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October 26, 2010

Vivek Nattanmai
New York State Department of Environmental Conservation
625 Broadway, 12th Floor
Albany, New York 12233-7013

Re: Monitoring Well Sampling Data Summary Report
Carroll Landfill, Chautauqua County, New York
Site No. 9-07-017
Work Assignment No. D004442

Dear Mr. Nattanmai:

Ecology and Environment Engineering, P.C. (EEEPC) is pleased to provide the New York State Department of Environmental Conservation (NYSDEC) with this Data Summary Report for Monitoring Well Sampling at Carroll Landfill (Site Number 9-07-017) in the Town of Frewsburg, Chautauqua County, New York.

If you have any questions or comments on this submittal, please contact me at 716-684-8060.

Sincerely,

Mark Gillings
Project Manager

cc: Tom Heins, EEEPC
Nicole Parganos, EEEPC

enclosures

Monitoring Well Sampling Data Summary Report
Carroll Landfill
Town of Carroll, Chautauqua County, New York
Site No. 9-07-017

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1. Introduction

A groundwater investigation to monitor existing site groundwater chemistry was conducted by Ecology and Environment Engineering, P.C. (EEEPC) on behalf of the New York State Department of Environmental Conservation (NYSDEC) at Carroll Landfill in Frewsburg, NY. The objectives of this investigation were to determine the nature and extent of chemicals present in groundwater while existing groundwater supply and treatment pumps were not operating and to determine groundwater flow directions to assist in the design of a new groundwater treatment system.

1.1 Site Location and Description

The Carroll Town Landfill is a former municipal, construction and demolition debris landfill, and solid waste transfer station. The landfill is located at the end of an unnamed gravel road approximately 1,700 feet north and downhill of NYS Route 62 (also known as Ivory road) in the village of Frewsburg, New York. The landfill is located on a 305-acre lot, although the landfill only occupies approximately 25 acres of property. The landfill is in a rural area surrounded by inactive farmland, wooded areas, wetlands and private homes. Northwest of the site is Conewango Creek, and a broad flood plain.

The site is located on the northwest-facing, gently sloping hillside and is composed of two roughly rectangular disposal areas, each surrounded by drainage ditches and swales. The two disposal areas are each approximately 750 feet (north to south) by 300 feet (east to west). The ground surface of the easternmost cell is estimated to range 1 to 4 feet above the surrounding ditch on the east, north and west. The topography of the western cell is more uneven, ranging

from approximately 1 to10 feet above the surrounding ditch with several flat areas. A drainage area separates the two disposal areas and eventually drains to the northwest into a wetland area before reaching Conewango Creek. An area west of the site is reported to have been used as a borrow area for cover soil.

Approximately 700 feet west of the site is the Town of Carroll Public Works Garage and the Frewsburg Water District which includes a water supply well and pump station. The Public Works Garage and Water District and are located in the same lot, but are accessed from Wahlgren Road from NYS Route 62. The nearest residential properties are approximately 1,200 feet to the west and south, uphill from the site.

1.2 Site History

The Town of Carroll operated the site as a municipal solid waste landfill from the early 1960s to 1979. Records indicate that industrial wastes were disposed of in the landfill during the period of operation. In 1979, the landfill was permitted to continue operation only as a construction and demolition debris landfill and also began operation as a waste transfer station (NYSDEC, 2009). The western landfill cell was closed in May 1980 but it is unclear when the eastern cell closed. The Town reported that the site closed as a waste transfer station in 1986. In 1992, as part of the remedial investigation of the Vac Air Alloys site (Site Number 907016) in Frewsburg, it was alleged that industrial waste from Vac Air Alloys was disposed of at the landfill. Allegations included citizen's reports of having witnessed drums of waste labeled as "trichloroethene" being disposed at the landfill. Vac Air Alloys allegedly disposed of drums containing metal debris and metal turnings (NYSDEC, 2009). In April 1992, NYSDEC inspected the site and found partially buried 55 gallon drums. Subsequent sampling results indicated volatile organic compounds (VOC) in leachate migrating from the site. This led to a listing as a probable hazardous waste disposal site on June 9, 1992. A preliminary site assessment was completed in February 1997 which led to a Class 2 site listing in 1998 (NYSDEC, 2009).

