SITE HAZARD ASSESSMENT
Worksheet 1
Summary Score Sheet

SITE INFORMATION:

Cleanup Site ID: 11039

Broadview Service

Facility/Site ID: 91618538

12250 & 12258 Greenwood Ave N

Seattle, King County, WA 98133

Section:	30	Latitude:	47.71921
Township:	26N	Longitude:	-122.35518
Range:	4E	Tax/Parcel ID:	6141100005

Site Scored/ranked for the August 2013 Hazardous Sites List Publication

SITE DESCRIPTION:

The Broadview Service site is a former automobile fueling and service station located in Seattle, King County, Washington. The 0.64-acre property is located approximately 2,300 feet from Bitter Lake, and zoned for neighborhood commercial (NC1-30) use.

The site is located at the southeast corner of N 125th Street and Greenwood Avenue North.

The site is currently operated as a mixed-use building with apartments and office space by Couch Investments II LLC.

The property was redeveloped in 1995 as a large mixed-use structure with parking, retail, and office space at street level, and forty-four apartment units on the second and third stories above.

Prior to redevelopment, the service station building, with work shop and an automobile service pit, was located on the northern third of the site near N 125th Street. An access road from N 125th Street was located on the east side of the service station building. Five USTs were located between the service station building and Greenwood Avenue N, with three additional USTs located south of the service station building, and two north to northwest of the service station building. Most of the property was paved with asphalt, with the exception of the southeast corner of the property.

SITE BACKGROUND:

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

From	To	Operator/Tenant	Activity
1923	1995	private owners	automobile filling and service station
1995	2013	Couch Investments	apartment building with retail

SITE CONTAMINATION:

In 1990 the Broadview Service site was reported to Washington Department of Ecology and placed on the LUST list with ID number 511.

In March 1990, seven of nine USTs were removed, and petroleum odors were identified in soil removed around the tanks.

While the site was used as a filling and service station, the site consisted of a three-bay service station, a work shop, and a cashier's office. The building area was located in the north central portion of the property. A brick-lined service pit and two hydraulic lifting hoists were located in the service building. Five 4,000-gallon gasoline USTs, one 550-gallon waste oil UST, one 550-gallon fuel oil UST, and one 550-gallon gasoline UST were located at the site between the service station and Greenwood Avenue North right-of-way.

Phase I site activities, conducted between March 1990 and June 1991 included tank removal, soil excavation and

segregation, and vapor extraction treatment of soils. A second phase of site activities was completed between June and Novemeber 1991, consisting of re-excavation of soils, additional laboratory analysis, and soil treatment by bioremediation.

PAST REMEDIATION ACTIVITIES:

In March 1990, a 550-gallon gasoline tank and a 550-gallon fuel oil tank were discovered and removed from the site. The seven other tanks had been removed previously. Soils were excavated in the UST area, and the excavation area was determined by the observed extent of stained soils, hydrocarbon odors, and PID measurements of volatile compounds in soils. The initial excavation extended beneath the service station, following demolition of the station building and the service pit. The maximum excavated depth was 26 feet below grade, and 2,400 cubic yards of soil was removed.

The second phase of excavation was conducted in July 1991, and focused on removing soils along the western sidewall and the base of the original excavation where initial confirmation sampling identified impacted soils exceeding MTCA Method A cleanup levels were present. An additional 50 cubic yards of soil was removed during the second phase of excavation. A combined 52 confirmation soil samples were collected during Phase I and Phase II excavation activities.

Seventeen excavation floor and sidewall soil samples identified concentrations of TPH and/or BTEX exceeding MTCA Method A cleanup levels - of those locations, 16 were overexcavated during Phase II excavation activities. Soil adjacent to Greenwood Avenue and the city-owned right-of-way could not be excavated and was left in place, despite containing concentrations of BTEX and TPH (undifferentiated) above MTCA Method A cleanup criteria (sample 8).

