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Broome County Division of Solid Waste Management

Soil Vapor Screening Evaluation Work Plan

Colesville Landfill
Broome County, New York
NYSDEC Site 704010

16 August 2006

ARCADIS

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1. Introduction

On behalf of the Broome County Division of Solid Waste Management, ARCADIS has prepared this Soil Vapor Screening Evaluation Work Plan (Work Plan) to evaluate the potential for indoor air vapor intrusion at residences in the vicinity of the Colesville Landfill (Site). The Site is located in Broome County, New York. The scope of work presented in this Work Plan has been developed in response to a suggestion that was provided in the U.S. Environmental Protection Agency (EPA) Second Five-Year Review Report for the Site dated April 2005. The EPA suggested that sub-slab soil vapor samples be collected beneath homes located hydraulically downgradient of the Site to evaluate the potential for vapor intrusion. Based on follow up discussions with EPA, it was mutually agreed that soil vapor samples would be collected from the interval immediately above the water table to evaluate the potential for vapor intrusion. Consequently, the scope of work presented in this Work Plan has been developed to evaluate volatile organic compounds (VOCs) in soil vapor in the vicinity of the residences.

Based on a number of discussions and correspondences with the EPA during 2006, the key aspects of the work scope are as follows:

- Soil borings will be advanced in the vicinity of the residences and along East Windsor Road.
- Soil vapor samples will be collected at the interval just above the water table.
- The soil vapor sample results will be evaluated in accordance with the Office of Solid Waste and Emergency Response (OSWER) document entitled, "Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance)".
    - ➢ The soil vapor sample data will be compared to Target Shallow and Deep Soil Gas Concentrations and evaluated using attenuation factors.
- A summary report will be prepared that describes the sampling methodology and data evaluation, and provides conclusions and recommendations.

2. Environmental Setting

The following subsections of this Work Plan describe the soil type in the vicinity of the proposed soil borings and recent environmental conditions as they relate to groundwater flow conditions and groundwater quality.

2.1 Soil Type

The soil type in the vicinity of the proposed soil borings is glacial till. The surficial till is generally brown in color, consisting of sand and gravel, with some clay and silt. The density of the material, as determined during drilling during remedial investigation activities, was quite low with blow counts generally less than 20 per six inches.

2.2 Groundwater Flow Conditions

Water-level measurements collected in existing wells in June 2005 and September 2005 are provided in Table 1. The depth to water in the vicinity of the residences ranges from 7 to 10 feet below the ground surface. Water-level elevations and the groundwater flow direction for the September 2005 monitoring event are shown on Figure 1. As shown on Figure 1, the groundwater flow direction in the project area (i.e., adjacent to the landfill western perimeter) and site-wide for the September 2005 round is toward the southwest from the western perimeter of the landfill. The groundwater flow direction in areas further to the east of the project area is toward the south/southwest. The groundwater flow direction in the project area was consistent with previous rounds.

2.3 Groundwater Quality

As shown in Table 2, total VOC (TVOC) concentrations detected in groundwater in monitoring wells ranged from not detected above laboratory reporting limits to 1,378 micrograms per liter (ug/L) (GMMW-6). TVOC concentrations in monitoring wells located in the vicinity and south of East Windsor Road were less than 150 ug/L. The primary constituent of potential concern (COPC) detected downgradient of the Site relative to the soil vapor intrusion pathway is trichloroethylene (TCE).

3. Soil Vapor Screening Evaluation

Consistent with the scope of work objectives described in Section 1, this Work Plan focuses on determining if there is a potential for the vapor intrusion pathway to be

complete in the vicinity of the residences located hydraulically downgradient of the Site. To meet this objective, a screening evaluation will be conducted through the collection of soil vapor samples in the vicinity of the residences.

