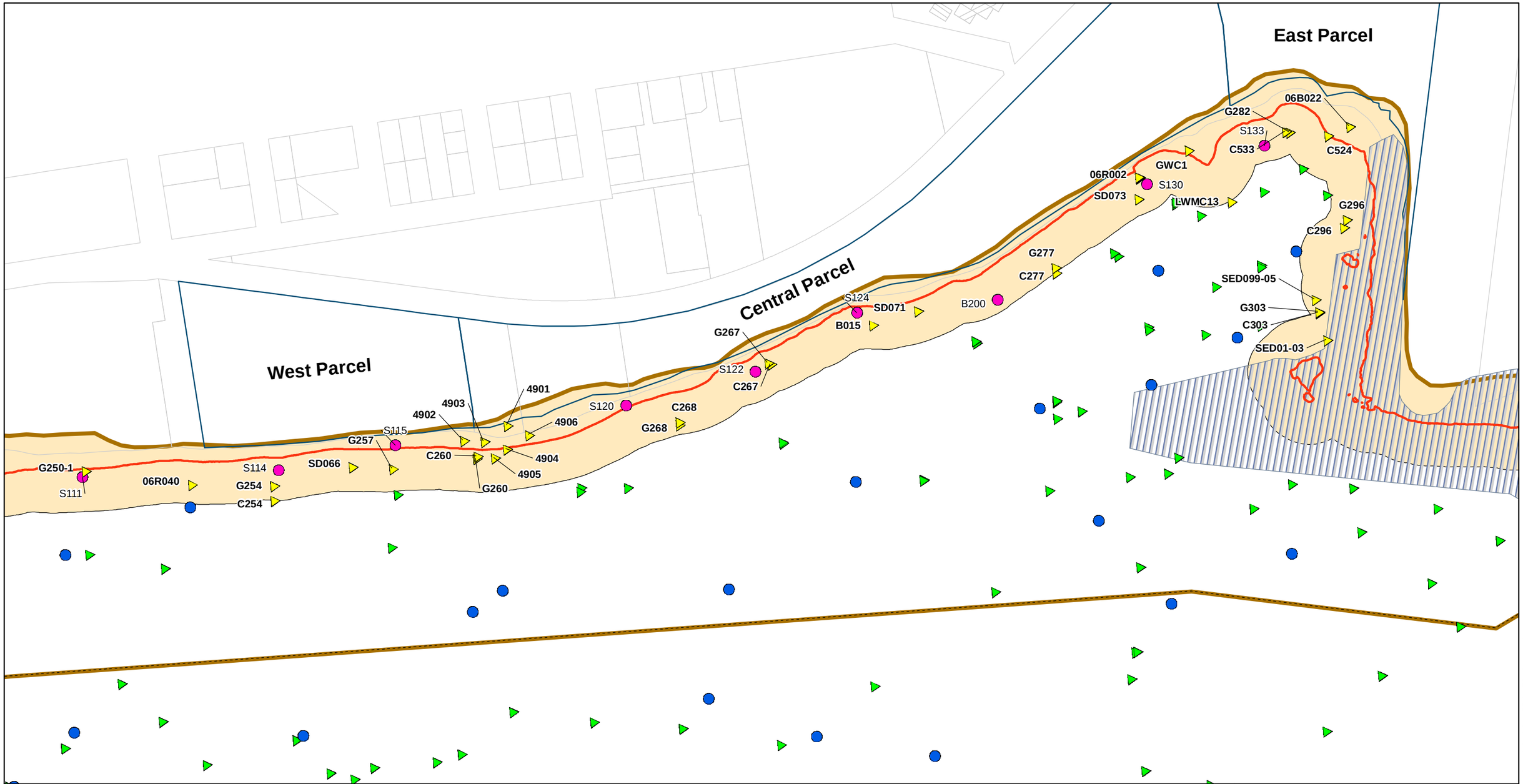
Notes:

Data qualifier definitions from Portland Harbor Feasibility Study, Appendix A (EPA 2016):

J - Estimated value.

U - Analyte was analyzed for but not detected.

UJ - Not deetected. Sample detection limit is estimated.



Legend

- Pre-Remedial Design Sediment Locations Within 100 feet of -2 CRD contour Test[1]
- FS Sediment Locations within 100 feet of -2 Ft CRD contour[2]
- Pre-Remedial Design Sediment Locations[1]
- FS Sediment Locations[2]
- -2 Ft CRD contour
- Within 100 Feet of -2 CRD Contour Buffer
- McCormick and Baxter Cap
- Willamette Cove Upland Facility Boundary
- Sediment Decision Unit (USEPA Feasibility Study, 2016)

1. Data were collected as part of from Pre-Remedial Design Investigation and Baseline Sampling (Pre-Remedial Design Footprint Report, AECOM/Geosyntec 2019)
2. Data were collected for Portland Harbor Superfund Site Remedial Investigation and Feasibility Study. (Portland Harbor RI/FS FEASIBILITY STUDY, USEPA 2016)

CRD = Columbia River Datum

N

0 200 400
Feet

PORT OF PORTLAND

WILLAMETTE COVE

SEDIMENT SAMPLING LOCATIONS ADJACENT TO WILLAMETTE COVE UPLAND FACILITY PRE-RD AND FS

DATE: FEB 15, 2019

BY: DKG FOR: MDL

FORMATION ENVIRONMENTAL

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Appendix G

Re-Evaluation of Soil Data to Identify Chemicals of Concern – Technical Memo

TECHNICAL MEMORANDUM –FINAL

TO: **Dan Hafley, Oregon Department of Environmental Quality**

FROM: **Dwight Leisle, The Port of Portland**
Mark Dunn Lewis, PhD, Formation Environmental
Joe Allen, MS, Formation Environmental
Herb Clough, Apex Companies
Carmen Owens, Apex Companies

DATE: **December 28, 2018**

SUBJECT: **Willamette Cove Feasibility Study: Re-Evaluation of Soil Data to Identify Chemicals of Concern.**

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1. Introduction

As requested by the Oregon Department of Environmental Quality (DEQ), the Port of Portland (Port) updated the chemicals of concern (COCs) evaluation for the Willamette Cove Upland Facility (Facility) to include data collected since the Residual Risk Assessments for human health and ecological receptors were completed in 2013 and 2014, respectively (Formation 2013, 2014). DEQ is requiring this analysis to support identification of COCs and Preliminary Remediation Goals (PRGs) for use in developing and evaluating remedial alternatives in the Feasibility Study (FS).

Additional information considered in the updated evaluation consisted of data from confirmation soil sampling conducted after the 2015 Removal Action. This resulted in 96 additional sample locations located across all parcels of the Facility and analyzed for one or more of the following analytes: dioxins/furans, polycyclic aromatic hydrocarbons (PAHs), and/or metals (antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium, and zinc).

Separate analyses were conducted for human health and ecological receptors. Results for human health are presented in Section 2; results for ecological receptors are presented in Section 3.

Overall results are described in Section 4. For this memorandum, risk-based concentrations (RBCs) are calculated for each receptor/chemical pair and compared to exposure point concentrations (EPCs) for the upland exposure units. Where an EPC exceeds the corresponding RBC, the chemical is identified as a COC. The lowest RBC is identified for each COC separately for human or ecological receptors. The

FINAL

PRG recommended for use in the FS to delineate cleanup action areas is identified as the lowest RBC or background concentrations (metals only), whichever is higher.

2. Human Health

For the human health assessment, the first step was to compare the range of concentrations in post-2014 samples to the range represented in samples used in the residual risk assessment. If the post-2014 results showed a large number of new samples with substantially different concentrations than previous data or above the relevant risk-based concentrations (RBCs), 90% upper confidence limits (UCL90) and hazard quotients (HQ) were calculated to assess if new data warranted inclusion of the chemical as a COC. If new results were generally not above the RBCs and/or were not substantially different from previously existing data, no additional screening with UCL90s was conducted. In addition, high-concentration Hot Spots were calculated for each of the COCs based on Oregon rule (ODEQ 1998). For individual carcinogens, high-concentration Hot Spots are 100x the RBC; for non-carcinogens, the Hot Spot concentrations are 10x the RBC.

Concentrations of copper, mercury, lead, and dioxins and furans in new samples were substantially different from previous data or included samples with concentrations in some samples above the relevant risk-based thresholds. New UCL90 values were calculated for each of these chemicals; and for antimony, arsenic, benzo(a) pyrene, and benzo(a)pyrene toxicity equivalents (BaPEq) which were previously COCs. The UCL90s were calculated for each Exposure Unit (EU) using the EPA Pro UCL statistical package (EPA 2016. ProUCL v5.1). Two types of soil samples were available for each EU: discrete/grab samples from individual locations, and composite samples composed of varying numbers of subsamples. Because composite sampling can result in different variability estimates, it was necessary to calculate separate UCLs for the two sample types in each EU. Pro-UCL output files are provided in electronic file format. In some cases, too few samples were available to calculate a reliable UCL90; these cases are identified in data presentation tables. ProUCL results are shown in Attachment 1.

At DEQ's request, new site-specific risk-based concentrations (RBCs) were calculated for these chemicals using the DEQ Risk Based Decision Making spreadsheet tool (DEQ 2017). For chemicals identified as potentially having both carcinogenic and non-carcinogenic effects, RBCs and Hot Spot values were calculated for both endpoints. PRG identification would then be based on the lower of the RBC values. Exposure frequency and duration parameters in the tool were changed to match site-specific assumptions used in the residual risk assessment, which included three human health scenarios: Transient Recreational Trespasser/Future Park User, Transient Trespasser, and Construction Worker. The analysis also reflects an updated cancer slope factor for benzo(a)pyrene (EPA 2017), which had been changed by EPA since the residual risk Assessment for Willamette Cove (Formation 2013) was completed. In addition, breast-feeding and early life exposure parameters were adjusted, based on guidance from the DEQ risk assessor, to account for site-specific exposure scenarios. This change makes the risk analysis consistent with 2015 changes to DEQ risk assessment guidance. This RBC

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replaces the separate RBCs for individual PAHs that were included in previous analyses for Willamette Cove. RBCs for these chemicals and receptors are shown in Table 1. Table 1 also includes values for other COCs identified from the Residual Risk Assessment: antimony, arsenic, polychlorinated biphenyls. The project-specific exposure factors, and the corresponding RBCs are shown in the DEQ RBDM tables in Attachment 2.

Copper. Copper concentrations in samples added to the data set were generally higher than in previous samples. The site-specific RBCs and UCL90 values for West Parcel, Central Parcel, and East Parcel data sets are shown in Table 1. UCL90-based exposure point concentrations (EPCs) exceeded RBCs only for samples from the East Parcel; specifically for the Recreational Trespasser and Construction Worker scenarios (Table 1). The highest Sitewide individual copper concentration of 47,500 milligrams per kilogram (mg/kg), is below the lowest copper Hot Spot value of 110,000 mg/kg (i.e., for the Recreational Trespasser/Future Park User). Copper was a COC prior to the current analysis based on the Recreational Trespasser scenario. As a result of this analysis, copper also exceeds the RBC for the Construction Worker scenario.

Lead. Lead concentrations in samples added to the data set were generally higher than in previous samples. The UCL90-based EPCs for lead exceeded the 400 mg/kg screening level in the Central Parcel and East Parcel. The screening level is adopted by DEQ for lead in residential scenarios where exposure for children is included in lifetime risk estimates. It was applied for the Recreational Trespasser/Future Park User scenario because it includes child exposure. Lead EPCs did not exceed screening levels for Transient Trespasser or Construction Worker scenarios and did not exceed Hot Spot concentrations for any of the scenarios. Lead remains a COC for human health.

Mercury. All of the UCL90 values were well below the RBCs for all three human health scenarios (Table 1). The highest mercury concentration for an individual location (26.6 mg/kg) is well below the lowest mercury hot spot value of 790 mg/kg (Recreational Trespasser). Based on these results, mercury will not be added as a human health COC for the Facility.

Carcinogenic PAHs as represented by BaPEq. The UCL90-based EPCs for discrete samples exceeded the RBC for the Recreational Trespasser in the West Parcel and Central Parcel, and the Sitewide EPC exceeded the RBC for the Recreational Trespasser. However, ISM and composite sample EPCs did not exceed the RBCs for any exposure unit (Table 1). Concentrations based on discrete samples, but not composite samples, would exceed the Hot Spot concentration for the Recreational Trespasser/Future Park User, but not other scenarios. BaPEq is included in COCs if the decision relies on discrete samples or Hot Spot criteria for one scenario. Multiple individual carcinogenic PAHs were included with human health COCs previously. BaPEq represents the combination of individual carcinogenic PAHs, and replaces them on the COC list.

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Dioxins and Furans. New data for dioxins and furans were generated as a result of confirmation sampling after removal actions, mostly in the Central Parcel. New EPCs are compared against total dioxin and furan concentrations expressed as toxicity equivalents (TEQs) based on 2,3,7,8-tetrachlorodibenzo-p-dioxin equivalents for mammals (Van den Berg et al., 2006)(Table 1).

3. Ecological Receptors

DEQ's requirement for ecological receptors was to determine whether addition of the post-2014 data would result in adding chemicals to the overall Facility COC list, or whether chemicals that were previously COCs for at least one receptor would also be added as COCs for additional receptors. This is an update of the 2014 Residual Ecological Risk Assessment, and the Updated Baseline Risk Evaluation presented in Appendix C of the Oct. 3rd, 2014 Feasibility Study. The updated ecological COC evaluation was conducted by comparing recalculated EPCs developed from the revised upland data set to RBCs developed for each of four representative ecological receptor groups: plants, invertebrates, birds, and mammals.

DEQ also directed the analysis to be conducted separately for the EUs included in the area addressed by the Feasibility Study. Five EUs were included in previous Ecological Risk Assessments (ERAs); however, no analysis was conducted for the Central Parcel Beach EU or the Inner Cove Beach EU because no additional data were collected in these EUs. The analysis was conducted for the West Parcel EU, the Central Parcel EU, the East Parcel EU, and Sitewide exposure estimates.

The overall evaluation process included development of RBCs and Hot Spot concentration criteria for all chemicals that were included in analysis of soil samples since 2014. Ecological receptors for which RBCs were developed are plants, invertebrates, American robin (representing birds), and short-tailed shrew (representing mammals.

RBCs for birds and mammals were based on exposure parameters for the American robin and short-tailed shrew, respectively. The residual ecological risk assessment (Formation 2014) analysis also included the red-tailed hawk and long-tailed weasel, predator species with much larger feeding ranges and less direct contact with soils. The robin and shrew were selected to represent wildlife receptors because the residual risk assessment showed they had relatively higher estimated exposure and risk, and more COCs identified compared to the wider ranging species (e.g., see Section 4 Expanded Level II tables, and Table 5-1 of the Residual Ecological Risk Assessment [Formation 2014]). Therefore, RBCs developed to be protective of these species would also be protective of other bird and mammal species.

Overall, more than 40 additional RBCs and Hot Spot concentrations were calculated. RBCs for plants and invertebrates were taken from existing criteria in US Environmental Protection Agency (EPA) Ecological Soil Screening Levels (EcoSSLs), DEQ ERA Level II Screening Levels, or Oak Ridge National Laboratory documents. RBCs for birds and mammals were calculated using exposure parameters and

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Lowest Observed Adverse Effects Levels (LOAELs). Hot Spot calculations were assumed to be 10-times the RBC concentration (DEQ 1998). The resulting RBCs and Hot Spot values are shown in Table 2. The exposure factors and toxicity reference values which were inputs for RBC calculations, except dioxins, are shown in Attachment 3.

The RBCs were compared to EPCs for each of the three EUs (Tables 3 through 6). EPCs were identified from samples taken from the upper 4 feet of soil. For plants/invertebrates (Tables 3 and 4), the EPC was the maximum concentration for a given analyte. Where no samples contained detectable concentrations of an analyte, the maximum non-detected concentration was substituted. Note that this would typically be considered a screening-level approach for plants/invertebrates and does not necessarily identify the maximum soil concentrations that are protective of the receptors. For birds and mammals (Tables 5 and 6), EPCs are the UCL90 calculated for each EU.

The RBCs for individual dioxins and furan congeners included in Table 2 were taken from previous calculations in the Residual Risk Assessment (Formation 2014) and the Updated Baseline Risk Evaluation presented in Appendix C of the Oct. 3rd, 2014 Feasibility Study. The RBCs were calculated for each dioxin / furan congener using congener-specific bioaccumulation factors and 2,3,7,8- TCDD toxicity equivalence factors (TEF) for birds (Van den Berg et al., 1998) and mammals (Van den Berg et al., 2006). The equations from the US EPA Ecological Soil Screening Level guidance (EPA Attachment 4-1, 2005) for organic chemicals were used to estimate the uptake of dioxin and furan congeners from soil into earthworms. The RBCs are acceptable soil concentrations based on LOAEL-toxicity reference values and assume 100% invertebrate diet for both the robin (representing birds) and shrew (representing mammals). Each congener RBC is normalized to 2,3,7,8-TCDD using toxicity equivalency factors (TEFs), and therefore the sum of the congener exceedances (or hazard quotients) for each sample location is the total 2,3,7,8-TCDD toxicity equivalent (TEQ) hazard quotient. The use of congener specific hazard quotients evaluates the site-specific mixture of congener concentrations and provides a site relevant calculation of total 2,3,7,8-TCDD TEQ risk.

The calculation of total 2,3,7,8-TCDD TEQ HQs provides a measure of risk exceedance for known sample results for birds and mammals, and provides a holistic measure of congener specific bioaccumulation and risk. In order to calculate acceptable soil concentrations for use in the feasibility study (FS), termed preliminary remediation goals (PRGs), RBCs representing acceptable exposure for 2,3,7,8-TCDD TEQ in soil were calculated for each congener and separately for birds and mammals. Bird and mammal soil 2,3,7,8-TCDD TEQ concentrations were plotted against total 2,3,7,8-TEQ hazard quotients using linear regression equations. These equations were then used to calculate soil concentrations that would result in acceptable total 2,3,7,8-TCDD TEQ hazard quotient of 1 for each receptor. These relationships are presented in Attachment 4, Page 1, Dioxin RBC Calculations. The resulting soil RBCs were calculated as bird 2,3,7,8-TCDD TEQ of 89 ng/kg and soil mammal TEQ of 6.1 ng/kg. These total 2,3,7,8-TCDD TEQ PRGs for birds and mammals are shown in Table 2 along with the congener RBCs. The bird total 2,3,7,8-TCDD TEQ risk was also correlated to mammalian 2,3,7,8-TCDD

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soil concentrations, and included in Tables 5 at DEQ's request. However, the relationship of the resulting RBCs based on mammalian soil TEQ concentrations is highly uncertain and not relevant, especially when the avian soil TEQ concentrations have been calculate and are available.

Attachment 4 shows bird and mammal RBCs for each congener compared to congener concentrations for each individual soil sample location remaining after the 2014 removal action (HQ; congener concentration/RBC) for each congener). The sum of the congener hazard quotients, or the total 2,3,7,8-TCDD TEQ hazard quotient are also shown. Hazard quotients for pre-removal data can be found in the 2014 FS, Attachment C. Hazard quotients for total 2,3,7,8-TCDD TEQ for exposure point concentrations represented by larger incremental samples (ISM) are presented in Table 7. For the confirmation samples representing DU-6, the result is expressed as the average (and UCL90) concentration of the total 2,3,7,8-TCDD TEQ HQs for individual confirmation samples (Table 7). The 2,3,7,8-TCDD TEQ RBCs for birds and mammals are compared to site exposure point concentrations for birds in Table 5, and mammals in Table 6 (see bottom rows in both tables).

4. Summary

Table 8 shows the overall identification of COCs for the human health scenarios and each of the ecological receptor groups. For plants and invertebrates, chemicals for which concentrations exceed RBCs at individual sampling locations are included as COCs. No additional COCs were added overall for human health, but the new analysis resulted in copper being added as a COC for the Construction Worker in the East Parcel (Table 1). Arsenic and selenium were added to the overall COCs for ecological receptors. Mercury and nickel were identified as COCs previously, but were added for new receptor pairings as a result of the new data. Low molecular weight PAH (LPAH) was also added but, along with high molecular weight PAH (HPAH), represent the individual PAHs listed as COCs in previous summaries. Dioxins/furans were previously included in the overall ecological COCs and remain COCs primarily based on concentrations in the Central Parcel.

Summaries of the RBCs for human health and ecological receptors are shown in separate tables in Attachment 5. These tables also identify the lowest RBC and Hot Spot value among the ecological receptors or human receptor scenarios, as well as the background concentrations (metals only). The overall PRG is then identified for each COC. The PRG is the higher value between the lowest RBC and background, where applicable. Information in these tables will appear in the FS.

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Tables:

1 Human Health Risk-Based Concentrations and Exposure Point Concentrations for Willamette Cove Upland Facility

2 Risk-Based Concentrations and Oregon High-Concentration Hot Spots Values, Willamette Cove Feasibility Study.

3 Comparison of Exposure Point Concentrations to Plant Risk-Based Concentrations: Updated to Include Post-2014 Soil Data.

4 Comparison of Exposure Point Concentrations to Plant Risk-Based Concentrations: Updated to Include Post-2014 Soil Data.

5 Comparison of Exposure Point Concentrations to Bird Risk-Based Concentrations: Updated to Include Post-2014 Soil Data.

6 Comparison of Exposure Point Concentrations to Mammal Risk-Based Concentrations: Updated to Include Post-2014 Soil Data.

7 Dioxin/Furan Sum Hazard Quotients for Bird (Robin) and Mammal (Shrew) Exposure Estimates.

8 Upland Soil Chemicals of Concern, Willamette Cove Upland Facility Feasibility Study.

Attachments:

1 USEPA Pro-UCL Results

2 Risk-Based Decision-Making Tool

3 Inputs for Calculation of Ecological Risk-Based Concentrations

4 Location-Specific Soil Data and Hazard Quotients for Dioxin and Furan Congeners and Total 2,3,7,8-TCDD and TEQ

5 Preliminary Remediation Goals and Hot Spot Value Summary Tables

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Table 1. Human Health Risk-Based Concentrations and Exposure Point Concentrations for Willamette Cove Upland Facility

	Risk-Based Concentrations[2] / Hot Spot Criteria (mg/kg dw)			Background[3]		UCL90, ISM Sample, and Maximum Exposure Point Concentrations[4]																					
						West Parcel (mg/kg dw)						Central Parcel (mg/kg dw)							East Parcel (mg/kg dw)						Sitewide UCL90s[5] (mg/kg dw)	
Chemical [1]	Recreational Trespasser/ Future Park User	Transient Trespasser	Construction Worker	Mean	95% UPL	Discrete UCL90[5]	ISM and Composite UCL90[5]	ISM Sample DU-7	Q	Maximum[5]	Q	Discrete UCL90[5]	ISM and Composite UCL90[5]	ISM Sample DU-5 (E. side of C. Parcel)	Q	ISM Sample DU-6 (W. side of C. Parcel)	Q	Maximum[5]	Q	Discrete UCL90[5]	ISM and Composite UCL90[5]	ISM Sample DU-4	Q	Maximum[5]	Q	Discrete UCL90	ISM and Composite UCL90
Antimony	24.3 / 243	98 / 980	31 / 310	0.29	0.56	N/A	N/A	0.52	U	0.52	U	7.21	1.20	1.29		0.51	U	29.9			71.39	2.89		192		41.77	1.64
Arsenic - Cancer	1.4 / 140	29 / 2,900	15 / 1,500	4.45	8.8	N/A	5.72	4.52		8.93		13.32	7.21	6.02		4.95		40.3		10.32	11.41	3.67		36.2		11.29	7.10
Arsenic - Non-Cancer	74 / 740	4,700 / 47,000	97 / 970	4.45	8.8	N/A	5.72	4.52		8.93		13.32	7.21	6.02		4.95		40.3		10.32	11.41	3.67		36.2		11.29	7.10
Benzo(a)pyrene Equivalents - Cancer	0.55 / 55	32 / 3,200	17 / 1,700	na	na	0.59	NA	0.443		1.27		13.88	2.70	0.43		1.06		63.6		0.35	0.419	0.303		0.89		7.00	2.10
Benzo(a)pyrene - Non-Cancer	60 / 600	3,300 / 33,000	74 / 740	na	na	0.47	N/A	0.313		0.93		10.18	1.93	0.29		0.66		46.3		0.25	0.30	0.22		0.59		4.54	1.49
Copper	11,000 / 110,000	700,000 / 7,000,000	14,000 / 140,000	24.19	34	N/A	75.6	102		102		835	232	293		404		5,440		19,182	16,281	65.1		47,500		3,209	626
Lead	400 / 4,000	800 / 8,000	800 / 8,000	27.19	79	N/A	36	43		48.9		555	185	310		164		4,040		739	625	201		3,090		495	188
Mercury	79 / 790	5,300 / 53,000	110 / 1,100	0.073	0.23	N/A	N/A	0.36		0.36		2.43	2.12	7.0		11.0		26.6		0.34	0.12	0.05		1.1		1.97	1.80
Polychlorinated Biphenyls[6] Cancer	0.74 / 74	14 / 1400	8.4 / 840	na	na	--[6]	--	--		--		--	--	--		--		--		--	--	--		--		--	--
Polychlorinated Biphenyls[6] Non-Cancer	4 / 40	220 / 2200	4.9 / 49	na	na	--[6]	--	--		--		--	--	--		--		--		--	--	--		--		--	--
2,3,7,8 TCDD Dioxin TEQ Cancer	1.5E-5 / 1.5E-3	3.2E-4 / 3.2E-2	1.7E-4 / 1.7E-2	na	na	NA	NA	1.0E-04		1.0E-04		NA	5.8E-04	1.5E-04		4.2E-03		5.7E-03		NA	NA	6.2E-05		6.1E-05		NA	5.5E-04
2,3,7,8 TCDD Dioxin TEQ Non-Cancer	1.7E-4 / 1.7E-3	1.1 E-2 / 1.1 E-1	2.3 E-4 / 2.3E-3	na	na	NA	NA	1.0E-04		1.0E-04		NA	5.8E-04	1.5E-04		4.2E-03		5.7E-03		NA	NA	6.2E-05		6.1E-05		NA	5.5E-04

Notes:

[1] Chemicals listed were identified as COCs in the 2014 Residual Risk Assessment and 2016 draft FS.

[2] Risk Based Concentrations calculated using ODEQ Risk-Based Decision Making Spreadsheet. (Downloaded 8/6/2018). Note that the RBDM tool does not include Antimony, so the RBCs shown here were calculated from Exposure/Risk assessment paramters from the 2014 Residual Risk Assessment.

[3] Mean and Upper Prediction Limit (UPL) values for Portland Basin Oregon DEQ. 2013. "Development of Oregon Background Metals Concentrations in Soil" (March 2013). Not applicable for organic compounds. Comparisons to UPLs are applicable only to discrete sample data. Composite sample data should be compared to Mean background concentrations.

[4] Exposure Point Concentrations calculated from samples with upper depth of 0 inches below ground surface (bgs), and bottom depth less than about 4 feet bgs.

[5] Maximum concentrations are compared only to Hot Spot Criteria. UCL90 values were not compared to hot spot values

[6] PCBs were not included in post-2014 sample analysis, so no new UCL or maximum values are presented. Based on the earlier data, PCBs remain COCs for human health. RBCs for PCBs are included here because of the previous identification as COCs

ISM = Integrated Sampling Methodology

Yellow Shading: At least one EPC exceeds this RBC.

Grey Shading: This EPC exceeds at least one RBC among the three scenarios.

Orange Shading: The maximum detection or ISM sample concentration exceeds at least one Hot Spot criterion among the three scenarios.

NA = UCL calculation not possible, usually due to too few samples available.

BaPEq = benzo(a)pyrene equivalents

U = not detected above detection limit.

Table 2. Risk-Based Concentrations and Oregon High-Concentration Hot Spots Values, Willamette Cove Feasibility Study.

	Receptor-Specific Screening Levels (mg/kg dw)								Background (mg/kg dw)[4]	
	Plants		*Invertebrates*		*Birds*		*Mammals*			
Chemical[1]	**Plant Screening Levels[2]**	**Plant Hot Spot**	**Invertebrate Screening Levels[2]**	**Invertebrate Hot Spot**	**Birds RBC[3,6]**	**Bird Hot Spot**	**Mammals RBC[3,6]**	**Mammal Hot Spot**	**Mean**	**95% Upper Prediction Limit**
Antimony	5[a]	50	78[c]	780	NA		2.7	27	0.29	0.56
Arsenic	18[c]	180	NA		575	5750	83	830	4.45	8.8
Beryllium	10[d]	100	40[c]	400	NA		206	2060	1.01	2
Cadmium	32[c]	320	140[c]	1400	5.1	50	6.5	65	0.387	0.63
Chromium	1[d]	10	0.4[d]	4	87	870	342	3420	38.94	76
Copper	70[c]	700	80[c]	800	87.7	877	82	820	24.19	34
Lead	120[c]	1,200	1700[c]	17000	33	330	122	1220	27.19	79
Mercury	0.3[d]	3	0.1[e]	1	0.015	0.15	3.53	35.3	0.073	0.23
Nickel	38[c]	380	280[c]	2800	139	1390	20	200	23.41	47
Selenium	0.52[c]	5.2	4.1[c]	41	3.42	34.2	1.1	11	0.331	0.71
Silver	560[c]	5600	NA		44.4	444	272	2720	0.179	0.82
Thallium	1[d]	10	NA		82.4	824	4.04	40.4	4.45	5.2
Zinc	160[c]	1,600	120[c]	1,200	673	6,730	201	2010	104.9	180
HPAH	NA		18[c]	180	NA		5.6	56	na	na
LPAH	NA		29	290	NA		100[c]	1000	na	na
Dibenzofuran	NA		NA		NA		1.00E-02	1.00E-01	na	na
Diesel[5]	*See note 5*								na	na
PCBs	40[b]	400	NA		0.734	7.34	0.098	0.98	na	na
Phthalates[5]	*See note 5*								na	na
2,3,7,8-TCDF	NA		NA		1.29E-04	1.29E-03	1.30E-04	1.30E-03	na	na
2,3,7,8-TCDD	NA		NA		1.36E-04	1.36E-03	1.95E-05	1.95E-04	na	na
1,2,3,7,8-PeCDF	NA		NA		1.27E-03	1.27E-02	4.31E-04	4.31E-03	na	na
2,3,4,7,8-PeCDF	NA		NA		9.90E-05	9.90E-04	3.35E-05	3.35E-04	na	na
1,2,3,7,8-PeCDD	NA		NA		5.47E-04	5.47E-03	5.67E-05	5.67E-04	na	na
1,2,3,4,7,8-HxCDF	NA		NA		2.28E-04	2.28E-03	2.29E-05	2.29E-04	na	na
1,2,3,6,7,8-HxCDF	NA		NA		2.28E-04	2.28E-03	2.29E-05	2.29E-04	na	na
2,3,4,6,7,8-HxCDF	NA		NA		2.28E-04	2.28E-03	2.29E-05	2.29E-04	na	na
1,2,3,7,8,9-HxCDF	NA		NA		4.48E-04	4.48E-03	4.52E-05	4.52E-04	na	na
1,2,3,4,7,8-HxCDD	NA		NA		1.05E-03	1.05E-02	5.30E-05	5.30E-04	na	na
1,2,3,6,7,8-HxCDD	NA		NA		2.28E-03	2.28E-02	2.30E-05	2.30E-04	na	na
1,2,3,7,8,9-HxCDD	NA		NA		2.28E-04	2.28E-03	2.30E-05	2.30E-04	na	na
1,2,3,4,6,7,8-HpCDF	NA		NA		3.79E-03	3.79E-02	3.83E-04	3.83E-03	na	na
1,2,3,4,7,8,9-HpCDF	NA		NA		3.79E-03	3.79E-02	3.83E-04	3.83E-03	na	na
1,2,3,4,6,7,8-HpCDD	NA		NA		3.87E-02	3.87E-01	3.91E-04	3.91E-03	na	na
OCDF	NA		NA		1.64E-01	1.64E+00	5.49E-03	5.49E-02	na	na
OCDD	NA		NA		6.43E-01	6.43E+00	2.17E-02	2.17E-01	na	na
2,3,7,8 TCDD Equiv[7]	NA		NA		8.93E-05	8.93E-04	6.10E-06	6.10E-05	na	na

Notes:

Yellow highlighted cells represent values for chemicals that were not identified as COCs for specific receptors in previous risk assessments.

NA = not available; na = not applicable.

[1] Analytes from soil sample analyses performed post 2014. PAHs represented by HPAHs (High molecular weight polynuclear aromatic hydrocarbons) and LPAHs (low molecular weight PAHs). Dioxins/furans RBCs based on 2,3,7,8-TCDD toxicity equivalents (TEQ).

[2] For plants and invertebrates, screening levels cited by sources for screening only. Not generally meant as action levels (e.g., EPA EcoSSLs)

[3] Calculated from site-specific exposure scenarios for the American robin and short-tailed shrew; based on LOAEL.

[4] Background values for Portland Basin from "Development of Oregon Background Metals Concentrations in Soil" (March 2013). Mean values from Table 2; UPL values from Table 4. Not applicable for organic compounds.

[5] Diesel and Phthalates were identified in Table 4 of DEQ comments on the Eco RRA (July 19, 2013), but the basis for inclusion as COCs was not explained, and quantitative basis for analysis is not possible. Therefore, no PRGs were calculated.

Toxicity Level Sources:

a - Sample, et al., (1996)
b - Efromson, et al., (2003)
c - EPA EcoSSLs
d - DEQ (2001)
e - Efromson, et al., (1997)
f - Los Alamos National Laboratory (2018)

[6] Bioavailability assumed to be 100%, except for lead which is assumed to be 50% from soils, 75% from diet.

[7] 2,3,7,8 TCDD equivalent PRGs are calculated in Attachement 4. The RBCs were calculated using TEFs specifically developed for birds and mammals (Van den Berg et al., 1998; Van den Berg et al., 2006). At DEQ request, additional RBC for total 2,3,7,8 TEQ was calculated using soil data transformed using mammalian TEFs, and avian RBCs. That value is 3.5E-5 mg/kg. (See Attachment 4).

Table 3. Comparison of Exposure Point Concentrations to Plant Risk-Based Concentrations: Updated to Include Post-2014 Soil Data.

	Background[1]		Risk-Based Concentrations Plants *(mg/kg dw)*		Maximum Detected Concentrations (or highest ND value if Not Detected; mg/kg dw)													
Chemical	**Mean**	**95% Upper Prediction Limit**	**RBC**	**Hot Spot**	**Central Parcel**	**Q**	**ISM Sample DU-5 (E. side of C. Parcel)**	**Q**	**ISM Sample DU-6 (W. side of C. Parcel)**	**Q**	**West Parcel**	**Q**	**ISM Sample DU-7 (West Parcel)**	**Q**	**East Parcel**	**Q**	**ISM Sample DU-4 (East Parcel)**	**Q**
Antimony	0.29	0.56	5	50	**29.9**		1.3		0.5	U	0.52	U	0.5	U	192		2.9	
Arsenic	4.45	8.8	18	180	**40.3**		6.0		5.0		8.9		4.5		**36.2**		3.7	
Beryllium	1.01	2	10	100	3.3		0.7		0.7		1.1		1.1		0.72		0.7	
Cadmium	0.387	0.63	32	320	2.2		0.5		0.4		0.44		0.3		1.7		0.4	
Chromium	38.94	76	1	10	68.6		16.1		11.7		20.6		19.2		145		11.4	
Copper	24.19	34	70	700	5440		**293**		**404**		**102**		**102**		47500		65.1	
Lead	27.19	79	120	1,200	4040		**310**		**164**		48.9		43		3090		**201**	
Mercury (methyl)	0.073	0.23	0.3	3	26.6		7.0		11.0		**0.36**		**0.4**		**1.1**		0.1	
Nickel	23.41	47	38	380	**144**		16.6		14.7		19.7		15.4		**306**		13.9	
Selenium	0.331	0.71	0.52	5.2	**1.8**		0.1	U	0.1	U	0.5	U	0.1	U	**1.3**		0.1	U
Silver	0.179	0.82	560	5600	2.8		0.3	U	0.3	U	0.5	U	0.3	U	8.6		0.3	U
Thallium	4.45	5.2	1	10	0.77		0.6	U	0.6	U	0.65	U	0.6	U	0.09		0.6	U
Zinc	104.9	180	160	1,600	**1460**		**238**		**187**		151		151		1810		**221**	
Dibenzofuran	na	na	NA	NA	0.58		--		--		1.7	U	--		1.7	U	--	
High Molecular Weight PAH	na	na	NA	NA	324.4		2.7		5.7		6.4		2.5		5.6		1.6	
Low Molecular Weight PAH	na	na	NA	NA	45.8		0.3		0.6		0.75		0.2		2.0		0.2	
Polychlorinated biphenyls[2]	na	na	40	400	--[2]		--		--		--		--		--		--	
2,3,7,8-TCDD Equivalent	na	na	NA		5.7E-03		1.5E-04		4.2E-03		1.0E-04		1.0E-04		6.1E-05		6.1E-05	

Notes:

[1] Background values for Portland Basin from "Development of Oregon Background Metals Concentrations in Soil" (ODEQ 2013). Mean values from Table 2; UPL values from Table 4. Not applicable for organic compounds. Comparison of ISM Composite or Average sample concentrations should be made using Mean background concentrations. Comparison of discrete sample data should be made to Upper Prediction LImits.

5 = Exceeds the RBC for Plants

5 = Exceeds the Hot Spot for Plants

[2]PCBs were not included in post-2014 sample analysis, so no new UCL or maximum values are presented. Based on the earlier data, PCBs remain COCs for ecological receptors. RBCs for PCBs are included here because of the previous identification as COCs.

na = No background values avaialable for organic chemicals.

NA = No screening value available.

Q = data validation qualifier. U = Not detected. If a value is shown with the U-qualifier, no samples contained detectable levels for the Parcel. The value shown represents the maximum detection limit.

Table 4. Comparison of Exposure Point Concentrations to Invertebrate Risk-Based Concentrations: Updated to Include Post-2014 Soil Data.

	Background[1]		Risk-Based Concentrations Invertebrates *(mg/kg dw)*		Maximum Detected Concentrations (or highest ND value if Not Detected; mg/kg dw)													
Chemical	**Mean**	**95% Upper Prediction Limit**	**RBC**	**Hot Spot**	**Central Parcel**	**Q**	**ISM Sample DU-5 (E. side of C. Parcel)**	**Q**	**ISM Sample DU-6 (W. side of C. Parcel)**	**Q**	**West Parcel**	**Q**	**ISM Sample DU-7 (West Parcel)**	**Q**	**East Parcel**	**Q**	**ISM Sample DU-4 (East Parcel)**	**Q**
Antimony	0.29	0.56	78	780	29.9		1.3		0.5	U	0.5	U	0.5	U	**192**		2.9	
Arsenic	4.45	8.8	NA	NA	40.3		6.0		5.0		8.9		4.5		36.2		3.7	
Beryllium	1.01	2	40	400	3.3		0.7		0.7		1.09		1.1		0.72		0.7	
Cadmium	0.387	0.63	140	1400	2.2		0.5		0.4		0.44		0.3		1.7		0.4	
Chromium	38.94	76	0.4	4	69		16.1		11.7		20.6		19.2		145		11.4	
Copper	24.19	34	80	800	5440		**293**		**404**		**102.0**		**102**		47500		65.1	
Lead	27.19	79	1700	17000	**4040**		310		164		48.9		43		**3090**		201	
Mercury (methyl)	0.073	0.23	0.1	1	26.6		7.0		11.0		**0.4**		**0.4**		1.1		0.1	
Nickel	23.41	47	280	2800	144		16.6		14.7		19.7		15.4		**306**		13.9	
Selenium	0.331	0.71	4.1	41	1.8		0.1	U	0.1	U	0.5	U	0.1	U	1.3		0.1	U
Silver	0.179	0.82	NA	NA	2.8		0.3	U	0.3	U	0.5	U	0.3	U	8.6		0.3	U
Thallium	4.45	5.2	NA	NA	0.77		0.6	U	0.6	U	0.7	U	0.6	U	0.09		0.6	U
Zinc	104.9	180	120	200	1460		238		**187**		**151**		**151**		1810		221	
Dibenzofuran	na	na	NA	NA	0.58		--		--		1.7	U	--		1.7	U	--	
High Molecular Weight PAH	na	na	18	180	324.4		2.7		5.7		6.3		2.5		5.6		1.6	
Low Molecular Weight PAH	na	na	29	290	**45.8**		0.3		0.6		0.75		0.2		2.0		0.2	
Polychlorinated biphenyls[2]	na	na	NA	NA	--[2]		--		--		--		--		--		--	
2,3,7,8-TCDD Equivalent	na	na	NA	NA	0.006		1.5E-04		4.2E-03		1.0E-04		1.03E-04		6.1E-05		6.1E-05	

Notes:

[1] Background values for Portland Basin from "Development of Oregon Background Metals Concentrations in Soil" (ODEQ 2013). Mean values from Table 2; UPL values from Table 4. Not applicable for organic compounds. Comparison of ISM Composite or Average sample concentrations should be made using Mean background concentrations. Comparison of discrete sample data should be made to Upper Prediction LImits.

5 = Exceeds the RBC for Invertebrates

5 = Exceeds the Hot Spot for Invertebrates

[2]PCBs were not included in post-2014 sample analysis, so no new UCL or maximum values are presented. Based on the earlier data, PCBs remain COCs for ecological receptors. RBCs for PCBs are included here because of the previous identification as COCs.

na = No background values avaialable for organic chemicals.

NA = No screening value available.

Q = data validation qualifier. U = Not detected. If a value is shown with the U-qualifier, no samples contained detectable levels for the Parcel. The value shown represents the maximum detection limit.

Table 5. Comparison of Exposure Point Concentrations to Bird Risk-Based Concentrations: Updated to Include Post-2014 Soil Data.

	Background[1]		Risk-Based Concentration Birds[5] (mg/kg dw)		Central Parcel (mg/kg dw)								West Parcel (mg/kg dw)						East Parcel (mg/kg dw)						Sitewide 90UCLs[6] (mg/kg dw)	
Chemical	Mean	95% Upper Prediction Limit	RBC	Hot Spot	Composite UCL90[6]	Discrete UCL90[6]	ISM Sample DU-5 (E. side of C. Parcel)	Q	ISM Sample DU-6 (W. side of C. Parcel)	Q	Maximum[6]	Q	Composite UCL90[6]	Discrete UCL90[6]	ISM Sample DU-7 (West Parcel)	Q	Maximum[6]	Q	Composite UCL90[6]	Discrete UCL90[6]	ISM Sample DU-4 (East Parcel)	Q	Maximum[6]	Q	Composite	Discrete
Antimony	0.29	0.56	NA	NA	1.2	7.2	1.3		0.5	U	29.9		N/A	N/A	0.5	U	0.5	U	12.9	71.4	2.9		192		1.6	41.8
Arsenic	4.45	8.8	575	5750	7.2	13.3	6.0		5.0		40.3		5.7	N/A	4.5		8.9		10.3	11.4	3.7		36.2		7.1	11.3
Beryllium	1.01	2	NA	NA	0.3	0.9	0.7		0.7		3.3		N/A	N/A	1.1		1.09		0.5	0.4	0.7		0.72		0.3	0.6
Cadmium	0.387	0.63	5.1	51	0.6	0.5	0.5		0.4		2.2		0.4	N/A	0.3		0.44		1.2	0.3	0.4		1.7		0.6	0.4
Chromium	38.94	76	87	870	16.6	29.2	16.1		11.7		69		N/A	N/A	19.2		20.6		41.6	44.2	11.4		145.00		17.6	30.6
Copper	24.19	34	87.7	877	**232**	**835**	**293**		**404**		5440		75.6	N/A	**102**		102		**16281**	**19182**	65.1		47,500		**626**	**3209**
Lead	27.19	79	33	330	**185**	**555**	**310**		**164**		4040		**35.9**	N/A	**43**		48.9		**625**	**739**	**201**		3,090		**188**	**495**
Mercury (methyl)[2]	0.073	0.23	0.015	0.15	**2.1**	**2.4**	7.0		11.0		26.6		**0.3**	N/A	0.4		0.4		**0.1**	**0.3**	**0.1**		1.10		**1.8**	**2.0**
Nickel	23.41	47	139	1390	22.8	53.1	16.6		14.7		144		N/A	N/A	15.4		19.7		49.2	109	13.9		306		23.6	61.0
Selenium	0.331	0.71	3.42	34.2	0.8	0.7	0.1	U	0.1	U	1.8		N/A	N/A	0.1	U	0.5	U	1.0	0.2	0.1	U	1.30		0.7	0.7
Silver	0.179	0.82	44.4	444	0.1	0.7	0.3	U	0.3	U	2.8		N/A	N/A	0.3	U	0.5	U	5.8	2.9	0.3	U	8.60		0.2	0.7
Thallium	4.45	5.2	82.4	824	0.09	0.3	0.6	U	0.6	U	0.77		N/A	N/A	0.6	U	0.7	U	0.08	0.1	0.6	U	0.09		0.1	0.2
Zinc	104.9	180	673	6730	205	413	238		187		1460		112	N/A	151		151		486	645	221		1810		207	425
Dibenzofuran	na	na	NA	NA	0.3	N/A	--		--		0.58		N/A	N/A	--		1.7	U	N/A	N/A	--		1.65	U	0.3	N/A
High Molecular Weight PAH	na	na	NA	NA	16.0	71.5	2.7		5.7		324.4		N/A	3.6	2.5		6.3		2.3	2.5	1.6		5.58		12.4	34.7
Low Molecular Weight PAH	na	na	NA	NA	3.0	8.2	0.3		0.6		45.8		N/A	0.4	0.2		0.75		0.7	0.9	0.2		2.00		2.4	6.1
Polychlorinated biphenyls[3]	na	na	0.73	7.34	--	--	--		--		--		--	--	--		--		--	--	--		--		--	--
Dioxin/Furan TEQ (avian TEFs)[4,7]	na	na	8.9E-05	8.9E-04	**3.1E-04**	N/A	**1.1E-04**		**2.8E-03**		1.8E-03		N/A	N/A	7.9E-05		7.9E-05		N/A	N/A	3.9E-05		3.9E-05		**2.9E-04**	N/A
Dioxin/Furan TEQ (soil data reflects mammalian TEFs)[4,8]	na	na	3.5E-05	3.5E-04	**5.8E-04**	N/A	**1.5E-04**		4.2E-03		5.7E-03		N/A	N/A	**1.0E-04**		**1.0E-04**		N/A	N/A	**6.2E-05**		**6.1E-05**		**5.5E-04**	N/A

Notes:

[1] Background values for Portland Basin from "Development of Oregon Background Metals Concentrations in Soil" (ODEQ 2013). Mean values from Table 2; UPL values from Table 4. Not applicable for organic compounds. Comparison of ISM Composite or Average sample concentrations should be made using Mean background concentrations. Comparison of discrete sample data should be made to Upper Prediction LImits.

5	= value exceeds RBC for birds
5	= value exceeds Hot Spot criterion for birds

[2] RBC and hot spot criteria are based on methyl mercury, but data collected at the site is total recoverable mercury.

[3] PCBs were not included in post-2014 sample analysis, so no new UCL or maximum values are presented. Based on the earlier data, PCBs remain COCs for ecological receptors. RBCs for PCBs are included here because of the previous identification as COCs.

[4] Congener-specific RBCs (Table 2) were used to calculate exceedence ratios for each sampling location. See Table 7 for results.

[5] The RBCs provided are for the omnivorous small bird feeding guild represented by the American robin. The RBCs are protective of all bird species addressed in the ERA.

[6] Maximum concentrations are compared only to Hot Spot Criteria. UCL90 values were not compared to hot spot values.

[7] Dioxin/furan RBCs calculated using avian TEFs compared to soil data converted with avian 2,3,7,8-TCDD equaivalents.

[8] Dioxin/furan RBCs calculated using avian TEFs compared to soil data converted with mammalian 2,3,7,8-TCDD equaivalents.

na = No background values avaialable for organic chemicals.

NA = No TRV or screening value available.

N/A = UCL calculation not possible, usually due to too few samples available.

-- = PCBs were not on the post 2014 analyte list.

Q = data validation qualifier. U = Not detected. If a value is shown with the U-qualifier, no samples contained detectable levels for the Parcel. The value shown represents the maximum detection limit.

Table 6. Comparison of Exposure Point Concentrations to Mammal Risk-Based Concentrations: Updated to Include Post-2014 Soil Data.

	Background[1]		Risk-Based Concentration Mammals[5] (mg/kg dw)		Central Parcel (mg/kg dw)								West Parcel (mg/kg dw)						East Parcel (mg/kg dw)						Sitewide 90UCLs[6] (mg/kg dw)	
Chemical	Mean	95% Upper Prediction Limit	RBC	Hot Spot	Composite UCL90[6]	Discrete UCL90[6]	ISM Sample DU-5 (E. side of C. Parcel)	Q	ISM Sample DU-6 (W. side of C. Parcel)	Q	Maximum[6]	Q	Composite UCL90[6]	Discrete UCL90[6]	ISM Sample DU-7 (West Parcel)	Q	Maximum[6]	Q	Composite UCL90[6]	Discrete UCL90[6]	ISM Sample DU-4 (East Parcel)	Q	Maximum[6]	Q	Composite UCL90	Discrete UCL90
Antimony	0.29	0.56	2.7	27	1.2	7.2	1.3		0.5	U	29.9		N/A	N/A	0.5	U	0.5	U	12.9	71.4	2.9		192		1.6	41.8
Arsenic	4.45	8.8	82.9	829	7.2	13.3	6.0		5.0		40.3		5.7	N/A	4.5		8.9		10.3	11.4	3.7		36.2		7.1	11.3
Beryllium	1.01	2	206	2060	0.3	0.9	0.7		0.7		3.3		N/A	N/A	1.1		1.09		0.5	0.4	0.7		0.7		0.3	0.6
Cadmium	0.387	0.63	6.5	65	0.6	0.5	0.5		0.4		2.2		0.4	N/A	0.3		0.44		1.2	0.3	0.4		1.7		0.6	0.4
Chromium	38.94	76	342	3420	16.6	29.2	16.1		11.7		69		N/A	N/A	19.2		20.6		41.6	44.2	11.4		145		17.6	30.6
Copper	24.19	34	82	820	232	835	293		404		5440		75.6	N/A	102		102		16281	19182	65.1		47,500		626	3209
Lead	27.19	79	122	1220	185	555	310		164		4040		35.9	N/A	43		48.9		625	739	201		3,090		188	495
Mercury (methyl)[2]	0.073	0.23	3.53	35.3	2.1	2.4	7.0		11		26.6		0.3	N/A	0.4		0.4		0.1	0.3	0.1		1.1		1.8	2.0
Nickel	23.41	47	20.1	201	22.8	53.1	16.6		14.7		144		N/A	N/A	15.4		19.7		49.2	109	13.9		306		23.6	61.0
Selenium	0.331	0.71	1.1	11	0.8	0.7	0.1	U	0.1	U	1.8		N/A	N/A	0.1	U	0.5	U	1.0	0.2	0.1	U	1.3		0.7	0.7
Silver	0.179	0.82	272	2720	0.1	0.7	0.3	U	0.3	U	2.8		N/A	N/A	0.3	U	0.5	U	5.8	2.9	0.3	U	8.6		0.2	0.7
Thallium	4.45	5.2	4.04	40.4	0.09	0.3	0.6	U	0.6	U	0.77		N/A	N/A	0.6	U	0.7	U	0.08	0.1	0.6	U	0.09		0.1	0.2
Zinc	104.9	180	201	2010	205	413	238		187		1460		112	N/A	151		151		486	645	221		1810		207	425
Dibenzofuran	na	na	0.010	0.10	0.3	N/A	--		--		0.58		N/A	N/A	--		1.7	U	N/A	N/A	--		1.7	U	0.3	N/A
High Molecular Weight PAH	na	na	5.6	56	16.0	71.5	2.7		5.7		324.4		N/A	3.6	2.5		6.3		2.3	2.5	1.6		5.6		12.4	34.7
Low Molecular Weight PAH	na	na	100	1000	3.0	8.2	0.3		0.6		45.8		N/A	0.4	0.2		0.75		0.7	0.9	0.2		2.0		2.4	6.1
Polychlorinated biphenyls[3]	na	na	0.10	0.98	--	--	--		--		--		--	--	--		--		--	--	--		--		--	--
Dioxin/Furan TEQ (mammal TEFs)[4]	na	na	6.10E-06	6.10E-05	5.8E-04	N/A	1.5E-04		4.2E-03		5.7E-03		N/A	N/A	1.0E-04		1.0E-04		N/A	N/A	6.1E-05		6.1E-05		5.5E-04	N/A

Notes:

[1] Background values for Portland Basin from "Development of Oregon Background Metals Concentrations in Soil" (ODEQ 2013). Mean values from Table 2; UPL values from Table 4. Not applicable for organic compounds. Comparison of ISM Composite or Average sample concentrations should be made using Mean background concentrations. Comparison of discrete sample data should be made to Upper Prediction LImits.

5 = value exceeds RBC for mammals

5 = value exceeds Hot Spot criterion for mammals

[2]RBC and hot spot criteria are based on methyl mercury, but data collected at the site is total recoverable mercury.

[3]PCBs were not included in post-2014 sample analysis, so no new UCL or maximum values are presented. Based on the earlier data, PCBs remain COCs for ecological receptors. RBCs for PCBs are included here because of the previous identification as COCs.

[4]Congener-specific RBCs (Table 2) were used to calculate exceedence ratios for each sampling location. See Table 7 for results.

[5]The RBCs provided are for the omnivorous smammal feeding guild represented by the short-tailed shrew. The RBCs are protective of all mammal species addressed in the ERA.

[6] Maximum concentrations are compared only to Hot Spot Criteria. UCL90 values were not compared to hot spot values

na = No background values avaialable for organic chemicals.

N/A = UCL calculation not possible, usually due to too few samples available.

-- = PCBs were not on the post 2014 analyte list.

Q = data validation qualifier. U = Not detected. If a value is shown with the U-qualifier, no samples contained detectable levels for the Parcel. The value shown represents the maximum detection limit.

Table 7. Dioxin/Furan Sum Hazard Quotients for Bird (Robin) and Mammal (Shrew) Exposure Estimates.

Parcel	Sampling Location	Summed Hazard Quotient	
		Bird	Mammal
Central	DU-1 (former Wharf Road area)	3.8	65.2
	DU-2 (former Wharf Road area)	22.8	128.8
	DU-3 (former Wharf Road area)	7.4	44.5
	DU-5	1.8	37.6
	Post-Removal DU-6 (average)	6.5	61.8
	Post-Removal DU-6 (UCL90)	18.1	126.7
East	DU-4	0.7	15.7
West	DU-7	1.3	25.0

Notes:

DU samples (DU-1 to DU-5, DU-7) and WC-1/2/3 are results for individual samples (e.g., ISM samples).

Post-removal DU-6 dataset includes "RA" samples, DU-6 Comp samples (DU-6-COMP-1 through DU-6-COMP-4).

The recommended 90UCL methodology for both bird and mammal exceedance ratios was '90% Chebyshev (Mean, Sd) UCL'.

Table 8. Upland Soil Chemicals of Concern, Willamette Cove Upland Facility Feasibility Study

Chemical	Ecological				Human Health		
	Plant	Invertebrate	Bird	Mammal	Recreational Trespasser/ Future Park User	Transient Trespasser	Construction Worker
Antimony	X	X	NA	X	X		X
Arsenic	X				X		
Beryllium			NA				
Cadmium							
Chromium	X	X					
Copper	X	X	X	X	X		X
Lead	X	X	X	X	X		
Mercury	X	X	X	X			
Nickel	X	X		X			
Selenium	X						
Silver		NA					
Thallium		NA					
Zinc	X	X		X			
BaP Eq	--	--	--	--	X		
HPAH	NA	X	NA	X	--	--	--
LPAH	NA	X	NA		--	--	--
Dibenzofuran	NA	NA	NA	X			
Diesel[1]							
Total PCBs[2]		NA	X	X	X	X	X
Phthalates[1]							
Dioxins/Furans[3]	NA	NA	X	X	X	X	X

Notes:

Yellow Highlighted Cells indicate COCs new for this receptor, compared to Table 5-1 from Residual Risk Assessment.

PAHs = Polycyclic Aromatic Hydrocarbons

BaPEq = Benzo(a)pyrene Equivalent

HPAH = High molecular weight PAHs

LPAH = Low molecular weight PAHs

TPH = Total Petroleum Hydrocarbons

PCBs = Polychlorinated Hydrocarbons

SVOCs = Semi-volatile Organic Compounds

NA = RBC not available due to lack of TRV.

[1]Diesel range hydrocarbons and phthalates are retained as a COC due to number of samples and detected concentrations, no RBCs are available for comparing to receptor scenarios.

[2]PCBs were not included in post-2014 analyses, but were identfied in the Residual Risk Assessments as a COC for locations that are technically in the Inner Cove Beach EU, but at the boundary with the East Parcel and Central Parcel EUs. PCBs are retained as COCs in this analysis based on this previous analysis.

[3] For birds and mamamals, congener-based RBCs were normalized to 2,3,4,7,8-TCDD Toxicity Equivalents.

Attachment 1:

USEPA Pro-UCL Results
(Output Files Presented as Separate Electronic Files)

Attachment Table 1
90% UCLs Calculated by ProUCL 5.1

	Sitewide			
	Composite With DU-5	EPC Calc	Discrete	EPC Calc
Antimony	1.636	90% Approximate Gamma	41.77	95% KM Chebyshev
Arsenic	7.103	90% Chebyshev	11.29	90% KM Chebyshev
Beryllium	0.348	90% KM (t)	0.559	90% KM (t)
Benzo(a)pyrene	1.492	90% Adjusted Gamma KM	4.544	90% H UCL
Cadmium	0.602	90% H UCL (KM Log)	0.433	90% KM (t)
Chromium	17.56	90% Students T	30.57	90% H UCL
Copper	625.7	90% Chebyshev	3209	90% Chebyshev
Dibenzofuran	0.346	90% KM Chebyshev	N/A	N/A
HPAH	12.42	90% Adjusted Gamma KM	34.7	90% H UCL (KM-Log)
Lead	188.2	90% Approximate Gamma	494.7	90% Approximate Gamma
LPAH	2.35	90% Adjusted Gamma KM	6.067	90% KM Chebyshev
Mercury	1.799	90% H UCL (KM Log)	1.973	90% H UCL (KM-Log)
Nickel	23.58	90% Students T	61	90% Chebyshev
Selenium	0.711	90% KM (t)	0.663	90% KM Chebyshev
Silver	0.163	90% H UCL (KM Log)	0.726	90% H UCL (KM-Log)
2,3,7,8-TCDD Equivalent - Mammals	5.4885E-4	90% H UCL	Only 3 samples	
2,3,7,8-TCDD Equivalent - Birds	2.89E-04	90% H UCL	Only 3 samples	
Thallium	0.124	90% KM Chebyshev	0.191	90% KM Chebyshev
Total BaP Eq	2.096	90% Adjusted Gamma KM	6.995	90% KM Chebyshev
Zinc	207.1	90% H UCL	425	90% H UCL

Attachment Table 1
90% UCLs Calculated by ProUCL 5.1

	Central Parcel			
	Composite With DU-5	EPC Calc	Discrete	EPC Calc
Antimony	1.201	90% Gamma Approximate	7.209	90% Adjusted Gamma KM
Arsenic	7.207	90% Chebyshev	13.32	90% Chebyshev
Beryllium	0.333	90% Approximate Gamma	0.919	90% KM Chebyshev
Benzo(a)pyrene	1.929	90% Adjusted Gamma KM	10.18	95% KM Chebyshev
Cadmium	0.621	90% H UCL (KM-Log)	0.539	90% KM (t)
Chromium	16.59	90% Students T	29.17	90% Adjusted Gamma
Copper	231.8	90% Chebyshev	835	90% Chebyshev
Dibenzofuran	0.346	90% KM Chebyshev	N/A	N/A
HPAH	15.97	90% Adjusted Gamma KM	71.51	95% KM Chebyshev
Lead	184.8	90% Approximate Gamma	555.3	90% Adjusted Gamma
LPAH	3.012	90% Adjusted Gamma KM	8.238	90% Gamma Adjusted KM
Mercury	2.122	90% H UCL (KM-Log)	2.432	90% H UCL (KM Log)
Nickel	22.76	90% Students T	53.13	90% Chebyshev
Selenium	0.81	90% KM (t)	0.734	90% KM (t)
Silver	0.138	90% KM (t)	0.698	90% Adjusted Gamma
2,3,7,8-TCDD Equivalent - Mammals	5.8393E-4	90% H UCL	Only 3 samples	
2,3,7,8-TCDD Equivalent - Birds	3.06E-04	90% H UCL	Only 3 samples	
Thallium	0.0863	90% Gamma Approximate	0.283	90% KM Chbyshev
Total BaP Eq	2.697	90% Adjusted Gamma KM	13.88	95% KM Chebyshev
Zinc	204.6	90% H UCL	413.2	90% Adjusted Gamma

Attachment Table 1
90% UCLs Calculated by ProUCL 5.1

	West Parcel			
	Composite	EPC Calc	Discrete	EPC Calc
Antimony	Not Detected		Not Detected	
Arsenic	5.722	90% Students T	Only 4 Samples	
Beryllium	1 Sample		Not Detected	
Benzo(a)pyrene	1 sample		0.469	90% Students T
Cadmium	0.35	90% KM (t)	Not Detected	
Chromium	1 Sample		Only 3 Samples	
Copper	75.61	90% Adjusted Gamma	Only 4 Samples	
Dibenzofuran	Not Detected		Not Detected	
HPAH	1 Sample		3.614	90% Students T
Lead	35.92	90% Students T	Only 4 Samples	
LPAH	1 Sample		0.376	90% KM (t)
Mercury	0.312	90% KM Chebyshev	Only 1 detection	
Nickel	1 Sample		Only 3 Samples	
Selenium	Not Detected		Not Detected	
Silver	Not Detected		Not Detected	
2,3,7,8-TCDD Equivalent - Mammals	1 Sample		Not Detected	
2,3,7,8-TCDD Equivalent - Birds	1 Sample		Not Detected	
Thallium	Not Detected		Not Detected	
Total BaP Eq	1 Sample		0.592	90% Students T
Zinc	112.4	90% Students T	Only 4 Samples	

Attachment Table 1
90% UCLs Calculated by ProUCL 5.1

	East Parcel			
	Composite	EPC Calc	Discrete	EPC Calc
Antimony	12.88	90% KM (t)	71.39	90% Adjusted Gamma
Arsenic	10.32	90% Students T	11.41	90% Gamma Adjusted KM
Beryllium	0.545	90% Adjusted Gamma	0.42	90% KM (t)
Benzo(a)pyrene	0.299	90% Students T	0.249	90% KM (t)
Cadmium	1.187	90% KM (t)	0.343	90% KM (t)
Chromium	41.6	90% Students T	44.24	90% Adjusted Gamma
Copper	16281	97.5% Chbyshev	19182	97.5% Chebyshev
Dibenzofuran	Not Detected		Not Detected	
HPAH	2.303	90% Students T	2.477	90% Adjusted Gamma
Lead	624.7	90% Students T	739.2	90% Adjusted Gamma
LPAH	0.676	90% Students T	0.899	90% KM Bootstrap T
Mercury	0.122	90% KM (t)	0.339	90% KM Chebyshev
Nickel	49.16	90% Students T	108.9	90% Chebyshev
Selenium	1.022	90% KM (t)	0.233	90% KM (t)
Silver	5.786	90% Adjusted Gamma KM	2.934	90% KM Chebyshev
2,3,7,8-TCDD Equivalent - Mammals	Only 1 Sample		Not Detected	
2,3,7,8-TCDD Equivalent - Birds	Only 1 Sample		Not Detected	
Thallium	0.0785	90% KM (t)	0.0604	90% KM (t)
Total BaP Eq	0.419	90% Students T	0.354	90% Students T
Zinc	486.1	90% Students T	645.3	90% Adjusted Gamma

Attachment 2:

Risk-Based Decision-Making Tool

The Oregon DEQ RBDM tool was revised to reflect site-specific scenarios adopted for the Willamette Cove Facility human health risk assessments. Revision were made to Exposure Duration and Exposure Frequency. The changes are highlighted on the fifth page of the *.pdf. The scenarios identified in the column headers were edited from the default to reflect the names adopted for the Willamette Cove risk assessments. The edited column headers are shown on the first and fifth pages of the *.pdf.

