Reviewed 1/26/10
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SITE HAZARD ASSESSMENT
WORKSHEET 1
Summary Score Sheet

SITE INFORMATION:

Name: Howard's Cleaners
Address: 4224 Pacific Ave SE
City: Lacey **County:** Thurston **State:** WA **Zip:** 98503
Section/Township/Range: S20/T18/R1W
Latitude: 47.03892 **Longitude:** -122.83104
TCP ID # 19341958
Date Scored: December 10, 2009
Site scored/ranked for the February 2010 Update

SITE DESCRIPTION:

Howard's Cleaners (Howard's) is located along the 4000 Block of Pacific Ave SE in Lacey Washington, adjacent to the Market Square Shopping Center (Market Square). The surrounding area is primarily commercial in nature and has experienced significant redevelopment since the 1990's. Prior to its current development, the surrounding properties contained a drive-in movie theater, insurance company, ice cream shop, and a rental car company. Another dry cleaning operation (Plaza Cleaners) was formerly located approximately 150 feet to the northwest of Howard's from 1963 to 1982.

Soils at the site include fine grained sand to a depth of approximately 9 feet below ground surface (bgs), cobbles from 9 to 10 feet bgs, and fine grained silty sand interbedded with gravel from 10 to 20 feet bgs. Groundwater ranges in depth from 15 to 17 feet bgs.

CURRENT SITE CONDITIONS:

In December 2003, Waterstone Environmental, Inc. (Waterstone) performed subsurface soil and groundwater sampling at the Market Square site. The purpose of the project was to evaluate ~~for~~ potential subsurface contamination resulting from adjacent dry cleaning operations. The investigation was focused along the northern property line separating the two sites, which included a shared alley and parking lot. The northern property boundary also contained a subsurface storm water pipe, which is connected to a catch basin located behind the Howard's building. A total of five soil borings were completed in the area, attach including four borings along the storm water pipe and one boring in the parking lot (See Figure XX). Soil and groundwater analysis confirmed the presence of tetrachloroethene (PCE) and trichloroethene (TCE) at concentrations exceeding the Washington Department of Ecology (Ecology) Model Toxics Control Act (MTCA) Method A cleanup levels. Similar analytical results were obtained during subsequent soil and groundwater sampling conducted in August 2007. Analytical results are summarized below in Tables 1 and 2.

TABLE 1: SOIL ANALYTICAL RESULTS

Boring #	Date	Depth (ft. bgs)	Tetrachloroethene (PCE)	Trichloroethene (TCE)
B3	Dec. 03	5	**0.069**	nd
B4	Dec. 03	5	**0.096**	nd
B5	Dec. 03	10	0.014	nd
B4-B	Aug. 07	5	**0.470**	nd
MTCA[1]			0.05	0.03

[1] *MTCA Method A Cleanup Level for Unrestricted Land Uses.*
Bold entries indicate MTCA exceedances.
All results are reported in milligrams per kilogram (mg/kg)
nd – not detected above the method detection limit

TABLE 2: GROUNDWATER ANALYTICAL RESULTS

Boring #	Date	Tetrachloroethene (PCE)	Trichloroethene (TCE)
B1	Dec. 03	**170**	**7.5**
B2	Dec. 03	**190**	**5.8**
B2-B	Aug. 07	**220**	**5.3**
B4-B	Aug. 07	**72**	2.2
MTCA[1]		5	5

[1] *MTCA Method A Cleanup Level.*
Bold entries indicate MTCA exceedances
All results are reported in micrograms per liter (ug/L)

CONCLUSION

Subsurface soil and groundwater contamination has been confirmed in the vicinity of the storm water conveyance piping. Storm water entering the catch basin located on the northwest corner of Howard's site is conveyed in this piping along the northern property line shared by Market Square. Since an Environmental Site Assessment (ESA) has not been completed at Howard's, the point source of the release has not been confirmed. However, improper waste disposal into the storm drain has occurred in the past. Waterstone reported that Ecology cited Howard's for illegally dumping at least 10 gallons of corrosive waste into the storm drain in March 2002. Furthermore, it is not known if the Howard building contains indoor floor drains, which have the potential to be connected to the storm water system or a drywell.

SPECIAL CONSIDERATIONS

Waterstone stated, "Based on the topography, location of major waterways, and groundwater sampling results, groundwater is likely flowing in a northwest direction from Howard's Cleaners onto the Market Square property." However, no groundwater measurements have been obtained utilizing permanent, surveyed monitoring wells, so the actual groundwater gradient has not been confirmed.

