SITE HAZARD ASSESSMENT
WORKSHEET 1
Summary Score Sheet

SITE INFORMATION:

Name: Boulevard Nursery
Address: 2021 Boulevard Rd SE
City: Olympia **County:** Thurston **State:** WA **Zip: 98501**
Section/Township/Range: Sec. 24/Twp. 18/R2W
Latitude: 47.03041 **Longitude:** -122.86575
Ecology FSID #3749
Date Scored: August 28, 2012

SITE DESCRIPTION

The 0.9 acre site is located at 2021 Boulevard Rd SE in Olympia, Washington. Available information suggests that the property contained a nursery/greenhouse business from the 1950's to approximately 2008. Since that time, that property has been abandoned and is currently in a state of disrepair. With the exception of a church located to the north, surrounding land use is primarily residential.

In June 2009, a Limited Phase II Environmental Assessment was conducted at the site. The goal of the project was to decommission the existing the septic system and collect soil samples in areas formerly associated with nursery operations. Three soil samples were collected from a depth of approximately 1 foot below ground surface and analyzed for total metals and pesticides. Results are summarized below in Table 1.

Table 1: Soil Analytical Results

Sample ID#	Sample Location	DDT	Dieldrin	Arsenic	Lead
S-1	South Greenhouse	0.036	nd	9.77	28.5
S-2	North Greenhouse	0.014	0.038	7.14	17.3
S-3	Yard Area	nd	nd	8.07	145
MTCA Cleanup Level		[1]4.2	[1]0.063	[2]20	[2]250

Results are reported in milligrams per kilogram (mk/kg). Bold entries indicate MTCA exceedances.
[1]CLARC Method B cleanup level for carcinogen, direct contact, unrestricted land uses
[2]MTCA Method A cleanup level for unrestricted land uses
nd - Analyte not detected

The metals and pesticides detected in soil did not exceed applicable cleanup levels defined by the Washington State Department of Ecology Model Toxics Control Act (MTCA). However, since only a screening level assessment was conducted, the limited number of soil samples did not fully characterize potential impacts to subsurface soil and groundwater at the site. Additional analysis would be required to fully assess the site in accordance with MTCA standards.

ROUTE SCORES:

Surface Water/Human Health:	**26.0**	Surface Water/Environmental.:	**22.2**
Air/Human Health:	**27.5**	Air/Environmental:	**25.3**
Groundwater/Human Health:	**38.4**	**Final Rank:**	**2**

WORKSHEET 2
Route Documentation

1. **SURFACE WATER ROUTE**
   a. List those substances to be considered for scoring: Source: 1, 2
      Arsenic, DDT, DDE, Dieldrin, Lead, Chromium, Mercury
   b. Explain basis for choice of substance(s) to be used in scoring.
      The substances listed above were detected in surficial soil.
   c. List those management units to be considered for scoring: Source: 1, 2
      Contaminated soil.
   d. Explain basis for choice of unit to be used in scoring:
      Documented release to soil.

2. **AIR ROUTE**
   a. List those substances to be considered for scoring: Source: 1, 2
      Arsenic, DDT, DDE, Dieldrin, Lead, Chromium, Mercury
   b. Explain basis for choice of substance(s) to be used in scoring:
      The substances listed above were detected in surficial soil.
   c. List those management units to be considered for scoring: Source: 1, 2
      Contaminated soil.
   d. Explain basis for choice of unit to be used in scoring:
      Documented release to soil.

3. **GROUNDWATER ROUTE**
   a. List those substances to be considered for scoring: Source: 1, 2
      Arsenic, DDT, DDE, Dieldrin, Lead, Chromium, Mercury
   b. Explain basis for choice of substance(s) to be used in scoring:
      The substances listed above were detected in surficial soil.
   c. List those management units to be considered for scoring: Source: 1, 2
      Contaminated soil.
   d. Explain basis for choice of unit to be used in scoring:
      Documented release to soil.

WORKSHEET 4
Surface Water Route

1.0 SUBSTANCE CHARACTERISTICS

1.1 Human Toxicity

	Substance	Drinking Water Standard (µg/L)	Value	Acute Toxicity (mg/kg-bw)	Value	Chronic Toxicity (mg/kg/day)	Value	Carcinogenicity		Value
								WOE	PF*	
1	Arsenic	10	8	763 (rat)	5	0.001	5	1.0	1.75	7
2	DDT	ND	-	87 (rat)	8	0.0005	5	0.8	0.34	5
3	Dieldrin	ND	-	38.3 (rat)	10	5E-05	8	0.8	16	9
4	Lead	5	8	ND	-	0.001 (NOAEL)	10	ND	ND	-

Potency Factor, ND=No Data

Source: 3, 4

Highest Value: 10
(Max = 10)

Plus 2 Bonus Points? Yes

Final Toxicity Value: 12
(Max = 12)

1.2 Environmental Toxicity (X) Freshwater ( ) Marine

	Substance	Acute Water Quality Criteria		Non-Human Mammalian Acute Toxicity	
		(µg/L)	Value	(mg/kg)	Value
1	Arsenic	360	4		
2	DDT	1.1	8		
3	Dieldrin	2.5	8		
4	Lead	82	6		

Source: 3, 4

Value: 4
(Max = 10)

1.3 Substance Quantity (areal extent)

Explain Basis: Unknown. Use default Value=1.