3.1 EPA Second Five-Year Review Evaluation

The EPA evaluated the potential for vapor intrusion during the Second Five-Year Review. Soil vapor intrusion was evaluated by the EPA based on the health-protective assumption that residences are located above the maximum chemical concentrations detected in downgradient off-site monitoring wells. Only the off-site wells were used by the EPA in the vapor intrusion evaluation since on-site wells exhibit concentrations that do not realistically represent groundwater quality beneath the residences downgradient of the Site.

EPA compared maximum concentrations of VOCs in the downgradient off-site monitoring wells from sampling data collected between 2002 and 2004 with the health-based screening criteria provided in the "Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (EPA, 2002)." This guidance provides chemical-specific groundwater concentrations protective of indoor air at a cancer risk ranging from one in a million to one in ten thousand and a noncancer hazard quotient (HQ) of 1.0.

As described previously, TCE is the primary COPC in groundwater. The maximum concentration of TCE detected in a downgradient off-site monitoring well (W-18 at 19 ug/l) was compared to the EPA Target Groundwater Concentration (5.3 µg/L) at a cancer risk of one in ten thousand (10^{-4}). Although this value is greater than the Target Groundwater Concentration, monitoring well W-18 is located on a property where there is currently an abandoned house and therefore, there are no current exposures. However, these results do suggest that vapor intrusion could potentially be a route of future exposure if a residential dwelling is constructed. As discussed previously, the depth to water in well W-18 ranges from 7 to 10 feet below the ground surface. It is unlikely that groundwater VOC concentrations in well W-18 are present at similar concentrations near occupied residences, which are either sidegradient of the highest VOC concentrations in groundwater, or are located on the other side of the North Stream.

3.2 Sampling Approach and Methodology

To evaluate VOCs in soil vapor, six (6) soil borings (SV-1 through SV-6) will be advanced for the collection of soil cores and soil vapor samples along East Windsor Road. The proposed soil boring locations are shown on Figure 1. The proposed soil boring locations are positioned to meet the objective of the screening evaluation. Specifically, the proposed soil borings are located to provide areal coverage and are situated along a transect that is generally transverse to the direction of groundwater flow. Three of the proposed soil borings are located in the vicinity of the Riley residence (abandoned house), the Scott residence, and the Smith residence. SV-1 is located in the vicinity of the Riley residence and upgradient of well W-18, SV-2 and SV-3 are located between SV-1 and the Scott residence, SV-4 is located near the Scott residence and downgradient of well W-16, SV-5 is located between the Scott and Smith residences, and SV-6 is located near the Smith residence. Soil borings SV-1, SV-4, and SV-6 will be advanced at least 10 feet away from the residential structures.

A soil boring will be advanced at each location to a depth of approximately 10 to 12 feet below land surface (ft bls) for the collection of continuous soil cores. The soil cores will be used to characterize the soil lithology and to determine the depth of the water table in the vicinity of the soil vapor sample locations. After the soil cores have been collected, a separate boring will be advanced approximately five feet from the soil boring for the collection of the soil vapor sample.

3.2.1 Soil Core Collection Methodology

The soil cores will be collected using a Geoprobe® direct push drill rig and a Geoprobe® Macro-Core Soil Sampler. The Geoprobe® Macro-Core Soil Sampler will be fitted with acetate liners dedicated to each soil core. The soil cores will be logged and the soil lithology and moisture content will recorded. The soil borings will be backfilled with the soil core material and clean sand.

Soil from the two-foot interval above the soil vapor sample depth (e.g., 5 to 7 foot soil core if the soil vapor sample is collected at 7 ft bls and the depth to water is 8 ft bls) will be submitted to a laboratory for grain size analysis by American Society for Testing and Materials (ASTM) D422 Standard Test Method for Particle-Size Analysis of Soils.

3.2.2 Soil Vapor Sampling Methodology

Soil vapor samples will be collected using the following methodology. At each location, ARCADIS will install a temporary soil vapor sampling point using a Geoprobe® direct push drill rig and the Geoprobe® Post Run Tubing (PRT) System. The PRT System allows for the collection of soil vapor samples at the desired sampling depth while significantly reducing the chances of rod leakage and ambient air contamination. O-ring connections enable the PRT System to deliver a vacuum-tight seal that prevents sample contamination from ambient air and assures that the sample is taken from the desired depth at the bottom of the boring. A tracer gas (i.e., helium) test will be conducted at one of the soil boring locations to check the seal established around the temporary soil vapor sampling point.