Phase I soil treatment activities occurred between August 1990 and June 1991. A soil venting system was used to treat 2,000 cubic yards of soil containing gasoline compounds, which were then returned to the UST excavation. The vapor extraction system involved the installation of 18 vertical soil vents and the system began operating in August 1990. Water levels in the UST excavation were monitored at the site during treatment by VES. Groundwater was not encountered during excavation activities, however seepage was observed in the excavation, assumed to be from utility corridors and other high permeability zones intercepted during excavation. Approximately 40,800 gallons of water were pumped from the excavation and disposed in the Seattle Sewer system. Fourteen soil samples were collected from the vapor extraction treated soil area and analyzed in January 1992. Analytical results indicated concentrations of BTEX constituents were below laboratory detection limits, but five soil samples contained concentrations of total petroleum hydrocarbons (reportedly diesel and oil range hydrocarbons) ranging from 270 to 1,100 mg/kg. These concentrations exceeded MTCA Method A cleanup levels in 1992, but are below the current (2013) standard of 2,000 mg/kg for diesel or oil range petroleum hydrocarbons. Soils treated by vapor extraction were re-excavated and stockpiled in 100-cubic yard piles at the site for further (Phase II) soil treatment, based on detections of diesel and oil in treated soils.

Prior to additional soil treatment, each 100-cubic yard pile was resampled, and thirteen piles were identified for Phase II soil treatment. Soils were treated by landfarming, where soils were tilled and chemical fertilizer and water were applied to the soils. During Phase II soil treatment, soils were tilled twice per week, and approximately 800 pounds of fertilizer were applied to each 100-cubic yard stockpile. Soils were sampled monthly from each 100-cubic yard stockpile until TPH results were below the 200 mg/kg cleanup level. Following Phase II soil treatment, soils were returned to the excavation and the site was re-graded.

Approximately 400 cubic yards of fuel oil and heavier hydrocarbon impacted soil was also treated by landfarming at the site. Verification soil samples were collected to confirm petroleum hydrocarbon concentrations were below the 200 mg/kg cleanup level before re-using soil as backfill at the site.

There is no report of groundwater wells being installed at the site or groundwater being sampled or monitored during investigation and/or remediation activities.

CURRENT SITE CONDITIONS:

Mass excavation and on-site treatment of over 2,000 cubic yards of soil was conducted in 1991 and 1992 to address petroleum contaminated soils. Groundwater was not encountered during remediation activities, however some shallow (potentially perched) groundwater infiltrated into the excavation and was pumped from the site.

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Worksheet 1
Summary Score Sheet

Some petroleum contaminated soil was left in-place along the Greenwood Avenue N right-of-way due to access and structural limitations. Groundwater at the site was not investigated during the course of site investigation and remediation activities.

Petroleum hydrocarbon and BTEX contaminated soil was left in-place in the Greenwood Avenue N right-of-way adjacent to the site.

The approximate depth to groundwater is more than 26 feet below ground surface, with groundwater flowing to the southwest (assumed). Subsurface soils are coarse sand and gravel, with silty sand glacial till beneath.

SPECIAL CONSIDERATIONS:

Checked boxes indicate routes applicable for WARM scoring

☐ **Surface Water**

Release occurred in the subsurface.

☑ **Air**

BTEX and potentially gasoline-contaminated soils were left in-place along the Greenwood Ave N right-of-way.

☑ **Groundwater**

BTEX and potentially gasoline, diesel and/or oil-contaminated soils were left in-place along the Greenwood Ave N right-of-way.

Petroleum contaminated soil was left in-place along the Greenwood Ave N right-of-way following remedial activities in the early 1990s. It is unknown whether further remedial action has occurred during possible infrastructure improvements, or during the 1995 construction of the current structure on the property.

ROUTE SCORES:

Surface Water/ Human Health:		Surface Water/ Environment:	
Air/ Human Health:	40.4	Air/ Environment:	1.5
Groundwater/ Human Health:	33.1		

Overall Rank: 3

REFERENCES:

WARM Toxicological Database

WARM Scoring Manual

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

King County GIS Center iMAP application, Property Information, Groundwater Program, and Sensitive Areas mapsets. Accessed January 2013. http://www.kingcounty.gov/operations/GIS/Maps/iMAP.aspx

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

Washington State Department of Health Source Water Assessment Maps. March 2011 update. https://fortress.wa.gov/doh/eh/dw/swap/maps/

Ecology Water Resources Explorer, accessed January 2013. https://fortress.wa.gov/ecy/waterresources/map/WaterResourcesExplorer.aspx