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Human Health RBC Calculations - Non-Cancer Endpoints

Risk-Based Concentrations

Contaminated Medium			SOIL mg/Kg (ppm)									
Exposure Pathway			Soil Ingestion, Dermal Contact, and Inhalation RBC_{ss}									
Receptor Scenario			Residential		Recreational Trespass		Transient		Const Worker		Excavation Worker	
Direct or Indirect Pathway (see notes)			DCS		DCS		DCS		DCS		DCS	
CASn	Chemical	Note		Note		Note		Note		Note		Note
83-32-9	Acenaphthene	nc, v	4,700	>Csat	16,000	>Csat	-	>Max	21,000	>Csat	590,000	>Csat
107-13-1	Acrylonitrile	c, v	0.86		2.7		60		40		1,100	
309-00-2	Aldrin	c, v	0.031		0.098		2.0		1.1		30	>Csat
120-12-7	Anthracene	nc, v	23,000	>Csat	79,000	>Csat	-	>Max	110,000	>Csat	-	>Max
7440-38-2	Arsenic	nc, nv	22		74		4,700		97		2,700	
7440-39-3	Barium	nc, nv	15,000		51,000		-	>Max	69,000		-	>Max
56-55-3	Benz[a]anthracene	c, v	1.1		5.4		310	>Csat	170	>Csat	4,800	>Csat
71-43-2	Benzene	c, v	8.2		25		560		380		11,000	>Csat
92-87-5	Benzidine	c, nv	0.00052		0.0025		0.15		0.082		2.3	
50-32-8	Benzo[a]pyrene (BaP equivalents)	nc, nv	18	>Csat	60	>Csat	3,300	>Csat	74	>Csat	2,100	>Csat
205-99-2	Benzo[b]fluoranthene	c, nv	1.1		5.5		320	>Csat	170	>Csat	4,900	>Csat
207-08-9	Benzo[k]fluoranthene	c, nv	11	>Csat	55	>Csat	3,200	>Csat	1,700	>Csat	49,000	>Csat
7440-41-7	Beryllium	c, nv	1,500		4,500		100,000		170,000		-	>Max
117-81-7	Bis(2-ethylhexyl)phthalate	c, nv	39		120		2,500	>Csat	1,300	>Csat	37,000	>Csat
75-27-4	Bromodichloromethane	c, v	3.4		10		230		230		6,300	>Csat
75-25-2	Bromoform	c, v	57		180		3,900	>Csat	2,700	>Csat	74,000	>Csat
74-83-9	Bromomethane	nc, v	46		160		11,000	>Csat	370		10,000	>Csat
7440-43-9	Cadmium	nc, nv	78		260		17,000		350		9,700	
56-23-5	Carbon tetrachloride	c, v	7.5		23		520		320		8,900	>Csat
108-90-7	Chlorobenzene	nc, v	530		1,800	>Csat	130,000	>Csat	4,700	>Csat	130,000	>Csat
124-48-1	Chlorodibromomethane (dibromochloromethane)	c, v	3.7		11		250		210		5,800	>Csat
75-00-3	Chloroethane (ethyl chloride)	nc, v	160,000	>Csat	540,000	>Csat	-	>Max	-	>Max	-	>Max
67-66-3	Chloroform	c, v	5.8		17		390		410		11,000	>Csat
74-87-3	Chloromethane	nc, v	1,400	>Csat	4,800	>Csat	380,000	>Csat	25,000	>Csat	700,000	>Csat
12789-03-6	Chlordane	c, v	1.7		5.4		110	>Csat	62	>Csat	1,700	>Csat
16065-83-1	Chromium (III)	nc, nv	120,000		390,000		-	>Max	530,000		-	>Max
18540-29-9	Chromium (VI)	c, nv	0.30		1.5		95		49		1,400	
218-01-9	Chrysene	c, nv	110	>Csat	550	>Csat	32,000	>Csat	17,000	>Csat	490,000	>Csat
7440-50-8	Copper	nc, nv	3,100		11,000		700,000		14,000		390,000	
74-90-8	Cyanide (hydrogen cyanide) ^	nc, v	14		47		2,500		110		3,000	
72-54-8	DDD (4,4'-Dichlorodiphenyldichloroethane)	c, nv	2.7		8.6		180		94		2,600	>Csat
72-55-9	DDE (4,4'-Dichlorodiphenyldichloroethene)	c, v	1.8		5.8		120		66		1,800	
50-29-3	DDT (4,4'-Dichlorodiphenyltrichloroethane)	c, nv	1.9		6.0		130		66		1,800	>Csat
53-70-3	Dibenz[a,h]anthracene	c, nv	0.11		0.55		32	>Csat	17	>Csat	490	>Csat
95-50-1	1,2-Dichlorobenzene	nc, v	2,200	>Csat	7,400	>Csat	550,000	>Csat	20,000	>Csat	560,000	>Csat
106-46-7	1,4-Dichlorobenzene	c, v	14		43		960	>Csat	1,300	>Csat	36,000	>Csat
91-94-1	3,3-Dichlorobenzidine	c, nv	1.2		3.9		77	>Csat	42	>Csat	1,200	>Csat
75-34-3	1,1-Dichloroethane	c, v	58		180		4,000	>Csat	3,200	>Csat	89,000	>Csat
75-35-4	1,1-Dichloroethene	nc, v	1,800	>Csat	5,900	>Csat	430,000	>Csat	13,000	>Csat	370,000	>Csat
156-59-2	cis-1,2-Dichloroethene	nc, v	160		530		35,000	>Csat	710		20,000	>Csat
156-60-5	trans-1,2-Dichloroethene	nc, v	1,600		5,300	>Csat	350,000	>Csat	7,100	>Csat	200,000	>Csat
111-44-4	Dichloroethylether	c, v	0.29		0.89		20		16		450	

Risk-Based Concentrations

Contaminated Medium			SOIL mg/Kg (ppm)									
Exposure Pathway			Soil Ingestion, Dermal Contact, and Inhalation RBC_{ss}									
Receptor Scenario			Residential		Urban Residential		Occupational		Construction Worker		Excavation Worker	
Direct or Indirect Pathway (see notes)			DCS		DCS		DCS		DCS		DCS	
CASn	Chemical	Note		Note		Note		Note		Note		Note
75-09-2	Dichloromethane	c, v	76		370		24,000	>Csat	12,000	>Csat	340,000	>Csat
94-75-7	2,4-Dichlorophenoxyacetic acid (2,4-D)	nc, nv	630	>Csat	2,100	>Csat	120,000	>Csat	2,700	>Csat	74,000	>Csat
60-57-1	Dieldrin	c, nv	0.034		0.11		2.2		1.2		33	>Csat
606-20-2	2,6-Dinitrotoluene	c, nv	0.36		1.2		23		13		350	
621-64-7	Di-N-propylnitrosamine (N-nitroso-di-N-propylamine)	c, nv	0.078		0.25		4.9		2.7		74	
123-91-1	1,4-Dioxane	c, v	5.4		17		370		210		5,900	
86-30-6	Diphenylnitrosamine	c, nv	110		350	>Csat	7,000	>Csat	3,800	>Csat	110,000	>Csat
106-93-4	EDB (1,2-dibromoethane)	c, v	0.16		0.49		11		9.0		250	
107-06-2	EDC (1,2-dichloroethane)	c, v	3.6		11		250		200		5,600	>Csat
115-29-7	Endosulfan (alpha-beta)	nc, v	380	>Csat	1,300	>Csat	74,000	>Csat	1,600	>Csat	45,000	>Csat
72-20-8	Endrin	nc, nv	19	>Csat	64	>Csat	3,700	>Csat	80	>Csat	2,200	>Csat
100-41-4	Ethylbenzene	c, v	34		100		2,300	>Csat	1,700	>Csat	49,000	>Csat
206-44-0	Fluoranthene	nc, nv	2,400	>Csat	8,000	>Csat	450,000	>Csat	10,000	>Csat	280,000	>Csat
86-73-7	Fluorene	nc, v	3,100	>Csat	11,000	>Csat	700,000	>Csat	14,000	>Csat	390,000	>Csat
50-00-0	Formaldehyde	c, v	15		43		960		1,600		44,000	>Csat
76-44-8	Heptachlor	c, v	0.11		0.34		6.8		4.0		110	
1024-57-3	Heptachlor Epoxide	c, v	0.055		0.18		3.5		2.0		56	
118-74-1	Hexachlorobenzene	c, v	0.21		0.63		14		11		320	
319-84-6	alpha-Hexachlorocyclohexane (alpha-HCH)	c, nv	0.086		0.28		5.5		3.0		83	>Csat
58-89-9	gamma-Hexachlorocyclohexane (Lindane)	c, nv	0.49		1.6		31		17		470	>Csat
67-72-1	Hexachloroethane	c, v	7.4		23		480	>Csat	370		10,000	>Csat
193-39-5	Indeno[1,2,3-cd]pyrene	c, nv	1.1	>Csat	5.5	>Csat	320	>Csat	170	>Csat	4,900	>Csat
7439-92-1	Lead	NA, nv	400	L	400	L	800	L	800	L	800	
7439-96-5	Manganese	nc, nv	1,800		6,100		380,000		8,200		230,000	
94-74-6	MCPA ((4-chloro-2-methylphenoxy)acetic acid)	nc, nv	32		110		6,200	>Csat	130		3,700	>Csat
7439-97-6	Mercury	nc, nv	23		79		5,300		110		2,900	
1634-04-4	MTBE (methyl t-butyl ether)	c, v	250		770		17,000	>Csat	12,000	>Csat	320,000	>Csat
91-20-3	Naphthalene	c, v	5.3		15		350	>Csat	580	>Csat	16,000	>Csat
7440-02-0	Nickel	c, nv	14,000		42,000		940,000		-	>Max	-	>Max
87-86-5	Pentachlorophenol	c, nv	1.0		3.2		60		34		960	
11097-69-1	Polychlorinated biphenyls (Total PCBs)	nc, v	1.2		4.0	>Csat	220	>Csat	4.9	>Csat	140	>Csat
98-82-8	iso-Propylbenzene (cumene)	nc, v	3,500	>Csat	12,000	>Csat	860,000	>Csat	27,000	>Csat	750,000	>Csat
129-00-0	Pyrene	nc, v	1,800	>Csat	6,000	>Csat	340,000	>Csat	7,500	>Csat	210,000	>Csat
7440-22-4	Silver	nc, nv	390		1,300		88,000		1,800		49,000	
100-42-5	Styrene	nc, v	7,900	>Csat	27,000	>Csat	-	>Max	56,000	>Csat	-	>Max
1746-01-6	2,3,7,8-TCDD (dioxin) equivalents	nc, v	0.000051		0.00017		0.011		0.00023		0.0063	
127-18-4	Tetrachloroethene (PCE)	c, v	220	>Csat	700	>Csat	15,000	>Csat	10,000	>Csat	280,000	>Csat
108-88-3	Toluene	nc, v	5,800	>Csat	20,000	>Csat	-	>Max	28,000	>Csat	770,000	>Csat
8001-35-2	Toxaphene	c, nv	0.49		1.6		31		17		470	
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	nc, v	400,000	>Csat	-	>Max	-	>Max	-	>Max	-	>Max
71-55-6	1,1,1-Trichloroethane	nc, v	53,000	>Csat	180,000	>Csat	-	>Max	470,000	>Csat	-	>Max
79-00-5	1,1,2-Trichloroethane	c, v	5.8		18		400		320		8,900	>Csat

Risk-Based Concentrations

Contaminated Medium →			SOIL mg/Kg (ppm)									
Exposure Pathway →			Soil Ingestion, Dermal Contact, and Inhalation RBC_{ss}									
Receptor Scenario →			Residential		Urban Residential		Occupational		Construction Worker		Excavation Worker	
Direct or Indirect Pathway (see notes)			DCS		DCS		DCS		DCS		DCS	
CASn	Chemical	Note		Note		Note		Note		Note		Note
79-01-6	Trichloroethene	NA, v	6.7		17		51		130		3,700	>Csat
75-69-4	Trichlorofluoromethane (Freon 11)	nc, v	7,600	>Csat	25,000	>Csat	-	>Max	69,000	>Csat	-	>Max
88-06-2	2,4,6-Trichlorophenol	c, nv	49		160		3,100		1,700		47,000	>Csat
95-63-6	1,2,4-Trimethylbenzene	nc, v	430		1,400	>Csat	100,000	>Csat	2,900	>Csat	81,000	>Csat
108-67-8	1,3,5-Trimethylbenzene	nc, v	430	>Csat	1,400	>Csat	100,000	>Csat	2,900	>Csat	81,000	>Csat
75-01-4	Vinyl chloride	c, v	0.36		1.3		67		34		950	>Csat
1330-20-7	Xylenes	nc, v	1,400	>Csat	4,900	>Csat	380,000	>Csat	20,000	>Csat	560,000	>Csat

Exposure Factors: Reasonable Maximum Exposure

Parameter (unit)	Symbol	Residential		Urban Residential		Occupational		Construction Worker		Excavation Worker	
			Note		Note		Note		Note		Note
ACCEPTABLE RISK LEVELS											
Acceptable Risk Level - Carcinogens	**ARLc**	1.00E-06	1	=		=		=		=	
Acceptable Risk Level - Noncarcinogens	**ARLn**	1	1	=		=		=		=	
EXPOSURE PARAMETERS											
Averaging Time - Carcinogen (yr)	**ATc**	70	3	=		=		=		=	
Averaging Time - Noncarcinogen (yr)	**ATn**	26	3	11	2	25	3	1	3	1	3
Averaging Time - Noncarcinogen, Child (yr)	**ATnc**	6	3	6	3	NA		NA		NA	
Body Weight - Adult (kg)	**BWa**	80	3	=		=		=		=	
Body Weight - Child (kg)	**BWc**	15	3	=		NA		NA		NA	
Exposure Duration - Adult (yr)	**ED**	26	3	30	4	2	3	1	21	1	6
Exposure Duration - Child (yr)	**EDc**	6	3	6	4	NA		NA		NA	
Exposure Frequency (day/yr)	**EF**	350	3	104	3c	208	6	250	6	9	6
Exposure Time (hr/day)	**ET**	24		24		8		8		8	
Event Frequency - Groundwater (events/day)	**EvF**	1	24	1	24	2	24	2	6	=	
Event Time - Groundwater (hr/event) (age adjusted)	**t_{event}**	0.67	25	0.62	25	2	24	2	6	=	
Soil Ingestion Rate - Adult (mg/day)	**IRS**	100	6	100	6	100	6	330	21	330	21
Soil Ingestion Rate - Child (mg/day)	**IRSc**	200	4	200	4	NA		NA		NA	
Water Ingestion Rate - Adult (L/day)	**IRW**	2.5	3a	2.5	3a	0.7	4a	NA		NA	
Water Ingestion Rate - Child (L/day)	**IRWc**	0.78	3b	=		NA		NA		NA	
Skin Surface Area - Adult to Soil (cm^2)	**SA**	6032	4	6032	4	3527	4	3527	4	3527	4
Skin Surface Area - Child to Soil (cm^2)	**SAc**	2373	3	=		NA		NA		NA	
Skin Surface Area - Adult to Groundwater (cm^2)	**SAw**	20900	3	20900	3	3527	3	6032	4	6032	4
Skin Surface Area - Child to Groundwater (cm^2)	**SAwc**	6378	3	6378	3	NA		NA		NA	
Soil to Skin Adherence Factor - Adult (mg/cm^2-day)	**AF**	0.07	5a	0.07	5a	0.12	5b	0.30	5c	0.30	5c
Soil to Skin Adherence Factor - Child (mg/cm^2-day)	**AFc**	0.20	5d	=		NA		NA		NA	
AGE-ADJUSTED EXPOSURE FACTORS											
Ingestion Factor - Soil (mg-yr/kg-d)	**IFSadj**	105	7	110	7a	NA		NA		NA	
Ingestion Factor - Water (L-yr/kg-d)	**IFWadj**	0.94	7	1.06	7a	NA		NA		NA	
Surface Area Tapwater-age adjusted (cm2-yr/kg)	**SAwadj**	6174	7	8821	7	NA		NA		NA	
Surface Area Factor - Skin (mg-yr/kg-d)	**SFSadj**	295	7	317	7a	NA		NA		NA	

SITE PARAMETERS											
Soil Bulk Density (g/cm^3)	ρ_b	1.70	8	=		=		=		=	
Soil Particle Density (g/cm^3)	ρ_s	2.74	9	=		=		=		=	
Soil Porosity	n	0.38	8	=		=		=		=	
Air Content - Vadose Zone Soils	n_a	0.26	10	=		=		=		=	
Air Content - Cap. Fringe Soils	n_{acap}	0.038	10	=		=		=		=	
Air Content - Foundation Cracks	n_{acrk}	0.26	10	=		=		=		=	
Water Content - Vadose Zone Soils	n_w	0.12	8	=		=		=		=	
Water Content - Cap. Fringe Soils	n_{wcap}	0.342	8	=		=		=		=	
Water Content - Foundation Cracks	n_{wcrk}	0.12	11	=		=		=		=	
Vadose Zone Thickness (cm)	L_v	295	12	=		=		=		=	
Capillary Fringe Thickness (cm)	L_{cap}	5.00	8	=		=		=		=	
Fraction Organic Carbon (shallow soil)	f_{oc}	0.005	8a	=		=		=		=	
Depth to Groundwater (cm)	L_w	300	8	=		=		=		=	
Groundwater Dilution-Attenuation Factor	**DAF**	60	19	=		=		=		=	
SOIL CONTAMINATION PARAMETERS											
Thickness of Contaminated Surface Soils (cm)	L_{ss}	100	8	=		=		=		=	
Fraction of Site with Surface Soil Contamination	f_{ss}	0.50	16	=		=		=		=	
Thickness of Clean Surface Soils (cm)	L_c	100	8	=		=		=		=	
Thickness of Subsurface Contamination (cm)	L_s	200	8	=		=		=		=	
Soil Gas Attenuation Factor for Chlorinated Hydrocarbons	AF_{ch}	200	23	200	23	1000	23	NA		NA	
Soil Gas Attenuation Factor for Petroleum Hydrocarbons	AF_{ph}	200	23	200	23	1000	23	NA		NA	
Fraction of Site with Subsurface Vol. To Outdoor Air	f_{so}	0.50	17	=		=		=		=	
Thickness of Clean Soils Under Building (cm)	L_{cb}	100	8	=		=		=		=	
Thickness of Contaminated Soils Under Building (cm)	L_{sb}	200	8	=		=		=		=	
Fraction of Contaminated Soils Under Building	f_{sb}	0.50	18	=		=		=		=	
Particulate Emission Factor for Soils (kg/m^3)	**PEF**	7.58E-10	13	=		=		=		=	
BUILDING PARAMETERS											
Building Air Exchange Rate (1/day)	**ER**	24	14	=		48	14	NA		NA	
Building Height (indoor air mixing zone) (cm)	L_B	200	8	=		300	8	NA		NA	
Foundation Wall Thickness (cm)	L_{crk}	15	8	=		=		NA		NA	
Foundation Crack Fraction	f_{crk}	0.0010	15	=		=		NA		NA	
VOLATILIZATION FACTORS											
Averaging time for Volatilization -Adults (yr)	t_{vol}	25	16	=		=		=		=	
Averaging time for Volatilization -Children (yr)	t_{volc}	6	16	=		NA		NA		NA	
Max. Soil to Building Vol. Factor (kg/m^3)	$VF_{si}max$	3.88E-03	18	3.88E-03	18	1.29E-03	18	NA		NA	
Max. <u>Surface</u> Soil Vol. Factor - Adult (kg/m^3)	$VF_{ss}max$	1.57E-05	16	1.57E-05	16	1.57E-05	16	1.57E-05	16	1.57E-05	16
Max. <u>Surface</u> Soil Vol. Factor - Child (kg/m^3)	$VF_{ss}max$	6.53E-05	16	=		NA		NA		NA	
Max. Soil to Outdoor Air Vol. Factor - Adult (kg/m^3)	$VF_{so}max$	3.13E-05	17	3.13E-05	17	3.13E-05	17	NA		NA	
Volatile Organics Dispersion Term (g/m^2-s per kg/m^3)	**Q/C**	6.88E+01	13	=		=		=		=	
MISCELLANEOUS PARAMETERS											
Ideal Gas Law Constant (m^3-atm/K-mol)	**R**	8.21E-05	20	=		=		=		=	
Absolute Temperature (K)	**T**	2.93E+02	20	=		=		=		=	

Additional Information for Early Life-Stage Factor Calculations

Early Life-Stage Factors - Residential	Symbol	0 - 2 Years		3 - 6 Years		7 - 16 Years		17 - 26 Years		Total	
(See Note 22)			Note		Note		Note		Note		Note
Exposure Duration (yr)	ED	2		4		10		10		26	
Body Weight (kg)	BW	15		15		80		80		NA	
Soil Ingestion Rate (mg/day)	IRs	200		200		100		100		NA	
Air Inhalation Rate (m^3/day)	IRa	10		10		20		20		NA	
Water Ingestion Rate (L/day) -adults	IRw	0.78		0.78		2.5		2.5		NA	
Age-dependent Adjustment Factor	ADAF	10		3		3		1		NA	
Soil to Skin Adherence Factor (mg/cm^2)	AF	0.2		0.2		0.07		0.07		NA	
Skin Surface Area - Adult to Soil (cm^2)	SA	2690		2690		6032		6032		NA	
Skin Surface Area - to tapwater (cm2)	SAtw	6378		6378		20900		20900		NA	
Adjusted Exposure Duration (yr)	EDadj	20		12		30		10		72	
Ingestion Factor - Soil (mg-yr/kg-d)	IFSadj	267		160		38		13		477	
Ingestion Factor - Water (L-yr/kg-d)	IFWadj	1		1		1		0		3	
Surface Area Factor - Skin (mg-yr/kg-d)	SFSadj	717		430		158		53		1359	
Surface Area Tapwater-age adjusted (cm2-yr/kg)	Sawr_adj	8504		5102		7838		2613		24056	

Early Life-Stage Factors - Urban Residential	Symbol	0 - 2 Years		3 - 6 Years		7 - 16 Years		17 - 26 Years		Total	
(See Note 22)			Note		Note		Note		Note		Note
Exposure Duration (yr)	ED	1		4		1		24		30	
Adjusted Exposure Duration (yr)	EDadj	10		12		3		24		49	
Ingestion Factor - Soil (mg-yr/kg-d)	IFSadj	133		160		3.75		30		327	
Ingestion Factor - Water (L-yr/kg-d)	IFWadj	0.52		0.624		0.09375		0.75		2	
Surface Area Tapwater-age adjusted (cm2-yr/kg)	Sawu_adj	4252		5102		783.75		6270		16408	
Surface Area Factor - Skin (mg-yr/kg-d)	SFSadj	359		430		16		127		932	

Early Life-Stage Factors - Vinyl Chloride Residential	Symbol	0 - 6 Years		0 - 6 Years		7 - 30 Years		7 - 70 Years		Total	
(See Note 22)			Note		Note		Note		Note		Note
Exposure Duration (yr)	ED	6		6		24		64		100	
Adjusted Exposure Duration (yr)	EDadj	6		6		24		64		100	
Ingestion Factor - Soil (mg-yr/kg-d)	IFSadj	80		80		30		80		270	
Ingestion Factor - Water (L-yr/kg-d)	IFWadj	0.3		0.3		0.8		2.0		3.4	
Surface Area Factor - Skin (mg-yr/kg-d)	SFSadj	190		190		127		338		844	

Early Life-Stage Factors - Vinyl Chloride Urban Residential	Symbol	0 - 6 Years		0 - 6 Years		7 - 11 Years		7 - 70 Years		Total	
(See Note 22)			Note		Note		Note		Note		Note
Exposure Duration (yr)	ED	6		6		5		64		81	
Adjusted Exposure Duration (yr)	EDadj	6		6		5		64		81	
Ingestion Factor - Soil (mg-yr/kg-d)	IFSadj	80		80		6.3		80		246	
Ingestion Factor - Water (L-yr/kg-d)	IFWadj	0.3		0.3		0.2		2.0		2.8	
Surface Area Factor - Skin (mg-yr/kg-d)	SFSadj	190		190		26		338		744	

For explanation of notes, please see "Notes to Accompany Risk-Based Concentrations for Individual Chemicals."

Toxicological Data

Chemical	Risk Type	Early Life	Breast Feeding	Organics Predictive Domain	SF_o $(mg/Kg\text{-}day)^{-1}$	Note	SF_i $(mg/Kg\text{-}day)^{-1}$	Note 1	iUR $(ug/m^3)^{-1}$	Note	Chronic RfD_o (mg/Kg-day)	Note	Chronic RfD_i (mg/Kg-day)	Note 2	Chronic RfCi (mg/m^3)	Note	Subchronic RfD_o (mg/Kg-day)	Note	Subchronic RfD_i (mg/Kg-day)	Note 2	Subchronic RfCi (mg/m^3)	Note	RAF_d	K_p (cm/hr)	τ (hr)	t* (hr)	B	Note
																							Note 5	Note 6	Note 6	Note 6	Note 6	
Acenaphthene	nc	n	n	in	NA		NA		NA		0.06	3	NA		NA		NA	10	NA		NA		0.00E+00	8.60E-02	7.68E-01	1.84E+00	4.11E-01	6
Acrylonitrile	c	n	n	in	0.54	3	2.38E-01		0.000068	3	0.04	3	5.71E-04		0.002	3	NA	10	NA		NA		0.00E+00	1.16E-03	2.08E-01	5.00E-01	3.25E-03	6
Aldrin	c	n	n	out	17	3	1.72E+01		0.0049	3	0.00003	3	NA		NA		0.00004	10	NA		NA		1.00E-01	2.93E-01	1.16E+01	4.77E+01	2.15E+00	6
Anthracene	nc	n	n	in	NA		NA		NA		0.3	3	NA		NA		1	10	NA		NA		0.00E+00	1.42E-01	1.05E+00	4.05E+00	7.29E-01	6
Arsenic	nc	n	n	in	1.5	3	1.51E+01		0.0043	3	0.0003	3	4.29E-06		0.000015	3	0.005	10	NA		NA		3.00E-02	1.00E-03	2.76E-01	6.63E-01	3.33E-03	6
Barium	nc	n	n	in	NA		NA		NA		0.2	3	1.43E-04		0.0005	3	NA	10	1.43E-03		0.005	10	1.00E-03	1.00E-03	6.18E-01	1.48E+00	4.51E-03	6
Benz[a]anthracene	c	y	n	out	0.1	3	2.10E-01		6.00E-05	3	NA		NA		NA		NA		NA		NA		1.30E-01	5.52E-01	2.00E+00	8.48E+00	3.21E+00	6
Benzene	c	n	n	in	0.055	3	2.73E-02		0.0000078	3	0.004	3	8.57E-03		0.03	3	0.01	10	2.29E-02		0.08	10	0.00E+00	1.49E-02	2.88E-01	6.91E-01	5.06E-02	6
Benzidine	c	y	n	in	230	3	2.35E+02		0.067	3	0.003	3	NA		NA		0.003	10	NA		NA		1.00E-01	1.13E-03	1.13E+00	2.72E+00	5.90E-03	6
Benzo[a]pyrene (BaP equivalents)	nc	y	n	out	1	3	2.10E+00		0.0006	3	0.0003		5.71E-07		0.000002		NA		NA		NA		1.30E-01	7.13E-01	2.72E+00	1.18E+01	4.36E+00	6
Benzo[b]fluoranthene	c	y	n	out	0.1	3	2.10E-01		6.00E-05	3	NA		NA		NA		NA		NA		NA		1.30E-01	4.17E-01	2.72E+00	1.13E+01	2.55E+00	6
Benzo[k]fluoranthene	c	y	n	out	0.01	3	2.10E-02		6.00E-06	3	NA		NA		NA		NA		NA		NA		1.30E-01	6.91E-01	2.72E+00	1.18E+01	4.22E+00	6
Beryllium	c	n	n	in	NA		8.40E+00		0.0024	3	0.002	3	5.71E-06		0.00002	3	0.005	10	NA		NA		1.00E-03	1.00E-03	1.18E-01	2.83E-01	1.15E-03	6
Bis(2-ethylhexyl)phthalate	c	n	n	out	0.014	3	8.40E-03		0.0000024	3	0.02	3	NA		NA		NA		NA		NA		1.00E-01	1.13E+00	1.62E+01	7.29E+01	8.59E+00	6
Bromodichloromethane	c	n	n	in	0.062	3	1.30E-01		0.000037	3	0.02	3	NA		NA		NA	10	5.71E-03		0.02	10	0.00E+00	4.02E-03	8.70E-01	2.09E+00	1.98E-02	6
Bromoform	c	n	n	in	0.0079	3	3.85E-03		0.0000011	3	0.02	3	NA		NA		0.03	10	NA		NA		0.00E+00	2.35E-03	2.74E+00	6.57E+00	1.44E-02	6
Bromomethane	nc	n	n	in	NA		NA		NA		0.0014	3	1.43E-03		0.005	3	0.005	10	2.86E-02		0.1	10	0.00E+00	2.84E-03	3.58E-01	8.58E-01	1.06E-02	6
Cadmium	nc	n	n	in	NA		6.30E+00		0.0018	3	1.00E-03	12	2.86E-06		1.00E-05	3	NA		2.57E-04		0.0009	10	1.00E-03	1.00E-03	4.48E-01	1.08E+00	4.08E-03	6
Carbon tetrachloride	c	n	n	in	0.07	3	2.10E-02		0.000006	3	0.004	3	2.86E-02		0.1	3	0.007	10	NA		NA	10	0.00E+00	1.63E-02	7.64E-01	1.83E+00	7.78E-02	6
Chlorobenzene	nc	n	n	in	NA		NA		NA		0.02	3	1.43E-02		0.05	3	0.07	10	1.43E-01		0.5	10	0.00E+00	2.82E-02	4.49E-01	1.08E+00	1.15E-01	6
Chlorodibromomethane (dibromochloromethane)	c	n	n	in	0.084	3	9.45E-02		0.000027	3	0.02	3	NA		NA		NA		NA		NA		0.00E+00	2.89E-03	1.54E+00	3.70E+00	1.60E-02	6
Chloroethane (ethyl chloride)	nc	n	n	in	NA		NA		NA		NA		2.86E+00		10	3	0.1	10	NA		NA	10	0.00E+00	6.07E-03	2.42E-01	5.80E-01	1.88E-02	6
Chloroform	c	n	n	in	0.031	3	8.05E-02		0.000023	3	0.01	3	2.80E-02		0.098	3	0.01	10	NA		NA		0.00E+00	6.83E-03	4.90E-01	1.18E+00	2.87E-02	6
Chloromethane	nc	n	n	in	NA	3	NA		NA	3	NA		2.57E-02		0.09	3	NA		NA		NA	10	0.00E+00	3.28E-03	2.02E-01	4.84E-01	8.96E-03	6
Chlordane	c	n	n	out	0.35	3	3.50E-01		0.0001	3	0.0005	3	2.00E-04		0.0007	3	NA	10	NA		NA		4.00E-02	1.07E-01	2.07E+01	7.97E+01	8.33E-01	6
Chromium (III)	nc	n	n	in	NA		NA		NA		1.5	3	NA		NA		1.5	10	NA		NA		1.00E-03	1.00E-03	2.06E-01	4.93E-01	2.77E-03	6
Chromium (VI)	c	y	n	in	0.5	3	2.94E+02		0.084	3	0.003	3	2.86E-05		0.0001	3	0.02	10	NA		NA		1.00E-03	2.00E-03	2.06E-01	4.93E-01	5.55E-03	6
Chrysene	c	y	n	out	0.001	3	2.10E-03		6.00E-07	3	NA		NA		NA		NA		NA		NA		1.30E-01	5.96E-01	2.00E+00	8.53E+00	3.46E+00	6
Copper	nc	n	n	in	NA		NA		NA		0.04	3	NA		NA		0.04	10	NA		NA		1.00E-03	1.00E-03	2.39E-01	5.73E-01	3.07E-03	6
Cyanide (hydrogen cyanide) ^	nc	n	n	in	NA		NA		NA		0.0006	3	2.29E-04		0.0008	3	NA		NA		NA		1.00E-03	1.00E-03	1.49E-01	3.58E-01	2.00E-03	6
DDD (4,4'-Dichlorodiphenyldichloroethane)	c	n	n	in	0.24	3	2.42E-01		0.000069	3	0.00003		NA		NA		NA		NA		NA		3.00E-02	2.51E-01	6.52E+00	2.62E+01	1.73E+00	6
DDE (4,4'-Dichlorodiphenyldichloroethene)	c	n	n	out	0.34	3	3.40E-01		0.000097	3	0.0003		NA		NA		NA		NA		NA		3.00E-02	5.45E-01	6.35E+00	2.73E+01	3.74E+00	6
DDT (4,4'-Dichlorodiphenyltrichloroethane)	c	n	n	out	0.34	3	3.40E-01		0.000097	3	0.0005	3	NA		NA		0.0005	10	NA		NA		3.00E-02	6.28E-01	1.02E+01	4.43E+01	4.55E+00	6
Dibenz[a,h]anthracene	c	y	n	out	1	3	2.10E+00		6.00E-04	3	NA		NA		NA		NA		NA		NA		1.30E-01	9.53E-01	3.81E+00	1.69E+01	6.12E+00	6
1,2-Dichlorobenzene	nc	n	n	in	NA		NA		NA		0.09	3	5.71E-02		0.2	3	NA	10	5.71E-01		2	10	0.00E+00	4.46E-02	7.00E-01	1.68E+00	2.08E-01	6
1,4-Dichlorobenzene	c	n	n	in	0.0054	3	3.85E-02		0.000011	3	0.07	3	2.29E-01		0.8	3	NA		7.14E-01		2.5	10	0.00E+00	4.53E-02	7.00E-01	1.68E+00	2.11E-01	6
3,3-Dichlorobenzidine	c	n	n	In	0.45	3	1.19E+00		0.00034	3	NA		NA		NA		NA		NA		NA		1.00E-01	1.28E-02	2.75E+00	6.60E+00	7.83E-02	6
1,1-Dichloroethane	c	n	n	in	0.0057	3	5.60E-03		0.0000016	3	0.2	3	NA		NA		2	10	1.43E+00		5	10	0.00E+00	6.75E-03	3.77E-01	9.04E-01	2.58E-02	6
1,1-Dichloroethene	nc	n	n	in	NA		NA		NA		0.05	3	5.71E-02		0.2	3	0.009	10	NA		NA		0.00E+00	1.17E-02	3.67E-01	8.81E-01	4.43E-02	6
cis-1,2-Dichloroethene	nc	n	n	in	NA		NA		NA		0.002	3	NA		NA		0.02	10	NA		NA		0.00E+00	1.10E-02	3.67E-01	8.81E-01	4.17E-02	6
trans-1,2-Dichloroethene	nc	n	n	in	NA		NA		NA		0.02	3	NA		NA	3	0.2	10	NA		NA		0.00E+00	1.10E-02	3.67E-01	8.81E-01	4.17E-02	6
Dichloroethylether	c	n	n	in	1.1	3	1.16E+00		0.00033	3	NA		NA		NA		NA		NA		NA		0.00E+00	1.78E-03	6.65E-01	1.60E+00	8.19E-03	6
Dichloromethane	c	y	n	in	2.00E-03	3	3.50E-05		1.00E-08	3	6.00E-03	3	1.71E-01		6.00E-01	3	0.06	10	8.57E-01		3	10	0.00E+00	3.54E-03	3.14E-01	7.55E-01	1.25E-02	6
2,4-Dichlorophenoxyacetic acid (2,4-D)	nc	n	n	in	NA		NA		NA		0.01	3	NA		NA		0.01	10	NA		NA		1.00E-01	6.64E-03	1.82E+00	4.36E+00	3.80E-02	6
Dieldrin	c	n	n	in	16	3	1.61E+01		0.0046	3	0.00005	3	NA		NA		0.00005	10	NA		NA		1.00E-01	3.26E-02	1.43E+01	3.43E+01	2.45E-01	6
2,6-Dinitrotoluene	c	n	n	in	1.50E+00		NA		NA		3.00E-04	3	NA		NA		0.01	10	NA		NA		1.00E-01	3.70E-03	1.10E+00	2.64E+00	1.92E-02	6
Di-N-propylnitrosamine (N-nitroso-di-N-propylamine	c	n	n	in	7	3	7.00E+00		0.002	3	NA		NA		NA		NA		NA		NA		1.00E-01	2.30E-03	5.70E-01	1.37E+00	0.00E+00	6
1,4-Dioxane	c	n	n	in	0.1	3	1.75E-02		5.00E-06	3	0.03	3	8.57E-03		3.00E-02	3	NA		NA		NA		3.00E-02	3.32E-04	3.28E-01	7.86E-01	1.20E-03	6
Diphenylnitrosamine	c	n	n	in	0.0049	3	9.10E-03		0.0000026	3	NA		NA		NA		NA		NA		NA		1.00E-01	1.45E-02	1.35E+00	3.25E+00	7.85E-02	6
EDB (1,2-dibromoethane)	c	n	n	in	2	3	2.10E+00		0.0006	3	0.009	3	2.57E-03		0.009	3	NA		NA		NA	10	0.00E+00	2.78E-03	1.19E+00	2.84E+00	1.47E-02	6
EDC (1,2-dichloroethane)	c	n	n	in	0.091	3	9.10E-02		2.60E-05	3	6.00E-03	3	2.00E-03		7.00E-03	3	0.02	10	NA		NA	10	0.00E+00	4.20E-03	3.77E-01	9.04E-01	1.61E-02	6
Endosulfan (alpha-beta)	nc	n	n	in	NA		NA		NA		0.006	3	NA		NA		0.006	10	NA		NA		1.00E-01	2.86E-03	2.00E+01	4.80E+01	2.22E-02	6
Endrin	nc	n	n	in	NA		NA		NA		0.0003	3	NA		NA		0.0003	10	NA		NA		1.00E-01	3.26E-02	1.43E+01	3.43E+01	2.45E-01	6
Ethylbenzene	c	n	n	in	0.011	3	8.75E-03		0.0000025	3	0.1	3	2.86E-01		1		NA	10	2.57E+00		9	10	0.00E+00	4.93E-02	4.13E-01	9.92E-01	1.95E-01	6
Fluoranthene	nc	n	n	out	NA		NA		NA		0.04	3	NA		NA		0.4	10	NA		NA		1.30E-01	3.08E-01	1.43E+00	5.73E+00	1.68E+00	6
Fluorene	nc	n	n	in	NA		NA		NA		0.04	3	NA		NA		0.4	10	NA		NA		0.00E+00	1.10E-01	8.97E-01	2.15E+00	5.45E-01	6
Formaldehyde	c	n	n	in	NA		4.55E-02		0.000013	3	0.2	3	2.80E-03		0.0098	3	0.2	10	NA		NA		0.00E+00	1.82E-03	1.55E-01	3.72E-01	3.84E-03	6
Heptachlor	c	n	n	in	4.5	3	4.55E+00		0.0013	3	0.0005	3	NA		NA		0.0005	10	NA		NA		1.00E-01	1.43E-01	1.30E+01	5.01E+01	1.06E+00	6
Heptachlor Epoxide	c	n	n	in	9.1	3	9.10E+00		0.0026	3	0.000013	3	NA		NA		0.000013	10	NA		NA		1.00E-01	2.09E-02	1.59E+01	3.82E+01	1.59E-01	6
Hexachlorobenzene	c	n	n	out	1.6	3	1.61E+00		0.00046	3	0.0008	3	NA		NA		NA	10	NA		NA		0.00E+00	2.54E-01	4.14E+00	1.66E+01	1.65E+00	6
alpha-Hexachlorocyclohexane (alpha-HCH)	c	n	n	in	6.3	3	6.30E+00		0.0018	3	0.008	3	NA		NA		NA		NA		NA		1.00E-01	2.06E-02	4.47E+00	1.07E+01	1.35E-01	6
gamma-Hexachlorocyclohexane (Lindane)	c	n	n	in	1.1	3	1.09E+00		0.00031	3	0.0003	3	NA		NA		0.003	10	NA		NA		1.00E-01	2.06E-02	4.47E+00	1.07E+01	1.35E-01	6

Toxicological Data

Chemical	Risk Type	Early Life	Breast Feeding	Organics Predictive Domain	SF_o (mg/Kg-day)$^{-1}$	Note	SF_i (mg/Kg-day)$^{-1}$	Note 1	iUR (ug/m^3)$^{-1}$	Note	Chronic RfD_o (mg/Kg-day)	Note	Chronic RfD_i (mg/Kg-day)	Note 2	Chronic RfCi (mg/m^3)	Note	Subchronic RfD_o (mg/Kg-day)	Note	Subchronic RfD_i (mg/Kg-day)	Note 2	Subchronic RfCi (mg/m^3)	Note	RAF_d	K_p (cm/hr)	τ (hr)	t* (hr)	B	Note
																							Note 5	Note 6	Note 6	Note 6	Note 6	
Hexachloroethane	c	n	n	in	4.00E-02	3	3.85E-02		1.10E-05	3	7.00E-04	3	8.57E-03		3.00E-02		0.01	10	NA		NA		1.00E-01	4.15E-02	2.23E+00	5.34E+00	2.46E-01	6
Indeno[1,2,3-cd]pyrene	c	y	n	out	0.1	3	2.10E-01		6.00E-05	3	NA		NA		NA		NA		NA		NA		1.30E-01	1.24E+00	3.71E+00	1.67E+01	7.93E+00	6
Lead	NA	NA	n	in	NA	9	NA		NA	9	NA	9	NA		NA	9	NA		NA		NA		NA	1.00E-04	1.52E+00	3.65E+00	5.54E-04	6
Manganese	nc	n	n	in	NA		NA		NA		2.40E-02	11	1.43E-05		0.00005	3	NA		NA		NA		1.00E-03	1.00E-03	2.14E-01	5.13E-01	2.85E-03	6
MCPA ((4-chloro-2-methylphenoxy)acetic acid)	nc	n	n	in	NA		NA		NA		0.0005	3	NA		NA		0.0005	10	NA		NA		1.00E-01	1.69E-02	1.40E+00	3.35E+00	9.21E-02	6
Mercury	nc	n	n	in	NA		NA		NA		3.00E-04	3	8.57E-05		3.00E-04	3	NA	10	NA		NA		0.00E+00	1.00E-03	1.40E+00	3.35E+00	5.45E-03	6
MTBE (methyl t-butyl ether)	c	n	n	in	0.0018	3	9.10E-04		2.6E-07	3	NA		8.57E-01		3	3	NA		NA		NA		0.00E+00	2.11E-03	3.28E-01	7.87E-01	7.62E-03	6
Naphthalene	c	n	n	in	NA		1.19E-01		0.000034	3	0.02	3	8.57E-04		0.003	3	NA		NA		NA		0.00E+00	4.66E-02	5.49E-01	1.32E+00	2.03E-01	6
Nickel	c	n	n	in	NA		9.10E-01		0.00026	3	0.02	3	2.57E-05		0.00009	3	0.02	10	NA		NA		1.00E-03	2.00E-04	2.24E-01	5.38E-01	5.89E-04	6
Pentachlorophenol	c	n	n	in	0.4	3	1.79E-02		0.0000051	3	0.005	3	NA		NA		0.03	10	NA		NA		2.50E-01	1.27E-01	3.26E+00	1.25E+01	7.97E-01	6
Polychlorinated biphenyls (Total PCBs)	nc	n	n	out	2	3	2.00E+00		0.00057	3	0.00002	3	NA		NA		0.00005	10	NA		NA		1.40E-01	7.51E-01	7.08E+00	3.11E+01	5.22E+00	6
iso-Propylbenzene (cumene)	nc	n	n	in	NA		NA		NA		0.1	3	1.14E-01		0.4	3	0.4	10	NA		NA	10	0.00E+00	8.97E-02	4.95E-01	1.19E+00	3.78E-01	6
Pyrene	nc	n	n	in	NA		NA		NA		0.03	3	NA		NA		0.3	10	NA		NA		1.30E-01	2.01E-01	1.43E+00	5.54E+00	1.10E+00	6
Silver	nc	n	n	in	NA		NA		NA		0.005	3	NA		NA		0.005	10	NA		NA		0.00E+00	6.00E-04	4.23E-01	1.01E+00	2.40E-03	6
Styrene	nc	n	n	in	NA		NA		NA		0.2	3	2.86E-01		1.0	3	NA		8.57E-01		3	10	0.00E+00	3.72E-02	4.03E-01	9.67E-01	1.46E-01	6
2,3,7,8-TCDD (dioxin) equivalents	nc	n	n	out	130000	3	1.33E+05		38	3	7.00E-10	3	1.14E-08		4E-08	3	NA		NA		NA		3.00E-02	8.08E-01	6.68E+00	2.95E+01	5.58E+00	6
Tetrachloroethene (PCE)	c	n	n	in	2.10E-03	14	9.10E-04		2.60E-07	3	0.006	3	1.14E-02		0.04	3	0.1	10	NA		NA		0.00E+00	3.34E-02	8.92E-01	2.14E+00	1.65E-01	6
Toluene	nc	n	n	in	NA		NA		NA		0.08	3	1.43E+00		5	3	0.8	10	1.43E+00		5	10	0.00E+00	3.11E-02	3.45E-01	8.28E-01	1.15E-01	6
Toxaphene	c	n	n	in	1.1	3	1.12E+00		0.00032	3	NA		NA		NA		NA		NA		NA		1.00E-01	5.18E-02	2.18E+01	5.24E+01	4.05E-01	6
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	nc	n	n	in	NA		NA		NA		30	3	8.57E+00		30	3	NA	10	8.57E+00		30	10	0.00E+00	1.75E-02	1.18E+00	2.83E+00	9.21E-02	6
1,1,1-Trichloroethane	nc	n	n	in	NA		NA		NA		2	3	1.43E+00		5	3	7	10	1.43E+00		5	10	0.00E+00	1.26E-02	5.87E-01	1.41E+00	5.60E-02	6
1,1,2-Trichloroethane	c	n	n	in	0.057	3	5.60E-02		0.000016	3	0.004	3	5.71E-05		0.0002	3	NA	10	NA		NA		0.00E+00	5.04E-03	5.87E-01	1.41E+00	2.24E-02	6
Trichloroethene	NA	n	n	in	0.046	4	1.44E-02		4.10E-06	4	0.0005	3	5.71E-04		0.002	4	NA		NA		NA		0.00E+00	1.16E-02	5.72E-01	1.37E+00	5.11E-02	6
Trichlorofluoromethane (Freon 11)	nc	n	n	in	NA		NA		NA		0.3	3	2.00E-01		0.7	3	0.7	10	2.86E-01		1	10	0.00E+00	1.27E-02	6.18E-01	1.48E+00	5.73E-02	6
2,4,6-Trichlorophenol	c	n	n	in	0.011	3	1.09E-02		0.0000031	3	0.001	3	NA		NA		NA		NA		NA		1.00E-01	3.46E-02	1.34E+00	3.22E+00	1.87E-01	6
1,2,4-Trimethylbenzene	nc	n	n	in	NA		NA		NA		0.01		1.71E-02		0.06	3	NA		NA		NA	10	0.00E+00	8.57E-02	4.95E-01	1.19E+00	3.61E-01	6
1,3,5-Trimethylbenzene	nc	n	n	in	NA		NA		NA		0.01	3	1.71E-02		0.06	3	0.1	10	NA		NA	10	0.00E+00	6.21E-02	4.95E-01	1.19E+00	2.62E-01	6
Vinyl chloride	c	vc	n	in	0.72	3	1.54E-02		0.0000044	3	0.003	3	2.86E-02		0.1	3	NA		NA		NA		0.00E+00	8.38E-03	2.35E-01	5.65E-01	2.55E-02	6
Xylenes	nc	n	n	in	NA		NA		NA		0.2	3	2.86E-02		0.1	3	0.4	10	1.14E-01		0.4	10	0.00E+00	5.00E-02	4.13E-01	9.92E-01	1.98E-01	6

For explanation of notes, please see "Notes to Accompany Risk-Based Concentrations for Individual Chemicals."

Human Health RBC Calculations - Cancer Endpoints

Risk-Based Concentrations

Contaminated Medium			SOIL mg/Kg (ppm)									
Exposure Pathway			Soil Ingestion, Dermal Contact, and Inhalation RBC_{ss}									
Receptor Scenario			Residential		Recreational Trespass		Transient		Const Worker		Excavation Worker	
Direct or Indirect Pathway (see notes)			DCS		DCS		DCS		DCS		DCS	
CASn	Chemical	Note		Note		Note		Note		Note		Note
83-32-9	Acenaphthene	nc, v	4,700	>Csat	16,000	>Csat	-	>Max	21,000	>Csat	590,000	>Csat
107-13-1	Acrylonitrile	c, v	0.86		2.7		60		40		1,100	
309-00-2	Aldrin	c, v	0.031		0.098		2.0		1.1		30	>Csat
120-12-7	Anthracene	nc, v	23,000	>Csat	79,000	>Csat	-	>Max	110,000	>Csat	-	>Max
7440-38-2	Arsenic	c, nv	0.43		1.4		29		15		420	
7440-39-3	Barium	nc, nv	15,000		51,000		-	>Max	69,000		-	>Max
56-55-3	Benz[a]anthracene	c, v	1.1		5.4		310	>Csat	170	>Csat	4,800	>Csat
71-43-2	Benzene	c, v	8.2		25		560		380		11,000	>Csat
92-87-5	Benzidine	c, nv	0.00052		0.0025		0.15		0.082		2.3	
50-32-8	Benzo[a]pyrene (BaP equivalents)	c, nv	0.11		0.55		32	>Csat	17	>Csat	490	>Csat
205-99-2	Benzo[b]fluoranthene	c, nv	1.1		5.5		320	>Csat	170	>Csat	4,900	>Csat
207-08-9	Benzo[k]fluoranthene	c, nv	11	>Csat	55	>Csat	3,200	>Csat	1,700	>Csat	49,000	>Csat
7440-41-7	Beryllium	c, nv	1,500		4,500		100,000		170,000		-	>Max
117-81-7	Bis(2-ethylhexyl)phthalate	c, nv	39		120		2,500	>Csat	1,300	>Csat	37,000	>Csat
75-27-4	Bromodichloromethane	c, v	3.4		10		230		230		6,300	>Csat
75-25-2	Bromoform	c, v	57		180		3,900	>Csat	2,700	>Csat	74,000	>Csat
74-83-9	Bromomethane	nc, v	46		160		11,000	>Csat	370		10,000	>Csat
7440-43-9	Cadmium	nc, nv	78		260		17,000		350		9,700	
56-23-5	Carbon tetrachloride	c, v	7.5		23		520		320		8,900	>Csat
108-90-7	Chlorobenzene	nc, v	530		1,800	>Csat	130,000	>Csat	4,700	>Csat	130,000	>Csat
124-48-1	Chlorodibromomethane (dibromochloromethane)	c, v	3.7		11		250		210		5,800	>Csat
75-00-3	Chloroethane (ethyl chloride)	nc, v	160,000	>Csat	540,000	>Csat	-	>Max	-	>Max	-	>Max
67-66-3	Chloroform	c, v	5.8		17		390		410		11,000	>Csat
74-87-3	Chloromethane	nc, v	1,400	>Csat	4,800	>Csat	380,000	>Csat	25,000	>Csat	700,000	>Csat
12789-03-6	Chlordane	c, v	1.7		5.4		110	>Csat	62	>Csat	1,700	>Csat
16065-83-1	Chromium (III)	nc, nv	120,000		390,000		-	>Max	530,000		-	>Max
18540-29-9	Chromium (VI)	c, nv	0.30		1.5		95		49		1,400	
218-01-9	Chrysene	c, nv	110	>Csat	550	>Csat	32,000	>Csat	17,000	>Csat	490,000	>Csat
7440-50-8	Copper	nc, nv	3,100		11,000		700,000		14,000		390,000	
74-90-8	Cyanide (hydrogen cyanide) ^	nc, v	14		47		2,500		110		3,000	
72-54-8	DDD (4,4'-Dichlorodiphenyldichloroethane)	c, nv	2.7		8.6		180		94		2,600	>Csat
72-55-9	DDE (4,4'-Dichlorodiphenyldichloroethene)	c, v	1.8		5.8		120		66		1,800	
50-29-3	DDT (4,4'-Dichlorodiphenyltrichloroethane)	c, nv	1.9		6.0		130		66		1,800	>Csat
53-70-3	Dibenz[a,h]anthracene	c, nv	0.11		0.55		32	>Csat	17	>Csat	490	>Csat
95-50-1	1,2-Dichlorobenzene	nc, v	2,200	>Csat	7,400	>Csat	550,000	>Csat	20,000	>Csat	560,000	>Csat
106-46-7	1,4-Dichlorobenzene	c, v	14		43		960	>Csat	1,300	>Csat	36,000	>Csat
91-94-1	3,3-Dichlorobenzidine	c, nv	1.2		3.9		77	>Csat	42	>Csat	1,200	>Csat
75-34-3	1,1-Dichloroethane	c, v	58		180		4,000	>Csat	3,200	>Csat	89,000	>Csat
75-35-4	1,1-Dichloroethene	nc, v	1,800	>Csat	5,900	>Csat	430,000	>Csat	13,000	>Csat	370,000	>Csat
156-59-2	cis-1,2-Dichloroethene	nc, v	160		530		35,000	>Csat	710		20,000	>Csat
156-60-5	trans-1,2-Dichloroethene	nc, v	1,600		5,300	>Csat	350,000	>Csat	7,100	>Csat	200,000	>Csat
111-44-4	Dichloroethylether	c, v	0.29		0.89		20		16		450	

Risk-Based Concentrations

Contaminated Medium			SOIL mg/Kg (ppm)									
Exposure Pathway			Soil Ingestion, Dermal Contact, and Inhalation RBC_{ss}									
Receptor Scenario			Residential		Urban Residential		Occupational		Construction Worker		Excavation Worker	
Direct or Indirect Pathway (see notes)			DCS		DCS		DCS		DCS		DCS	
CASn	Chemical	Note		Note		Note		Note		Note		Note
75-09-2	Dichloromethane	c, v	76		370		24,000	>Csat	12,000	>Csat	340,000	>Csat
94-75-7	2,4-Dichlorophenoxyacetic acid (2,4-D)	nc, nv	630	>Csat	2,100	>Csat	120,000	>Csat	2,700	>Csat	74,000	>Csat
60-57-1	Dieldrin	c, nv	0.034		0.11		2.2		1.2		33	>Csat
606-20-2	2,6-Dinitrotoluene	c, nv	0.36		1.2		23		13		350	
621-64-7	Di-N-propylnitrosamine (N-nitroso-di-N-propylamine)	c, nv	0.078		0.25		4.9		2.7		74	
123-91-1	1,4-Dioxane	c, v	5.4		17		370		210		5,900	
86-30-6	Diphenylnitrosamine	c, nv	110		350	>Csat	7,000	>Csat	3,800	>Csat	110,000	>Csat
106-93-4	EDB (1,2-dibromoethane)	c, v	0.16		0.49		11		9.0		250	
107-06-2	EDC (1,2-dichloroethane)	c, v	3.6		11		250		200		5,600	>Csat
115-29-7	Endosulfan (alpha-beta)	nc, v	380	>Csat	1,300	>Csat	74,000	>Csat	1,600	>Csat	45,000	>Csat
72-20-8	Endrin	nc, nv	19	>Csat	64	>Csat	3,700	>Csat	80	>Csat	2,200	>Csat
100-41-4	Ethylbenzene	c, v	34		100		2,300	>Csat	1,700	>Csat	49,000	>Csat
206-44-0	Fluoranthene	nc, nv	2,400	>Csat	8,000	>Csat	450,000	>Csat	10,000	>Csat	280,000	>Csat
86-73-7	Fluorene	nc, v	3,100	>Csat	11,000	>Csat	700,000	>Csat	14,000	>Csat	390,000	>Csat
50-00-0	Formaldehyde	c, v	15		43		960		1,600		44,000	>Csat
76-44-8	Heptachlor	c, v	0.11		0.34		6.8		4.0		110	
1024-57-3	Heptachlor Epoxide	c, v	0.055		0.18		3.5		2.0		56	
118-74-1	Hexachlorobenzene	c, v	0.21		0.63		14		11		320	
319-84-6	alpha-Hexachlorocyclohexane (alpha-HCH)	c, nv	0.086		0.28		5.5		3.0		83	>Csat
58-89-9	gamma-Hexachlorocyclohexane (Lindane)	c, nv	0.49		1.6		31		17		470	>Csat
67-72-1	Hexachloroethane	c, v	7.4		23		480	>Csat	370		10,000	>Csat
193-39-5	Indeno[1,2,3-cd]pyrene	c, nv	1.1	>Csat	5.5	>Csat	320	>Csat	170	>Csat	4,900	>Csat
7439-92-1	Lead	NA, nv	400	L	400	L	800	L	800	L	800	
7439-96-5	Manganese	nc, nv	1,800		6,100		380,000		8,200		230,000	
94-74-6	MCPA ((4-chloro-2-methylphenoxy)acetic acid)	nc, nv	32		110		6,200	>Csat	130		3,700	>Csat
7439-97-6	Mercury	nc, nv	23		79		5,300		110		2,900	
1634-04-4	MTBE (methyl t-butyl ether)	c, v	250		770		17,000	>Csat	12,000	>Csat	320,000	>Csat
91-20-3	Naphthalene	c, v	5.3		15		350	>Csat	580	>Csat	16,000	>Csat
7440-02-0	Nickel	c, nv	14,000		42,000		940,000		-	>Max	-	>Max
87-86-5	Pentachlorophenol	c, nv	1.0		3.2		60		34		960	
11097-69-1	Polychlorinated biphenyls (Total PCBs)	c, v	0.23		0.74		14	>Csat	8.4	>Csat	230	>Csat
98-82-8	iso-Propylbenzene (cumene)	nc, v	3,500	>Csat	12,000	>Csat	860,000	>Csat	27,000	>Csat	750,000	>Csat
129-00-0	Pyrene	nc, v	1,800	>Csat	6,000	>Csat	340,000	>Csat	7,500	>Csat	210,000	>Csat
7440-22-4	Silver	nc, nv	390		1,300		88,000		1,800		49,000	
100-42-5	Styrene	nc, v	7,900	>Csat	27,000	>Csat	-	>Max	56,000	>Csat	-	>Max
1746-01-6	2,3,7,8-TCDD (dioxin) equivalents	c, v	4.7E-06		0.000015		0.00032		0.00017		0.0048	
127-18-4	Tetrachloroethene (PCE)	c, v	220	>Csat	700	>Csat	15,000	>Csat	10,000	>Csat	280,000	>Csat
108-88-3	Toluene	nc, v	5,800	>Csat	20,000	>Csat	-	>Max	28,000	>Csat	770,000	>Csat
8001-35-2	Toxaphene	c, nv	0.49		1.6		31		17		470	
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	nc, v	400,000	>Csat	-	>Max	-	>Max	-	>Max	-	>Max
71-55-6	1,1,1-Trichloroethane	nc, v	53,000	>Csat	180,000	>Csat	-	>Max	470,000	>Csat	-	>Max
79-00-5	1,1,2-Trichloroethane	c, v	5.8		18		400		320		8,900	>Csat

Risk-Based Concentrations

Contaminated Medium →			SOIL mg/Kg (ppm)									
Exposure Pathway →			Soil Ingestion, Dermal Contact, and Inhalation RBC_{ss}									
Receptor Scenario →			Residential		Urban Residential		Occupational		Construction Worker		Excavation Worker	
Direct or Indirect Pathway (see notes)			DCS		DCS		DCS		DCS		DCS	
CASn	Chemical	Note		Note		Note		Note		Note		Note
79-01-6	Trichloroethene	NA, v	6.7		17		51		130		3,700	>Csat
75-69-4	Trichlorofluoromethane (Freon 11)	nc, v	7,600	>Csat	25,000	>Csat	-	>Max	69,000	>Csat	-	>Max
88-06-2	2,4,6-Trichlorophenol	c, nv	49		160		3,100		1,700		47,000	>Csat
95-63-6	1,2,4-Trimethylbenzene	nc, v	430		1,400	>Csat	100,000	>Csat	2,900	>Csat	81,000	>Csat
108-67-8	1,3,5-Trimethylbenzene	nc, v	430	>Csat	1,400	>Csat	100,000	>Csat	2,900	>Csat	81,000	>Csat
75-01-4	Vinyl chloride	c, v	0.36		1.3		67		34		950	>Csat
1330-20-7	Xylenes	nc, v	1,400	>Csat	4,900	>Csat	380,000	>Csat	20,000	>Csat	560,000	>Csat

Exposure Factors: Reasonable Maximum Exposure

Parameter (unit)	Symbol	Residential		Urban Residential		Occupational		Construction Worker		Excavation Worker	
			Note		Note		Note		Note		Note
ACCEPTABLE RISK LEVELS											
Acceptable Risk Level - Carcinogens	**ARLc**	1.00E-06	1	=		=		=		=	
Acceptable Risk Level - Noncarcinogens	**ARLn**	1	1	=		=		=		=	
EXPOSURE PARAMETERS											
Averaging Time - Carcinogen (yr)	**ATc**	70	3	=		=		=		=	
Averaging Time - Noncarcinogen (yr)	**ATn**	26	3	11	2	25	3	1	3	1	3
Averaging Time - Noncarcinogen, Child (yr)	**ATnc**	6	3	6	3	NA		NA		NA	
Body Weight - Adult (kg)	**BWa**	80	3	=		=		=		=	
Body Weight - Child (kg)	**BWc**	15	3	=		NA		NA		NA	
Exposure Duration - Adult (yr)	**ED**	26	3	30	4	2	3	1	21	1	6
Exposure Duration - Child (yr)	**EDc**	6	3	6	4	NA		NA		NA	
Exposure Frequency (day/yr)	**EF**	350	3	104	3c	208	6	250	6	9	6
Exposure Time (hr/day)	**ET**	24		24		8		8		8	
Event Frequency - Groundwater (events/day)	**EvF**	1	24	1	24	2	24	2	6	=	
Event Time - Groundwater (hr/event) (age adjusted)	**t_{event}**	0.67	25	0.62	25	2	24	2	6	=	
Soil Ingestion Rate - Adult (mg/day)	**IRS**	100	6	100	6	100	6	330	21	330	21
Soil Ingestion Rate - Child (mg/day)	**IRSc**	200	4	200	4	NA		NA		NA	
Water Ingestion Rate - Adult (L/day)	**IRW**	2.5	3a	2.5	3a	0.7	4a	NA		NA	
Water Ingestion Rate - Child (L/day)	**IRWc**	0.78	3b	=		NA		NA		NA	
Skin Surface Area - Adult to Soil (cm^2)	**SA**	6032	4	6032	4	3527	4	3527	4	3527	4
Skin Surface Area - Child to Soil (cm^2)	**SAc**	2373	3	=		NA		NA		NA	
Skin Surface Area - Adult to Groundwater (cm^2)	**SAw**	20900	3	20900	3	3527	3	6032	4	6032	4
Skin Surface Area - Child to Groundwater (cm^2)	**SAwc**	6378	3	6378	3	NA		NA		NA	
Soil to Skin Adherence Factor - Adult (mg/cm^2-day)	**AF**	0.07	5a	0.07	5a	0.12	5b	0.30	5c	0.30	5c
Soil to Skin Adherence Factor - Child (mg/cm^2-day)	**AFc**	0.20	5d	=		NA		NA		NA	
AGE-ADJUSTED EXPOSURE FACTORS											
Ingestion Factor - Soil (mg-yr/kg-d)	**IFSadj**	105	7	110	7a	NA		NA		NA	
Ingestion Factor - Water (L-yr/kg-d)	**IFWadj**	0.94	7	1.06	7a	NA		NA		NA	
Surface Area Tapwater-age adjusted (cm2-yr/kg)	**SAwadj**	6174	7	8821	7	NA		NA		NA	
Surface Area Factor - Skin (mg-yr/kg-d)	**SFSadj**	295	7	317	7a	NA		NA		NA	

SITE PARAMETERS											
Soil Bulk Density (g/cm^3)	ρ_b	1.70	8	=		=		=		=	
Soil Particle Density (g/cm^3)	ρ_s	2.74	9	=		=		=		=	
Soil Porosity	n	0.38	8	=		=		=		=	
Air Content - Vadose Zone Soils	n_a	0.26	10	=		=		=		=	
Air Content - Cap. Fringe Soils	n_{acap}	0.038	10	=		=		=		=	
Air Content - Foundation Cracks	n_{acrk}	0.26	10	=		=		=		=	
Water Content - Vadose Zone Soils	n_w	0.12	8	=		=		=		=	
Water Content - Cap. Fringe Soils	n_{wcap}	0.342	8	=		=		=		=	
Water Content - Foundation Cracks	n_{wcrk}	0.12	11	=		=		=		=	
Vadose Zone Thickness (cm)	L_v	295	12	=		=		=		=	
Capillary Fringe Thickness (cm)	L_{cap}	5.00	8	=		=		=		=	
Fraction Organic Carbon (shallow soil)	f_{oc}	0.005	8a	=		=		=		=	
Depth to Groundwater (cm)	L_w	300	8	=		=		=		=	
Groundwater Dilution-Attenuation Factor	**DAF**	60	19	=		=		=		=	
SOIL CONTAMINATION PARAMETERS											
Thickness of Contaminated Surface Soils (cm)	L_{ss}	100	8	=		=		=		=	
Fraction of Site with Surface Soil Contamination	f_{ss}	0.50	16	=		=		=		=	
Thickness of Clean Surface Soils (cm)	L_c	100	8	=		=		=		=	
Thickness of Subsurface Contamination (cm)	L_s	200	8	=		=		=		=	
Soil Gas Attenuation Factor for Chlorinated Hydrocarbons	AF_{ch}	200	23	200	23	1000	23	NA		NA	
Soil Gas Attenuation Factor for Petroleum Hydrocarbons	AF_{ph}	200	23	200	23	1000	23	NA		NA	
Fraction of Site with Subsurface Vol. To Outdoor Air	f_{so}	0.50	17	=		=		=		=	
Thickness of Clean Soils Under Building (cm)	L_{cb}	100	8	=		=		=		=	
Thickness of Contaminated Soils Under Building (cm)	L_{sb}	200	8	=		=		=		=	
Fraction of Contaminated Soils Under Building	f_{sb}	0.50	18	=		=		=		=	
Particulate Emission Factor for Soils (kg/m^3)	**PEF**	7.58E-10	13	=		=		=		=	
BUILDING PARAMETERS											
Building Air Exchange Rate (1/day)	**ER**	24	14	=		48	14	NA		NA	
Building Height (indoor air mixing zone) (cm)	L_B	200	8	=		300	8	NA		NA	
Foundation Wall Thickness (cm)	L_{crk}	15	8	=		=		NA		NA	
Foundation Crack Fraction	f_{crk}	0.0010	15	=		=		NA		NA	
VOLATILIZATION FACTORS											
Averaging time for Volatilization -Adults (yr)	t_{vol}	25	16	=		=		=		=	
Averaging time for Volatilization -Children (yr)	t_{volc}	6	16	=		NA		NA		NA	
Max. Soil to Building Vol. Factor (kg/m^3)	$VF_{si}max$	3.88E-03	18	3.88E-03	18	1.29E-03	18	NA		NA	
Max. <u>Surface</u> Soil Vol. Factor - Adult (kg/m^3)	$VF_{ss}max$	1.57E-05	16	1.57E-05	16	1.57E-05	16	1.57E-05	16	1.57E-05	16
Max. <u>Surface</u> Soil Vol. Factor - Child (kg/m^3)	$VF_{ss}max$	6.53E-05	16	=		NA		NA		NA	
Max. Soil to Outdoor Air Vol. Factor - Adult (kg/m^3)	$VF_{so}max$	3.13E-05	17	3.13E-05	17	3.13E-05	17	NA		NA	
Volatile Organics Dispersion Term (g/m^2-s per kg/m^3)	**Q/C**	6.88E+01	13	=		=		=		=	
MISCELLANEOUS PARAMETERS											
Ideal Gas Law Constant (m^3-atm/K-mol)	**R**	8.21E-05	20	=		=		=		=	
Absolute Temperature (K)	**T**	2.93E+02	20	=		=		=		=	

Additional Information for Early Life-Stage Factor Calculations

Early Life-Stage Factors - Residential	Symbol	0 - 2 Years		3 - 6 Years		7 - 16 Years		17 - 26 Years		Total	
(See Note 22)			Note		Note		Note		Note		Note
Exposure Duration (yr)	ED	2		4		10		10		26	
Body Weight (kg)	BW	15		15		80		80		NA	
Soil Ingestion Rate (mg/day)	IRs	200		200		100		100		NA	
Air Inhalation Rate (m^3/day)	IRa	10		10		20		20		NA	
Water Ingestion Rate (L/day) -adults	IRw	0.78		0.78		2.5		2.5		NA	
Age-dependent Adjustment Factor	ADAF	10		3		3		1		NA	
Soil to Skin Adherence Factor (mg/cm^2)	AF	0.2		0.2		0.07		0.07		NA	
Skin Surface Area - Adult to Soil (cm^2)	SA	2690		2690		6032		6032		NA	
Skin Surface Area - to tapwater (cm2)	SAtw	6378		6378		20900		20900		NA	
Adjusted Exposure Duration (yr)	EDadj	20		12		30		10		72	
Ingestion Factor - Soil (mg-yr/kg-d)	IFSadj	267		160		38		13		477	
Ingestion Factor - Water (L-yr/kg-d)	IFWadj	1		1		1		0		3	
Surface Area Factor - Skin (mg-yr/kg-d)	SFSadj	717		430		158		53		1359	
Surface Area Tapwater-age adjusted (cm2-yr/kg)	Sawr_adj	8504		5102		7838		2613		24056	

Early Life-Stage Factors - Urban Residential	Symbol	0 - 2 Years		3 - 6 Years		7 - 16 Years		17 - 26 Years		Total	
(See Note 22)			Note		Note		Note		Note		Note
Exposure Duration (yr)	ED	1		4		1		24		30	
Adjusted Exposure Duration (yr)	EDadj	10		12		3		24		49	
Ingestion Factor - Soil (mg-yr/kg-d)	IFSadj	133		160		3.75		30		327	
Ingestion Factor - Water (L-yr/kg-d)	IFWadj	0.52		0.624		0.09375		0.75		2	
Surface Area Tapwater-age adjusted (cm2-yr/kg)	Sawu_adj	4252		5102		783.75		6270		16408	
Surface Area Factor - Skin (mg-yr/kg-d)	SFSadj	359		430		16		127		932	

Early Life-Stage Factors - Vinyl Chloride Residential	Symbol	0 - 6 Years		0 - 6 Years		7 - 30 Years		7 - 70 Years		Total	
(See Note 22)			Note		Note		Note		Note		Note
Exposure Duration (yr)	ED	6		6		24		64		100	
Adjusted Exposure Duration (yr)	EDadj	6		6		24		64		100	
Ingestion Factor - Soil (mg-yr/kg-d)	IFSadj	80		80		30		80		270	
Ingestion Factor - Water (L-yr/kg-d)	IFWadj	0.3		0.3		0.8		2.0		3.4	
Surface Area Factor - Skin (mg-yr/kg-d)	SFSadj	190		190		127		338		844	

Early Life-Stage Factors - Vinyl Chloride Urban Residential	Symbol	0 - 6 Years		0 - 6 Years		7 - 11 Years		7 - 70 Years		Total	
(See Note 22)			Note		Note		Note		Note		Note
Exposure Duration (yr)	ED	6		6		5		64		81	
Adjusted Exposure Duration (yr)	EDadj	6		6		5		64		81	
Ingestion Factor - Soil (mg-yr/kg-d)	IFSadj	80		80		6.3		80		246	
Ingestion Factor - Water (L-yr/kg-d)	IFWadj	0.3		0.3		0.2		2.0		2.8	
Surface Area Factor - Skin (mg-yr/kg-d)	SFSadj	190		190		26		338		744	

For explanation of notes, please see "Notes to Accompany Risk-Based Concentrations for Individual Chemicals."

Toxicological Data

Chemical	Risk Type	Early Life	Breast Feeding	Organics Predictive Domain	SF_o $(mg/Kg\text{-}day)^{-1}$	Note	SF_i $(mg/Kg\text{-}day)^{-1}$	Note 1	iUR $(ug/m^3)^{-1}$	Note	Chronic RfD_o (mg/Kg-day)	Note	Chronic RfD_i (mg/Kg-day)	Note 2	Chronic RfCi (mg/m^3)	Note	Subchronic RfD_o (mg/Kg-day)	Note	Subchronic RfD_i (mg/Kg-day)	Note 2	Subchronic RfCi (mg/m^3)	Note	RAF_d	K_p (cm/hr)	τ (hr)	t* (hr)	B	Note
Acenaphthene	nc	n	n	in	NA		NA		NA		0.06	3	NA		NA		NA	10	NA		NA		0.00E+00	8.60E-02	7.68E-01	1.84E+00	4.11E-01	6
Acrylonitrile	c	n	n	in	0.54	3	2.38E-01		0.000068	3	0.04	3	5.71E-04		0.002	3	NA	10	NA		NA		0.00E+00	1.16E-03	2.08E-01	5.00E-01	3.25E-03	6
Aldrin	c	n	n	out	17	3	1.72E+01		0.0049	3	0.00003	3	NA		NA		0.00004	10	NA		NA		1.00E-01	2.93E-01	1.16E+01	4.77E+01	2.15E+00	6
Anthracene	nc	n	n	in	NA		NA		NA		0.3	3	NA		NA		1	10	NA		NA		0.00E+00	1.42E-01	1.05E+00	4.05E+00	7.29E-01	6
Arsenic	c	n	n	in	1.5	3	1.51E+01		0.0043	3	0.0003	3	4.29E-06		0.000015	3	0.005	10	NA		NA		3.00E-02	1.00E-03	2.76E-01	6.63E-01	3.33E-03	6
Barium	nc	n	n	in	NA		NA		NA		0.2	3	1.43E-04		0.0005	3	NA	10	1.43E-03		0.005	10	1.00E-03	1.00E-03	6.18E-01	1.48E+00	4.51E-03	6
Benz[a]anthracene	c	y	n	out	0.1	3	2.10E-01		6.00E-05	3	NA		NA		NA		NA		NA		NA		1.30E-01	5.52E-01	2.00E+00	8.48E+00	3.21E+00	6
Benzene	c	n	n	in	0.055	3	2.73E-02		0.0000078	3	0.004	3	8.57E-03		0.03	3	0.01	10	2.29E-02		0.08	10	0.00E+00	1.49E-02	2.88E-01	6.91E-01	5.06E-02	6
Benzidine	c	y	n	in	230	3	2.35E+02		0.067	3	0.003	3	NA		NA		0.003	10	NA		NA		1.00E-01	1.13E-03	1.13E+00	2.72E+00	5.90E-03	6
Benzo[a]pyrene (BaP equivalents)	c	y	n	out	1	3	2.10E+00		0.0006	3	0.0003		5.71E-07		0.000002		NA		NA		NA		1.30E-01	7.13E-01	2.72E+00	1.18E+01	4.36E+00	6
Benzo[b]fluoranthene	c	y	n	out	0.1	3	2.10E-01		6.00E-05	3	NA		NA		NA		NA		NA		NA		1.30E-01	4.17E-01	2.72E+00	1.13E+01	2.55E+00	6
Benzo[k]fluoranthene	c	y	n	out	0.01	3	2.10E-02		6.00E-06	3	NA		NA		NA		NA		NA		NA		1.30E-01	6.91E-01	2.72E+00	1.18E+01	4.22E+00	6
Beryllium	c	n	n	in	NA		8.40E+00		0.0024	3	0.002	3	5.71E-06		0.00002	3	0.005	10	NA		NA		1.00E-03	1.00E-03	1.18E-01	2.83E-01	1.15E-03	6
Bis(2-ethylhexyl)phthalate	c	n	n	out	0.014	3	8.40E-03		0.0000024	3	0.02	3	NA		NA		NA		NA		NA		1.00E-01	1.13E+00	1.62E+01	7.29E+01	8.59E+00	6
Bromodichloromethane	c	n	n	in	0.062	3	1.30E-01		0.000037	3	0.02	3	NA		NA		NA	10	5.71E-03		0.02	10	0.00E+00	4.02E-03	8.70E-01	2.09E+00	1.98E-02	6
Bromoform	c	n	n	in	0.0079	3	3.85E-03		0.0000011	3	0.02	3	NA		NA		0.03	10	NA		NA		0.00E+00	2.35E-03	2.74E+00	6.57E+00	1.44E-02	6
Bromomethane	nc	n	n	in	NA		NA		NA		0.0014	3	1.43E-03		0.005	3	0.005	10	2.86E-02		0.1	10	0.00E+00	2.84E-03	3.58E-01	8.58E-01	1.06E-02	6
Cadmium	nc	n	n	in	NA		6.30E+00		0.0018	3	1.00E-03	12	2.86E-06		1.00E-05	3	NA		2.57E-04		0.0009	10	1.00E-03	1.00E-03	4.48E-01	1.08E+00	4.08E-03	6
Carbon tetrachloride	c	n	n	in	0.07	3	2.10E-02		0.000006	3	0.004	3	2.86E-02		0.1	3	0.007	10	NA		NA	10	0.00E+00	1.63E-02	7.64E-01	1.83E+00	7.78E-02	6
Chlorobenzene	nc	n	n	in	NA		NA		NA		0.02	3	1.43E-02		0.05	3	0.07	10	1.43E-01		0.5	10	0.00E+00	2.82E-02	4.49E-01	1.08E+00	1.15E-01	6
Chlorodibromomethane (dibromochloromethane)	c	n	n	in	0.084	3	9.45E-02		0.000027	3	0.02	3	NA		NA		NA		NA		NA		0.00E+00	2.89E-03	1.54E+00	3.70E+00	1.60E-02	6
Chloroethane (ethyl chloride)	nc	n	n	in	NA		NA		NA		NA		2.86E+00		10	3	0.1	10	NA		NA	10	0.00E+00	6.07E-03	2.42E-01	5.80E-01	1.88E-02	6
Chloroform	c	n	n	in	0.031	3	8.05E-02		0.000023	3	0.01	3	2.80E-02		0.098	3	0.01	10	NA		NA		0.00E+00	6.83E-03	4.90E-01	1.18E+00	2.87E-02	6
Chloromethane	nc	n	n	in	NA	3	NA		NA	3	NA		2.57E-02		0.09	3	NA		NA		NA	10	0.00E+00	3.28E-03	2.02E-01	4.84E-01	8.96E-03	6
Chlordane	c	n	n	out	0.35	3	3.50E-01		0.0001	3	0.0005	3	2.00E-04		0.0007	3	NA	10	NA		NA		4.00E-02	1.07E-01	2.07E+01	7.97E+01	8.33E-01	6
Chromium (III)	nc	n	n	in	NA		NA		NA		1.5	3	NA		NA		1.5	10	NA		NA		1.00E-03	1.00E-03	2.06E-01	4.93E-01	2.77E-03	6
Chromium (VI)	c	y	n	in	0.5	3	2.94E+02		0.084	3	0.003	3	2.86E-05		0.0001	3	0.02	10	NA		NA		1.00E-03	2.00E-03	2.06E-01	4.93E-01	5.55E-03	6
Chrysene	c	y	n	out	0.001	3	2.10E-03		6.00E-07	3	NA		NA		NA		NA		NA		NA		1.30E-01	5.96E-01	2.00E+00	8.53E+00	3.46E+00	6
Copper	nc	n	n	in	NA		NA		NA		0.04	3	NA		NA		0.04	10	NA		NA		1.00E-03	1.00E-03	2.39E-01	5.73E-01	3.07E-03	6
Cyanide (hydrogen cyanide) ^	nc	n	n	in	NA		NA		NA		0.0006	3	2.29E-04		0.0008	3	NA		NA		NA		1.00E-03	1.00E-03	1.49E-01	3.58E-01	2.00E-03	6
DDD (4,4'-Dichlorodiphenyldichloroethane)	c	n	n	in	0.24	3	2.42E-01		0.000069	3	0.00003		NA		NA		NA		NA		NA		3.00E-02	2.51E-01	6.52E+00	2.62E+01	1.73E+00	6
DDE (4,4'-Dichlorodiphenyldichloroethene)	c	n	n	out	0.34	3	3.40E-01		0.000097	3	0.0003		NA		NA		NA		NA		NA		3.00E-02	5.45E-01	6.35E+00	2.73E+01	3.74E+00	6
DDT (4,4'-Dichlorodiphenyltrichloroethane)	c	n	n	out	0.34	3	3.40E-01		0.000097	3	0.0005	3	NA		NA		0.0005	10	NA		NA		3.00E-02	6.28E-01	1.02E+01	4.43E+01	4.55E+00	6
Dibenz[a,h]anthracene	c	y	n	out	1	3	2.10E+00		6.00E-04	3	NA		NA		NA		NA		NA		NA		1.30E-01	9.53E-01	3.81E+00	1.69E+01	6.12E+00	6
1,2-Dichlorobenzene	nc	n	n	in	NA		NA		NA		0.09	3	5.71E-02		0.2	3	NA	10	5.71E-01		2	10	0.00E+00	4.46E-02	7.00E-01	1.68E+00	2.08E-01	6
1,4-Dichlorobenzene	c	n	n	in	0.0054	3	3.85E-02		0.000011	3	0.07	3	2.29E-01		0.8	3	NA		7.14E-01		2.5	10	0.00E+00	4.53E-02	7.00E-01	1.68E+00	2.11E-01	6
3,3-Dichlorobenzidine	c	n	n	In	0.45	3	1.19E+00		0.00034	3	NA		NA		NA		NA		NA		NA		1.00E-01	1.28E-02	2.75E+00	6.60E+00	7.83E-02	6
1,1-Dichloroethane	c	n	n	in	0.0057	3	5.60E-03		0.0000016	3	0.2	3	NA		NA		2	10	1.43E+00		5	10	0.00E+00	6.75E-03	3.77E-01	9.04E-01	2.58E-02	6
1,1-Dichloroethene	nc	n	n	in	NA		NA		NA		0.05	3	5.71E-02		0.2	3	0.009	10	NA		NA		0.00E+00	1.17E-02	3.67E-01	8.81E-01	4.43E-02	6
cis-1,2-Dichloroethene	nc	n	n	in	NA		NA		NA		0.002	3	NA		NA		0.02	10	NA		NA		0.00E+00	1.10E-02	3.67E-01	8.81E-01	4.17E-02	6
trans-1,2-Dichloroethene	nc	n	n	in	NA		NA		NA		0.02	3	NA		NA	3	0.2	10	NA		NA		0.00E+00	1.10E-02	3.67E-01	8.81E-01	4.17E-02	6
Dichloroethylether	c	n	n	in	1.1	3	1.16E+00		0.00033	3	NA		NA		NA		NA		NA		NA		0.00E+00	1.78E-03	6.65E-01	1.60E+00	8.19E-03	6
Dichloromethane	c	y	n	in	2.00E-03	3	3.50E-05		1.00E-08	3	6.00E-03	3	1.71E-01		6.00E-01	3	0.06	10	8.57E-01		3	10	0.00E+00	3.54E-03	3.14E-01	7.55E-01	1.25E-02	6
2,4-Dichlorophenoxyacetic acid (2,4-D)	nc	n	n	in	NA		NA		NA		0.01	3	NA		NA		0.01	10	NA		NA		1.00E-01	6.64E-03	1.82E+00	4.36E+00	3.80E-02	6
Dieldrin	c	n	n	in	16	3	1.61E+01		0.0046	3	0.00005	3	NA		NA		0.00005	10	NA		NA		1.00E-01	3.26E-02	1.43E+01	3.43E+01	2.45E-01	6
2,6-Dinitrotoluene	c	n	n	in	1.50E+00		NA		NA		3.00E-04	3	NA		NA		0.01	10	NA		NA		1.00E-01	3.70E-03	1.10E+00	2.64E+00	1.92E-02	6
Di-N-propylnitrosamine (N-nitroso-di-N-propylamine	c	n	n	in	7	3	7.00E+00		0.002	3	NA		NA		NA		NA		NA		NA		1.00E-01	2.30E-03	5.70E-01	1.37E+00	0.00E+00	6
1,4-Dioxane	c	n	n	in	0.1	3	1.75E-02		5.00E-06	3	0.03	3	8.57E-03		3.00E-02	3	NA		NA		NA		3.00E-02	3.32E-04	3.28E-01	7.86E-01	1.20E-03	6
Diphenylnitrosamine	c	n	n	in	0.0049	3	9.10E-03		0.0000026	3	NA		NA		NA		NA		NA		NA		1.00E-01	1.45E-02	1.35E+00	3.25E+00	7.85E-02	6
EDB (1,2-dibromoethane)	c	n	n	in	2	3	2.10E+00		0.0006	3	0.009	3	2.57E-03		0.009	3	NA		NA		NA	10	0.00E+00	2.78E-03	1.19E+00	2.84E+00	1.47E-02	6
EDC (1,2-dichloroethane)	c	n	n	in	0.091	3	9.10E-02		2.60E-05	3	6.00E-03	3	2.00E-03		7.00E-03	3	0.02	10	NA		NA	10	0.00E+00	4.20E-03	3.77E-01	9.04E-01	1.61E-02	6
Endosulfan (alpha-beta)	nc	n	n	in	NA		NA		NA		0.006	3	NA		NA		0.006	10	NA		NA		1.00E-01	2.86E-03	2.00E+01	4.80E+01	2.22E-02	6
Endrin	nc	n	n	in	NA		NA		NA		0.0003	3	NA		NA		0.0003	10	NA		NA		1.00E-01	3.26E-02	1.43E+01	3.43E+01	2.45E-01	6
Ethylbenzene	c	n	n	in	0.011	3	8.75E-03		0.0000025	3	0.1	3	2.86E-01		1		NA	10	2.57E+00		9	10	0.00E+00	4.93E-02	4.13E-01	9.92E-01	1.95E-01	6
Fluoranthene	nc	n	n	out	NA		NA		NA		0.04	3	NA		NA		0.4	10	NA		NA		1.30E-01	3.08E-01	1.43E+00	5.73E+00	1.68E+00	6
Fluorene	nc	n	n	in	NA		NA		NA		0.04	3	NA		NA		0.4	10	NA		NA		0.00E+00	1.10E-01	8.97E-01	2.15E+00	5.45E-01	6
Formaldehyde	c	n	n	in	NA		4.55E-02		0.000013	3	0.2	3	2.80E-03		0.0098	3	0.2	10	NA		NA		0.00E+00	1.82E-03	1.55E-01	3.72E-01	3.84E-03	6
Heptachlor	c	n	n	in	4.5	3	4.55E+00		0.0013	3	0.0005	3	NA		NA		0.0005	10	NA		NA		1.00E-01	1.43E-01	1.30E+01	5.01E+01	1.06E+00	6
Heptachlor Epoxide	c	n	n	in	9.1	3	9.10E+00		0.0026	3	0.000013	3	NA		NA		0.000013	10	NA		NA		1.00E-01	2.09E-02	1.59E+01	3.82E+01	1.59E-01	6
Hexachlorobenzene	c	n	n	out	1.6	3	1.61E+00		0.00046	3	0.0008	3	NA		NA		NA	10	NA		NA		0.00E+00	2.54E-01	4.14E+00	1.66E+01	1.65E+00	6
alpha-Hexachlorocyclohexane (alpha-HCH)	c	n	n	in	6.3	3	6.30E+00		0.0018	3	0.008	3	NA		NA		NA		NA		NA		1.00E-01	2.06E-02	4.47E+00	1.07E+01	1.35E-01	6
gamma-Hexachlorocyclohexane (Lindane)	c	n	n	in	1.1	3	1.09E+00		0.00031	3	0.0003	3	NA		NA		0.003	10	NA		NA		1.00E-01	2.06E-02	4.47E+00	1.07E+01	1.35E-01	6

Toxicological Data

Chemical	Risk Type	Early Life	Breast Feeding	Organics Predictive Domain	SF_o (mg/Kg-day)$^{-1}$	Note	SF_i (mg/Kg-day)$^{-1}$	Note 1	iUR (ug/m^3)$^{-1}$	Note	Chronic RfD_o (mg/Kg-day)	Note	Chronic RfD_i (mg/Kg-day)	Note 2	Chronic RfCi (mg/m^3)	Note	Subchronic RfD_o (mg/Kg-day)	Note	Subchronic RfD_i (mg/Kg-day)	Note 2	Subchronic RfCi (mg/m^3)	Note	RAF_d	K_p (cm/hr)	τ (hr)	t* (hr)	B	Note
																							Note 5	Note 6	Note 6	Note 6	Note 6	
Hexachloroethane	c	n	n	in	4.00E-02	3	3.85E-02		1.10E-05	3	7.00E-04	3	8.57E-03		3.00E-02		0.01	10	NA		NA		1.00E-01	4.15E-02	2.23E+00	5.34E+00	2.46E-01	6
Indeno[1,2,3-cd]pyrene	c	y	n	out	0.1	3	2.10E-01		6.00E-05	3	NA		NA		NA		NA		NA		NA		1.30E-01	1.24E+00	3.71E+00	1.67E+01	7.93E+00	6
Lead	NA	NA	n	in	NA	9	NA		NA	9	NA	9	NA		NA	9	NA		NA		NA		NA	1.00E-04	1.52E+00	3.65E+00	5.54E-04	6
Manganese	nc	n	n	in	NA		NA		NA		2.40E-02	11	1.43E-05		0.00005	3	NA		NA		NA		1.00E-03	1.00E-03	2.14E-01	5.13E-01	2.85E-03	6
MCPA ((4-chloro-2-methylphenoxy)acetic acid)	nc	n	n	in	NA		NA		NA		0.0005	3	NA		NA		0.0005	10	NA		NA		1.00E-01	1.69E-02	1.40E+00	3.35E+00	9.21E-02	6
Mercury	nc	n	n	in	NA		NA		NA		3.00E-04	3	8.57E-05		3.00E-04	3	NA	10	NA		NA		0.00E+00	1.00E-03	1.40E+00	3.35E+00	5.45E-03	6
MTBE (methyl t-butyl ether)	c	n	n	in	0.0018	3	9.10E-04		2.6E-07	3	NA		8.57E-01		3	3	NA		NA		NA		0.00E+00	2.11E-03	3.28E-01	7.87E-01	7.62E-03	6
Naphthalene	c	n	n	in	NA		1.19E-01		0.000034	3	0.02	3	8.57E-04		0.003	3	NA		NA		NA		0.00E+00	4.66E-02	5.49E-01	1.32E+00	2.03E-01	6
Nickel	c	n	n	in	NA		9.10E-01		0.00026	3	0.02	3	2.57E-05		0.00009	3	0.02	10	NA		NA		1.00E-03	2.00E-04	2.24E-01	5.38E-01	5.89E-04	6
Pentachlorophenol	c	n	n	in	0.4	3	1.79E-02		0.0000051	3	0.005	3	NA		NA		0.03	10	NA		NA		2.50E-01	1.27E-01	3.26E+00	1.25E+01	7.97E-01	6
Polychlorinated biphenyls (Total PCBs)	c	n	n	out	2	3	2.00E+00		0.00057	3	0.00002	3	NA		NA		0.00005	10	NA		NA		1.40E-01	7.51E-01	7.08E+00	3.11E+01	5.22E+00	6
iso-Propylbenzene (cumene)	nc	n	n	in	NA		NA		NA		0.1	3	1.14E-01		0.4	3	0.4	10	NA		NA	10	0.00E+00	8.97E-02	4.95E-01	1.19E+00	3.78E-01	6
Pyrene	nc	n	n	in	NA		NA		NA		0.03	3	NA		NA		0.3	10	NA		NA		1.30E-01	2.01E-01	1.43E+00	5.54E+00	1.10E+00	6
Silver	nc	n	n	in	NA		NA		NA		0.005	3	NA		NA		0.005	10	NA		NA		0.00E+00	6.00E-04	4.23E-01	1.01E+00	2.40E-03	6
Styrene	nc	n	n	in	NA		NA		NA		0.2	3	2.86E-01		1.0	3	NA		8.57E-01		3	10	0.00E+00	3.72E-02	4.03E-01	9.67E-01	1.46E-01	6
2,3,7,8-TCDD (dioxin) equivalents	c	n	n	out	130000	3	1.33E+05		38	3	7.00E-10	3	1.14E-08		4E-08	3	NA		NA		NA		3.00E-02	8.08E-01	6.68E+00	2.95E+01	5.58E+00	6
Tetrachloroethene (PCE)	c	n	n	in	2.10E-03	14	9.10E-04		2.60E-07	3	0.006	3	1.14E-02		0.04	3	0.1	10	NA		NA		0.00E+00	3.34E-02	8.92E-01	2.14E+00	1.65E-01	6
Toluene	nc	n	n	in	NA		NA		NA		0.08	3	1.43E+00		5	3	0.8	10	1.43E+00		5	10	0.00E+00	3.11E-02	3.45E-01	8.28E-01	1.15E-01	6
Toxaphene	c	n	n	in	1.1	3	1.12E+00		0.00032	3	NA		NA		NA		NA		NA		NA		1.00E-01	5.18E-02	2.18E+01	5.24E+01	4.05E-01	6
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	nc	n	n	in	NA		NA		NA		30	3	8.57E+00		30	3	NA	10	8.57E+00		30	10	0.00E+00	1.75E-02	1.18E+00	2.83E+00	9.21E-02	6
1,1,1-Trichloroethane	nc	n	n	in	NA		NA		NA		2	3	1.43E+00		5	3	7	10	1.43E+00		5	10	0.00E+00	1.26E-02	5.87E-01	1.41E+00	5.60E-02	6
1,1,2-Trichloroethane	c	n	n	in	0.057	3	5.60E-02		0.000016	3	0.004	3	5.71E-05		0.0002	3	NA	10	NA		NA		0.00E+00	5.04E-03	5.87E-01	1.41E+00	2.24E-02	6
Trichloroethene	NA	n	n	in	0.046	4	1.44E-02		4.10E-06	4	0.0005	3	5.71E-04		0.002	4	NA		NA		NA		0.00E+00	1.16E-02	5.72E-01	1.37E+00	5.11E-02	6
Trichlorofluoromethane (Freon 11)	nc	n	n	in	NA		NA		NA		0.3	3	2.00E-01		0.7	3	0.7	10	2.86E-01		1	10	0.00E+00	1.27E-02	6.18E-01	1.48E+00	5.73E-02	6
2,4,6-Trichlorophenol	c	n	n	in	0.011	3	1.09E-02		0.0000031	3	0.001	3	NA		NA		NA		NA		NA		1.00E-01	3.46E-02	1.34E+00	3.22E+00	1.87E-01	6
1,2,4-Trimethylbenzene	nc	n	n	in	NA		NA		NA		0.01		1.71E-02		0.06	3	NA		NA		NA	10	0.00E+00	8.57E-02	4.95E-01	1.19E+00	3.61E-01	6
1,3,5-Trimethylbenzene	nc	n	n	in	NA		NA		NA		0.01	3	1.71E-02		0.06	3	0.1	10	NA		NA	10	0.00E+00	6.21E-02	4.95E-01	1.19E+00	2.62E-01	6
Vinyl chloride	c	vc	n	in	0.72	3	1.54E-02		0.0000044	3	0.003	3	2.86E-02		0.1	3	NA		NA		NA		0.00E+00	8.38E-03	2.35E-01	5.65E-01	2.55E-02	6
Xylenes	nc	n	n	in	NA		NA		NA		0.2	3	2.86E-02		0.1	3	0.4	10	1.14E-01		0.4	10	0.00E+00	5.00E-02	4.13E-01	9.92E-01	1.98E-01	6

For explanation of notes, please see "Notes to Accompany Risk-Based Concentrations for Individual Chemicals."