A temporary soil vapor sampling point consisting of 1.25-inch diameter steel drive rods will be advanced to a depth approximately one foot above the water table. An expendable PRT System point holder and expendable PRT System point will be affixed at the downhole end of the rods. Once the desired sample depth is reached, the sampling assembly will be retracted approximately 6 inches, allowing the expendable point to disengage from the rods, and creating a void in the subsurface for soil vapor sample collection. A bentonite seal will be placed around the outside of the rods at the ground surface. Teflon®-lined tubing and a PRT adapter will then be inserted down the center of the rods. The system is airtight and the potential for rod leakage is significantly reduced using O-ring connections. New Teflon®-lined tubing will be used at each sample location.

The soil vapor samples will be collected in batch certified, pre-cleaned 6-liter SUMMA® canisters provided by Air Toxics, Ltd. (ATL), a NYSDOH approved laboratory, located in Folsom, California. All samples will be analyzed for the twenty-one (21) site-related VOCs shown in Table 2 by U.S. Environmental Protection Agency (USEPA) Method TO-15. The whole-air sample will be analyzed using a gas chromatograph/mass spectrometer (GC/MS) system to provide low-level target compound detection limits of 0.1 parts per billion volume (ppbv).

Prior to sampling, a portable vacuum pump will be used to purge at least 1.5 volumes of air from the temporary soil vapor sampling point and tubing at a rate of approximately 100 to 200 mL/min. A laboratory pre-calibrated 0.5-hour flow controller (i.e., calibrated to collect the soil vapor sample at a rate of less than 200 mL/min) with an in-line particulate filter will be attached to the SUMMA® canister. Following purging, the tubing will be connected to the flow controller and the SUMMA® canister. The

SUMMA® canister valve will be opened, the sample start time and initial vacuum will be recorded, and the soil vapor sample will be collected. The SUMMA® canister vacuum and sample time duration will be monitored during sampling and the SUMMA® canister valve will be closed when the vacuum is between 2 and 5 inches of Hg. The sample end time and final vacuum will be recorded. Weather-related data such as barometric pressure and wind speed will also be recorded. The SUMMA® canisters will then be submitted to ATL for analysis.

A duplicate soil vapor sample will be collected at the SV-1 location. The duplicate sample will be collected at the same time as the SV-1 sample using a stainless steel "T" fitting, a second SUMMA® canister, and the procedures described above.

4. Data Evaluation and Reporting

The soil vapor sample analytical results will be evaluated in accordance with the OSWER document entitled, "Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance)". The soil vapor sample data will be compared to Target Shallow or Deep Soil Gas Concentrations (Table 2a Screening Levels). Target Shallow Soil Gas Concentrations will be used if the sample is collected at 5 feet or less from the base of the foundation level of a structure. Target Deep Soil Gas Concentrations will be used if the sample is collected at a depth greater than approximately 5 feet below the foundation level of a structure or if the sample is collected at a depth greater than 5 feet below land surface if no structure exists at the sample location. Generic attenuation factors are used in Table 2a. Table 2a was developed with a risk equal to 1×10^{-4}, which represents a cancer risk of one in ten thousand.

If the soil vapor sample concentration data exceed the Target Shallow or Deep Soil Gas Concentrations (depending on the depth of the sample location) provided in Table 2a, a site-specific Target Shallow or Deep Soil Gas Concentration will be calculated using the scenario-specific attenuation factors provided in Figure 3a based on soil type and depth to groundwater. This information will be used to select a Target Soil Gas Concentration (Table 3a Soil Gas Screening Levels) at a 1×10^{-4} risk level.

At the completion of these comparisons, a summary report will be prepared that describes the sampling methodology and data evaluation, and provides conclusions and recommendations.