SITE HAZARD ASSESSMENT
Worksheet 1
Summary Score Sheet

FEMA Map Service Center, accessed January 2013. https://msc.fema.gov/webapp/wcs/stores/servlet/FemaWelcomeView?storeId=10001&catalogId=10001&langId=-1

Missouri Census Data Center, Circular Area Profiles - 2010 census data around a point location. Http://mcdc.missouri.edu/websas/caps10c.html. Accessed February 2013

Sweet-Edwards/EMCON, Inc., 1992, Final Report Soil Sampling and Remediation Services Former Broadview Service Site Seattle, Washington. February 11.

SITE HAZARD ASSESSMENT
Worksheet 2
Route Documentation

Cleanup Site ID: 11039 Broadview Service

Facility/Site ID: 91618538

1. SURFACE WATER ROUTE

List those substances to be considered for scoring:

Not applicable

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

List those management units to be considered for scoring:

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

2. AIR ROUTE

List those substances to be considered for scoring:

Gasoline and BTEX

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

Soil with concentrations exceeding MTCA Method A cleanup levels in place beneath right-of-way.

List those management units to be considered for scoring:

Soil vapor

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

Potential for vapor intrusion.

3. GROUNDWATER ROUTE

List those substances to be considered for scoring:

Gasoline, diesel and BTEX

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

Soil with concentrations exceeding MTCA Method A cleanup levels in place beneath right-of-way.

List those management units to be considered for scoring:

Groundwater

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

Potential for transport to groundwater.

Worksheet 5

Air Route

CSID: 11039 **Site Name:** Broadview Service

1.0 Substance Characteristics

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

1.2 Human Toxicity

Substance	Ambient Air Standard Value	Acute Toxicity Value	Chronic Toxicity Value	Carcinogenicity Value
Gasoline (benzene)	10	3	X	5
Toluene	1	X	1	X
Ethylbenzene	1	X	X	X
Xylenes	1	3	1	X

Highest Value 10

Bonus Points? 0

Toxicity Value 10

1.3 Mobility

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

1.4 Final Human Health Toxicity/Mobility Matrix Value **HH Final Matrix Value** 20

1.5 Environmental Toxicity/Mobility

Substance	Non-human Mammalian Inhalation Toxicity (mg/m3)	Acute Value	Mobility Value	Table A-7 Matrix Value
Gasoline (benzene)	31947	3	4	6
Toluene	X	X	X	X
Ethylbenzene	X	X	X	X
Xylenes	21714	3	3	5

Env. Final Matrix Value 6

1.6 Substance Quantity

Amount: up to 200 square feet

Basis: Estimated surface area of contaminated soil

Substance Quantity Value 2

Worksheet 5

Air Route

CSID: 11039 **Site Name:** Broadview Service

2.0 Migration Potential

2.1 Containment Containment Value: 5

Explain Basis: Assume 2' thick cover, no vapor collection system currently operating

3.0 Targets

3.1 Nearest Population Population Distance Value: 10

Less than 100 feet

3.2 Distance to and name of nearest sensitive environments Sensitive Environment Value: 7

540 feet to Broadview Park

3.3 Population within 0.5 miles Population Value: 75

6383 population

4.0 Release Release to Air Value: 0

Explain basis for scoring a release to air

no confirmed release

Pathway Scoring - Air Route, Human Health Pathway

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

Where:

SUB_{AH} =(Human toxicity + 5) * (Containment + 1) + Substance Qty	SUB_{AH}	152
REL_A = Release to Air	REL_A	0
TAR_{AH} = Nearest Population + Population within 1/2 mile	TAR_{AH}	85
	AIR_H	40.4

Pathway Scoring - Air Route, Environmental Pathway

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

Where:

SUB_{AE} =(Environmental Toxicity Value +5)*(Containment +1) +Substance Qty	SUB_{AE}	68
REL_A = Release to Air	REL_A	0
TAR_{AE} = Nearest Sensitive Environment	TAR_{AE}	7
	AIR_E	1.5