2. Scope of Work

In accordance with the Record of Decision (NYSDEC, 2009) for the Carroll Landfill site, the groundwater will be treated for removal of contamination from the landfill and the landfill will receive a soil cover. Existing monitoring wells were sampled to update groundwater chemistry data prior to the installation of the treatment system and while the existing water supply pump was inactive. The existing water supply pump has been off for a period of approximately 3 and one half years. Previous sampling rounds were conducted in October 2004, March 2005, and August 2008.

Groundwater samples were collected from 17 of 19 monitoring wells (see Figure 1). Two of the 19 wells could not be sampled due to damage (see Table 1). Because the water pumped from the landfill area flows towards a drinking water supply well, drinking water methods were used for VOC and Target Analyte List (TAL) metals analysis. In addition, water quality parameters such as alkalinity, chloride, hardness, nitrogen, sulfate, total suspended solids (TSS), and total dissolved solids (TDS) were also analyzed at MW-13 and Public Supply Well #5 for design purposes. Analytical parameters and methods are listed below.

All monitoring well sampling was performed in accordance with the approved procedures in EEEPC's August 2010 Work Plan. A summary of the work is provided below.

3. Investigation Methodology

3.1 Monitoring Well Sampling

A total of 17 out of 19 groundwater monitoring wells were sampled between August 16 and August 20, 2010 and included: eight shallow wells (MW-104, MW-105S, MW-106S, MW-107S, MW-108S, MW-109S, MW-110S and MW-111S), seven intermediate wells (MW-102, MW-102I, MW-103, MW-107I, MW-108I, MW-110I and MW-111I), and two deep wells (MW-109D and MW-13/Sentinel Well). In addition, Public Supply Well #5 was sampled. Two wells (MW-101 and MW109I) could not be sampled due to damage.

All 17 groundwater monitoring wells and Supply Well #5 were sampled and analyzed using the following methods:

- EPA Method 524 (Volatile Organics in drinking water); and
- EPA Methods 200.7/200.8/245.1 (TAL Metals in drinking water).

Prior to sampling, each of the wells (except for Supply Well #5) were purged and sampled using a modified low-flow technique (submersible pump with flow controller). The wells were purged with the submersible pump of a minimum of three well volumes and until water parameters (pH, temperature °C, Oxidation Reduction Potential in mV, conductivity in µS/cm, and turbidity in NTU) stabilized. Seven of the wells were purged dry with the pump and sampled with a bailer after recharge and within 24 hours (see Table 3). Supply Well #5 was purged by opening the existing raw-water sampling valve, purging stagnant water for approximately 2 minutes and collecting samples in appropriate containers.

In addition to VOCs and metals, MW-13 (sentinel well) and Supply Well #5 were sampled and analyzed for the following parameters:

- Standard Method 5210B (5-Day Biological Oxygen Demand [BOD-5]);
- EPA Method 410.4 (Chemical Oxygen Demand [COD]);
- EPA Method 1664 (Oil and Grease);
- Standard Method 2540C (Total Dissolved Solids);
- Standard Method 2540D (Total Suspended Solids);
- EPA Method 353.2 (Nitrate-Nitrite);
- ASTM Method D516-90 (Sulfate);
- EPA Method 310.2 (Total Alkalinity);
- Standard Method 2340C (Total Hardness); and
- Standard Method 4500-CL E (Chloride).

Prior to sampling, water levels were measured in all wells for the purpose of determining groundwater flow direction (see Figures 3 and 4). Results are summarized in Tables 4-6.