Attachment 3:

Inputs for Calculation of Ecological Risk-Based Concentrations

7200 NE Airport Way Portland OR 97218
Box 3529 Portland OR 97208
503 415 6000

Modeled Receptor: American Robin (insectivorous and omnivorous diets)

Intake Equations:

Equation (a) - total CPEC intake

$$Intake_{total} = Intake_{food} + Intake_{water} + Intake_{soil}$$

Parameters - Equation (a):

Parameter	Description	Units	Value	Source/Notes
$Intake_{food}$	average daily intake from ingestion of prey items (vegetation and animal tissues).	mg/kg	calculated	See Equation (b)
$Intake_{soil}$	average daily intake from incidental ingestion of surface soil.	mg/kg	calculated	See Equation (c)
$Intake_{water}$	average daily intake from the ingestion of water.	mg/kg	0	No surface water at Upland Facility; water intake assumed to be 0.

Equation (b) - CPEC intake from food

$$Intake_{food} = AUF * \left(\sum_{i=1}^{N} B_{ij} * P_i * FIR \right)$$

Parameters - Equation (b):

Parameter	Description	Units	Value	Source/Notes
$Intake_{food}$	Intake for contaminant (j) in food	mg dw/kg bw-d	calculated	
AUF	Area use factor	unitless	1	Fraction of food derived from site; area use assumed to be 100%
FIR	Food intake rate	kg dw/kg bw-d	0.207	WDOE 2012 - food ingestion rate for American Robin
N	total number of ingested prey types	unitless	2	EPA 1993 - American robin diet
P_i	Fraction of food as prey type$_i$	unitless	Plants - 0.29	EPA 1993 - American robin diet - omnivorous
			Invertebrates - 0.71	
			Plants - 0	Insectivorous diet
			Invertebrates - 1	

Equation (c) - CPEC intake from ingested soil

$$Intake_{soil} = AUF * (FIR * P_s * C_{js} * AF_{js})$$

Parameters - Equation (c):

Parameter	Description	Units	Value	Source/Notes
$Intake_{soil}$	Intake for contaminant (j) in soil	mg dw/kg bw-d	calculated	
C_{js}	Concentration of contaminant (j) in soil (s)	mg/kg dw	available data	All available site-wide sample data
FIR	Food intake rate	kg dw/kg bw-d	0.207	WDOE 2012 - food ingestion rate for American Robin
P_s	Proportion of total mass intake that is soil	kg soil/kg food	15.15%	EPA 2007 - average of 90th percentile values for avian granivore and avian insectivore[1]
			16.40%	EPA 2007 - 90th percentile values for avian insectivore [1]
AF_{js}	Bioavailability factor of contaminant (j) in soil	unitless	1	Lead = 50%; Bioavailability of all other analytes from ingested soil and food was conservatively assumed to be 100%.
P_i	Fraction of food as prey type$_i$	unitless	Plants - 0.29	EPA 1993 - American robin diet - omnivorous
			Invertebrates - 0.71	
			Plants - 0	Insectivorous diet
			Invertebrates - 1	
AUF	Area use factor	unitless	1	Fraction of food derived from site; area use assumed to be 100% for each exposure unit

Notes:

mg - milligram dw - dry weight
kg - kilogram bw - body weight
d - day

Sources:

United States Environmental Protection Agency (EPA). 1993. Wildlife Exposure Factors Handbook. EPA/600/R-93/1987a. Volumes I & II.

United States Environmental Protection Agency (EPA). 2007. Attachment 4-1, Guidance for Developing Ecological Soil-Screening Levels (Eco-SSLs), OSWER Directive 9285.7-55 (issued November 2003, revised February 2005, revised April 2007).

Washington State Department of Ecology (WDOE). 2012. Table 749-4: Wildlife Exposure Model for Site-Specific Evaluations Available at: http://www.ecy.wa.gov/programs/tcp/policies/terrestrial/table_749-4.pdf Taken from: Table Terrestrial Ecological Evaluation (TEE) Process- The Site-Specific Evaluation. Available at: http://www.ecy.wa.gov/programs/tcp/policies/terrestrial/site-specific.htm. Toxics Cleanup Program, Model Toxics Control Act Cleanup (MTCA) Regulation. Accessed 6/22/2012.

Modeled Receptor: Short-tailed Shrew

Intake Equations:

Equation (a) - total CPEC intake

$$Intake_{total} = Intake_{food} + Intake_{water} + Intake_{soil}$$

Parameters - Equation (a):

Parameter	Description	Units	Value	Source/Notes
$Intake_{food}$	average daily intake from ingestion of prey items (vegetation and animal tissues).	mg/kg	calculated	See Equation (b)
$Intake_{soil}$	average daily intake from incidental ingestion of surface soil.	mg/kg	calculated	See Equation (c)
$Intake_{water}$	average daily intake from the ingestion of water.	mg/kg	0	No surface water at Upland Facility; water intake assumed to be 0.

Equation (b) - CPEC intake from food

$$Intake_{food} = AUF * \left(\sum_{i=1}^{N} B_{ij} * P_i * FIR \right)$$

Parameters - Equation (b):

Parameter	Description	Units	Value	Source/Notes
$Intake_{food}$	Intake for contaminant (j) in food	mg dw/kg bw-d	calculated	
AUF	Area use factor	unitless	1	Fraction of food derived from site; area use assumed to be 100%
FIR	Food intake rate	kg dw/kg bw-d	0.209	EPA 2007 - food ingestion rate for shrew
N	total number of ingested prey types	unitless	1	EPA 2007 - shrew diet
P_i	Fraction of food as prey $type_i$	unitless	Plants - 0	EPA 2007 - shrew diet
			Invertebrates - 1	
			Plants - 0.5	Omnivorous diet
			Invertebrates - 0.5	

Equation (c) - CPEC intake from ingested soil

$$Intake_{soil} = AUF * (FIR * P_s * C_{js} * AF_{js})$$

Parameters - Equation (c):

Parameter	Description	Units	Value	Source/Notes
$Intake_{soil}$	Intake for contaminant (j) in soil	mg dw/kg bw-d	calculated	
C_{js}	Concentration of contaminant (j) in soil (s)	mg/kg dw	available data	All available site-wide sample data
FIR	Food intake rate	kg dw/kg bw-d	0.209	EPA 2007 - food ingestion rate for shrew
P_s	Proportion of total mass intake that is soil	kg soil/kg food	0.03	EPA 2007 - soil ingestion rate for shrew
AF_{js}	Bioavailability factor of contaminant (j) in soil	unitless	1	Bioavailability of all other analytes from ingested soil and food was conservatively assumed to be 100%.
P_i	Fraction of food as prey $type_i$	unitless	Plants - 0	EPA 2007 - shrew diet
			Invertebrates - 1	
			Plants - 0.5	Omnivorous diet
			Invertebrates - 0.5	
AUF	Area use factor	unitless	1	Fraction of food derived from site; area use assumed to be 100%

Notes:
mg - milligram dw - dry weight
kg - kilogram bw - body weight
d - day
Koc = organic carbon normalized soil-water partition coefficient for organic compounds
Kow = octanol-water partition coefficient
HPAHs - High molecular weight polyaromatic hydrocarbons
Diesel range hydrocarbons and dibenzofuran not evaluated in this Level II expanded assessment.

Sources:

United States Environmental Protection Agency (EPA). 2007. Attachment 4-1, Guidance for Developing Ecological Soil-Screening Levels (Eco-SSLs), OSWER Directive 9285.7-55 (issued November 2003, revised February 2005, revised April 2007).

Plant Tissue Concentration Estimation Equations

COPC	Food Tissue Concentration			Source
	BAF	m	B	
Arsenic	0.03752	NA	NA	EcoSSL Model
Beryllium	NA	0.7345	-0.5361	EcoSSL Model
Cadmium	NA	0.546	-0.475	EcoSSL Model
Chromium	0.041	NA	NA	EcoSSL Model
Lead	NA	0.561	-1.328	EcoSSL Model
Mercury	NA	0.544	-0.996	Bechtel Jacobs (1998)
Nickel	NA	0.748	-2.223	EcoSSL Model
Selenium	NA	1.104	-0.677	EcoSSL Model
Silver	0.014	NA	NA	EcoSSL Model
Thallium	0.004	NA	NA	LANL ECORISK Database v 4.1
Zinc	NA	0.554	1.575	EcoSSL Model

Where BAF = NA; $\ln C_{plant} = m \times \ln C_{soil} + B$

Where BAF <> NA, $C_{plant} = C_{soil} \times BAF$

EcoSSL Model - https://www.epa.gov/chemical-research/interim-ecological-soil-screening-level-documents

LANL ECORISK Database v4.1 - https://www.lanl.gov/environment/protection/eco-risk-assessment.php

Bechtel-Jacobs. 1998. Empirical Models for the Uptake of Inorganic Chemicals from Soil by Plants. Bechtel-Jacobs Company LLC, Oak Ridge, TN. BJC/OR-133.

Invertebrate Tissue Concentration Estimation Equations

COPC	Calculations:Cinv			Source
	BAF	m	B	
Arsenic	NA	0.706	-1.421	EcoSSL Model
Beryllium	0.045	NA	NA	EcoSSL Model
Cadmium	NA	0.795	2.114	EcoSSL Model
Chromium	0.306	NA	NA	EcoSSL Model
Lead	NA	0.807	-0.218	EcoSSL Model
Mercury	NA	0.118	-0.684	Sample et al. (1998)
Nickel	0.7778	NA	NA	EcoSSL Model
Selenium	NA	0.733	-0.075	EcoSSL Model
Silver	2.045	NA	NA	EcoSSL Model
Thallium	0.0541	NA	NA	LANL ECORISK Database v 4.1
Zinc	NA	0.328	4.449	EcoSSL Model

Where BAF = NA; lnCinv = m x lnCsoil + B
Where BAF <> NA, Cinv = Csoil x BAF

EcoSSL Model - https://www.epa.gov/chemical-research/interim-ecological-soil-screening-level-documents
LANL ECORISK Database v4.1 - https://www.lanl.gov/environment/protection/eco-risk-assessment.php
Sample, B. E, J. J. Beauchamp, R. A. Efroymson, and G. W. Suter, II. 1998. Development and Validation of Bioaccumulation Models for Small Mammals. Oak Ridge National Laboratory ES/ER/TM-219. Lockheed Martin Energy Systems Environmental Restoration Program.

Avian Toxicity Reference Values

Analyte	Ecological Benchmark Value	Type of Value	From Residual Risk Assessment?	Source/Notes
Arsenic	22.4	LOAEL	No	ECORISK v 4.1 (LANL 2017) - Chronic CS
Beryllium	N/A			
Cadmium	6.4	LOAEL	Yes	Oregon DEQ (2013) preferred value (cited as geomean of toxicity data presented in EcoSSL [EPA 2005c])
Chromium	8.35	LOAEL	No	ECORISK v 4.1 (LANL 2017) - Chronic GMM
Lead	3.3	LOAEL	Yes	Based on EcoSSL data, as used in Portland Harbor BERA (LWG 2011)
Mercury (methyl)	0.064	LOAEL	Yes	Heinz (1975, 1979)
Nickel	26.8	LOAEL	No	ECORISK v 4.1 (LANL 2017) - Chronic GMM
Selenium	0.58	LOAEL	No	ECORISK v 4.1 (LANL 2017) - Chronic CS
Silver	20.2	LOAEL	No	ECORISK v 4.1 (LANL 2017) - Chronic CS
Thallium	3.5	LOAEL	No	ECORISK v 4.1 (LANL 2017) - Chronic CS
Zinc	171.0	LOAEL	Yes	Geometric mean of LOAELs for reproduction and growth from EcoSSL (EPA 2007) as used in Portland Harbor BERA

LANL 2017 Chronic CS and Chronic GMM calculated using methods provided for L-ESL calculations in ECORISK v 3.3 (LANL 2014. Toxicity Reference Value Developments for the Los Alamso National Laboratory Revision 1. LA-UR-14-20694)

Heinz, G.H. 1975. Effects of methylmercury on approach and avoidance behavior of mallard ducklings. Bulletin of Environmental Contamination and Toxicology. 13: 554-564.
Heinz, G.H. 1979. Methylmercury: Reproductive and behavioral effects on three generations of mallard ducks. The Journal of Wildlife Management. 43: 394-401.
LANL ECORISK Database v4.1 - https://www.lanl.gov/environment/protection/eco-risk-assessment.php
Lower Willamette Group (LWG). 2011. Portland Harbor RI/FS. Draft Final Remedial Investigation Report. Appendix G. BERA. July 1, 2011.

Oregon DEQ (Oregon Department of Environmental Quality). 2013. Letter from Kenneth Thiessen (Oregon DEQ) to Dwight Leisle (Port) re: comments on "Draft Residual Human Health and Ecological Risk Residual Assessments Willamette Cove Upland Facility. ECSI# 2066". July 19, 2013.
United States Environmental Protection Agency (EPA). 2007. Ecological Soil Screening Levels for Zinc, Interim Final. OSWER Directive 9285.7-73 (June 2007).

Mammalian Toxicity Reference Values

Analyte	Ecological Benchmark Value	Type of Value	From Residual Risk Assessment?	Source/Notes
Arsenic	1.66	LOAEL	No	ECORISK v 4.1 (LANL 2017) - Chronic CS
Beryllium	5.32	LOAEL	No	ECORISK v 4.1 (LANL 2017) - Chronic CS
Cadmium	7.7	LOAEL	Yes	Oregon DEQ (2013) preferred value - (cited as LOAEL from same study as NOAEL in EPA 2005a).
Chromium	240	LOAEL	No	ECORISK v 4.1 (LANL 2017) - Chronic GMM
Lead	8.9	LOAEL	Yes	TRV used in Portland Harbor BERA; from EcoSSL (EPA 2005b)
Mercury (methyl)	0.16	LOAEL	No	ECORISK v 4.1 (LANL 2017) - Chronic CS
Nickel	3.4	LOAEL	No	ECORISK v 4.1 (LANL 2017) - Chronic CS
Selenium	0.215	LOAEL	No	ECORISK v 4.1 (LANL 2017) - Chronic CS
Silver	60.2	LOAEL	No	ECORISK v 4.1 (LANL 2017) - Chronic CS
Thallium	0.071	LOAEL	No	ECORISK v 4.1 (LANL 2017) - Chronic CS
Zinc	103.0	LOAEL	Yes	Hill et. al., 1983, as cited in EcoSSL (EPA 2007)

LANL 2017 Chronic CS and Chronic GMM calculated using methods provided for L-ESL calculations in ECORISK v 3.3 (LANL 2014. Toxicity Reference Value Developments for the Los Alamso National Laboratory Revision 1. LA-UR-14-20694)

LANL ECORISK Database v4.1 - https://www.lanl.gov/environment/protection/eco-risk-assessment.php
United States Environmental Protection Agency (EPA). 2005a. Ecological Soil Screening Levels for Cadmium. Interim Final. OSWER Directive 9285.7-65 (March 2005).
United States Environmental Protection Agency (EPA). 2005b. Ecological Soil Screening Levels for Lead, Interim Final. OSWER Directive 9285.7-70 (March 2005).
United States Environmental Protection Agency (EPA). 2007. Ecological Soil Screening Levels for Zinc, Interim Final. OSWER Directive 9285.7-73 (June 2007).

Attachment 4:

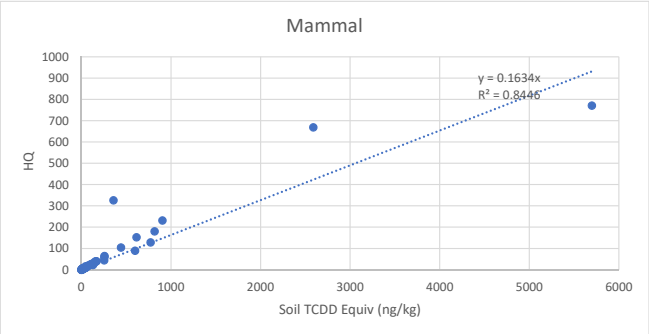
Location Specific Soil Data and Hazard Quotients for Dioxin and Furan Congeners and Total 2,3,7,8-TCDD TEQ

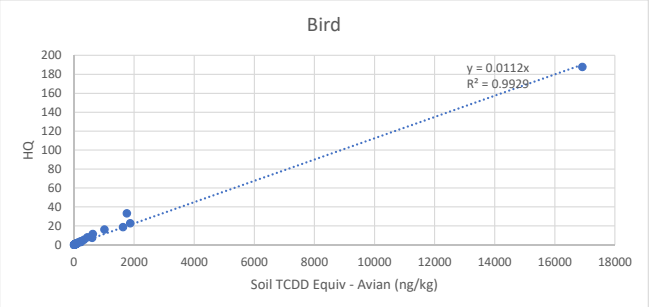
7200 NE Airport Way Portland OR 97218
Box 3529 Portland OR 97208
503 415 6000

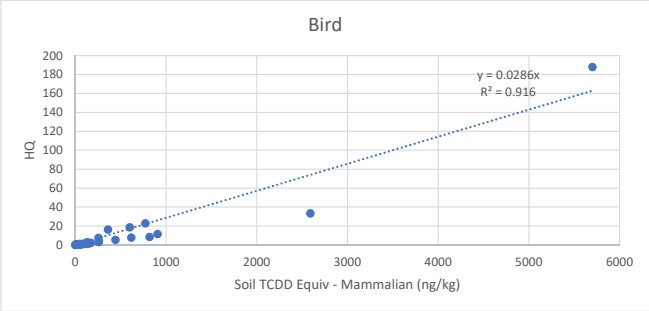
Calculation of Bird and Mammal RBCs for 2,3,7,8-TCDD Equivalents

Calculation of Dioxin/Furan Risk-Based Concentrations for Birds and Mammals
(Methods and data uses described in Section 3 of the COC Screening Memorandum)

Parcel	Sample	Sample Type	Date	2,3,7,8 TCDD Equiv Bird (ng/kg)	2,3,7,8 TCDD Equiv Mammal (ng/kg)	Sum of Congener Specific Bird Hazard Quotient	Sum of Congener Specific Mammal Hazard Quotient
Central Parcel	DU-1	ISM	8/9/2012	229.38	259.00	3.76	65.22
Central Parcel	DU-2	ISM	8/8/2012	1868.90	773.00	22.75	128.76
Central Parcel	DU-3	ISM	8/13/2012	600.35	255.00	7.35	44.48
Central Parcel	DU-6-COMP-1	Composite	4/8/2014	18.32	26.10	0.31	6.30
Central Parcel	DU-6-COMP-2	Composite	4/8/2014	28.60	39.10	0.44	8.92
Central Parcel	DU-6-COMP-3	Composite	4/8/2014	185.29	257.00	2.94	60.04
Central Parcel	DU-6-COMP-4	Composite	4/8/2014	31.38	40.60	0.53	10.18
Central Parcel	RA3-B1	Composite	10/19/2015	36.90	14.30	0.43	4.40
Central Parcel	RA3-B10	Composite	10/19/2015	97.00	109.00	1.50	25.80
Central Parcel	RA3-B11	Composite	10/19/2015	32.06	9.09	0.42	5.18
Central Parcel	RA3-B13	Composite	10/28/2015	26.15	36.20	0.41	8.16
Central Parcel	RA3-B14	Composite	10/28/2015	14.30	17.70	0.22	3.99
Central Parcel	RA3-B15	Composite	12/22/2015	0.60	0.02	0.01	0.07
Central Parcel	RA3-B16	Composite	12/22/2015	6.04	5.27	0.09	1.34
Central Parcel	RA3-B2	Composite	10/19/2015	121.82	162.00	2.11	40.26
Central Parcel	RA3-B3	Composite	10/19/2015	32.00	29.20	0.58	8.90
Central Parcel	RA3-B4	Composite	10/19/2015	39.33	13.60	0.61	8.03
Central Parcel	RA3-B7	Composite	10/21/2015	58.10	78.00	1.00	19.35
Central Parcel	RA3-B8	Composite	10/27/2015	7.74	7.64	0.13	1.91
Central Parcel	RA3-B9	Composite	10/27/2015	3.73	2.24	0.05	0.58
Central Parcel	RA3-D-S3	Composite	12/28/2015	6.42	4.93	0.12	1.81
Central Parcel	RA3-D-S4	Composite	12/30/2015	12.80	16.20	0.24	4.43
Central Parcel	RA3-S1	Composite	10/19/2015	28.24	23.40	0.48	7.52
Central Parcel	RA3-S10	Composite	10/28/2015	49.58	66.80	0.87	16.86
Central Parcel	RA3-S11	Composite	10/28/2015	124.56	170.00	2.03	40.05
Central Parcel	RA3-S12	Composite	10/28/2015	9.91	11.00	0.15	2.64
Central Parcel	RA3-S13	Composite	10/28/2015	8.25	11.30	0.14	2.73
Central Parcel	RA3-S14	Composite	10/28/2015	75.81	122.00	1.41	28.70
Central Parcel	RA3-S15	Composite	10/28/2015	25.20	25.20	0.42	6.22
Central Parcel	RA3-S16	Composite	10/28/2015	624.29	906.00	11.43	231.53
Central Parcel	RA3-S17	Composite	10/28/2015	1008.96	359.00	16.20	326.55
Central Parcel	RA3-S18	Composite	10/28/2015	27.63	32.40	0.44	7.39
Central Parcel	RA3-S19	Composite	10/28/2015	42.68	55.20	0.63	11.60
Central Parcel	RA3-S2	Composite	10/19/2015	63.96	46.40	1.09	16.52
Central Parcel	RA3-S20	Composite	10/28/2015	575.19	818.00	8.48	180.83
Central Parcel	RA3-S21	Composite	10/28/2015	31.12	43.30	0.49	9.80
Central Parcel	RA3-S23	Composite	10/28/2015	33.35	44.30	0.59	11.80
Central Parcel	RA3-S24	Composite	10/28/2015	92.18	123.00	1.35	26.69
Central Parcel	RA3-S25	Composite	10/28/2015	100.05	144.00	1.43	32.99
Central Parcel	RA3-S26	Composite	10/28/2015	29.79	29.50	0.54	7.37
Central Parcel	RA3-S27	Composite	10/28/2015	15.79	14.30	0.29	3.75
Central Parcel	RA3-S28	Composite	12/22/2015	2.04	1.76	0.03	0.42
Central Parcel	RA3-S29	Composite	12/22/2015	29.58	28.50	0.47	7.06
Central Parcel	RA3-S3	Composite	10/19/2015	441.01	617.00	7.81	153.05
Central Parcel	RA3-S5	Composite	10/19/2015	332.52	443.00	5.37	104.73
Central Parcel	RA3-S6	Composite	10/28/2015	14.96	17.20	0.20	3.60
Central Parcel	RA3-S7	Composite	10/28/2015	13.62	14.50	0.20	3.08
Central Parcel	RA3-S8	Composite	10/28/2015	38.93	51.30	0.61	11.39
Central Parcel	RA3-S9	Composite	10/28/2015	1755.97	2590.00	33.19	668.54
Central Parcel	WC-1 Surface	Discrete	10/1/2010	1629.01	600.00	18.60	89.87
Central Parcel	WC-1/2/3	Composite	10/1/2010	43.24	80.00	0.80	20.94
Central Parcel	WC-2 Surface	Discrete	10/1/2010	232.01	130.00	2.88	23.05
Central Parcel	WC-3 Surface	Discrete	10/1/2010	16912.89	5700.00	187.86	770.83
East Parcel	DU-4	ISM	1/13/2014	38.66	61.20	0.71	15.67
West Parcel	DU-7	ISM	1/13/2014	78.76	103.00	1.29	24.97
Central Parcel	DU-5	ISM	1/13/2014	105.52	152.00	1.76	37.61







y = HQ	
x = 2,3,7,8 TCDD Equiv (ng/kg)	
Mammal RBC (TEQ HQ = 1)	
y = 0.1634x	
Where y = 1, x =	6.1
Bird RBC (Avian TEQ HQ = 1)	
y = 0.0112x	
Where y = 1, x =	89.3
Bird RBC (Mammalian TEQ HQ = 1)	
y = 0.0286x	
Where y = 1, x =	35.0

Note: Mammal RBC should be compared to mammalian 2,3,7,8 TCDD Eq only.

Note: Bird RBC should be compared to avian 2,3,7,8 TCDD Eq only.

Note: Bird RBC using mammalian TEQs shou be compared to mammalian 2,3,7,8 TCDD Eq to represent potential risk to birds.

Location Specific Soil Data and Mammalian Hazard Quotients for Dioxin and Furan Congeners and Total 2,3,7,8-TCDD TEQ

Mammalian Dioxin Tool for all Samples where [Upland0_3] = "Y" (and DU-5) Based on WC_All_data.xlsx data file sent by CO on 10/8/2018 6:30pm. Note: Mammalian 2,3,7,8-TCDD TEQ provided as calculated in the laboratory database.

Parcel	Media	Sample	CompSampIn	Date	Upland0_3	StdAnalyteDiox	StdResult	Qualifier	DetectFlag	UnitsStd	MammalRBC	Mammal Hazard Quotient
Central Parcel	Soil	DU-1	ISM	8/9/2012	Y	1,2,3,4,6,7,8-HpCDD	3.16E-03	E	Y	mg/kg	3.91E-04	8.08E+00
Central Parcel	Soil	DU-1	ISM	8/9/2012	Y	1,2,3,4,6,7,8-HpCDF	3.87E-04		Y	mg/kg	3.83E-04	1.01E+00
Central Parcel	Soil	DU-1	ISM	8/9/2012	Y	1,2,3,4,7,8,9-HpCDF	2.32E-05		Y	mg/kg	3.83E-04	6.06E-02
Central Parcel	Soil	DU-1	ISM	8/9/2012	Y	1,2,3,4,7,8-HxCDD	5.30E-05		Y	mg/kg	5.30E-05	1.00E+00
Central Parcel	Soil	DU-1	ISM	8/9/2012	Y	1,2,3,4,7,8-HxCDF	4.68E-05		Y	mg/kg	2.29E-05	2.04E+00
Central Parcel	Soil	DU-1	ISM	8/9/2012	Y	1,2,3,6,7,8-HxCDD	6.59E-04		Y	mg/kg	2.30E-05	2.87E+01
Central Parcel	Soil	DU-1	ISM	8/9/2012	Y	1,2,3,6,7,8-HxCDF	4.24E-05		Y	mg/kg	2.29E-05	1.85E+00
Central Parcel	Soil	DU-1	ISM	8/9/2012	Y	1,2,3,7,8,9-HxCDD	3.33E-04		Y	mg/kg	2.30E-05	1.45E+01
Central Parcel	Soil	DU-1	ISM	8/9/2012	Y	1,2,3,7,8,9-HxCDF	4.08E-07	U	N	mg/kg	4.52E-05	9.02E-03
Central Parcel	Soil	DU-1	ISM	8/9/2012	Y	1,2,3,7,8-PeCDD	6.74E-05		Y	mg/kg	5.67E-05	1.19E+00
Central Parcel	Soil	DU-1	ISM	8/9/2012	Y	1,2,3,7,8-PeCDF	1.83E-05		Y	mg/kg	4.31E-04	4.24E-02
Central Parcel	Soil	DU-1	ISM	8/9/2012	Y	2,3,4,6,7,8-HxCDF	7.42E-05		Y	mg/kg	2.29E-05	3.23E+00
Central Parcel	Soil	DU-1	ISM	8/9/2012	Y	2,3,4,7,8-PeCDF	7.24E-05		Y	mg/kg	3.35E-05	2.16E+00
Central Parcel	Soil	DU-1	ISM	8/9/2012	Y	2,3,7,8-TCDD	6.30E-06		Y	mg/kg	1.95E-05	3.24E-01
Central Parcel	Soil	DU-1	ISM	8/9/2012	Y	2,3,7,8-TCDF	1.34E-05		Y	mg/kg	1.30E-04	1.03E-01
Central Parcel	Soil	DU-1	ISM	8/9/2012	Y	OCDD	1.83E-02	E	Y	mg/kg	2.17E-02	8.42E-01
Central Parcel	Soil	DU-1	ISM	8/9/2012	Y	OCDF	3.31E-04		Y	mg/kg	5.49E-03	6.02E-02
Central Parcel	Soil	DU-1	ISM	8/9/2012	Y	Total 2,3,7,8-TCDD TEQ HQ				mg/kg		**6.52E+01**
Central Parcel	Soil	DU-1	ISM	8/9/2012	Y	2,3,7,8-TCDD TEQ	**2.59E-04**		Y	mg/kg	1.95E-05	1.33E+01
Central Parcel	Soil	DU-2	ISM	8/8/2012	Y	1,2,3,4,6,7,8-HpCDD	2.55E-03	E	Y	mg/kg	3.91E-04	6.52E+00
Central Parcel	Soil	DU-2	ISM	8/8/2012	Y	1,2,3,4,6,7,8-HpCDF	4.49E-04		Y	mg/kg	3.83E-04	1.17E+00
Central Parcel	Soil	DU-2	ISM	8/8/2012	Y	1,2,3,4,7,8,9-HpCDF	7.38E-05		Y	mg/kg	3.83E-04	1.93E-01
Central Parcel	Soil	DU-2	ISM	8/8/2012	Y	1,2,3,4,7,8-HxCDD	4.39E-05		Y	mg/kg	5.30E-05	8.28E-01
Central Parcel	Soil	DU-2	ISM	8/8/2012	Y	1,2,3,4,7,8-HxCDF	2.55E-04		Y	mg/kg	2.29E-05	1.11E+01
Central Parcel	Soil	DU-2	ISM	8/8/2012	Y	1,2,3,6,7,8-HxCDD	2.82E-04		Y	mg/kg	2.30E-05	1.23E+01
Central Parcel	Soil	DU-2	ISM	8/8/2012	Y	1,2,3,6,7,8-HxCDF	2.80E-04		Y	mg/kg	2.29E-05	1.22E+01
Central Parcel	Soil	DU-2	ISM	8/8/2012	Y	1,2,3,7,8,9-HxCDD	1.23E-04		Y	mg/kg	2.30E-05	5.36E+00
Central Parcel	Soil	DU-2	ISM	8/8/2012	Y	1,2,3,7,8,9-HxCDF	8.35E-07	U	N	mg/kg	4.52E-05	1.85E-02
Central Parcel	Soil	DU-2	ISM	8/8/2012	Y	1,2,3,7,8-PeCDD	8.48E-05		Y	mg/kg	5.67E-05	1.50E+00
Central Parcel	Soil	DU-2	ISM	8/8/2012	Y	1,2,3,7,8-PeCDF	4.56E-05		Y	mg/kg	4.31E-04	1.06E-01
Central Parcel	Soil	DU-2	ISM	8/8/2012	Y	2,3,4,6,7,8-HxCDF	6.52E-04		Y	mg/kg	2.29E-05	2.84E+01
Central Parcel	Soil	DU-2	ISM	8/8/2012	Y	2,3,4,7,8-PeCDF	1.59E-03	E	Y	mg/kg	3.35E-05	4.75E+01
Central Parcel	Soil	DU-2	ISM	8/8/2012	Y	2,3,7,8-TCDD	6.45E-06		Y	mg/kg	1.95E-05	3.32E-01
Central Parcel	Soil	DU-2	ISM	8/8/2012	Y	2,3,7,8-TCDF	3.73E-05		Y	mg/kg	1.30E-04	2.86E-01
Central Parcel	Soil	DU-2	ISM	8/8/2012	Y	OCDD	1.88E-02	E	Y	mg/kg	2.17E-02	8.65E-01
Central Parcel	Soil	DU-2	ISM	8/8/2012	Y	OCDF	3.10E-04		Y	mg/kg	5.49E-03	5.64E-02
Central Parcel	Soil	DU-2	ISM	8/8/2012	Y	Total 2,3,7,8-TCDD TEQ HQ				mg/kg		**1.29E+02**
Central Parcel	Soil	DU-2	ISM	8/8/2012	Y	2,3,7,8-TCDD TEQ	**7.73E-04**		Y	mg/kg	1.95E-05	3.97E+01
Central Parcel	Soil	DU-3	ISM	8/13/2012	Y	1,2,3,4,6,7,8-HpCDD	1.53E-03	E	Y	mg/kg	3.91E-04	3.91E+00
Central Parcel	Soil	DU-3	ISM	8/13/2012	Y	1,2,3,4,6,7,8-HpCDF	2.35E-04		Y	mg/kg	3.83E-04	6.14E-01
Central Parcel	Soil	DU-3	ISM	8/13/2012	Y	1,2,3,4,7,8,9-HpCDF	2.12E-05		Y	mg/kg	3.83E-04	5.54E-02
Central Parcel	Soil	DU-3	ISM	8/13/2012	Y	1,2,3,4,7,8-HxCDD	2.03E-05		Y	mg/kg	5.30E-05	3.83E-01
Central Parcel	Soil	DU-3	ISM	8/13/2012	Y	1,2,3,4,7,8-HxCDF	5.13E-05		Y	mg/kg	2.29E-05	2.24E+00
Central Parcel	Soil	DU-3	ISM	8/13/2012	Y	1,2,3,6,7,8-HxCDD	1.18E-04		Y	mg/kg	2.30E-05	5.14E+00
Central Parcel	Soil	DU-3	ISM	8/13/2012	Y	1,2,3,6,7,8-HxCDF	8.19E-05		Y	mg/kg	2.29E-05	3.57E+00
Central Parcel	Soil	DU-3	ISM	8/13/2012	Y	1,2,3,7,8,9-HxCDD	6.42E-05		Y	mg/kg	2.30E-05	2.80E+00
Central Parcel	Soil	DU-3	ISM	8/13/2012	Y	1,2,3,7,8,9-HxCDF	4.94E-07	U	N	mg/kg	4.52E-05	1.09E-02
Central Parcel	Soil	DU-3	ISM	8/13/2012	Y	1,2,3,7,8-PeCDD	2.15E-05		Y	mg/kg	5.67E-05	3.79E-01
Central Parcel	Soil	DU-3	ISM	8/13/2012	Y	1,2,3,7,8-PeCDF	1.56E-05		Y	mg/kg	4.31E-04	3.62E-02
Central Parcel	Soil	DU-3	ISM	8/13/2012	Y	2,3,4,6,7,8-HxCDF	2.14E-04		Y	mg/kg	2.29E-05	9.33E+00
Central Parcel	Soil	DU-3	ISM	8/13/2012	Y	2,3,4,7,8-PeCDF	5.10E-04		Y	mg/kg	3.35E-05	1.52E+01
Central Parcel	Soil	DU-3	ISM	8/13/2012	Y	2,3,7,8-TCDD	2.58E-06		Y	mg/kg	1.95E-05	1.33E-01
Central Parcel	Soil	DU-3	ISM	8/13/2012	Y	2,3,7,8-TCDF	1.62E-05		Y	mg/kg	1.30E-04	1.24E-01
Central Parcel	Soil	DU-3	ISM	8/13/2012	Y	OCDD	1.00E-02	E	Y	mg/kg	2.17E-02	4.60E-01

Location Specific Soil Data and Mammalian Hazard Quotients for Dioxin and Furan Congeners and Total 2,3,7,8-TCDD TEQ

Mammalian Dioxin Tool for all Samples where [Upland0_3] = "Y" (and DU-5) Based on WC_All_data.xlsx data file sent by CO on 10/8/2018 6:30pm. Note: Mammalian 2,3,7,8-TCDD TEQ provided as calculated in the laboratory database.

Parcel	Media	Sample	CompSampIn	Date	Upland0_3	StdAnalyteDiox	StdResult	Qualifier	DetectFlag	UnitsStd	MammalRBC	Mammal Hazard Quotient
Central Parcel	Soil	DU-3	ISM	8/13/2012	Y	OCDF	3.66E-04		Y	mg/kg	5.49E-03	6.66E-02
Central Parcel	Soil	DU-3	ISM	8/13/2012	Y	Total 2,3,7,8-TCDD TEQ HQ				mg/kg		**4.45E+01**
Central Parcel	Soil	DU-3	ISM	8/13/2012	Y	2,3,7,8-TCDD TEQ	**2.55E-04**		Y	mg/kg	1.95E-05	1.31E+01
Central Parcel	Soil	DU-6-COMP-1	Composite	4/8/2014	Y	1,2,3,4,6,7,8-HpCDD	3.09E-04		Y	mg/kg	3.91E-04	7.90E-01
Central Parcel	Soil	DU-6-COMP-1	Composite	4/8/2014	Y	1,2,3,4,6,7,8-HpCDF	8.03E-05		Y	mg/kg	3.83E-04	2.10E-01
Central Parcel	Soil	DU-6-COMP-1	Composite	4/8/2014	Y	1,2,3,4,7,8,9-HpCDF	3.07E-06		Y	mg/kg	3.83E-04	8.02E-03
Central Parcel	Soil	DU-6-COMP-1	Composite	4/8/2014	Y	1,2,3,4,7,8-HxCDD	4.10E-06		Y	mg/kg	5.30E-05	7.74E-02
Central Parcel	Soil	DU-6-COMP-1	Composite	4/8/2014	Y	1,2,3,4,7,8-HxCDF	3.04E-06		Y	mg/kg	2.29E-05	1.33E-01
Central Parcel	Soil	DU-6-COMP-1	Composite	4/8/2014	Y	1,2,3,6,7,8-HxCDD	6.56E-05		Y	mg/kg	2.30E-05	2.86E+00
Central Parcel	Soil	DU-6-COMP-1	Composite	4/8/2014	Y	1,2,3,6,7,8-HxCDF	2.10E-06		Y	mg/kg	2.29E-05	9.16E-02
Central Parcel	Soil	DU-6-COMP-1	Composite	4/8/2014	Y	1,2,3,7,8,9-HxCDD	3.75E-05		Y	mg/kg	2.30E-05	1.63E+00
Central Parcel	Soil	DU-6-COMP-1	Composite	4/8/2014	Y	1,2,3,7,8,9-HxCDF	7.33E-07	J	Y	mg/kg	4.52E-05	1.62E-02
Central Parcel	Soil	DU-6-COMP-1	Composite	4/8/2014	Y	1,2,3,7,8-PeCDD	8.85E-06		Y	mg/kg	5.67E-05	1.56E-01
Central Parcel	Soil	DU-6-COMP-1	Composite	4/8/2014	Y	1,2,3,7,8-PeCDF	1.05E-06	J	Y	mg/kg	4.31E-04	2.43E-03
Central Parcel	Soil	DU-6-COMP-1	Composite	4/8/2014	Y	2,3,4,6,7,8-HxCDF	3.03E-06		Y	mg/kg	2.29E-05	1.32E-01
Central Parcel	Soil	DU-6-COMP-1	Composite	4/8/2014	Y	2,3,4,7,8-PeCDF	9.47E-07	J	Y	mg/kg	3.35E-05	2.83E-02
Central Parcel	Soil	DU-6-COMP-1	Composite	4/8/2014	Y	2,3,7,8-TCDD	7.16E-07		Y	mg/kg	1.95E-05	3.68E-02
Central Parcel	Soil	DU-6-COMP-1	Composite	4/8/2014	Y	2,3,7,8-TCDF	8.59E-07		Y	mg/kg	1.30E-04	6.59E-03
Central Parcel	Soil	DU-6-COMP-1	Composite	4/8/2014	Y	OCDD	1.76E-03		Y	mg/kg	2.17E-02	8.09E-02
Central Parcel	Soil	DU-6-COMP-1	Composite	4/8/2014	Y	OCDF	2.17E-04		Y	mg/kg	5.49E-03	3.95E-02
Central Parcel	Soil	DU-6-COMP-1	Composite	4/8/2014	Y	Total 2,3,7,8-TCDD TEQ HQ				mg/kg		**6.30E+00**
Central Parcel	Soil	DU-6-COMP-1	Composite	4/8/2014	Y	2,3,7,8-TCDD TEQ	**2.61E-05**		Y	mg/kg	1.95E-05	1.34E+00
Central Parcel	Soil	DU-6-COMP-2	Composite	4/8/2014	Y	1,2,3,4,6,7,8-HpCDD	2.82E-04		Y	mg/kg	3.91E-04	7.21E-01
Central Parcel	Soil	DU-6-COMP-2	Composite	4/8/2014	Y	1,2,3,4,6,7,8-HpCDF	7.02E-05		Y	mg/kg	3.83E-04	1.83E-01
Central Parcel	Soil	DU-6-COMP-2	Composite	4/8/2014	Y	1,2,3,4,7,8,9-HpCDF	2.12E-06		Y	mg/kg	3.83E-04	5.54E-03
Central Parcel	Soil	DU-6-COMP-2	Composite	4/8/2014	Y	1,2,3,4,7,8-HxCDD	5.33E-06		Y	mg/kg	5.30E-05	1.01E-01
Central Parcel	Soil	DU-6-COMP-2	Composite	4/8/2014	Y	1,2,3,4,7,8-HxCDF	3.33E-06		Y	mg/kg	2.29E-05	1.45E-01
Central Parcel	Soil	DU-6-COMP-2	Composite	4/8/2014	Y	1,2,3,6,7,8-HxCDD	1.02E-04		Y	mg/kg	2.30E-05	4.44E+00
Central Parcel	Soil	DU-6-COMP-2	Composite	4/8/2014	Y	1,2,3,6,7,8-HxCDF	2.30E-06		Y	mg/kg	2.29E-05	1.00E-01
Central Parcel	Soil	DU-6-COMP-2	Composite	4/8/2014	Y	1,2,3,7,8,9-HxCDD	6.04E-05		Y	mg/kg	2.30E-05	2.63E+00
Central Parcel	Soil	DU-6-COMP-2	Composite	4/8/2014	Y	1,2,3,7,8,9-HxCDF	4.18E-07	J	Y	mg/kg	4.52E-05	9.24E-03
Central Parcel	Soil	DU-6-COMP-2	Composite	4/8/2014	Y	1,2,3,7,8-PeCDD	1.61E-05		Y	mg/kg	5.67E-05	2.84E-01
Central Parcel	Soil	DU-6-COMP-2	Composite	4/8/2014	Y	1,2,3,7,8-PeCDF	1.21E-06		Y	mg/kg	4.31E-04	2.80E-03
Central Parcel	Soil	DU-6-COMP-2	Composite	4/8/2014	Y	2,3,4,6,7,8-HxCDF	2.85E-06		Y	mg/kg	2.29E-05	1.24E-01
Central Parcel	Soil	DU-6-COMP-2	Composite	4/8/2014	Y	2,3,4,7,8-PeCDF	1.35E-06		Y	mg/kg	3.35E-05	4.03E-02
Central Parcel	Soil	DU-6-COMP-2	Composite	4/8/2014	Y	2,3,7,8-TCDD	9.47E-07		Y	mg/kg	1.95E-05	4.87E-02
Central Parcel	Soil	DU-6-COMP-2	Composite	4/8/2014	Y	2,3,7,8-TCDF	7.37E-07		Y	mg/kg	1.30E-04	5.65E-03
Central Parcel	Soil	DU-6-COMP-2	Composite	4/8/2014	Y	OCDD	1.17E-03		Y	mg/kg	2.17E-02	5.38E-02
Central Parcel	Soil	DU-6-COMP-2	Composite	4/8/2014	Y	OCDF	9.31E-05		Y	mg/kg	5.49E-03	1.69E-02
Central Parcel	Soil	DU-6-COMP-2	Composite	4/8/2014	Y	Total 2,3,7,8-TCDD TEQ HQ				mg/kg		**8.92E+00**
Central Parcel	Soil	DU-6-COMP-2	Composite	4/8/2014	Y	2,3,7,8-TCDD TEQ	**3.91E-05**		Y	mg/kg	1.95E-05	2.01E+00
Central Parcel	Soil	DU-6-COMP-3	Composite	4/8/2014	Y	1,2,3,4,6,7,8-HpCDD	1.25E-03	E	Y	mg/kg	3.91E-04	3.20E+00
Central Parcel	Soil	DU-6-COMP-3	Composite	4/8/2014	Y	1,2,3,4,6,7,8-HpCDF	4.02E-04		Y	mg/kg	3.83E-04	1.05E+00
Central Parcel	Soil	DU-6-COMP-3	Composite	4/8/2014	Y	1,2,3,4,7,8,9-HpCDF	6.52E-06		Y	mg/kg	3.83E-04	1.70E-02
Central Parcel	Soil	DU-6-COMP-3	Composite	4/8/2014	Y	1,2,3,4,7,8-HxCDD	3.48E-05		Y	mg/kg	5.30E-05	6.57E-01
Central Parcel	Soil	DU-6-COMP-3	Composite	4/8/2014	Y	1,2,3,4,7,8-HxCDF	8.96E-06		Y	mg/kg	2.29E-05	3.91E-01
Central Parcel	Soil	DU-6-COMP-3	Composite	4/8/2014	Y	1,2,3,6,7,8-HxCDD	7.24E-04		Y	mg/kg	2.30E-05	3.15E+01
Central Parcel	Soil	DU-6-COMP-3	Composite	4/8/2014	Y	1,2,3,6,7,8-HxCDF	9.93E-06		Y	mg/kg	2.29E-05	4.33E-01
Central Parcel	Soil	DU-6-COMP-3	Composite	4/8/2014	Y	1,2,3,7,8,9-HxCDD	4.51E-04		Y	mg/kg	2.30E-05	1.96E+01
Central Parcel	Soil	DU-6-COMP-3	Composite	4/8/2014	Y	1,2,3,7,8,9-HxCDF	1.79E-06		Y	mg/kg	4.52E-05	3.96E-02
Central Parcel	Soil	DU-6-COMP-3	Composite	4/8/2014	Y	1,2,3,7,8-PeCDD	1.08E-04		Y	mg/kg	5.67E-05	1.90E+00
Central Parcel	Soil	DU-6-COMP-3	Composite	4/8/2014	Y	1,2,3,7,8-PeCDF	2.95E-06		Y	mg/kg	4.31E-04	6.84E-03
Central Parcel	Soil	DU-6-COMP-3	Composite	4/8/2014	Y	2,3,4,6,7,8-HxCDF	1.28E-05		Y	mg/kg	2.29E-05	5.58E-01
Central Parcel	Soil	DU-6-COMP-3	Composite	4/8/2014	Y	2,3,4,7,8-PeCDF	5.98E-06		Y	mg/kg	3.35E-05	1.79E-01

Location Specific Soil Data and Mammalian Hazard Quotients for Dioxin and Furan Congeners and Total 2,3,7,8-TCDD TEQ

Mammalian Dioxin Tool for all Samples where [Upland0_3] = "Y" (and DU-5) Based on WC_All_data.xlsx data file sent by CO on 10/8/2018 6:30pm. Note: Mammalian 2,3,7,8-TCDD TEQ provided as calculated in the laboratory database.

Parcel	Media	Sample	CompSampIn	Date	Upland0_3	StdAnalyteDiox	StdResult	Qualifier	DetectFlag	UnitsStd	MammalRBC	Mammal Hazard Quotient
Central Parcel	Soil	DU-6-COMP-3	Composite	4/8/2014	Y	2,3,7,8-TCDD	5.01E-06		Y	mg/kg	1.95E-05	2.57E-01
Central Parcel	Soil	DU-6-COMP-3	Composite	4/8/2014	Y	2,3,7,8-TCDF	3.00E-06		Y	mg/kg	1.30E-04	2.30E-02
Central Parcel	Soil	DU-6-COMP-3	Composite	4/8/2014	Y	OCDD	2.13E-03		Y	mg/kg	2.17E-02	9.80E-02
Central Parcel	Soil	DU-6-COMP-3	Composite	4/8/2014	Y	OCDF	2.64E-04		Y	mg/kg	5.49E-03	4.80E-02
Central Parcel	Soil	DU-6-COMP-3	Composite	4/8/2014	Y	Total 2,3,7,8-TCDD TEQ HQ				mg/kg		**6.00E+01**
Central Parcel	Soil	DU-6-COMP-3	Composite	4/8/2014	Y	2,3,7,8-TCDD TEQ	**2.57E-04**		Y	mg/kg	1.95E-05	1.32E+01
Central Parcel	Soil	DU-6-COMP-4	Composite	4/8/2014	Y	1,2,3,4,6,7,8-HpCDD	3.58E-04		Y	mg/kg	3.91E-04	9.16E-01
Central Parcel	Soil	DU-6-COMP-4	Composite	4/8/2014	Y	1,2,3,4,6,7,8-HpCDF	6.90E-05		Y	mg/kg	3.83E-04	1.80E-01
Central Parcel	Soil	DU-6-COMP-4	Composite	4/8/2014	Y	1,2,3,4,7,8,9-HpCDF	3.85E-06		Y	mg/kg	3.83E-04	1.01E-02
Central Parcel	Soil	DU-6-COMP-4	Composite	4/8/2014	Y	1,2,3,4,7,8-HxCDD	6.16E-06		Y	mg/kg	5.30E-05	1.16E-01
Central Parcel	Soil	DU-6-COMP-4	Composite	4/8/2014	Y	1,2,3,4,7,8-HxCDF	4.10E-06		Y	mg/kg	2.29E-05	1.79E-01
Central Parcel	Soil	DU-6-COMP-4	Composite	4/8/2014	Y	1,2,3,6,7,8-HxCDD	1.14E-04		Y	mg/kg	2.30E-05	4.97E+00
Central Parcel	Soil	DU-6-COMP-4	Composite	4/8/2014	Y	1,2,3,6,7,8-HxCDF	3.76E-06		Y	mg/kg	2.29E-05	1.64E-01
Central Parcel	Soil	DU-6-COMP-4	Composite	4/8/2014	Y	1,2,3,7,8,9-HxCDD	6.43E-05		Y	mg/kg	2.30E-05	2.80E+00
Central Parcel	Soil	DU-6-COMP-4	Composite	4/8/2014	Y	1,2,3,7,8,9-HxCDF	6.88E-07	J	Y	mg/kg	4.52E-05	1.52E-02
Central Parcel	Soil	DU-6-COMP-4	Composite	4/8/2014	Y	1,2,3,7,8-PeCDD	1.35E-05		Y	mg/kg	5.67E-05	2.38E-01
Central Parcel	Soil	DU-6-COMP-4	Composite	4/8/2014	Y	1,2,3,7,8-PeCDF	1.40E-06		Y	mg/kg	4.31E-04	3.24E-03
Central Parcel	Soil	DU-6-COMP-4	Composite	4/8/2014	Y	2,3,4,6,7,8-HxCDF	6.59E-06		Y	mg/kg	2.29E-05	2.87E-01
Central Parcel	Soil	DU-6-COMP-4	Composite	4/8/2014	Y	2,3,4,7,8-PeCDF	4.03E-06		Y	mg/kg	3.35E-05	1.20E-01
Central Parcel	Soil	DU-6-COMP-4	Composite	4/8/2014	Y	2,3,7,8-TCDD	6.93E-07		Y	mg/kg	1.95E-05	3.56E-02
Central Parcel	Soil	DU-6-COMP-4	Composite	4/8/2014	Y	2,3,7,8-TCDF	2.33E-06		Y	mg/kg	1.30E-04	1.79E-02
Central Parcel	Soil	DU-6-COMP-4	Composite	4/8/2014	Y	OCDD	1.87E-03		Y	mg/kg	2.17E-02	8.60E-02
Central Parcel	Soil	DU-6-COMP-4	Composite	4/8/2014	Y	OCDF	2.50E-04		Y	mg/kg	5.49E-03	4.55E-02
Central Parcel	Soil	DU-6-COMP-4	Composite	4/8/2014	Y	Total 2,3,7,8-TCDD TEQ HQ				mg/kg		**1.02E+01**
Central Parcel	Soil	DU-6-COMP-4	Composite	4/8/2014	Y	2,3,7,8-TCDD TEQ	**4.06E-05**		Y	mg/kg	1.95E-05	2.09E+00
Central Parcel	Soil	RA3-B1	Composite	10/19/2015	Y	1,2,3,4,6,7,8-HpCDD	1.27E-04		Y	mg/kg	3.91E-04	3.25E-01
Central Parcel	Soil	RA3-B1	Composite	10/19/2015	Y	1,2,3,4,6,7,8-HpCDF	4.25E-05		Y	mg/kg	3.83E-04	1.11E-01
Central Parcel	Soil	RA3-B1	Composite	10/19/2015	Y	1,2,3,4,7,8,9-HpCDF	1.21E-05	U	N	mg/kg	3.83E-04	3.16E-02
Central Parcel	Soil	RA3-B1	Composite	10/19/2015	Y	1,2,3,4,7,8-HxCDD	5.03E-05		Y	mg/kg	5.30E-05	9.49E-01
Central Parcel	Soil	RA3-B1	Composite	10/19/2015	Y	1,2,3,4,7,8-HxCDF	3.38E-06	J	Y	mg/kg	2.29E-05	1.47E-01
Central Parcel	Soil	RA3-B1	Composite	10/19/2015	Y	1,2,3,6,7,8-HxCDD	1.21E-05	U	N	mg/kg	2.30E-05	5.27E-01
Central Parcel	Soil	RA3-B1	Composite	10/19/2015	Y	1,2,3,6,7,8-HxCDF	3.15E-06	J	Y	mg/kg	2.29E-05	1.37E-01
Central Parcel	Soil	RA3-B1	Composite	10/19/2015	Y	1,2,3,7,8,9-HxCDD	2.64E-05		Y	mg/kg	2.30E-05	1.15E+00
Central Parcel	Soil	RA3-B1	Composite	10/19/2015	Y	1,2,3,7,8,9-HxCDF	1.51E-06	J	Y	mg/kg	4.52E-05	3.34E-02
Central Parcel	Soil	RA3-B1	Composite	10/19/2015	Y	1,2,3,7,8-PeCDD	1.21E-05	U	N	mg/kg	5.67E-05	2.13E-01
Central Parcel	Soil	RA3-B1	Composite	10/19/2015	Y	1,2,3,7,8-PeCDF	1.21E-05	U	N	mg/kg	4.31E-04	2.80E-02
Central Parcel	Soil	RA3-B1	Composite	10/19/2015	Y	2,3,4,6,7,8-HxCDF	5.46E-06	J	Y	mg/kg	2.29E-05	2.38E-01
Central Parcel	Soil	RA3-B1	Composite	10/19/2015	Y	2,3,4,7,8-PeCDF	1.14E-05	J	Y	mg/kg	3.35E-05	3.41E-01
Central Parcel	Soil	RA3-B1	Composite	10/19/2015	Y	2,3,7,8-TCDD	2.42E-06	U	N	mg/kg	1.95E-05	1.24E-01
Central Parcel	Soil	RA3-B1	Composite	10/19/2015	Y	2,3,7,8-TCDF	2.42E-06	U	N	mg/kg	1.30E-04	1.86E-02
Central Parcel	Soil	RA3-B1	Composite	10/19/2015	Y	OCDD	4.92E-04		Y	mg/kg	2.17E-02	2.26E-02
Central Parcel	Soil	RA3-B1	Composite	10/19/2015	Y	OCDF	3.51E-05		Y	mg/kg	5.49E-03	6.39E-03
Central Parcel	Soil	RA3-B1	Composite	10/19/2015	Y	Total 2,3,7,8-TCDD TEQ HQ				mg/kg		**4.40E+00**
Central Parcel	Soil	RA3-B1	Composite	10/19/2015	Y	2,3,7,8-TCDD TEQ	**1.43E-05**		Y	mg/kg	1.95E-05	7.35E-01
Central Parcel	Soil	RA3-B10	Composite	10/19/2015	Y	1,2,3,4,6,7,8-HpCDD	5.05E-04		Y	mg/kg	3.91E-04	1.29E+00
Central Parcel	Soil	RA3-B10	Composite	10/19/2015	Y	1,2,3,4,6,7,8-HpCDF	1.88E-04		Y	mg/kg	3.83E-04	4.91E-01
Central Parcel	Soil	RA3-B10	Composite	10/19/2015	Y	1,2,3,4,7,8,9-HpCDF	1.21E-05	U	N	mg/kg	3.83E-04	3.16E-02
Central Parcel	Soil	RA3-B10	Composite	10/19/2015	Y	1,2,3,4,7,8-HxCDD	1.96E-05		Y	mg/kg	5.30E-05	3.70E-01
Central Parcel	Soil	RA3-B10	Composite	10/19/2015	Y	1,2,3,4,7,8-HxCDF	1.04E-05		Y	mg/kg	2.29E-05	4.53E-01
Central Parcel	Soil	RA3-B10	Composite	10/19/2015	Y	1,2,3,6,7,8-HxCDD	2.81E-04		Y	mg/kg	2.30E-05	1.22E+01
Central Parcel	Soil	RA3-B10	Composite	10/19/2015	Y	1,2,3,6,7,8-HxCDF	9.18E-06		Y	mg/kg	2.29E-05	4.00E-01
Central Parcel	Soil	RA3-B10	Composite	10/19/2015	Y	1,2,3,7,8,9-HxCDD	1.92E-04		Y	mg/kg	2.30E-05	8.36E+00
Central Parcel	Soil	RA3-B10	Composite	10/19/2015	Y	1,2,3,7,8,9-HxCDF	1.21E-05	U	N	mg/kg	4.52E-05	2.68E-01
Central Parcel	Soil	RA3-B10	Composite	10/19/2015	Y	1,2,3,7,8-PeCDD	4.48E-05		Y	mg/kg	5.67E-05	7.90E-01

Location Specific Soil Data and Mammalian Hazard Quotients for Dioxin and Furan Congeners and Total 2,3,7,8-TCDD TEQ

Mammalian Dioxin Tool for all Samples where [Upland0_3] = "Y" (and DU-5) Based on WC_All_data.xlsx data file sent by CO on 10/8/2018 6:30pm. Note: Mammalian 2,3,7,8-TCDD TEQ provided as calculated in the laboratory database.

Parcel	Media	Sample	CompSampIn	Date	Upland0_3	StdAnalyteDiox	StdResult	Qualifier	DetectFlag	UnitsStd	MammalRBC	Mammal Hazard Quotient
Central Parcel	Soil	RA3-B10	Composite	10/19/2015	Y	1,2,3,7,8-PeCDF	4.97E-06		Y	mg/kg	4.31E-04	1.15E-02
Central Parcel	Soil	RA3-B10	Composite	10/19/2015	Y	2,3,4,6,7,8-HxCDF	9.96E-06		Y	mg/kg	2.29E-05	4.34E-01
Central Parcel	Soil	RA3-B10	Composite	10/19/2015	Y	2,3,4,7,8-PeCDF	1.59E-05		Y	mg/kg	3.35E-05	4.75E-01
Central Parcel	Soil	RA3-B10	Composite	10/19/2015	Y	2,3,7,8-TCDD	2.41E-06	U	N	mg/kg	1.95E-05	1.24E-01
Central Parcel	Soil	RA3-B10	Composite	10/19/2015	Y	2,3,7,8-TCDF	3.69E-06		Y	mg/kg	1.30E-04	2.83E-02
Central Parcel	Soil	RA3-B10	Composite	10/19/2015	Y	OCDD	3.65E-04		Y	mg/kg	2.17E-02	1.68E-02
Central Parcel	Soil	RA3-B10	Composite	10/19/2015	Y	OCDF	7.30E-05		Y	mg/kg	5.49E-03	1.33E-02
Central Parcel	Soil	RA3-B10	Composite	10/19/2015	Y	Total 2,3,7,8-TCDD TEQ HQ				mg/kg		**2.58E+01**
Central Parcel	Soil	RA3-B10	Composite	10/19/2015	Y	2,3,7,8-TCDD TEQ	**1.09E-04**		Y	mg/kg	1.95E-05	5.60E+00
Central Parcel	Soil	RA3-B11	Composite	10/19/2015	Y	1,2,3,4,6,7,8-HpCDD	5.90E-05		Y	mg/kg	3.91E-04	1.51E-01
Central Parcel	Soil	RA3-B11	Composite	10/19/2015	Y	1,2,3,4,6,7,8-HpCDF	3.09E-05		Y	mg/kg	3.83E-04	8.07E-02
Central Parcel	Soil	RA3-B11	Composite	10/19/2015	Y	1,2,3,4,7,8,9-HpCDF	1.22E-05	U	N	mg/kg	3.83E-04	3.19E-02
Central Parcel	Soil	RA3-B11	Composite	10/19/2015	Y	1,2,3,4,7,8-HxCDD	1.22E-05	U	Y	mg/kg	5.30E-05	2.30E-01
Central Parcel	Soil	RA3-B11	Composite	10/19/2015	Y	1,2,3,4,7,8-HxCDF	1.22E-05	U	N	mg/kg	2.29E-05	5.32E-01
Central Parcel	Soil	RA3-B11	Composite	10/19/2015	Y	1,2,3,6,7,8-HxCDD	3.69E-05		Y	mg/kg	2.30E-05	1.61E+00
Central Parcel	Soil	RA3-B11	Composite	10/19/2015	Y	1,2,3,6,7,8-HxCDF	1.22E-05	U	N	mg/kg	2.29E-05	5.32E-01
Central Parcel	Soil	RA3-B11	Composite	10/19/2015	Y	1,2,3,7,8,9-HxCDD	2.46E-05		Y	mg/kg	2.30E-05	1.07E+00
Central Parcel	Soil	RA3-B11	Composite	10/19/2015	Y	1,2,3,7,8,9-HxCDF	1.22E-05	U	N	mg/kg	4.52E-05	2.70E-01
Central Parcel	Soil	RA3-B11	Composite	10/19/2015	Y	1,2,3,7,8-PeCDD	1.22E-05	U	N	mg/kg	5.67E-05	2.15E-01
Central Parcel	Soil	RA3-B11	Composite	10/19/2015	Y	1,2,3,7,8-PeCDF	1.22E-05	U	N	mg/kg	4.31E-04	2.83E-02
Central Parcel	Soil	RA3-B11	Composite	10/19/2015	Y	2,3,4,6,7,8-HxCDF	2.46E-06		Y	mg/kg	2.29E-05	1.07E-01
Central Parcel	Soil	RA3-B11	Composite	10/19/2015	Y	2,3,4,7,8-PeCDF	5.92E-06		Y	mg/kg	3.35E-05	1.77E-01
Central Parcel	Soil	RA3-B11	Composite	10/19/2015	Y	2,3,7,8-TCDD	2.44E-06	U	N	mg/kg	1.95E-05	1.25E-01
Central Parcel	Soil	RA3-B11	Composite	10/19/2015	Y	2,3,7,8-TCDF	2.44E-06	U	N	mg/kg	1.30E-04	1.87E-02
Central Parcel	Soil	RA3-B11	Composite	10/19/2015	Y	OCDD	5.89E-05		Y	mg/kg	2.17E-02	2.71E-03
Central Parcel	Soil	RA3-B11	Composite	10/19/2015	Y	OCDF	2.44E-05	U	N	mg/kg	5.49E-03	4.44E-03
Central Parcel	Soil	RA3-B11	Composite	10/19/2015	Y	Total 2,3,7,8-TCDD TEQ HQ				mg/kg		**5.18E+00**
Central Parcel	Soil	RA3-B11	Composite	10/19/2015	Y	2,3,7,8-TCDD TEQ	**9.09E-06**		Y	mg/kg	1.95E-05	4.67E-01
Central Parcel	Soil	RA3-B13	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDD	3.49E-04		Y	mg/kg	3.91E-04	8.93E-01
Central Parcel	Soil	RA3-B13	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDF	7.97E-05		Y	mg/kg	3.83E-04	2.08E-01
Central Parcel	Soil	RA3-B13	Composite	10/28/2015	Y	1,2,3,4,7,8,9-HpCDF	3.41E-06		Y	mg/kg	3.83E-04	8.91E-03
Central Parcel	Soil	RA3-B13	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDD	7.17E-06		Y	mg/kg	5.30E-05	1.35E-01
Central Parcel	Soil	RA3-B13	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDF	2.48E-06		Y	mg/kg	2.29E-05	1.08E-01
Central Parcel	Soil	RA3-B13	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDD	8.34E-05		Y	mg/kg	2.30E-05	3.63E+00
Central Parcel	Soil	RA3-B13	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDF	2.42E-06		Y	mg/kg	2.29E-05	1.06E-01
Central Parcel	Soil	RA3-B13	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDD	5.53E-05		Y	mg/kg	2.30E-05	2.41E+00
Central Parcel	Soil	RA3-B13	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDF	9.13E-07		Y	mg/kg	4.52E-05	2.02E-02
Central Parcel	Soil	RA3-B13	Composite	10/28/2015	Y	1,2,3,7,8-PeCDD	1.42E-05		Y	mg/kg	5.67E-05	2.50E-01
Central Parcel	Soil	RA3-B13	Composite	10/28/2015	Y	1,2,3,7,8-PeCDF	6.57E-07		Y	mg/kg	4.31E-04	1.52E-03
Central Parcel	Soil	RA3-B13	Composite	10/28/2015	Y	2,3,4,6,7,8-HxCDF	3.82E-06		Y	mg/kg	2.29E-05	1.67E-01
Central Parcel	Soil	RA3-B13	Composite	10/28/2015	Y	2,3,4,7,8-PeCDF	1.37E-06		Y	mg/kg	3.35E-05	4.09E-02
Central Parcel	Soil	RA3-B13	Composite	10/28/2015	Y	2,3,7,8-TCDD	9.88E-07		Y	mg/kg	1.95E-05	5.08E-02
Central Parcel	Soil	RA3-B13	Composite	10/28/2015	Y	2,3,7,8-TCDF	4.26E-07		Y	mg/kg	1.30E-04	3.27E-03
Central Parcel	Soil	RA3-B13	Composite	10/28/2015	Y	OCDD	2.27E-03		Y	mg/kg	2.17E-02	1.04E-01
Central Parcel	Soil	RA3-B13	Composite	10/28/2015	Y	OCDF	9.95E-05		Y	mg/kg	5.49E-03	1.81E-02
Central Parcel	Soil	RA3-B13	Composite	10/28/2015	Y	Total 2,3,7,8-TCDD TEQ HQ				mg/kg		**8.16E+00**
Central Parcel	Soil	RA3-B13	Composite	10/28/2015	Y	2,3,7,8-TCDD TEQ	**3.62E-05**		Y	mg/kg	1.95E-05	1.86E+00
Central Parcel	Soil	RA3-B14	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDD	2.14E-04		Y	mg/kg	3.91E-04	5.47E-01
Central Parcel	Soil	RA3-B14	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDF	6.05E-05		Y	mg/kg	3.83E-04	1.58E-01
Central Parcel	Soil	RA3-B14	Composite	10/28/2015	Y	1,2,3,4,7,8,9-HpCDF	3.28E-06		Y	mg/kg	3.83E-04	8.57E-03
Central Parcel	Soil	RA3-B14	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDD	2.62E-06		Y	mg/kg	5.30E-05	4.94E-02
Central Parcel	Soil	RA3-B14	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDF	2.21E-06		Y	mg/kg	2.29E-05	9.63E-02
Central Parcel	Soil	RA3-B14	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDD	3.59E-05		Y	mg/kg	2.30E-05	1.56E+00
Central Parcel	Soil	RA3-B14	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDF	2.14E-06		Y	mg/kg	2.29E-05	9.33E-02

Location Specific Soil Data and Mammalian Hazard Quotients for Dioxin and Furan Congeners and Total 2,3,7,8-TCDD TEQ

Mammalian Dioxin Tool for all Samples where [Upland0_3] = "Y" (and DU-5) Based on WC_All_data.xlsx data file sent by CO on 10/8/2018 6:30pm. Note: Mammalian 2,3,7,8-TCDD TEQ provided as calculated in the laboratory database.