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Table 1. Water-Level Measurements Collected During 2005, Colesville Landfill, Broome County, New York.

Well Identification	MP Elevation (feet above msl)	6/21/2005 Depth to Water (feet below MP)	6/21/2005 Water-Level Elevation (feet above msl)	9/13/2005 Depth to Water (feet below MP)	9/13/2005 Water-Level Elevation (feet above msl)	MP Description
GMMW-2	1030.95	AM	AM	36.38	994.57	Inner casing
GMMW-5	1043.66	47.78	995.88	47.16	996.50	Inner casing
GMMW-6	1033.56	37.77	995.79	38.84	994.72	Inner casing
GMMW-7	1045.43	NM	NM	46.89	998.54	Inner casing
PW-3	988.92	10.92	978.00	13.09	975.83	Inner casing
PW-4	1001.75	16.15	985.60	17.88	983.87	Inner casing
PW-5	986.12	AM	AM	AM	AM	Inner casing
W-5	1051.41	50.35	1001.06	50.90	1000.51	Inner casing
W-6	1050.38	47.35	1003.03	49.02	1001.36	Inner casing
PW-7	1042.47	39.46	1003.01	38.79	1003.68	Inner casing
W-7	1049.12	40.87	1008.25	42.24	1006.88	Inner casing
PW-10	1049.29	35.17	1014.12	AM	AM	Inner casing
PW-13	1072.41	58.73	1013.68	60.41	1012.00	Inner casing
W-13	1053.43	44.64	1008.79	46.43	1007.00	Inner casing
W-14S	957.68	9.41	948.27	11.34	946.34	Inner casing
W-16S	990.33	10.59	979.74	10.08	980.25	Outer casing
W-17S	959.13	10.43	948.70	12.26	946.87	Inner casing
W-18	973.56	11.46	962.10	10.67	962.89	Inner casing
W-20S	952.88	10.00	942.88	11.81	941.07	Inner casing

msl Mean sea level.
MP Measuring point.
NM Not measured.
AM Anomalous measurement.

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Table 2. Concentrations of Volatile Organic Compounds Detected in Groundwater Between December 2004 and September 2005, Colesville Landfill, Broome County, New York.

Constituents (units in ug/L)	Sample ID: / Date:	GMMW-02 12/8/2004	GMMW-02 3/24/2005	GMMW-02 6/22/2005	GMMW-2 9/15/2005	GMMW-05 12/7/2004	GMMW-05 3/24/2005	GMMW-05 6/21/2005	GMMW-5 9/15/2005	GMMW-06 12/9/2004	GMMW-06 3/24/2005	GMMW-06 6/21/2005
1,1,1-Trichloroethane		**62**	**57**	**57**	**38**	<10	<10	<10	<5	<10	<10	<10
1,1,2-Trichloroethane		<1.0	<1	<1.0	<1	<10	<10	<10	<5	<10	<10	<10
1,1-Dichloroethane		**120**	**120**	**130**	**110**	**110**	**150**	**88**	**47**	**520**	**390**	**370**
1,1-Dichloroethene		**2.3**	**2.8**	**2.7**	**2**	<10	<10	<10	<5	<10	<10	<10
1,2-Dichloroethane		<1.0	<1	<1.0	<1	<10	<10	<10	<5	<10	<10	<10
1,2-Dichloropropane		<1.0	<1	<1.0	<1	<10	<10	<10	<5	<10	<10	<10
Benzene		**3.6**	**3.6**	**4.0**	**3.4**	<10	<10	<10	<5	<10	<10	<10
Chlorobenzene		**44**	**38**	**42**	**40**	**17**	**25**	**28**	**45**	**38**	**31**	**32**
Chloroethane		**38**	**40**	**45**	**37**	**90**	**190**	**240**	**240**	**250**	**190**	**120**
Chloroform		<1.0	<1	<1.0	<1	<10	<10	<10	<5	<10	<10	<10
cis-1,2-Dichloroethene		**150**	**150**	**150**	**150**	**360**	**180**	**96**	**150**	**290**	**170**	**200**
Dichlorodifluoromethane		**1.5**	<1	**1.9**	<1	<10	<10	<10	<5	<10	<10	<10
Ethylbenzene		<1.0	<1	<1.0	<1	<10	<10	<10	<5	<10	<10	<10
Methylene chloride		<2.0	**1.9**	**2.0**	<1	<10	<10	<10	<5	**21**	**16**	<10
Methyl tert-butyl ether		<1.0	<1	<1.0	<1	<10	<10	<10	<5	<10	<10	<10
o-Xylene		<1.0	<1	<1.0	<1	<10	<10	<10	<5	<10	<10	<10
Tetrachloroethene		<1.0	<1	<1.0	<1	<10	<10	<10	<5	**13**	<10	<10
Toluene		<1.0	<1	<1.0	<1	<10	<10	<10	**6.2**	<10	<10	<10
trans-1,2-Dichloroethene		**2**	<1	<1.0	<1	<10	<10	<10	<5	<10	<10	<10
Trichloroethene		**110**	**90**	**100**	**84**	<10	<10	<10	<5	**16**	<10	**10**
Vinyl chloride		**21**	**20**	**22**	**18**	<10	**31**	**23**	**32**	**230**	**170**	**94**
Total VOCs		**554.4**	**523.3**	**556.6**	**482.4**	**577.0**	**576.0**	**475.0**	**520.2**	**1,378.0**	**967.0**	**826.0**