3.2 Quality Assurance/Quality Control (QA/QC) Samples

QA/QC samples, including field duplicates, trip blanks, and additional volume for matrix spike/ matrix spike duplicate (MS/MSD) analysis were collected for groundwater samples in accordance with the standard EEEPC Quality Assurance Project Plans (QAPP) followed for NYSDEC projects. Based on quality control review of the data, appropriate data qualifiers were applied and are included in Tables 4-6.

Duplicate samples provide insight into the homogeneity of the sample matrix and establish a degree of confidence that the sample represents site conditions. Groundwater duplicates were collected by filling additional laboratory vials. A review of the duplicate sample results is provided in the Data Usability Summary Report (DUSR) provided in The Appendix. Where the relative percent difference between the original and duplicate sample results exceeded data review guidelines, "J" flags were added to indicate that the results are estimated; however, there were no significant impacts on data usability associated with the field duplicate sample results.

Trip blanks were collected to establish that the transport of sample vials to and from the field did not result in the contamination of the samples from external sources. Trip blanks consisted of laboratory vials containing deionized water for groundwater. One trip blank was transported to and from the field with each sample delivery (five total). Trip blank results are discussed in the DUSR in The Appendix. No analytes were detected in the trip blanks.

Rinsate blanks were collected to provide a laboratory analytical check on possible sources of contamination of a sample that may be related to equipment decontamination and sample handling procedures. The rinsate blank was collected in the field and therefore may also be used to assess ambient conditions that may potentially affect the sample quality. Chloroform and several metals were detected at low levels in the rinsate blank and affected sample results were flagged "U" as non-detect; however, there were no significant impacts on data usability associated with the rinsate blank sample results.

Laboratory QC sample results are presented in the laboratory reports in The Appendix and are discussed in the DUSR.

3.3 Data Review

All laboratory deliverables were reviewed in accordance appropriate method and general reporting requirements from the NYSDEC Analytical Services Protocol (ASP). The data were qualified following general guidelines in EPA 540/R-99-008 (USEPA 1999b). One DUSR was prepared for the single laboratory report (based on sample delivery group) as specified in NYSDEC guidance (NYSDEC 1999). The data review included an evaluation of the following:

- Holding times
- Initial and continuing calibration
- Reporting limits
- Laboratory blanks
- Matrix spike/matrix spike duplicate samples
- Laboratory control samples

- Field duplicates
- Sample result verification
- Method-specific QC samples (e.g., chromatography/mass spectrometry)

The DUSR was prepared by EEEPC's project chemist and was reviewed by EEEPC's project manager. The DUSR is provided in The Appendix. Any deviations from acceptable QC specifications are discussed in the DUSR. Qualifiers were added to the data, if appropriate, to indicate potential concerns with data usability and these qualifiers were transferred to the data summary tables. In general, there were no significant impacts on data usability.

3.4 Decontamination and Investigation-derived Waste

Decontamination of pumps and equipment was performed using a laboratory-grade detergent wash, 5% nitric acid solution, potable water rinse and DI water rinse before sampling at each location. The following types of investigation-derived waste were generated during this investigation: decontamination water; groundwater from monitoring well purging; disposable polyethylene tubing and bailers; and spent personal protective equipment. Decontamination water and groundwater generated from monitoring well purging and sampling was field-screened for organic vapors with a photoionization detector and visually inspected to determine whether the water was potentially contaminated. No organic vapors or unusual odors/colors were detected. Waste containerization was not necessary due to the absence of obvious contamination (determined by observed staining, odor, or PID readings of 5 ppm or higher). Groundwater and potable/DI water used for decontamination procedures were discharged to the ground surface. All personal protective equipment and disposable polyethylene tubing and bailers were disposed of as nonregulated solid waste by the Frewsburg Water Department at its facility.

4. Results

4.1 Analytical Results

This section presents the analytical results from field sampling activities in order to determine the nature and extent of chemicals present in groundwater during non-pumping conditions. The existing water supply well pump has been off since approximately January 2007.