Parcel	Media	Sample	CompSampIn	Date	Upland0_3	StdAnalyteDiox	StdResult	Qualifier	DetectFlag	UnitsStd	MammalRBC	Mammal Hazard Quotient
Central Parcel	Soil	RA3-B14	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDD	2.19E-05		Y	mg/kg	2.30E-05	9.54E-01
Central Parcel	Soil	RA3-B14	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDF	8.01E-07		Y	mg/kg	4.52E-05	1.77E-02
Central Parcel	Soil	RA3-B14	Composite	10/28/2015	Y	1,2,3,7,8-PeCDD	6.19E-06		Y	mg/kg	5.67E-05	1.09E-01
Central Parcel	Soil	RA3-B14	Composite	10/28/2015	Y	1,2,3,7,8-PeCDF	5.64E-07		Y	mg/kg	4.31E-04	1.31E-03
Central Parcel	Soil	RA3-B14	Composite	10/28/2015	Y	2,3,4,6,7,8-HxCDF	4.12E-06		Y	mg/kg	2.29E-05	1.80E-01
Central Parcel	Soil	RA3-B14	Composite	10/28/2015	Y	2,3,4,7,8-PeCDF	2.43E-06		Y	mg/kg	3.35E-05	7.26E-02
Central Parcel	Soil	RA3-B14	Composite	10/28/2015	Y	2,3,7,8-TCDD	4.55E-07		Y	mg/kg	1.95E-05	2.34E-02
Central Parcel	Soil	RA3-B14	Composite	10/28/2015	Y	2,3,7,8-TCDF	5.24E-07		Y	mg/kg	1.30E-04	4.02E-03
Central Parcel	Soil	RA3-B14	Composite	10/28/2015	Y	OCDD	1.58E-03		Y	mg/kg	2.17E-02	7.27E-02
Central Parcel	Soil	RA3-B14	Composite	10/28/2015	Y	OCDF	2.35E-04		Y	mg/kg	5.49E-03	4.28E-02
Central Parcel	Soil	RA3-B14	Composite	10/28/2015	Y	Total 2,3,7,8-TCDD TEQ HQ				mg/kg		**3.99E+00**
Central Parcel	Soil	RA3-B14	Composite	10/28/2015	Y	2,3,7,8-TCDD TEQ	**1.77E-05**		Y	mg/kg	1.95E-05	9.10E-01
Central Parcel	Soil	RA3-B15	Composite	12/22/2015	Y	1,2,3,4,6,7,8-HpCDD	1.31E-06	J	Y	mg/kg	3.91E-04	3.35E-03
Central Parcel	Soil	RA3-B15	Composite	12/22/2015	Y	1,2,3,4,6,7,8-HpCDF	2.13E-07	U	N	mg/kg	3.83E-04	5.57E-04
Central Parcel	Soil	RA3-B15	Composite	12/22/2015	Y	1,2,3,4,7,8,9-HpCDF	6.31E-08	U	N	mg/kg	3.83E-04	1.65E-04
Central Parcel	Soil	RA3-B15	Composite	12/22/2015	Y	1,2,3,4,7,8-HxCDD	4.18E-07	U	N	mg/kg	5.30E-05	7.89E-03
Central Parcel	Soil	RA3-B15	Composite	12/22/2015	Y	1,2,3,4,7,8-HxCDF	5.36E-08	U	N	mg/kg	2.29E-05	2.34E-03
Central Parcel	Soil	RA3-B15	Composite	12/22/2015	Y	1,2,3,6,7,8-HxCDD	3.97E-07	U	N	mg/kg	2.30E-05	1.73E-02
Central Parcel	Soil	RA3-B15	Composite	12/22/2015	Y	1,2,3,6,7,8-HxCDF	5.17E-08	U	N	mg/kg	2.29E-05	2.25E-03
Central Parcel	Soil	RA3-B15	Composite	12/22/2015	Y	1,2,3,7,8,9-HxCDD	4.53E-07	U	N	mg/kg	2.30E-05	1.97E-02
Central Parcel	Soil	RA3-B15	Composite	12/22/2015	Y	1,2,3,7,8,9-HxCDF	7.79E-08	U	N	mg/kg	4.52E-05	1.72E-03
Central Parcel	Soil	RA3-B15	Composite	12/22/2015	Y	1,2,3,7,8-PeCDD	1.73E-07	U	N	mg/kg	5.67E-05	3.05E-03
Central Parcel	Soil	RA3-B15	Composite	12/22/2015	Y	1,2,3,7,8-PeCDF	1.30E-07	U	N	mg/kg	4.31E-04	3.01E-04
Central Parcel	Soil	RA3-B15	Composite	12/22/2015	Y	2,3,4,6,7,8-HxCDF	5.95E-08	U	N	mg/kg	2.29E-05	2.59E-03
Central Parcel	Soil	RA3-B15	Composite	12/22/2015	Y	2,3,4,7,8-PeCDF	1.22E-07	U	N	mg/kg	3.35E-05	3.64E-03
Central Parcel	Soil	RA3-B15	Composite	12/22/2015	Y	2,3,7,8-TCDD	1.04E-07	U	N	mg/kg	1.95E-05	5.35E-03
Central Parcel	Soil	RA3-B15	Composite	12/22/2015	Y	2,3,7,8-TCDF	9.22E-08	U	N	mg/kg	1.30E-04	7.07E-04
Central Parcel	Soil	RA3-B15	Composite	12/22/2015	Y	OCDD	1.25E-05		Y	mg/kg	2.17E-02	5.75E-04
Central Parcel	Soil	RA3-B15	Composite	12/22/2015	Y	OCDF	4.09E-07	J	Y	mg/kg	5.49E-03	7.44E-05
Central Parcel	Soil	RA3-B15	Composite	12/22/2015	Y	Total 2,3,7,8-TCDD TEQ HQ				mg/kg		**7.16E-02**
Central Parcel	Soil	RA3-B15	Composite	12/22/2015	Y	2,3,7,8-TCDD TEQ	**1.70E-08**		Y	mg/kg	1.95E-05	8.74E-04
Central Parcel	Soil	RA3-B16	Composite	12/22/2015	Y	1,2,3,4,6,7,8-HpCDD	3.42E-05		Y	mg/kg	3.91E-04	8.75E-02
Central Parcel	Soil	RA3-B16	Composite	12/22/2015	Y	1,2,3,4,6,7,8-HpCDF	9.51E-06		Y	mg/kg	3.83E-04	2.49E-02
Central Parcel	Soil	RA3-B16	Composite	12/22/2015	Y	1,2,3,4,7,8,9-HpCDF	3.49E-07	U	N	mg/kg	3.83E-04	9.12E-04
Central Parcel	Soil	RA3-B16	Composite	12/22/2015	Y	1,2,3,4,7,8-HxCDD	1.00E-06		Y	mg/kg	5.30E-05	1.89E-02
Central Parcel	Soil	RA3-B16	Composite	12/22/2015	Y	1,2,3,4,7,8-HxCDF	7.98E-07		Y	mg/kg	2.29E-05	3.48E-02
Central Parcel	Soil	RA3-B16	Composite	12/22/2015	Y	1,2,3,6,7,8-HxCDD	1.36E-05		Y	mg/kg	2.30E-05	5.92E-01
Central Parcel	Soil	RA3-B16	Composite	12/22/2015	Y	1,2,3,6,7,8-HxCDF	7.31E-07		Y	mg/kg	2.29E-05	3.19E-02
Central Parcel	Soil	RA3-B16	Composite	12/22/2015	Y	1,2,3,7,8,9-HxCDD	8.26E-06		Y	mg/kg	2.30E-05	3.60E-01
Central Parcel	Soil	RA3-B16	Composite	12/22/2015	Y	1,2,3,7,8,9-HxCDF	2.95E-07	U	N	mg/kg	4.52E-05	6.52E-03
Central Parcel	Soil	RA3-B16	Composite	12/22/2015	Y	1,2,3,7,8-PeCDD	1.58E-06		Y	mg/kg	5.67E-05	2.79E-02
Central Parcel	Soil	RA3-B16	Composite	12/22/2015	Y	1,2,3,7,8-PeCDF	6.55E-07	U	N	mg/kg	4.31E-04	1.52E-03
Central Parcel	Soil	RA3-B16	Composite	12/22/2015	Y	2,3,4,6,7,8-HxCDF	1.31E-06		Y	mg/kg	2.29E-05	5.71E-02
Central Parcel	Soil	RA3-B16	Composite	12/22/2015	Y	2,3,4,7,8-PeCDF	2.03E-06		Y	mg/kg	3.35E-05	6.06E-02
Central Parcel	Soil	RA3-B16	Composite	12/22/2015	Y	2,3,7,8-TCDD	3.18E-07	U	N	mg/kg	1.95E-05	1.63E-02
Central Parcel	Soil	RA3-B16	Composite	12/22/2015	Y	2,3,7,8-TCDF	5.65E-07	U	N	mg/kg	1.30E-04	4.33E-03
Central Parcel	Soil	RA3-B16	Composite	12/22/2015	Y	OCDD	2.23E-04		Y	mg/kg	2.17E-02	1.03E-02
Central Parcel	Soil	RA3-B16	Composite	12/22/2015	Y	OCDF	1.32E-05		Y	mg/kg	5.49E-03	2.40E-03
Central Parcel	Soil	RA3-B16	Composite	12/22/2015	Y	Total 2,3,7,8-TCDD TEQ HQ				mg/kg		**1.34E+00**
Central Parcel	Soil	RA3-B16	Composite	12/22/2015	Y	2,3,7,8-TCDD TEQ	**5.27E-06**		Y	mg/kg	1.95E-05	2.71E-01
Central Parcel	Soil	RA3-B2	Composite	10/19/2015	Y	1,2,3,4,6,7,8-HpCDD	7.90E-04		Y	mg/kg	3.91E-04	2.02E+00
Central Parcel	Soil	RA3-B2	Composite	10/19/2015	Y	1,2,3,4,6,7,8-HpCDF	2.81E-04		Y	mg/kg	3.83E-04	7.34E-01
Central Parcel	Soil	RA3-B2	Composite	10/19/2015	Y	1,2,3,4,7,8,9-HpCDF	1.19E-05	U	N	mg/kg	3.83E-04	3.11E-02
Central Parcel	Soil	RA3-B2	Composite	10/19/2015	Y	1,2,3,4,7,8-HxCDD	2.56E-05		Y	mg/kg	5.30E-05	4.83E-01

Location Specific Soil Data and Mammalian Hazard Quotients for Dioxin and Furan Congeners and Total 2,3,7,8-TCDD TEQ

Mammalian Dioxin Tool for all Samples where [Upland0_3] = "Y" (and DU-5) Based on WC_All_data.xlsx data file sent by CO on 10/8/2018 6:30pm. Note: Mammalian 2,3,7,8-TCDD TEQ provided as calculated in the laboratory database.

Parcel	Media	Sample	CompSampIn	Date	Upland0_3	StdAnalyteDiox	StdResult	Qualifier	DetectFlag	UnitsStd	MammalRBC	Mammal Hazard Quotient
Central Parcel	Soil	RA3-B2	Composite	10/19/2015	Y	1,2,3,4,7,8-HxCDF	1.19E-05	U	N	mg/kg	2.29E-05	5.19E-01
Central Parcel	Soil	RA3-B2	Composite	10/19/2015	Y	1,2,3,6,7,8-HxCDD	4.56E-04		Y	mg/kg	2.30E-05	1.99E+01
Central Parcel	Soil	RA3-B2	Composite	10/19/2015	Y	1,2,3,6,7,8-HxCDF	5.25E-06		Y	mg/kg	2.29E-05	2.29E-01
Central Parcel	Soil	RA3-B2	Composite	10/19/2015	Y	1,2,3,7,8,9-HxCDD	3.26E-04		Y	mg/kg	2.30E-05	1.42E+01
Central Parcel	Soil	RA3-B2	Composite	10/19/2015	Y	1,2,3,7,8,9-HxCDF	1.19E-05	U	N	mg/kg	4.52E-05	2.63E-01
Central Parcel	Soil	RA3-B2	Composite	10/19/2015	Y	1,2,3,7,8-PeCDD	6.40E-05		Y	mg/kg	5.67E-05	1.13E+00
Central Parcel	Soil	RA3-B2	Composite	10/19/2015	Y	1,2,3,7,8-PeCDF	1.19E-05	U	N	mg/kg	4.31E-04	2.76E-02
Central Parcel	Soil	RA3-B2	Composite	10/19/2015	Y	2,3,4,6,7,8-HxCDF	8.28E-06		Y	mg/kg	2.29E-05	3.61E-01
Central Parcel	Soil	RA3-B2	Composite	10/19/2015	Y	2,3,4,7,8-PeCDF	4.63E-06		Y	mg/kg	3.35E-05	1.38E-01
Central Parcel	Soil	RA3-B2	Composite	10/19/2015	Y	2,3,7,8-TCDD	3.65E-06		Y	mg/kg	1.95E-05	1.88E-01
Central Parcel	Soil	RA3-B2	Composite	10/19/2015	Y	2,3,7,8-TCDF	2.38E-06	U	N	mg/kg	1.30E-04	1.83E-02
Central Parcel	Soil	RA3-B2	Composite	10/19/2015	Y	OCDD	7.10E-04		Y	mg/kg	2.17E-02	3.27E-02
Central Parcel	Soil	RA3-B2	Composite	10/19/2015	Y	OCDF	1.05E-04		Y	mg/kg	5.49E-03	1.91E-02
Central Parcel	Soil	RA3-B2	Composite	10/19/2015	Y	Total 2,3,7,8-TCDD TEQ HQ				mg/kg		**4.03E+01**
Central Parcel	Soil	RA3-B2	Composite	10/19/2015	Y	2,3,7,8-TCDD TEQ	**1.62E-04**		Y	mg/kg	1.95E-05	8.33E+00
Central Parcel	Soil	RA3-B3	Composite	10/19/2015	Y	1,2,3,4,6,7,8-HpCDD	1.21E-04		Y	mg/kg	3.91E-04	3.09E-01
Central Parcel	Soil	RA3-B3	Composite	10/19/2015	Y	1,2,3,4,6,7,8-HpCDF	4.17E-05		Y	mg/kg	3.83E-04	1.09E-01
Central Parcel	Soil	RA3-B3	Composite	10/19/2015	Y	1,2,3,4,7,8,9-HpCDF	1.12E-05	U	N	mg/kg	3.83E-04	2.93E-02
Central Parcel	Soil	RA3-B3	Composite	10/19/2015	Y	1,2,3,4,7,8-HxCDD	4.33E-06		Y	mg/kg	5.30E-05	8.17E-02
Central Parcel	Soil	RA3-B3	Composite	10/19/2015	Y	1,2,3,4,7,8-HxCDF	1.12E-05	U	N	mg/kg	2.29E-05	4.88E-01
Central Parcel	Soil	RA3-B3	Composite	10/19/2015	Y	1,2,3,6,7,8-HxCDD	8.27E-05		Y	mg/kg	2.30E-05	3.60E+00
Central Parcel	Soil	RA3-B3	Composite	10/19/2015	Y	1,2,3,6,7,8-HxCDF	1.12E-05	U	N	mg/kg	2.29E-05	4.88E-01
Central Parcel	Soil	RA3-B3	Composite	10/19/2015	Y	1,2,3,7,8,9-HxCDD	6.00E-05		Y	mg/kg	2.30E-05	2.61E+00
Central Parcel	Soil	RA3-B3	Composite	10/19/2015	Y	1,2,3,7,8,9-HxCDF	1.12E-05	U	N	mg/kg	4.52E-05	2.48E-01
Central Parcel	Soil	RA3-B3	Composite	10/19/2015	Y	1,2,3,7,8-PeCDD	1.22E-05		Y	mg/kg	5.67E-05	2.15E-01
Central Parcel	Soil	RA3-B3	Composite	10/19/2015	Y	1,2,3,7,8-PeCDF	1.12E-05	U	N	mg/kg	4.31E-04	2.60E-02
Central Parcel	Soil	RA3-B3	Composite	10/19/2015	Y	2,3,4,6,7,8-HxCDF	1.12E-05	U	N	mg/kg	2.29E-05	4.88E-01
Central Parcel	Soil	RA3-B3	Composite	10/19/2015	Y	2,3,4,7,8-PeCDF	2.04E-06		Y	mg/kg	3.35E-05	6.09E-02
Central Parcel	Soil	RA3-B3	Composite	10/19/2015	Y	2,3,7,8-TCDD	2.23E-06	U	N	mg/kg	1.95E-05	1.15E-01
Central Parcel	Soil	RA3-B3	Composite	10/19/2015	Y	2,3,7,8-TCDF	2.23E-06	U	N	mg/kg	1.30E-04	1.71E-02
Central Parcel	Soil	RA3-B3	Composite	10/19/2015	Y	OCDD	8.61E-05		Y	mg/kg	2.17E-02	3.96E-03
Central Parcel	Soil	RA3-B3	Composite	10/19/2015	Y	OCDF	1.63E-05		Y	mg/kg	5.49E-03	2.97E-03
Central Parcel	Soil	RA3-B3	Composite	10/19/2015	Y	Total 2,3,7,8-TCDD TEQ HQ				mg/kg		**8.90E+00**
Central Parcel	Soil	RA3-B3	Composite	10/19/2015	Y	2,3,7,8-TCDD TEQ	**2.92E-05**		Y	mg/kg	1.95E-05	1.50E+00
Central Parcel	Soil	RA3-B4	Composite	10/19/2015	Y	1,2,3,4,6,7,8-HpCDD	1.19E-04		Y	mg/kg	3.91E-04	3.04E-01
Central Parcel	Soil	RA3-B4	Composite	10/19/2015	Y	1,2,3,4,6,7,8-HpCDF	3.75E-05		Y	mg/kg	3.83E-04	9.80E-02
Central Parcel	Soil	RA3-B4	Composite	10/19/2015	Y	1,2,3,4,7,8,9-HpCDF	1.15E-05	U	N	mg/kg	3.83E-04	3.01E-02
Central Parcel	Soil	RA3-B4	Composite	10/19/2015	Y	1,2,3,4,7,8-HxCDD	3.65E-06		Y	mg/kg	5.30E-05	6.89E-02
Central Parcel	Soil	RA3-B4	Composite	10/19/2015	Y	1,2,3,4,7,8-HxCDF	1.15E-05	U	N	mg/kg	2.29E-05	5.01E-01
Central Parcel	Soil	RA3-B4	Composite	10/19/2015	Y	1,2,3,6,7,8-HxCDD	7.14E-05		Y	mg/kg	2.30E-05	3.11E+00
Central Parcel	Soil	RA3-B4	Composite	10/19/2015	Y	1,2,3,6,7,8-HxCDF	1.15E-05	U	N	mg/kg	2.29E-05	5.01E-01
Central Parcel	Soil	RA3-B4	Composite	10/19/2015	Y	1,2,3,7,8,9-HxCDD	4.46E-05		Y	mg/kg	2.30E-05	1.94E+00
Central Parcel	Soil	RA3-B4	Composite	10/19/2015	Y	1,2,3,7,8,9-HxCDF	1.15E-05	U	N	mg/kg	4.52E-05	2.54E-01
Central Parcel	Soil	RA3-B4	Composite	10/19/2015	Y	1,2,3,7,8-PeCDD	1.15E-05	U	N	mg/kg	5.67E-05	2.03E-01
Central Parcel	Soil	RA3-B4	Composite	10/19/2015	Y	1,2,3,7,8-PeCDF	1.15E-05	U	N	mg/kg	4.31E-04	2.67E-02
Central Parcel	Soil	RA3-B4	Composite	10/19/2015	Y	2,3,4,6,7,8-HxCDF	1.15E-05	U	N	mg/kg	2.29E-05	5.01E-01
Central Parcel	Soil	RA3-B4	Composite	10/19/2015	Y	2,3,4,7,8-PeCDF	1.15E-05	U	N	mg/kg	3.35E-05	3.43E-01
Central Parcel	Soil	RA3-B4	Composite	10/19/2015	Y	2,3,7,8-TCDD	2.30E-06	U	N	mg/kg	1.95E-05	1.18E-01
Central Parcel	Soil	RA3-B4	Composite	10/19/2015	Y	2,3,7,8-TCDF	2.30E-06	U	N	mg/kg	1.30E-04	1.76E-02
Central Parcel	Soil	RA3-B4	Composite	10/19/2015	Y	OCDD	1.60E-04		Y	mg/kg	2.17E-02	7.36E-03
Central Parcel	Soil	RA3-B4	Composite	10/19/2015	Y	OCDF	2.33E-05		Y	mg/kg	5.49E-03	4.24E-03
Central Parcel	Soil	RA3-B4	Composite	10/19/2015	Y	Total 2,3,7,8-TCDD TEQ HQ				mg/kg		**8.03E+00**
Central Parcel	Soil	RA3-B4	Composite	10/19/2015	Y	2,3,7,8-TCDD TEQ	**1.36E-05**		Y	mg/kg	1.95E-05	6.99E-01
Central Parcel	Soil	RA3-B7	Composite	10/21/2015	Y	1,2,3,4,6,7,8-HpCDD	5.55E-04		Y	mg/kg	3.91E-04	1.42E+00

Location Specific Soil Data and Mammalian Hazard Quotients for Dioxin and Furan Congeners and Total 2,3,7,8-TCDD TEQ

Mammalian Dioxin Tool for all Samples where [Upland0_3] = "Y" (and DU-5) Based on WC_All_data.xlsx data file sent by CO on 10/8/2018 6:30pm. Note: Mammalian 2,3,7,8-TCDD TEQ provided as calculated in the laboratory database.

Parcel	Media	Sample	CompSampIn	Date	Upland0_3	StdAnalyteDiox	StdResult	Qualifier	DetectFlag	UnitsStd	MammalRBC	Mammal Hazard Quotient
Central Parcel	Soil	RA3-B7	Composite	10/21/2015	Y	1,2,3,4,6,7,8-HpCDF	1.25E-04		Y	mg/kg	3.83E-04	3.27E-01
Central Parcel	Soil	RA3-B7	Composite	10/21/2015	Y	1,2,3,4,7,8,9-HpCDF	3.83E-06		Y	mg/kg	3.83E-04	1.00E-02
Central Parcel	Soil	RA3-B7	Composite	10/21/2015	Y	1,2,3,4,7,8-HxCDD	1.13E-05		Y	mg/kg	5.30E-05	2.13E-01
Central Parcel	Soil	RA3-B7	Composite	10/21/2015	Y	1,2,3,4,7,8-HxCDF	4.94E-06		Y	mg/kg	2.29E-05	2.15E-01
Central Parcel	Soil	RA3-B7	Composite	10/21/2015	Y	1,2,3,6,7,8-HxCDD	2.19E-04		Y	mg/kg	2.30E-05	9.54E+00
Central Parcel	Soil	RA3-B7	Composite	10/21/2015	Y	1,2,3,6,7,8-HxCDF	5.40E-06		Y	mg/kg	2.29E-05	2.35E-01
Central Parcel	Soil	RA3-B7	Composite	10/21/2015	Y	1,2,3,7,8,9-HxCDD	1.38E-04		Y	mg/kg	2.30E-05	6.01E+00
Central Parcel	Soil	RA3-B7	Composite	10/21/2015	Y	1,2,3,7,8,9-HxCDF	1.99E-06		Y	mg/kg	4.52E-05	4.40E-02
Central Parcel	Soil	RA3-B7	Composite	10/21/2015	Y	1,2,3,7,8-PeCDD	2.76E-05		Y	mg/kg	5.67E-05	4.87E-01
Central Parcel	Soil	RA3-B7	Composite	10/21/2015	Y	1,2,3,7,8-PeCDF	1.73E-06		Y	mg/kg	4.31E-04	4.01E-03
Central Parcel	Soil	RA3-B7	Composite	10/21/2015	Y	2,3,4,6,7,8-HxCDF	9.96E-06		Y	mg/kg	2.29E-05	4.34E-01
Central Parcel	Soil	RA3-B7	Composite	10/21/2015	Y	2,3,4,7,8-PeCDF	6.23E-06		Y	mg/kg	3.35E-05	1.86E-01
Central Parcel	Soil	RA3-B7	Composite	10/21/2015	Y	2,3,7,8-TCDD	1.78E-06		Y	mg/kg	1.95E-05	9.15E-02
Central Parcel	Soil	RA3-B7	Composite	10/21/2015	Y	2,3,7,8-TCDF	1.46E-06		Y	mg/kg	1.30E-04	1.12E-02
Central Parcel	Soil	RA3-B7	Composite	10/21/2015	Y	OCDD	2.18E-03		Y	mg/kg	2.17E-02	1.00E-01
Central Parcel	Soil	RA3-B7	Composite	10/21/2015	Y	OCDF	1.25E-04		Y	mg/kg	5.49E-03	2.27E-02
Central Parcel	Soil	RA3-B7	Composite	10/21/2015	Y	Total 2,3,7,8-TCDD TEQ HQ				mg/kg		**1.94E+01**
Central Parcel	Soil	RA3-B7	Composite	10/21/2015	Y	2,3,7,8-TCDD TEQ	**7.80E-05**		Y	mg/kg	1.95E-05	4.01E+00
Central Parcel	Soil	RA3-B8	Composite	10/27/2015	Y	1,2,3,4,6,7,8-HpCDD	1.90E-04		Y	mg/kg	3.91E-04	4.86E-01
Central Parcel	Soil	RA3-B8	Composite	10/27/2015	Y	1,2,3,4,6,7,8-HpCDF	4.42E-05		Y	mg/kg	3.83E-04	1.15E-01
Central Parcel	Soil	RA3-B8	Composite	10/27/2015	Y	1,2,3,4,7,8,9-HpCDF	3.07E-06		Y	mg/kg	3.83E-04	8.02E-03
Central Parcel	Soil	RA3-B8	Composite	10/27/2015	Y	1,2,3,4,7,8-HxCDD	1.16E-06		Y	mg/kg	5.30E-05	2.19E-02
Central Parcel	Soil	RA3-B8	Composite	10/27/2015	Y	1,2,3,4,7,8-HxCDF	2.06E-06		Y	mg/kg	2.29E-05	8.98E-02
Central Parcel	Soil	RA3-B8	Composite	10/27/2015	Y	1,2,3,6,7,8-HxCDD	9.58E-06		Y	mg/kg	2.30E-05	4.17E-01
Central Parcel	Soil	RA3-B8	Composite	10/27/2015	Y	1,2,3,6,7,8-HxCDF	2.00E-06		Y	mg/kg	2.29E-05	8.72E-02
Central Parcel	Soil	RA3-B8	Composite	10/27/2015	Y	1,2,3,7,8,9-HxCDD	4.62E-06		Y	mg/kg	2.30E-05	2.01E-01
Central Parcel	Soil	RA3-B8	Composite	10/27/2015	Y	1,2,3,7,8,9-HxCDF	7.69E-07		Y	mg/kg	4.52E-05	1.70E-02
Central Parcel	Soil	RA3-B8	Composite	10/27/2015	Y	1,2,3,7,8-PeCDD	1.23E-06		Y	mg/kg	5.67E-05	2.17E-02
Central Parcel	Soil	RA3-B8	Composite	10/27/2015	Y	1,2,3,7,8-PeCDF	5.24E-07		Y	mg/kg	4.31E-04	1.21E-03
Central Parcel	Soil	RA3-B8	Composite	10/27/2015	Y	2,3,4,6,7,8-HxCDF	4.71E-06		Y	mg/kg	2.29E-05	2.05E-01
Central Parcel	Soil	RA3-B8	Composite	10/27/2015	Y	2,3,4,7,8-PeCDF	3.10E-06		Y	mg/kg	3.35E-05	9.26E-02
Central Parcel	Soil	RA3-B8	Composite	10/27/2015	Y	2,3,7,8-TCDD	4.98E-07	U	N	mg/kg	1.95E-05	2.56E-02
Central Parcel	Soil	RA3-B8	Composite	10/27/2015	Y	2,3,7,8-TCDF	4.44E-07		Y	mg/kg	1.30E-04	3.41E-03
Central Parcel	Soil	RA3-B8	Composite	10/27/2015	Y	OCDD	1.63E-03		Y	mg/kg	2.17E-02	7.50E-02
Central Parcel	Soil	RA3-B8	Composite	10/27/2015	Y	OCDF	2.16E-04		Y	mg/kg	5.49E-03	3.93E-02
Central Parcel	Soil	RA3-B8	Composite	10/27/2015	Y	Total 2,3,7,8-TCDD TEQ HQ				mg/kg		**1.91E+00**
Central Parcel	Soil	RA3-B8	Composite	10/27/2015	Y	2,3,7,8-TCDD TEQ	**7.64E-06**		Y	mg/kg	1.95E-05	3.93E-01
Central Parcel	Soil	RA3-B9	Composite	10/27/2015	Y	1,2,3,4,6,7,8-HpCDD	1.94E-05		Y	mg/kg	3.91E-04	4.96E-02
Central Parcel	Soil	RA3-B9	Composite	10/27/2015	Y	1,2,3,4,6,7,8-HpCDF	4.41E-06		Y	mg/kg	3.83E-04	1.15E-02
Central Parcel	Soil	RA3-B9	Composite	10/27/2015	Y	1,2,3,4,7,8,9-HpCDF	2.49E-06	U	N	mg/kg	3.83E-04	6.51E-03
Central Parcel	Soil	RA3-B9	Composite	10/27/2015	Y	1,2,3,4,7,8-HxCDD	2.49E-06	U	N	mg/kg	5.30E-05	4.70E-02
Central Parcel	Soil	RA3-B9	Composite	10/27/2015	Y	1,2,3,4,7,8-HxCDF	5.35E-07		Y	mg/kg	2.29E-05	2.33E-02
Central Parcel	Soil	RA3-B9	Composite	10/27/2015	Y	1,2,3,6,7,8-HxCDD	3.76E-06		Y	mg/kg	2.30E-05	1.64E-01
Central Parcel	Soil	RA3-B9	Composite	10/27/2015	Y	1,2,3,6,7,8-HxCDF	2.59E-07		Y	mg/kg	2.29E-05	1.13E-02
Central Parcel	Soil	RA3-B9	Composite	10/27/2015	Y	1,2,3,7,8,9-HxCDD	2.66E-06		Y	mg/kg	2.30E-05	1.16E-01
Central Parcel	Soil	RA3-B9	Composite	10/27/2015	Y	1,2,3,7,8,9-HxCDF	2.49E-06	U	N	mg/kg	4.52E-05	5.51E-02
Central Parcel	Soil	RA3-B9	Composite	10/27/2015	Y	1,2,3,7,8-PeCDD	1.04E-06		Y	mg/kg	5.67E-05	1.83E-02
Central Parcel	Soil	RA3-B9	Composite	10/27/2015	Y	1,2,3,7,8-PeCDF	2.49E-06	U	N	mg/kg	4.31E-04	5.77E-03
Central Parcel	Soil	RA3-B9	Composite	10/27/2015	Y	2,3,4,6,7,8-HxCDF	3.90E-07		Y	mg/kg	2.29E-05	1.70E-02
Central Parcel	Soil	RA3-B9	Composite	10/27/2015	Y	2,3,4,7,8-PeCDF	5.50E-07		Y	mg/kg	3.35E-05	1.64E-02
Central Parcel	Soil	RA3-B9	Composite	10/27/2015	Y	2,3,7,8-TCDD	4.99E-07	U	N	mg/kg	1.95E-05	2.56E-02
Central Parcel	Soil	RA3-B9	Composite	10/27/2015	Y	2,3,7,8-TCDF	4.99E-07	U	N	mg/kg	1.30E-04	3.83E-03
Central Parcel	Soil	RA3-B9	Composite	10/27/2015	Y	OCDD	1.05E-04		Y	mg/kg	2.17E-02	4.83E-03
Central Parcel	Soil	RA3-B9	Composite	10/27/2015	Y	OCDF	1.01E-05		Y	mg/kg	5.49E-03	1.84E-03

Location Specific Soil Data and Mammalian Hazard Quotients for Dioxin and Furan Congeners and Total 2,3,7,8-TCDD TEQ

Mammalian Dioxin Tool for all Samples where [Upland0_3] = "Y" (and DU-5) Based on WC_All_data.xlsx data file sent by CO on 10/8/2018 6:30pm. Note: Mammalian 2,3,7,8-TCDD TEQ provided as calculated in the laboratory database.

Parcel	Media	Sample	CompSampIn	Date	Upland0_3	StdAnalyteDiox	StdResult	Qualifier	DetectFlag	UnitsStd	MammalRBC	Mammal Hazard Quotient
Central Parcel	Soil	RA3-B9	Composite	10/27/2015	Y	Total 2,3,7,8-TCDD TEQ HQ				mg/kg		**5.78E-01**
Central Parcel	Soil	RA3-B9	Composite	10/27/2015	Y	2,3,7,8-TCDD TEQ	**2.24E-06**		Y	mg/kg	1.95E-05	1.15E-01
Central Parcel	Soil	RA3-D-S3	Composite	12/28/2015	Y	1,2,3,4,6,7,8-HpCDD	5.85E-05		Y	mg/kg	3.91E-04	1.50E-01
Central Parcel	Soil	RA3-D-S3	Composite	12/28/2015	Y	1,2,3,4,6,7,8-HpCDF	1.97E-05		Y	mg/kg	3.83E-04	5.15E-02
Central Parcel	Soil	RA3-D-S3	Composite	12/28/2015	Y	1,2,3,4,7,8,9-HpCDF	1.45E-06	J	Y	mg/kg	3.83E-04	3.79E-03
Central Parcel	Soil	RA3-D-S3	Composite	12/28/2015	Y	1,2,3,4,7,8-HxCDD	1.78E-06	J	Y	mg/kg	5.30E-05	3.36E-02
Central Parcel	Soil	RA3-D-S3	Composite	12/28/2015	Y	1,2,3,4,7,8-HxCDF	1.61E-06	J	Y	mg/kg	2.29E-05	7.02E-02
Central Parcel	Soil	RA3-D-S3	Composite	12/28/2015	Y	1,2,3,6,7,8-HxCDD	1.66E-05		Y	mg/kg	2.30E-05	7.23E-01
Central Parcel	Soil	RA3-D-S3	Composite	12/28/2015	Y	1,2,3,6,7,8-HxCDF	1.36E-06	J	Y	mg/kg	2.29E-05	5.93E-02
Central Parcel	Soil	RA3-D-S3	Composite	12/28/2015	Y	1,2,3,7,8,9-HxCDD	1.12E-05		Y	mg/kg	2.30E-05	4.88E-01
Central Parcel	Soil	RA3-D-S3	Composite	12/28/2015	Y	1,2,3,7,8,9-HxCDF	6.07E-07	J	Y	mg/kg	4.52E-05	1.34E-02
Central Parcel	Soil	RA3-D-S3	Composite	12/28/2015	Y	1,2,3,7,8-PeCDD	1.72E-06	U	N	mg/kg	5.67E-05	3.03E-02
Central Parcel	Soil	RA3-D-S3	Composite	12/28/2015	Y	1,2,3,7,8-PeCDF	7.62E-07	U	N	mg/kg	4.31E-04	1.77E-03
Central Parcel	Soil	RA3-D-S3	Composite	12/28/2015	Y	2,3,4,6,7,8-HxCDF	2.26E-06	J	Y	mg/kg	2.29E-05	9.85E-02
Central Parcel	Soil	RA3-D-S3	Composite	12/28/2015	Y	2,3,4,7,8-PeCDF	1.50E-06	J	Y	mg/kg	3.35E-05	4.48E-02
Central Parcel	Soil	RA3-D-S3	Composite	12/28/2015	Y	2,3,7,8-TCDD	2.08E-07	U	N	mg/kg	1.95E-05	1.07E-02
Central Parcel	Soil	RA3-D-S3	Composite	12/28/2015	Y	2,3,7,8-TCDF	6.45E-07	U	N	mg/kg	1.30E-04	4.95E-03
Central Parcel	Soil	RA3-D-S3	Composite	12/28/2015	Y	OCDD	4.25E-04		Y	mg/kg	2.17E-02	1.95E-02
Central Parcel	Soil	RA3-D-S3	Composite	12/28/2015	Y	OCDF	3.38E-05		Y	mg/kg	5.49E-03	6.15E-03
Central Parcel	Soil	RA3-D-S3	Composite	12/28/2015	Y	Total 2,3,7,8-TCDD TEQ HQ				mg/kg		**1.81E+00**
Central Parcel	Soil	RA3-D-S3	Composite	12/28/2015	Y	2,3,7,8-TCDD TEQ	**4.93E-06**		Y	mg/kg	1.95E-05	2.53E-01
Central Parcel	Soil	RA3-D-S4	Composite	12/30/2015	Y	1,2,3,4,6,7,8-HpCDD	1.22E-04		Y	mg/kg	3.91E-04	3.12E-01
Central Parcel	Soil	RA3-D-S4	Composite	12/30/2015	Y	1,2,3,4,6,7,8-HpCDF	2.94E-05		Y	mg/kg	3.83E-04	7.68E-02
Central Parcel	Soil	RA3-D-S4	Composite	12/30/2015	Y	1,2,3,4,7,8,9-HpCDF	1.30E-06	J	Y	mg/kg	3.83E-04	3.40E-03
Central Parcel	Soil	RA3-D-S4	Composite	12/30/2015	Y	1,2,3,4,7,8-HxCDD	3.91E-06		Y	mg/kg	5.30E-05	7.38E-02
Central Parcel	Soil	RA3-D-S4	Composite	12/30/2015	Y	1,2,3,4,7,8-HxCDF	2.13E-06	J	Y	mg/kg	2.29E-05	9.29E-02
Central Parcel	Soil	RA3-D-S4	Composite	12/30/2015	Y	1,2,3,6,7,8-HxCDD	4.85E-05		Y	mg/kg	2.30E-05	2.11E+00
Central Parcel	Soil	RA3-D-S4	Composite	12/30/2015	Y	1,2,3,6,7,8-HxCDF	1.34E-06	J	Y	mg/kg	2.29E-05	5.84E-02
Central Parcel	Soil	RA3-D-S4	Composite	12/30/2015	Y	1,2,3,7,8,9-HxCDD	3.20E-05		Y	mg/kg	2.30E-05	1.39E+00
Central Parcel	Soil	RA3-D-S4	Composite	12/30/2015	Y	1,2,3,7,8,9-HxCDF	5.87E-07	J	Y	mg/kg	4.52E-05	1.30E-02
Central Parcel	Soil	RA3-D-S4	Composite	12/30/2015	Y	1,2,3,7,8-PeCDD	4.85E-06		Y	mg/kg	5.67E-05	8.55E-02
Central Parcel	Soil	RA3-D-S4	Composite	12/30/2015	Y	1,2,3,7,8-PeCDF	7.27E-07	U	N	mg/kg	4.31E-04	1.68E-03
Central Parcel	Soil	RA3-D-S4	Composite	12/30/2015	Y	2,3,4,6,7,8-HxCDF	1.95E-06	J	Y	mg/kg	2.29E-05	8.50E-02
Central Parcel	Soil	RA3-D-S4	Composite	12/30/2015	Y	2,3,4,7,8-PeCDF	1.81E-06	J	Y	mg/kg	3.35E-05	5.41E-02
Central Parcel	Soil	RA3-D-S4	Composite	12/30/2015	Y	2,3,7,8-TCDD	3.75E-07	U	N	mg/kg	1.95E-05	1.93E-02
Central Parcel	Soil	RA3-D-S4	Composite	12/30/2015	Y	2,3,7,8-TCDF	7.04E-07	U	N	mg/kg	1.30E-04	5.40E-03
Central Parcel	Soil	RA3-D-S4	Composite	12/30/2015	Y	OCDD	7.57E-04		Y	mg/kg	2.17E-02	3.48E-02
Central Parcel	Soil	RA3-D-S4	Composite	12/30/2015	Y	OCDF	4.71E-05		Y	mg/kg	5.49E-03	8.57E-03
Central Parcel	Soil	RA3-D-S4	Composite	12/30/2015	Y	Total 2,3,7,8-TCDD TEQ HQ				mg/kg		**4.43E+00**
Central Parcel	Soil	RA3-D-S4	Composite	12/30/2015	Y	2,3,7,8-TCDD TEQ	**1.62E-05**		Y	mg/kg	1.95E-05	8.33E-01
Central Parcel	Soil	RA3-S1	Composite	10/19/2015	Y	1,2,3,4,6,7,8-HpCDD	2.09E-04		Y	mg/kg	3.91E-04	5.35E-01
Central Parcel	Soil	RA3-S1	Composite	10/19/2015	Y	1,2,3,4,6,7,8-HpCDF	3.90E-05		Y	mg/kg	3.83E-04	1.02E-01
Central Parcel	Soil	RA3-S1	Composite	10/19/2015	Y	1,2,3,4,7,8,9-HpCDF	1.12E-05	U	N	mg/kg	3.83E-04	2.93E-02
Central Parcel	Soil	RA3-S1	Composite	10/19/2015	Y	1,2,3,4,7,8-HxCDD	1.12E-05	U	N	mg/kg	5.30E-05	2.11E-01
Central Parcel	Soil	RA3-S1	Composite	10/19/2015	Y	1,2,3,4,7,8-HxCDF	1.12E-05	U	N	mg/kg	2.29E-05	4.88E-01
Central Parcel	Soil	RA3-S1	Composite	10/19/2015	Y	1,2,3,6,7,8-HxCDD	7.35E-05		Y	mg/kg	2.30E-05	3.20E+00
Central Parcel	Soil	RA3-S1	Composite	10/19/2015	Y	1,2,3,6,7,8-HxCDF	1.12E-05	U	N	mg/kg	2.29E-05	4.88E-01
Central Parcel	Soil	RA3-S1	Composite	10/19/2015	Y	1,2,3,7,8,9-HxCDD	3.41E-05		Y	mg/kg	2.30E-05	1.49E+00
Central Parcel	Soil	RA3-S1	Composite	10/19/2015	Y	1,2,3,7,8,9-HxCDF	1.12E-05	U	N	mg/kg	4.52E-05	2.48E-01
Central Parcel	Soil	RA3-S1	Composite	10/19/2015	Y	1,2,3,7,8-PeCDD	7.23E-06	J	Y	mg/kg	5.67E-05	1.27E-01
Central Parcel	Soil	RA3-S1	Composite	10/19/2015	Y	1,2,3,7,8-PeCDF	1.12E-05	U	N	mg/kg	4.31E-04	2.60E-02
Central Parcel	Soil	RA3-S1	Composite	10/19/2015	Y	2,3,4,6,7,8-HxCDF	4.36E-06	J	Y	mg/kg	2.29E-05	1.90E-01
Central Parcel	Soil	RA3-S1	Composite	10/19/2015	Y	2,3,4,7,8-PeCDF	7.03E-06	J	Y	mg/kg	3.35E-05	2.10E-01
Central Parcel	Soil	RA3-S1	Composite	10/19/2015	Y	2,3,7,8-TCDD	2.23E-06	U	N	mg/kg	1.95E-05	1.15E-01

Location Specific Soil Data and Mammalian Hazard Quotients for Dioxin and Furan Congeners and Total 2,3,7,8-TCDD TEQ

Mammalian Dioxin Tool for all Samples where [Upland0_3] = "Y" (and DU-5) Based on WC_All_data.xlsx data file sent by CO on 10/8/2018 6:30pm. Note: Mammalian 2,3,7,8-TCDD TEQ provided as calculated in the laboratory database.

Parcel	Media	Sample	CompSampIn	Date	Upland0_3	StdAnalyteDiox	StdResult	Qualifier	DetectFlag	UnitsStd	MammalRBC	Mammal Hazard Quotient
Central Parcel	Soil	RA3-S1	Composite	10/19/2015	Y	2,3,7,8-TCDF	1.32E-06	J	Y	mg/kg	1.30E-04	1.01E-02
Central Parcel	Soil	RA3-S1	Composite	10/19/2015	Y	OCDD	9.17E-04		Y	mg/kg	2.17E-02	4.22E-02
Central Parcel	Soil	RA3-S1	Composite	10/19/2015	Y	OCDF	5.07E-05		Y	mg/kg	5.49E-03	9.23E-03
Central Parcel	Soil	RA3-S1	Composite	10/19/2015	Y	Total 2,3,7,8-TCDD TEQ HQ				mg/kg		**7.52E+00**
Central Parcel	Soil	RA3-S1	Composite	10/19/2015	Y	2,3,7,8-TCDD TEQ	**2.34E-05**		Y	mg/kg	1.95E-05	1.20E+00
Central Parcel	Soil	RA3-S10	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDD	3.86E-04		Y	mg/kg	3.91E-04	9.87E-01
Central Parcel	Soil	RA3-S10	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDF	9.15E-05		Y	mg/kg	3.83E-04	2.39E-01
Central Parcel	Soil	RA3-S10	Composite	10/28/2015	Y	1,2,3,4,7,8,9-HpCDF	2.80E-06		Y	mg/kg	3.83E-04	7.32E-03
Central Parcel	Soil	RA3-S10	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDD	8.34E-06		Y	mg/kg	5.30E-05	1.57E-01
Central Parcel	Soil	RA3-S10	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDF	4.73E-06		Y	mg/kg	2.29E-05	2.06E-01
Central Parcel	Soil	RA3-S10	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDD	1.96E-04		Y	mg/kg	2.30E-05	8.54E+00
Central Parcel	Soil	RA3-S10	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDF	5.03E-06		Y	mg/kg	2.29E-05	2.19E-01
Central Parcel	Soil	RA3-S10	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDD	1.24E-04		Y	mg/kg	2.30E-05	5.40E+00
Central Parcel	Soil	RA3-S10	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDF	1.85E-06		Y	mg/kg	4.52E-05	4.09E-02
Central Parcel	Soil	RA3-S10	Composite	10/28/2015	Y	1,2,3,7,8-PeCDD	2.42E-05		Y	mg/kg	5.67E-05	4.27E-01
Central Parcel	Soil	RA3-S10	Composite	10/28/2015	Y	1,2,3,7,8-PeCDF	1.94E-06		Y	mg/kg	4.31E-04	4.50E-03
Central Parcel	Soil	RA3-S10	Composite	10/28/2015	Y	2,3,4,6,7,8-HxCDF	8.92E-06		Y	mg/kg	2.29E-05	3.89E-01
Central Parcel	Soil	RA3-S10	Composite	10/28/2015	Y	2,3,4,7,8-PeCDF	3.93E-06		Y	mg/kg	3.35E-05	1.17E-01
Central Parcel	Soil	RA3-S10	Composite	10/28/2015	Y	2,3,7,8-TCDD	1.19E-06		Y	mg/kg	1.95E-05	6.12E-02
Central Parcel	Soil	RA3-S10	Composite	10/28/2015	Y	2,3,7,8-TCDF	1.81E-06		Y	mg/kg	1.30E-04	1.39E-02
Central Parcel	Soil	RA3-S10	Composite	10/28/2015	Y	OCDD	9.02E-04		Y	mg/kg	2.17E-02	4.15E-02
Central Parcel	Soil	RA3-S10	Composite	10/28/2015	Y	OCDF	7.50E-05		Y	mg/kg	5.49E-03	1.36E-02
Central Parcel	Soil	RA3-S10	Composite	10/28/2015	Y	Total 2,3,7,8-TCDD TEQ HQ				mg/kg		**1.69E+01**
Central Parcel	Soil	RA3-S10	Composite	10/28/2015	Y	2,3,7,8-TCDD TEQ	**6.68E-05**		Y	mg/kg	1.95E-05	3.43E+00
Central Parcel	Soil	RA3-S11	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDD	1.09E-03		Y	mg/kg	3.91E-04	2.79E+00
Central Parcel	Soil	RA3-S11	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDF	2.71E-04		Y	mg/kg	3.83E-04	7.08E-01
Central Parcel	Soil	RA3-S11	Composite	10/28/2015	Y	1,2,3,4,7,8,9-HpCDF	7.34E-06		Y	mg/kg	3.83E-04	1.92E-02
Central Parcel	Soil	RA3-S11	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDD	2.67E-05		Y	mg/kg	5.30E-05	5.04E-01
Central Parcel	Soil	RA3-S11	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDF	1.11E-05		Y	mg/kg	2.29E-05	4.84E-01
Central Parcel	Soil	RA3-S11	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDD	4.55E-04		Y	mg/kg	2.30E-05	1.98E+01
Central Parcel	Soil	RA3-S11	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDF	1.19E-05		Y	mg/kg	2.29E-05	5.19E-01
Central Parcel	Soil	RA3-S11	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDD	2.87E-04		Y	mg/kg	2.30E-05	1.25E+01
Central Parcel	Soil	RA3-S11	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDF	4.22E-06		Y	mg/kg	4.52E-05	9.33E-02
Central Parcel	Soil	RA3-S11	Composite	10/28/2015	Y	1,2,3,7,8-PeCDD	6.72E-05		Y	mg/kg	5.67E-05	1.18E+00
Central Parcel	Soil	RA3-S11	Composite	10/28/2015	Y	1,2,3,7,8-PeCDF	3.77E-06		Y	mg/kg	4.31E-04	8.74E-03
Central Parcel	Soil	RA3-S11	Composite	10/28/2015	Y	2,3,4,6,7,8-HxCDF	1.80E-05		Y	mg/kg	2.29E-05	7.85E-01
Central Parcel	Soil	RA3-S11	Composite	10/28/2015	Y	2,3,4,7,8-PeCDF	6.76E-06		Y	mg/kg	3.35E-05	2.02E-01
Central Parcel	Soil	RA3-S11	Composite	10/28/2015	Y	2,3,7,8-TCDD	3.58E-06		Y	mg/kg	1.95E-05	1.84E-01
Central Parcel	Soil	RA3-S11	Composite	10/28/2015	Y	2,3,7,8-TCDF	3.25E-06		Y	mg/kg	1.30E-04	2.49E-02
Central Parcel	Soil	RA3-S11	Composite	10/28/2015	Y	OCDD	3.83E-03		Y	mg/kg	2.17E-02	1.76E-01
Central Parcel	Soil	RA3-S11	Composite	10/28/2015	Y	OCDF	2.48E-04		Y	mg/kg	5.49E-03	4.51E-02
Central Parcel	Soil	RA3-S11	Composite	10/28/2015	Y	Total 2,3,7,8-TCDD TEQ HQ				mg/kg		**4.00E+01**
Central Parcel	Soil	RA3-S11	Composite	10/28/2015	Y	2,3,7,8-TCDD TEQ	**1.70E-04**		Y	mg/kg	1.95E-05	8.74E+00
Central Parcel	Soil	RA3-S12	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDD	9.46E-05		Y	mg/kg	3.91E-04	2.42E-01
Central Parcel	Soil	RA3-S12	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDF	1.97E-05		Y	mg/kg	3.83E-04	5.15E-02
Central Parcel	Soil	RA3-S12	Composite	10/28/2015	Y	1,2,3,4,7,8,9-HpCDF	7.47E-07		Y	mg/kg	3.83E-04	1.95E-03
Central Parcel	Soil	RA3-S12	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDD	1.76E-06		Y	mg/kg	5.30E-05	3.32E-02
Central Parcel	Soil	RA3-S12	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDF	1.08E-06		Y	mg/kg	2.29E-05	4.71E-02
Central Parcel	Soil	RA3-S12	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDD	2.75E-05		Y	mg/kg	2.30E-05	1.20E+00
Central Parcel	Soil	RA3-S12	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDF	1.03E-06		Y	mg/kg	2.29E-05	4.49E-02
Central Parcel	Soil	RA3-S12	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDD	1.72E-05		Y	mg/kg	2.30E-05	7.49E-01
Central Parcel	Soil	RA3-S12	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDF	4.42E-07		Y	mg/kg	4.52E-05	9.77E-03
Central Parcel	Soil	RA3-S12	Composite	10/28/2015	Y	1,2,3,7,8-PeCDD	3.93E-06		Y	mg/kg	5.67E-05	6.93E-02
Central Parcel	Soil	RA3-S12	Composite	10/28/2015	Y	1,2,3,7,8-PeCDF	4.61E-07		Y	mg/kg	4.31E-04	1.07E-03

Location Specific Soil Data and Mammalian Hazard Quotients for Dioxin and Furan Congeners and Total 2,3,7,8-TCDD TEQ

Mammalian Dioxin Tool for all Samples where [Upland0_3] = "Y" (and DU-5) Based on WC_All_data.xlsx data file sent by CO on 10/8/2018 6:30pm. Note: Mammalian 2,3,7,8-TCDD TEQ provided as calculated in the laboratory database.

Parcel	Media	Sample	CompSampIn	Date	Upland0_3	StdAnalyteDiox	StdResult	Qualifier	DetectFlag	UnitsStd	MammalRBC	Mammal Hazard Quotient
Central Parcel	Soil	RA3-S12	Composite	10/28/2015	Y	2,3,4,6,7,8-HxCDF	1.53E-06		Y	mg/kg	2.29E-05	6.67E-02
Central Parcel	Soil	RA3-S12	Composite	10/28/2015	Y	2,3,4,7,8-PeCDF	2.28E-06		Y	mg/kg	3.35E-05	6.81E-02
Central Parcel	Soil	RA3-S12	Composite	10/28/2015	Y	2,3,7,8-TCDD	5.00E-07	U	N	mg/kg	1.95E-05	2.57E-02
Central Parcel	Soil	RA3-S12	Composite	10/28/2015	Y	2,3,7,8-TCDF	3.17E-07		Y	mg/kg	1.30E-04	2.43E-03
Central Parcel	Soil	RA3-S12	Composite	10/28/2015	Y	OCDD	4.67E-04		Y	mg/kg	2.17E-02	2.15E-02
Central Parcel	Soil	RA3-S12	Composite	10/28/2015	Y	OCDF	2.52E-05		Y	mg/kg	5.49E-03	4.59E-03
Central Parcel	Soil	RA3-S12	Composite	10/28/2015	Y	Total 2,3,7,8-TCDD TEQ HQ				mg/kg		**2.64E+00**
Central Parcel	Soil	RA3-S12	Composite	10/28/2015	Y	2,3,7,8-TCDD TEQ	**1.10E-05**		Y	mg/kg	1.95E-05	5.65E-01
Central Parcel	Soil	RA3-S13	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDD	1.09E-04		Y	mg/kg	3.91E-04	2.79E-01
Central Parcel	Soil	RA3-S13	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDF	2.31E-05		Y	mg/kg	3.83E-04	6.04E-02
Central Parcel	Soil	RA3-S13	Composite	10/28/2015	Y	1,2,3,4,7,8,9-HpCDF	9.06E-07		Y	mg/kg	3.83E-04	2.37E-03
Central Parcel	Soil	RA3-S13	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDD	1.81E-06		Y	mg/kg	5.30E-05	3.41E-02
Central Parcel	Soil	RA3-S13	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDF	9.25E-07		Y	mg/kg	2.29E-05	4.03E-02
Central Parcel	Soil	RA3-S13	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDD	2.85E-05		Y	mg/kg	2.30E-05	1.24E+00
Central Parcel	Soil	RA3-S13	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDF	8.20E-07		Y	mg/kg	2.29E-05	3.57E-02
Central Parcel	Soil	RA3-S13	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDD	1.90E-05		Y	mg/kg	2.30E-05	8.28E-01
Central Parcel	Soil	RA3-S13	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDF	4.06E-07		Y	mg/kg	4.52E-05	8.98E-03
Central Parcel	Soil	RA3-S13	Composite	10/28/2015	Y	1,2,3,7,8-PeCDD	4.00E-06		Y	mg/kg	5.67E-05	7.05E-02
Central Parcel	Soil	RA3-S13	Composite	10/28/2015	Y	1,2,3,7,8-PeCDF	2.86E-07		Y	mg/kg	4.31E-04	6.63E-04
Central Parcel	Soil	RA3-S13	Composite	10/28/2015	Y	2,3,4,6,7,8-HxCDF	1.44E-06		Y	mg/kg	2.29E-05	6.28E-02
Central Parcel	Soil	RA3-S13	Composite	10/28/2015	Y	2,3,4,7,8-PeCDF	5.53E-07		Y	mg/kg	3.35E-05	1.65E-02
Central Parcel	Soil	RA3-S13	Composite	10/28/2015	Y	2,3,7,8-TCDD	3.40E-07		Y	mg/kg	1.95E-05	1.75E-02
Central Parcel	Soil	RA3-S13	Composite	10/28/2015	Y	2,3,7,8-TCDF	2.89E-07		Y	mg/kg	1.30E-04	2.22E-03
Central Parcel	Soil	RA3-S13	Composite	10/28/2015	Y	OCDD	5.14E-04		Y	mg/kg	2.17E-02	2.36E-02
Central Parcel	Soil	RA3-S13	Composite	10/28/2015	Y	OCDF	4.55E-05		Y	mg/kg	5.49E-03	8.28E-03
Central Parcel	Soil	RA3-S13	Composite	10/28/2015	Y	Total 2,3,7,8-TCDD TEQ HQ				mg/kg		**2.73E+00**
Central Parcel	Soil	RA3-S13	Composite	10/28/2015	Y	2,3,7,8-TCDD TEQ	**1.13E-05**		Y	mg/kg	1.95E-05	5.81E-01
Central Parcel	Soil	RA3-S14	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDD	2.76E-03		Y	mg/kg	3.91E-04	7.06E+00
Central Parcel	Soil	RA3-S14	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDF	9.35E-04		Y	mg/kg	3.83E-04	2.44E+00
Central Parcel	Soil	RA3-S14	Composite	10/28/2015	Y	1,2,3,4,7,8,9-HpCDF	4.11E-05		Y	mg/kg	3.83E-04	1.07E-01
Central Parcel	Soil	RA3-S14	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDD	5.94E-05		Y	mg/kg	5.30E-05	1.12E+00
Central Parcel	Soil	RA3-S14	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDF	1.76E-05		Y	mg/kg	2.29E-05	7.67E-01
Central Parcel	Soil	RA3-S14	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDD	1.80E-04		Y	mg/kg	2.30E-05	7.84E+00
Central Parcel	Soil	RA3-S14	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDF	1.69E-05		Y	mg/kg	2.29E-05	7.37E-01
Central Parcel	Soil	RA3-S14	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDD	1.21E-04		Y	mg/kg	2.30E-05	5.27E+00
Central Parcel	Soil	RA3-S14	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDF	3.32E-06		Y	mg/kg	4.52E-05	7.34E-02
Central Parcel	Soil	RA3-S14	Composite	10/28/2015	Y	1,2,3,7,8-PeCDD	3.38E-05		Y	mg/kg	5.67E-05	5.96E-01
Central Parcel	Soil	RA3-S14	Composite	10/28/2015	Y	1,2,3,7,8-PeCDF	1.78E-06		Y	mg/kg	4.31E-04	4.13E-03
Central Parcel	Soil	RA3-S14	Composite	10/28/2015	Y	2,3,4,6,7,8-HxCDF	2.34E-05		Y	mg/kg	2.29E-05	1.02E+00
Central Parcel	Soil	RA3-S14	Composite	10/28/2015	Y	2,3,4,7,8-PeCDF	1.66E-06		Y	mg/kg	3.35E-05	4.96E-02
Central Parcel	Soil	RA3-S14	Composite	10/28/2015	Y	2,3,7,8-TCDD	2.05E-06		Y	mg/kg	1.95E-05	1.05E-01
Central Parcel	Soil	RA3-S14	Composite	10/28/2015	Y	2,3,7,8-TCDF	6.32E-07		Y	mg/kg	1.30E-04	4.85E-03
Central Parcel	Soil	RA3-S14	Composite	10/28/2015	Y	OCDD	1.55E-02		Y	mg/kg	2.17E-02	7.13E-01
Central Parcel	Soil	RA3-S14	Composite	10/28/2015	Y	OCDF	4.31E-03		Y	mg/kg	5.49E-03	7.84E-01
Central Parcel	Soil	RA3-S14	Composite	10/28/2015	Y	Total 2,3,7,8-TCDD TEQ HQ				mg/kg		**2.87E+01**
Central Parcel	Soil	RA3-S14	Composite	10/28/2015	Y	2,3,7,8-TCDD TEQ	**1.22E-04**		Y	mg/kg	1.95E-05	6.27E+00
Central Parcel	Soil	RA3-S15	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDD	3.04E-04		Y	mg/kg	3.91E-04	7.77E-01
Central Parcel	Soil	RA3-S15	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDF	7.37E-05		Y	mg/kg	3.83E-04	1.93E-01
Central Parcel	Soil	RA3-S15	Composite	10/28/2015	Y	1,2,3,4,7,8,9-HpCDF	4.62E-06		Y	mg/kg	3.83E-04	1.21E-02
Central Parcel	Soil	RA3-S15	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDD	4.04E-06		Y	mg/kg	5.30E-05	7.62E-02
Central Parcel	Soil	RA3-S15	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDF	1.16E-05		Y	mg/kg	2.29E-05	5.06E-01
Central Parcel	Soil	RA3-S15	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDD	5.18E-05		Y	mg/kg	2.30E-05	2.26E+00
Central Parcel	Soil	RA3-S15	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDF	7.66E-06		Y	mg/kg	2.29E-05	3.34E-01
Central Parcel	Soil	RA3-S15	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDD	1.76E-05		Y	mg/kg	2.30E-05	7.67E-01

Location Specific Soil Data and Mammalian Hazard Quotients for Dioxin and Furan Congeners and Total 2,3,7,8-TCDD TEQ

Mammalian Dioxin Tool for all Samples where [Upland0_3] = "Y" (and DU-5) Based on WC_All_data.xlsx data file sent by CO on 10/8/2018 6:30pm. Note: Mammalian 2,3,7,8-TCDD TEQ provided as calculated in the laboratory database.

Parcel	Media	Sample	CompSampIn	Date	Upland0_3	StdAnalyteDiox	StdResult	Qualifier	DetectFlag	UnitsStd	MammalRBC	Mammal Hazard Quotient
Central Parcel	Soil	RA3-S15	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDF	3.08E-06		Y	mg/kg	4.52E-05	6.81E-02
Central Parcel	Soil	RA3-S15	Composite	10/28/2015	Y	1,2,3,7,8-PeCDD	5.87E-06		Y	mg/kg	5.67E-05	1.03E-01
Central Parcel	Soil	RA3-S15	Composite	10/28/2015	Y	1,2,3,7,8-PeCDF	2.10E-06		Y	mg/kg	4.31E-04	4.87E-03
Central Parcel	Soil	RA3-S15	Composite	10/28/2015	Y	2,3,4,6,7,8-HxCDF	1.53E-05		Y	mg/kg	2.29E-05	6.67E-01
Central Parcel	Soil	RA3-S15	Composite	10/28/2015	Y	2,3,4,7,8-PeCDF	9.30E-06		Y	mg/kg	3.35E-05	2.78E-01
Central Parcel	Soil	RA3-S15	Composite	10/28/2015	Y	2,3,7,8-TCDD	5.92E-07		Y	mg/kg	1.95E-05	3.04E-02
Central Parcel	Soil	RA3-S15	Composite	10/28/2015	Y	2,3,7,8-TCDF	1.64E-06		Y	mg/kg	1.30E-04	1.26E-02
Central Parcel	Soil	RA3-S15	Composite	10/28/2015	Y	OCDD	2.40E-03		Y	mg/kg	2.17E-02	1.10E-01
Central Parcel	Soil	RA3-S15	Composite	10/28/2015	Y	OCDF	1.34E-04		Y	mg/kg	5.49E-03	2.44E-02
Central Parcel	Soil	RA3-S15	Composite	10/28/2015	Y	Total 2,3,7,8-TCDD TEQ HQ				mg/kg		**6.22E+00**
Central Parcel	Soil	RA3-S15	Composite	10/28/2015	Y	2,3,7,8-TCDD TEQ	**2.52E-05**		Y	mg/kg	1.95E-05	1.30E+00
Central Parcel	Soil	RA3-S16	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDD	5.02E-03		Y	mg/kg	3.91E-04	1.28E+01
Central Parcel	Soil	RA3-S16	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDF	1.52E-03		Y	mg/kg	3.83E-04	3.97E+00
Central Parcel	Soil	RA3-S16	Composite	10/28/2015	Y	1,2,3,4,7,8,9-HpCDF	1.54E-05		Y	mg/kg	3.83E-04	4.02E-02
Central Parcel	Soil	RA3-S16	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDD	1.06E-04		Y	mg/kg	5.30E-05	2.00E+00
Central Parcel	Soil	RA3-S16	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDF	2.16E-05		Y	mg/kg	2.29E-05	9.42E-01
Central Parcel	Soil	RA3-S16	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDD	2.74E-03		Y	mg/kg	2.30E-05	1.19E+02
Central Parcel	Soil	RA3-S16	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDF	2.49E-05		Y	mg/kg	2.29E-05	1.09E+00
Central Parcel	Soil	RA3-S16	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDD	1.89E-03		Y	mg/kg	2.30E-05	8.23E+01
Central Parcel	Soil	RA3-S16	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDF	7.44E-06		Y	mg/kg	4.52E-05	1.65E-01
Central Parcel	Soil	RA3-S16	Composite	10/28/2015	Y	1,2,3,7,8-PeCDD	3.38E-04		Y	mg/kg	5.67E-05	5.96E+00
Central Parcel	Soil	RA3-S16	Composite	10/28/2015	Y	1,2,3,7,8-PeCDF	4.50E-06		Y	mg/kg	4.31E-04	1.04E-02
Central Parcel	Soil	RA3-S16	Composite	10/28/2015	Y	2,3,4,6,7,8-HxCDF	3.04E-05		Y	mg/kg	2.29E-05	1.33E+00
Central Parcel	Soil	RA3-S16	Composite	10/28/2015	Y	2,3,4,7,8-PeCDF	1.87E-05		Y	mg/kg	3.35E-05	5.59E-01
Central Parcel	Soil	RA3-S16	Composite	10/28/2015	Y	2,3,7,8-TCDD	1.40E-05		Y	mg/kg	1.95E-05	7.20E-01
Central Parcel	Soil	RA3-S16	Composite	10/28/2015	Y	2,3,7,8-TCDF	2.34E-06		Y	mg/kg	1.30E-04	1.79E-02
Central Parcel	Soil	RA3-S16	Composite	10/28/2015	Y	OCDD	2.27E-03		Y	mg/kg	2.17E-02	1.04E-01
Central Parcel	Soil	RA3-S16	Composite	10/28/2015	Y	OCDF	6.22E-04		Y	mg/kg	5.49E-03	1.13E-01
Central Parcel	Soil	RA3-S16	Composite	10/28/2015	Y	Total 2,3,7,8-TCDD TEQ HQ				mg/kg		**2.32E+02**
Central Parcel	Soil	RA3-S16	Composite	10/28/2015	Y	2,3,7,8-TCDD TEQ	**9.06E-04**		Y	mg/kg	1.95E-05	4.66E+01
Central Parcel	Soil	RA3-S17	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDD	6.00E-03		Y	mg/kg	3.91E-04	1.53E+01
Central Parcel	Soil	RA3-S17	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDF	1.97E-03		Y	mg/kg	3.83E-04	5.15E+00
Central Parcel	Soil	RA3-S17	Composite	10/28/2015	Y	1,2,3,4,7,8,9-HpCDF	3.70E-07	U	N	mg/kg	3.83E-04	9.67E-04
Central Parcel	Soil	RA3-S17	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDD	1.79E-04		Y	mg/kg	5.30E-05	3.38E+00
Central Parcel	Soil	RA3-S17	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDF	3.79E-05		Y	mg/kg	2.29E-05	1.65E+00
Central Parcel	Soil	RA3-S17	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDD	3.93E-03		Y	mg/kg	2.30E-05	1.71E+02
Central Parcel	Soil	RA3-S17	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDF	4.45E-05		Y	mg/kg	2.29E-05	1.94E+00
Central Parcel	Soil	RA3-S17	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDD	2.56E-03		Y	mg/kg	2.30E-05	1.12E+02
Central Parcel	Soil	RA3-S17	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDF	1.30E-05		Y	mg/kg	4.52E-05	2.87E-01
Central Parcel	Soil	RA3-S17	Composite	10/28/2015	Y	1,2,3,7,8-PeCDD	5.91E-04		Y	mg/kg	5.67E-05	1.04E+01
Central Parcel	Soil	RA3-S17	Composite	10/28/2015	Y	1,2,3,7,8-PeCDF	9.64E-06		Y	mg/kg	4.31E-04	2.23E-02
Central Parcel	Soil	RA3-S17	Composite	10/28/2015	Y	2,3,4,6,7,8-HxCDF	6.04E-05		Y	mg/kg	2.29E-05	2.63E+00
Central Parcel	Soil	RA3-S17	Composite	10/28/2015	Y	2,3,4,7,8-PeCDF	3.86E-05		Y	mg/kg	3.35E-05	1.15E+00
Central Parcel	Soil	RA3-S17	Composite	10/28/2015	Y	2,3,7,8-TCDD	2.70E-05		Y	mg/kg	1.95E-05	1.39E+00
Central Parcel	Soil	RA3-S17	Composite	10/28/2015	Y	2,3,7,8-TCDF	5.17E-06		Y	mg/kg	1.30E-04	3.96E-02
Central Parcel	Soil	RA3-S17	Composite	10/28/2015	Y	OCDD	6.00E-03		Y	mg/kg	2.17E-02	2.76E-01
Central Parcel	Soil	RA3-S17	Composite	10/28/2015	Y	OCDF	9.03E-04		Y	mg/kg	5.49E-03	1.64E-01
Central Parcel	Soil	RA3-S17	Composite	10/28/2015	Y	Total 2,3,7,8-TCDD TEQ HQ				mg/kg		**3.27E+02**
Central Parcel	Soil	RA3-S17	Composite	10/28/2015	Y	2,3,7,8-TCDD TEQ	**3.59E-04**		Y	mg/kg	1.95E-05	1.85E+01
Central Parcel	Soil	RA3-S18	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDD	1.48E-04		Y	mg/kg	3.91E-04	3.79E-01
Central Parcel	Soil	RA3-S18	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDF	6.64E-05		Y	mg/kg	3.83E-04	1.74E-01
Central Parcel	Soil	RA3-S18	Composite	10/28/2015	Y	1,2,3,4,7,8,9-HpCDF	2.06E-06		Y	mg/kg	3.83E-04	5.38E-03
Central Parcel	Soil	RA3-S18	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDD	4.00E-06		Y	mg/kg	5.30E-05	7.55E-02
Central Parcel	Soil	RA3-S18	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDF	4.96E-06		Y	mg/kg	2.29E-05	2.16E-01

Location Specific Soil Data and Mammalian Hazard Quotients for Dioxin and Furan Congeners and Total 2,3,7,8-TCDD TEQ

Mammalian Dioxin Tool for all Samples where [Upland0_3] = "Y" (and DU-5) Based on WC_All_data.xlsx data file sent by CO on 10/8/2018 6:30pm. Note: Mammalian 2,3,7,8-TCDD TEQ provided as calculated in the laboratory database.