Bold Constituent detected above MDL.

VOCs Volatile Organic Compounds.
ug/L Micrograms per liter.
* Field replicate.
J Estimated value.
MDL Method detection limit.
NA Not analyzed.

Table 2. Concentrations of Volatile Organic Compounds Detected in Groundwater Between December 2004 and September 2005, Colesville Landfill, Broome County, New York.

Constituents (units in ug/L)	Sample ID:	GMMW-06	GMMW-06*	PW-03	PW-03	PW-04	PW-04	PW-04	PW-04	PW-05	PW-05	PW-07
	Date:	9/15/2005	9/15/2005	3/23/2005	9/15/2005	12/9/2004	3/24/2005	6/21/2005	9/14/2005	3/25/2005	9/15/2005	9/13/2005
1,1,1-Trichloroethane		**40J**	**3.8J**	**13**	**16**	**22**	**18**	**21**	**16**	<1	<1	<1
1,1,2-Trichloroethane		<5J	**2.6J**	<1	<1	<1	<1	<1.0	<1	<1	<1	<1
1,1-Dichloroethane		**110J**	**390J**	**37**	**40**	**16**	**13**	**23**	**13**	**5.7**	<1	**4.4**
1,1-Dichloroethene		<5J	**1.4J**	<1	<1	<1	<1	<1.0	<1	<1	<1	<1
1,2-Dichloroethane		<5	<1	<1	<1	<1	<1	<1.0	<1	<1	<1	<1
1,2-Dichloropropane		<5J	**1.2J**	<1	<1	<1	<1	<1.0	<1	<1	<1	<1
Benzene		<5J	**6.0J**	<1	<1	<1	<1	<1.0	<1	<1	<1	<1
Chlorobenzene		**39**	**36**	<1	<1	<1	<1	<1.0	<1	<1	<1	**3.8**
Chloroethane		**34J**	**150J**	**9.6**	**6.5**	**4.6**	**4.6**	**9.7**	**4.9**	**1.4**	<1	**6.9**
Chloroform		<5	**1.3**	**1.7**	**1.6**	**1.7**	**1.6**	**1.3**	**1.2**	<1	<1	<1
cis-1,2-Dichloroethene		**150**	**190**	**42**	**39**	**15**	**15**	**25**	**15**	**60**	**3.6**	<1
Dichlorodifluoromethane		<5J	**3.9J**	<1	<1	**2.0**	<1	**1.7**	<1	<1	<1	<1
Ethylbenzene		<5	<1	<1	<1	<1	<1	<1.0	<1	<1	<1	<1
Methylene chloride		<5J	**11J**	**2**	**1.6**	<1	<1	<1.0	<1	<1	<1	<1
Methyl tert-butyl ether		<5	<1	<1	<1	<1	<1	<1.0	<1	<1	<1	<1
o-Xylene		<5	<1	<1	<1	<1	<1	<1.0	<1	<1	<1	<1
Tetrachloroethene		<5	<1	**2.7**	**3.3**	<1	<1	<1.0	<1	<1	<1	<1
Toluene		<5J	**1.5J**	<1	<1	<1	<1	<1.0	<1	<1	<1	<1
trans-1,2-Dichloroethene		<5	<1	<1	<1	**1.8**	<1	<1.0	<1	<1	<1	<1
Trichloroethene		**78J**	**9.2J**	**23**	**25**	**28**	**20**	**27**	**21**	**2.8**	<1	**1.3**
Vinyl chloride		**17J**	**110J**	<1	**1.9**	<1	<1	**1.7**	<1	**2.3**	<1	<1
Total VOCs		**468**	**917.9**	**131.0**	**134.9**	**91.1**	**72.2**	**110.4**	**71.1**	**72.2**	**3.6**	**16.4**