ROUTE SCORES:

Surface Water/Human Health: 3.6 1
Air/Human Health: 38.5 5
Groundwater/Human Health: 78.5 5
5

Surface Water/Environmental: 2.2 1
Air/Environmental: 8.2 2
OVERALL RANK: ~~2~~ 1
1

WORKSHEET 2
Route Documentation

1. **SURFACE WATER ROUTE**

   a. List those substances to be considered for scoring: Source: 1

   Tetrachloroethene (PCE), Trichloroethene (TCE)

   b. Explain basis for choice of substance(s) to be used in scoring.

   Documented presence of PCE and TCE in excess of MTCA Method A cleanup levels in shallow subsurface soils, located adjacent to storm water conveyance piping.

   c. List those management units to be considered for scoring: Source: 1

   Contaminated soil

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

   Documented presence of PCE and TCE in excess of MTCA Method A cleanup levels in soil.

2. **AIR ROUTE**

   e. List those substances to be considered for scoring: Source: 1

   Tetrachloroethene (PCE), Trichloroethene (TCE)

   f. Explain basis for choice of substance(s) to be used in scoring:

   Documented presence of PCE and TCE in excess of MTCA Method A cleanup levels in shallow subsurface soils, located adjacent to storm water conveyance piping.

   g. List those management units to be considered for scoring: Source: 1

   Contaminated soil

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

   Documented presence of PCE and TCE in excess of MTCA Method A cleanup levels in soil.

3. **GROUNDWATER ROUTE**

   i. List those substances to be considered for scoring: Source: 1

   Tetrachloroethene (PCE), Trichloroethene (TCE)

   j. Explain basis for choice of substance(s) to be used in scoring:

   Documented presence of PCE and TCE in excess of MTCA Method A cleanup levels in groundwater.

   k. List those management units to be considered for scoring: Source: 1

   Contaminated groundwater

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

   Documented presence of PCE and TCE in excess of MTCA Method A cleanup levels in groundwater.

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	Tetrachloroethene (PCE)	5	8	800 rat	5	0.01	3	0.8	.0408	3
2	Trichloroethene (TCE)	5	8	2402 mus	3	ND	-	0.8	.0088	4

Potency Factor, ND=No Data

Source: 2, 3
Highest Value: 8
(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	Tetrachloroethene (PCE)	5280	2		
2	Trichloroethene (TCE)	45000	2		
3					
4					

Source: 2, 3
Highest Value: 2
(Max = 10)

1.3 Substance Quantity (areal extent)

Explain Basis: Unknown. Use default value = 1

Source: 1
Value: 1
(Max = 10)

2.0 MIGRATION POTENTIAL

		Source	Value
2.1	**Containment:** Score as spills **Explain basis:** Contaminated soil only occurs at the subsurface.	1	**0** (Max = 10)
2.2	**Surface Soil Permeability:** Piped to surface water	1	**7** (Max = 7)
2.3	**Total Annual Precipitation:** 50.81 inches	4	**4** (Max = 5)
2.4	**Max 2yr/24hr Precipitation:** 3.0 inches	3	**3** (Max = 5)
2.5	**Flood Plain:** Not in a flood plain	6	**0** (Max = 2)
2.6	**Terrain Slope:** $\leq$2%	6	**1** (Max = 5)

3.0 TARGETS

		Source	Value
3.1	**Distance to Surface Water:** Approx. 2,700 feet	1	**6** (Max = 10)
3.2	**Population Served within 2 miles:** 32 Single Domestic Connections x 3 people per connection = 96 total. 3 Multiple Domestic Connections x 12 people per connection = 36 total. Total population = $\sqrt{108}$ = 10.3	8	**11** (Max = 75)
3.3	**Area Irrigated by surface water within 2 miles:** 349.87 acres. $0.75\sqrt{350}$=14.0	8	**14** (Max = 30)
3.4	**Distance to Nearest Fishery Resource:** Chambers Lake. 5,000 feet	6	**6** (Max = 12)
3.5	**Distance to, and Name(s) of, Nearest Sensitive Environment(s):** Wetland. 2,000 feet	6	**9** (Max = 12)