Worksheet 6

Groundwater Route

CSID: 11039 **Site Name:** Broadview Service

1.0 Substance Characteristics

1.1 Human Toxicity

Substance	Drinking Water Standard Value	Acute Toxicity Value	Chronic Toxicity Value	Carcinogenicity Value
Gasoline (benzene)	8	3	X	5
Toluene	2	3	1	X
Ethylbenzene	4	3	1	X
Xylenes	2	10	1	X
Diesel	6	5	3	X

Highest Value 10

Bonus Points? +2

Toxicity Value 12

1.2 Mobility

Cations/Anions Max Value:

Solubility Max Value: 3 Mobility Value 3

1.3 Substance Quantity

Amount: 50 cubic yards of soil

Basis: Estimated volume of impacted soil remaining in-place

Substance Quantity Value 2

2.0 Migration Potential

2.1 Containment Containment Value 10

Explain Basis: Contaminated soil

2.2 Net Precipitation 10-20 inches Net Precipitation Value 2

2.3 Subsurface Hydraulic Conductivity Conductivity Value 3

silty sand

2.4 Vertical Depth to Groundwater Depth to Aquifer Value 6

Approximately 26 feet (actual depth unknown)

3.0 Targets

3.1 Groundwater Usage Aquifer Use Value 4

Drinking water and irrigation

3.2 Distance to Nearest Drinking Water Well Well Distance Value 2

0.5-1 mile away

3.3 Population Served within 2 Miles Population Served Value 3.46

12 population (estimated)

Worksheet 6

Groundwater Route

CSID: 11039 **Site Name:** Broadview Service

3.4 Area Irrigated by GW Wells within 2 miles Area Irrigated Value 15.17

409 acres

4.0 Release Release to Groundwater Value 0

Explain basis for scoring a release to groundwater:

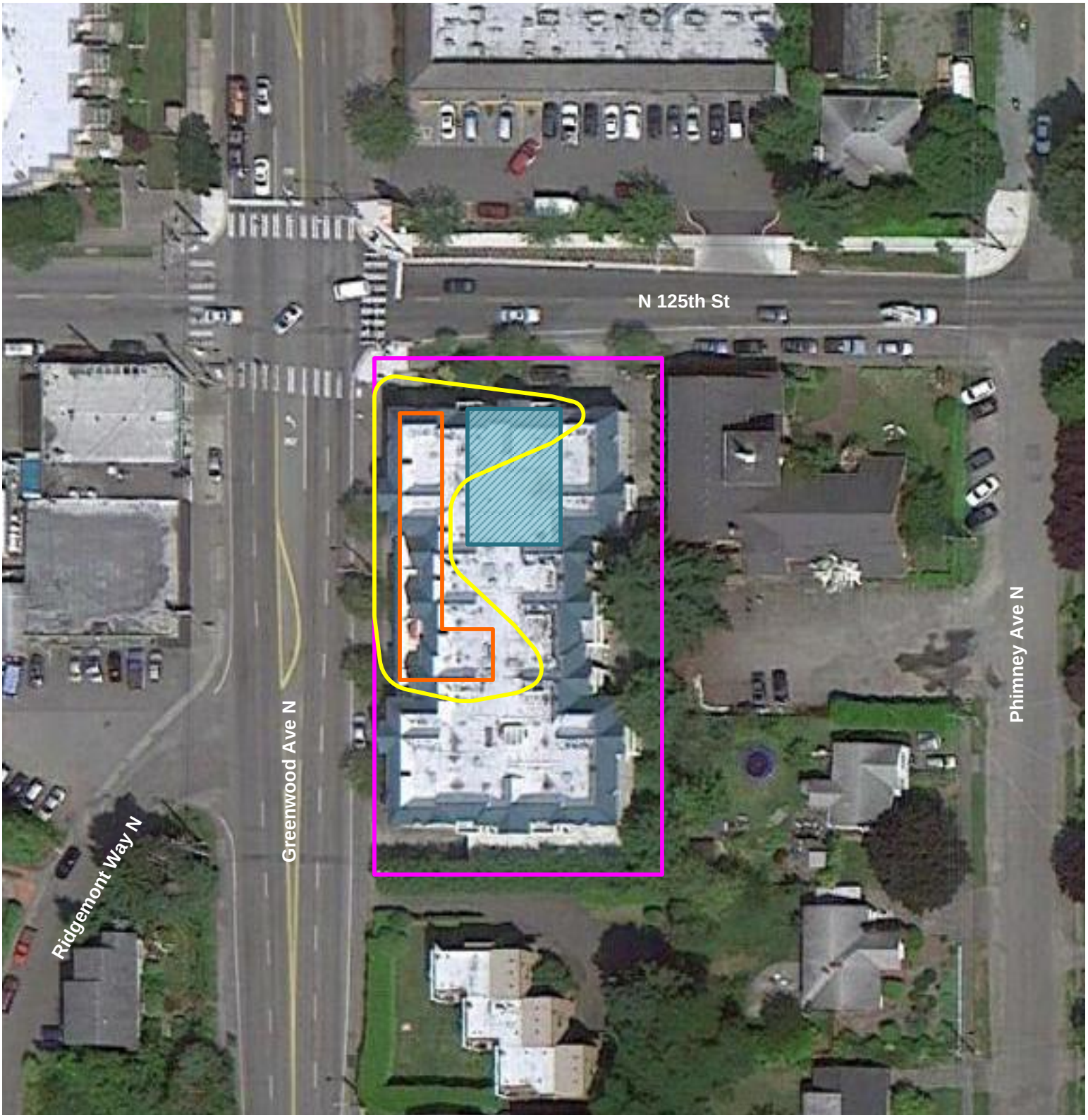
No confirmed release to groundwater

Pathway Scoring - Groundwater Route, Human Health Pathway

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

Where:

SUB_{GH} =(Human toxicity + mobility + 3) * (Containment + 1) + Substance Qty	SUB_{GH}	200
MIG_G=Depth to Aquifer+Net Precip + Hydraulic Conductivity	MIG_G	11
REL_G = Release to Groundwater	REL_G	0
TAR_{GH} = Aquifer Use + Well Distance + Population Served + Area Irrigated	TAR_{GH}	24.63191293
	GW_H	33.1



Legend:

- Property location (approximate)
- Excavation area (approximate)
- Former UST area (approximate)
- Former building location (approximate)

Notes:

1. All locations are approximate, and not to scale.

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Broadview Service
12258 Greewood Avenue North
Seattle, WA 98133

DEPARTMENT OF ECOLOGY
State of Washington

Site Overview Map

CSID 11039
CSID11039.vsd

Washington Ranking Method
Route Scores Summary and Ranking Calculation Sheet

Site Name: Broadview Service **CSID:** 11039

Site Address: 12250 & 12258 Greenwood Ave N **FSID:** 91618538

HUMAN HEALTH ROUTE SCORES

Enter Human Health Route Scores for all Applicable Routes:

Pathway	Route Score	Quintile Group
Surface Water	ns	0
Air	40.4	5
Groundwater	33.1	3

H=	5
M=	3
L=	0

$$\frac{H^2 + 2M + L}{8} = \frac{25 + 6 + 0}{8}$$

Human Health Priority Bin Score: **4**

rounded up to next whole number

ENVIRONMENT ROUTE SCORES

Enter Environment Route Scores for all Applicable Routes:

Pathway	Route Score	Quintile Group
Surface Water	ns	0
Air	1.5	1

H=	1
L=	0

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

Environment Priority Bin Score: **1**

rounded up to next whole number

Comments/Notes:

FINAL MATRIX RANKING **3**

FOR REFERENCE:

Final WARM Bin Ranking Matrix

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

Quintile Values for Route Scores - February 2013 Values

Quintile	Human Health: Surface Water	Human Health: Air	Human Health: Ground Water	Environment: Surface Water	Environment: Air
5	>= **27.0**	>= **32.0**	>= **50.1**	>= **47.0**	>= **32.0**
4	>= **18.5**	>= **21.1**	>= **40.4**	>= **30.3**	>= **26.1**
3	>= **12.4**	>= **13.1**	>= **31.6**	>= **21.4**	>= **21.1**
2	>= **7.5**	>= **7.1**	>= **22.4**	>= **11.0**	>= **14.6**
1	< **7.5**	< **7.1**	< **22.4**	< **11.0**	< **14.6**

Quintile value associated with each route score entered above