Parcel	Media	Sample	CompSampIn	Date	Upland0_3	StdAnalyteDiox	StdResult	Qualifier	DetectFlag	UnitsStd	MammalRBC	Mammal Hazard Quotient
Central Parcel	Soil	RA3-S18	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDD	7.54E-05		Y	mg/kg	2.30E-05	3.28E+00
Central Parcel	Soil	RA3-S18	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDF	4.92E-06		Y	mg/kg	2.29E-05	2.14E-01
Central Parcel	Soil	RA3-S18	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDD	4.98E-05		Y	mg/kg	2.30E-05	2.17E+00
Central Parcel	Soil	RA3-S18	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDF	1.99E-06		Y	mg/kg	4.52E-05	4.40E-02
Central Parcel	Soil	RA3-S18	Composite	10/28/2015	Y	1,2,3,7,8-PeCDD	1.29E-05		Y	mg/kg	5.67E-05	2.27E-01
Central Parcel	Soil	RA3-S18	Composite	10/28/2015	Y	1,2,3,7,8-PeCDF	2.21E-06		Y	mg/kg	4.31E-04	5.12E-03
Central Parcel	Soil	RA3-S18	Composite	10/28/2015	Y	2,3,4,6,7,8-HxCDF	9.64E-06		Y	mg/kg	2.29E-05	4.20E-01
Central Parcel	Soil	RA3-S18	Composite	10/28/2015	Y	2,3,4,7,8-PeCDF	2.67E-06		Y	mg/kg	3.35E-05	7.98E-02
Central Parcel	Soil	RA3-S18	Composite	10/28/2015	Y	2,3,7,8-TCDD	1.03E-06		Y	mg/kg	1.95E-05	5.29E-02
Central Parcel	Soil	RA3-S18	Composite	10/28/2015	Y	2,3,7,8-TCDF	1.85E-06		Y	mg/kg	1.30E-04	1.42E-02
Central Parcel	Soil	RA3-S18	Composite	10/28/2015	Y	OCDD	4.00E-04		Y	mg/kg	2.17E-02	1.84E-02
Central Parcel	Soil	RA3-S18	Composite	10/28/2015	Y	OCDF	5.36E-05		Y	mg/kg	5.49E-03	9.76E-03
Central Parcel	Soil	RA3-S18	Composite	10/28/2015	Y	Total 2,3,7,8-TCDD TEQ HQ				mg/kg		**7.39E+00**
Central Parcel	Soil	RA3-S18	Composite	10/28/2015	Y	2,3,7,8-TCDD TEQ	**3.24E-05**		Y	mg/kg	1.95E-05	1.67E+00
Central Parcel	Soil	RA3-S19	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDD	2.71E-04		Y	mg/kg	3.91E-04	6.93E-01
Central Parcel	Soil	RA3-S19	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDF	5.91E-05		Y	mg/kg	3.83E-04	1.54E-01
Central Parcel	Soil	RA3-S19	Composite	10/28/2015	Y	1,2,3,4,7,8,9-HpCDF	1.35E-06		Y	mg/kg	3.83E-04	3.53E-03
Central Parcel	Soil	RA3-S19	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDD	6.43E-06		Y	mg/kg	5.30E-05	1.21E-01
Central Parcel	Soil	RA3-S19	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDF	2.23E-06		Y	mg/kg	2.29E-05	9.72E-02
Central Parcel	Soil	RA3-S19	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDD	1.25E-04		Y	mg/kg	2.30E-05	5.45E+00
Central Parcel	Soil	RA3-S19	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDF	1.91E-06		Y	mg/kg	2.29E-05	8.33E-02
Central Parcel	Soil	RA3-S19	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDD	9.63E-05		Y	mg/kg	2.30E-05	4.19E+00
Central Parcel	Soil	RA3-S19	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDF	7.64E-07		Y	mg/kg	4.52E-05	1.69E-02
Central Parcel	Soil	RA3-S19	Composite	10/28/2015	Y	1,2,3,7,8-PeCDD	2.47E-05		Y	mg/kg	5.67E-05	4.35E-01
Central Parcel	Soil	RA3-S19	Composite	10/28/2015	Y	1,2,3,7,8-PeCDF	9.89E-07		Y	mg/kg	4.31E-04	2.29E-03
Central Parcel	Soil	RA3-S19	Composite	10/28/2015	Y	2,3,4,6,7,8-HxCDF	2.86E-06		Y	mg/kg	2.29E-05	1.25E-01
Central Parcel	Soil	RA3-S19	Composite	10/28/2015	Y	2,3,4,7,8-PeCDF	9.65E-07		Y	mg/kg	3.35E-05	2.88E-02
Central Parcel	Soil	RA3-S19	Composite	10/28/2015	Y	2,3,7,8-TCDD	2.99E-06		Y	mg/kg	1.95E-05	1.54E-01
Central Parcel	Soil	RA3-S19	Composite	10/28/2015	Y	2,3,7,8-TCDF	1.01E-06		Y	mg/kg	1.30E-04	7.75E-03
Central Parcel	Soil	RA3-S19	Composite	10/28/2015	Y	OCDD	6.05E-04		Y	mg/kg	2.17E-02	2.78E-02
Central Parcel	Soil	RA3-S19	Composite	10/28/2015	Y	OCDF	3.16E-05		Y	mg/kg	5.49E-03	5.75E-03
Central Parcel	Soil	RA3-S19	Composite	10/28/2015	Y	Total 2,3,7,8-TCDD TEQ HQ				mg/kg		**1.16E+01**
Central Parcel	Soil	RA3-S19	Composite	10/28/2015	Y	2,3,7,8-TCDD TEQ	**5.52E-05**		Y	mg/kg	1.95E-05	2.84E+00
Central Parcel	Soil	RA3-S2	Composite	10/19/2015	Y	1,2,3,4,6,7,8-HpCDD	4.42E-04		Y	mg/kg	3.91E-04	1.13E+00
Central Parcel	Soil	RA3-S2	Composite	10/19/2015	Y	1,2,3,4,6,7,8-HpCDF	1.07E-04		Y	mg/kg	3.83E-04	2.80E-01
Central Parcel	Soil	RA3-S2	Composite	10/19/2015	Y	1,2,3,4,7,8,9-HpCDF	1.10E-05	U	N	mg/kg	3.83E-04	2.87E-02
Central Parcel	Soil	RA3-S2	Composite	10/19/2015	Y	1,2,3,4,7,8-HxCDD	1.16E-05		Y	mg/kg	5.30E-05	2.19E-01
Central Parcel	Soil	RA3-S2	Composite	10/19/2015	Y	1,2,3,4,7,8-HxCDF	6.62E-06	J	Y	mg/kg	2.29E-05	2.89E-01
Central Parcel	Soil	RA3-S2	Composite	10/19/2015	Y	1,2,3,6,7,8-HxCDD	1.75E-04		Y	mg/kg	2.30E-05	7.62E+00
Central Parcel	Soil	RA3-S2	Composite	10/19/2015	Y	1,2,3,6,7,8-HxCDF	6.79E-06	J	Y	mg/kg	2.29E-05	2.96E-01
Central Parcel	Soil	RA3-S2	Composite	10/19/2015	Y	1,2,3,7,8,9-HxCDD	1.03E-04		Y	mg/kg	2.30E-05	4.49E+00
Central Parcel	Soil	RA3-S2	Composite	10/19/2015	Y	1,2,3,7,8,9-HxCDF	1.10E-05	U	N	mg/kg	4.52E-05	2.43E-01
Central Parcel	Soil	RA3-S2	Composite	10/19/2015	Y	1,2,3,7,8-PeCDD	1.10E-05	U	N	mg/kg	5.67E-05	1.94E-01
Central Parcel	Soil	RA3-S2	Composite	10/19/2015	Y	1,2,3,7,8-PeCDF	1.10E-05	U	N	mg/kg	4.31E-04	2.55E-02
Central Parcel	Soil	RA3-S2	Composite	10/19/2015	Y	2,3,4,6,7,8-HxCDF	1.45E-05		Y	mg/kg	2.29E-05	6.32E-01
Central Parcel	Soil	RA3-S2	Composite	10/19/2015	Y	2,3,4,7,8-PeCDF	2.92E-05		Y	mg/kg	3.35E-05	8.72E-01
Central Parcel	Soil	RA3-S2	Composite	10/19/2015	Y	2,3,7,8-TCDD	2.19E-06	U	N	mg/kg	1.95E-05	1.13E-01
Central Parcel	Soil	RA3-S2	Composite	10/19/2015	Y	2,3,7,8-TCDF	2.19E-06	U	N	mg/kg	1.30E-04	1.68E-02
Central Parcel	Soil	RA3-S2	Composite	10/19/2015	Y	OCDD	1.36E-03		Y	mg/kg	2.17E-02	6.25E-02
Central Parcel	Soil	RA3-S2	Composite	10/19/2015	Y	OCDF	5.40E-05		Y	mg/kg	5.49E-03	9.83E-03
Central Parcel	Soil	RA3-S2	Composite	10/19/2015	Y	Total 2,3,7,8-TCDD TEQ HQ				mg/kg		**1.65E+01**
Central Parcel	Soil	RA3-S2	Composite	10/19/2015	Y	2,3,7,8-TCDD TEQ	**4.64E-05**		Y	mg/kg	1.95E-05	2.38E+00
Central Parcel	Soil	RA3-S20	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDD	4.32E-03		Y	mg/kg	3.91E-04	1.10E+01
Central Parcel	Soil	RA3-S20	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDF	1.02E-03		Y	mg/kg	3.83E-04	2.67E+00

Location Specific Soil Data and Mammalian Hazard Quotients for Dioxin and Furan Congeners and Total 2,3,7,8-TCDD TEQ

Mammalian Dioxin Tool for all Samples where [Upland0_3] = "Y" (and DU-5) Based on WC_All_data.xlsx data file sent by CO on 10/8/2018 6:30pm. Note: Mammalian 2,3,7,8-TCDD TEQ provided as calculated in the laboratory database.

Parcel	Media	Sample	CompSampIn	Date	Upland0_3	StdAnalyteDiox	StdResult	Qualifier	DetectFlag	UnitsStd	MammalRBC	Mammal Hazard Quotient
Central Parcel	Soil	RA3-S20	Composite	10/28/2015	Y	1,2,3,4,7,8,9-HpCDF	1.93E-05		Y	mg/kg	3.83E-04	5.04E-02
Central Parcel	Soil	RA3-S20	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDD	1.14E-04		Y	mg/kg	5.30E-05	2.15E+00
Central Parcel	Soil	RA3-S20	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDF	1.80E-05		Y	mg/kg	2.29E-05	7.85E-01
Central Parcel	Soil	RA3-S20	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDD	2.19E-03		Y	mg/kg	2.30E-05	9.54E+01
Central Parcel	Soil	RA3-S20	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDF	2.28E-05		Y	mg/kg	2.29E-05	9.94E-01
Central Parcel	Soil	RA3-S20	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDD	1.32E-03		Y	mg/kg	2.30E-05	5.75E+01
Central Parcel	Soil	RA3-S20	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDF	5.85E-06		Y	mg/kg	4.52E-05	1.29E-01
Central Parcel	Soil	RA3-S20	Composite	10/28/2015	Y	1,2,3,7,8-PeCDD	3.65E-04		Y	mg/kg	5.67E-05	6.44E+00
Central Parcel	Soil	RA3-S20	Composite	10/28/2015	Y	1,2,3,7,8-PeCDF	3.54E-06		Y	mg/kg	4.31E-04	8.20E-03
Central Parcel	Soil	RA3-S20	Composite	10/28/2015	Y	2,3,4,6,7,8-HxCDF	3.02E-05		Y	mg/kg	2.29E-05	1.32E+00
Central Parcel	Soil	RA3-S20	Composite	10/28/2015	Y	2,3,4,7,8-PeCDF	3.56E-06		Y	mg/kg	3.35E-05	1.06E-01
Central Parcel	Soil	RA3-S20	Composite	10/28/2015	Y	2,3,7,8-TCDD	2.07E-05		Y	mg/kg	1.95E-05	1.06E+00
Central Parcel	Soil	RA3-S20	Composite	10/28/2015	Y	2,3,7,8-TCDF	1.22E-06		Y	mg/kg	1.30E-04	9.36E-03
Central Parcel	Soil	RA3-S20	Composite	10/28/2015	Y	OCDD	2.29E-02		Y	mg/kg	2.17E-02	1.05E+00
Central Parcel	Soil	RA3-S20	Composite	10/28/2015	Y	OCDF	6.53E-04		Y	mg/kg	5.49E-03	1.19E-01
Central Parcel	Soil	RA3-S20	Composite	10/28/2015	Y	Total 2,3,7,8-TCDD TEQ HQ				mg/kg		**1.81E+02**
Central Parcel	Soil	RA3-S20	Composite	10/28/2015	Y	2,3,7,8-TCDD TEQ	**8.18E-04**		Y	mg/kg	1.95E-05	4.20E+01
Central Parcel	Soil	RA3-S21	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDD	2.57E-04		Y	mg/kg	3.91E-04	6.57E-01
Central Parcel	Soil	RA3-S21	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDF	1.51E-04		Y	mg/kg	3.83E-04	3.95E-01
Central Parcel	Soil	RA3-S21	Composite	10/28/2015	Y	1,2,3,4,7,8,9-HpCDF	3.03E-06		Y	mg/kg	3.83E-04	7.92E-03
Central Parcel	Soil	RA3-S21	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDD	5.58E-06		Y	mg/kg	5.30E-05	1.05E-01
Central Parcel	Soil	RA3-S21	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDF	1.87E-06		Y	mg/kg	2.29E-05	8.15E-02
Central Parcel	Soil	RA3-S21	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDD	1.11E-04		Y	mg/kg	2.30E-05	4.84E+00
Central Parcel	Soil	RA3-S21	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDF	1.76E-06		Y	mg/kg	2.29E-05	7.67E-02
Central Parcel	Soil	RA3-S21	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDD	6.83E-05		Y	mg/kg	2.30E-05	2.98E+00
Central Parcel	Soil	RA3-S21	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDF	7.02E-07		Y	mg/kg	4.52E-05	1.55E-02
Central Parcel	Soil	RA3-S21	Composite	10/28/2015	Y	1,2,3,7,8-PeCDD	1.83E-05		Y	mg/kg	5.67E-05	3.23E-01
Central Parcel	Soil	RA3-S21	Composite	10/28/2015	Y	1,2,3,7,8-PeCDF	4.09E-07		Y	mg/kg	4.31E-04	9.48E-04
Central Parcel	Soil	RA3-S21	Composite	10/28/2015	Y	2,3,4,6,7,8-HxCDF	2.89E-06		Y	mg/kg	2.29E-05	1.26E-01
Central Parcel	Soil	RA3-S21	Composite	10/28/2015	Y	2,3,4,7,8-PeCDF	6.22E-07		Y	mg/kg	3.35E-05	1.86E-02
Central Parcel	Soil	RA3-S21	Composite	10/28/2015	Y	2,3,7,8-TCDD	9.30E-07		Y	mg/kg	1.95E-05	4.78E-02
Central Parcel	Soil	RA3-S21	Composite	10/28/2015	Y	2,3,7,8-TCDF	3.07E-07		Y	mg/kg	1.30E-04	2.35E-03
Central Parcel	Soil	RA3-S21	Composite	10/28/2015	Y	OCDD	1.37E-03		Y	mg/kg	2.17E-02	6.30E-02
Central Parcel	Soil	RA3-S21	Composite	10/28/2015	Y	OCDF	4.00E-04		Y	mg/kg	5.49E-03	7.28E-02
Central Parcel	Soil	RA3-S21	Composite	10/28/2015	Y	Total 2,3,7,8-TCDD TEQ HQ				mg/kg		**9.80E+00**
Central Parcel	Soil	RA3-S21	Composite	10/28/2015	Y	2,3,7,8-TCDD TEQ	**4.33E-05**		Y	mg/kg	1.95E-05	2.23E+00
Central Parcel	Soil	RA3-S23	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDD	4.30E-04		Y	mg/kg	3.91E-04	1.10E+00
Central Parcel	Soil	RA3-S23	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDF	7.11E-05		Y	mg/kg	3.83E-04	1.86E-01
Central Parcel	Soil	RA3-S23	Composite	10/28/2015	Y	1,2,3,4,7,8,9-HpCDF	3.37E-06		Y	mg/kg	3.83E-04	8.81E-03
Central Parcel	Soil	RA3-S23	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDD	6.26E-06		Y	mg/kg	5.30E-05	1.18E-01
Central Parcel	Soil	RA3-S23	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDF	3.17E-06		Y	mg/kg	2.29E-05	1.38E-01
Central Parcel	Soil	RA3-S23	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDD	1.36E-04		Y	mg/kg	2.30E-05	5.92E+00
Central Parcel	Soil	RA3-S23	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDF	2.99E-06		Y	mg/kg	2.29E-05	1.30E-01
Central Parcel	Soil	RA3-S23	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDD	7.70E-05		Y	mg/kg	2.30E-05	3.35E+00
Central Parcel	Soil	RA3-S23	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDF	1.24E-06		Y	mg/kg	4.52E-05	2.74E-02
Central Parcel	Soil	RA3-S23	Composite	10/28/2015	Y	1,2,3,7,8-PeCDD	1.33E-05		Y	mg/kg	5.67E-05	2.34E-01
Central Parcel	Soil	RA3-S23	Composite	10/28/2015	Y	1,2,3,7,8-PeCDF	9.52E-07		Y	mg/kg	4.31E-04	2.21E-03
Central Parcel	Soil	RA3-S23	Composite	10/28/2015	Y	2,3,4,6,7,8-HxCDF	5.31E-06		Y	mg/kg	2.29E-05	2.31E-01
Central Parcel	Soil	RA3-S23	Composite	10/28/2015	Y	2,3,4,7,8-PeCDF	6.68E-06		Y	mg/kg	3.35E-05	2.00E-01
Central Parcel	Soil	RA3-S23	Composite	10/28/2015	Y	2,3,7,8-TCDD	4.90E-07	U	N	mg/kg	1.95E-05	2.52E-02
Central Parcel	Soil	RA3-S23	Composite	10/28/2015	Y	2,3,7,8-TCDF	7.67E-07		Y	mg/kg	1.30E-04	5.88E-03
Central Parcel	Soil	RA3-S23	Composite	10/28/2015	Y	OCDD	1.87E-03		Y	mg/kg	2.17E-02	8.60E-02
Central Parcel	Soil	RA3-S23	Composite	10/28/2015	Y	OCDF	1.67E-04		Y	mg/kg	5.49E-03	3.04E-02
Central Parcel	Soil	RA3-S23	Composite	10/28/2015	Y	Total 2,3,7,8-TCDD TEQ HQ				mg/kg		**1.18E+01**

Location Specific Soil Data and Mammalian Hazard Quotients for Dioxin and Furan Congeners and Total 2,3,7,8-TCDD TEQ

Mammalian Dioxin Tool for all Samples where [Upland0_3] = "Y" (and DU-5) Based on WC_All_data.xlsx data file sent by CO on 10/8/2018 6:30pm. Note: Mammalian 2,3,7,8-TCDD TEQ provided as calculated in the laboratory database.

Parcel	Media	Sample	CompSampIn	Date	Upland0_3	StdAnalyteDiox	StdResult	Qualifier	DetectFlag	UnitsStd	MammalRBC	Mammal Hazard Quotient
Central Parcel	Soil	RA3-S23	Composite	10/28/2015	Y	2,3,7,8-TCDD TEQ	**4.43E-05**		Y	mg/kg	1.95E-05	2.28E+00
Central Parcel	Soil	RA3-S24	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDD	8.81E-04		Y	mg/kg	3.91E-04	2.25E+00
Central Parcel	Soil	RA3-S24	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDF	2.12E-04		Y	mg/kg	3.83E-04	5.54E-01
Central Parcel	Soil	RA3-S24	Composite	10/28/2015	Y	1,2,3,4,7,8,9-HpCDF	8.59E-06		Y	mg/kg	3.83E-04	2.24E-02
Central Parcel	Soil	RA3-S24	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDD	1.81E-05		Y	mg/kg	5.30E-05	3.41E-01
Central Parcel	Soil	RA3-S24	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDF	7.38E-06		Y	mg/kg	2.29E-05	3.22E-01
Central Parcel	Soil	RA3-S24	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDD	2.92E-04		Y	mg/kg	2.30E-05	1.27E+01
Central Parcel	Soil	RA3-S24	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDF	7.48E-06		Y	mg/kg	2.29E-05	3.26E-01
Central Parcel	Soil	RA3-S24	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDD	1.84E-04		Y	mg/kg	2.30E-05	8.02E+00
Central Parcel	Soil	RA3-S24	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDF	2.35E-06		Y	mg/kg	4.52E-05	5.20E-02
Central Parcel	Soil	RA3-S24	Composite	10/28/2015	Y	1,2,3,7,8-PeCDD	5.37E-05		Y	mg/kg	5.67E-05	9.47E-01
Central Parcel	Soil	RA3-S24	Composite	10/28/2015	Y	1,2,3,7,8-PeCDF	1.97E-06		Y	mg/kg	4.31E-04	4.57E-03
Central Parcel	Soil	RA3-S24	Composite	10/28/2015	Y	2,3,4,6,7,8-HxCDF	1.22E-05		Y	mg/kg	2.29E-05	5.32E-01
Central Parcel	Soil	RA3-S24	Composite	10/28/2015	Y	2,3,4,7,8-PeCDF	4.40E-06		Y	mg/kg	3.35E-05	1.31E-01
Central Parcel	Soil	RA3-S24	Composite	10/28/2015	Y	2,3,7,8-TCDD	3.42E-06		Y	mg/kg	1.95E-05	1.76E-01
Central Parcel	Soil	RA3-S24	Composite	10/28/2015	Y	2,3,7,8-TCDF	1.73E-06		Y	mg/kg	1.30E-04	1.33E-02
Central Parcel	Soil	RA3-S24	Composite	10/28/2015	Y	OCDD	4.31E-03		Y	mg/kg	2.17E-02	1.98E-01
Central Parcel	Soil	RA3-S24	Composite	10/28/2015	Y	OCDF	4.67E-04		Y	mg/kg	5.49E-03	8.50E-02
Central Parcel	Soil	RA3-S24	Composite	10/28/2015	Y	Total 2,3,7,8-TCDD TEQ HQ				mg/kg		**2.67E+01**
Central Parcel	Soil	RA3-S24	Composite	10/28/2015	Y	2,3,7,8-TCDD TEQ	**1.23E-04**		Y	mg/kg	1.95E-05	6.32E+00
Central Parcel	Soil	RA3-S25	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDD	6.03E-04		Y	mg/kg	3.91E-04	1.54E+00
Central Parcel	Soil	RA3-S25	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDF	1.93E-04		Y	mg/kg	3.83E-04	5.04E-01
Central Parcel	Soil	RA3-S25	Composite	10/28/2015	Y	1,2,3,4,7,8,9-HpCDF	4.40E-06		Y	mg/kg	3.83E-04	1.15E-02
Central Parcel	Soil	RA3-S25	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDD	1.71E-05		Y	mg/kg	5.30E-05	3.23E-01
Central Parcel	Soil	RA3-S25	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDF	4.70E-06		Y	mg/kg	2.29E-05	2.05E-01
Central Parcel	Soil	RA3-S25	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDD	4.46E-04		Y	mg/kg	2.30E-05	1.94E+01
Central Parcel	Soil	RA3-S25	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDF	5.95E-06		Y	mg/kg	2.29E-05	2.59E-01
Central Parcel	Soil	RA3-S25	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDD	2.02E-04		Y	mg/kg	2.30E-05	8.80E+00
Central Parcel	Soil	RA3-S25	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDF	1.57E-06		Y	mg/kg	4.52E-05	3.47E-02
Central Parcel	Soil	RA3-S25	Composite	10/28/2015	Y	1,2,3,7,8-PeCDD	6.30E-05		Y	mg/kg	5.67E-05	1.11E+00
Central Parcel	Soil	RA3-S25	Composite	10/28/2015	Y	1,2,3,7,8-PeCDF	9.86E-07		Y	mg/kg	4.31E-04	2.29E-03
Central Parcel	Soil	RA3-S25	Composite	10/28/2015	Y	2,3,4,6,7,8-HxCDF	9.27E-06		Y	mg/kg	2.29E-05	4.04E-01
Central Parcel	Soil	RA3-S25	Composite	10/28/2015	Y	2,3,4,7,8-PeCDF	2.88E-06		Y	mg/kg	3.35E-05	8.60E-02
Central Parcel	Soil	RA3-S25	Composite	10/28/2015	Y	2,3,7,8-TCDD	2.98E-06		Y	mg/kg	1.95E-05	1.53E-01
Central Parcel	Soil	RA3-S25	Composite	10/28/2015	Y	2,3,7,8-TCDF	6.42E-07		Y	mg/kg	1.30E-04	4.92E-03
Central Parcel	Soil	RA3-S25	Composite	10/28/2015	Y	OCDD	1.89E-03		Y	mg/kg	2.17E-02	8.69E-02
Central Parcel	Soil	RA3-S25	Composite	10/28/2015	Y	OCDF	1.96E-04		Y	mg/kg	5.49E-03	3.57E-02
Central Parcel	Soil	RA3-S25	Composite	10/28/2015	Y	Total 2,3,7,8-TCDD TEQ HQ				mg/kg		**3.30E+01**
Central Parcel	Soil	RA3-S25	Composite	10/28/2015	Y	2,3,7,8-TCDD TEQ	**1.44E-04**		Y	mg/kg	1.95E-05	7.40E+00
Central Parcel	Soil	RA3-S26	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDD	3.70E-04		Y	mg/kg	3.91E-04	9.46E-01
Central Parcel	Soil	RA3-S26	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDF	7.46E-05		Y	mg/kg	3.83E-04	1.95E-01
Central Parcel	Soil	RA3-S26	Composite	10/28/2015	Y	1,2,3,4,7,8,9-HpCDF	4.71E-06		Y	mg/kg	3.83E-04	1.23E-02
Central Parcel	Soil	RA3-S26	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDD	4.82E-06		Y	mg/kg	5.30E-05	9.09E-02
Central Parcel	Soil	RA3-S26	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDF	7.07E-06		Y	mg/kg	2.29E-05	3.08E-01
Central Parcel	Soil	RA3-S26	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDD	4.74E-05		Y	mg/kg	2.30E-05	2.06E+00
Central Parcel	Soil	RA3-S26	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDF	1.16E-05		Y	mg/kg	2.29E-05	5.06E-01
Central Parcel	Soil	RA3-S26	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDD	3.18E-05		Y	mg/kg	2.30E-05	1.39E+00
Central Parcel	Soil	RA3-S26	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDF	3.55E-06		Y	mg/kg	4.52E-05	7.85E-02
Central Parcel	Soil	RA3-S26	Composite	10/28/2015	Y	1,2,3,7,8-PeCDD	7.12E-06		Y	mg/kg	5.67E-05	1.26E-01
Central Parcel	Soil	RA3-S26	Composite	10/28/2015	Y	1,2,3,7,8-PeCDF	2.46E-06		Y	mg/kg	4.31E-04	5.70E-03
Central Parcel	Soil	RA3-S26	Composite	10/28/2015	Y	2,3,4,6,7,8-HxCDF	2.70E-05		Y	mg/kg	2.29E-05	1.18E+00
Central Parcel	Soil	RA3-S26	Composite	10/28/2015	Y	2,3,4,7,8-PeCDF	9.03E-06		Y	mg/kg	3.35E-05	2.70E-01
Central Parcel	Soil	RA3-S26	Composite	10/28/2015	Y	2,3,7,8-TCDD	8.21E-07		Y	mg/kg	1.95E-05	4.22E-02
Central Parcel	Soil	RA3-S26	Composite	10/28/2015	Y	2,3,7,8-TCDF	2.35E-06		Y	mg/kg	1.30E-04	1.80E-02

Location Specific Soil Data and Mammalian Hazard Quotients for Dioxin and Furan Congeners and Total 2,3,7,8-TCDD TEQ

Mammalian Dioxin Tool for all Samples where [Upland0_3] = "Y" (and DU-5) Based on WC_All_data.xlsx data file sent by CO on 10/8/2018 6:30pm. Note: Mammalian 2,3,7,8-TCDD TEQ provided as calculated in the laboratory database.

Parcel	Media	Sample	CompSampIn	Date	Upland0_3	StdAnalyteDiox	StdResult	Qualifier	DetectFlag	UnitsStd	MammalRBC	Mammal Hazard Quotient
Central Parcel	Soil	RA3-S26	Composite	10/28/2015	Y	OCDD	2.20E-03		Y	mg/kg	2.17E-02	1.01E-01
Central Parcel	Soil	RA3-S26	Composite	10/28/2015	Y	OCDF	2.35E-04		Y	mg/kg	5.49E-03	4.28E-02
Central Parcel	Soil	RA3-S26	Composite	10/28/2015	Y	Total 2,3,7,8-TCDD TEQ HQ				mg/kg		**7.37E+00**
Central Parcel	Soil	RA3-S26	Composite	10/28/2015	Y	2,3,7,8-TCDD TEQ	**2.95E-05**		Y	mg/kg	1.95E-05	1.52E+00
Central Parcel	Soil	RA3-S27	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDD	1.85E-04		Y	mg/kg	3.91E-04	4.73E-01
Central Parcel	Soil	RA3-S27	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDF	4.84E-05		Y	mg/kg	3.83E-04	1.26E-01
Central Parcel	Soil	RA3-S27	Composite	10/28/2015	Y	1,2,3,4,7,8,9-HpCDF	3.64E-06		Y	mg/kg	3.83E-04	9.51E-03
Central Parcel	Soil	RA3-S27	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDD	2.41E-06		Y	mg/kg	5.30E-05	4.55E-02
Central Parcel	Soil	RA3-S27	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDF	8.42E-06		Y	mg/kg	2.29E-05	3.67E-01
Central Parcel	Soil	RA3-S27	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDD	1.99E-05		Y	mg/kg	2.30E-05	8.67E-01
Central Parcel	Soil	RA3-S27	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDF	7.37E-06		Y	mg/kg	2.29E-05	3.21E-01
Central Parcel	Soil	RA3-S27	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDD	1.03E-05		Y	mg/kg	2.30E-05	4.49E-01
Central Parcel	Soil	RA3-S27	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDF	2.59E-06		Y	mg/kg	4.52E-05	5.73E-02
Central Parcel	Soil	RA3-S27	Composite	10/28/2015	Y	1,2,3,7,8-PeCDD	3.22E-06		Y	mg/kg	5.67E-05	5.68E-02
Central Parcel	Soil	RA3-S27	Composite	10/28/2015	Y	1,2,3,7,8-PeCDF	1.38E-06		Y	mg/kg	4.31E-04	3.20E-03
Central Parcel	Soil	RA3-S27	Composite	10/28/2015	Y	2,3,4,6,7,8-HxCDF	1.62E-05		Y	mg/kg	2.29E-05	7.06E-01
Central Parcel	Soil	RA3-S27	Composite	10/28/2015	Y	2,3,4,7,8-PeCDF	4.76E-06		Y	mg/kg	3.35E-05	1.42E-01
Central Parcel	Soil	RA3-S27	Composite	10/28/2015	Y	2,3,7,8-TCDD	9.13E-07	U	N	mg/kg	1.95E-05	4.69E-02
Central Parcel	Soil	RA3-S27	Composite	10/28/2015	Y	2,3,7,8-TCDF	1.11E-06		Y	mg/kg	1.30E-04	8.51E-03
Central Parcel	Soil	RA3-S27	Composite	10/28/2015	Y	OCDD	1.31E-03		Y	mg/kg	2.17E-02	6.02E-02
Central Parcel	Soil	RA3-S27	Composite	10/28/2015	Y	OCDF	7.70E-05		Y	mg/kg	5.49E-03	1.40E-02
Central Parcel	Soil	RA3-S27	Composite	10/28/2015	Y	Total 2,3,7,8-TCDD TEQ HQ				mg/kg		**3.75E+00**
Central Parcel	Soil	RA3-S27	Composite	10/28/2015	Y	2,3,7,8-TCDD TEQ	**1.43E-05**		Y	mg/kg	1.95E-05	7.35E-01
Central Parcel	Soil	RA3-S28	Composite	12/22/2015	Y	1,2,3,4,6,7,8-HpCDD	7.93E-06		Y	mg/kg	3.91E-04	2.03E-02
Central Parcel	Soil	RA3-S28	Composite	12/22/2015	Y	1,2,3,4,6,7,8-HpCDF	2.70E-06		Y	mg/kg	3.83E-04	7.06E-03
Central Parcel	Soil	RA3-S28	Composite	12/22/2015	Y	1,2,3,4,7,8,9-HpCDF	8.88E-08	U	N	mg/kg	3.83E-04	2.32E-04
Central Parcel	Soil	RA3-S28	Composite	12/22/2015	Y	1,2,3,4,7,8-HxCDD	4.03E-07	U	N	mg/kg	5.30E-05	7.60E-03
Central Parcel	Soil	RA3-S28	Composite	12/22/2015	Y	1,2,3,4,7,8-HxCDF	2.23E-07	U	N	mg/kg	2.29E-05	9.72E-03
Central Parcel	Soil	RA3-S28	Composite	12/22/2015	Y	1,2,3,6,7,8-HxCDD	4.54E-06		Y	mg/kg	2.30E-05	1.98E-01
Central Parcel	Soil	RA3-S28	Composite	12/22/2015	Y	1,2,3,6,7,8-HxCDF	7.20E-08	U	N	mg/kg	2.29E-05	3.14E-03
Central Parcel	Soil	RA3-S28	Composite	12/22/2015	Y	1,2,3,7,8,9-HxCDD	2.80E-06		Y	mg/kg	2.30E-05	1.22E-01
Central Parcel	Soil	RA3-S28	Composite	12/22/2015	Y	1,2,3,7,8,9-HxCDF	1.10E-07	U	N	mg/kg	4.52E-05	2.43E-03
Central Parcel	Soil	RA3-S28	Composite	12/22/2015	Y	1,2,3,7,8-PeCDD	8.76E-07	J	Y	mg/kg	5.67E-05	1.54E-02
Central Parcel	Soil	RA3-S28	Composite	12/22/2015	Y	1,2,3,7,8-PeCDF	5.10E-07	U	N	mg/kg	4.31E-04	1.18E-03
Central Parcel	Soil	RA3-S28	Composite	12/22/2015	Y	2,3,4,6,7,8-HxCDF	3.24E-07	J	Y	mg/kg	2.29E-05	1.41E-02
Central Parcel	Soil	RA3-S28	Composite	12/22/2015	Y	2,3,4,7,8-PeCDF	3.26E-07	U	N	mg/kg	3.35E-05	9.74E-03
Central Parcel	Soil	RA3-S28	Composite	12/22/2015	Y	2,3,7,8-TCDD	1.68E-07	U	N	mg/kg	1.95E-05	8.63E-03
Central Parcel	Soil	RA3-S28	Composite	12/22/2015	Y	2,3,7,8-TCDF	1.67E-07	U	N	mg/kg	1.30E-04	1.28E-03
Central Parcel	Soil	RA3-S28	Composite	12/22/2015	Y	OCDD	1.96E-05		Y	mg/kg	2.17E-02	9.01E-04
Central Parcel	Soil	RA3-S28	Composite	12/22/2015	Y	OCDF	1.77E-06	J	Y	mg/kg	5.49E-03	3.22E-04
Central Parcel	Soil	RA3-S28	Composite	12/22/2015	Y	Total 2,3,7,8-TCDD TEQ HQ				mg/kg		**4.22E-01**
Central Parcel	Soil	RA3-S28	Composite	12/22/2015	Y	2,3,7,8-TCDD TEQ	**1.76E-06**		Y	mg/kg	1.95E-05	9.05E-02
Central Parcel	Soil	RA3-S29	Composite	12/22/2015	Y	1,2,3,4,6,7,8-HpCDD	8.92E-04		Y	mg/kg	3.91E-04	2.28E+00
Central Parcel	Soil	RA3-S29	Composite	12/22/2015	Y	1,2,3,4,6,7,8-HpCDF	1.75E-04		Y	mg/kg	3.83E-04	4.57E-01
Central Parcel	Soil	RA3-S29	Composite	12/22/2015	Y	1,2,3,4,7,8,9-HpCDF	1.27E-05		Y	mg/kg	3.83E-04	3.32E-02
Central Parcel	Soil	RA3-S29	Composite	12/22/2015	Y	1,2,3,4,7,8-HxCDD	4.29E-06		Y	mg/kg	5.30E-05	8.09E-02
Central Parcel	Soil	RA3-S29	Composite	12/22/2015	Y	1,2,3,4,7,8-HxCDF	7.83E-06		Y	mg/kg	2.29E-05	3.41E-01
Central Parcel	Soil	RA3-S29	Composite	12/22/2015	Y	1,2,3,6,7,8-HxCDD	3.10E-05		Y	mg/kg	2.30E-05	1.35E+00
Central Parcel	Soil	RA3-S29	Composite	12/22/2015	Y	1,2,3,6,7,8-HxCDF	5.30E-06		Y	mg/kg	2.29E-05	2.31E-01
Central Parcel	Soil	RA3-S29	Composite	12/22/2015	Y	1,2,3,7,8,9-HxCDD	1.13E-05		Y	mg/kg	2.30E-05	4.92E-01
Central Parcel	Soil	RA3-S29	Composite	12/22/2015	Y	1,2,3,7,8,9-HxCDF	3.03E-06		Y	mg/kg	4.52E-05	6.70E-02
Central Parcel	Soil	RA3-S29	Composite	12/22/2015	Y	1,2,3,7,8-PeCDD	2.05E-06	J	Y	mg/kg	5.67E-05	3.61E-02
Central Parcel	Soil	RA3-S29	Composite	12/22/2015	Y	1,2,3,7,8-PeCDF	1.23E-06	U	N	mg/kg	4.31E-04	2.85E-03
Central Parcel	Soil	RA3-S29	Composite	12/22/2015	Y	2,3,4,6,7,8-HxCDF	1.14E-05		Y	mg/kg	2.29E-05	4.97E-01

Location Specific Soil Data and Mammalian Hazard Quotients for Dioxin and Furan Congeners and Total 2,3,7,8-TCDD TEQ

Mammalian Dioxin Tool for all Samples where [Upland0_3] = "Y" (and DU-5) Based on WC_All_data.xlsx data file sent by CO on 10/8/2018 6:30pm. Note: Mammalian 2,3,7,8-TCDD TEQ provided as calculated in the laboratory database.

Parcel	Media	Sample	CompSampIn	Date	Upland0_3	StdAnalyteDiox	StdResult	Qualifier	DetectFlag	UnitsStd	MammalRBC	Mammal Hazard Quotient
Central Parcel	Soil	RA3-S29	Composite	12/22/2015	Y	2,3,4,7,8-PeCDF	1.70E-05		Y	mg/kg	3.35E-05	5.08E-01
Central Parcel	Soil	RA3-S29	Composite	12/22/2015	Y	2,3,7,8-TCDD	5.10E-07	U	N	mg/kg	1.95E-05	2.62E-02
Central Parcel	Soil	RA3-S29	Composite	12/22/2015	Y	2,3,7,8-TCDF	1.69E-06	U	N	mg/kg	1.30E-04	1.30E-02
Central Parcel	Soil	RA3-S29	Composite	12/22/2015	Y	OCDD	9.12E-03	D	Y	mg/kg	2.17E-02	4.19E-01
Central Parcel	Soil	RA3-S29	Composite	12/22/2015	Y	OCDF	1.20E-03		Y	mg/kg	5.49E-03	2.18E-01
Central Parcel	Soil	RA3-S29	Composite	12/22/2015	Y	Total 2,3,7,8-TCDD TEQ HQ				mg/kg		**7.06E+00**
Central Parcel	Soil	RA3-S29	Composite	12/22/2015	Y	2,3,7,8-TCDD TEQ	**2.85E-05**		Y	mg/kg	1.95E-05	1.46E+00
Central Parcel	Soil	RA3-S3	Composite	10/19/2015	Y	1,2,3,4,6,7,8-HpCDD	2.82E-03		Y	mg/kg	3.91E-04	7.21E+00
Central Parcel	Soil	RA3-S3	Composite	10/19/2015	Y	1,2,3,4,6,7,8-HpCDF	9.65E-04		Y	mg/kg	3.83E-04	2.52E+00
Central Parcel	Soil	RA3-S3	Composite	10/19/2015	Y	1,2,3,4,7,8,9-HpCDF	1.22E-05	U	N	mg/kg	3.83E-04	3.19E-02
Central Parcel	Soil	RA3-S3	Composite	10/19/2015	Y	1,2,3,4,7,8-HxCDD	8.41E-05		Y	mg/kg	5.30E-05	1.59E+00
Central Parcel	Soil	RA3-S3	Composite	10/19/2015	Y	1,2,3,4,7,8-HxCDF	1.75E-05		Y	mg/kg	2.29E-05	7.63E-01
Central Parcel	Soil	RA3-S3	Composite	10/19/2015	Y	1,2,3,6,7,8-HxCDD	1.78E-03		Y	mg/kg	2.30E-05	7.75E+01
Central Parcel	Soil	RA3-S3	Composite	10/19/2015	Y	1,2,3,6,7,8-HxCDF	1.98E-05		Y	mg/kg	2.29E-05	8.63E-01
Central Parcel	Soil	RA3-S3	Composite	10/19/2015	Y	1,2,3,7,8,9-HxCDD	1.28E-03		Y	mg/kg	2.30E-05	5.58E+01
Central Parcel	Soil	RA3-S3	Composite	10/19/2015	Y	1,2,3,7,8,9-HxCDF	1.22E-05	U	N	mg/kg	4.52E-05	2.70E-01
Central Parcel	Soil	RA3-S3	Composite	10/19/2015	Y	1,2,3,7,8-PeCDD	2.42E-04		Y	mg/kg	5.67E-05	4.27E+00
Central Parcel	Soil	RA3-S3	Composite	10/19/2015	Y	1,2,3,7,8-PeCDF	4.31E-06	J	Y	mg/kg	4.31E-04	9.99E-03
Central Parcel	Soil	RA3-S3	Composite	10/19/2015	Y	2,3,4,6,7,8-HxCDF	2.37E-05		Y	mg/kg	2.29E-05	1.03E+00
Central Parcel	Soil	RA3-S3	Composite	10/19/2015	Y	2,3,4,7,8-PeCDF	1.55E-05		Y	mg/kg	3.35E-05	4.63E-01
Central Parcel	Soil	RA3-S3	Composite	10/19/2015	Y	2,3,7,8-TCDD	1.11E-05		Y	mg/kg	1.95E-05	5.71E-01
Central Parcel	Soil	RA3-S3	Composite	10/19/2015	Y	2,3,7,8-TCDF	1.83E-06	J	Y	mg/kg	1.30E-04	1.40E-02
Central Parcel	Soil	RA3-S3	Composite	10/19/2015	Y	OCDD	1.99E-03		Y	mg/kg	2.17E-02	9.15E-02
Central Parcel	Soil	RA3-S3	Composite	10/19/2015	Y	OCDF	3.34E-04		Y	mg/kg	5.49E-03	6.08E-02
Central Parcel	Soil	RA3-S3	Composite	10/19/2015	Y	Total 2,3,7,8-TCDD TEQ HQ				mg/kg		**1.53E+02**
Central Parcel	Soil	RA3-S3	Composite	10/19/2015	Y	2,3,7,8-TCDD TEQ	**6.17E-04**		Y	mg/kg	1.95E-05	3.17E+01
Central Parcel	Soil	RA3-S5	Composite	10/19/2015	Y	1,2,3,4,6,7,8-HpCDD	1.91E-03		Y	mg/kg	3.91E-04	4.88E+00
Central Parcel	Soil	RA3-S5	Composite	10/19/2015	Y	1,2,3,4,6,7,8-HpCDF	7.01E-04		Y	mg/kg	3.83E-04	1.83E+00
Central Parcel	Soil	RA3-S5	Composite	10/19/2015	Y	1,2,3,4,7,8,9-HpCDF	1.21E-05	U	N	mg/kg	3.83E-04	3.16E-02
Central Parcel	Soil	RA3-S5	Composite	10/19/2015	Y	1,2,3,4,7,8-HxCDD	5.89E-05		Y	mg/kg	5.30E-05	1.11E+00
Central Parcel	Soil	RA3-S5	Composite	10/19/2015	Y	1,2,3,4,7,8-HxCDF	1.35E-05		Y	mg/kg	2.29E-05	5.89E-01
Central Parcel	Soil	RA3-S5	Composite	10/19/2015	Y	1,2,3,6,7,8-HxCDD	1.24E-03		Y	mg/kg	2.30E-05	5.40E+01
Central Parcel	Soil	RA3-S5	Composite	10/19/2015	Y	1,2,3,6,7,8-HxCDF	1.60E-05		Y	mg/kg	2.29E-05	6.98E-01
Central Parcel	Soil	RA3-S5	Composite	10/19/2015	Y	1,2,3,7,8,9-HxCDD	8.21E-04		Y	mg/kg	2.30E-05	3.58E+01
Central Parcel	Soil	RA3-S5	Composite	10/19/2015	Y	1,2,3,7,8,9-HxCDF	1.21E-05	U	N	mg/kg	4.52E-05	2.68E-01
Central Parcel	Soil	RA3-S5	Composite	10/19/2015	Y	1,2,3,7,8-PeCDD	1.83E-04		Y	mg/kg	5.67E-05	3.23E+00
Central Parcel	Soil	RA3-S5	Composite	10/19/2015	Y	1,2,3,7,8-PeCDF	4.55E-06	J	Y	mg/kg	4.31E-04	1.05E-02
Central Parcel	Soil	RA3-S5	Composite	10/19/2015	Y	2,3,4,6,7,8-HxCDF	2.25E-05		Y	mg/kg	2.29E-05	9.81E-01
Central Parcel	Soil	RA3-S5	Composite	10/19/2015	Y	2,3,4,7,8-PeCDF	2.45E-05		Y	mg/kg	3.35E-05	7.32E-01
Central Parcel	Soil	RA3-S5	Composite	10/19/2015	Y	2,3,7,8-TCDD	9.10E-06		Y	mg/kg	1.95E-05	4.68E-01
Central Parcel	Soil	RA3-S5	Composite	10/19/2015	Y	2,3,7,8-TCDF	2.42E-06	U	N	mg/kg	1.30E-04	1.86E-02
Central Parcel	Soil	RA3-S5	Composite	10/19/2015	Y	OCDD	1.27E-03		Y	mg/kg	2.17E-02	5.84E-02
Central Parcel	Soil	RA3-S5	Composite	10/19/2015	Y	OCDF	2.27E-04		Y	mg/kg	5.49E-03	4.13E-02
Central Parcel	Soil	RA3-S5	Composite	10/19/2015	Y	Total 2,3,7,8-TCDD TEQ HQ				mg/kg		**1.05E+02**
Central Parcel	Soil	RA3-S5	Composite	10/19/2015	Y	2,3,7,8-TCDD TEQ	**4.43E-04**		Y	mg/kg	1.95E-05	2.28E+01
Central Parcel	Soil	RA3-S6	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDD	1.94E-04		Y	mg/kg	3.91E-04	4.96E-01
Central Parcel	Soil	RA3-S6	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDF	2.90E-05		Y	mg/kg	3.83E-04	7.58E-02
Central Parcel	Soil	RA3-S6	Composite	10/28/2015	Y	1,2,3,4,7,8,9-HpCDF	1.44E-06		Y	mg/kg	3.83E-04	3.76E-03
Central Parcel	Soil	RA3-S6	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDD	2.55E-06		Y	mg/kg	5.30E-05	4.81E-02
Central Parcel	Soil	RA3-S6	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDF	2.64E-06		Y	mg/kg	2.29E-05	1.15E-01
Central Parcel	Soil	RA3-S6	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDD	3.52E-05		Y	mg/kg	2.30E-05	1.53E+00
Central Parcel	Soil	RA3-S6	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDF	1.85E-06		Y	mg/kg	2.29E-05	8.07E-02
Central Parcel	Soil	RA3-S6	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDD	1.72E-05		Y	mg/kg	2.30E-05	7.49E-01
Central Parcel	Soil	RA3-S6	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDF	9.65E-07		Y	mg/kg	4.52E-05	2.13E-02

Location Specific Soil Data and Mammalian Hazard Quotients for Dioxin and Furan Congeners and Total 2,3,7,8-TCDD TEQ

Mammalian Dioxin Tool for all Samples where [Upland0_3] = "Y" (and DU-5) Based on WC_All_data.xlsx data file sent by CO on 10/8/2018 6:30pm. Note: Mammalian 2,3,7,8-TCDD TEQ provided as calculated in the laboratory database.

Parcel	Media	Sample	CompSampIn	Date	Upland0_3	StdAnalyteDiox	StdResult	Qualifier	DetectFlag	UnitsStd	MammalRBC	Mammal Hazard Quotient
Central Parcel	Soil	RA3-S6	Composite	10/28/2015	Y	1,2,3,7,8-PeCDD	5.44E-06		Y	mg/kg	5.67E-05	9.59E-02
Central Parcel	Soil	RA3-S6	Composite	10/28/2015	Y	1,2,3,7,8-PeCDF	1.45E-06		Y	mg/kg	4.31E-04	3.36E-03
Central Parcel	Soil	RA3-S6	Composite	10/28/2015	Y	2,3,4,6,7,8-HxCDF	3.05E-06		Y	mg/kg	2.29E-05	1.33E-01
Central Parcel	Soil	RA3-S6	Composite	10/28/2015	Y	2,3,4,7,8-PeCDF	1.30E-06		Y	mg/kg	3.35E-05	3.88E-02
Central Parcel	Soil	RA3-S6	Composite	10/28/2015	Y	2,3,7,8-TCDD	1.98E-06		Y	mg/kg	1.95E-05	1.02E-01
Central Parcel	Soil	RA3-S6	Composite	10/28/2015	Y	2,3,7,8-TCDF	2.38E-06		Y	mg/kg	1.30E-04	1.83E-02
Central Parcel	Soil	RA3-S6	Composite	10/28/2015	Y	OCDD	1.60E-03		Y	mg/kg	2.17E-02	7.36E-02
Central Parcel	Soil	RA3-S6	Composite	10/28/2015	Y	OCDF	4.81E-05		Y	mg/kg	5.49E-03	8.75E-03
Central Parcel	Soil	RA3-S6	Composite	10/28/2015	Y	Total 2,3,7,8-TCDD TEQ HQ				mg/kg		**3.60E+00**
Central Parcel	Soil	RA3-S6	Composite	10/28/2015	Y	2,3,7,8-TCDD TEQ	**1.72E-05**		Y	mg/kg	1.95E-05	8.84E-01
Central Parcel	Soil	RA3-S7	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDD	1.39E-04		Y	mg/kg	3.91E-04	3.55E-01
Central Parcel	Soil	RA3-S7	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDF	8.80E-05		Y	mg/kg	3.83E-04	2.30E-01
Central Parcel	Soil	RA3-S7	Composite	10/28/2015	Y	1,2,3,4,7,8,9-HpCDF	1.49E-06		Y	mg/kg	3.83E-04	3.89E-03
Central Parcel	Soil	RA3-S7	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDD	2.46E-06		Y	mg/kg	5.30E-05	4.64E-02
Central Parcel	Soil	RA3-S7	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDF	2.79E-06		Y	mg/kg	2.29E-05	1.22E-01
Central Parcel	Soil	RA3-S7	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDD	2.46E-05		Y	mg/kg	2.30E-05	1.07E+00
Central Parcel	Soil	RA3-S7	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDF	2.32E-06		Y	mg/kg	2.29E-05	1.01E-01
Central Parcel	Soil	RA3-S7	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDD	1.53E-05		Y	mg/kg	2.30E-05	6.66E-01
Central Parcel	Soil	RA3-S7	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDF	1.20E-06		Y	mg/kg	4.52E-05	2.65E-02
Central Parcel	Soil	RA3-S7	Composite	10/28/2015	Y	1,2,3,7,8-PeCDD	4.56E-06		Y	mg/kg	5.67E-05	8.04E-02
Central Parcel	Soil	RA3-S7	Composite	10/28/2015	Y	1,2,3,7,8-PeCDF	1.26E-06		Y	mg/kg	4.31E-04	2.92E-03
Central Parcel	Soil	RA3-S7	Composite	10/28/2015	Y	2,3,4,6,7,8-HxCDF	4.28E-06		Y	mg/kg	2.29E-05	1.87E-01
Central Parcel	Soil	RA3-S7	Composite	10/28/2015	Y	2,3,4,7,8-PeCDF	1.89E-06		Y	mg/kg	3.35E-05	5.65E-02
Central Parcel	Soil	RA3-S7	Composite	10/28/2015	Y	2,3,7,8-TCDD	1.27E-06		Y	mg/kg	1.95E-05	6.53E-02
Central Parcel	Soil	RA3-S7	Composite	10/28/2015	Y	2,3,7,8-TCDF	1.69E-06		Y	mg/kg	1.30E-04	1.30E-02
Central Parcel	Soil	RA3-S7	Composite	10/28/2015	Y	OCDD	8.67E-04		Y	mg/kg	2.17E-02	3.99E-02
Central Parcel	Soil	RA3-S7	Composite	10/28/2015	Y	OCDF	5.34E-05		Y	mg/kg	5.49E-03	9.72E-03
Central Parcel	Soil	RA3-S7	Composite	10/28/2015	Y	Total 2,3,7,8-TCDD TEQ HQ				mg/kg		**3.08E+00**
Central Parcel	Soil	RA3-S7	Composite	10/28/2015	Y	2,3,7,8-TCDD TEQ	**1.45E-05**		Y	mg/kg	1.95E-05	7.45E-01
Central Parcel	Soil	RA3-S8	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDD	2.57E-04		Y	mg/kg	3.91E-04	6.57E-01
Central Parcel	Soil	RA3-S8	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDF	5.77E-05		Y	mg/kg	3.83E-04	1.51E-01
Central Parcel	Soil	RA3-S8	Composite	10/28/2015	Y	1,2,3,4,7,8,9-HpCDF	1.13E-06		Y	mg/kg	3.83E-04	2.95E-03
Central Parcel	Soil	RA3-S8	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDD	7.17E-06		Y	mg/kg	5.30E-05	1.35E-01
Central Parcel	Soil	RA3-S8	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDF	2.16E-06		Y	mg/kg	2.29E-05	9.42E-02
Central Parcel	Soil	RA3-S8	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDD	1.25E-04		Y	mg/kg	2.30E-05	5.45E+00
Central Parcel	Soil	RA3-S8	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDF	1.99E-06		Y	mg/kg	2.29E-05	8.68E-02
Central Parcel	Soil	RA3-S8	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDD	9.38E-05		Y	mg/kg	2.30E-05	4.09E+00
Central Parcel	Soil	RA3-S8	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDF	8.12E-07		Y	mg/kg	4.52E-05	1.80E-02
Central Parcel	Soil	RA3-S8	Composite	10/28/2015	Y	1,2,3,7,8-PeCDD	2.12E-05		Y	mg/kg	5.67E-05	3.74E-01
Central Parcel	Soil	RA3-S8	Composite	10/28/2015	Y	1,2,3,7,8-PeCDF	8.88E-07		Y	mg/kg	4.31E-04	2.06E-03
Central Parcel	Soil	RA3-S8	Composite	10/28/2015	Y	2,3,4,6,7,8-HxCDF	2.77E-06		Y	mg/kg	2.29E-05	1.21E-01
Central Parcel	Soil	RA3-S8	Composite	10/28/2015	Y	2,3,4,7,8-PeCDF	9.26E-07		Y	mg/kg	3.35E-05	2.77E-02
Central Parcel	Soil	RA3-S8	Composite	10/28/2015	Y	2,3,7,8-TCDD	2.97E-06		Y	mg/kg	1.95E-05	1.53E-01
Central Parcel	Soil	RA3-S8	Composite	10/28/2015	Y	2,3,7,8-TCDF	1.08E-06		Y	mg/kg	1.30E-04	8.28E-03
Central Parcel	Soil	RA3-S8	Composite	10/28/2015	Y	OCDD	5.79E-04		Y	mg/kg	2.17E-02	2.66E-02
Central Parcel	Soil	RA3-S8	Composite	10/28/2015	Y	OCDF	3.31E-05		Y	mg/kg	5.49E-03	6.02E-03
Central Parcel	Soil	RA3-S8	Composite	10/28/2015	Y	Total 2,3,7,8-TCDD TEQ HQ				mg/kg		**1.14E+01**
Central Parcel	Soil	RA3-S8	Composite	10/28/2015	Y	2,3,7,8-TCDD TEQ	**5.13E-05**		Y	mg/kg	1.95E-05	2.64E+00
Central Parcel	Soil	RA3-S9	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDD	1.21E-02		Y	mg/kg	3.91E-04	3.09E+01
Central Parcel	Soil	RA3-S9	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDF	3.35E-03		Y	mg/kg	3.83E-04	8.75E+00
Central Parcel	Soil	RA3-S9	Composite	10/28/2015	Y	1,2,3,4,7,8,9-HpCDF	3.81E-05		Y	mg/kg	3.83E-04	9.96E-02
Central Parcel	Soil	RA3-S9	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDD	2.82E-04		Y	mg/kg	5.30E-05	5.32E+00
Central Parcel	Soil	RA3-S9	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDF	4.84E-05		Y	mg/kg	2.29E-05	2.11E+00
Central Parcel	Soil	RA3-S9	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDD	7.92E-03		Y	mg/kg	2.30E-05	3.45E+02

Location Specific Soil Data and Mammalian Hazard Quotients for Dioxin and Furan Congeners and Total 2,3,7,8-TCDD TEQ

Mammalian Dioxin Tool for all Samples where [Upland0_3] = "Y" (and DU-5) Based on WC_All_data.xlsx data file sent by CO on 10/8/2018 6:30pm. Note: Mammalian 2,3,7,8-TCDD TEQ provided as calculated in the laboratory database.

Parcel	Media	Sample	CompSampIn	Date	Upland0_3	StdAnalyteDiox	StdResult	Qualifier	DetectFlag	UnitsStd	MammalRBC	Mammal Hazard Quotient
Central Parcel	Soil	RA3-S9	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDF	5.84E-05		Y	mg/kg	2.29E-05	2.55E+00
Central Parcel	Soil	RA3-S9	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDD	5.75E-03		Y	mg/kg	2.30E-05	2.50E+02
Central Parcel	Soil	RA3-S9	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDF	1.60E-05		Y	mg/kg	4.52E-05	3.54E-01
Central Parcel	Soil	RA3-S9	Composite	10/28/2015	Y	1,2,3,7,8-PeCDD	9.72E-04		Y	mg/kg	5.67E-05	1.71E+01
Central Parcel	Soil	RA3-S9	Composite	10/28/2015	Y	1,2,3,7,8-PeCDF	8.91E-06		Y	mg/kg	4.31E-04	2.07E-02
Central Parcel	Soil	RA3-S9	Composite	10/28/2015	Y	2,3,4,6,7,8-HxCDF	7.10E-05		Y	mg/kg	2.29E-05	3.10E+00
Central Parcel	Soil	RA3-S9	Composite	10/28/2015	Y	2,3,4,7,8-PeCDF	4.48E-06		Y	mg/kg	3.35E-05	1.34E-01
Central Parcel	Soil	RA3-S9	Composite	10/28/2015	Y	2,3,7,8-TCDD	4.01E-05		Y	mg/kg	1.95E-05	2.06E+00
Central Parcel	Soil	RA3-S9	Composite	10/28/2015	Y	2,3,7,8-TCDF	4.20E-06		Y	mg/kg	1.30E-04	3.22E-02
Central Parcel	Soil	RA3-S9	Composite	10/28/2015	Y	OCDD	5.18E-03		Y	mg/kg	2.17E-02	2.38E-01
Central Parcel	Soil	RA3-S9	Composite	10/28/2015	Y	OCDF	1.24E-03		Y	mg/kg	5.49E-03	2.26E-01
Central Parcel	Soil	RA3-S9	Composite	10/28/2015	Y	Total 2,3,7,8-TCDD TEQ HQ				mg/kg		**6.69E+02**
Central Parcel	Soil	RA3-S9	Composite	10/28/2015	Y	2,3,7,8-TCDD TEQ	**2.59E-03**		Y	mg/kg	1.95E-05	1.33E+02
Central Parcel	Soil	WC-1 Surface	Discrete	10/1/2010	Y	1,2,3,4,6,7,8-HpCDD	2.00E-03		Y	mg/kg	3.91E-04	5.12E+00
Central Parcel	Soil	WC-1 Surface	Discrete	10/1/2010	Y	1,2,3,4,6,7,8-HpCDF	4.30E-04		Y	mg/kg	3.83E-04	1.12E+00
Central Parcel	Soil	WC-1 Surface	Discrete	10/1/2010	Y	1,2,3,4,7,8,9-HpCDF	5.20E-05		Y	mg/kg	3.83E-04	1.36E-01
Central Parcel	Soil	WC-1 Surface	Discrete	10/1/2010	Y	1,2,3,4,7,8-HxCDD	4.20E-05	J	Y	mg/kg	5.30E-05	7.92E-01
Central Parcel	Soil	WC-1 Surface	Discrete	10/1/2010	Y	1,2,3,4,7,8-HxCDF	2.20E-04		Y	mg/kg	2.29E-05	9.59E+00
Central Parcel	Soil	WC-1 Surface	Discrete	10/1/2010	Y	1,2,3,6,7,8-HxCDD	1.50E-04		Y	mg/kg	2.30E-05	6.53E+00
Central Parcel	Soil	WC-1 Surface	Discrete	10/1/2010	Y	1,2,3,6,7,8-HxCDF	4.60E-06	P U	N	mg/kg	2.29E-05	2.01E-01
Central Parcel	Soil	WC-1 Surface	Discrete	10/1/2010	Y	1,2,3,7,8,9-HxCDD	9.00E-05		Y	mg/kg	2.30E-05	3.92E+00
Central Parcel	Soil	WC-1 Surface	Discrete	10/1/2010	Y	1,2,3,7,8,9-HxCDF	1.20E-04		Y	mg/kg	4.52E-05	2.65E+00
Central Parcel	Soil	WC-1 Surface	Discrete	10/1/2010	Y	1,2,3,7,8-PeCDD	3.50E-05	J	Y	mg/kg	5.67E-05	6.17E-01
Central Parcel	Soil	WC-1 Surface	Discrete	10/1/2010	Y	1,2,3,7,8-PeCDF	5.70E-06	P U	N	mg/kg	4.31E-04	1.32E-02
Central Parcel	Soil	WC-1 Surface	Discrete	10/1/2010	Y	2,3,4,6,7,8-HxCDF	3.10E-04		Y	mg/kg	2.29E-05	1.35E+01
Central Parcel	Soil	WC-1 Surface	Discrete	10/1/2010	Y	2,3,4,7,8-PeCDF	1.50E-03		Y	mg/kg	3.35E-05	4.48E+01
Central Parcel	Soil	WC-1 Surface	Discrete	10/1/2010	Y	2,3,7,8-TCDD	1.90E-06	Ui	N	mg/kg	1.95E-05	9.77E-02
Central Parcel	Soil	WC-1 Surface	Discrete	10/1/2010	Y	2,3,7,8-TCDF	5.30E-06	P U	N	mg/kg	1.30E-04	4.06E-02
Central Parcel	Soil	WC-1 Surface	Discrete	10/1/2010	Y	OCDD	1.30E-02		Y	mg/kg	2.17E-02	5.98E-01
Central Parcel	Soil	WC-1 Surface	Discrete	10/1/2010	Y	OCDF	6.30E-04		Y	mg/kg	5.49E-03	1.15E-01
Central Parcel	Soil	WC-1 Surface	Discrete	10/1/2010	Y	Total 2,3,7,8-TCDD TEQ HQ				mg/kg		**8.99E+01**
Central Parcel	Soil	WC-1 Surface	Discrete	10/1/2010	Y	2,3,7,8-TCDD TEQ	**6.00E-04**		Y	mg/kg	1.95E-05	3.08E+01
Central Parcel	Soil	WC-1/2/3	Composite	10/1/2010	Y	1,2,3,4,6,7,8-HpCDD	3.10E-03		Y	mg/kg	3.91E-04	7.93E+00
Central Parcel	Soil	WC-1/2/3	Composite	10/1/2010	Y	1,2,3,4,6,7,8-HpCDF	2.50E-04		Y	mg/kg	3.83E-04	6.53E-01
Central Parcel	Soil	WC-1/2/3	Composite	10/1/2010	Y	1,2,3,4,7,8,9-HpCDF	1.60E-05		Y	mg/kg	3.83E-04	4.18E-02
Central Parcel	Soil	WC-1/2/3	Composite	10/1/2010	Y	1,2,3,4,7,8-HxCDD	1.50E-05		Y	mg/kg	5.30E-05	2.83E-01
Central Parcel	Soil	WC-1/2/3	Composite	10/1/2010	Y	1,2,3,4,7,8-HxCDF	2.20E-05		Y	mg/kg	2.29E-05	9.59E-01
Central Parcel	Soil	WC-1/2/3	Composite	10/1/2010	Y	1,2,3,6,7,8-HxCDD	1.50E-04		Y	mg/kg	2.30E-05	6.53E+00
Central Parcel	Soil	WC-1/2/3	Composite	10/1/2010	Y	1,2,3,6,7,8-HxCDF	1.30E-05		Y	mg/kg	2.29E-05	5.67E-01
Central Parcel	Soil	WC-1/2/3	Composite	10/1/2010	Y	1,2,3,7,8,9-HxCDD	2.90E-05		Y	mg/kg	2.30E-05	1.26E+00
Central Parcel	Soil	WC-1/2/3	Composite	10/1/2010	Y	1,2,3,7,8,9-HxCDF	1.40E-05		Y	mg/kg	4.52E-05	3.10E-01
Central Parcel	Soil	WC-1/2/3	Composite	10/1/2010	Y	1,2,3,7,8-PeCDD	8.50E-06		Y	mg/kg	5.67E-05	1.50E-01
Central Parcel	Soil	WC-1/2/3	Composite	10/1/2010	Y	1,2,3,7,8-PeCDF	5.80E-06		Y	mg/kg	4.31E-04	1.34E-02
Central Parcel	Soil	WC-1/2/3	Composite	10/1/2010	Y	2,3,4,6,7,8-HxCDF	1.30E-05		Y	mg/kg	2.29E-05	5.67E-01
Central Parcel	Soil	WC-1/2/3	Composite	10/1/2010	Y	2,3,4,7,8-PeCDF	8.30E-06		Y	mg/kg	3.35E-05	2.48E-01
Central Parcel	Soil	WC-1/2/3	Composite	10/1/2010	Y	2,3,7,8-TCDD	1.00E-06	J	Y	mg/kg	1.95E-05	5.14E-02
Central Parcel	Soil	WC-1/2/3	Composite	10/1/2010	Y	2,3,7,8-TCDF	5.00E-06		Y	mg/kg	1.30E-04	3.83E-02
Central Parcel	Soil	WC-1/2/3	Composite	10/1/2010	Y	OCDD	2.70E-02		Y	mg/kg	2.17E-02	1.24E+00
Central Parcel	Soil	WC-1/2/3	Composite	10/1/2010	Y	OCDF	4.90E-04		Y	mg/kg	5.49E-03	8.92E-02
Central Parcel	Soil	WC-1/2/3	Composite	10/1/2010	Y	Total 2,3,7,8-TCDD TEQ HQ				mg/kg		**2.09E+01**
Central Parcel	Soil	WC-1/2/3	Composite	10/1/2010	Y	2,3,7,8-TCDD TEQ	**8.00E-05**		Y	mg/kg	1.95E-05	4.11E+00
Central Parcel	Soil	WC-2 Surface	Discrete	10/1/2010	Y	1,2,3,4,6,7,8-HpCDD	1.20E-03		Y	mg/kg	3.91E-04	3.07E+00
Central Parcel	Soil	WC-2 Surface	Discrete	10/1/2010	Y	1,2,3,4,6,7,8-HpCDF	2.10E-04		Y	mg/kg	3.83E-04	5.49E-01
Central Parcel	Soil	WC-2 Surface	Discrete	10/1/2010	Y	1,2,3,4,7,8,9-HpCDF	1.90E-05	J	Y	mg/kg	3.83E-04	4.96E-02

Location Specific Soil Data and Mammalian Hazard Quotients for Dioxin and Furan Congeners and Total 2,3,7,8-TCDD TEQ

Mammalian Dioxin Tool for all Samples where [Upland0_3] = "Y" (and DU-5) Based on WC_All_data.xlsx data file sent by CO on 10/8/2018 6:30pm. Note: Mammalian 2,3,7,8-TCDD TEQ provided as calculated in the laboratory database.

Parcel	Media	Sample	CompSampIn	Date	Upland0_3	StdAnalyteDiox	StdResult	Qualifier	DetectFlag	UnitsStd	MammalRBC	Mammal Hazard Quotient
Central Parcel	Soil	WC-2 Surface	Discrete	10/1/2010	Y	1,2,3,4,7,8-HxCDD	2.50E-05	J	Y	mg/kg	5.30E-05	4.72E-01
Central Parcel	Soil	WC-2 Surface	Discrete	10/1/2010	Y	1,2,3,4,7,8-HxCDF	4.30E-05	J	Y	mg/kg	2.29E-05	1.87E+00
Central Parcel	Soil	WC-2 Surface	Discrete	10/1/2010	Y	1,2,3,6,7,8-HxCDD	1.10E-04		Y	mg/kg	2.30E-05	4.79E+00
Central Parcel	Soil	WC-2 Surface	Discrete	10/1/2010	Y	1,2,3,6,7,8-HxCDF	2.20E-06	P U	N	mg/kg	2.29E-05	9.59E-02
Central Parcel	Soil	WC-2 Surface	Discrete	10/1/2010	Y	1,2,3,7,8,9-HxCDD	6.50E-05		Y	mg/kg	2.30E-05	2.83E+00
Central Parcel	Soil	WC-2 Surface	Discrete	10/1/2010	Y	1,2,3,7,8,9-HxCDF	2.00E-05	J	Y	mg/kg	4.52E-05	4.42E-01
Central Parcel	Soil	WC-2 Surface	Discrete	10/1/2010	Y	1,2,3,7,8-PeCDD	1.80E-05	J	Y	mg/kg	5.67E-05	3.17E-01
Central Parcel	Soil	WC-2 Surface	Discrete	10/1/2010	Y	1,2,3,7,8-PeCDF	2.80E-06	P U	N	mg/kg	4.31E-04	6.49E-03
Central Parcel	Soil	WC-2 Surface	Discrete	10/1/2010	Y	2,3,4,6,7,8-HxCDF	5.80E-05		Y	mg/kg	2.29E-05	2.53E+00
Central Parcel	Soil	WC-2 Surface	Discrete	10/1/2010	Y	2,3,4,7,8-PeCDF	1.80E-04		Y	mg/kg	3.35E-05	5.38E+00
Central Parcel	Soil	WC-2 Surface	Discrete	10/1/2010	Y	2,3,7,8-TCDD	4.50E-06	J	Y	mg/kg	1.95E-05	2.31E-01
Central Parcel	Soil	WC-2 Surface	Discrete	10/1/2010	Y	2,3,7,8-TCDF	3.80E-06	P U	N	mg/kg	1.30E-04	2.91E-02
Central Parcel	Soil	WC-2 Surface	Discrete	10/1/2010	Y	OCDD	7.50E-03		Y	mg/kg	2.17E-02	3.45E-01
Central Parcel	Soil	WC-2 Surface	Discrete	10/1/2010	Y	OCDF	2.40E-04		Y	mg/kg	5.49E-03	4.37E-02
Central Parcel	Soil	WC-2 Surface	Discrete	10/1/2010	Y	Total 2,3,7,8-TCDD TEQ HQ				mg/kg		**2.31E+01**
Central Parcel	Soil	WC-2 Surface	Discrete	10/1/2010	Y	2,3,7,8-TCDD TEQ	**1.30E-04**		Y	mg/kg	1.95E-05	6.68E+00
Central Parcel	Soil	WC-3 Surface	Discrete	10/1/2010	Y	1,2,3,4,6,7,8-HpCDD	2.40E-03		Y	mg/kg	3.91E-04	6.14E+00
Central Parcel	Soil	WC-3 Surface	Discrete	10/1/2010	Y	1,2,3,4,6,7,8-HpCDF	2.30E-03		Y	mg/kg	3.83E-04	6.01E+00
Central Parcel	Soil	WC-3 Surface	Discrete	10/1/2010	Y	1,2,3,4,7,8,9-HpCDF	3.40E-04		Y	mg/kg	3.83E-04	8.88E-01
Central Parcel	Soil	WC-3 Surface	Discrete	10/1/2010	Y	1,2,3,4,7,8-HxCDD	1.50E-04		Y	mg/kg	5.30E-05	2.83E+00
Central Parcel	Soil	WC-3 Surface	Discrete	10/1/2010	Y	1,2,3,4,7,8-HxCDF	1.40E-03		Y	mg/kg	2.29E-05	6.10E+01
Central Parcel	Soil	WC-3 Surface	Discrete	10/1/2010	Y	1,2,3,6,7,8-HxCDD	6.80E-04		Y	mg/kg	2.30E-05	2.96E+01
Central Parcel	Soil	WC-3 Surface	Discrete	10/1/2010	Y	1,2,3,6,7,8-HxCDF	5.00E-07	P U	N	mg/kg	2.29E-05	2.18E-02
Central Parcel	Soil	WC-3 Surface	Discrete	10/1/2010	Y	1,2,3,7,8,9-HxCDD	4.30E-04		Y	mg/kg	2.30E-05	1.87E+01
Central Parcel	Soil	WC-3 Surface	Discrete	10/1/2010	Y	1,2,3,7,8,9-HxCDF	1.00E-03		Y	mg/kg	4.52E-05	2.21E+01
Central Parcel	Soil	WC-3 Surface	Discrete	10/1/2010	Y	1,2,3,7,8-PeCDD	2.40E-04		Y	mg/kg	5.67E-05	4.23E+00
Central Parcel	Soil	WC-3 Surface	Discrete	10/1/2010	Y	1,2,3,7,8-PeCDF	9.58E-07	P U	N	mg/kg	4.31E-04	2.22E-03
Central Parcel	Soil	WC-3 Surface	Discrete	10/1/2010	Y	2,3,4,6,7,8-HxCDF	3.20E-03		Y	mg/kg	2.29E-05	1.40E+02
Central Parcel	Soil	WC-3 Surface	Discrete	10/1/2010	Y	2,3,4,7,8-PeCDF	1.60E-02		Y	mg/kg	3.35E-05	4.78E+02
Central Parcel	Soil	WC-3 Surface	Discrete	10/1/2010	Y	2,3,7,8-TCDD	2.40E-05		Y	mg/kg	1.95E-05	1.23E+00
Central Parcel	Soil	WC-3 Surface	Discrete	10/1/2010	Y	2,3,7,8-TCDF	1.60E-06	P U	N	mg/kg	1.30E-04	1.23E-02
Central Parcel	Soil	WC-3 Surface	Discrete	10/1/2010	Y	OCDD	1.00E-02		Y	mg/kg	2.17E-02	4.60E-01
Central Parcel	Soil	WC-3 Surface	Discrete	10/1/2010	Y	OCDF	4.60E-04		Y	mg/kg	5.49E-03	8.37E-02
Central Parcel	Soil	WC-3 Surface	Discrete	10/1/2010	Y	Total 2,3,7,8-TCDD TEQ HQ				mg/kg		**7.71E+02**
Central Parcel	Soil	WC-3 Surface	Discrete	10/1/2010	Y	2,3,7,8-TCDD TEQ	**5.70E-03**		Y	mg/kg	1.95E-05	2.93E+02
East Parcel	Soil	DU-4	ISM	1/13/2014	Y	1,2,3,4,6,7,8-HpCDD	1.81E-03	E	Y	mg/kg	3.91E-04	4.63E+00
East Parcel	Soil	DU-4	ISM	1/13/2014	Y	1,2,3,4,6,7,8-HpCDF	1.71E-04		Y	mg/kg	3.83E-04	4.47E-01
East Parcel	Soil	DU-4	ISM	1/13/2014	Y	1,2,3,4,7,8,9-HpCDF	1.16E-05		Y	mg/kg	3.83E-04	3.03E-02
East Parcel	Soil	DU-4	ISM	1/13/2014	Y	1,2,3,4,7,8-HxCDD	1.60E-05		Y	mg/kg	5.30E-05	3.02E-01
East Parcel	Soil	DU-4	ISM	1/13/2014	Y	1,2,3,4,7,8-HxCDF	1.77E-05		Y	mg/kg	2.29E-05	7.72E-01
East Parcel	Soil	DU-4	ISM	1/13/2014	Y	1,2,3,6,7,8-HxCDD	1.16E-04		Y	mg/kg	2.30E-05	5.05E+00
East Parcel	Soil	DU-4	ISM	1/13/2014	Y	1,2,3,6,7,8-HxCDF	1.12E-05		Y	mg/kg	2.29E-05	4.88E-01
East Parcel	Soil	DU-4	ISM	1/13/2014	Y	1,2,3,7,8,9-HxCDD	4.39E-05		Y	mg/kg	2.30E-05	1.91E+00
East Parcel	Soil	DU-4	ISM	1/13/2014	Y	1,2,3,7,8,9-HxCDF	5.74E-06		Y	mg/kg	4.52E-05	1.27E-01
East Parcel	Soil	DU-4	ISM	1/13/2014	Y	1,2,3,7,8-PeCDD	1.14E-05		Y	mg/kg	5.67E-05	2.01E-01
East Parcel	Soil	DU-4	ISM	1/13/2014	Y	1,2,3,7,8-PeCDF	5.15E-06		Y	mg/kg	4.31E-04	1.19E-02
East Parcel	Soil	DU-4	ISM	1/13/2014	Y	2,3,4,6,7,8-HxCDF	1.96E-05		Y	mg/kg	2.29E-05	8.54E-01
East Parcel	Soil	DU-4	ISM	1/13/2014	Y	2,3,4,7,8-PeCDF	4.97E-06		Y	mg/kg	3.35E-05	1.48E-01
East Parcel	Soil	DU-4	ISM	1/13/2014	Y	2,3,7,8-TCDD	1.08E-06		Y	mg/kg	1.95E-05	5.55E-02
East Parcel	Soil	DU-4	ISM	1/13/2014	Y	2,3,7,8-TCDF	4.04E-06		Y	mg/kg	1.30E-04	3.10E-02
East Parcel	Soil	DU-4	ISM	1/13/2014	Y	OCDD	1.22E-02	E	Y	mg/kg	2.17E-02	5.61E-01
East Parcel	Soil	DU-4	ISM	1/13/2014	Y	OCDF	2.79E-04		Y	mg/kg	5.49E-03	5.08E-02
East Parcel	Soil	DU-4	ISM	1/13/2014	Y	Total 2,3,7,8-TCDD TEQ HQ				mg/kg		**1.57E+01**
East Parcel	Soil	DU-4	ISM	1/13/2014	Y	2,3,7,8-TCDD TEQ	**6.12E-05**		Y	mg/kg	1.95E-05	3.15E+00

Location Specific Soil Data and Mammalian Hazard Quotients for Dioxin and Furan Congeners and Total 2,3,7,8-TCDD TEQ

Mammalian Dioxin Tool for all Samples where [Upland0_3] = "Y" (and DU-5) Based on WC_All_data.xlsx data file sent by CO on 10/8/2018 6:30pm. Note: Mammalian 2,3,7,8-TCDD TEQ provided as calculated in the laboratory database.