4.0 RELEASE

Explain Basis: No documented release	Source: 1 **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	Tetrachloroethene (PCE)	1.1	9	ND	-	0.01	3	0.8	ND	-
2	Trichloroethene (TCE)	0.8	10	15583	1	ND	-	0.8	.0136	3
3										
4										

** Potency Factor, ND=No Data*

Source: 1
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	PCE, 1.8E+01, Value 4			
2	TCE, 5.8E+01, Value 4			
3				
4				

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

Source:
Value:
(Max = 4)

1.4 Highest Human Health Toxicity/ Mobility Matrix Value (from Table A-7)
PCE: Toxicity = 9 , Mobility = 4, Final Value = 18
TCE: Toxicity = 10, Mobility = 4, Final Value = 20

Final Matrix Value: 20
(Max = 24)

1.5 Environmental Toxicity/Mobility						
	Substance	**Non-human Mammalian Inhalation Toxicity (mg/m^3)**	**Acute Value**	**Mobility (mmHg)**	**Value**	**Matrix Value**
1	PCE	ND	-	1.8E+01	4	-
2	TCE	ND	1	5.8E+01	4	

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

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

2.0 MIGRATION POTENTIAL

		Source	Value
2.1	**Containment:** Paved site, score as landfill: Soil cover >6 inches thick with no vapor collection.	1	**6** (Max = 10)

3.0 TARGETS

		Source	Value
3.1	**Nearest Population:** Less than 1,000 feet.	6	**10** (Max = 10)
3.2	**Distance to [and name(s) of] nearest sensitive environment(s) [fisheries excluded]:** Wetland. 2,000 feet	6	**6** (Max = 7)
3.3	**Population within 0.5 miles:** $\sqrt{3225} = 59.8$	6	**60** (Max = 75)

4.0 RELEASE

Explain Basis for scoring a release to air: No documented release	Source:1 **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	Tetrachloroethene (PCE)	5	8	800 rat	5	0.01	3	0.8	.0408	3
2	Trichloroethene (TCE)	5	8	2402 mus	3	ND	-	0.8	.0088	4

** Potency Factor, ND=No Data*

Source: 2, 3
Highest Value: 8
(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=	Tetrachloroethene (PCE), 1.5E+02, Value 2
2=	Trichloroethene (TCE), 1.1E+03, Value 3

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

1.3 Substance Quantity (volume):

Explain basis: Unknown. Use default value = 1

Source: 1
Value: 1
(Max=10)

MIGRATION POTENTIAL

		Source	Value
2.1	**Containment (explain basis):** Spills	1	**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.	4, 5	**3** (Max = 5)
2.3	**Subsurface hydraulic conductivity:** silty sand, gravel, cobbles. $>10^{-3}$	1	**4** (Max = 4)
2.4	**Vertical depth to groundwater:** 15-17 feet bgs	1	**8** (Max = 8)