Source: 1, 2

Value: 1
(Max = 10)

2.0 MIGRATION POTENTIAL

		Source	Value
2.1	**Containment:** Spills **Explain basis:** Contaminated soil with no run-on/runoff control	1, 2	**10** (Max = 10)
2.2	**Surface Soil Permeability:** fine sandy loam	7	**1** (Max = 7)
2.3	**Total Annual Precipitation:** 50.81 inches	5	**4** (Max = 5)
2.4	**Max 2yr/24hr Precipitation:** 3 inches	4	**3** (Max = 5)
2.5	**Flood Plain:** Not in a flood plain	7	**0** (Max = 2)
2.6	**Terrain Slope:** 0-2%	7	**1** (Max = 5)

3.0 TARGETS

		Source	Value
3.1	**Distance to Surface Water:** 2,700 feet – Indian Creek	7	**4** (Max = 10)
3.2	**Population Served within 2 miles:** 16 domestic single intakes (16 x 4 per household = 64 people est. Total population √64=8	9	**8** (Max = 75)
3.3	**Area Irrigated by surface water within 2 miles:** 397 acres. 0.75√397=14.9	9	**15** (Max = 30)
3.4	**Distance to Nearest Fishery Resource:** 2,700 feet – Indian Creek	7	**6** (Max = 12)
3.5	**Distance to, and Name(s) of, Nearest Sensitive Environment(s):** 1,500 feet – freshwater wetland	7	**9** (Max = 12)

4.0 RELEASE

Explain Basis: No confirmed release	Source: 1, 2 **Value: 0** (Max = 5)

WORKSHEET 5
Air Route

1.0 SUBSTANCE CHARACTERISTICS

1.1. Introduction

1.2 Human Toxicity

	Substance	Air Standard ($\mu g/m^3$)	Value	Acute Toxicity (mg/m^3)	Value	Chronic Toxicity (mg/kg/day)	Value	Carcinogenicity		Value
								WOE	PF*	
1	Arsenic	0.00023	10	ND	-	ND	-	1.0	1.75	7
2	DDT	0.01	10	ND	-	ND	-	0.8	0.34	5
3	Dieldrin	0.8	10	13	10	ND	-	0.8	16	9
4	Lead	0.5	10	ND	-	ND	-	ND	ND	-

**** Potency Factor, ND=No Data***

Source: 3, 4

Highest Value: 10
(Max = 10)

Plus 2 Bonus Points? Yes

Final Toxicity Value: 12
(Max = 12)

1.3 Mobility (Use numbers to refer to above listed substances)

	1.3.1 Gaseous Mobility	1.3.2 Particulate Mobility		
	Vapor Pressure(s) (mmHg)	Soil Type	Erodibility	Climatic Factor
1	Arsenic, Vapor Pressure NA	Fine sandy loam	86 tons/acre/yr	<1
2	DDT, Vapor Pressure NA	Fine sandy loam	86 tons/acre/yr	<1
3	Dieldrin, Vapor Pressure NA	Fine sandy loam	86 tons/acre/yr	<1
4	Lead, Vapor Pressure NA	Fine sandy loam	86 tons/acre/yr	<1

NA=Not Applicable

Source:

Value:
(Max = 4)

Source: 3, 4

Value: 1
(Max = 4)

1.4 Highest Human Health Toxicity/ Mobility Matrix Value (from Table A-7)

Final Matrix Value: 6
(Max = 24)

1.5 Environmental Toxicity/Mobility						
	Substance	**Non-human Mammalian Inhalation Toxicity (mg/m^3)**	**Acute Value**	**Mobility (mmHg)**	**Value**	**Matrix Value**
1	Arsenic	0.00023	NS	NA	NS	-
2	DDT	0.01	NS	NA	NS	-
3	Dieldrin	0.8	10	1.8E-07	1	5
4	Lead	0.5	NS	NA	NS	-

NS=Not Scored, NA=Not Applicable

Highest Environmental Toxicity/Mobility Matrix Value (from Table A-7) = **Final Matrix Value: 5**
(Max = 24)