Parcel	Media	Sample	CompSampIn	Date	Upland0_3	StdAnalyteDiox	StdResult	Qualifier	DetectFlag	UnitsStd	MammalRBC	Mammal Hazard Quotient
West Parcel	Soil	DU-7	ISM	1/13/2014	Y	1,2,3,4,6,7,8-HpCDD	6.72E-04		Y	mg/kg	3.91E-04	1.72E+00
West Parcel	Soil	DU-7	ISM	1/13/2014	Y	1,2,3,4,6,7,8-HpCDF	1.72E-04		Y	mg/kg	3.83E-04	4.49E-01
West Parcel	Soil	DU-7	ISM	1/13/2014	Y	1,2,3,4,7,8,9-HpCDF	6.74E-06		Y	mg/kg	3.83E-04	1.76E-02
West Parcel	Soil	DU-7	ISM	1/13/2014	Y	1,2,3,4,7,8-HxCDD	1.34E-05		Y	mg/kg	5.30E-05	2.53E-01
West Parcel	Soil	DU-7	ISM	1/13/2014	Y	1,2,3,4,7,8-HxCDF	1.89E-05		Y	mg/kg	2.29E-05	8.24E-01
West Parcel	Soil	DU-7	ISM	1/13/2014	Y	1,2,3,6,7,8-HxCDD	2.85E-04		Y	mg/kg	2.30E-05	1.24E+01
West Parcel	Soil	DU-7	ISM	1/13/2014	Y	1,2,3,6,7,8-HxCDF	8.47E-06		Y	mg/kg	2.29E-05	3.69E-01
West Parcel	Soil	DU-7	ISM	1/13/2014	Y	1,2,3,7,8,9-HxCDD	1.70E-04		Y	mg/kg	2.30E-05	7.41E+00
West Parcel	Soil	DU-7	ISM	1/13/2014	Y	1,2,3,7,8,9-HxCDF	1.18E-06		Y	mg/kg	4.52E-05	2.61E-02
West Parcel	Soil	DU-7	ISM	1/13/2014	Y	1,2,3,7,8-PeCDD	3.86E-05		Y	mg/kg	5.67E-05	6.81E-01
West Parcel	Soil	DU-7	ISM	1/13/2014	Y	1,2,3,7,8-PeCDF	8.02E-06		Y	mg/kg	4.31E-04	1.86E-02
West Parcel	Soil	DU-7	ISM	1/13/2014	Y	2,3,4,6,7,8-HxCDF	7.40E-06		Y	mg/kg	2.29E-05	3.23E-01
West Parcel	Soil	DU-7	ISM	1/13/2014	Y	2,3,4,7,8-PeCDF	4.92E-06		Y	mg/kg	3.35E-05	1.47E-01
West Parcel	Soil	DU-7	ISM	1/13/2014	Y	2,3,7,8-TCDD	2.11E-06		Y	mg/kg	1.95E-05	1.08E-01
West Parcel	Soil	DU-7	ISM	1/13/2014	Y	2,3,7,8-TCDF	5.45E-06		Y	mg/kg	1.30E-04	4.18E-02
West Parcel	Soil	DU-7	ISM	1/13/2014	Y	OCDD	2.86E-03	E	Y	mg/kg	2.17E-02	1.32E-01
West Parcel	Soil	DU-7	ISM	1/13/2014	Y	OCDF	2.19E-04		Y	mg/kg	5.49E-03	3.99E-02
West Parcel	Soil	DU-7	ISM	1/13/2014	Y	Total 2,3,7,8-TCDD TEQ HQ				mg/kg		**2.50E+01**
West Parcel	Soil	DU-7	ISM	1/13/2014	Y	2,3,7,8-TCDD TEQ	**1.03E-04**		Y	mg/kg	1.95E-05	5.29E+00
Central Parcel	Soil	DU-5	ISM	1/13/2014	N	1,2,3,4,6,7,8-HpCDD	2.96E-03	E	Y	mg/kg	3.91E-04	7.57E+00
Central Parcel	Soil	DU-5	ISM	1/13/2014	N	1,2,3,4,6,7,8-HpCDF	2.73E-04	P	Y	mg/kg	3.83E-04	7.13E-01
Central Parcel	Soil	DU-5	ISM	1/13/2014	N	1,2,3,4,7,8,9-HpCDF	1.57E-05		Y	mg/kg	3.83E-04	4.10E-02
Central Parcel	Soil	DU-5	ISM	1/13/2014	N	1,2,3,4,7,8-HxCDD	3.73E-05		Y	mg/kg	5.30E-05	7.04E-01
Central Parcel	Soil	DU-5	ISM	1/13/2014	N	1,2,3,4,7,8-HxCDF	2.94E-05		Y	mg/kg	2.29E-05	1.28E+00
Central Parcel	Soil	DU-5	ISM	1/13/2014	N	1,2,3,6,7,8-HxCDD	3.58E-04		Y	mg/kg	2.30E-05	1.56E+01
Central Parcel	Soil	DU-5	ISM	1/13/2014	N	1,2,3,6,7,8-HxCDF	2.83E-05	P	Y	mg/kg	2.29E-05	1.23E+00
Central Parcel	Soil	DU-5	ISM	1/13/2014	N	1,2,3,7,8,9-HxCDD	1.33E-04		Y	mg/kg	2.30E-05	5.79E+00
Central Parcel	Soil	DU-5	ISM	1/13/2014	N	1,2,3,7,8,9-HxCDF	2.21E-06		Y	mg/kg	4.52E-05	4.89E-02
Central Parcel	Soil	DU-5	ISM	1/13/2014	N	1,2,3,7,8-PeCDD	4.14E-05		Y	mg/kg	5.67E-05	7.30E-01
Central Parcel	Soil	DU-5	ISM	1/13/2014	N	1,2,3,7,8-PeCDF	8.54E-06		Y	mg/kg	4.31E-04	1.98E-02
Central Parcel	Soil	DU-5	ISM	1/13/2014	N	2,3,4,6,7,8-HxCDF	5.12E-05		Y	mg/kg	2.29E-05	2.23E+00
Central Parcel	Soil	DU-5	ISM	1/13/2014	N	2,3,4,7,8-PeCDF	1.68E-05		Y	mg/kg	3.35E-05	5.02E-01
Central Parcel	Soil	DU-5	ISM	1/13/2014	N	2,3,7,8-TCDD	2.92E-06		Y	mg/kg	1.95E-05	1.50E-01
Central Parcel	Soil	DU-5	ISM	1/13/2014	N	2,3,7,8-TCDF	5.91E-06		Y	mg/kg	1.30E-04	4.53E-02
Central Parcel	Soil	DU-5	ISM	1/13/2014	N	OCDD	1.89E-02	E	Y	mg/kg	2.17E-02	8.69E-01
Central Parcel	Soil	DU-5	ISM	1/13/2014	N	OCDF	4.52E-04		Y	mg/kg	5.49E-03	8.23E-02
Central Parcel	Soil	DU-5	ISM	1/13/2014	N	Total 2,3,7,8-TCDD TEQ HQ				mg/kg		**3.76E+01**
Central Parcel	Soil	DU-5	ISM	1/13/2014	N	2,3,7,8-TCDD TEQ	**1.52E-04**		Y	mg/kg	1.95E-05	7.81E+00

Sum Hazard Quotients for Dioxin/Furans for Birds

Avian Dioxin Tool for all Samples where [Upland0_3] = "Y" (and DU-5) Based on WC_All_data.xlsx data file sent by CO on 10/8/2018 6:30pm

Parcel	Media	Sample	CompSampIn	Date	Upland0_3	StdAnalyteDiox	StdResult	Bird TEF	Bird TEQ	Qualifier	DetectFlag	UnitsStd	BirdRBC	Bird HQ	Sum Bird TEQ	Sum Bird Hazard Quotient
Central Parcel	Soil	DU-1	ISM	8/9/2012	Y	1,2,3,4,6,7,8-HpCDD	3.16E-03	1.00E-03	3.16E-06	E	Y	mg/kg	3.87E-02	8.16E-02		
Central Parcel	Soil	DU-1	ISM	8/9/2012	Y	1,2,3,4,6,7,8-HpCDF	3.87E-04	1.00E-02	3.87E-06		Y	mg/kg	3.79E-03	1.02E-01		
Central Parcel	Soil	DU-1	ISM	8/9/2012	Y	1,2,3,4,7,8,9-HpCDF	2.32E-05	1.00E-02	2.32E-07		Y	mg/kg	3.79E-03	6.12E-03		
Central Parcel	Soil	DU-1	ISM	8/9/2012	Y	1,2,3,4,7,8-HxCDD	5.30E-05	5.00E-02	2.65E-06		Y	mg/kg	1.05E-03	5.06E-02		
Central Parcel	Soil	DU-1	ISM	8/9/2012	Y	1,2,3,4,7,8-HxCDF	4.68E-05	1.00E-01	4.68E-06		Y	mg/kg	2.28E-04	2.06E-01		
Central Parcel	Soil	DU-1	ISM	8/9/2012	Y	1,2,3,6,7,8-HxCDD	6.59E-04	1.00E-02	6.59E-06		Y	mg/kg	2.28E-03	2.89E-01		
Central Parcel	Soil	DU-1	ISM	8/9/2012	Y	1,2,3,6,7,8-HxCDF	4.24E-05	1.00E-01	4.24E-06		Y	mg/kg	2.28E-04	1.86E-01		
Central Parcel	Soil	DU-1	ISM	8/9/2012	Y	1,2,3,7,8,9-HxCDD	3.33E-04	1.00E-01	3.33E-05		Y	mg/kg	2.28E-04	1.46E+00		
Central Parcel	Soil	DU-1	ISM	8/9/2012	Y	1,2,3,7,8,9-HxCDF	4.08E-07	1.00E-01	4.08E-08	U	N	mg/kg	4.48E-04	9.12E-04	2.29E-04	3.76E+00
Central Parcel	Soil	DU-1	ISM	8/9/2012	Y	1,2,3,7,8-PeCDD	6.74E-05	1.00E+00	6.74E-05		Y	mg/kg	5.47E-04	1.23E-01		
Central Parcel	Soil	DU-1	ISM	8/9/2012	Y	1,2,3,7,8-PeCDF	1.83E-05	1.00E-01	1.83E-06		Y	mg/kg	1.27E-03	1.44E-02		
Central Parcel	Soil	DU-1	ISM	8/9/2012	Y	2,3,4,6,7,8-HxCDF	7.42E-05	1.00E-01	7.42E-06		Y	mg/kg	2.28E-04	3.26E-01		
Central Parcel	Soil	DU-1	ISM	8/9/2012	Y	2,3,4,7,8-PeCDF	7.24E-05	1.00E+00	7.24E-05		Y	mg/kg	9.90E-05	7.32E-01		
Central Parcel	Soil	DU-1	ISM	8/9/2012	Y	2,3,7,8-TCDD	6.30E-06	1.00E+00	6.30E-06		Y	mg/kg	1.36E-04	4.65E-02		
Central Parcel	Soil	DU-1	ISM	8/9/2012	Y	2,3,7,8-TCDF	1.34E-05	1.00E+00	1.34E-05		Y	mg/kg	1.29E-04	1.04E-01		
Central Parcel	Soil	DU-1	ISM	8/9/2012	Y	OCDD	1.83E-02	1.00E-04	1.83E-06	E	Y	mg/kg	6.43E-01	2.84E-02		
Central Parcel	Soil	DU-1	ISM	8/9/2012	Y	OCDF	3.31E-04	1.00E-04	3.31E-08		Y	mg/kg	1.64E-01	2.02E-03		
Central Parcel	Soil	DU-2	ISM	8/8/2012	Y	1,2,3,4,6,7,8-HpCDD	2.55E-03	1.00E-03	2.55E-06	E	Y	mg/kg	3.87E-02	6.59E-02		
Central Parcel	Soil	DU-2	ISM	8/8/2012	Y	1,2,3,4,6,7,8-HpCDF	4.49E-04	1.00E-02	4.49E-06		Y	mg/kg	3.79E-03	1.18E-01		
Central Parcel	Soil	DU-2	ISM	8/8/2012	Y	1,2,3,4,7,8,9-HpCDF	7.38E-05	1.00E-02	7.38E-07		Y	mg/kg	3.79E-03	1.95E-02		
Central Parcel	Soil	DU-2	ISM	8/8/2012	Y	1,2,3,4,7,8-HxCDD	4.39E-05	5.00E-02	2.20E-06		Y	mg/kg	1.05E-03	4.19E-02		
Central Parcel	Soil	DU-2	ISM	8/8/2012	Y	1,2,3,4,7,8-HxCDF	2.55E-04	1.00E-01	2.55E-05		Y	mg/kg	2.28E-04	1.12E+00		
Central Parcel	Soil	DU-2	ISM	8/8/2012	Y	1,2,3,6,7,8-HxCDD	2.82E-04	1.00E-02	2.82E-06		Y	mg/kg	2.28E-03	1.24E-01		
Central Parcel	Soil	DU-2	ISM	8/8/2012	Y	1,2,3,6,7,8-HxCDF	2.80E-04	1.00E-01	2.80E-05		Y	mg/kg	2.28E-04	1.23E+00		
Central Parcel	Soil	DU-2	ISM	8/8/2012	Y	1,2,3,7,8,9-HxCDD	1.23E-04	1.00E-01	1.23E-05		Y	mg/kg	2.28E-04	5.40E-01		
Central Parcel	Soil	DU-2	ISM	8/8/2012	Y	1,2,3,7,8,9-HxCDF	8.35E-07	1.00E-01	8.35E-08	U	N	mg/kg	4.48E-04	1.87E-03	1.87E-03	2.28E+01
Central Parcel	Soil	DU-2	ISM	8/8/2012	Y	1,2,3,7,8-PeCDD	8.48E-05	1.00E+00	8.48E-05		Y	mg/kg	5.47E-04	1.55E-01		
Central Parcel	Soil	DU-2	ISM	8/8/2012	Y	1,2,3,7,8-PeCDF	4.56E-05	1.00E-01	4.56E-06		Y	mg/kg	1.27E-03	3.58E-02		
Central Parcel	Soil	DU-2	ISM	8/8/2012	Y	2,3,4,6,7,8-HxCDF	6.52E-04	1.00E-01	6.52E-05		Y	mg/kg	2.28E-04	2.86E+00		
Central Parcel	Soil	DU-2	ISM	8/8/2012	Y	2,3,4,7,8-PeCDF	1.59E-03	1.00E+00	1.59E-03	E	Y	mg/kg	9.90E-05	1.61E+01		
Central Parcel	Soil	DU-2	ISM	8/8/2012	Y	2,3,7,8-TCDD	6.45E-06	1.00E+00	6.45E-06		Y	mg/kg	1.36E-04	4.76E-02		
Central Parcel	Soil	DU-2	ISM	8/8/2012	Y	2,3,7,8-TCDF	3.73E-05	1.00E+00	3.73E-05		Y	mg/kg	1.29E-04	2.90E-01		
Central Parcel	Soil	DU-2	ISM	8/8/2012	Y	OCDD	1.88E-02	1.00E-04	1.88E-06	E	Y	mg/kg	6.43E-01	2.92E-02		
Central Parcel	Soil	DU-2	ISM	8/8/2012	Y	OCDF	3.10E-04	1.00E-04	3.10E-08		Y	mg/kg	1.64E-01	1.89E-03		
Central Parcel	Soil	DU-3	ISM	8/13/2012	Y	1,2,3,4,6,7,8-HpCDD	1.53E-03	1.00E-03	1.53E-06	E	Y	mg/kg	3.87E-02	3.95E-02		
Central Parcel	Soil	DU-3	ISM	8/13/2012	Y	1,2,3,4,6,7,8-HpCDF	2.35E-04	1.00E-02	2.35E-06		Y	mg/kg	3.79E-03	6.20E-02		
Central Parcel	Soil	DU-3	ISM	8/13/2012	Y	1,2,3,4,7,8,9-HpCDF	2.12E-05	1.00E-02	2.12E-07		Y	mg/kg	3.79E-03	5.59E-03		
Central Parcel	Soil	DU-3	ISM	8/13/2012	Y	1,2,3,4,7,8-HxCDD	2.03E-05	5.00E-02	1.02E-06		Y	mg/kg	1.05E-03	1.94E-02		
Central Parcel	Soil	DU-3	ISM	8/13/2012	Y	1,2,3,4,7,8-HxCDF	5.13E-05	1.00E-01	5.13E-06		Y	mg/kg	2.28E-04	2.25E-01		
Central Parcel	Soil	DU-3	ISM	8/13/2012	Y	1,2,3,6,7,8-HxCDD	1.18E-04	1.00E-02	1.18E-06		Y	mg/kg	2.28E-03	5.18E-02		
Central Parcel	Soil	DU-3	ISM	8/13/2012	Y	1,2,3,6,7,8-HxCDF	8.19E-05	1.00E-01	8.19E-06		Y	mg/kg	2.28E-04	3.60E-01		
Central Parcel	Soil	DU-3	ISM	8/13/2012	Y	1,2,3,7,8,9-HxCDD	6.42E-05	1.00E-01	6.42E-06		Y	mg/kg	2.28E-04	2.82E-01		
Central Parcel	Soil	DU-3	ISM	8/13/2012	Y	1,2,3,7,8,9-HxCDF	4.94E-07	1.00E-01	4.94E-08	U	N	mg/kg	4.48E-04	1.10E-03	6.00E-04	7.35E+00
Central Parcel	Soil	DU-3	ISM	8/13/2012	Y	1,2,3,7,8-PeCDD	2.15E-05	1.00E+00	2.15E-05		Y	mg/kg	5.47E-04	3.93E-02		
Central Parcel	Soil	DU-3	ISM	8/13/2012	Y	1,2,3,7,8-PeCDF	1.56E-05	1.00E-01	1.56E-06		Y	mg/kg	1.27E-03	1.23E-02		
Central Parcel	Soil	DU-3	ISM	8/13/2012	Y	2,3,4,6,7,8-HxCDF	2.14E-04	1.00E-01	2.14E-05		Y	mg/kg	2.28E-04	9.40E-01		
Central Parcel	Soil	DU-3	ISM	8/13/2012	Y	2,3,4,7,8-PeCDF	5.10E-04	1.00E+00	5.10E-04		Y	mg/kg	9.90E-05	5.15E+00		
Central Parcel	Soil	DU-3	ISM	8/13/2012	Y	2,3,7,8-TCDD	2.58E-06	1.00E+00	2.58E-06		Y	mg/kg	1.36E-04	1.90E-02		
Central Parcel	Soil	DU-3	ISM	8/13/2012	Y	2,3,7,8-TCDF	1.62E-05	1.00E+00	1.62E-05		Y	mg/kg	1.29E-04	1.26E-01		
Central Parcel	Soil	DU-3	ISM	8/13/2012	Y	OCDD	1.00E-02	1.00E-04	1.00E-06	E	Y	mg/kg	6.43E-01	1.55E-02		
Central Parcel	Soil	DU-3	ISM	8/13/2012	Y	OCDF	3.66E-04	1.00E-04	3.66E-08		Y	mg/kg	1.64E-01	2.24E-03		
Central Parcel	Soil	DU-5	ISM	1/13/2014	N	1,2,3,4,6,7,8-HpCDD	2.96E-03	1.00E-03	2.96E-06	E	Y	mg/kg	3.87E-02	7.65E-02		
Central Parcel	Soil	DU-5	ISM	1/13/2014	N	1,2,3,4,6,7,8-HpCDF	2.73E-04	1.00E-02	2.73E-06	P	Y	mg/kg	3.79E-03	7.20E-02		
Central Parcel	Soil	DU-5	ISM	1/13/2014	N	1,2,3,4,7,8,9-HpCDF	1.57E-05	1.00E-02	1.57E-07		Y	mg/kg	3.79E-03	4.14E-03		
Central Parcel	Soil	DU-5	ISM	1/13/2014	N	1,2,3,4,7,8-HxCDD	3.73E-05	5.00E-02	1.87E-06		Y	mg/kg	1.05E-03	3.56E-02		
Central Parcel	Soil	DU-5	ISM	1/13/2014	N	1,2,3,4,7,8-HxCDF	2.94E-05	1.00E-01	2.94E-06		Y	mg/kg	2.28E-04	1.29E-01		
Central Parcel	Soil	DU-5	ISM	1/13/2014	N	1,2,3,6,7,8-HxCDD	3.58E-04	1.00E-02	3.58E-06		Y	mg/kg	2.28E-03	1.57E-01		
Central Parcel	Soil	DU-5	ISM	1/13/2014	N	1,2,3,6,7,8-HxCDF	2.83E-05	1.00E-01	2.83E-06	P	Y	mg/kg	2.28E-04	1.24E-01		
Central Parcel	Soil	DU-5	ISM	1/13/2014	N	1,2,3,7,8,9-HxCDD	1.33E-04	1.00E-01	1.33E-05		Y	mg/kg	2.28E-04	5.84E-01		
Central Parcel	Soil	DU-5	ISM	1/13/2014	N	1,2,3,7,8,9-HxCDF	2.21E-06	1.00E-01	2.21E-07		Y	mg/kg	4.48E-04	4.94E-03	1.06E-04	1.76E+00
Central Parcel	Soil	DU-5	ISM	1/13/2014	N	1,2,3,7,8-PeCDD	4.14E-05	1.00E+00	4.14E-05		Y	mg/kg	5.47E-04	7.57E-02		
Central Parcel	Soil	DU-5	ISM	1/13/2014	N	1,2,3,7,8-PeCDF	8.54E-06	1.00E-01	8.54E-07		Y	mg/kg	1.27E-03	6.71E-03		
Central Parcel	Soil	DU-5	ISM	1/13/2014	N	2,3,4,6,7,8-HxCDF	5.12E-05	1.00E-01	5.12E-06		Y	mg/kg	2.28E-04	2.25E-01		

Sum Hazard Quotients for Dioxin/Furans for Birds

Avian Dioxin Tool for all Samples where [Upland0_3] = "Y" (and DU-5) Based on WC_All_data.xlsx data file sent by CO on 10/8/2018 6:30pm

Parcel	Media	Sample	CompSampIn	Date	Upland0_3	StdAnalyteDiox	StdResult	Bird TEF	Bird TEQ	Qualifier	DetectFlag	UnitsStd	BirdRBC	Bird HQ	Sum Bird TEQ	Sum Bird Hazard Quotient
Central Parcel	Soil	DU-5	ISM	1/13/2014	N	2,3,4,7,8-PeCDF	1.68E-05	1.00E+00	1.68E-05		Y	mg/kg	9.90E-05	1.70E-01		
Central Parcel	Soil	DU-5	ISM	1/13/2014	N	2,3,7,8-TCDD	2.92E-06	1.00E+00	2.92E-06		Y	mg/kg	1.36E-04	2.15E-02		
Central Parcel	Soil	DU-5	ISM	1/13/2014	N	2,3,7,8-TCDF	5.91E-06	1.00E+00	5.91E-06		Y	mg/kg	1.29E-04	4.60E-02		
Central Parcel	Soil	DU-5	ISM	1/13/2014	N	OCDD	1.89E-02	1.00E-04	1.89E-06	E	Y	mg/kg	6.43E-01	2.94E-02		
Central Parcel	Soil	DU-5	ISM	1/13/2014	N	OCDF	4.52E-04	1.00E-04	4.52E-08		Y	mg/kg	1.64E-01	2.76E-03		
Central Parcel	Soil	DU-6-COMP-1	Composite	4/8/2014	Y	1,2,3,4,6,7,8-HpCDD	3.09E-04	1.00E-03	3.09E-07		Y	mg/kg	3.87E-02	7.98E-03		
Central Parcel	Soil	DU-6-COMP-1	Composite	4/8/2014	Y	1,2,3,4,6,7,8-HpCDF	8.03E-05	1.00E-02	8.03E-07		Y	mg/kg	3.79E-03	2.12E-02		
Central Parcel	Soil	DU-6-COMP-1	Composite	4/8/2014	Y	1,2,3,4,7,8,9-HpCDF	3.07E-06	1.00E-02	3.07E-08		Y	mg/kg	3.79E-03	8.10E-04		
Central Parcel	Soil	DU-6-COMP-1	Composite	4/8/2014	Y	1,2,3,4,7,8-HxCDD	4.10E-06	5.00E-02	2.05E-07		Y	mg/kg	1.05E-03	3.91E-03		
Central Parcel	Soil	DU-6-COMP-1	Composite	4/8/2014	Y	1,2,3,4,7,8-HxCDF	3.04E-06	1.00E-01	3.04E-07		Y	mg/kg	2.28E-04	1.34E-02		
Central Parcel	Soil	DU-6-COMP-1	Composite	4/8/2014	Y	1,2,3,6,7,8-HxCDD	6.56E-05	1.00E-02	6.56E-07		Y	mg/kg	2.28E-03	2.88E-02		
Central Parcel	Soil	DU-6-COMP-1	Composite	4/8/2014	Y	1,2,3,6,7,8-HxCDF	2.10E-06	1.00E-01	2.10E-07		Y	mg/kg	2.28E-04	9.23E-03		
Central Parcel	Soil	DU-6-COMP-1	Composite	4/8/2014	Y	1,2,3,7,8,9-HxCDD	3.75E-05	1.00E-01	3.75E-06		Y	mg/kg	2.28E-04	1.65E-01		
Central Parcel	Soil	DU-6-COMP-1	Composite	4/8/2014	Y	1,2,3,7,8,9-HxCDF	7.33E-07	1.00E-01	7.33E-08	J	Y	mg/kg	4.48E-04	1.64E-03	1.83E-05	3.07E-01
Central Parcel	Soil	DU-6-COMP-1	Composite	4/8/2014	Y	1,2,3,7,8-PeCDD	8.85E-06	1.00E+00	8.85E-06		Y	mg/kg	5.47E-04	1.62E-02		
Central Parcel	Soil	DU-6-COMP-1	Composite	4/8/2014	Y	1,2,3,7,8-PeCDF	1.05E-06	1.00E-01	1.05E-07	J	Y	mg/kg	1.27E-03	8.25E-04		
Central Parcel	Soil	DU-6-COMP-1	Composite	4/8/2014	Y	2,3,4,6,7,8-HxCDF	3.03E-06	1.00E-01	3.03E-07		Y	mg/kg	2.28E-04	1.33E-02		
Central Parcel	Soil	DU-6-COMP-1	Composite	4/8/2014	Y	2,3,4,7,8-PeCDF	9.47E-07	1.00E+00	9.47E-07	J	Y	mg/kg	9.90E-05	9.57E-03		
Central Parcel	Soil	DU-6-COMP-1	Composite	4/8/2014	Y	2,3,7,8-TCDD	7.16E-07	1.00E+00	7.16E-07		Y	mg/kg	1.36E-04	5.28E-03		
Central Parcel	Soil	DU-6-COMP-1	Composite	4/8/2014	Y	2,3,7,8-TCDF	8.59E-07	1.00E+00	8.59E-07		Y	mg/kg	1.29E-04	6.68E-03		
Central Parcel	Soil	DU-6-COMP-1	Composite	4/8/2014	Y	OCDD	1.76E-03	1.00E-04	1.76E-07		Y	mg/kg	6.43E-01	2.74E-03		
Central Parcel	Soil	DU-6-COMP-1	Composite	4/8/2014	Y	OCDF	2.17E-04	1.00E-04	2.17E-08		Y	mg/kg	1.64E-01	1.33E-03		
Central Parcel	Soil	DU-6-COMP-2	Composite	4/8/2014	Y	1,2,3,4,6,7,8-HpCDD	2.82E-04	1.00E-03	2.82E-07		Y	mg/kg	3.87E-02	7.29E-03		
Central Parcel	Soil	DU-6-COMP-2	Composite	4/8/2014	Y	1,2,3,4,6,7,8-HpCDF	7.02E-05	1.00E-02	7.02E-07		Y	mg/kg	3.79E-03	1.85E-02		
Central Parcel	Soil	DU-6-COMP-2	Composite	4/8/2014	Y	1,2,3,4,7,8,9-HpCDF	2.12E-06	1.00E-02	2.12E-08		Y	mg/kg	3.79E-03	5.59E-04		
Central Parcel	Soil	DU-6-COMP-2	Composite	4/8/2014	Y	1,2,3,4,7,8-HxCDD	5.33E-06	5.00E-02	2.67E-07		Y	mg/kg	1.05E-03	5.09E-03		
Central Parcel	Soil	DU-6-COMP-2	Composite	4/8/2014	Y	1,2,3,4,7,8-HxCDF	3.33E-06	1.00E-01	3.33E-07		Y	mg/kg	2.28E-04	1.46E-02		
Central Parcel	Soil	DU-6-COMP-2	Composite	4/8/2014	Y	1,2,3,6,7,8-HxCDD	1.02E-04	1.00E-02	1.02E-06		Y	mg/kg	2.28E-03	4.48E-02		
Central Parcel	Soil	DU-6-COMP-2	Composite	4/8/2014	Y	1,2,3,6,7,8-HxCDF	2.30E-06	1.00E-01	2.30E-07		Y	mg/kg	2.28E-04	1.01E-02		
Central Parcel	Soil	DU-6-COMP-2	Composite	4/8/2014	Y	1,2,3,7,8,9-HxCDD	6.04E-05	1.00E-01	6.04E-06		Y	mg/kg	2.28E-04	2.65E-01		
Central Parcel	Soil	DU-6-COMP-2	Composite	4/8/2014	Y	1,2,3,7,8,9-HxCDF	4.18E-07	1.00E-01	4.18E-08	J	Y	mg/kg	4.48E-04	9.34E-04	2.86E-05	4.39E-01
Central Parcel	Soil	DU-6-COMP-2	Composite	4/8/2014	Y	1,2,3,7,8-PeCDD	1.61E-05	1.00E+00	1.61E-05		Y	mg/kg	5.47E-04	2.94E-02		
Central Parcel	Soil	DU-6-COMP-2	Composite	4/8/2014	Y	1,2,3,7,8-PeCDF	1.21E-06	1.00E-01	1.21E-07		Y	mg/kg	1.27E-03	9.51E-04		
Central Parcel	Soil	DU-6-COMP-2	Composite	4/8/2014	Y	2,3,4,6,7,8-HxCDF	2.85E-06	1.00E-01	2.85E-07		Y	mg/kg	2.28E-04	1.25E-02		
Central Parcel	Soil	DU-6-COMP-2	Composite	4/8/2014	Y	2,3,4,7,8-PeCDF	1.35E-06	1.00E+00	1.35E-06		Y	mg/kg	9.90E-05	1.36E-02		
Central Parcel	Soil	DU-6-COMP-2	Composite	4/8/2014	Y	2,3,7,8-TCDD	9.47E-07	1.00E+00	9.47E-07		Y	mg/kg	1.36E-04	6.98E-03		
Central Parcel	Soil	DU-6-COMP-2	Composite	4/8/2014	Y	2,3,7,8-TCDF	7.37E-07	1.00E+00	7.37E-07		Y	mg/kg	1.29E-04	5.73E-03		
Central Parcel	Soil	DU-6-COMP-2	Composite	4/8/2014	Y	OCDD	1.17E-03	1.00E-04	1.17E-07		Y	mg/kg	6.43E-01	1.82E-03		
Central Parcel	Soil	DU-6-COMP-2	Composite	4/8/2014	Y	OCDF	9.31E-05	1.00E-04	9.31E-09		Y	mg/kg	1.64E-01	5.69E-04		
Central Parcel	Soil	DU-6-COMP-3	Composite	4/8/2014	Y	1,2,3,4,6,7,8-HpCDD	1.25E-03	1.00E-03	1.25E-06	E	Y	mg/kg	3.87E-02	3.23E-02		
Central Parcel	Soil	DU-6-COMP-3	Composite	4/8/2014	Y	1,2,3,4,6,7,8-HpCDF	4.02E-04	1.00E-02	4.02E-06		Y	mg/kg	3.79E-03	1.06E-01		
Central Parcel	Soil	DU-6-COMP-3	Composite	4/8/2014	Y	1,2,3,4,7,8,9-HpCDF	6.52E-06	1.00E-02	6.52E-08		Y	mg/kg	3.79E-03	1.72E-03		
Central Parcel	Soil	DU-6-COMP-3	Composite	4/8/2014	Y	1,2,3,4,7,8-HxCDD	3.48E-05	5.00E-02	1.74E-06		Y	mg/kg	1.05E-03	3.32E-02		
Central Parcel	Soil	DU-6-COMP-3	Composite	4/8/2014	Y	1,2,3,4,7,8-HxCDF	8.96E-06	1.00E-01	8.96E-07		Y	mg/kg	2.28E-04	3.94E-02		
Central Parcel	Soil	DU-6-COMP-3	Composite	4/8/2014	Y	1,2,3,6,7,8-HxCDD	7.24E-04	1.00E-02	7.24E-06		Y	mg/kg	2.28E-03	3.18E-01		
Central Parcel	Soil	DU-6-COMP-3	Composite	4/8/2014	Y	1,2,3,6,7,8-HxCDF	9.93E-06	1.00E-01	9.93E-07		Y	mg/kg	2.28E-04	4.36E-02		
Central Parcel	Soil	DU-6-COMP-3	Composite	4/8/2014	Y	1,2,3,7,8,9-HxCDD	4.51E-04	1.00E-01	4.51E-05		Y	mg/kg	2.28E-04	1.98E+00		
Central Parcel	Soil	DU-6-COMP-3	Composite	4/8/2014	Y	1,2,3,7,8,9-HxCDF	1.79E-06	1.00E-01	1.79E-07		Y	mg/kg	4.48E-04	4.00E-03	1.85E-04	2.94E+00
Central Parcel	Soil	DU-6-COMP-3	Composite	4/8/2014	Y	1,2,3,7,8-PeCDD	1.08E-04	1.00E+00	1.08E-04		Y	mg/kg	5.47E-04	1.97E-01		
Central Parcel	Soil	DU-6-COMP-3	Composite	4/8/2014	Y	1,2,3,7,8-PeCDF	2.95E-06	1.00E-01	2.95E-07		Y	mg/kg	1.27E-03	2.32E-03		
Central Parcel	Soil	DU-6-COMP-3	Composite	4/8/2014	Y	2,3,4,6,7,8-HxCDF	1.28E-05	1.00E-01	1.28E-06		Y	mg/kg	2.28E-04	5.62E-02		
Central Parcel	Soil	DU-6-COMP-3	Composite	4/8/2014	Y	2,3,4,7,8-PeCDF	5.98E-06	1.00E+00	5.98E-06		Y	mg/kg	9.90E-05	6.04E-02		
Central Parcel	Soil	DU-6-COMP-3	Composite	4/8/2014	Y	2,3,7,8-TCDD	5.01E-06	1.00E+00	5.01E-06		Y	mg/kg	1.36E-04	3.69E-02		
Central Parcel	Soil	DU-6-COMP-3	Composite	4/8/2014	Y	2,3,7,8-TCDF	3.00E-06	1.00E+00	3.00E-06		Y	mg/kg	1.29E-04	2.33E-02		
Central Parcel	Soil	DU-6-COMP-3	Composite	4/8/2014	Y	OCDD	2.13E-03	1.00E-04	2.13E-07		Y	mg/kg	6.43E-01	3.31E-03		
Central Parcel	Soil	DU-6-COMP-3	Composite	4/8/2014	Y	OCDF	2.64E-04	1.00E-04	2.64E-08		Y	mg/kg	1.64E-01	1.61E-03		
Central Parcel	Soil	DU-6-COMP-4	Composite	4/8/2014	Y	1,2,3,4,6,7,8-HpCDD	3.58E-04	1.00E-03	3.58E-07		Y	mg/kg	3.87E-02	9.25E-03		
Central Parcel	Soil	DU-6-COMP-4	Composite	4/8/2014	Y	1,2,3,4,6,7,8-HpCDF	6.90E-05	1.00E-02	6.90E-07		Y	mg/kg	3.79E-03	1.82E-02		
Central Parcel	Soil	DU-6-COMP-4	Composite	4/8/2014	Y	1,2,3,4,7,8,9-HpCDF	3.85E-06	1.00E-02	3.85E-08		Y	mg/kg	3.79E-03	1.02E-03		
Central Parcel	Soil	DU-6-COMP-4	Composite	4/8/2014	Y	1,2,3,4,7,8-HxCDD	6.16E-06	5.00E-02	3.08E-07		Y	mg/kg	1.05E-03	5.88E-03		
Central Parcel	Soil	DU-6-COMP-4	Composite	4/8/2014	Y	1,2,3,4,7,8-HxCDF	4.10E-06	1.00E-01	4.10E-07		Y	mg/kg	2.28E-04	1.80E-02		
Central Parcel	Soil	DU-6-COMP-4	Composite	4/8/2014	Y	1,2,3,6,7,8-HxCDD	1.14E-04	1.00E-02	1.14E-06		Y	mg/kg	2.28E-03	5.00E-02		
Central Parcel	Soil	DU-6-COMP-4	Composite	4/8/2014	Y	1,2,3,6,7,8-HxCDF	3.76E-06	1.00E-01	3.76E-07		Y	mg/kg	2.28E-04	1.65E-02		

Sum Hazard Quotients for Dioxin/Furans for Birds

Avian Dioxin Tool for all Samples where [Upland0_3] = "Y" (and DU-5) Based on WC_All_data.xlsx data file sent by CO on 10/8/2018 6:30pm

Parcel	Media	Sample	CompSampIn	Date	Upland0_3	StdAnalyteDiox	StdResult	Bird TEF	Bird TEQ	Qualifier	DetectFlag	UnitsStd	BirdRBC	Bird HQ	Sum Bird TEQ	Sum Bird Hazard Quotient
Central Parcel	Soil	DU-6-COMP-4	Composite	4/8/2014	Y	1,2,3,7,8,9-HxCDD	6.43E-05	1.00E-01	6.43E-06		Y	mg/kg	2.28E-04	2.82E-01	3.14E-05	5.26E-01
Central Parcel	Soil	DU-6-COMP-4	Composite	4/8/2014	Y	1,2,3,7,8,9-HxCDF	6.88E-07	1.00E-01	6.88E-08	J	Y	mg/kg	4.48E-04	1.54E-03		
Central Parcel	Soil	DU-6-COMP-4	Composite	4/8/2014	Y	1,2,3,7,8-PeCDD	1.35E-05	1.00E+00	1.35E-05		Y	mg/kg	5.47E-04	2.47E-02		
Central Parcel	Soil	DU-6-COMP-4	Composite	4/8/2014	Y	1,2,3,7,8-PeCDF	1.40E-06	1.00E-01	1.40E-07		Y	mg/kg	1.27E-03	1.10E-03		
Central Parcel	Soil	DU-6-COMP-4	Composite	4/8/2014	Y	2,3,4,6,7,8-HxCDF	6.59E-06	1.00E-01	6.59E-07		Y	mg/kg	2.28E-04	2.90E-02		
Central Parcel	Soil	DU-6-COMP-4	Composite	4/8/2014	Y	2,3,4,7,8-PeCDF	4.03E-06	1.00E+00	4.03E-06		Y	mg/kg	9.90E-05	4.07E-02		
Central Parcel	Soil	DU-6-COMP-4	Composite	4/8/2014	Y	2,3,7,8-TCDD	6.93E-07	1.00E+00	6.93E-07		Y	mg/kg	1.36E-04	5.11E-03		
Central Parcel	Soil	DU-6-COMP-4	Composite	4/8/2014	Y	2,3,7,8-TCDF	2.33E-06	1.00E+00	2.33E-06		Y	mg/kg	1.29E-04	1.81E-02		
Central Parcel	Soil	DU-6-COMP-4	Composite	4/8/2014	Y	OCDD	1.87E-03	1.00E-04	1.87E-07		Y	mg/kg	6.43E-01	2.91E-03		
Central Parcel	Soil	DU-6-COMP-4	Composite	4/8/2014	Y	OCDF	2.50E-04	1.00E-04	2.50E-08		Y	mg/kg	1.64E-01	1.53E-03		
Central Parcel	Soil	RA3-B1	Composite	10/19/2015	Y	1,2,3,4,6,7,8-HpCDD	1.27E-04	1.00E-03	1.27E-07		Y	mg/kg	3.87E-02	3.28E-03	3.69E-05	4.27E-01
Central Parcel	Soil	RA3-B1	Composite	10/19/2015	Y	1,2,3,4,6,7,8-HpCDF	4.25E-05	1.00E-02	4.25E-07		Y	mg/kg	3.79E-03	1.12E-02		
Central Parcel	Soil	RA3-B1	Composite	10/19/2015	Y	1,2,3,4,7,8,9-HpCDF	1.21E-05	1.00E-02	1.21E-07	U	N	mg/kg	3.79E-03	3.19E-03		
Central Parcel	Soil	RA3-B1	Composite	10/19/2015	Y	1,2,3,4,7,8-HxCDD	5.03E-05	5.00E-02	2.52E-06		Y	mg/kg	1.05E-03	4.80E-02		
Central Parcel	Soil	RA3-B1	Composite	10/19/2015	Y	1,2,3,4,7,8-HxCDF	3.38E-06	1.00E-01	3.38E-07	J	Y	mg/kg	2.28E-04	1.48E-02		
Central Parcel	Soil	RA3-B1	Composite	10/19/2015	Y	1,2,3,6,7,8-HxCDD	1.21E-05	1.00E-02	1.21E-07	U	N	mg/kg	2.28E-03	5.31E-03		
Central Parcel	Soil	RA3-B1	Composite	10/19/2015	Y	1,2,3,6,7,8-HxCDF	3.15E-06	1.00E-01	3.15E-07	J	Y	mg/kg	2.28E-04	1.38E-02		
Central Parcel	Soil	RA3-B1	Composite	10/19/2015	Y	1,2,3,7,8,9-HxCDD	2.64E-05	1.00E-01	2.64E-06		Y	mg/kg	2.28E-04	1.16E-01		
Central Parcel	Soil	RA3-B1	Composite	10/19/2015	Y	1,2,3,7,8,9-HxCDF	1.51E-06	1.00E-01	1.51E-07	J	Y	mg/kg	4.48E-04	3.37E-03		
Central Parcel	Soil	RA3-B1	Composite	10/19/2015	Y	1,2,3,7,8-PeCDD	1.21E-05	1.00E+00	1.21E-05	U	N	mg/kg	5.47E-04	2.21E-02		
Central Parcel	Soil	RA3-B1	Composite	10/19/2015	Y	1,2,3,7,8-PeCDF	1.21E-05	1.00E-01	1.21E-06	U	N	mg/kg	1.27E-03	9.51E-03		
Central Parcel	Soil	RA3-B1	Composite	10/19/2015	Y	2,3,4,6,7,8-HxCDF	5.46E-06	1.00E-01	5.46E-07	J	Y	mg/kg	2.28E-04	2.40E-02		
Central Parcel	Soil	RA3-B1	Composite	10/19/2015	Y	2,3,4,7,8-PeCDF	1.14E-05	1.00E+00	1.14E-05	J	Y	mg/kg	9.90E-05	1.15E-01		
Central Parcel	Soil	RA3-B1	Composite	10/19/2015	Y	2,3,7,8-TCDD	2.42E-06	1.00E+00	2.42E-06	U	N	mg/kg	1.36E-04	1.78E-02		
Central Parcel	Soil	RA3-B1	Composite	10/19/2015	Y	2,3,7,8-TCDF	2.42E-06	1.00E+00	2.42E-06	U	N	mg/kg	1.29E-04	1.88E-02		
Central Parcel	Soil	RA3-B1	Composite	10/19/2015	Y	OCDD	4.92E-04	1.00E-04	4.92E-08		Y	mg/kg	6.43E-01	7.65E-04		
Central Parcel	Soil	RA3-B1	Composite	10/19/2015	Y	OCDF	3.51E-05	1.00E-04	3.51E-09		Y	mg/kg	1.64E-01	2.14E-04		
Central Parcel	Soil	RA3-B10	Composite	10/19/2015	Y	1,2,3,4,6,7,8-HpCDD	5.05E-04	1.00E-03	5.05E-07		Y	mg/kg	3.87E-02	1.30E-02	9.70E-05	1.50E+00
Central Parcel	Soil	RA3-B10	Composite	10/19/2015	Y	1,2,3,4,6,7,8-HpCDF	1.88E-04	1.00E-02	1.88E-06		Y	mg/kg	3.79E-03	4.96E-02		
Central Parcel	Soil	RA3-B10	Composite	10/19/2015	Y	1,2,3,4,7,8,9-HpCDF	1.21E-05	1.00E-02	1.21E-07	U	N	mg/kg	3.79E-03	3.19E-03		
Central Parcel	Soil	RA3-B10	Composite	10/19/2015	Y	1,2,3,4,7,8-HxCDD	1.96E-05	5.00E-02	9.80E-07		Y	mg/kg	1.05E-03	1.87E-02		
Central Parcel	Soil	RA3-B10	Composite	10/19/2015	Y	1,2,3,4,7,8-HxCDF	1.04E-05	1.00E-01	1.04E-06		Y	mg/kg	2.28E-04	4.57E-02		
Central Parcel	Soil	RA3-B10	Composite	10/19/2015	Y	1,2,3,6,7,8-HxCDD	2.81E-04	1.00E-02	2.81E-06		Y	mg/kg	2.28E-03	1.23E-01		
Central Parcel	Soil	RA3-B10	Composite	10/19/2015	Y	1,2,3,6,7,8-HxCDF	9.18E-06	1.00E-01	9.18E-07		Y	mg/kg	2.28E-04	4.03E-02		
Central Parcel	Soil	RA3-B10	Composite	10/19/2015	Y	1,2,3,7,8,9-HxCDD	1.92E-04	1.00E-01	1.92E-05		Y	mg/kg	2.28E-04	8.43E-01		
Central Parcel	Soil	RA3-B10	Composite	10/19/2015	Y	1,2,3,7,8,9-HxCDF	1.21E-05	1.00E-01	1.21E-06	U	N	mg/kg	4.48E-04	2.70E-02		
Central Parcel	Soil	RA3-B10	Composite	10/19/2015	Y	1,2,3,7,8-PeCDD	4.48E-05	1.00E+00	4.48E-05		Y	mg/kg	5.47E-04	8.19E-02		
Central Parcel	Soil	RA3-B10	Composite	10/19/2015	Y	1,2,3,7,8-PeCDF	4.97E-06	1.00E-01	4.97E-07		Y	mg/kg	1.27E-03	3.90E-03		
Central Parcel	Soil	RA3-B10	Composite	10/19/2015	Y	2,3,4,6,7,8-HxCDF	9.96E-06	1.00E-01	9.96E-07		Y	mg/kg	2.28E-04	4.38E-02		
Central Parcel	Soil	RA3-B10	Composite	10/19/2015	Y	2,3,4,7,8-PeCDF	1.59E-05	1.00E+00	1.59E-05		Y	mg/kg	9.90E-05	1.61E-01		
Central Parcel	Soil	RA3-B10	Composite	10/19/2015	Y	2,3,7,8-TCDD	2.41E-06	1.00E+00	2.41E-06	U	N	mg/kg	1.36E-04	1.78E-02		
Central Parcel	Soil	RA3-B10	Composite	10/19/2015	Y	2,3,7,8-TCDF	3.69E-06	1.00E+00	3.69E-06		Y	mg/kg	1.29E-04	2.87E-02		
Central Parcel	Soil	RA3-B10	Composite	10/19/2015	Y	OCDD	3.65E-04	1.00E-04	3.65E-08		Y	mg/kg	6.43E-01	5.67E-04		
Central Parcel	Soil	RA3-B10	Composite	10/19/2015	Y	OCDF	7.30E-05	1.00E-04	7.30E-09		Y	mg/kg	1.64E-01	4.46E-04		
Central Parcel	Soil	RA3-B11	Composite	10/19/2015	Y	1,2,3,4,6,7,8-HpCDD	5.90E-05	1.00E-03	5.90E-08		Y	mg/kg	3.87E-02	1.52E-03	3.21E-05	4.23E-01
Central Parcel	Soil	RA3-B11	Composite	10/19/2015	Y	1,2,3,4,6,7,8-HpCDF	3.09E-05	1.00E-02	3.09E-07		Y	mg/kg	3.79E-03	8.15E-03		
Central Parcel	Soil	RA3-B11	Composite	10/19/2015	Y	1,2,3,4,7,8,9-HpCDF	1.22E-05	1.00E-02	1.22E-07	U	N	mg/kg	3.79E-03	3.22E-03		
Central Parcel	Soil	RA3-B11	Composite	10/19/2015	Y	1,2,3,4,7,8-HxCDD	1.22E-05	5.00E-02	6.10E-07	U	Y	mg/kg	1.05E-03	1.16E-02		
Central Parcel	Soil	RA3-B11	Composite	10/19/2015	Y	1,2,3,4,7,8-HxCDF	1.22E-05	1.00E-01	1.22E-06	U	N	mg/kg	2.28E-04	5.36E-02		
Central Parcel	Soil	RA3-B11	Composite	10/19/2015	Y	1,2,3,6,7,8-HxCDD	3.69E-05	1.00E-02	3.69E-07		Y	mg/kg	2.28E-03	1.62E-02		
Central Parcel	Soil	RA3-B11	Composite	10/19/2015	Y	1,2,3,6,7,8-HxCDF	1.22E-05	1.00E-01	1.22E-06	U	N	mg/kg	2.28E-04	5.36E-02		
Central Parcel	Soil	RA3-B11	Composite	10/19/2015	Y	1,2,3,7,8,9-HxCDD	2.46E-05	1.00E-01	2.46E-06		Y	mg/kg	2.28E-04	1.08E-01		
Central Parcel	Soil	RA3-B11	Composite	10/19/2015	Y	1,2,3,7,8,9-HxCDF	1.22E-05	1.00E-01	1.22E-06	U	N	mg/kg	4.48E-04	2.73E-02		
Central Parcel	Soil	RA3-B11	Composite	10/19/2015	Y	1,2,3,7,8-PeCDD	1.22E-05	1.00E+00	1.22E-05	U	N	mg/kg	5.47E-04	2.23E-02		
Central Parcel	Soil	RA3-B11	Composite	10/19/2015	Y	1,2,3,7,8-PeCDF	1.22E-05	1.00E-01	1.22E-06	U	N	mg/kg	1.27E-03	9.58E-03		
Central Parcel	Soil	RA3-B11	Composite	10/19/2015	Y	2,3,4,6,7,8-HxCDF	2.46E-06	1.00E-01	2.46E-07		Y	mg/kg	2.28E-04	1.08E-02		
Central Parcel	Soil	RA3-B11	Composite	10/19/2015	Y	2,3,4,7,8-PeCDF	5.92E-06	1.00E+00	5.92E-06		Y	mg/kg	9.90E-05	5.98E-02		
Central Parcel	Soil	RA3-B11	Composite	10/19/2015	Y	2,3,7,8-TCDD	2.44E-06	1.00E+00	2.44E-06	U	N	mg/kg	1.36E-04	1.80E-02		
Central Parcel	Soil	RA3-B11	Composite	10/19/2015	Y	2,3,7,8-TCDF	2.44E-06	1.00E+00	2.44E-06	U	N	mg/kg	1.29E-04	1.90E-02		
Central Parcel	Soil	RA3-B11	Composite	10/19/2015	Y	OCDD	5.89E-05	1.00E-04	5.89E-09		Y	mg/kg	6.43E-01	9.15E-05		
Central Parcel	Soil	RA3-B11	Composite	10/19/2015	Y	OCDF	2.44E-05	1.00E-04	2.44E-09	U	N	mg/kg	1.64E-01	1.49E-04		
Central Parcel	Soil	RA3-B13	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDD	3.49E-04	1.00E-03	3.49E-07		Y	mg/kg	3.87E-02	9.02E-03		
Central Parcel	Soil	RA3-B13	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDF	7.97E-05	1.00E-02	7.97E-07		Y	mg/kg	3.79E-03	2.10E-02		

Sum Hazard Quotients for Dioxin/Furans for Birds

Avian Dioxin Tool for all Samples where [Upland0_3] = "Y" (and DU-5) Based on WC_All_data.xlsx data file sent by CO on 10/8/2018 6:30pm

Parcel	Media	Sample	CompSampIn	Date	Upland0_3	StdAnalyteDiox	StdResult	Bird TEF	Bird TEQ	Qualifier	DetectFlag	UnitsStd	BirdRBC	Bird HQ	Sum Bird TEQ	Sum Bird Hazard Quotient
Central Parcel	Soil	RA3-B13	Composite	10/28/2015	Y	1,2,3,4,7,8,9-HpCDF	3.41E-06	1.00E-02	3.41E-08		Y	mg/kg	3.79E-03	9.00E-04		
Central Parcel	Soil	RA3-B13	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDD	7.17E-06	5.00E-02	3.59E-07		Y	mg/kg	1.05E-03	6.84E-03		
Central Parcel	Soil	RA3-B13	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDF	2.48E-06	1.00E-01	2.48E-07		Y	mg/kg	2.28E-04	1.09E-02		
Central Parcel	Soil	RA3-B13	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDD	8.34E-05	1.00E-02	8.34E-07		Y	mg/kg	2.28E-03	3.66E-02		
Central Parcel	Soil	RA3-B13	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDF	2.42E-06	1.00E-01	2.42E-07		Y	mg/kg	2.28E-04	1.06E-02		
Central Parcel	Soil	RA3-B13	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDD	5.53E-05	1.00E-01	5.53E-06		Y	mg/kg	2.28E-04	2.43E-01		
Central Parcel	Soil	RA3-B13	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDF	9.13E-07	1.00E-01	9.13E-08		Y	mg/kg	4.48E-04	2.04E-03	2.62E-05	4.13E-01
Central Parcel	Soil	RA3-B13	Composite	10/28/2015	Y	1,2,3,7,8-PeCDD	1.42E-05	1.00E+00	1.42E-05		Y	mg/kg	5.47E-04	2.60E-02		
Central Parcel	Soil	RA3-B13	Composite	10/28/2015	Y	1,2,3,7,8-PeCDF	6.57E-07	1.00E-01	6.57E-08		Y	mg/kg	1.27E-03	5.16E-04		
Central Parcel	Soil	RA3-B13	Composite	10/28/2015	Y	2,3,4,6,7,8-HxCDF	3.82E-06	1.00E-01	3.82E-07		Y	mg/kg	2.28E-04	1.68E-02		
Central Parcel	Soil	RA3-B13	Composite	10/28/2015	Y	2,3,4,7,8-PeCDF	1.37E-06	1.00E+00	1.37E-06		Y	mg/kg	9.90E-05	1.38E-02		
Central Parcel	Soil	RA3-B13	Composite	10/28/2015	Y	2,3,7,8-TCDD	9.88E-07	1.00E+00	9.88E-07		Y	mg/kg	1.36E-04	7.29E-03		
Central Parcel	Soil	RA3-B13	Composite	10/28/2015	Y	2,3,7,8-TCDF	4.26E-07	1.00E+00	4.26E-07		Y	mg/kg	1.29E-04	3.31E-03		
Central Parcel	Soil	RA3-B13	Composite	10/28/2015	Y	OCDD	2.27E-03	1.00E-04	2.27E-07		Y	mg/kg	6.43E-01	3.53E-03		
Central Parcel	Soil	RA3-B13	Composite	10/28/2015	Y	OCDF	9.95E-05	1.00E-04	9.95E-09		Y	mg/kg	1.64E-01	6.08E-04		
Central Parcel	Soil	RA3-B14	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDD	2.14E-04	1.00E-03	2.14E-07		Y	mg/kg	3.87E-02	5.53E-03		
Central Parcel	Soil	RA3-B14	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDF	6.05E-05	1.00E-02	6.05E-07		Y	mg/kg	3.79E-03	1.60E-02		
Central Parcel	Soil	RA3-B14	Composite	10/28/2015	Y	1,2,3,4,7,8,9-HpCDF	3.28E-06	1.00E-02	3.28E-08		Y	mg/kg	3.79E-03	8.66E-04		
Central Parcel	Soil	RA3-B14	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDD	2.62E-06	5.00E-02	1.31E-07		Y	mg/kg	1.05E-03	2.50E-03		
Central Parcel	Soil	RA3-B14	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDF	2.21E-06	1.00E-01	2.21E-07		Y	mg/kg	2.28E-04	9.71E-03		
Central Parcel	Soil	RA3-B14	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDD	3.59E-05	1.00E-02	3.59E-07		Y	mg/kg	2.28E-03	1.58E-02		
Central Parcel	Soil	RA3-B14	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDF	2.14E-06	1.00E-01	2.14E-07		Y	mg/kg	2.28E-04	9.40E-03		
Central Parcel	Soil	RA3-B14	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDD	2.19E-05	1.00E-01	2.19E-06		Y	mg/kg	2.28E-04	9.61E-02		
Central Parcel	Soil	RA3-B14	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDF	8.01E-07	1.00E-01	8.01E-08		Y	mg/kg	4.48E-04	1.79E-03	1.43E-05	2.23E-01
Central Parcel	Soil	RA3-B14	Composite	10/28/2015	Y	1,2,3,7,8-PeCDD	6.19E-06	1.00E+00	6.19E-06		Y	mg/kg	5.47E-04	1.13E-02		
Central Parcel	Soil	RA3-B14	Composite	10/28/2015	Y	1,2,3,7,8-PeCDF	5.64E-07	1.00E-01	5.64E-08		Y	mg/kg	1.27E-03	4.43E-04		
Central Parcel	Soil	RA3-B14	Composite	10/28/2015	Y	2,3,4,6,7,8-HxCDF	4.12E-06	1.00E-01	4.12E-07		Y	mg/kg	2.28E-04	1.81E-02		
Central Parcel	Soil	RA3-B14	Composite	10/28/2015	Y	2,3,4,7,8-PeCDF	2.43E-06	1.00E+00	2.43E-06		Y	mg/kg	9.90E-05	2.46E-02		
Central Parcel	Soil	RA3-B14	Composite	10/28/2015	Y	2,3,7,8-TCDD	4.55E-07	1.00E+00	4.55E-07		Y	mg/kg	1.36E-04	3.35E-03		
Central Parcel	Soil	RA3-B14	Composite	10/28/2015	Y	2,3,7,8-TCDF	5.24E-07	1.00E+00	5.24E-07		Y	mg/kg	1.29E-04	4.08E-03		
Central Parcel	Soil	RA3-B14	Composite	10/28/2015	Y	OCDD	1.58E-03	1.00E-04	1.58E-07		Y	mg/kg	6.43E-01	2.46E-03		
Central Parcel	Soil	RA3-B14	Composite	10/28/2015	Y	OCDF	2.35E-04	1.00E-04	2.35E-08		Y	mg/kg	1.64E-01	1.44E-03		
Central Parcel	Soil	RA3-B15	Composite	12/22/2015	Y	1,2,3,4,6,7,8-HpCDD	1.31E-06	1.00E-03	1.31E-09	J	Y	mg/kg	3.87E-02	3.38E-05		
Central Parcel	Soil	RA3-B15	Composite	12/22/2015	Y	1,2,3,4,6,7,8-HpCDF	2.13E-07	1.00E-02	2.13E-09	U	N	mg/kg	3.79E-03	5.62E-05		
Central Parcel	Soil	RA3-B15	Composite	12/22/2015	Y	1,2,3,4,7,8,9-HpCDF	6.31E-08	1.00E-02	6.31E-10	U	N	mg/kg	3.79E-03	1.67E-05		
Central Parcel	Soil	RA3-B15	Composite	12/22/2015	Y	1,2,3,4,7,8-HxCDD	4.18E-07	5.00E-02	2.09E-08	U	N	mg/kg	1.05E-03	3.99E-04		
Central Parcel	Soil	RA3-B15	Composite	12/22/2015	Y	1,2,3,4,7,8-HxCDF	5.36E-08	1.00E-01	5.36E-09	U	N	mg/kg	2.28E-04	2.35E-04		
Central Parcel	Soil	RA3-B15	Composite	12/22/2015	Y	1,2,3,6,7,8-HxCDD	3.97E-07	1.00E-02	3.97E-09	U	N	mg/kg	2.28E-03	1.74E-04		
Central Parcel	Soil	RA3-B15	Composite	12/22/2015	Y	1,2,3,6,7,8-HxCDF	5.17E-08	1.00E-01	5.17E-09	U	N	mg/kg	2.28E-04	2.27E-04		
Central Parcel	Soil	RA3-B15	Composite	12/22/2015	Y	1,2,3,7,8,9-HxCDD	4.53E-07	1.00E-01	4.53E-08	U	N	mg/kg	2.28E-04	1.99E-03		
Central Parcel	Soil	RA3-B15	Composite	12/22/2015	Y	1,2,3,7,8,9-HxCDF	7.79E-08	1.00E-01	7.79E-09	U	N	mg/kg	4.48E-04	1.74E-04	6.04E-07	6.72E-03
Central Parcel	Soil	RA3-B15	Composite	12/22/2015	Y	1,2,3,7,8-PeCDD	1.73E-07	1.00E+00	1.73E-07	U	N	mg/kg	5.47E-04	3.16E-04		
Central Parcel	Soil	RA3-B15	Composite	12/22/2015	Y	1,2,3,7,8-PeCDF	1.30E-07	1.00E-01	1.30E-08	U	N	mg/kg	1.27E-03	1.02E-04		
Central Parcel	Soil	RA3-B15	Composite	12/22/2015	Y	2,3,4,6,7,8-HxCDF	5.95E-08	1.00E-01	5.95E-09	U	N	mg/kg	2.28E-04	2.61E-04		
Central Parcel	Soil	RA3-B15	Composite	12/22/2015	Y	2,3,4,7,8-PeCDF	1.22E-07	1.00E+00	1.22E-07	U	N	mg/kg	9.90E-05	1.23E-03		
Central Parcel	Soil	RA3-B15	Composite	12/22/2015	Y	2,3,7,8-TCDD	1.04E-07	1.00E+00	1.04E-07	U	N	mg/kg	1.36E-04	7.67E-04		
Central Parcel	Soil	RA3-B15	Composite	12/22/2015	Y	2,3,7,8-TCDF	9.22E-08	1.00E+00	9.22E-08	U	N	mg/kg	1.29E-04	7.17E-04		
Central Parcel	Soil	RA3-B15	Composite	12/22/2015	Y	OCDD	1.25E-05	1.00E-04	1.25E-09		Y	mg/kg	6.43E-01	1.94E-05		
Central Parcel	Soil	RA3-B15	Composite	12/22/2015	Y	OCDF	4.09E-07	1.00E-04	4.09E-11	J	Y	mg/kg	1.64E-01	2.50E-06		
Central Parcel	Soil	RA3-B16	Composite	12/22/2015	Y	1,2,3,4,6,7,8-HpCDD	3.42E-05	1.00E-03	3.42E-08		Y	mg/kg	3.87E-02	8.84E-04		
Central Parcel	Soil	RA3-B16	Composite	12/22/2015	Y	1,2,3,4,6,7,8-HpCDF	9.51E-06	1.00E-02	9.51E-08		Y	mg/kg	3.79E-03	2.51E-03		
Central Parcel	Soil	RA3-B16	Composite	12/22/2015	Y	1,2,3,4,7,8,9-HpCDF	3.49E-07	1.00E-02	3.49E-09	U	N	mg/kg	3.79E-03	9.21E-05		
Central Parcel	Soil	RA3-B16	Composite	12/22/2015	Y	1,2,3,4,7,8-HxCDD	1.00E-06	5.00E-02	5.00E-08		Y	mg/kg	1.05E-03	9.54E-04		
Central Parcel	Soil	RA3-B16	Composite	12/22/2015	Y	1,2,3,4,7,8-HxCDF	7.98E-07	1.00E-01	7.98E-08		Y	mg/kg	2.28E-04	3.51E-03		
Central Parcel	Soil	RA3-B16	Composite	12/22/2015	Y	1,2,3,6,7,8-HxCDD	1.36E-05	1.00E-02	1.36E-07		Y	mg/kg	2.28E-03	5.97E-03		
Central Parcel	Soil	RA3-B16	Composite	12/22/2015	Y	1,2,3,6,7,8-HxCDF	7.31E-07	1.00E-01	7.31E-08		Y	mg/kg	2.28E-04	3.21E-03		
Central Parcel	Soil	RA3-B16	Composite	12/22/2015	Y	1,2,3,7,8,9-HxCDD	8.26E-06	1.00E-01	8.26E-07		Y	mg/kg	2.28E-04	3.63E-02		
Central Parcel	Soil	RA3-B16	Composite	12/22/2015	Y	1,2,3,7,8,9-HxCDF	2.95E-07	1.00E-01	2.95E-08	U	N	mg/kg	4.48E-04	6.59E-04	6.04E-06	9.09E-02
Central Parcel	Soil	RA3-B16	Composite	12/22/2015	Y	1,2,3,7,8-PeCDD	1.58E-06	1.00E+00	1.58E-06		Y	mg/kg	5.47E-04	2.89E-03		
Central Parcel	Soil	RA3-B16	Composite	12/22/2015	Y	1,2,3,7,8-PeCDF	6.55E-07	1.00E-01	6.55E-08	U	N	mg/kg	1.27E-03	5.15E-04		
Central Parcel	Soil	RA3-B16	Composite	12/22/2015	Y	2,3,4,6,7,8-HxCDF	1.31E-06	1.00E-01	1.31E-07		Y	mg/kg	2.28E-04	5.76E-03		
Central Parcel	Soil	RA3-B16	Composite	12/22/2015	Y	2,3,4,7,8-PeCDF	2.03E-06	1.00E+00	2.03E-06		Y	mg/kg	9.90E-05	2.05E-02		
Central Parcel	Soil	RA3-B16	Composite	12/22/2015	Y	2,3,7,8-TCDD	3.18E-07	1.00E+00	3.18E-07	U	N	mg/kg	1.36E-04	2.34E-03		

Sum Hazard Quotients for Dioxin/Furans for Birds

Avian Dioxin Tool for all Samples where [Upland0_3] = "Y" (and DU-5) Based on WC_All_data.xlsx data file sent by CO on 10/8/2018 6:30pm

Parcel	Media	Sample	CompSampIn	Date	Upland0_3	StdAnalyteDiox	StdResult	Bird TEF	Bird TEQ	Qualifier	DetectFlag	UnitsStd	BirdRBC	Bird HQ	Sum Bird TEQ	Sum Bird Hazard Quotient
Central Parcel	Soil	RA3-B16	Composite	12/22/2015	Y	2,3,7,8-TCDF	5.65E-07	1.00E+00	5.65E-07	U	N	mg/kg	1.29E-04	4.40E-03		
Central Parcel	Soil	RA3-B16	Composite	12/22/2015	Y	OCDD	2.23E-04	1.00E-04	2.23E-08		Y	mg/kg	6.43E-01	3.47E-04		
Central Parcel	Soil	RA3-B16	Composite	12/22/2015	Y	OCDF	1.32E-05	1.00E-04	1.32E-09		Y	mg/kg	1.64E-01	8.06E-05		
Central Parcel	Soil	RA3-B2	Composite	10/19/2015	Y	1,2,3,4,6,7,8-HpCDD	7.90E-04	1.00E-03	7.90E-07		Y	mg/kg	3.87E-02	2.04E-02		
Central Parcel	Soil	RA3-B2	Composite	10/19/2015	Y	1,2,3,4,6,7,8-HpCDF	2.81E-04	1.00E-02	2.81E-06		Y	mg/kg	3.79E-03	7.42E-02		
Central Parcel	Soil	RA3-B2	Composite	10/19/2015	Y	1,2,3,4,7,8,9-HpCDF	1.19E-05	1.00E-02	1.19E-07	U	N	mg/kg	3.79E-03	3.14E-03		
Central Parcel	Soil	RA3-B2	Composite	10/19/2015	Y	1,2,3,4,7,8-HxCDD	2.56E-05	5.00E-02	1.28E-06		Y	mg/kg	1.05E-03	2.44E-02		
Central Parcel	Soil	RA3-B2	Composite	10/19/2015	Y	1,2,3,4,7,8-HxCDF	1.19E-05	1.00E-01	1.19E-06	U	N	mg/kg	2.28E-04	5.23E-02		
Central Parcel	Soil	RA3-B2	Composite	10/19/2015	Y	1,2,3,6,7,8-HxCDD	4.56E-04	1.00E-02	4.56E-06		Y	mg/kg	2.28E-03	2.00E-01		
Central Parcel	Soil	RA3-B2	Composite	10/19/2015	Y	1,2,3,6,7,8-HxCDF	5.25E-06	1.00E-01	5.25E-07		Y	mg/kg	2.28E-04	2.31E-02		
Central Parcel	Soil	RA3-B2	Composite	10/19/2015	Y	1,2,3,7,8,9-HxCDD	3.26E-04	1.00E-01	3.26E-05		Y	mg/kg	2.28E-04	1.43E+00		
Central Parcel	Soil	RA3-B2	Composite	10/19/2015	Y	1,2,3,7,8,9-HxCDF	1.19E-05	1.00E-01	1.19E-06	U	N	mg/kg	4.48E-04	2.66E-02	1.22E-04	2.11E+00
Central Parcel	Soil	RA3-B2	Composite	10/19/2015	Y	1,2,3,7,8-PeCDD	6.40E-05	1.00E+00	6.40E-05		Y	mg/kg	5.47E-04	1.17E-01		
Central Parcel	Soil	RA3-B2	Composite	10/19/2015	Y	1,2,3,7,8-PeCDF	1.19E-05	1.00E-01	1.19E-06	U	N	mg/kg	1.27E-03	9.35E-03		
Central Parcel	Soil	RA3-B2	Composite	10/19/2015	Y	2,3,4,6,7,8-HxCDF	8.28E-06	1.00E-01	8.28E-07		Y	mg/kg	2.28E-04	3.64E-02		
Central Parcel	Soil	RA3-B2	Composite	10/19/2015	Y	2,3,4,7,8-PeCDF	4.63E-06	1.00E+00	4.63E-06		Y	mg/kg	9.90E-05	4.68E-02		
Central Parcel	Soil	RA3-B2	Composite	10/19/2015	Y	2,3,7,8-TCDD	3.65E-06	1.00E+00	3.65E-06		Y	mg/kg	1.36E-04	2.69E-02		
Central Parcel	Soil	RA3-B2	Composite	10/19/2015	Y	2,3,7,8-TCDF	2.38E-06	1.00E+00	2.38E-06	U	N	mg/kg	1.29E-04	1.85E-02		
Central Parcel	Soil	RA3-B2	Composite	10/19/2015	Y	OCDD	7.10E-04	1.00E-04	7.10E-08		Y	mg/kg	6.43E-01	1.10E-03		
Central Parcel	Soil	RA3-B2	Composite	10/19/2015	Y	OCDF	1.05E-04	1.00E-04	1.05E-08		Y	mg/kg	1.64E-01	6.41E-04		
Central Parcel	Soil	RA3-B3	Composite	10/19/2015	Y	1,2,3,4,6,7,8-HpCDD	1.21E-04	1.00E-03	1.21E-07		Y	mg/kg	3.87E-02	3.13E-03		
Central Parcel	Soil	RA3-B3	Composite	10/19/2015	Y	1,2,3,4,6,7,8-HpCDF	4.17E-05	1.00E-02	4.17E-07		Y	mg/kg	3.79E-03	1.10E-02		
Central Parcel	Soil	RA3-B3	Composite	10/19/2015	Y	1,2,3,4,7,8,9-HpCDF	1.12E-05	1.00E-02	1.12E-07	U	N	mg/kg	3.79E-03	2.96E-03		
Central Parcel	Soil	RA3-B3	Composite	10/19/2015	Y	1,2,3,4,7,8-HxCDD	4.33E-06	5.00E-02	2.17E-07		Y	mg/kg	1.05E-03	4.13E-03		
Central Parcel	Soil	RA3-B3	Composite	10/19/2015	Y	1,2,3,4,7,8-HxCDF	1.12E-05	1.00E-01	1.12E-06	U	N	mg/kg	2.28E-04	4.92E-02		
Central Parcel	Soil	RA3-B3	Composite	10/19/2015	Y	1,2,3,6,7,8-HxCDD	8.27E-05	1.00E-02	8.27E-07		Y	mg/kg	2.28E-03	3.63E-02		
Central Parcel	Soil	RA3-B3	Composite	10/19/2015	Y	1,2,3,6,7,8-HxCDF	1.12E-05	1.00E-01	1.12E-06	U	N	mg/kg	2.28E-04	4.92E-02		
Central Parcel	Soil	RA3-B3	Composite	10/19/2015	Y	1,2,3,7,8,9-HxCDD	6.00E-05	1.00E-01	6.00E-06		Y	mg/kg	2.28E-04	2.63E-01		
Central Parcel	Soil	RA3-B3	Composite	10/19/2015	Y	1,2,3,7,8,9-HxCDF	1.12E-05	1.00E-01	1.12E-06	U	N	mg/kg	4.48E-04	2.50E-02	3.20E-05	5.79E-01
Central Parcel	Soil	RA3-B3	Composite	10/19/2015	Y	1,2,3,7,8-PeCDD	1.22E-05	1.00E+00	1.22E-05		Y	mg/kg	5.47E-04	2.23E-02		
Central Parcel	Soil	RA3-B3	Composite	10/19/2015	Y	1,2,3,7,8-PeCDF	1.12E-05	1.00E-01	1.12E-06	U	N	mg/kg	1.27E-03	8.80E-03		
Central Parcel	Soil	RA3-B3	Composite	10/19/2015	Y	2,3,4,6,7,8-HxCDF	1.12E-05	1.00E-01	1.12E-06	U	N	mg/kg	2.28E-04	4.92E-02		
Central Parcel	Soil	RA3-B3	Composite	10/19/2015	Y	2,3,4,7,8-PeCDF	2.04E-06	1.00E+00	2.04E-06		Y	mg/kg	9.90E-05	2.06E-02		
Central Parcel	Soil	RA3-B3	Composite	10/19/2015	Y	2,3,7,8-TCDD	2.23E-06	1.00E+00	2.23E-06	U	N	mg/kg	1.36E-04	1.64E-02		
Central Parcel	Soil	RA3-B3	Composite	10/19/2015	Y	2,3,7,8-TCDF	2.23E-06	1.00E+00	2.23E-06	U	N	mg/kg	1.29E-04	1.74E-02		
Central Parcel	Soil	RA3-B3	Composite	10/19/2015	Y	OCDD	8.61E-05	1.00E-04	8.61E-09		Y	mg/kg	6.43E-01	1.34E-04		
Central Parcel	Soil	RA3-B3	Composite	10/19/2015	Y	OCDF	1.63E-05	1.00E-04	1.63E-09		Y	mg/kg	1.64E-01	9.96E-05		
Central Parcel	Soil	RA3-B4	Composite	10/19/2015	Y	1,2,3,4,6,7,8-HpCDD	1.19E-04	1.00E-03	1.19E-07		Y	mg/kg	3.87E-02	3.07E-03		
Central Parcel	Soil	RA3-B4	Composite	10/19/2015	Y	1,2,3,4,6,7,8-HpCDF	3.75E-05	1.00E-02	3.75E-07		Y	mg/kg	3.79E-03	9.90E-03		
Central Parcel	Soil	RA3-B4	Composite	10/19/2015	Y	1,2,3,4,7,8,9-HpCDF	1.15E-05	1.00E-02	1.15E-07	U	N	mg/kg	3.79E-03	3.03E-03		
Central Parcel	Soil	RA3-B4	Composite	10/19/2015	Y	1,2,3,4,7,8-HxCDD	3.65E-06	5.00E-02	1.83E-07		Y	mg/kg	1.05E-03	3.48E-03		
Central Parcel	Soil	RA3-B4	Composite	10/19/2015	Y	1,2,3,4,7,8-HxCDF	1.15E-05	1.00E-01	1.15E-06	U	N	mg/kg	2.28E-04	5.05E-02		
Central Parcel	Soil	RA3-B4	Composite	10/19/2015	Y	1,2,3,6,7,8-HxCDD	7.14E-05	1.00E-02	7.14E-07		Y	mg/kg	2.28E-03	3.13E-02		
Central Parcel	Soil	RA3-B4	Composite	10/19/2015	Y	1,2,3,6,7,8-HxCDF	1.15E-05	1.00E-01	1.15E-06	U	N	mg/kg	2.28E-04	5.05E-02		
Central Parcel	Soil	RA3-B4	Composite	10/19/2015	Y	1,2,3,7,8,9-HxCDD	4.46E-05	1.00E-01	4.46E-06		Y	mg/kg	2.28E-04	1.96E-01		
Central Parcel	Soil	RA3-B4	Composite	10/19/2015	Y	1,2,3,7,8,9-HxCDF	1.15E-05	1.00E-01	1.15E-06	U	N	mg/kg	4.48E-04	2.57E-02	3.93E-05	6.05E-01
Central Parcel	Soil	RA3-B4	Composite	10/19/2015	Y	1,2,3,7,8-PeCDD	1.15E-05	1.00E+00	1.15E-05	U	N	mg/kg	5.47E-04	2.10E-02		
Central Parcel	Soil	RA3-B4	Composite	10/19/2015	Y	1,2,3,7,8-PeCDF	1.15E-05	1.00E-01	1.15E-06	U	N	mg/kg	1.27E-03	9.03E-03		
Central Parcel	Soil	RA3-B4	Composite	10/19/2015	Y	2,3,4,6,7,8-HxCDF	1.15E-05	1.00E-01	1.15E-06	U	N	mg/kg	2.28E-04	5.05E-02		
Central Parcel	Soil	RA3-B4	Composite	10/19/2015	Y	2,3,4,7,8-PeCDF	1.15E-05	1.00E+00	1.15E-05	U	N	mg/kg	9.90E-05	1.16E-01		
Central Parcel	Soil	RA3-B4	Composite	10/19/2015	Y	2,3,7,8-TCDD	2.30E-06	1.00E+00	2.30E-06	U	N	mg/kg	1.36E-04	1.70E-02		
Central Parcel	Soil	RA3-B4	Composite	10/19/2015	Y	2,3,7,8-TCDF	2.30E-06	1.00E+00	2.30E-06	U	N	mg/kg	1.29E-04	1.79E-02		
Central Parcel	Soil	RA3-B4	Composite	10/19/2015	Y	OCDD	1.60E-04	1.00E-04	1.60E-08		Y	mg/kg	6.43E-01	2.49E-04		
Central Parcel	Soil	RA3-B4	Composite	10/19/2015	Y	OCDF	2.33E-05	1.00E-04	2.33E-09		Y	mg/kg	1.64E-01	1.42E-04		
Central Parcel	Soil	RA3-B7	Composite	10/21/2015	Y	1,2,3,4,6,7,8-HpCDD	5.55E-04	1.00E-03	5.55E-07		Y	mg/kg	3.87E-02	1.43E-02		
Central Parcel	Soil	RA3-B7	Composite	10/21/2015	Y	1,2,3,4,6,7,8-HpCDF	1.25E-04	1.00E-02	1.25E-06		Y	mg/kg	3.79E-03	3.30E-02		
Central Parcel	Soil	RA3-B7	Composite	10/21/2015	Y	1,2,3,4,7,8,9-HpCDF	3.83E-06	1.00E-02	3.83E-08		Y	mg/kg	3.79E-03	1.01E-03		
Central Parcel	Soil	RA3-B7	Composite	10/21/2015	Y	1,2,3,4,7,8-HxCDD	1.13E-05	5.00E-02	5.65E-07		Y	mg/kg	1.05E-03	1.08E-02		
Central Parcel	Soil	RA3-B7	Composite	10/21/2015	Y	1,2,3,4,7,8-HxCDF	4.94E-06	1.00E-01	4.94E-07		Y	mg/kg	2.28E-04	2.17E-02		
Central Parcel	Soil	RA3-B7	Composite	10/21/2015	Y	1,2,3,6,7,8-HxCDD	2.19E-04	1.00E-02	2.19E-06		Y	mg/kg	2.28E-03	9.61E-02		
Central Parcel	Soil	RA3-B7	Composite	10/21/2015	Y	1,2,3,6,7,8-HxCDF	5.40E-06	1.00E-01	5.40E-07		Y	mg/kg	2.28E-04	2.37E-02		
Central Parcel	Soil	RA3-B7	Composite	10/21/2015	Y	1,2,3,7,8,9-HxCDD	1.38E-04	1.00E-01	1.38E-05		Y	mg/kg	2.28E-04	6.06E-01		
Central Parcel	Soil	RA3-B7	Composite	10/21/2015	Y	1,2,3,7,8,9-HxCDF	1.99E-06	1.00E-01	1.99E-07		Y	mg/kg	4.48E-04	4.45E-03	5.81E-05	9.98E-01