2.0 TARGETS

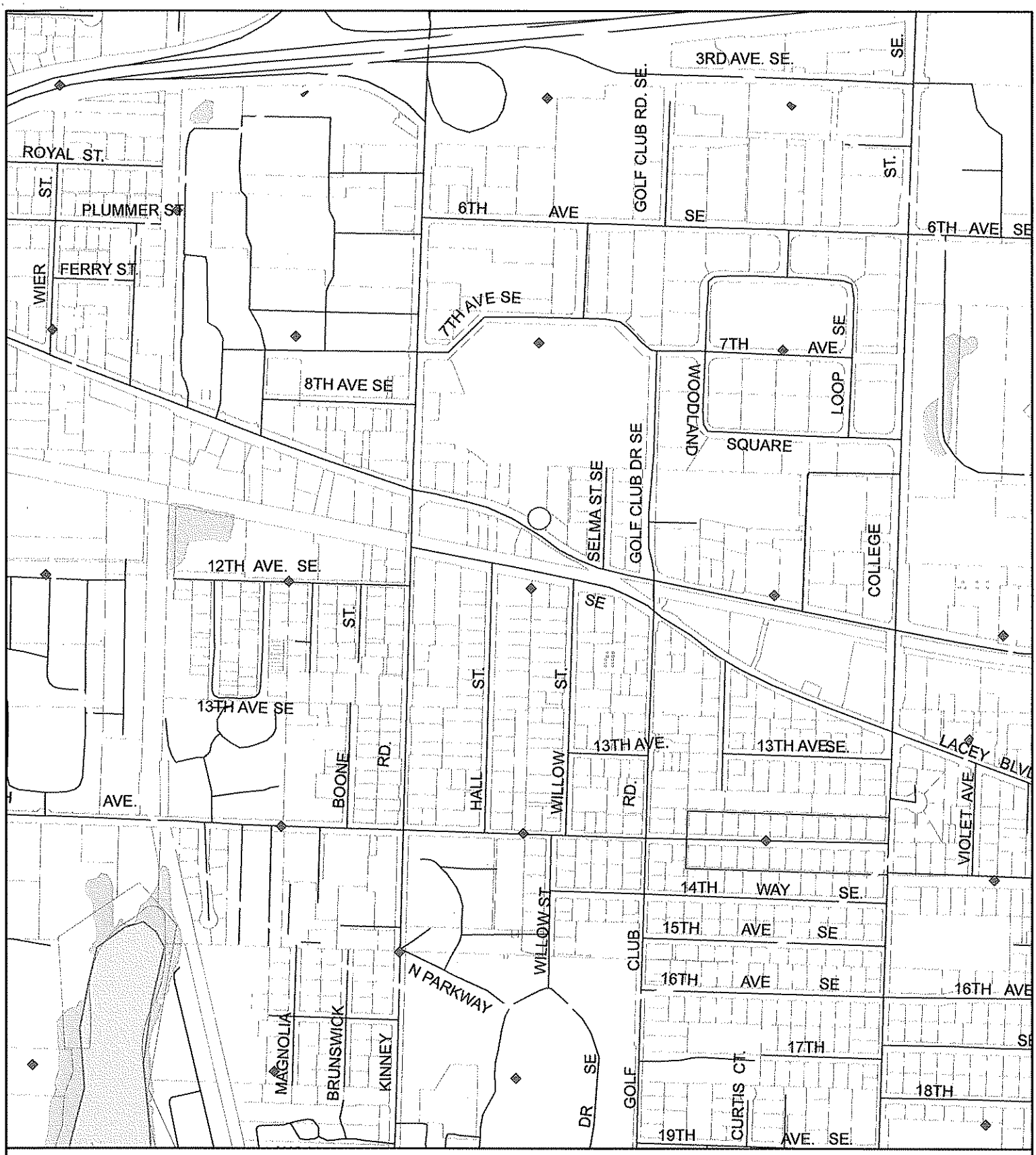
		Source	Value
3.1	**Groundwater usage:** Public supply, alternate sources available.	6	**4** (Max = 10)
3.2	**Distance to nearest drinking water well:** <600ft	6	**5** (Max = 5)
3.3	**Population served within 2 miles:** >10,000 people	7, 8	**100** (Max = 100)
3.4	**Area irrigated by (groundwater) wells within 2 miles:** 278.2 acres. $0.75\sqrt{278}=12.5$	8	**13** (Max = 50)

3.0 RELEASE

	Source	Value
Explain basis for scoring a release to groundwater: Confirmed release	1	**5** (Max = 5)

SOURCES USED IN SCORING

1. Waterstone Environmental, Inc., *Report of Soil and Groundwater Sampling, Subject Property Located at 4224 Pacific Avenue Southeast, Lacey, Washington,* December 21, 2007.
2. Washington State Department of Ecology, *Toxicology Database for Use in Washington Ranking Method Scoring*, January 1992.
3. Washington State Department of Ecology, *WARM Scoring Manual*, April 1992.
4. Western Regional Climate Center, Precipitation data from the Olympia, Washington Airport, June 1948 to September 2005.
5. Table 16-Estimated Evapotranspiration, E.M. 2462, p. 42, for Thurston County Airport.
6. Thurston County Geodata Center, Roads and Transportation Division, August 2009.
7. Washington State Department of Health, Drinking Water Division, Sentry Database, August 2009.
8. Washington State Department of Ecology, Water Resources Program, Water Right Tracking System (WRTS), August 2009.