1.6 Substance Quantity (areal extent)	
Explain Basis: Unknown. Use default Value=1.	Source: 1, 2 **Value: 1** (Max = 10)

2.0 MIGRATION POTENTIAL

		Source	Value
2.1	**Containment:** Spills, no cover	3, 4	**10** (Max = 10)

3.0 TARGETS

		Source	Value
3.1	**Nearest Population:** Less than 1,000 feet	7	**10** (Max = 10)
3.2	**Distance to [and name(s) of] nearest sensitive environment(s) [fisheries excluded]:** 1,500 feet – freshwater wetland	7	**6** (Max = 7)
3.3	**Population served within 0.5 miles:** √3801 = 61.6	9	**62** (Max = 75)

4.0 RELEASE

Explain Basis for scoring a release to air: No confirmed release	Source: 1, 2 **Value: 0** (Max = 5)

WORKSHEET 6
Groundwater Route

1.0 SUBSTANCE CHARACTERISTICS

1.2 Human Toxicity

	Substance	Drinking Water Standard (µg/L)	Value	Acute Toxicity (mg/ kg-bw)	Value	Chronic Toxicity (mg/kg/day)	Value	Carcinogenicity		Value
								WOE	PF*	
1	Arsenic	10	8	763 (rat)	5	0.001	5	1.0	1.75	7
2	DDT	ND	-	87 (rat)	8	0.0005	5	0.8	0.34	5
3	Dieldrin	ND	-	38.3 (rat)	10	5E-05	8	0.8	16	9
4	Lead	5	8	ND	-	0.001 (NOAEL)	10	ND	ND	-

* *Potency Factor, ND-No Data*

Source: 3, 4
Highest Value: 10
(Max = 10)
Plus 2 Bonus Points? Yes
Final Toxicity Value: 12
(Max = 12)

1.2 Mobility (use numbers to refer to above listed substances)

Cations/Anions [Coefficient of Aqueous Migration (K)] OR	Solubility (mg/L)
1=	**1=** Arsenic, Value=2
2= DDT, Value=0	**2=**
3= Dieldrin, Value=0	**3=**
4=	**4=** Lead, Value=2

Source: 3, 4
Value: 2
(Max = 3)

1.3 Substance Quantity (volume):

Explain basis: Unknown, use default value = 1	Source: 1, 2 **Value: 1** (Max=10)

2.0 MIGRATION POTENTIAL

		Source	Value
2.1	**Containment (explain basis):** Spills. No containment.	1, 2	**10** (Max = 10)
2.2	**Net precipitation:** Nov-Apr (inches): 38.54" total precipitation, 11.74" evapotranspiration rate, 38.54-11.74 = 26.80 net precip.	5, 6	**3** (Max = 5)
2.3	**Subsurface hydraulic conductivity:** Sand	7	**4** (Max = 4)
2.4	**Vertical depth to groundwater:** 27 feet (according to nearby well logs)	8, 9	**6** (Max = 8)

3.0 TARGETS

		Source	Value
3.1	**Groundwater usage:** Public/private supplies, alt. sources available	8, 9	**4** (Max = 10)
3.2	**Distance to nearest drinking water well:** 700 feet	7	**4** (Max = 5)
3.3	**Population served within 2 miles:** >10,000 people	8, 9	**10** (Max = 100)
3.4	**Area irrigated by (groundwater) wells within 2 miles:** 464 acres $(0.75)*\sqrt{464} = 16.1$	9	**17** (Max = 50)

4.0 RELEASE

	Source	Value
Explain basis for scoring a release to groundwater: No documented release	1, 2	**0** (Max = 5)

SOURCES USED IN SCORING

1. Hemphill, Green, & Associates, LLC., *Limited Phase II Environmental Assessment, Boulevard Nursery,* Travis S. Thornton, June 9, 2009.
2. Thurston County Environmental Health Division, *Initial Investigation Field Report, ERTS#614620,* Gerald Tousley, September 9, 2009.
3. Washington Department of Ecology, *Toxicology Database for Use in Washington Ranking Method Scoring*, January 1992.
4. Washington Department of Ecology, *WARM Scoring Manual*, April 1992.
5. Western Regional Climate Center, Precipitation data from the Olympia, Washington Airport, June 1948 to September 2005.
6. Table 16-Estimated Evapotranspiration, E.M. 2462, p42, for Thurston County Airport.
7. Thurston County Geodata Center, Roads and Transportation Division, September 2012.
8. Washington State Department of Health, Drinking Water Division, Sentry Database, August 2012.
9. Washington Department of Ecology, Water Resources Program, Water Right Tracking System (WRTS), August 2012.