Sum Hazard Quotients for Dioxin/Furans for Birds

Avian Dioxin Tool for all Samples where [Upland0_3] = "Y" (and DU-5) Based on WC_All_data.xlsx data file sent by CO on 10/8/2018 6:30pm

Parcel	Media	Sample	CompSampIn	Date	Upland0_3	StdAnalyteDiox	StdResult	Bird TEF	Bird TEQ	Qualifier	DetectFlag	UnitsStd	BirdRBC	Bird HQ	Sum Bird TEQ	Sum Bird Hazard Quotient
Central Parcel	Soil	RA3-B7	Composite	10/21/2015	Y	1,2,3,7,8-PeCDD	2.76E-05	1.00E+00	2.76E-05		Y	mg/kg	5.47E-04	5.05E-02		
Central Parcel	Soil	RA3-B7	Composite	10/21/2015	Y	1,2,3,7,8-PeCDF	1.73E-06	1.00E-01	1.73E-07		Y	mg/kg	1.27E-03	1.36E-03		
Central Parcel	Soil	RA3-B7	Composite	10/21/2015	Y	2,3,4,6,7,8-HxCDF	9.96E-06	1.00E-01	9.96E-07		Y	mg/kg	2.28E-04	4.38E-02		
Central Parcel	Soil	RA3-B7	Composite	10/21/2015	Y	2,3,4,7,8-PeCDF	6.23E-06	1.00E+00	6.23E-06		Y	mg/kg	9.90E-05	6.30E-02		
Central Parcel	Soil	RA3-B7	Composite	10/21/2015	Y	2,3,7,8-TCDD	1.78E-06	1.00E+00	1.78E-06		Y	mg/kg	1.36E-04	1.31E-02		
Central Parcel	Soil	RA3-B7	Composite	10/21/2015	Y	2,3,7,8-TCDF	1.46E-06	1.00E+00	1.46E-06		Y	mg/kg	1.29E-04	1.14E-02		
Central Parcel	Soil	RA3-B7	Composite	10/21/2015	Y	OCDD	2.18E-03	1.00E-04	2.18E-07		Y	mg/kg	6.43E-01	3.39E-03		
Central Parcel	Soil	RA3-B7	Composite	10/21/2015	Y	OCDF	1.25E-04	1.00E-04	1.25E-08		Y	mg/kg	1.64E-01	7.64E-04		
Central Parcel	Soil	RA3-B8	Composite	10/27/2015	Y	1,2,3,4,6,7,8-HpCDD	1.90E-04	1.00E-03	1.90E-07		Y	mg/kg	3.87E-02	4.91E-03		
Central Parcel	Soil	RA3-B8	Composite	10/27/2015	Y	1,2,3,4,6,7,8-HpCDF	4.42E-05	1.00E-02	4.42E-07		Y	mg/kg	3.79E-03	1.17E-02		
Central Parcel	Soil	RA3-B8	Composite	10/27/2015	Y	1,2,3,4,7,8,9-HpCDF	3.07E-06	1.00E-02	3.07E-08		Y	mg/kg	3.79E-03	8.10E-04		
Central Parcel	Soil	RA3-B8	Composite	10/27/2015	Y	1,2,3,4,7,8-HxCDD	1.16E-06	5.00E-02	5.80E-08		Y	mg/kg	1.05E-03	1.11E-03		
Central Parcel	Soil	RA3-B8	Composite	10/27/2015	Y	1,2,3,4,7,8-HxCDF	2.06E-06	1.00E-01	2.06E-07		Y	mg/kg	2.28E-04	9.05E-03		
Central Parcel	Soil	RA3-B8	Composite	10/27/2015	Y	1,2,3,6,7,8-HxCDD	9.58E-06	1.00E-02	9.58E-08		Y	mg/kg	2.28E-03	4.21E-03		
Central Parcel	Soil	RA3-B8	Composite	10/27/2015	Y	1,2,3,6,7,8-HxCDF	2.00E-06	1.00E-01	2.00E-07		Y	mg/kg	2.28E-04	8.79E-03		
Central Parcel	Soil	RA3-B8	Composite	10/27/2015	Y	1,2,3,7,8,9-HxCDD	4.62E-06	1.00E-01	4.62E-07		Y	mg/kg	2.28E-04	2.03E-02		
Central Parcel	Soil	RA3-B8	Composite	10/27/2015	Y	1,2,3,7,8,9-HxCDF	7.69E-07	1.00E-01	7.69E-08		Y	mg/kg	4.48E-04	1.72E-03	7.74E-06	1.28E-01
Central Parcel	Soil	RA3-B8	Composite	10/27/2015	Y	1,2,3,7,8-PeCDD	1.23E-06	1.00E+00	1.23E-06		Y	mg/kg	5.47E-04	2.25E-03		
Central Parcel	Soil	RA3-B8	Composite	10/27/2015	Y	1,2,3,7,8-PeCDF	5.24E-07	1.00E-01	5.24E-08		Y	mg/kg	1.27E-03	4.12E-04		
Central Parcel	Soil	RA3-B8	Composite	10/27/2015	Y	2,3,4,6,7,8-HxCDF	4.71E-06	1.00E-01	4.71E-07		Y	mg/kg	2.28E-04	2.07E-02		
Central Parcel	Soil	RA3-B8	Composite	10/27/2015	Y	2,3,4,7,8-PeCDF	3.10E-06	1.00E+00	3.10E-06		Y	mg/kg	9.90E-05	3.13E-02		
Central Parcel	Soil	RA3-B8	Composite	10/27/2015	Y	2,3,7,8-TCDD	4.98E-07	1.00E+00	4.98E-07	U	N	mg/kg	1.36E-04	3.67E-03		
Central Parcel	Soil	RA3-B8	Composite	10/27/2015	Y	2,3,7,8-TCDF	4.44E-07	1.00E+00	4.44E-07		Y	mg/kg	1.29E-04	3.45E-03		
Central Parcel	Soil	RA3-B8	Composite	10/27/2015	Y	OCDD	1.63E-03	1.00E-04	1.63E-07		Y	mg/kg	6.43E-01	2.53E-03		
Central Parcel	Soil	RA3-B8	Composite	10/27/2015	Y	OCDF	2.16E-04	1.00E-04	2.16E-08		Y	mg/kg	1.64E-01	1.32E-03		
Central Parcel	Soil	RA3-B9	Composite	10/27/2015	Y	1,2,3,4,6,7,8-HpCDD	1.94E-05	1.00E-03	1.94E-08		Y	mg/kg	3.87E-02	5.01E-04		
Central Parcel	Soil	RA3-B9	Composite	10/27/2015	Y	1,2,3,4,6,7,8-HpCDF	4.41E-06	1.00E-02	4.41E-08		Y	mg/kg	3.79E-03	1.16E-03		
Central Parcel	Soil	RA3-B9	Composite	10/27/2015	Y	1,2,3,4,7,8,9-HpCDF	2.49E-06	1.00E-02	2.49E-08	U	N	mg/kg	3.79E-03	6.57E-04		
Central Parcel	Soil	RA3-B9	Composite	10/27/2015	Y	1,2,3,4,7,8-HxCDD	2.49E-06	5.00E-02	1.25E-07	U	N	mg/kg	1.05E-03	2.38E-03		
Central Parcel	Soil	RA3-B9	Composite	10/27/2015	Y	1,2,3,4,7,8-HxCDF	5.35E-07	1.00E-01	5.35E-08		Y	mg/kg	2.28E-04	2.35E-03		
Central Parcel	Soil	RA3-B9	Composite	10/27/2015	Y	1,2,3,6,7,8-HxCDD	3.76E-06	1.00E-02	3.76E-08		Y	mg/kg	2.28E-03	1.65E-03		
Central Parcel	Soil	RA3-B9	Composite	10/27/2015	Y	1,2,3,6,7,8-HxCDF	2.59E-07	1.00E-01	2.59E-08		Y	mg/kg	2.28E-04	1.14E-03		
Central Parcel	Soil	RA3-B9	Composite	10/27/2015	Y	1,2,3,7,8,9-HxCDD	2.66E-06	1.00E-01	2.66E-07		Y	mg/kg	2.28E-04	1.17E-02		
Central Parcel	Soil	RA3-B9	Composite	10/27/2015	Y	1,2,3,7,8,9-HxCDF	2.49E-06	1.00E-01	2.49E-07	U	N	mg/kg	4.48E-04	5.56E-03	3.73E-06	4.60E-02
Central Parcel	Soil	RA3-B9	Composite	10/27/2015	Y	1,2,3,7,8-PeCDD	1.04E-06	1.00E+00	1.04E-06		Y	mg/kg	5.47E-04	1.90E-03		
Central Parcel	Soil	RA3-B9	Composite	10/27/2015	Y	1,2,3,7,8-PeCDF	2.49E-06	1.00E-01	2.49E-07	U	N	mg/kg	1.27E-03	1.96E-03		
Central Parcel	Soil	RA3-B9	Composite	10/27/2015	Y	2,3,4,6,7,8-HxCDF	3.90E-07	1.00E-01	3.90E-08		Y	mg/kg	2.28E-04	1.71E-03		
Central Parcel	Soil	RA3-B9	Composite	10/27/2015	Y	2,3,4,7,8-PeCDF	5.50E-07	1.00E+00	5.50E-07		Y	mg/kg	9.90E-05	5.56E-03		
Central Parcel	Soil	RA3-B9	Composite	10/27/2015	Y	2,3,7,8-TCDD	4.99E-07	1.00E+00	4.99E-07	U	N	mg/kg	1.36E-04	3.68E-03		
Central Parcel	Soil	RA3-B9	Composite	10/27/2015	Y	2,3,7,8-TCDF	4.99E-07	1.00E+00	4.99E-07	U	N	mg/kg	1.29E-04	3.88E-03		
Central Parcel	Soil	RA3-B9	Composite	10/27/2015	Y	OCDD	1.05E-04	1.00E-04	1.05E-08		Y	mg/kg	6.43E-01	1.63E-04		
Central Parcel	Soil	RA3-B9	Composite	10/27/2015	Y	OCDF	1.01E-05	1.00E-04	1.01E-09		Y	mg/kg	1.64E-01	6.17E-05		
Central Parcel	Soil	RA3-D-S3	Composite	12/28/2015	Y	1,2,3,4,6,7,8-HpCDD	5.85E-05	1.00E-03	5.85E-08		Y	mg/kg	3.87E-02	1.51E-03		
Central Parcel	Soil	RA3-D-S3	Composite	12/28/2015	Y	1,2,3,4,6,7,8-HpCDF	1.97E-05	1.00E-02	1.97E-07		Y	mg/kg	3.79E-03	5.20E-03		
Central Parcel	Soil	RA3-D-S3	Composite	12/28/2015	Y	1,2,3,4,7,8,9-HpCDF	1.45E-06	1.00E-02	1.45E-08	J	Y	mg/kg	3.79E-03	3.83E-04		
Central Parcel	Soil	RA3-D-S3	Composite	12/28/2015	Y	1,2,3,4,7,8-HxCDD	1.78E-06	5.00E-02	8.90E-08	J	Y	mg/kg	1.05E-03	1.70E-03		
Central Parcel	Soil	RA3-D-S3	Composite	12/28/2015	Y	1,2,3,4,7,8-HxCDF	1.61E-06	1.00E-01	1.61E-07	J	Y	mg/kg	2.28E-04	7.07E-03		
Central Parcel	Soil	RA3-D-S3	Composite	12/28/2015	Y	1,2,3,6,7,8-HxCDD	1.66E-05	1.00E-02	1.66E-07		Y	mg/kg	2.28E-03	7.29E-03		
Central Parcel	Soil	RA3-D-S3	Composite	12/28/2015	Y	1,2,3,6,7,8-HxCDF	1.36E-06	1.00E-01	1.36E-07	J	Y	mg/kg	2.28E-04	5.97E-03		
Central Parcel	Soil	RA3-D-S3	Composite	12/28/2015	Y	1,2,3,7,8,9-HxCDD	1.12E-05	1.00E-01	1.12E-06		Y	mg/kg	2.28E-04	4.92E-02		
Central Parcel	Soil	RA3-D-S3	Composite	12/28/2015	Y	1,2,3,7,8,9-HxCDF	6.07E-07	1.00E-01	6.07E-08	J	Y	mg/kg	4.48E-04	1.36E-03	6.42E-06	1.16E-01
Central Parcel	Soil	RA3-D-S3	Composite	12/28/2015	Y	1,2,3,7,8-PeCDD	1.72E-06	1.00E+00	1.72E-06	U	N	mg/kg	5.47E-04	3.14E-03		
Central Parcel	Soil	RA3-D-S3	Composite	12/28/2015	Y	1,2,3,7,8-PeCDF	7.62E-07	1.00E-01	7.62E-08	U	N	mg/kg	1.27E-03	5.99E-04		
Central Parcel	Soil	RA3-D-S3	Composite	12/28/2015	Y	2,3,4,6,7,8-HxCDF	2.26E-06	1.00E-01	2.26E-07	J	Y	mg/kg	2.28E-04	9.93E-03		
Central Parcel	Soil	RA3-D-S3	Composite	12/28/2015	Y	2,3,4,7,8-PeCDF	1.50E-06	1.00E+00	1.50E-06	J	Y	mg/kg	9.90E-05	1.52E-02		
Central Parcel	Soil	RA3-D-S3	Composite	12/28/2015	Y	2,3,7,8-TCDD	2.08E-07	1.00E+00	2.08E-07	U	N	mg/kg	1.36E-04	1.53E-03		
Central Parcel	Soil	RA3-D-S3	Composite	12/28/2015	Y	2,3,7,8-TCDF	6.45E-07	1.00E+00	6.45E-07	U	N	mg/kg	1.29E-04	5.02E-03		
Central Parcel	Soil	RA3-D-S3	Composite	12/28/2015	Y	OCDD	4.25E-04	1.00E-04	4.25E-08		Y	mg/kg	6.43E-01	6.61E-04		
Central Parcel	Soil	RA3-D-S3	Composite	12/28/2015	Y	OCDF	3.38E-05	1.00E-04	3.38E-09		Y	mg/kg	1.64E-01	2.06E-04		
Central Parcel	Soil	RA3-D-S4	Composite	12/30/2015	Y	1,2,3,4,6,7,8-HpCDD	1.22E-04	1.00E-03	1.22E-07		Y	mg/kg	3.87E-02	3.15E-03		
Central Parcel	Soil	RA3-D-S4	Composite	12/30/2015	Y	1,2,3,4,6,7,8-HpCDF	2.94E-05	1.00E-02	2.94E-07		Y	mg/kg	3.79E-03	7.76E-03		
Central Parcel	Soil	RA3-D-S4	Composite	12/30/2015	Y	1,2,3,4,7,8,9-HpCDF	1.30E-06	1.00E-02	1.30E-08	J	Y	mg/kg	3.79E-03	3.43E-04		
Central Parcel	Soil	RA3-D-S4	Composite	12/30/2015	Y	1,2,3,4,7,8-HxCDD	3.91E-06	5.00E-02	1.96E-07		Y	mg/kg	1.05E-03	3.73E-03		

Sum Hazard Quotients for Dioxin/Furans for Birds

Avian Dioxin Tool for all Samples where [Upland0_3] = "Y" (and DU-5) Based on WC_All_data.xlsx data file sent by CO on 10/8/2018 6:30pm

Parcel	Media	Sample	CompSampIn	Date	Upland0_3	StdAnalyteDiox	StdResult	Bird TEF	Bird TEQ	Qualifier	DetectFlag	UnitsStd	BirdRBC	Bird HQ	Sum Bird TEQ	Sum Bird Hazard Quotient
Central Parcel	Soil	RA3-D-S4	Composite	12/30/2015	Y	1,2,3,4,7,8-HxCDF	2.13E-06	1.00E-01	2.13E-07	J	Y	mg/kg	2.28E-04	9.36E-03		
Central Parcel	Soil	RA3-D-S4	Composite	12/30/2015	Y	1,2,3,6,7,8-HxCDD	4.85E-05	1.00E-02	4.85E-07		Y	mg/kg	2.28E-03	2.13E-02		
Central Parcel	Soil	RA3-D-S4	Composite	12/30/2015	Y	1,2,3,6,7,8-HxCDF	1.34E-06	1.00E-01	1.34E-07	J	Y	mg/kg	2.28E-04	5.89E-03		
Central Parcel	Soil	RA3-D-S4	Composite	12/30/2015	Y	1,2,3,7,8,9-HxCDD	3.20E-05	1.00E-01	3.20E-06		Y	mg/kg	2.28E-04	1.40E-01		
Central Parcel	Soil	RA3-D-S4	Composite	12/30/2015	Y	1,2,3,7,8,9-HxCDF	5.87E-07	1.00E-01	5.87E-08	J	Y	mg/kg	4.48E-04	1.31E-03	1.28E-05	2.39E-01
Central Parcel	Soil	RA3-D-S4	Composite	12/30/2015	Y	1,2,3,7,8-PeCDD	4.85E-06	1.00E+00	4.85E-06		Y	mg/kg	5.47E-04	8.87E-03		
Central Parcel	Soil	RA3-D-S4	Composite	12/30/2015	Y	1,2,3,7,8-PeCDF	7.27E-07	1.00E-01	7.27E-08	U	N	mg/kg	1.27E-03	5.71E-04		
Central Parcel	Soil	RA3-D-S4	Composite	12/30/2015	Y	2,3,4,6,7,8-HxCDF	1.95E-06	1.00E-01	1.95E-07	J	Y	mg/kg	2.28E-04	8.57E-03		
Central Parcel	Soil	RA3-D-S4	Composite	12/30/2015	Y	2,3,4,7,8-PeCDF	1.81E-06	1.00E+00	1.81E-06	J	Y	mg/kg	9.90E-05	1.83E-02		
Central Parcel	Soil	RA3-D-S4	Composite	12/30/2015	Y	2,3,7,8-TCDD	3.75E-07	1.00E+00	3.75E-07	U	N	mg/kg	1.36E-04	2.77E-03		
Central Parcel	Soil	RA3-D-S4	Composite	12/30/2015	Y	2,3,7,8-TCDF	7.04E-07	1.00E+00	7.04E-07	U	N	mg/kg	1.29E-04	5.48E-03		
Central Parcel	Soil	RA3-D-S4	Composite	12/30/2015	Y	OCDD	7.57E-04	1.00E-04	7.57E-08		Y	mg/kg	6.43E-01	1.18E-03		
Central Parcel	Soil	RA3-D-S4	Composite	12/30/2015	Y	OCDF	4.71E-05	1.00E-04	4.71E-09		Y	mg/kg	1.64E-01	2.88E-04		
Central Parcel	Soil	RA3-S1	Composite	10/19/2015	Y	1,2,3,4,6,7,8-HpCDD	2.09E-04	1.00E-03	2.09E-07		Y	mg/kg	3.87E-02	5.40E-03		
Central Parcel	Soil	RA3-S1	Composite	10/19/2015	Y	1,2,3,4,6,7,8-HpCDF	3.90E-05	1.00E-02	3.90E-07		Y	mg/kg	3.79E-03	1.03E-02		
Central Parcel	Soil	RA3-S1	Composite	10/19/2015	Y	1,2,3,4,7,8,9-HpCDF	1.12E-05	1.00E-02	1.12E-07	U	N	mg/kg	3.79E-03	2.96E-03		
Central Parcel	Soil	RA3-S1	Composite	10/19/2015	Y	1,2,3,4,7,8-HxCDD	1.12E-05	5.00E-02	5.60E-07	U	N	mg/kg	1.05E-03	1.07E-02		
Central Parcel	Soil	RA3-S1	Composite	10/19/2015	Y	1,2,3,4,7,8-HxCDF	1.12E-05	1.00E-01	1.12E-06	U	N	mg/kg	2.28E-04	4.92E-02		
Central Parcel	Soil	RA3-S1	Composite	10/19/2015	Y	1,2,3,6,7,8-HxCDD	7.35E-05	1.00E-02	7.35E-07		Y	mg/kg	2.28E-03	3.23E-02		
Central Parcel	Soil	RA3-S1	Composite	10/19/2015	Y	1,2,3,6,7,8-HxCDF	1.12E-05	1.00E-01	1.12E-06	U	N	mg/kg	2.28E-04	4.92E-02		
Central Parcel	Soil	RA3-S1	Composite	10/19/2015	Y	1,2,3,7,8,9-HxCDD	3.41E-05	1.00E-01	3.41E-06		Y	mg/kg	2.28E-04	1.50E-01		
Central Parcel	Soil	RA3-S1	Composite	10/19/2015	Y	1,2,3,7,8,9-HxCDF	1.12E-05	1.00E-01	1.12E-06	U	N	mg/kg	4.48E-04	2.50E-02	2.82E-05	4.75E-01
Central Parcel	Soil	RA3-S1	Composite	10/19/2015	Y	1,2,3,7,8-PeCDD	7.23E-06	1.00E+00	7.23E-06	J	Y	mg/kg	5.47E-04	1.32E-02		
Central Parcel	Soil	RA3-S1	Composite	10/19/2015	Y	1,2,3,7,8-PeCDF	1.12E-05	1.00E-01	1.12E-06	U	N	mg/kg	1.27E-03	8.80E-03		
Central Parcel	Soil	RA3-S1	Composite	10/19/2015	Y	2,3,4,6,7,8-HxCDF	4.36E-06	1.00E-01	4.36E-07	J	Y	mg/kg	2.28E-04	1.92E-02		
Central Parcel	Soil	RA3-S1	Composite	10/19/2015	Y	2,3,4,7,8-PeCDF	7.03E-06	1.00E+00	7.03E-06	J	Y	mg/kg	9.90E-05	7.10E-02		
Central Parcel	Soil	RA3-S1	Composite	10/19/2015	Y	2,3,7,8-TCDD	2.23E-06	1.00E+00	2.23E-06	U	N	mg/kg	1.36E-04	1.64E-02		
Central Parcel	Soil	RA3-S1	Composite	10/19/2015	Y	2,3,7,8-TCDF	1.32E-06	1.00E+00	1.32E-06	J	Y	mg/kg	1.29E-04	1.03E-02		
Central Parcel	Soil	RA3-S1	Composite	10/19/2015	Y	OCDD	9.17E-04	1.00E-04	9.17E-08		Y	mg/kg	6.43E-01	1.43E-03		
Central Parcel	Soil	RA3-S1	Composite	10/19/2015	Y	OCDF	5.07E-05	1.00E-04	5.07E-09		Y	mg/kg	1.64E-01	3.10E-04		
Central Parcel	Soil	RA3-S10	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDD	3.86E-04	1.00E-03	3.86E-07		Y	mg/kg	3.87E-02	9.97E-03		
Central Parcel	Soil	RA3-S10	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDF	9.15E-05	1.00E-02	9.15E-07		Y	mg/kg	3.79E-03	2.41E-02		
Central Parcel	Soil	RA3-S10	Composite	10/28/2015	Y	1,2,3,4,7,8,9-HpCDF	2.80E-06	1.00E-02	2.80E-08		Y	mg/kg	3.79E-03	7.39E-04		
Central Parcel	Soil	RA3-S10	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDD	8.34E-06	5.00E-02	4.17E-07		Y	mg/kg	1.05E-03	7.96E-03		
Central Parcel	Soil	RA3-S10	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDF	4.73E-06	1.00E-01	4.73E-07		Y	mg/kg	2.28E-04	2.08E-02		
Central Parcel	Soil	RA3-S10	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDD	1.96E-04	1.00E-02	1.96E-06		Y	mg/kg	2.28E-03	8.60E-02		
Central Parcel	Soil	RA3-S10	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDF	5.03E-06	1.00E-01	5.03E-07		Y	mg/kg	2.28E-04	2.21E-02		
Central Parcel	Soil	RA3-S10	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDD	1.24E-04	1.00E-01	1.24E-05		Y	mg/kg	2.28E-04	5.44E-01		
Central Parcel	Soil	RA3-S10	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDF	1.85E-06	1.00E-01	1.85E-07		Y	mg/kg	4.48E-04	4.13E-03	4.96E-05	8.70E-01
Central Parcel	Soil	RA3-S10	Composite	10/28/2015	Y	1,2,3,7,8-PeCDD	2.42E-05	1.00E+00	2.42E-05		Y	mg/kg	5.47E-04	4.42E-02		
Central Parcel	Soil	RA3-S10	Composite	10/28/2015	Y	1,2,3,7,8-PeCDF	1.94E-06	1.00E-01	1.94E-07		Y	mg/kg	1.27E-03	1.52E-03		
Central Parcel	Soil	RA3-S10	Composite	10/28/2015	Y	2,3,4,6,7,8-HxCDF	8.92E-06	1.00E-01	8.92E-07		Y	mg/kg	2.28E-04	3.92E-02		
Central Parcel	Soil	RA3-S10	Composite	10/28/2015	Y	2,3,4,7,8-PeCDF	3.93E-06	1.00E+00	3.93E-06		Y	mg/kg	9.90E-05	3.97E-02		
Central Parcel	Soil	RA3-S10	Composite	10/28/2015	Y	2,3,7,8-TCDD	1.19E-06	1.00E+00	1.19E-06		Y	mg/kg	1.36E-04	8.77E-03		
Central Parcel	Soil	RA3-S10	Composite	10/28/2015	Y	2,3,7,8-TCDF	1.81E-06	1.00E+00	1.81E-06		Y	mg/kg	1.29E-04	1.41E-02		
Central Parcel	Soil	RA3-S10	Composite	10/28/2015	Y	OCDD	9.02E-04	1.00E-04	9.02E-08		Y	mg/kg	6.43E-01	1.40E-03		
Central Parcel	Soil	RA3-S10	Composite	10/28/2015	Y	OCDF	7.50E-05	1.00E-04	7.50E-09		Y	mg/kg	1.64E-01	4.58E-04		
Central Parcel	Soil	RA3-S11	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDD	1.09E-03	1.00E-03	1.09E-06		Y	mg/kg	3.87E-02	2.82E-02		
Central Parcel	Soil	RA3-S11	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDF	2.71E-04	1.00E-02	2.71E-06		Y	mg/kg	3.79E-03	7.15E-02		
Central Parcel	Soil	RA3-S11	Composite	10/28/2015	Y	1,2,3,4,7,8,9-HpCDF	7.34E-06	1.00E-02	7.34E-08		Y	mg/kg	3.79E-03	1.94E-03		
Central Parcel	Soil	RA3-S11	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDD	2.67E-05	5.00E-02	1.34E-06		Y	mg/kg	1.05E-03	2.55E-02		
Central Parcel	Soil	RA3-S11	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDF	1.11E-05	1.00E-01	1.11E-06		Y	mg/kg	2.28E-04	4.88E-02		
Central Parcel	Soil	RA3-S11	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDD	4.55E-04	1.00E-02	4.55E-06		Y	mg/kg	2.28E-03	2.00E-01		
Central Parcel	Soil	RA3-S11	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDF	1.19E-05	1.00E-01	1.19E-06		Y	mg/kg	2.28E-04	5.23E-02		
Central Parcel	Soil	RA3-S11	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDD	2.87E-04	1.00E-01	2.87E-05		Y	mg/kg	2.28E-04	1.26E+00		
Central Parcel	Soil	RA3-S11	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDF	4.22E-06	1.00E-01	4.22E-07		Y	mg/kg	4.48E-04	9.43E-03	1.25E-04	2.03E+00
Central Parcel	Soil	RA3-S11	Composite	10/28/2015	Y	1,2,3,7,8-PeCDD	6.72E-05	1.00E+00	6.72E-05		Y	mg/kg	5.47E-04	1.23E-01		
Central Parcel	Soil	RA3-S11	Composite	10/28/2015	Y	1,2,3,7,8-PeCDF	3.77E-06	1.00E-01	3.77E-07		Y	mg/kg	1.27E-03	2.96E-03		
Central Parcel	Soil	RA3-S11	Composite	10/28/2015	Y	2,3,4,6,7,8-HxCDF	1.80E-05	1.00E-01	1.80E-06		Y	mg/kg	2.28E-04	7.91E-02		
Central Parcel	Soil	RA3-S11	Composite	10/28/2015	Y	2,3,4,7,8-PeCDF	6.76E-06	1.00E+00	6.76E-06		Y	mg/kg	9.90E-05	6.83E-02		
Central Parcel	Soil	RA3-S11	Composite	10/28/2015	Y	2,3,7,8-TCDD	3.58E-06	1.00E+00	3.58E-06		Y	mg/kg	1.36E-04	2.64E-02		
Central Parcel	Soil	RA3-S11	Composite	10/28/2015	Y	2,3,7,8-TCDF	3.25E-06	1.00E+00	3.25E-06		Y	mg/kg	1.29E-04	2.53E-02		
Central Parcel	Soil	RA3-S11	Composite	10/28/2015	Y	OCDD	3.83E-03	1.00E-04	3.83E-07		Y	mg/kg	6.43E-01	5.95E-03		

Sum Hazard Quotients for Dioxin/Furans for Birds

Avian Dioxin Tool for all Samples where [Upland0_3] = "Y" (and DU-5) Based on WC_All_data.xlsx data file sent by CO on 10/8/2018 6:30pm

Parcel	Media	Sample	CompSampIn	Date	Upland0_3	StdAnalyteDiox	StdResult	Bird TEF	Bird TEQ	Qualifier	DetectFlag	UnitsStd	BirdRBC	Bird HQ	Sum Bird TEQ	Sum Bird Hazard Quotient
Central Parcel	Soil	RA3-S11	Composite	10/28/2015	Y	OCDF	2.48E-04	1.00E-04	2.48E-08		Y	mg/kg	1.64E-01	1.52E-03		
Central Parcel	Soil	RA3-S12	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDD	9.46E-05	1.00E-03	9.46E-08		Y	mg/kg	3.87E-02	2.44E-03		
Central Parcel	Soil	RA3-S12	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDF	1.97E-05	1.00E-02	1.97E-07		Y	mg/kg	3.79E-03	5.20E-03		
Central Parcel	Soil	RA3-S12	Composite	10/28/2015	Y	1,2,3,4,7,8,9-HpCDF	7.47E-07	1.00E-02	7.47E-09		Y	mg/kg	3.79E-03	1.97E-04		
Central Parcel	Soil	RA3-S12	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDD	1.76E-06	5.00E-02	8.80E-08		Y	mg/kg	1.05E-03	1.68E-03		
Central Parcel	Soil	RA3-S12	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDF	1.08E-06	1.00E-01	1.08E-07		Y	mg/kg	2.28E-04	4.74E-03		
Central Parcel	Soil	RA3-S12	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDD	2.75E-05	1.00E-02	2.75E-07		Y	mg/kg	2.28E-03	1.21E-02		
Central Parcel	Soil	RA3-S12	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDF	1.03E-06	1.00E-01	1.03E-07		Y	mg/kg	2.28E-04	4.53E-03		
Central Parcel	Soil	RA3-S12	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDD	1.72E-05	1.00E-01	1.72E-06		Y	mg/kg	2.28E-04	7.55E-02		
Central Parcel	Soil	RA3-S12	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDF	4.42E-07	1.00E-01	4.42E-08		Y	mg/kg	4.48E-04	9.88E-04	9.91E-06	1.52E-01
Central Parcel	Soil	RA3-S12	Composite	10/28/2015	Y	1,2,3,7,8-PeCDD	3.93E-06	1.00E+00	3.93E-06		Y	mg/kg	5.47E-04	7.18E-03		
Central Parcel	Soil	RA3-S12	Composite	10/28/2015	Y	1,2,3,7,8-PeCDF	4.61E-07	1.00E-01	4.61E-08		Y	mg/kg	1.27E-03	3.62E-04		
Central Parcel	Soil	RA3-S12	Composite	10/28/2015	Y	2,3,4,6,7,8-HxCDF	1.53E-06	1.00E-01	1.53E-07		Y	mg/kg	2.28E-04	6.72E-03		
Central Parcel	Soil	RA3-S12	Composite	10/28/2015	Y	2,3,4,7,8-PeCDF	2.28E-06	1.00E+00	2.28E-06		Y	mg/kg	9.90E-05	2.30E-02		
Central Parcel	Soil	RA3-S12	Composite	10/28/2015	Y	2,3,7,8-TCDD	5.00E-07	1.00E+00	5.00E-07	U	N	mg/kg	1.36E-04	3.69E-03		
Central Parcel	Soil	RA3-S12	Composite	10/28/2015	Y	2,3,7,8-TCDF	3.17E-07	1.00E+00	3.17E-07		Y	mg/kg	1.29E-04	2.47E-03		
Central Parcel	Soil	RA3-S12	Composite	10/28/2015	Y	OCDD	4.67E-04	1.00E-04	4.67E-08		Y	mg/kg	6.43E-01	7.26E-04		
Central Parcel	Soil	RA3-S12	Composite	10/28/2015	Y	OCDF	2.52E-05	1.00E-04	2.52E-09		Y	mg/kg	1.64E-01	1.54E-04		
Central Parcel	Soil	RA3-S13	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDD	1.09E-04	1.00E-03	1.09E-07		Y	mg/kg	3.87E-02	2.82E-03		
Central Parcel	Soil	RA3-S13	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDF	2.31E-05	1.00E-02	2.31E-07		Y	mg/kg	3.79E-03	6.10E-03		
Central Parcel	Soil	RA3-S13	Composite	10/28/2015	Y	1,2,3,4,7,8,9-HpCDF	9.06E-07	1.00E-02	9.06E-09		Y	mg/kg	3.79E-03	2.39E-04		
Central Parcel	Soil	RA3-S13	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDD	1.81E-06	5.00E-02	9.05E-08		Y	mg/kg	1.05E-03	1.73E-03		
Central Parcel	Soil	RA3-S13	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDF	9.25E-07	1.00E-01	9.25E-08		Y	mg/kg	2.28E-04	4.06E-03		
Central Parcel	Soil	RA3-S13	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDD	2.85E-05	1.00E-02	2.85E-07		Y	mg/kg	2.28E-03	1.25E-02		
Central Parcel	Soil	RA3-S13	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDF	8.20E-07	1.00E-01	8.20E-08		Y	mg/kg	2.28E-04	3.60E-03		
Central Parcel	Soil	RA3-S13	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDD	1.90E-05	1.00E-01	1.90E-06		Y	mg/kg	2.28E-04	8.34E-02		
Central Parcel	Soil	RA3-S13	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDF	4.06E-07	1.00E-01	4.06E-08		Y	mg/kg	4.48E-04	9.07E-04	8.25E-06	1.41E-01
Central Parcel	Soil	RA3-S13	Composite	10/28/2015	Y	1,2,3,7,8-PeCDD	4.00E-06	1.00E+00	4.00E-06		Y	mg/kg	5.47E-04	7.31E-03		
Central Parcel	Soil	RA3-S13	Composite	10/28/2015	Y	1,2,3,7,8-PeCDF	2.86E-07	1.00E-01	2.86E-08		Y	mg/kg	1.27E-03	2.25E-04		
Central Parcel	Soil	RA3-S13	Composite	10/28/2015	Y	2,3,4,6,7,8-HxCDF	1.44E-06	1.00E-01	1.44E-07		Y	mg/kg	2.28E-04	6.33E-03		
Central Parcel	Soil	RA3-S13	Composite	10/28/2015	Y	2,3,4,7,8-PeCDF	5.53E-07	1.00E+00	5.53E-07		Y	mg/kg	9.90E-05	5.59E-03		
Central Parcel	Soil	RA3-S13	Composite	10/28/2015	Y	2,3,7,8-TCDD	3.40E-07	1.00E+00	3.40E-07		Y	mg/kg	1.36E-04	2.51E-03		
Central Parcel	Soil	RA3-S13	Composite	10/28/2015	Y	2,3,7,8-TCDF	2.89E-07	1.00E+00	2.89E-07		Y	mg/kg	1.29E-04	2.25E-03		
Central Parcel	Soil	RA3-S13	Composite	10/28/2015	Y	OCDD	5.14E-04	1.00E-04	5.14E-08		Y	mg/kg	6.43E-01	7.99E-04		
Central Parcel	Soil	RA3-S13	Composite	10/28/2015	Y	OCDF	4.55E-05	1.00E-04	4.55E-09		Y	mg/kg	1.64E-01	2.78E-04		
Central Parcel	Soil	RA3-S14	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDD	2.76E-03	1.00E-03	2.76E-06		Y	mg/kg	3.87E-02	7.13E-02		
Central Parcel	Soil	RA3-S14	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDF	9.35E-04	1.00E-02	9.35E-06		Y	mg/kg	3.79E-03	2.47E-01		
Central Parcel	Soil	RA3-S14	Composite	10/28/2015	Y	1,2,3,4,7,8,9-HpCDF	4.11E-05	1.00E-02	4.11E-07		Y	mg/kg	3.79E-03	1.08E-02		
Central Parcel	Soil	RA3-S14	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDD	5.94E-05	5.00E-02	2.97E-06		Y	mg/kg	1.05E-03	5.67E-02		
Central Parcel	Soil	RA3-S14	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDF	1.76E-05	1.00E-01	1.76E-06		Y	mg/kg	2.28E-04	7.73E-02		
Central Parcel	Soil	RA3-S14	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDD	1.80E-04	1.00E-02	1.80E-06		Y	mg/kg	2.28E-03	7.90E-02		
Central Parcel	Soil	RA3-S14	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDF	1.69E-05	1.00E-01	1.69E-06		Y	mg/kg	2.28E-04	7.42E-02		
Central Parcel	Soil	RA3-S14	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDD	1.21E-04	1.00E-01	1.21E-05		Y	mg/kg	2.28E-04	5.31E-01		
Central Parcel	Soil	RA3-S14	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDF	3.32E-06	1.00E-01	3.32E-07		Y	mg/kg	4.48E-04	7.42E-03	7.58E-05	1.41E+00
Central Parcel	Soil	RA3-S14	Composite	10/28/2015	Y	1,2,3,7,8-PeCDD	3.38E-05	1.00E+00	3.38E-05		Y	mg/kg	5.47E-04	6.18E-02		
Central Parcel	Soil	RA3-S14	Composite	10/28/2015	Y	1,2,3,7,8-PeCDF	1.78E-06	1.00E-01	1.78E-07		Y	mg/kg	1.27E-03	1.40E-03		
Central Parcel	Soil	RA3-S14	Composite	10/28/2015	Y	2,3,4,6,7,8-HxCDF	2.34E-05	1.00E-01	2.34E-06		Y	mg/kg	2.28E-04	1.03E-01		
Central Parcel	Soil	RA3-S14	Composite	10/28/2015	Y	2,3,4,7,8-PeCDF	1.66E-06	1.00E+00	1.66E-06		Y	mg/kg	9.90E-05	1.68E-02		
Central Parcel	Soil	RA3-S14	Composite	10/28/2015	Y	2,3,7,8-TCDD	2.05E-06	1.00E+00	2.05E-06		Y	mg/kg	1.36E-04	1.51E-02		
Central Parcel	Soil	RA3-S14	Composite	10/28/2015	Y	2,3,7,8-TCDF	6.32E-07	1.00E+00	6.32E-07		Y	mg/kg	1.29E-04	4.92E-03		
Central Parcel	Soil	RA3-S14	Composite	10/28/2015	Y	OCDD	1.55E-02	1.00E-04	1.55E-06		Y	mg/kg	6.43E-01	2.41E-02		
Central Parcel	Soil	RA3-S14	Composite	10/28/2015	Y	OCDF	4.31E-03	1.00E-04	4.31E-07		Y	mg/kg	1.64E-01	2.63E-02		
Central Parcel	Soil	RA3-S15	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDD	3.04E-04	1.00E-03	3.04E-07		Y	mg/kg	3.87E-02	7.85E-03		
Central Parcel	Soil	RA3-S15	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDF	7.37E-05	1.00E-02	7.37E-07		Y	mg/kg	3.79E-03	1.94E-02		
Central Parcel	Soil	RA3-S15	Composite	10/28/2015	Y	1,2,3,4,7,8,9-HpCDF	4.62E-06	1.00E-02	4.62E-08		Y	mg/kg	3.79E-03	1.22E-03		
Central Parcel	Soil	RA3-S15	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDD	4.04E-06	5.00E-02	2.02E-07		Y	mg/kg	1.05E-03	3.86E-03		
Central Parcel	Soil	RA3-S15	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDF	1.16E-05	1.00E-01	1.16E-06		Y	mg/kg	2.28E-04	5.10E-02		
Central Parcel	Soil	RA3-S15	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDD	5.18E-05	1.00E-02	5.18E-07		Y	mg/kg	2.28E-03	2.27E-02		
Central Parcel	Soil	RA3-S15	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDF	7.66E-06	1.00E-01	7.66E-07		Y	mg/kg	2.28E-04	3.37E-02		
Central Parcel	Soil	RA3-S15	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDD	1.76E-05	1.00E-01	1.76E-06		Y	mg/kg	2.28E-04	7.73E-02		
Central Parcel	Soil	RA3-S15	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDF	3.08E-06	1.00E-01	3.08E-07		Y	mg/kg	4.48E-04	6.88E-03	2.52E-05	4.19E-01
Central Parcel	Soil	RA3-S15	Composite	10/28/2015	Y	1,2,3,7,8-PeCDD	5.87E-06	1.00E+00	5.87E-06		Y	mg/kg	5.47E-04	1.07E-02		
Central Parcel	Soil	RA3-S15	Composite	10/28/2015	Y	1,2,3,7,8-PeCDF	2.10E-06	1.00E-01	2.10E-07		Y	mg/kg	1.27E-03	1.65E-03		

Sum Hazard Quotients for Dioxin/Furans for Birds

Avian Dioxin Tool for all Samples where [Upland0_3] = "Y" (and DU-5) Based on WC_All_data.xlsx data file sent by CO on 10/8/2018 6:30pm

Parcel	Media	Sample	CompSampIn	Date	Upland0_3	StdAnalyteDiox	StdResult	Bird TEF	Bird TEQ	Qualifier	DetectFlag	UnitsStd	BirdRBC	Bird HQ	Sum Bird TEQ	Sum Bird Hazard Quotient
Central Parcel	Soil	RA3-S15	Composite	10/28/2015	Y	2,3,4,6,7,8-HxCDF	1.53E-05	1.00E-01	1.53E-06		Y	mg/kg	2.28E-04	6.72E-02		
Central Parcel	Soil	RA3-S15	Composite	10/28/2015	Y	2,3,4,7,8-PeCDF	9.30E-06	1.00E+00	9.30E-06		Y	mg/kg	9.90E-05	9.40E-02		
Central Parcel	Soil	RA3-S15	Composite	10/28/2015	Y	2,3,7,8-TCDD	5.92E-07	1.00E+00	5.92E-07		Y	mg/kg	1.36E-04	4.37E-03		
Central Parcel	Soil	RA3-S15	Composite	10/28/2015	Y	2,3,7,8-TCDF	1.64E-06	1.00E+00	1.64E-06		Y	mg/kg	1.29E-04	1.28E-02		
Central Parcel	Soil	RA3-S15	Composite	10/28/2015	Y	OCDD	2.40E-03	1.00E-04	2.40E-07		Y	mg/kg	6.43E-01	3.73E-03		
Central Parcel	Soil	RA3-S15	Composite	10/28/2015	Y	OCDF	1.34E-04	1.00E-04	1.34E-08		Y	mg/kg	1.64E-01	8.19E-04		
Central Parcel	Soil	RA3-S16	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDD	5.02E-03	1.00E-03	5.02E-06		Y	mg/kg	3.87E-02	1.30E-01		
Central Parcel	Soil	RA3-S16	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDF	1.52E-03	1.00E-02	1.52E-05		Y	mg/kg	3.79E-03	4.01E-01		
Central Parcel	Soil	RA3-S16	Composite	10/28/2015	Y	1,2,3,4,7,8,9-HpCDF	1.54E-05	1.00E-02	1.54E-07		Y	mg/kg	3.79E-03	4.06E-03		
Central Parcel	Soil	RA3-S16	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDD	1.06E-04	5.00E-02	5.30E-06		Y	mg/kg	1.05E-03	1.01E-01		
Central Parcel	Soil	RA3-S16	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDF	2.16E-05	1.00E-01	2.16E-06		Y	mg/kg	2.28E-04	9.49E-02		
Central Parcel	Soil	RA3-S16	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDD	2.74E-03	1.00E-02	2.74E-05		Y	mg/kg	2.28E-03	1.20E+00		
Central Parcel	Soil	RA3-S16	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDF	2.49E-05	1.00E-01	2.49E-06		Y	mg/kg	2.28E-04	1.09E-01		
Central Parcel	Soil	RA3-S16	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDD	1.89E-03	1.00E-01	1.89E-04		Y	mg/kg	2.28E-04	8.30E+00		
Central Parcel	Soil	RA3-S16	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDF	7.44E-06	1.00E-01	7.44E-07		Y	mg/kg	4.48E-04	1.66E-02	6.24E-04	1.14E+01
Central Parcel	Soil	RA3-S16	Composite	10/28/2015	Y	1,2,3,7,8-PeCDD	3.38E-04	1.00E+00	3.38E-04		Y	mg/kg	5.47E-04	6.18E-01		
Central Parcel	Soil	RA3-S16	Composite	10/28/2015	Y	1,2,3,7,8-PeCDF	4.50E-06	1.00E-01	4.50E-07		Y	mg/kg	1.27E-03	3.54E-03		
Central Parcel	Soil	RA3-S16	Composite	10/28/2015	Y	2,3,4,6,7,8-HxCDF	3.04E-05	1.00E-01	3.04E-06		Y	mg/kg	2.28E-04	1.34E-01		
Central Parcel	Soil	RA3-S16	Composite	10/28/2015	Y	2,3,4,7,8-PeCDF	1.87E-05	1.00E+00	1.87E-05		Y	mg/kg	9.90E-05	1.89E-01		
Central Parcel	Soil	RA3-S16	Composite	10/28/2015	Y	2,3,7,8-TCDD	1.40E-05	1.00E+00	1.40E-05		Y	mg/kg	1.36E-04	1.03E-01		
Central Parcel	Soil	RA3-S16	Composite	10/28/2015	Y	2,3,7,8-TCDF	2.34E-06	1.00E+00	2.34E-06		Y	mg/kg	1.29E-04	1.82E-02		
Central Parcel	Soil	RA3-S16	Composite	10/28/2015	Y	OCDD	2.27E-03	1.00E-04	2.27E-07		Y	mg/kg	6.43E-01	3.53E-03		
Central Parcel	Soil	RA3-S16	Composite	10/28/2015	Y	OCDF	6.22E-04	1.00E-04	6.22E-08		Y	mg/kg	1.64E-01	3.80E-03		
Central Parcel	Soil	RA3-S17	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDD	6.00E-03	1.00E-03	6.00E-06		Y	mg/kg	3.87E-02	1.55E-01		
Central Parcel	Soil	RA3-S17	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDF	1.97E-03	1.00E-02	1.97E-05		Y	mg/kg	3.79E-03	5.20E-01		
Central Parcel	Soil	RA3-S17	Composite	10/28/2015	Y	1,2,3,4,7,8,9-HpCDF	3.70E-07	1.00E-02	3.70E-09	U	N	mg/kg	3.79E-03	9.76E-05		
Central Parcel	Soil	RA3-S17	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDD	1.79E-04	5.00E-02	8.95E-06		Y	mg/kg	1.05E-03	1.71E-01		
Central Parcel	Soil	RA3-S17	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDF	3.79E-05	1.00E-01	3.79E-06		Y	mg/kg	2.28E-04	1.67E-01		
Central Parcel	Soil	RA3-S17	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDD	3.93E-03	1.00E-02	3.93E-05		Y	mg/kg	2.28E-03	1.73E+00		
Central Parcel	Soil	RA3-S17	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDF	4.45E-05	1.00E-01	4.45E-06		Y	mg/kg	2.28E-04	1.96E-01		
Central Parcel	Soil	RA3-S17	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDD	2.56E-03	1.00E-01	2.56E-04		Y	mg/kg	2.28E-04	1.12E+01		
Central Parcel	Soil	RA3-S17	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDF	1.30E-05	1.00E-01	1.30E-06		Y	mg/kg	4.48E-04	2.90E-02	1.01E-03	1.62E+01
Central Parcel	Soil	RA3-S17	Composite	10/28/2015	Y	1,2,3,7,8-PeCDD	5.91E-04	1.00E+00	5.91E-04		Y	mg/kg	5.47E-04	1.08E+00		
Central Parcel	Soil	RA3-S17	Composite	10/28/2015	Y	1,2,3,7,8-PeCDF	9.64E-06	1.00E-01	9.64E-07		Y	mg/kg	1.27E-03	7.57E-03		
Central Parcel	Soil	RA3-S17	Composite	10/28/2015	Y	2,3,4,6,7,8-HxCDF	6.04E-05	1.00E-01	6.04E-06		Y	mg/kg	2.28E-04	2.65E-01		
Central Parcel	Soil	RA3-S17	Composite	10/28/2015	Y	2,3,4,7,8-PeCDF	3.86E-05	1.00E+00	3.86E-05		Y	mg/kg	9.90E-05	3.90E-01		
Central Parcel	Soil	RA3-S17	Composite	10/28/2015	Y	2,3,7,8-TCDD	2.70E-05	1.00E+00	2.70E-05		Y	mg/kg	1.36E-04	1.99E-01		
Central Parcel	Soil	RA3-S17	Composite	10/28/2015	Y	2,3,7,8-TCDF	5.17E-06	1.00E+00	5.17E-06		Y	mg/kg	1.29E-04	4.02E-02		
Central Parcel	Soil	RA3-S17	Composite	10/28/2015	Y	OCDD	6.00E-03	1.00E-04	6.00E-07		Y	mg/kg	6.43E-01	9.33E-03		
Central Parcel	Soil	RA3-S17	Composite	10/28/2015	Y	OCDF	9.03E-04	1.00E-04	9.03E-08		Y	mg/kg	1.64E-01	5.52E-03		
Central Parcel	Soil	RA3-S18	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDD	1.48E-04	1.00E-03	1.48E-07		Y	mg/kg	3.87E-02	3.82E-03		
Central Parcel	Soil	RA3-S18	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDF	6.64E-05	1.00E-02	6.64E-07		Y	mg/kg	3.79E-03	1.75E-02		
Central Parcel	Soil	RA3-S18	Composite	10/28/2015	Y	1,2,3,4,7,8,9-HpCDF	2.06E-06	1.00E-02	2.06E-08		Y	mg/kg	3.79E-03	5.44E-04		
Central Parcel	Soil	RA3-S18	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDD	4.00E-06	5.00E-02	2.00E-07		Y	mg/kg	1.05E-03	3.82E-03		
Central Parcel	Soil	RA3-S18	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDF	4.96E-06	1.00E-01	4.96E-07		Y	mg/kg	2.28E-04	2.18E-02		
Central Parcel	Soil	RA3-S18	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDD	7.54E-05	1.00E-02	7.54E-07		Y	mg/kg	2.28E-03	3.31E-02		
Central Parcel	Soil	RA3-S18	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDF	4.92E-06	1.00E-01	4.92E-07		Y	mg/kg	2.28E-04	2.16E-02		
Central Parcel	Soil	RA3-S18	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDD	4.98E-05	1.00E-01	4.98E-06		Y	mg/kg	2.28E-04	2.19E-01		
Central Parcel	Soil	RA3-S18	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDF	1.99E-06	1.00E-01	1.99E-07		Y	mg/kg	4.48E-04	4.45E-03	2.76E-05	4.43E-01
Central Parcel	Soil	RA3-S18	Composite	10/28/2015	Y	1,2,3,7,8-PeCDD	1.29E-05	1.00E+00	1.29E-05		Y	mg/kg	5.47E-04	2.36E-02		
Central Parcel	Soil	RA3-S18	Composite	10/28/2015	Y	1,2,3,7,8-PeCDF	2.21E-06	1.00E-01	2.21E-07		Y	mg/kg	1.27E-03	1.74E-03		
Central Parcel	Soil	RA3-S18	Composite	10/28/2015	Y	2,3,4,6,7,8-HxCDF	9.64E-06	1.00E-01	9.64E-07		Y	mg/kg	2.28E-04	4.24E-02		
Central Parcel	Soil	RA3-S18	Composite	10/28/2015	Y	2,3,4,7,8-PeCDF	2.67E-06	1.00E+00	2.67E-06		Y	mg/kg	9.90E-05	2.70E-02		
Central Parcel	Soil	RA3-S18	Composite	10/28/2015	Y	2,3,7,8-TCDD	1.03E-06	1.00E+00	1.03E-06		Y	mg/kg	1.36E-04	7.59E-03		
Central Parcel	Soil	RA3-S18	Composite	10/28/2015	Y	2,3,7,8-TCDF	1.85E-06	1.00E+00	1.85E-06		Y	mg/kg	1.29E-04	1.44E-02		
Central Parcel	Soil	RA3-S18	Composite	10/28/2015	Y	OCDD	4.00E-04	1.00E-04	4.00E-08		Y	mg/kg	6.43E-01	6.22E-04		
Central Parcel	Soil	RA3-S18	Composite	10/28/2015	Y	OCDF	5.36E-05	1.00E-04	5.36E-09		Y	mg/kg	1.64E-01	3.27E-04		
Central Parcel	Soil	RA3-S19	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDD	2.71E-04	1.00E-03	2.71E-07		Y	mg/kg	3.87E-02	7.00E-03		
Central Parcel	Soil	RA3-S19	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDF	5.91E-05	1.00E-02	5.91E-07		Y	mg/kg	3.79E-03	1.56E-02		
Central Parcel	Soil	RA3-S19	Composite	10/28/2015	Y	1,2,3,4,7,8,9-HpCDF	1.35E-06	1.00E-02	1.35E-08		Y	mg/kg	3.79E-03	3.56E-04		
Central Parcel	Soil	RA3-S19	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDD	6.43E-06	5.00E-02	3.22E-07		Y	mg/kg	1.05E-03	6.14E-03		
Central Parcel	Soil	RA3-S19	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDF	2.23E-06	1.00E-01	2.23E-07		Y	mg/kg	2.28E-04	9.80E-03		
Central Parcel	Soil	RA3-S19	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDD	1.25E-04	1.00E-02	1.25E-06		Y	mg/kg	2.28E-03	5.49E-02		

Sum Hazard Quotients for Dioxin/Furans for Birds

Avian Dioxin Tool for all Samples where [Upland0_3] = "Y" (and DU-5) Based on WC_All_data.xlsx data file sent by CO on 10/8/2018 6:30pm

Parcel	Media	Sample	CompSampIn	Date	Upland0_3	StdAnalyteDiox	StdResult	Bird TEF	Bird TEQ	Qualifier	DetectFlag	UnitsStd	BirdRBC	Bird HQ	Sum Bird TEQ	Sum Bird Hazard Quotient
Central Parcel	Soil	RA3-S19	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDF	1.91E-06	1.00E-01	1.91E-07		Y	mg/kg	2.28E-04	8.39E-03		
Central Parcel	Soil	RA3-S19	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDD	9.63E-05	1.00E-01	9.63E-06		Y	mg/kg	2.28E-04	4.23E-01		
Central Parcel	Soil	RA3-S19	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDF	7.64E-07	1.00E-01	7.64E-08		Y	mg/kg	4.48E-04	1.71E-03	4.27E-05	6.26E-01
Central Parcel	Soil	RA3-S19	Composite	10/28/2015	Y	1,2,3,7,8-PeCDD	2.47E-05	1.00E+00	2.47E-05		Y	mg/kg	5.47E-04	4.52E-02		
Central Parcel	Soil	RA3-S19	Composite	10/28/2015	Y	1,2,3,7,8-PeCDF	9.89E-07	1.00E-01	9.89E-08		Y	mg/kg	1.27E-03	7.77E-04		
Central Parcel	Soil	RA3-S19	Composite	10/28/2015	Y	2,3,4,6,7,8-HxCDF	2.86E-06	1.00E-01	2.86E-07		Y	mg/kg	2.28E-04	1.26E-02		
Central Parcel	Soil	RA3-S19	Composite	10/28/2015	Y	2,3,4,7,8-PeCDF	9.65E-07	1.00E+00	9.65E-07		Y	mg/kg	9.90E-05	9.75E-03		
Central Parcel	Soil	RA3-S19	Composite	10/28/2015	Y	2,3,7,8-TCDD	2.99E-06	1.00E+00	2.99E-06		Y	mg/kg	1.36E-04	2.20E-02		
Central Parcel	Soil	RA3-S19	Composite	10/28/2015	Y	2,3,7,8-TCDF	1.01E-06	1.00E+00	1.01E-06		Y	mg/kg	1.29E-04	7.86E-03		
Central Parcel	Soil	RA3-S19	Composite	10/28/2015	Y	OCDD	6.05E-04	1.00E-04	6.05E-08		Y	mg/kg	6.43E-01	9.40E-04		
Central Parcel	Soil	RA3-S19	Composite	10/28/2015	Y	OCDF	3.16E-05	1.00E-04	3.16E-09		Y	mg/kg	1.64E-01	1.93E-04		
Central Parcel	Soil	RA3-S2	Composite	10/19/2015	Y	1,2,3,4,6,7,8-HpCDD	4.42E-04	1.00E-03	4.42E-07		Y	mg/kg	3.87E-02	1.14E-02		
Central Parcel	Soil	RA3-S2	Composite	10/19/2015	Y	1,2,3,4,6,7,8-HpCDF	1.07E-04	1.00E-02	1.07E-06		Y	mg/kg	3.79E-03	2.82E-02		
Central Parcel	Soil	RA3-S2	Composite	10/19/2015	Y	1,2,3,4,7,8,9-HpCDF	1.10E-05	1.00E-02	1.10E-07	U	N	mg/kg	3.79E-03	2.90E-03		
Central Parcel	Soil	RA3-S2	Composite	10/19/2015	Y	1,2,3,4,7,8-HxCDD	1.16E-05	5.00E-02	5.80E-07		Y	mg/kg	1.05E-03	1.11E-02		
Central Parcel	Soil	RA3-S2	Composite	10/19/2015	Y	1,2,3,4,7,8-HxCDF	6.62E-06	1.00E-01	6.62E-07	J	Y	mg/kg	2.28E-04	2.91E-02		
Central Parcel	Soil	RA3-S2	Composite	10/19/2015	Y	1,2,3,6,7,8-HxCDD	1.75E-04	1.00E-02	1.75E-06		Y	mg/kg	2.28E-03	7.68E-02		
Central Parcel	Soil	RA3-S2	Composite	10/19/2015	Y	1,2,3,6,7,8-HxCDF	6.79E-06	1.00E-01	6.79E-07	J	Y	mg/kg	2.28E-04	2.98E-02		
Central Parcel	Soil	RA3-S2	Composite	10/19/2015	Y	1,2,3,7,8,9-HxCDD	1.03E-04	1.00E-01	1.03E-05		Y	mg/kg	2.28E-04	4.52E-01		
Central Parcel	Soil	RA3-S2	Composite	10/19/2015	Y	1,2,3,7,8,9-HxCDF	1.10E-05	1.00E-01	1.10E-06	U	N	mg/kg	4.48E-04	2.46E-02	6.40E-05	1.09E+00
Central Parcel	Soil	RA3-S2	Composite	10/19/2015	Y	1,2,3,7,8-PeCDD	1.10E-05	1.00E+00	1.10E-05	U	N	mg/kg	5.47E-04	2.01E-02		
Central Parcel	Soil	RA3-S2	Composite	10/19/2015	Y	1,2,3,7,8-PeCDF	1.10E-05	1.00E-01	1.10E-06	U	N	mg/kg	1.27E-03	8.64E-03		
Central Parcel	Soil	RA3-S2	Composite	10/19/2015	Y	2,3,4,6,7,8-HxCDF	1.45E-05	1.00E-01	1.45E-06		Y	mg/kg	2.28E-04	6.37E-02		
Central Parcel	Soil	RA3-S2	Composite	10/19/2015	Y	2,3,4,7,8-PeCDF	2.92E-05	1.00E+00	2.92E-05		Y	mg/kg	9.90E-05	2.95E-01		
Central Parcel	Soil	RA3-S2	Composite	10/19/2015	Y	2,3,7,8-TCDD	2.19E-06	1.00E+00	2.19E-06	U	N	mg/kg	1.36E-04	1.61E-02		
Central Parcel	Soil	RA3-S2	Composite	10/19/2015	Y	2,3,7,8-TCDF	2.19E-06	1.00E+00	2.19E-06	U	N	mg/kg	1.29E-04	1.70E-02		
Central Parcel	Soil	RA3-S2	Composite	10/19/2015	Y	OCDD	1.36E-03	1.00E-04	1.36E-07		Y	mg/kg	6.43E-01	2.11E-03		
Central Parcel	Soil	RA3-S2	Composite	10/19/2015	Y	OCDF	5.40E-05	1.00E-04	5.40E-09		Y	mg/kg	1.64E-01	3.30E-04		
Central Parcel	Soil	RA3-S20	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDD	4.32E-03	1.00E-03	4.32E-06		Y	mg/kg	3.87E-02	1.12E-01		
Central Parcel	Soil	RA3-S20	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDF	1.02E-03	1.00E-02	1.02E-05		Y	mg/kg	3.79E-03	2.69E-01		
Central Parcel	Soil	RA3-S20	Composite	10/28/2015	Y	1,2,3,4,7,8,9-HpCDF	1.93E-05	1.00E-02	1.93E-07		Y	mg/kg	3.79E-03	5.09E-03		
Central Parcel	Soil	RA3-S20	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDD	1.14E-04	5.00E-02	5.70E-06		Y	mg/kg	1.05E-03	1.09E-01		
Central Parcel	Soil	RA3-S20	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDF	1.80E-05	1.00E-01	1.80E-06		Y	mg/kg	2.28E-04	7.91E-02		
Central Parcel	Soil	RA3-S20	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDD	2.19E-03	1.00E-02	2.19E-05		Y	mg/kg	2.28E-03	9.61E-01		
Central Parcel	Soil	RA3-S20	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDF	2.28E-05	1.00E-01	2.28E-06		Y	mg/kg	2.28E-04	1.00E-01		
Central Parcel	Soil	RA3-S20	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDD	1.32E-03	1.00E-01	1.32E-04		Y	mg/kg	2.28E-04	5.80E+00		
Central Parcel	Soil	RA3-S20	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDF	5.85E-06	1.00E-01	5.85E-07		Y	mg/kg	4.48E-04	1.31E-02	5.75E-04	8.48E+00
Central Parcel	Soil	RA3-S20	Composite	10/28/2015	Y	1,2,3,7,8-PeCDD	3.65E-04	1.00E+00	3.65E-04		Y	mg/kg	5.47E-04	6.67E-01		
Central Parcel	Soil	RA3-S20	Composite	10/28/2015	Y	1,2,3,7,8-PeCDF	3.54E-06	1.00E-01	3.54E-07		Y	mg/kg	1.27E-03	2.78E-03		
Central Parcel	Soil	RA3-S20	Composite	10/28/2015	Y	2,3,4,6,7,8-HxCDF	3.02E-05	1.00E-01	3.02E-06		Y	mg/kg	2.28E-04	1.33E-01		
Central Parcel	Soil	RA3-S20	Composite	10/28/2015	Y	2,3,4,7,8-PeCDF	3.56E-06	1.00E+00	3.56E-06		Y	mg/kg	9.90E-05	3.60E-02		
Central Parcel	Soil	RA3-S20	Composite	10/28/2015	Y	2,3,7,8-TCDD	2.07E-05	1.00E+00	2.07E-05		Y	mg/kg	1.36E-04	1.53E-01		
Central Parcel	Soil	RA3-S20	Composite	10/28/2015	Y	2,3,7,8-TCDF	1.22E-06	1.00E+00	1.22E-06		Y	mg/kg	1.29E-04	9.49E-03		
Central Parcel	Soil	RA3-S20	Composite	10/28/2015	Y	OCDD	2.29E-02	1.00E-04	2.29E-06		Y	mg/kg	6.43E-01	3.56E-02		
Central Parcel	Soil	RA3-S20	Composite	10/28/2015	Y	OCDF	6.53E-04	1.00E-04	6.53E-08		Y	mg/kg	1.64E-01	3.99E-03		
Central Parcel	Soil	RA3-S21	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDD	2.57E-04	1.00E-03	2.57E-07		Y	mg/kg	3.87E-02	6.64E-03		
Central Parcel	Soil	RA3-S21	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDF	1.51E-04	1.00E-02	1.51E-06		Y	mg/kg	3.79E-03	3.98E-02		
Central Parcel	Soil	RA3-S21	Composite	10/28/2015	Y	1,2,3,4,7,8,9-HpCDF	3.03E-06	1.00E-02	3.03E-08		Y	mg/kg	3.79E-03	8.00E-04		
Central Parcel	Soil	RA3-S21	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDD	5.58E-06	5.00E-02	2.79E-07		Y	mg/kg	1.05E-03	5.33E-03		
Central Parcel	Soil	RA3-S21	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDF	1.87E-06	1.00E-01	1.87E-07		Y	mg/kg	2.28E-04	8.22E-03		
Central Parcel	Soil	RA3-S21	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDD	1.11E-04	1.00E-02	1.11E-06		Y	mg/kg	2.28E-03	4.87E-02		
Central Parcel	Soil	RA3-S21	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDF	1.76E-06	1.00E-01	1.76E-07		Y	mg/kg	2.28E-04	7.73E-03		
Central Parcel	Soil	RA3-S21	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDD	6.83E-05	1.00E-01	6.83E-06		Y	mg/kg	2.28E-04	3.00E-01		
Central Parcel	Soil	RA3-S21	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDF	7.02E-07	1.00E-01	7.02E-08		Y	mg/kg	4.48E-04	1.57E-03	3.11E-05	4.85E-01
Central Parcel	Soil	RA3-S21	Composite	10/28/2015	Y	1,2,3,7,8-PeCDD	1.83E-05	1.00E+00	1.83E-05		Y	mg/kg	5.47E-04	3.35E-02		
Central Parcel	Soil	RA3-S21	Composite	10/28/2015	Y	1,2,3,7,8-PeCDF	4.09E-07	1.00E-01	4.09E-08		Y	mg/kg	1.27E-03	3.21E-04		
Central Parcel	Soil	RA3-S21	Composite	10/28/2015	Y	2,3,4,6,7,8-HxCDF	2.89E-06	1.00E-01	2.89E-07		Y	mg/kg	2.28E-04	1.27E-02		
Central Parcel	Soil	RA3-S21	Composite	10/28/2015	Y	2,3,4,7,8-PeCDF	6.22E-07	1.00E+00	6.22E-07		Y	mg/kg	9.90E-05	6.29E-03		
Central Parcel	Soil	RA3-S21	Composite	10/28/2015	Y	2,3,7,8-TCDD	9.30E-07	1.00E+00	9.30E-07		Y	mg/kg	1.36E-04	6.86E-03		
Central Parcel	Soil	RA3-S21	Composite	10/28/2015	Y	2,3,7,8-TCDF	3.07E-07	1.00E+00	3.07E-07		Y	mg/kg	1.29E-04	2.39E-03		
Central Parcel	Soil	RA3-S21	Composite	10/28/2015	Y	OCDD	1.37E-03	1.00E-04	1.37E-07		Y	mg/kg	6.43E-01	2.13E-03		
Central Parcel	Soil	RA3-S21	Composite	10/28/2015	Y	OCDF	4.00E-04	1.00E-04	4.00E-08		Y	mg/kg	1.64E-01	2.44E-03		
Central Parcel	Soil	RA3-S23	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDD	4.30E-04	1.00E-03	4.30E-07		Y	mg/kg	3.87E-02	1.11E-02		

Sum Hazard Quotients for Dioxin/Furans for Birds

Avian Dioxin Tool for all Samples where [Upland0_3] = "Y" (and DU-5) Based on WC_All_data.xlsx data file sent by CO on 10/8/2018 6:30pm