Howards Cleaners

Half Mile Radius Around Site

Wetland

Sensitive Species Location

Well

Stream

Roads

THURSTON COUNTY

Howards Cleaners
Ecology Site ID #19341958
Half Mile Radius Analysis

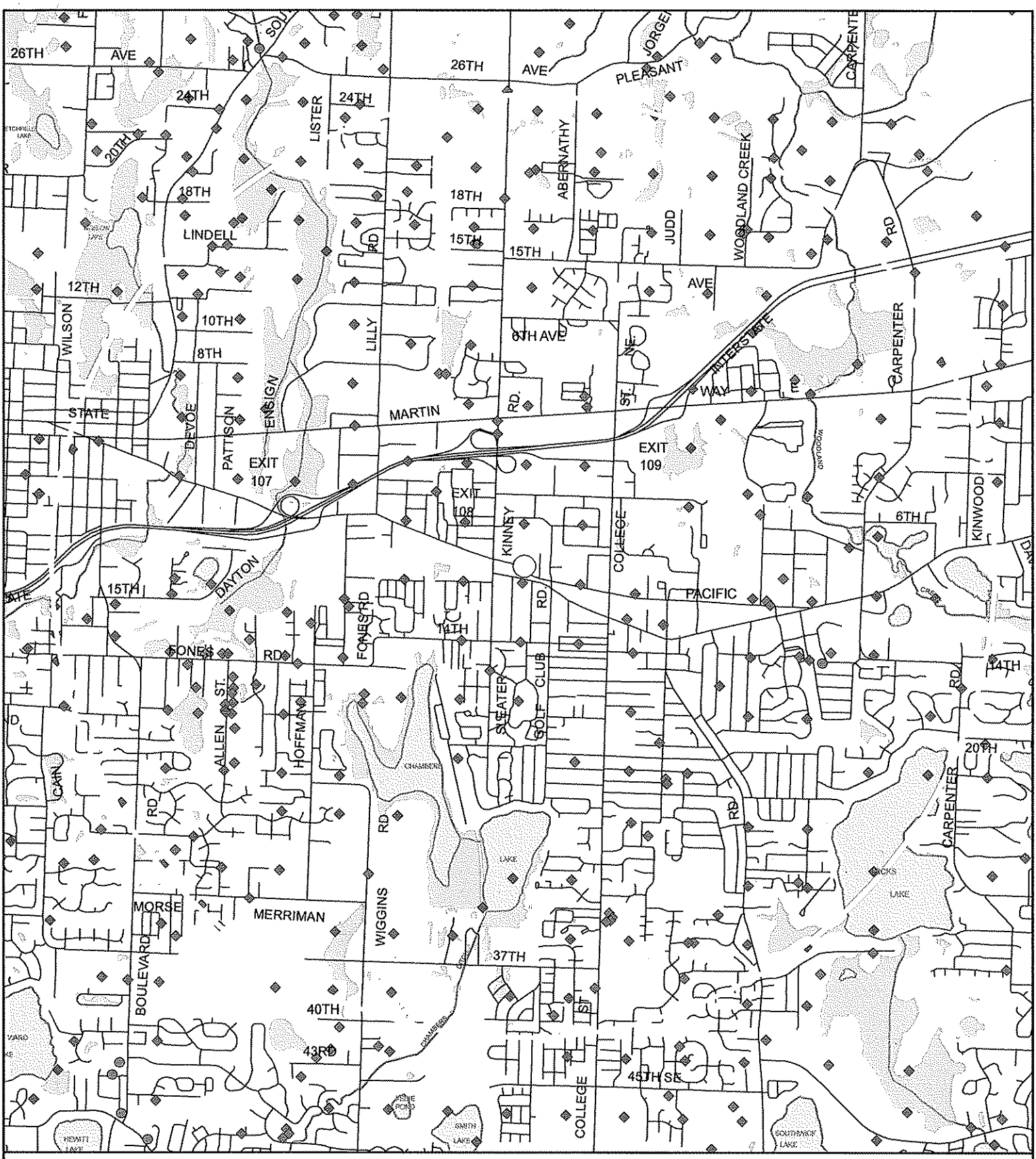
Apprximate Population (2000 Census) within Half Mile Radius: 3225

0 0.125 0.25 Miles

Thurston GeoData Center

THURSTON COUNTY

Map Created on 08/25/2009 abc



- Howards Cleaners
- Two Mile Radius Around Site
- Wetland
- Sensitive Species Location
- Well
- Stream
- Roads

THURSTON COUNTY

Howards Cleaners
Ecology Site ID #19341958
Two Mile Radius Analysis

Apprximate Population (2000 Census) within Two Mile Radius: 35,051

0 0.5 1 Miles

Thurston GeoData Center

THURSTON COUNTY

Map Created on 08/25/2009 abc