Bold Constituent detected above MDL.

VOCs Volatile Organic Compounds.
ug/L Micrograms per liter.
* Field replicate.
J Estimated value.
MDL Method detection limit.
NA Not analyzed.

Table 2. Concentrations of Volatile Organic Compounds Detected in Groundwater Between December 2004 and September 2005, Colesville Landfill, Broome County, New York.

Constituents (units in ug/L)	Sample ID: / Date:	PW-13 9/13/2005	W-05 12/8/2004	W-05 3/24/2005	W-05 6/22/2005	W-05 9/15/2005	W-06 3/22/2005	W-06 9/14/2005	W-07 3/23/2005	W-07 9/13/2005	W-13 9/13/2005	W-14S 9/13/2005
1,1,1-Trichloroethane		<1	**2**	**2.4**	**7.4**	<1	<1	<1	<1	**28**	<1	<1
1,1,2-Trichloroethane		<1	<1	<1	<1.0	<1	<1	<1	<1	<1	<1	<1
1,1-Dichloroethane		**5.6**	**97**	**91**	**120**	**77**	**31**	**30**	**3.6**	**170**	<1	<1
1,1-Dichloroethene		<1	<1	<1	<1.0	<1	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane		<1	<1	<1	<1.0	<1	<1	<1	<1	<1	<1	<1
1,2-Dichloropropane		<1	<1	<1	<1.0	<1	<1	<1	<1	<1	<1	<1
Benzene		<1	**3.8**	**3.3**	**4.9**	**4.2**	**4.8**	**5**	<1	<1	<1	<1
Chlorobenzene		**14**	**23**	**23**	**25**	**18**	**13**	**18**	**3.8**	**27**	<1	<1
Chloroethane		**4.7**	**87**	**63**	**51**	**110**	**7.4**	**7.8**	**2.8**	**34**	<1	<1
Chloroform		<1	<1	<1	<1.0	<1	<1	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene		**2.1**	**7.8**	**14**	**36**	**1.5**	**8.5**	**6.1**	<1	**55**	<1	<1
Dichlorodifluoromethane		<1	**1.4**	<1	**2.3**	<1	<1	<1	<1	<1	<1	<1
Ethylbenzene		<1	<1	<1	<1.0	<1	<1	<1	<1	**17**	<1	<1
Methylene chloride		<1	<2.8	**1.8**	<1.0	**1.9**	<1	<1	<1	**4.8**	<1	<1
Methyl tert-butyl ether		<1	<1	<1	<1.0	<1	<1	<1	<1	<1	<1	<1
o-Xylene		<1	<1	<1	<1.0	<1	<1	<1	<1	**12**	<1	<1
Tetrachloroethene		<1	<1	<1	<1.0	<1	<1	<1	<1	<1	<1	<1
Toluene		<1	**1.4**	**2.1**	<1.0	**1.2**	<1	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene		<1	<1	<1	<1.0	<1	<1	<1	<1	<1	<1	<1
Trichloroethene		**3**	**5.9**	**7.4**	**6.6**	**1.5**	**5.5**	**5.3**	**1.1**	**11**	<1	<1
Vinyl chloride		<1	**16**	**23**	**7.2**	**8.3**	<1	<1	<1	**13**	<1	<1
Total VOCs		**29.4**	**245.3**	**231.0**	**260.4**	**223.6**	**70.2**	**72.2**	**11.3**	**371.8**	**0.0**	**0.0**