Parcel	Media	Sample	CompSampIn	Date	Upland0_3	StdAnalyteDiox	StdResult	Bird TEF	Bird TEQ	Qualifier	DetectFlag	UnitsStd	BirdRBC	Bird HQ	Sum Bird TEQ	Sum Bird Hazard Quotient
Central Parcel	Soil	RA3-S23	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDF	7.11E-05	1.00E-02	7.11E-07		Y	mg/kg	3.79E-03	1.88E-02		
Central Parcel	Soil	RA3-S23	Composite	10/28/2015	Y	1,2,3,4,7,8,9-HpCDF	3.37E-06	1.00E-02	3.37E-08		Y	mg/kg	3.79E-03	8.89E-04		
Central Parcel	Soil	RA3-S23	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDD	6.26E-06	5.00E-02	3.13E-07		Y	mg/kg	1.05E-03	5.97E-03		
Central Parcel	Soil	RA3-S23	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDF	3.17E-06	1.00E-01	3.17E-07		Y	mg/kg	2.28E-04	1.39E-02		
Central Parcel	Soil	RA3-S23	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDD	1.36E-04	1.00E-02	1.36E-06		Y	mg/kg	2.28E-03	5.97E-02		
Central Parcel	Soil	RA3-S23	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDF	2.99E-06	1.00E-01	2.99E-07		Y	mg/kg	2.28E-04	1.31E-02		
Central Parcel	Soil	RA3-S23	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDD	7.70E-05	1.00E-01	7.70E-06		Y	mg/kg	2.28E-04	3.38E-01		
Central Parcel	Soil	RA3-S23	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDF	1.24E-06	1.00E-01	1.24E-07		Y	mg/kg	4.48E-04	2.77E-03	3.34E-05	5.94E-01
Central Parcel	Soil	RA3-S23	Composite	10/28/2015	Y	1,2,3,7,8-PeCDD	1.33E-05	1.00E+00	1.33E-05		Y	mg/kg	5.47E-04	2.43E-02		
Central Parcel	Soil	RA3-S23	Composite	10/28/2015	Y	1,2,3,7,8-PeCDF	9.52E-07	1.00E-01	9.52E-08		Y	mg/kg	1.27E-03	7.48E-04		
Central Parcel	Soil	RA3-S23	Composite	10/28/2015	Y	2,3,4,6,7,8-HxCDF	5.31E-06	1.00E-01	5.31E-07		Y	mg/kg	2.28E-04	2.33E-02		
Central Parcel	Soil	RA3-S23	Composite	10/28/2015	Y	2,3,4,7,8-PeCDF	6.68E-06	1.00E+00	6.68E-06		Y	mg/kg	9.90E-05	6.75E-02		
Central Parcel	Soil	RA3-S23	Composite	10/28/2015	Y	2,3,7,8-TCDD	4.90E-07	1.00E+00	4.90E-07	U	N	mg/kg	1.36E-04	3.61E-03		
Central Parcel	Soil	RA3-S23	Composite	10/28/2015	Y	2,3,7,8-TCDF	7.67E-07	1.00E+00	7.67E-07		Y	mg/kg	1.29E-04	5.97E-03		
Central Parcel	Soil	RA3-S23	Composite	10/28/2015	Y	OCDD	1.87E-03	1.00E-04	1.87E-07		Y	mg/kg	6.43E-01	2.91E-03		
Central Parcel	Soil	RA3-S23	Composite	10/28/2015	Y	OCDF	1.67E-04	1.00E-04	1.67E-08		Y	mg/kg	1.64E-01	1.02E-03		
Central Parcel	Soil	RA3-S24	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDD	8.81E-04	1.00E-03	8.81E-07		Y	mg/kg	3.87E-02	2.28E-02		
Central Parcel	Soil	RA3-S24	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDF	2.12E-04	1.00E-02	2.12E-06		Y	mg/kg	3.79E-03	5.59E-02		
Central Parcel	Soil	RA3-S24	Composite	10/28/2015	Y	1,2,3,4,7,8,9-HpCDF	8.59E-06	1.00E-02	8.59E-08		Y	mg/kg	3.79E-03	2.27E-03		
Central Parcel	Soil	RA3-S24	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDD	1.81E-05	5.00E-02	9.05E-07		Y	mg/kg	1.05E-03	1.73E-02		
Central Parcel	Soil	RA3-S24	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDF	7.38E-06	1.00E-01	7.38E-07		Y	mg/kg	2.28E-04	3.24E-02		
Central Parcel	Soil	RA3-S24	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDD	2.92E-04	1.00E-02	2.92E-06		Y	mg/kg	2.28E-03	1.28E-01		
Central Parcel	Soil	RA3-S24	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDF	7.48E-06	1.00E-01	7.48E-07		Y	mg/kg	2.28E-04	3.29E-02		
Central Parcel	Soil	RA3-S24	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDD	1.84E-04	1.00E-01	1.84E-05		Y	mg/kg	2.28E-04	8.08E-01		
Central Parcel	Soil	RA3-S24	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDF	2.35E-06	1.00E-01	2.35E-07		Y	mg/kg	4.48E-04	5.25E-03	9.22E-05	1.35E+00
Central Parcel	Soil	RA3-S24	Composite	10/28/2015	Y	1,2,3,7,8-PeCDD	5.37E-05	1.00E+00	5.37E-05		Y	mg/kg	5.47E-04	9.82E-02		
Central Parcel	Soil	RA3-S24	Composite	10/28/2015	Y	1,2,3,7,8-PeCDF	1.97E-06	1.00E-01	1.97E-07		Y	mg/kg	1.27E-03	1.55E-03		
Central Parcel	Soil	RA3-S24	Composite	10/28/2015	Y	2,3,4,6,7,8-HxCDF	1.22E-05	1.00E-01	1.22E-06		Y	mg/kg	2.28E-04	5.36E-02		
Central Parcel	Soil	RA3-S24	Composite	10/28/2015	Y	2,3,4,7,8-PeCDF	4.40E-06	1.00E+00	4.40E-06		Y	mg/kg	9.90E-05	4.45E-02		
Central Parcel	Soil	RA3-S24	Composite	10/28/2015	Y	2,3,7,8-TCDD	3.42E-06	1.00E+00	3.42E-06		Y	mg/kg	1.36E-04	2.52E-02		
Central Parcel	Soil	RA3-S24	Composite	10/28/2015	Y	2,3,7,8-TCDF	1.73E-06	1.00E+00	1.73E-06		Y	mg/kg	1.29E-04	1.35E-02		
Central Parcel	Soil	RA3-S24	Composite	10/28/2015	Y	OCDD	4.31E-03	1.00E-04	4.31E-07		Y	mg/kg	6.43E-01	6.70E-03		
Central Parcel	Soil	RA3-S24	Composite	10/28/2015	Y	OCDF	4.67E-04	1.00E-04	4.67E-08		Y	mg/kg	1.64E-01	2.85E-03		
Central Parcel	Soil	RA3-S25	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDD	6.03E-04	1.00E-03	6.03E-07		Y	mg/kg	3.87E-02	1.56E-02		
Central Parcel	Soil	RA3-S25	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDF	1.93E-04	1.00E-02	1.93E-06		Y	mg/kg	3.79E-03	5.09E-02		
Central Parcel	Soil	RA3-S25	Composite	10/28/2015	Y	1,2,3,4,7,8,9-HpCDF	4.40E-06	1.00E-02	4.40E-08		Y	mg/kg	3.79E-03	1.16E-03		
Central Parcel	Soil	RA3-S25	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDD	1.71E-05	5.00E-02	8.55E-07		Y	mg/kg	1.05E-03	1.63E-02		
Central Parcel	Soil	RA3-S25	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDF	4.70E-06	1.00E-01	4.70E-07		Y	mg/kg	2.28E-04	2.06E-02		
Central Parcel	Soil	RA3-S25	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDD	4.46E-04	1.00E-02	4.46E-06		Y	mg/kg	2.28E-03	1.96E-01		
Central Parcel	Soil	RA3-S25	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDF	5.95E-06	1.00E-01	5.95E-07		Y	mg/kg	2.28E-04	2.61E-02		
Central Parcel	Soil	RA3-S25	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDD	2.02E-04	1.00E-01	2.02E-05		Y	mg/kg	2.28E-04	8.87E-01		
Central Parcel	Soil	RA3-S25	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDF	1.57E-06	1.00E-01	1.57E-07		Y	mg/kg	4.48E-04	3.51E-03	1.00E-04	1.43E+00
Central Parcel	Soil	RA3-S25	Composite	10/28/2015	Y	1,2,3,7,8-PeCDD	6.30E-05	1.00E+00	6.30E-05		Y	mg/kg	5.47E-04	1.15E-01		
Central Parcel	Soil	RA3-S25	Composite	10/28/2015	Y	1,2,3,7,8-PeCDF	9.86E-07	1.00E-01	9.86E-08		Y	mg/kg	1.27E-03	7.75E-04		
Central Parcel	Soil	RA3-S25	Composite	10/28/2015	Y	2,3,4,6,7,8-HxCDF	9.27E-06	1.00E-01	9.27E-07		Y	mg/kg	2.28E-04	4.07E-02		
Central Parcel	Soil	RA3-S25	Composite	10/28/2015	Y	2,3,4,7,8-PeCDF	2.88E-06	1.00E+00	2.88E-06		Y	mg/kg	9.90E-05	2.91E-02		
Central Parcel	Soil	RA3-S25	Composite	10/28/2015	Y	2,3,7,8-TCDD	2.98E-06	1.00E+00	2.98E-06		Y	mg/kg	1.36E-04	2.20E-02		
Central Parcel	Soil	RA3-S25	Composite	10/28/2015	Y	2,3,7,8-TCDF	6.42E-07	1.00E+00	6.42E-07		Y	mg/kg	1.29E-04	5.00E-03		
Central Parcel	Soil	RA3-S25	Composite	10/28/2015	Y	OCDD	1.89E-03	1.00E-04	1.89E-07		Y	mg/kg	6.43E-01	2.94E-03		
Central Parcel	Soil	RA3-S25	Composite	10/28/2015	Y	OCDF	1.96E-04	1.00E-04	1.96E-08		Y	mg/kg	1.64E-01	1.20E-03		
Central Parcel	Soil	RA3-S26	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDD	3.70E-04	1.00E-03	3.70E-07		Y	mg/kg	3.87E-02	9.56E-03		
Central Parcel	Soil	RA3-S26	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDF	7.46E-05	1.00E-02	7.46E-07		Y	mg/kg	3.79E-03	1.97E-02		
Central Parcel	Soil	RA3-S26	Composite	10/28/2015	Y	1,2,3,4,7,8,9-HpCDF	4.71E-06	1.00E-02	4.71E-08		Y	mg/kg	3.79E-03	1.24E-03		
Central Parcel	Soil	RA3-S26	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDD	4.82E-06	5.00E-02	2.41E-07		Y	mg/kg	1.05E-03	4.60E-03		
Central Parcel	Soil	RA3-S26	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDF	7.07E-06	1.00E-01	7.07E-07		Y	mg/kg	2.28E-04	3.11E-02		
Central Parcel	Soil	RA3-S26	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDD	4.74E-05	1.00E-02	4.74E-07		Y	mg/kg	2.28E-03	2.08E-02		
Central Parcel	Soil	RA3-S26	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDF	1.16E-05	1.00E-01	1.16E-06		Y	mg/kg	2.28E-04	5.10E-02		
Central Parcel	Soil	RA3-S26	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDD	3.18E-05	1.00E-01	3.18E-06		Y	mg/kg	2.28E-04	1.40E-01		
Central Parcel	Soil	RA3-S26	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDF	3.55E-06	1.00E-01	3.55E-07		Y	mg/kg	4.48E-04	7.93E-03	2.98E-05	5.39E-01
Central Parcel	Soil	RA3-S26	Composite	10/28/2015	Y	1,2,3,7,8-PeCDD	7.12E-06	1.00E+00	7.12E-06		Y	mg/kg	5.47E-04	1.30E-02		
Central Parcel	Soil	RA3-S26	Composite	10/28/2015	Y	1,2,3,7,8-PeCDF	2.46E-06	1.00E-01	2.46E-07		Y	mg/kg	1.27E-03	1.93E-03		
Central Parcel	Soil	RA3-S26	Composite	10/28/2015	Y	2,3,4,6,7,8-HxCDF	2.70E-05	1.00E-01	2.70E-06		Y	mg/kg	2.28E-04	1.19E-01		
Central Parcel	Soil	RA3-S26	Composite	10/28/2015	Y	2,3,4,7,8-PeCDF	9.03E-06	1.00E+00	9.03E-06		Y	mg/kg	9.90E-05	9.12E-02		

Sum Hazard Quotients for Dioxin/Furans for Birds

Avian Dioxin Tool for all Samples where [Upland0_3] = "Y" (and DU-5) Based on WC_All_data.xlsx data file sent by CO on 10/8/2018 6:30pm

Parcel	Media	Sample	CompSampIn	Date	Upland0_3	StdAnalyteDiox	StdResult	Bird TEF	Bird TEQ	Qualifier	DetectFlag	UnitsStd	BirdRBC	Bird HQ	Sum Bird TEQ	Sum Bird Hazard Quotient
Central Parcel	Soil	RA3-S26	Composite	10/28/2015	Y	2,3,7,8-TCDD	8.21E-07	1.00E+00	8.21E-07		Y	mg/kg	1.36E-04	6.05E-03		
Central Parcel	Soil	RA3-S26	Composite	10/28/2015	Y	2,3,7,8-TCDF	2.35E-06	1.00E+00	2.35E-06		Y	mg/kg	1.29E-04	1.83E-02		
Central Parcel	Soil	RA3-S26	Composite	10/28/2015	Y	OCDD	2.20E-03	1.00E-04	2.20E-07		Y	mg/kg	6.43E-01	3.42E-03		
Central Parcel	Soil	RA3-S26	Composite	10/28/2015	Y	OCDF	2.35E-04	1.00E-04	2.35E-08		Y	mg/kg	1.64E-01	1.44E-03		
Central Parcel	Soil	RA3-S27	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDD	1.85E-04	1.00E-03	1.85E-07		Y	mg/kg	3.87E-02	4.78E-03		
Central Parcel	Soil	RA3-S27	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDF	4.84E-05	1.00E-02	4.84E-07		Y	mg/kg	3.79E-03	1.28E-02		
Central Parcel	Soil	RA3-S27	Composite	10/28/2015	Y	1,2,3,4,7,8,9-HpCDF	3.64E-06	1.00E-02	3.64E-08		Y	mg/kg	3.79E-03	9.61E-04		
Central Parcel	Soil	RA3-S27	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDD	2.41E-06	5.00E-02	1.21E-07		Y	mg/kg	1.05E-03	2.30E-03		
Central Parcel	Soil	RA3-S27	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDF	8.42E-06	1.00E-01	8.42E-07		Y	mg/kg	2.28E-04	3.70E-02		
Central Parcel	Soil	RA3-S27	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDD	1.99E-05	1.00E-02	1.99E-07		Y	mg/kg	2.28E-03	8.74E-03		
Central Parcel	Soil	RA3-S27	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDF	7.37E-06	1.00E-01	7.37E-07		Y	mg/kg	2.28E-04	3.24E-02		
Central Parcel	Soil	RA3-S27	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDD	1.03E-05	1.00E-01	1.03E-06		Y	mg/kg	2.28E-04	4.52E-02		
Central Parcel	Soil	RA3-S27	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDF	2.59E-06	1.00E-01	2.59E-07		Y	mg/kg	4.48E-04	5.79E-03	1.58E-05	2.94E-01
Central Parcel	Soil	RA3-S27	Composite	10/28/2015	Y	1,2,3,7,8-PeCDD	3.22E-06	1.00E+00	3.22E-06		Y	mg/kg	5.47E-04	5.89E-03		
Central Parcel	Soil	RA3-S27	Composite	10/28/2015	Y	1,2,3,7,8-PeCDF	1.38E-06	1.00E-01	1.38E-07		Y	mg/kg	1.27E-03	1.08E-03		
Central Parcel	Soil	RA3-S27	Composite	10/28/2015	Y	2,3,4,6,7,8-HxCDF	1.62E-05	1.00E-01	1.62E-06		Y	mg/kg	2.28E-04	7.12E-02		
Central Parcel	Soil	RA3-S27	Composite	10/28/2015	Y	2,3,4,7,8-PeCDF	4.76E-06	1.00E+00	4.76E-06		Y	mg/kg	9.90E-05	4.81E-02		
Central Parcel	Soil	RA3-S27	Composite	10/28/2015	Y	2,3,7,8-TCDD	9.13E-07	1.00E+00	9.13E-07	U	N	mg/kg	1.36E-04	6.73E-03		
Central Parcel	Soil	RA3-S27	Composite	10/28/2015	Y	2,3,7,8-TCDF	1.11E-06	1.00E+00	1.11E-06		Y	mg/kg	1.29E-04	8.64E-03		
Central Parcel	Soil	RA3-S27	Composite	10/28/2015	Y	OCDD	1.31E-03	1.00E-04	1.31E-07		Y	mg/kg	6.43E-01	2.04E-03		
Central Parcel	Soil	RA3-S27	Composite	10/28/2015	Y	OCDF	7.70E-05	1.00E-04	7.70E-09		Y	mg/kg	1.64E-01	4.70E-04		
Central Parcel	Soil	RA3-S28	Composite	12/22/2015	Y	1,2,3,4,6,7,8-HpCDD	7.93E-06	1.00E-03	7.93E-09		Y	mg/kg	3.87E-02	2.05E-04		
Central Parcel	Soil	RA3-S28	Composite	12/22/2015	Y	1,2,3,4,6,7,8-HpCDF	2.70E-06	1.00E-02	2.70E-08		Y	mg/kg	3.79E-03	7.12E-04		
Central Parcel	Soil	RA3-S28	Composite	12/22/2015	Y	1,2,3,4,7,8,9-HpCDF	8.88E-08	1.00E-02	8.88E-10	U	N	mg/kg	3.79E-03	2.34E-05		
Central Parcel	Soil	RA3-S28	Composite	12/22/2015	Y	1,2,3,4,7,8-HxCDD	4.03E-07	5.00E-02	2.02E-08	U	N	mg/kg	1.05E-03	3.85E-04		
Central Parcel	Soil	RA3-S28	Composite	12/22/2015	Y	1,2,3,4,7,8-HxCDF	2.23E-07	1.00E-01	2.23E-08	U	N	mg/kg	2.28E-04	9.80E-04		
Central Parcel	Soil	RA3-S28	Composite	12/22/2015	Y	1,2,3,6,7,8-HxCDD	4.54E-06	1.00E-02	4.54E-08		Y	mg/kg	2.28E-03	1.99E-03		
Central Parcel	Soil	RA3-S28	Composite	12/22/2015	Y	1,2,3,6,7,8-HxCDF	7.20E-08	1.00E-01	7.20E-09	U	N	mg/kg	2.28E-04	3.16E-04		
Central Parcel	Soil	RA3-S28	Composite	12/22/2015	Y	1,2,3,7,8,9-HxCDD	2.80E-06	1.00E-01	2.80E-07		Y	mg/kg	2.28E-04	1.23E-02		
Central Parcel	Soil	RA3-S28	Composite	12/22/2015	Y	1,2,3,7,8,9-HxCDF	1.10E-07	1.00E-01	1.10E-08	U	N	mg/kg	4.48E-04	2.46E-04	2.04E-06	2.65E-02
Central Parcel	Soil	RA3-S28	Composite	12/22/2015	Y	1,2,3,7,8-PeCDD	8.76E-07	1.00E+00	8.76E-07	J	Y	mg/kg	5.47E-04	1.60E-03		
Central Parcel	Soil	RA3-S28	Composite	12/22/2015	Y	1,2,3,7,8-PeCDF	5.10E-07	1.00E-01	5.10E-08	U	N	mg/kg	1.27E-03	4.01E-04		
Central Parcel	Soil	RA3-S28	Composite	12/22/2015	Y	2,3,4,6,7,8-HxCDF	3.24E-07	1.00E-01	3.24E-08	J	Y	mg/kg	2.28E-04	1.42E-03		
Central Parcel	Soil	RA3-S28	Composite	12/22/2015	Y	2,3,4,7,8-PeCDF	3.26E-07	1.00E+00	3.26E-07	U	N	mg/kg	9.90E-05	3.29E-03		
Central Parcel	Soil	RA3-S28	Composite	12/22/2015	Y	2,3,7,8-TCDD	1.68E-07	1.00E+00	1.68E-07	U	N	mg/kg	1.36E-04	1.24E-03		
Central Parcel	Soil	RA3-S28	Composite	12/22/2015	Y	2,3,7,8-TCDF	1.67E-07	1.00E+00	1.67E-07	U	N	mg/kg	1.29E-04	1.30E-03		
Central Parcel	Soil	RA3-S28	Composite	12/22/2015	Y	OCDD	1.96E-05	1.00E-04	1.96E-09		Y	mg/kg	6.43E-01	3.05E-05		
Central Parcel	Soil	RA3-S28	Composite	12/22/2015	Y	OCDF	1.77E-06	1.00E-04	1.77E-10	J	Y	mg/kg	1.64E-01	1.08E-05		
Central Parcel	Soil	RA3-S29	Composite	12/22/2015	Y	1,2,3,4,6,7,8-HpCDD	8.92E-04	1.00E-03	8.92E-07		Y	mg/kg	3.87E-02	2.30E-02		
Central Parcel	Soil	RA3-S29	Composite	12/22/2015	Y	1,2,3,4,6,7,8-HpCDF	1.75E-04	1.00E-02	1.75E-06		Y	mg/kg	3.79E-03	4.62E-02		
Central Parcel	Soil	RA3-S29	Composite	12/22/2015	Y	1,2,3,4,7,8,9-HpCDF	1.27E-05	1.00E-02	1.27E-07		Y	mg/kg	3.79E-03	3.35E-03		
Central Parcel	Soil	RA3-S29	Composite	12/22/2015	Y	1,2,3,4,7,8-HxCDD	4.29E-06	5.00E-02	2.15E-07		Y	mg/kg	1.05E-03	4.09E-03		
Central Parcel	Soil	RA3-S29	Composite	12/22/2015	Y	1,2,3,4,7,8-HxCDF	7.83E-06	1.00E-01	7.83E-07		Y	mg/kg	2.28E-04	3.44E-02		
Central Parcel	Soil	RA3-S29	Composite	12/22/2015	Y	1,2,3,6,7,8-HxCDD	3.10E-05	1.00E-02	3.10E-07		Y	mg/kg	2.28E-03	1.36E-02		
Central Parcel	Soil	RA3-S29	Composite	12/22/2015	Y	1,2,3,6,7,8-HxCDF	5.30E-06	1.00E-01	5.30E-07		Y	mg/kg	2.28E-04	2.33E-02		
Central Parcel	Soil	RA3-S29	Composite	12/22/2015	Y	1,2,3,7,8,9-HxCDD	1.13E-05	1.00E-01	1.13E-06		Y	mg/kg	2.28E-04	4.96E-02		
Central Parcel	Soil	RA3-S29	Composite	12/22/2015	Y	1,2,3,7,8,9-HxCDF	3.03E-06	1.00E-01	3.03E-07		Y	mg/kg	4.48E-04	6.77E-03	2.96E-05	4.69E-01
Central Parcel	Soil	RA3-S29	Composite	12/22/2015	Y	1,2,3,7,8-PeCDD	2.05E-06	1.00E+00	2.05E-06	J	Y	mg/kg	5.47E-04	3.75E-03		
Central Parcel	Soil	RA3-S29	Composite	12/22/2015	Y	1,2,3,7,8-PeCDF	1.23E-06	1.00E-01	1.23E-07	U	N	mg/kg	1.27E-03	9.66E-04		
Central Parcel	Soil	RA3-S29	Composite	12/22/2015	Y	2,3,4,6,7,8-HxCDF	1.14E-05	1.00E-01	1.14E-06		Y	mg/kg	2.28E-04	5.01E-02		
Central Parcel	Soil	RA3-S29	Composite	12/22/2015	Y	2,3,4,7,8-PeCDF	1.70E-05	1.00E+00	1.70E-05		Y	mg/kg	9.90E-05	1.72E-01		
Central Parcel	Soil	RA3-S29	Composite	12/22/2015	Y	2,3,7,8-TCDD	5.10E-07	1.00E+00	5.10E-07	U	N	mg/kg	1.36E-04	3.76E-03		
Central Parcel	Soil	RA3-S29	Composite	12/22/2015	Y	2,3,7,8-TCDF	1.69E-06	1.00E+00	1.69E-06	U	N	mg/kg	1.29E-04	1.32E-02		
Central Parcel	Soil	RA3-S29	Composite	12/22/2015	Y	OCDD	9.12E-03	1.00E-04	9.12E-07	D	Y	mg/kg	6.43E-01	1.42E-02		
Central Parcel	Soil	RA3-S29	Composite	12/22/2015	Y	OCDF	1.20E-03	1.00E-04	1.20E-07		Y	mg/kg	1.64E-01	7.33E-03		
Central Parcel	Soil	RA3-S3	Composite	10/19/2015	Y	1,2,3,4,6,7,8-HpCDD	2.82E-03	1.00E-03	2.82E-06		Y	mg/kg	3.87E-02	7.29E-02		
Central Parcel	Soil	RA3-S3	Composite	10/19/2015	Y	1,2,3,4,6,7,8-HpCDF	9.65E-04	1.00E-02	9.65E-06		Y	mg/kg	3.79E-03	2.55E-01		
Central Parcel	Soil	RA3-S3	Composite	10/19/2015	Y	1,2,3,4,7,8,9-HpCDF	1.22E-05	1.00E-02	1.22E-07	U	N	mg/kg	3.79E-03	3.22E-03		
Central Parcel	Soil	RA3-S3	Composite	10/19/2015	Y	1,2,3,4,7,8-HxCDD	8.41E-05	5.00E-02	4.21E-06		Y	mg/kg	1.05E-03	8.03E-02		
Central Parcel	Soil	RA3-S3	Composite	10/19/2015	Y	1,2,3,4,7,8-HxCDF	1.75E-05	1.00E-01	1.75E-06		Y	mg/kg	2.28E-04	7.69E-02		
Central Parcel	Soil	RA3-S3	Composite	10/19/2015	Y	1,2,3,6,7,8-HxCDD	1.78E-03	1.00E-02	1.78E-05		Y	mg/kg	2.28E-03	7.81E-01		
Central Parcel	Soil	RA3-S3	Composite	10/19/2015	Y	1,2,3,6,7,8-HxCDF	1.98E-05	1.00E-01	1.98E-06		Y	mg/kg	2.28E-04	8.70E-02		
Central Parcel	Soil	RA3-S3	Composite	10/19/2015	Y	1,2,3,7,8,9-HxCDD	1.28E-03	1.00E-01	1.28E-04		Y	mg/kg	2.28E-04	5.62E+00		

Sum Hazard Quotients for Dioxin/Furans for Birds

Avian Dioxin Tool for all Samples where [Upland0_3] = "Y" (and DU-5) Based on WC_All_data.xlsx data file sent by CO on 10/8/2018 6:30pm

Parcel	Media	Sample	CompSampIn	Date	Upland0_3	StdAnalyteDiox	StdResult	Bird TEF	Bird TEQ	Qualifier	DetectFlag	UnitsStd	BirdRBC	Bird HQ	Sum Bird TEQ	Sum Bird Hazard Quotient
Central Parcel	Soil	RA3-S3	Composite	10/19/2015	Y	1,2,3,7,8,9-HxCDF	1.22E-05	1.00E-01	1.22E-06	U	N	mg/kg	4.48E-04	2.73E-02	4.41E-04	7.81E+00
Central Parcel	Soil	RA3-S3	Composite	10/19/2015	Y	1,2,3,7,8-PeCDD	2.42E-04	1.00E+00	2.42E-04		Y	mg/kg	5.47E-04	4.42E-01		
Central Parcel	Soil	RA3-S3	Composite	10/19/2015	Y	1,2,3,7,8-PeCDF	4.31E-06	1.00E-01	4.31E-07	J	Y	mg/kg	1.27E-03	3.39E-03		
Central Parcel	Soil	RA3-S3	Composite	10/19/2015	Y	2,3,4,6,7,8-HxCDF	2.37E-05	1.00E-01	2.37E-06		Y	mg/kg	2.28E-04	1.04E-01		
Central Parcel	Soil	RA3-S3	Composite	10/19/2015	Y	2,3,4,7,8-PeCDF	1.55E-05	1.00E+00	1.55E-05		Y	mg/kg	9.90E-05	1.57E-01		
Central Parcel	Soil	RA3-S3	Composite	10/19/2015	Y	2,3,7,8-TCDD	1.11E-05	1.00E+00	1.11E-05		Y	mg/kg	1.36E-04	8.18E-02		
Central Parcel	Soil	RA3-S3	Composite	10/19/2015	Y	2,3,7,8-TCDF	1.83E-06	1.00E+00	1.83E-06	J	Y	mg/kg	1.29E-04	1.42E-02		
Central Parcel	Soil	RA3-S3	Composite	10/19/2015	Y	OCDD	1.99E-03	1.00E-04	1.99E-07		Y	mg/kg	6.43E-01	3.09E-03		
Central Parcel	Soil	RA3-S3	Composite	10/19/2015	Y	OCDF	3.34E-04	1.00E-04	3.34E-08		Y	mg/kg	1.64E-01	2.04E-03		
Central Parcel	Soil	RA3-S5	Composite	10/19/2015	Y	1,2,3,4,6,7,8-HpCDD	1.91E-03	1.00E-03	1.91E-06		Y	mg/kg	3.87E-02	4.93E-02		
Central Parcel	Soil	RA3-S5	Composite	10/19/2015	Y	1,2,3,4,6,7,8-HpCDF	7.01E-04	1.00E-02	7.01E-06		Y	mg/kg	3.79E-03	1.85E-01		
Central Parcel	Soil	RA3-S5	Composite	10/19/2015	Y	1,2,3,4,7,8,9-HpCDF	1.21E-05	1.00E-02	1.21E-07	U	N	mg/kg	3.79E-03	3.19E-03		
Central Parcel	Soil	RA3-S5	Composite	10/19/2015	Y	1,2,3,4,7,8-HxCDD	5.89E-05	5.00E-02	2.95E-06		Y	mg/kg	1.05E-03	5.62E-02		
Central Parcel	Soil	RA3-S5	Composite	10/19/2015	Y	1,2,3,4,7,8-HxCDF	1.35E-05	1.00E-01	1.35E-06		Y	mg/kg	2.28E-04	5.93E-02		
Central Parcel	Soil	RA3-S5	Composite	10/19/2015	Y	1,2,3,6,7,8-HxCDD	1.24E-03	1.00E-02	1.24E-05		Y	mg/kg	2.28E-03	5.44E-01		
Central Parcel	Soil	RA3-S5	Composite	10/19/2015	Y	1,2,3,6,7,8-HxCDF	1.60E-05	1.00E-01	1.60E-06		Y	mg/kg	2.28E-04	7.03E-02		
Central Parcel	Soil	RA3-S5	Composite	10/19/2015	Y	1,2,3,7,8,9-HxCDD	8.21E-04	1.00E-01	8.21E-05		Y	mg/kg	2.28E-04	3.60E+00		
Central Parcel	Soil	RA3-S5	Composite	10/19/2015	Y	1,2,3,7,8,9-HxCDF	1.21E-05	1.00E-01	1.21E-06	U	N	mg/kg	4.48E-04	2.70E-02	3.33E-04	5.37E+00
Central Parcel	Soil	RA3-S5	Composite	10/19/2015	Y	1,2,3,7,8-PeCDD	1.83E-04	1.00E+00	1.83E-04		Y	mg/kg	5.47E-04	3.35E-01		
Central Parcel	Soil	RA3-S5	Composite	10/19/2015	Y	1,2,3,7,8-PeCDF	4.55E-06	1.00E-01	4.55E-07	J	Y	mg/kg	1.27E-03	3.57E-03		
Central Parcel	Soil	RA3-S5	Composite	10/19/2015	Y	2,3,4,6,7,8-HxCDF	2.25E-05	1.00E-01	2.25E-06		Y	mg/kg	2.28E-04	9.89E-02		
Central Parcel	Soil	RA3-S5	Composite	10/19/2015	Y	2,3,4,7,8-PeCDF	2.45E-05	1.00E+00	2.45E-05		Y	mg/kg	9.90E-05	2.48E-01		
Central Parcel	Soil	RA3-S5	Composite	10/19/2015	Y	2,3,7,8-TCDD	9.10E-06	1.00E+00	9.10E-06		Y	mg/kg	1.36E-04	6.71E-02		
Central Parcel	Soil	RA3-S5	Composite	10/19/2015	Y	2,3,7,8-TCDF	2.42E-06	1.00E+00	2.42E-06	U	N	mg/kg	1.29E-04	1.88E-02		
Central Parcel	Soil	RA3-S5	Composite	10/19/2015	Y	OCDD	1.27E-03	1.00E-04	1.27E-07		Y	mg/kg	6.43E-01	1.97E-03		
Central Parcel	Soil	RA3-S5	Composite	10/19/2015	Y	OCDF	2.27E-04	1.00E-04	2.27E-08		Y	mg/kg	1.64E-01	1.39E-03		
Central Parcel	Soil	RA3-S6	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDD	1.94E-04	1.00E-03	1.94E-07		Y	mg/kg	3.87E-02	5.01E-03		
Central Parcel	Soil	RA3-S6	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDF	2.90E-05	1.00E-02	2.90E-07		Y	mg/kg	3.79E-03	7.65E-03		
Central Parcel	Soil	RA3-S6	Composite	10/28/2015	Y	1,2,3,4,7,8,9-HpCDF	1.44E-06	1.00E-02	1.44E-08		Y	mg/kg	3.79E-03	3.80E-04		
Central Parcel	Soil	RA3-S6	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDD	2.55E-06	5.00E-02	1.28E-07		Y	mg/kg	1.05E-03	2.43E-03		
Central Parcel	Soil	RA3-S6	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDF	2.64E-06	1.00E-01	2.64E-07		Y	mg/kg	2.28E-04	1.16E-02		
Central Parcel	Soil	RA3-S6	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDD	3.52E-05	1.00E-02	3.52E-07		Y	mg/kg	2.28E-03	1.55E-02		
Central Parcel	Soil	RA3-S6	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDF	1.85E-06	1.00E-01	1.85E-07		Y	mg/kg	2.28E-04	8.13E-03		
Central Parcel	Soil	RA3-S6	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDD	1.72E-05	1.00E-01	1.72E-06		Y	mg/kg	2.28E-04	7.55E-02		
Central Parcel	Soil	RA3-S6	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDF	9.65E-07	1.00E-01	9.65E-08		Y	mg/kg	4.48E-04	2.16E-03	1.50E-05	2.02E-01
Central Parcel	Soil	RA3-S6	Composite	10/28/2015	Y	1,2,3,7,8-PeCDD	5.44E-06	1.00E+00	5.44E-06		Y	mg/kg	5.47E-04	9.94E-03		
Central Parcel	Soil	RA3-S6	Composite	10/28/2015	Y	1,2,3,7,8-PeCDF	1.45E-06	1.00E-01	1.45E-07		Y	mg/kg	1.27E-03	1.14E-03		
Central Parcel	Soil	RA3-S6	Composite	10/28/2015	Y	2,3,4,6,7,8-HxCDF	3.05E-06	1.00E-01	3.05E-07		Y	mg/kg	2.28E-04	1.34E-02		
Central Parcel	Soil	RA3-S6	Composite	10/28/2015	Y	2,3,4,7,8-PeCDF	1.30E-06	1.00E+00	1.30E-06		Y	mg/kg	9.90E-05	1.31E-02		
Central Parcel	Soil	RA3-S6	Composite	10/28/2015	Y	2,3,7,8-TCDD	1.98E-06	1.00E+00	1.98E-06		Y	mg/kg	1.36E-04	1.46E-02		
Central Parcel	Soil	RA3-S6	Composite	10/28/2015	Y	2,3,7,8-TCDF	2.38E-06	1.00E+00	2.38E-06		Y	mg/kg	1.29E-04	1.85E-02		
Central Parcel	Soil	RA3-S6	Composite	10/28/2015	Y	OCDD	1.60E-03	1.00E-04	1.60E-07		Y	mg/kg	6.43E-01	2.49E-03		
Central Parcel	Soil	RA3-S6	Composite	10/28/2015	Y	OCDF	4.81E-05	1.00E-04	4.81E-09		Y	mg/kg	1.64E-01	2.94E-04		
Central Parcel	Soil	RA3-S7	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDD	1.39E-04	1.00E-03	1.39E-07		Y	mg/kg	3.87E-02	3.59E-03		
Central Parcel	Soil	RA3-S7	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDF	8.80E-05	1.00E-02	8.80E-07		Y	mg/kg	3.79E-03	2.32E-02		
Central Parcel	Soil	RA3-S7	Composite	10/28/2015	Y	1,2,3,4,7,8,9-HpCDF	1.49E-06	1.00E-02	1.49E-08		Y	mg/kg	3.79E-03	3.93E-04		
Central Parcel	Soil	RA3-S7	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDD	2.46E-06	5.00E-02	1.23E-07		Y	mg/kg	1.05E-03	2.35E-03		
Central Parcel	Soil	RA3-S7	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDF	2.79E-06	1.00E-01	2.79E-07		Y	mg/kg	2.28E-04	1.23E-02		
Central Parcel	Soil	RA3-S7	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDD	2.46E-05	1.00E-02	2.46E-07		Y	mg/kg	2.28E-03	1.08E-02		
Central Parcel	Soil	RA3-S7	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDF	2.32E-06	1.00E-01	2.32E-07		Y	mg/kg	2.28E-04	1.02E-02		
Central Parcel	Soil	RA3-S7	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDD	1.53E-05	1.00E-01	1.53E-06		Y	mg/kg	2.28E-04	6.72E-02		
Central Parcel	Soil	RA3-S7	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDF	1.20E-06	1.00E-01	1.20E-07		Y	mg/kg	4.48E-04	2.68E-03	1.36E-05	2.04E-01
Central Parcel	Soil	RA3-S7	Composite	10/28/2015	Y	1,2,3,7,8-PeCDD	4.56E-06	1.00E+00	4.56E-06		Y	mg/kg	5.47E-04	8.34E-03		
Central Parcel	Soil	RA3-S7	Composite	10/28/2015	Y	1,2,3,7,8-PeCDF	1.26E-06	1.00E-01	1.26E-07		Y	mg/kg	1.27E-03	9.90E-04		
Central Parcel	Soil	RA3-S7	Composite	10/28/2015	Y	2,3,4,6,7,8-HxCDF	4.28E-06	1.00E-01	4.28E-07		Y	mg/kg	2.28E-04	1.88E-02		
Central Parcel	Soil	RA3-S7	Composite	10/28/2015	Y	2,3,4,7,8-PeCDF	1.89E-06	1.00E+00	1.89E-06		Y	mg/kg	9.90E-05	1.91E-02		
Central Parcel	Soil	RA3-S7	Composite	10/28/2015	Y	2,3,7,8-TCDD	1.27E-06	1.00E+00	1.27E-06		Y	mg/kg	1.36E-04	9.36E-03		
Central Parcel	Soil	RA3-S7	Composite	10/28/2015	Y	2,3,7,8-TCDF	1.69E-06	1.00E+00	1.69E-06		Y	mg/kg	1.29E-04	1.32E-02		
Central Parcel	Soil	RA3-S7	Composite	10/28/2015	Y	OCDD	8.67E-04	1.00E-04	8.67E-08		Y	mg/kg	6.43E-01	1.35E-03		
Central Parcel	Soil	RA3-S7	Composite	10/28/2015	Y	OCDF	5.34E-05	1.00E-04	5.34E-09		Y	mg/kg	1.64E-01	3.26E-04		
Central Parcel	Soil	RA3-S8	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDD	2.57E-04	1.00E-03	2.57E-07		Y	mg/kg	3.87E-02	6.64E-03		
Central Parcel	Soil	RA3-S8	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDF	5.77E-05	1.00E-02	5.77E-07		Y	mg/kg	3.79E-03	1.52E-02		
Central Parcel	Soil	RA3-S8	Composite	10/28/2015	Y	1,2,3,4,7,8,9-HpCDF	1.13E-06	1.00E-02	1.13E-08		Y	mg/kg	3.79E-03	2.98E-04		

Sum Hazard Quotients for Dioxin/Furans for Birds

Avian Dioxin Tool for all Samples where [Upland0_3] = "Y" (and DU-5) Based on WC_All_data.xlsx data file sent by CO on 10/8/2018 6:30pm

Parcel	Media	Sample	CompSampIn	Date	Upland0_3	StdAnalyteDiox	StdResult	Bird TEF	Bird TEQ	Qualifier	DetectFlag	UnitsStd	BirdRBC	Bird HQ	Sum Bird TEQ	Sum Bird Hazard Quotient
Central Parcel	Soil	RA3-S8	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDD	7.17E-06	5.00E-02	3.59E-07		Y	mg/kg	1.05E-03	6.84E-03		
Central Parcel	Soil	RA3-S8	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDF	2.16E-06	1.00E-01	2.16E-07		Y	mg/kg	2.28E-04	9.49E-03		
Central Parcel	Soil	RA3-S8	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDD	1.25E-04	1.00E-02	1.25E-06		Y	mg/kg	2.28E-03	5.49E-02		
Central Parcel	Soil	RA3-S8	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDF	1.99E-06	1.00E-01	1.99E-07		Y	mg/kg	2.28E-04	8.74E-03		
Central Parcel	Soil	RA3-S8	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDD	9.38E-05	1.00E-01	9.38E-06		Y	mg/kg	2.28E-04	4.12E-01		
Central Parcel	Soil	RA3-S8	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDF	8.12E-07	1.00E-01	8.12E-08		Y	mg/kg	4.48E-04	1.81E-03	3.89E-05	6.08E-01
Central Parcel	Soil	RA3-S8	Composite	10/28/2015	Y	1,2,3,7,8-PeCDD	2.12E-05	1.00E+00	2.12E-05		Y	mg/kg	5.47E-04	3.88E-02		
Central Parcel	Soil	RA3-S8	Composite	10/28/2015	Y	1,2,3,7,8-PeCDF	8.88E-07	1.00E-01	8.88E-08		Y	mg/kg	1.27E-03	6.98E-04		
Central Parcel	Soil	RA3-S8	Composite	10/28/2015	Y	2,3,4,6,7,8-HxCDF	2.77E-06	1.00E-01	2.77E-07		Y	mg/kg	2.28E-04	1.22E-02		
Central Parcel	Soil	RA3-S8	Composite	10/28/2015	Y	2,3,4,7,8-PeCDF	9.26E-07	1.00E+00	9.26E-07		Y	mg/kg	9.90E-05	9.36E-03		
Central Parcel	Soil	RA3-S8	Composite	10/28/2015	Y	2,3,7,8-TCDD	2.97E-06	1.00E+00	2.97E-06		Y	mg/kg	1.36E-04	2.19E-02		
Central Parcel	Soil	RA3-S8	Composite	10/28/2015	Y	2,3,7,8-TCDF	1.08E-06	1.00E+00	1.08E-06		Y	mg/kg	1.29E-04	8.40E-03		
Central Parcel	Soil	RA3-S8	Composite	10/28/2015	Y	OCDD	5.79E-04	1.00E-04	5.79E-08		Y	mg/kg	6.43E-01	9.00E-04		
Central Parcel	Soil	RA3-S8	Composite	10/28/2015	Y	OCDF	3.31E-05	1.00E-04	3.31E-09		Y	mg/kg	1.64E-01	2.02E-04		
Central Parcel	Soil	RA3-S9	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDD	1.21E-02	1.00E-03	1.21E-05		Y	mg/kg	3.87E-02	3.13E-01		
Central Parcel	Soil	RA3-S9	Composite	10/28/2015	Y	1,2,3,4,6,7,8-HpCDF	3.35E-03	1.00E-02	3.35E-05		Y	mg/kg	3.79E-03	8.84E-01		
Central Parcel	Soil	RA3-S9	Composite	10/28/2015	Y	1,2,3,4,7,8,9-HpCDF	3.81E-05	1.00E-02	3.81E-07		Y	mg/kg	3.79E-03	1.01E-02		
Central Parcel	Soil	RA3-S9	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDD	2.82E-04	5.00E-02	1.41E-05		Y	mg/kg	1.05E-03	2.69E-01		
Central Parcel	Soil	RA3-S9	Composite	10/28/2015	Y	1,2,3,4,7,8-HxCDF	4.84E-05	1.00E-01	4.84E-06		Y	mg/kg	2.28E-04	2.13E-01		
Central Parcel	Soil	RA3-S9	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDD	7.92E-03	1.00E-02	7.92E-05		Y	mg/kg	2.28E-03	3.48E+00		
Central Parcel	Soil	RA3-S9	Composite	10/28/2015	Y	1,2,3,6,7,8-HxCDF	5.84E-05	1.00E-01	5.84E-06		Y	mg/kg	2.28E-04	2.57E-01		
Central Parcel	Soil	RA3-S9	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDD	5.75E-03	1.00E-01	5.75E-04		Y	mg/kg	2.28E-04	2.52E+01		
Central Parcel	Soil	RA3-S9	Composite	10/28/2015	Y	1,2,3,7,8,9-HxCDF	1.60E-05	1.00E-01	1.60E-06		Y	mg/kg	4.48E-04	3.57E-02	1.76E-03	3.32E+01
Central Parcel	Soil	RA3-S9	Composite	10/28/2015	Y	1,2,3,7,8-PeCDD	9.72E-04	1.00E+00	9.72E-04		Y	mg/kg	5.47E-04	1.78E+00		
Central Parcel	Soil	RA3-S9	Composite	10/28/2015	Y	1,2,3,7,8-PeCDF	8.91E-06	1.00E-01	8.91E-07		Y	mg/kg	1.27E-03	7.00E-03		
Central Parcel	Soil	RA3-S9	Composite	10/28/2015	Y	2,3,4,6,7,8-HxCDF	7.10E-05	1.00E-01	7.10E-06		Y	mg/kg	2.28E-04	3.12E-01		
Central Parcel	Soil	RA3-S9	Composite	10/28/2015	Y	2,3,4,7,8-PeCDF	4.48E-06	1.00E+00	4.48E-06		Y	mg/kg	9.90E-05	4.53E-02		
Central Parcel	Soil	RA3-S9	Composite	10/28/2015	Y	2,3,7,8-TCDD	4.01E-05	1.00E+00	4.01E-05		Y	mg/kg	1.36E-04	2.96E-01		
Central Parcel	Soil	RA3-S9	Composite	10/28/2015	Y	2,3,7,8-TCDF	4.20E-06	1.00E+00	4.20E-06		Y	mg/kg	1.29E-04	3.27E-02		
Central Parcel	Soil	RA3-S9	Composite	10/28/2015	Y	OCDD	5.18E-03	1.00E-04	5.18E-07		Y	mg/kg	6.43E-01	8.05E-03		
Central Parcel	Soil	RA3-S9	Composite	10/28/2015	Y	OCDF	1.24E-03	1.00E-04	1.24E-07		Y	mg/kg	1.64E-01	7.58E-03		
Central Parcel	Soil	WC-1 Surface	Discrete	10/1/2010	Y	1,2,3,4,6,7,8-HpCDD	2.00E-03	1.00E-03	2.00E-06		Y	mg/kg	3.87E-02	5.17E-02		
Central Parcel	Soil	WC-1 Surface	Discrete	10/1/2010	Y	1,2,3,4,6,7,8-HpCDF	4.30E-04	1.00E-02	4.30E-06		Y	mg/kg	3.79E-03	1.13E-01		
Central Parcel	Soil	WC-1 Surface	Discrete	10/1/2010	Y	1,2,3,4,7,8,9-HpCDF	5.20E-05	1.00E-02	5.20E-07		Y	mg/kg	3.79E-03	1.37E-02		
Central Parcel	Soil	WC-1 Surface	Discrete	10/1/2010	Y	1,2,3,4,7,8-HxCDD	4.20E-05	5.00E-02	2.10E-06	J	Y	mg/kg	1.05E-03	4.01E-02		
Central Parcel	Soil	WC-1 Surface	Discrete	10/1/2010	Y	1,2,3,4,7,8-HxCDF	2.20E-04	1.00E-01	2.20E-05		Y	mg/kg	2.28E-04	9.67E-01		
Central Parcel	Soil	WC-1 Surface	Discrete	10/1/2010	Y	1,2,3,6,7,8-HxCDD	1.50E-04	1.00E-02	1.50E-06		Y	mg/kg	2.28E-03	6.59E-02		
Central Parcel	Soil	WC-1 Surface	Discrete	10/1/2010	Y	1,2,3,6,7,8-HxCDF	4.60E-06	1.00E-01	4.60E-07	P U	N	mg/kg	2.28E-04	2.02E-02		
Central Parcel	Soil	WC-1 Surface	Discrete	10/1/2010	Y	1,2,3,7,8,9-HxCDD	9.00E-05	1.00E-01	9.00E-06		Y	mg/kg	2.28E-04	3.95E-01		
Central Parcel	Soil	WC-1 Surface	Discrete	10/1/2010	Y	1,2,3,7,8,9-HxCDF	1.20E-04	1.00E-01	1.20E-05		Y	mg/kg	4.48E-04	2.68E-01	1.63E-03	1.86E+01
Central Parcel	Soil	WC-1 Surface	Discrete	10/1/2010	Y	1,2,3,7,8-PeCDD	3.50E-05	1.00E+00	3.50E-05	J	Y	mg/kg	5.47E-04	6.40E-02		
Central Parcel	Soil	WC-1 Surface	Discrete	10/1/2010	Y	1,2,3,7,8-PeCDF	5.70E-06	1.00E-01	5.70E-07	P U	N	mg/kg	1.27E-03	4.48E-03		
Central Parcel	Soil	WC-1 Surface	Discrete	10/1/2010	Y	2,3,4,6,7,8-HxCDF	3.10E-04	1.00E-01	3.10E-05		Y	mg/kg	2.28E-04	1.36E+00		
Central Parcel	Soil	WC-1 Surface	Discrete	10/1/2010	Y	2,3,4,7,8-PeCDF	1.50E-03	1.00E+00	1.50E-03		Y	mg/kg	9.90E-05	1.52E+01		
Central Parcel	Soil	WC-1 Surface	Discrete	10/1/2010	Y	2,3,7,8-TCDD	1.90E-06	1.00E+00	1.90E-06	Ui	N	mg/kg	1.36E-04	1.40E-02		
Central Parcel	Soil	WC-1 Surface	Discrete	10/1/2010	Y	2,3,7,8-TCDF	5.30E-06	1.00E+00	5.30E-06	P U	N	mg/kg	1.29E-04	4.12E-02		
Central Parcel	Soil	WC-1 Surface	Discrete	10/1/2010	Y	OCDD	1.30E-02	1.00E-04	1.30E-06		Y	mg/kg	6.43E-01	2.02E-02		
Central Parcel	Soil	WC-1 Surface	Discrete	10/1/2010	Y	OCDF	6.30E-04	1.00E-04	6.30E-08		Y	mg/kg	1.64E-01	3.85E-03		
Central Parcel	Soil	WC-1/2/3	Composite	10/1/2010	Y	1,2,3,4,6,7,8-HpCDD	3.10E-03	1.00E-03	3.10E-06		Y	mg/kg	3.87E-02	8.01E-02		
Central Parcel	Soil	WC-1/2/3	Composite	10/1/2010	Y	1,2,3,4,6,7,8-HpCDF	2.50E-04	1.00E-02	2.50E-06		Y	mg/kg	3.79E-03	6.60E-02		
Central Parcel	Soil	WC-1/2/3	Composite	10/1/2010	Y	1,2,3,4,7,8,9-HpCDF	1.60E-05	1.00E-02	1.60E-07		Y	mg/kg	3.79E-03	4.22E-03		
Central Parcel	Soil	WC-1/2/3	Composite	10/1/2010	Y	1,2,3,4,7,8-HxCDD	1.50E-05	5.00E-02	7.50E-07		Y	mg/kg	1.05E-03	1.43E-02		
Central Parcel	Soil	WC-1/2/3	Composite	10/1/2010	Y	1,2,3,4,7,8-HxCDF	2.20E-05	1.00E-01	2.20E-06		Y	mg/kg	2.28E-04	9.67E-02		
Central Parcel	Soil	WC-1/2/3	Composite	10/1/2010	Y	1,2,3,6,7,8-HxCDD	1.50E-04	1.00E-02	1.50E-06		Y	mg/kg	2.28E-03	6.59E-02		
Central Parcel	Soil	WC-1/2/3	Composite	10/1/2010	Y	1,2,3,6,7,8-HxCDF	1.30E-05	1.00E-01	1.30E-06		Y	mg/kg	2.28E-04	5.71E-02		
Central Parcel	Soil	WC-1/2/3	Composite	10/1/2010	Y	1,2,3,7,8,9-HxCDD	2.90E-05	1.00E-01	2.90E-06		Y	mg/kg	2.28E-04	1.27E-01		
Central Parcel	Soil	WC-1/2/3	Composite	10/1/2010	Y	1,2,3,7,8,9-HxCDF	1.40E-05	1.00E-01	1.40E-06		Y	mg/kg	4.48E-04	3.13E-02	4.32E-05	7.95E-01
Central Parcel	Soil	WC-1/2/3	Composite	10/1/2010	Y	1,2,3,7,8-PeCDD	8.50E-06	1.00E+00	8.50E-06		Y	mg/kg	5.47E-04	1.55E-02		
Central Parcel	Soil	WC-1/2/3	Composite	10/1/2010	Y	1,2,3,7,8-PeCDF	5.80E-06	1.00E-01	5.80E-07		Y	mg/kg	1.27E-03	4.56E-03		
Central Parcel	Soil	WC-1/2/3	Composite	10/1/2010	Y	2,3,4,6,7,8-HxCDF	1.30E-05	1.00E-01	1.30E-06		Y	mg/kg	2.28E-04	5.71E-02		
Central Parcel	Soil	WC-1/2/3	Composite	10/1/2010	Y	2,3,4,7,8-PeCDF	8.30E-06	1.00E+00	8.30E-06		Y	mg/kg	9.90E-05	8.39E-02		
Central Parcel	Soil	WC-1/2/3	Composite	10/1/2010	Y	2,3,7,8-TCDD	1.00E-06	1.00E+00	1.00E-06	J	Y	mg/kg	1.36E-04	7.37E-03		
Central Parcel	Soil	WC-1/2/3	Composite	10/1/2010	Y	2,3,7,8-TCDF	5.00E-06	1.00E+00	5.00E-06		Y	mg/kg	1.29E-04	3.89E-02		

Sum Hazard Quotients for Dioxin/Furans for Birds

Avian Dioxin Tool for all Samples where [Upland0_3] = "Y" (and DU-5) Based on WC_All_data.xlsx data file sent by CO on 10/8/2018 6:30pm

Parcel	Media	Sample	CompSampIn	Date	Upland0_3	StdAnalyteDiox	StdResult	Bird TEF	Bird TEQ	Qualifier	DetectFlag	UnitsStd	BirdRBC	Bird HQ	Sum Bird TEQ	Sum Bird Hazard Quotient
Central Parcel	Soil	WC-1/2/3	Composite	10/1/2010	Y	OCDD	2.70E-02	1.00E-04	2.70E-06		Y	mg/kg	6.43E-01	4.20E-02		
Central Parcel	Soil	WC-1/2/3	Composite	10/1/2010	Y	OCDF	4.90E-04	1.00E-04	4.90E-08		Y	mg/kg	1.64E-01	2.99E-03		
Central Parcel	Soil	WC-2 Surface	Discrete	10/1/2010	Y	1,2,3,4,6,7,8-HpCDD	1.20E-03	1.00E-03	1.20E-06		Y	mg/kg	3.87E-02	3.10E-02		
Central Parcel	Soil	WC-2 Surface	Discrete	10/1/2010	Y	1,2,3,4,6,7,8-HpCDF	2.10E-04	1.00E-02	2.10E-06		Y	mg/kg	3.79E-03	5.54E-02		
Central Parcel	Soil	WC-2 Surface	Discrete	10/1/2010	Y	1,2,3,4,7,8,9-HpCDF	1.90E-05	1.00E-02	1.90E-07	J	Y	mg/kg	3.79E-03	5.01E-03		
Central Parcel	Soil	WC-2 Surface	Discrete	10/1/2010	Y	1,2,3,4,7,8-HxCDD	2.50E-05	5.00E-02	1.25E-06	J	Y	mg/kg	1.05E-03	2.39E-02		
Central Parcel	Soil	WC-2 Surface	Discrete	10/1/2010	Y	1,2,3,4,7,8-HxCDF	4.30E-05	1.00E-01	4.30E-06	J	Y	mg/kg	2.28E-04	1.89E-01		
Central Parcel	Soil	WC-2 Surface	Discrete	10/1/2010	Y	1,2,3,6,7,8-HxCDD	1.10E-04	1.00E-02	1.10E-06		Y	mg/kg	2.28E-03	4.83E-02		
Central Parcel	Soil	WC-2 Surface	Discrete	10/1/2010	Y	1,2,3,6,7,8-HxCDF	2.20E-06	1.00E-01	2.20E-07	P U	N	mg/kg	2.28E-04	9.67E-03		
Central Parcel	Soil	WC-2 Surface	Discrete	10/1/2010	Y	1,2,3,7,8,9-HxCDD	6.50E-05	1.00E-01	6.50E-06		Y	mg/kg	2.28E-04	2.85E-01		
Central Parcel	Soil	WC-2 Surface	Discrete	10/1/2010	Y	1,2,3,7,8,9-HxCDF	2.00E-05	1.00E-01	2.00E-06	J	Y	mg/kg	4.48E-04	4.47E-02	2.32E-04	2.88E+00
Central Parcel	Soil	WC-2 Surface	Discrete	10/1/2010	Y	1,2,3,7,8-PeCDD	1.80E-05	1.00E+00	1.80E-05	J	Y	mg/kg	5.47E-04	3.29E-02		
Central Parcel	Soil	WC-2 Surface	Discrete	10/1/2010	Y	1,2,3,7,8-PeCDF	2.80E-06	1.00E-01	2.80E-07	P U	N	mg/kg	1.27E-03	2.20E-03		
Central Parcel	Soil	WC-2 Surface	Discrete	10/1/2010	Y	2,3,4,6,7,8-HxCDF	5.80E-05	1.00E-01	5.80E-06		Y	mg/kg	2.28E-04	2.55E-01		
Central Parcel	Soil	WC-2 Surface	Discrete	10/1/2010	Y	2,3,4,7,8-PeCDF	1.80E-04	1.00E+00	1.80E-04		Y	mg/kg	9.90E-05	1.82E+00		
Central Parcel	Soil	WC-2 Surface	Discrete	10/1/2010	Y	2,3,7,8-TCDD	4.50E-06	1.00E+00	4.50E-06	J	Y	mg/kg	1.36E-04	3.32E-02		
Central Parcel	Soil	WC-2 Surface	Discrete	10/1/2010	Y	2,3,7,8-TCDF	3.80E-06	1.00E+00	3.80E-06	P U	N	mg/kg	1.29E-04	2.96E-02		
Central Parcel	Soil	WC-2 Surface	Discrete	10/1/2010	Y	OCDD	7.50E-03	1.00E-04	7.50E-07		Y	mg/kg	6.43E-01	1.17E-02		
Central Parcel	Soil	WC-2 Surface	Discrete	10/1/2010	Y	OCDF	2.40E-04	1.00E-04	2.40E-08		Y	mg/kg	1.64E-01	1.47E-03		
Central Parcel	Soil	WC-3 Surface	Discrete	10/1/2010	Y	1,2,3,4,6,7,8-HpCDD	2.40E-03	1.00E-03	2.40E-06		Y	mg/kg	3.87E-02	6.20E-02		
Central Parcel	Soil	WC-3 Surface	Discrete	10/1/2010	Y	1,2,3,4,6,7,8-HpCDF	2.30E-03	1.00E-02	2.30E-05		Y	mg/kg	3.79E-03	6.07E-01		
Central Parcel	Soil	WC-3 Surface	Discrete	10/1/2010	Y	1,2,3,4,7,8,9-HpCDF	3.40E-04	1.00E-02	3.40E-06		Y	mg/kg	3.79E-03	8.97E-02		
Central Parcel	Soil	WC-3 Surface	Discrete	10/1/2010	Y	1,2,3,4,7,8-HxCDD	1.50E-04	5.00E-02	7.50E-06		Y	mg/kg	1.05E-03	1.43E-01		
Central Parcel	Soil	WC-3 Surface	Discrete	10/1/2010	Y	1,2,3,4,7,8-HxCDF	1.40E-03	1.00E-01	1.40E-04		Y	mg/kg	2.28E-04	6.15E+00		
Central Parcel	Soil	WC-3 Surface	Discrete	10/1/2010	Y	1,2,3,6,7,8-HxCDD	6.80E-04	1.00E-02	6.80E-06		Y	mg/kg	2.28E-03	2.99E-01		
Central Parcel	Soil	WC-3 Surface	Discrete	10/1/2010	Y	1,2,3,6,7,8-HxCDF	5.00E-07	1.00E-01	5.00E-08	P U	N	mg/kg	2.28E-04	2.20E-03		
Central Parcel	Soil	WC-3 Surface	Discrete	10/1/2010	Y	1,2,3,7,8,9-HxCDD	4.30E-04	1.00E-01	4.30E-05		Y	mg/kg	2.28E-04	1.89E+00		
Central Parcel	Soil	WC-3 Surface	Discrete	10/1/2010	Y	1,2,3,7,8,9-HxCDF	1.00E-03	1.00E-01	1.00E-04		Y	mg/kg	4.48E-04	2.23E+00	1.69E-02	1.88E+02
Central Parcel	Soil	WC-3 Surface	Discrete	10/1/2010	Y	1,2,3,7,8-PeCDD	2.40E-04	1.00E+00	2.40E-04		Y	mg/kg	5.47E-04	4.39E-01		
Central Parcel	Soil	WC-3 Surface	Discrete	10/1/2010	Y	1,2,3,7,8-PeCDF	9.58E-07	1.00E-01	9.58E-08	P U	N	mg/kg	1.27E-03	7.53E-04		
Central Parcel	Soil	WC-3 Surface	Discrete	10/1/2010	Y	2,3,4,6,7,8-HxCDF	3.20E-03	1.00E-01	3.20E-04		Y	mg/kg	2.28E-04	1.41E+01		
Central Parcel	Soil	WC-3 Surface	Discrete	10/1/2010	Y	2,3,4,7,8-PeCDF	1.60E-02	1.00E+00	1.60E-02		Y	mg/kg	9.90E-05	1.62E+02		
Central Parcel	Soil	WC-3 Surface	Discrete	10/1/2010	Y	2,3,7,8-TCDD	2.40E-05	1.00E+00	2.40E-05		Y	mg/kg	1.36E-04	1.77E-01		
Central Parcel	Soil	WC-3 Surface	Discrete	10/1/2010	Y	2,3,7,8-TCDF	1.60E-06	1.00E+00	1.60E-06	P U	N	mg/kg	1.29E-04	1.24E-02		
Central Parcel	Soil	WC-3 Surface	Discrete	10/1/2010	Y	OCDD	1.00E-02	1.00E-04	1.00E-06		Y	mg/kg	6.43E-01	1.55E-02		
Central Parcel	Soil	WC-3 Surface	Discrete	10/1/2010	Y	OCDF	4.60E-04	1.00E-04	4.60E-08		Y	mg/kg	1.64E-01	2.81E-03		
East Parcel	Soil	DU-4	ISM	1/13/2014	Y	1,2,3,4,6,7,8-HpCDD	1.81E-03	1.00E-03	1.81E-06	E	Y	mg/kg	3.87E-02	4.68E-02		
East Parcel	Soil	DU-4	ISM	1/13/2014	Y	1,2,3,4,6,7,8-HpCDF	1.71E-04	1.00E-02	1.71E-06		Y	mg/kg	3.79E-03	4.51E-02		
East Parcel	Soil	DU-4	ISM	1/13/2014	Y	1,2,3,4,7,8,9-HpCDF	1.16E-05	1.00E-02	1.16E-07		Y	mg/kg	3.79E-03	3.06E-03		
East Parcel	Soil	DU-4	ISM	1/13/2014	Y	1,2,3,4,7,8-HxCDD	1.60E-05	5.00E-02	8.00E-07		Y	mg/kg	1.05E-03	1.53E-02		
East Parcel	Soil	DU-4	ISM	1/13/2014	Y	1,2,3,4,7,8-HxCDF	1.77E-05	1.00E-01	1.77E-06		Y	mg/kg	2.28E-04	7.78E-02		
East Parcel	Soil	DU-4	ISM	1/13/2014	Y	1,2,3,6,7,8-HxCDD	1.16E-04	1.00E-02	1.16E-06		Y	mg/kg	2.28E-03	5.09E-02		
East Parcel	Soil	DU-4	ISM	1/13/2014	Y	1,2,3,6,7,8-HxCDF	1.12E-05	1.00E-01	1.12E-06		Y	mg/kg	2.28E-04	4.92E-02		
East Parcel	Soil	DU-4	ISM	1/13/2014	Y	1,2,3,7,8,9-HxCDD	4.39E-05	1.00E-01	4.39E-06		Y	mg/kg	2.28E-04	1.93E-01		
East Parcel	Soil	DU-4	ISM	1/13/2014	Y	1,2,3,7,8,9-HxCDF	5.74E-06	1.00E-01	5.74E-07		Y	mg/kg	4.48E-04	1.28E-02	3.87E-05	7.15E-01
East Parcel	Soil	DU-4	ISM	1/13/2014	Y	1,2,3,7,8-PeCDD	1.14E-05	1.00E+00	1.14E-05		Y	mg/kg	5.47E-04	2.08E-02		
East Parcel	Soil	DU-4	ISM	1/13/2014	Y	1,2,3,7,8-PeCDF	5.15E-06	1.00E-01	5.15E-07		Y	mg/kg	1.27E-03	4.05E-03		
East Parcel	Soil	DU-4	ISM	1/13/2014	Y	2,3,4,6,7,8-HxCDF	1.96E-05	1.00E-01	1.96E-06		Y	mg/kg	2.28E-04	8.61E-02		
East Parcel	Soil	DU-4	ISM	1/13/2014	Y	2,3,4,7,8-PeCDF	4.97E-06	1.00E+00	4.97E-06		Y	mg/kg	9.90E-05	5.02E-02		
East Parcel	Soil	DU-4	ISM	1/13/2014	Y	2,3,7,8-TCDD	1.08E-06	1.00E+00	1.08E-06		Y	mg/kg	1.36E-04	7.96E-03		
East Parcel	Soil	DU-4	ISM	1/13/2014	Y	2,3,7,8-TCDF	4.04E-06	1.00E+00	4.04E-06		Y	mg/kg	1.29E-04	3.14E-02		
East Parcel	Soil	DU-4	ISM	1/13/2014	Y	OCDD	1.22E-02	1.00E-04	1.22E-06	E	Y	mg/kg	6.43E-01	1.90E-02		
East Parcel	Soil	DU-4	ISM	1/13/2014	Y	OCDF	2.79E-04	1.00E-04	2.79E-08		Y	mg/kg	1.64E-01	1.70E-03		
West Parcel	Soil	DU-7	ISM	1/13/2014	Y	1,2,3,4,6,7,8-HpCDD	6.72E-04	1.00E-03	6.72E-07		Y	mg/kg	3.87E-02	1.74E-02		
West Parcel	Soil	DU-7	ISM	1/13/2014	Y	1,2,3,4,6,7,8-HpCDF	1.72E-04	1.00E-02	1.72E-06		Y	mg/kg	3.79E-03	4.54E-02		
West Parcel	Soil	DU-7	ISM	1/13/2014	Y	1,2,3,4,7,8,9-HpCDF	6.74E-06	1.00E-02	6.74E-08		Y	mg/kg	3.79E-03	1.78E-03		
West Parcel	Soil	DU-7	ISM	1/13/2014	Y	1,2,3,4,7,8-HxCDD	1.34E-05	5.00E-02	6.70E-07		Y	mg/kg	1.05E-03	1.28E-02		
West Parcel	Soil	DU-7	ISM	1/13/2014	Y	1,2,3,4,7,8-HxCDF	1.89E-05	1.00E-01	1.89E-06		Y	mg/kg	2.28E-04	8.30E-02		
West Parcel	Soil	DU-7	ISM	1/13/2014	Y	1,2,3,6,7,8-HxCDD	2.85E-04	1.00E-02	2.85E-06		Y	mg/kg	2.28E-03	1.25E-01		
West Parcel	Soil	DU-7	ISM	1/13/2014	Y	1,2,3,6,7,8-HxCDF	8.47E-06	1.00E-01	8.47E-07		Y	mg/kg	2.28E-04	3.72E-02		
West Parcel	Soil	DU-7	ISM	1/13/2014	Y	1,2,3,7,8,9-HxCDD	1.70E-04	1.00E-01	1.70E-05		Y	mg/kg	2.28E-04	7.46E-01		
West Parcel	Soil	DU-7	ISM	1/13/2014	Y	1,2,3,7,8,9-HxCDF	1.18E-06	1.00E-01	1.18E-07		Y	mg/kg	4.48E-04	2.64E-03	7.88E-05	1.29E+00
West Parcel	Soil	DU-7	ISM	1/13/2014	Y	1,2,3,7,8-PeCDD	3.86E-05	1.00E+00	3.86E-05		Y	mg/kg	5.47E-04	7.06E-02		

Sum Hazard Quotients for Dioxin/Furans for Birds

Avian Dioxin Tool for all Samples where [Upland0_3] = "Y" (and DU-5) Based on WC_All_data.xlsx data file sent by CO on 10/8/2018 6:30pm

Parcel	Media	Sample	CompSampIn	Date	Upland0_3	StdAnalyteDiox	StdResult	Bird TEF	Bird TEQ	Qualifier	DetectFlag	UnitsStd	BirdRBC	Bird HQ	Sum Bird TEQ	Sum Bird Hazard Quotient
West Parcel	Soil	DU-7	ISM	1/13/2014	Y	1,2,3,7,8-PeCDF	8.02E-06	1.00E-01	8.02E-07		Y	mg/kg	1.27E-03	6.30E-03		
West Parcel	Soil	DU-7	ISM	1/13/2014	Y	2,3,4,6,7,8-HxCDF	7.40E-06	1.00E-01	7.40E-07		Y	mg/kg	2.28E-04	3.25E-02		
West Parcel	Soil	DU-7	ISM	1/13/2014	Y	2,3,4,7,8-PeCDF	4.92E-06	1.00E+00	4.92E-06		Y	mg/kg	9.90E-05	4.97E-02		
West Parcel	Soil	DU-7	ISM	1/13/2014	Y	2,3,7,8-TCDD	2.11E-06	1.00E+00	2.11E-06		Y	mg/kg	1.36E-04	1.56E-02		
West Parcel	Soil	DU-7	ISM	1/13/2014	Y	2,3,7,8-TCDF	5.45E-06	1.00E+00	5.45E-06		Y	mg/kg	1.29E-04	4.24E-02		
West Parcel	Soil	DU-7	ISM	1/13/2014	Y	OCDD	2.86E-03	1.00E-04	2.86E-07	E	Y	mg/kg	6.43E-01	4.45E-03		
West Parcel	Soil	DU-7	ISM	1/13/2014	Y	OCDF	2.19E-04	1.00E-04	2.19E-08		Y	mg/kg	1.64E-01	1.34E-03		

Attachment 5:

Recommendations for Preliminary Remediation Goals

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503 415 6000

Table D-1
Preliminary Remediation Goals and Oregon High-Concentration Hot Spots Values
Ecological Receptors
Willamette Cove

	Receptor-Specific Preliminary Remediation Goals and Hot Spot Values (mg/kg dw)								Lowest RBC and Hot Spot Values Among Ecological Receptors (mg/kg dw)			Preliminary Remediation Goal and Hot Spot Values if MEAN Background Concentration is Used				Preliminary Remediation Goal and Hot Spot Values if UPL Background Concentration is Used			
	Plants		Invertebrates		Birds		Mammals												
Chemical Of Concern[1]	Plant Screening Levels[2]	Plant Hot Spot	Invertebrate Screening Levels[2]	Invertebrate Hot Spot	Birds RBC[3,6]	Bird Hot Spot	Mammals RBC[3,6]	Mammal Hot Spot	Lowest RBC	Lowest Hot Spot	Lowest RBC Source	MEAN Background (mg/kg dw)[4]	PRG[6] (mg/kg dw)	Hot Spot	PRG Source	95% Upper Prediction Limit (mg/kg dw)[4]	PRG[6] (mg/kg dw)	Hot Spot	PRG Source
Antimony	5	50	78	780	NA		2.7	27	2.7	27	Mammals	0.29	2.7	27	RBC	0.56	2.7	27	RBC
Arsenic	18	180	Not a COC		Not a COC		Not a COC		18	180	Plants	4.4	18	180	RBC	8.8	18	180	RBC
Chromium	1	10	0.4	4	Not a COC		Not a COC		0.4	4	Inverts	39	39	39	Mean Bkg	76	76	76	UPL Bkg
Copper	70	700	80	800	87.7	877	82	820	70	700	Plants	24	70	700	RBC	34	70	700	RBC
Lead	120	1,200	1700	17,000	33	330	122	1,220	33	330	Birds	27	33	330	RBC	79	79	330	UPL Bkg
Mercury	0.3	3	0.1	1	0.015	0.15	3.53	35.3	0.015	0.15	Birds	0.073	0.073	0.15	Mean Bkg	0.23	0.23	0.23	UPL Bkg
Nickel	38	380	280	2,800	Not a COC		20	200	20	200	Mammals	23	23	200	Mean Bkg	47	47	200	UPL Bkg
Selenium	0.52	5.2	Not a COC		Not a COC		Not a COC		0.52	5.2	Plants	0.33	0.52	5.2	RBC	0.71	0.71	5.2	UPL Bkg
Zinc	160	1,600	120	1,200	Not a COC		201	2,010	120	1,200	Inverts	105	120	1,200	RBC	180	180	1,200	UPL Bkg
HPAH	Not a COC		18	180	Not a COC		5.6	56	5.6	56	Mammals	na	5.6	56	RBC	na	5.6	56	RBC
LPAH	Not a COC		29	290	Not a COC		Not a COC		29	290	Inverts	na	29	290	RBC	na	29	290	RBC
Dibenzofuran	Not a COC		Not a COC		Not a COC		0.01	0.10	0.01	0.1	Mammals	na	0.01	0.1	RBC	na	0.01	0.1	RBC
Diesel[5]	*See note 5*								--	--	--	na	--	--	RBC	na	--	--	--
PCBs	40	400	Not a COC		0.734	7.34	0.098	0.98	0.098	0.98	Mammals	na	0.098	0.98	RBC	na	0.098	0.98	RBC
Phthalates[5]	*See note 5*								--	--	--	na	--	--	RBC	na	--	--	--
2,3,7,8 TCDD Equiv[7]	Not a COC		Not a COC		8.9E-05	8.9E-04	6.1E-06	6.1E-05	6.10E-06	6.10E-05	Mammals	na	6.10E-06	6.10E-05	RBC	na	6.10E-06	6.10E-05	RBC

Notes:
NA = not available; na = not applicable.

1. Analytes from soil sample analyses performed post 2014. PAHs represented by HPAHs (High molecular weight polynuclear aromatic hydrocarbons) and LPAHs (low molecular weight PAHs). Dioxins/furans represented by 2,3,7,8-TCDD toxicity equivalents (TEQ)

2. For plants and invertebrates, screening levels cited by sources for screening only and are not generally meant as action levels (e.g., EPA EcoSSLs)

3. Calculated from site-specific exposure scenarios for the American robin and short-tailed shrew; based on LOAEL.

4. Background values for Portland Basin from "Development of Oregon Background Metals Concentrations in Soil" (March 2013). Mean values from Table 2; UPL values from Table 4. Not applicable for organic compounds. Comparison of ISM Composite or Average sample concentrations should be made useing Mean background concentrations. Comparison of discrete sample data should be made to Upper Prediction LImits.

5. Diesel and Phthalates were identified in Table 4 of DEQ comments on the Eco RRA (July 19, 2013), but the basis for inclusion as COCs was not explained, and quantitative basis for analysis is not possible. Therefore, no PRGs were calculated.

6. PRG selected is the higher value between the lowest RBC and the background value.

7. 2,3,7,8 TCDD equivalent PRGs were calculated using TEFs specifically developed for birds and mammals (Van den Berg et al., 1998; Van den Berg et al., 2006).

Table D-2
Preliminary Remediation Goals and Oregon High-Concentration Hot Spots Values
Human Health Receptors
Willamette Cove

	Receptor Scenario[1]												Lowest RBCs/Hot Spots Among Scenarios			Preliminary Remediation Goal and Hot Spot Values if MEAN Background Concentration is Used				Preliminary Remediation Goal and Hot Spot Values if UPL Background Concentration is Used			
	Recreational Trespasser/ Park User				Transient Trespasser				Construction Worker														
Chemical Of Concern	RBC Cancer	Cancer Hot Spot	RBC Non Cancer	Non-Cancer Hot Spot	RBC Cancer	Cancer Hot Spot	RBC Non Cancer	Non-Cancer Hot Spot	RBC Cancer	Cancer Hot Spot	RBC Non Cancer	Non-Cancer Hot Spot	Lowest RBC	RBC Source	Lowest Hot Spot	MEAN Background (mg/kg dw)[2]	PRG[3] (mg/kg dw)	PRG Source	Hot Spot[4] (mg/kg dw)	95% Upper Prediction Limit (mg/kg dw)[2]	PRG[3] (mg/kg dw)	PRG Source	Hot Spot[4] (mg/kg dw)
Antimony	na	na	24.3	243	Not a COC				na	na	31	310	24.3	RecTresp	243	0.29	24.3	RBC	243	0.56	24.3	RBC	243
Arsenic	1.4	140	74	740	Not a COC				Not a COC				1.4	RecTresp	140	4.4	4.4	Mean Bkg	140	8.8	8.8	UPL Bkg	140
Copper	na	na	11,000	110,000	Not a COC				na	na	14,000	140,000	11,000	RecTresp	110,000	24	11,000	RBC	110,000	34	11000	RBC	110,000
Lead	na	na	400	4,000	Not a COC				Not a COC				400	RecTresp	4,000	27	400	RBC	4,000	79	400	RBC	4,000
PCBs	0.74	74	4	40	14	1,400	220	2,200	8.4	840	4.9	49	0.74	RecTresp	40	na	0.74	RBC	40	na	0.74	RBC	40
Dioxins/FuranTEQ	1.5E-05	1.5E-03	1.7E-04	1.7E-03	3.2E-04	3.2E-02	1.1E-02	1.1E-01	1.7E-04	1.7E-02	2.3E-04	2.3E-03	1.5E-05	RecTresp	1.5E-03	na	1.5E-05	RBC	1.5E-03	na	1.5E-05	RBC	1.1E-03
Total BaPEq[5]	0.55	55	na	na	Not a COC				Not a COC				0.55	RecTresp	55	na	0.55	RBC	55	na	0.55	RBC	55

Notes:

NA = not available; na = not applicable.

1. Calculated from site-specific exposure scenarios identified in Human Health Risk Assessment. RBCs calculated using Oregon DEQ Risk Based Decision Making spreadsheet tool.

2. Background values for Portland Basin from "Development of Oregon Background Metals Concentrations in Soil" (March 2013). Mean values from Table 2; UPL values from Table 4. Not applicable for organic compounds. Comparison of ISM Composite or Average sample concentrations should be made useing Mean background concentrations. Comparison of discrete sample data should be made to Upper Prediction LImits.

3. PRG selected is the higher value between the lowest RBC and the background value.

4. Hot Spot value selected is the higher value between the lowest Hot Spot and background value.