Bold Constituent detected above MDL.

VOCs Volatile Organic Compounds.
ug/L Micrograms per liter.
* Field replicate.
J Estimated value.
MDL Method detection limit.
NA Not analyzed.

Table 2. Concentrations of Volatile Organic Compounds Detected in Groundwater Between December 2004 and September 2005, Colesville Landfill, Broome County, New York.

Constituents (units in ug/L)	Sample ID:	W-16S	W-16S	W-17S	W-18	W-18	W-20S	TB 09-13-05	FB9-15-05
	Date:	3/23/2005	9/13/2005	9/13/2005	3/22/2005	9/15/2005	9/13/2005	9/13/2005	9/15/2005
1,1,1-Trichloroethane		<1	<1	<1	**7.1**	**18**	<1	<1	NA
1,1,2-Trichloroethane		<1	<1	<1	<1	<1	<1	<1	NA
1,1-Dichloroethane		**23**	**24**	<1	**6**	**17**	<1	<1	NA
1,1-Dichloroethene		<1	<1	<1	<1	<1	<1	<1	NA
1,2-Dichloroethane		<1	<1	<1	<1	<1	<1	<1	NA
1,2-Dichloropropane		<1	<1	<1	<1	<1	<1	<1	NA
Benzene		**3.1**	**2.6**	<1	<1	<1	<1	<1	NA
Chlorobenzene		**24**	**26**	<1	<1	<1	<1	<1	NA
Chloroethane		**11**	**9.8**	<1	<1	<1	<1	<1	NA
Chloroform		<1	<1	<1	<1	<1	<1	<1	NA
cis-1,2-Dichloroethene		<1	**1.7**	<1	**4.2**	**14**	<1	<1	NA
Dichlorodifluoromethane		<1	<1	<1	<1	<1	<1	<1	NA
Ethylbenzene		<1	<1	<1	<1	<1	<1	<1	NA
Methylene chloride		<1	<1	<1	<1	<1	<1	<1	NA
Methyl tert-butyl ether		<1	<1	<1	<1	<1	<1	<1	NA
o-Xylene		<1	<1	<1	<1	<1	<1	<1	NA
Tetrachloroethene		<1	<1	<1	<1	<1	<1	<1	NA
Toluene		<1	<1	<1	<1	<1	<1	<1	NA
trans-1,2-Dichloroethene		<1	<1	<1	<1	<1	<1	<1	NA
Trichloroethene		**2.1**	**2.6**	<1	**8.7**	**20**	<1	<1	NA
Vinyl chloride		<1	<1	<1	<1	<1	<1	<1	NA
Total VOCs		**63.2**	**66.7**	**0.0**	**26.0**	**69.0**	**0.0**	**0.0**	**0.0**

Bold Constituent detected above MDL.
VOCs Volatile Organic Compounds.
ug/L Micrograms per liter.
* Field replicate.
J Estimated value.
MDL Method detection limit.
NA Not analyzed.

EXPLANATION

- SV-1 — LOCATION AND DESIGNATION OF SOIL BORING AND SOIL VAPOR SAMPLE LOCATION
- W-24 — LOCATION AND DESIGNATION OF RI MONITORING WELL
- SCOTT — LOCATION AND DESIGNATION OF EXISTING HOMEOWNER WELL
- HILL — LOCATION AND DESIGNATION OF FORMER HOMEOWNER WELL
- IW-2 — LOCATION AND DESIGNATION OF INJECTION WELL
- GMPW-2 — LOCATION AND DESIGNATION OF PRODUCTION WELL
- 950 — WATER LEVEL CONTOUR IN FT. MSL; CONTOUR INTERVAL IS FIVE (5) FT (DASHED WHERE INFERRED)
- HORIZONTAL COMPONENT OF FLOW

LONG-TERM MONITORING PLAN DESIGNATIONS

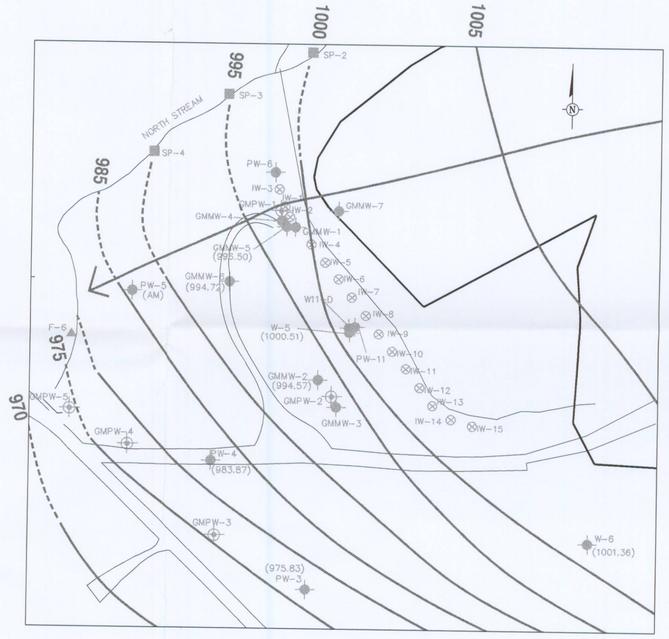
- W-5 — LOCATION AND DESIGNATION OF QUARTERLY MONITORING WELL
- W-6 — LOCATION AND DESIGNATION OF SEMI-ANNUAL MONITORING WELL
- W-16S — LOCATION AND DESIGNATION OF ANNUAL MONITORING WELL
- F-6 — LOCATION AND DESIGNATION OF SURFACE WATER SAMPLE LOCATION
- SP-2 — LOCATION AND DESIGNATION OF SPRING SAMPLE LOCATION
- W-13 (1007.00) — LOCATION AND DESIGNATION OF WELLS INCLUDED IN HYDRAULIC MEASUREMENT PROGRAM AND WATER-LEVEL ELEVATION IN FT MSL (WELL SYMBOL AND OTHER LTM COMPONENTS NOT SHOWN)

NOTES:

WATER-LEVEL ELEVATIONS AND GROUNDWATER FLOW DIRECTION BASED ON SEPTEMBER 13, 2005 WATER-LEVEL ROUND

FT MSL FEET RELATIVE TO MEAN SEA LEVEL

AM ANOMALOUS MEASUREMENT



SITE PLAN SHOWING PROJECT AREA

0 100 200
SCALE IN FEET

NO.	ISSUED DATE	REVISION DESCRIPTION	BY/CKD

KEYPLAN

SEAL

ARCADIS
88 Duryea Road
Melville, NY 11747
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www.arcadis-us.com

PROJECT TITLE

COLESVILLE LANDFILL
COLESVILLE, NEW YORK

PROJECT MANAGER	DEPARTMENT MANAGER	LEAD DESIGN PROF.	CHECKED BY
S. FELDMAN	M. WOLFERT	S. FELDMAN	C. KEEN
SHEET TITLE		TASK/PHASE NUMBER	DRAWN BY
PROPOSED SOIL BORING AND SOIL VAPOR SAMPLE LOCATIONS		00007	A. SANCHEZ
		PROJECT NUMBER	DRAWING NUMBER
		NY000949.0019	1