Groundwater analytical results are summarized in Tables 4 through 6. For ease of review, these tables include only analytes that were detected in at least one sample. Complete tables including all compounds reported by the laboratories are provided in the Appendix. Analytical results for the groundwater samples were compared to NYSDEC Class GA groundwater standards and guidance values (NYSDEC 1998). Compounds exceeding NYSDEC criteria during at least one of the sampling rounds between October 2004 and August 2010 are presented on Figure 2.

All of the 22 metals that were analyzed for were detected in at least one well. Iron and manganese concentrations exceeded screening criteria in five shallow wells (MW-105S, MW-107S, MW-109S and MW-111S) and one intermediate well (MW-107I). Iron and manganese concentrations exceeding criteria were also detected during previous sampling rounds (See Figure 2). Magnesium concentrations exceeded criteria in two shallow wells (MW-107S and MW-111S), magnesium in MW-107S previously exceeded criteria in the 2005 sampling round.

Barium, arsenic and lead each exceeded criteria in one well, MW-108S, MW-104, and MW-111S, respectively.

Seven of the 58 VOCs analyzed were detected in at least one well. Vinyl chloride exceeded screening criteria in three (MW-102, MW-103 and MW-107S) of the 17 wells. Trichloroethylene and cis-1,2-dichloroethylene both exceeded screening criteria in one well (MW-102).

Other than metals concentrations being higher in shallow groundwater, no other spatial patterns concerning VOC or metals concentrations were apparent. This is likely due to the nature of landfills, with multiple sources of metals and VOC compounds. In most cases, concentrations detected during the most recent sampling round in August 2010 were lower than in previous rounds and compounds that exceeded criteria were similar between rounds.

3.2 Groundwater Flow Direction

A groundwater elevation contour map was created using water levels measured from 18 of the 19 monitoring wells in the landfill between August 16-20, 2010 (see Figures 3 and 4). The direction of shallow groundwater flow is generally to the north toward Conewango Creek. There is variation in the direction and magnitude of the shallow groundwater gradient at the east side of the site, which is likely due to variation in the overburden material at the site. Shallow overburden material in this area consists of lacustrine sandy silt and silty clay to 20 feet bgs (NYSDEC, 2009). The direction of intermediate groundwater flow is also generally to the north toward Conewango Creek. The direction and magnitude of this gradient is less irregular, likely because it is flowing at a depth consistent with the depth of a glacial outwash sand and gravel unit in the area (NYSDEC, 2009). Groundwater contours were not drawn for deep groundwater because the number of deep wells is too few to accurately depict the gradient. Figures 3 and 4 represent groundwater flow during non-pumping conditions.

4 References

Ecology and Environment Engineering, P.C. (EEEPC), 2010 *Groundwater Monitoring Well Sampling Procedure Work Plan Carroll Town Landfill, Chautauqua County, New York, Site No. 7-07-017* (August 2010).

Environmental Protection Agency (USEPA), 1999a, *Compendium Method TO-15, Determination of Volatile Organic Compounds (VOCs) in Air Collected in Specially-Prepared Canisters and Analyzed by Gas Chromatography/Mass Spectrometry*. Cincinnati, Ohio: Center for Environmental Research Information, Office of Research and Development.

_____, October 1999b, *Contract Laboratory Program National Functional Guidelines for Organic Data Review,* EPA 540/R-99-008.

New York State Department of Environmental Conservation (NYSDEC), March 2009, *Record of Decision, Carroll Town Landfill Site, Town of Carroll, Chautauqua County, New York, Site Number 9-07-017*, Division of Environmental Remediation, Albany, New York.

_____, June 2000, *Analytical Services Protocol*.

_____, July 1999, *Guidance for the Development of Quality Assurance Plans and Data Usability Summary Reports.*

_____, 1998, Division of Water Technical and Operational Guidance Series (1.1.1): *Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations*, Division of Water, Albany, New York.

Table 1. Carroll Landfill Monitoring Well Maintenance Needs

August 16-20, 2010

Well ID	heaved/ broken pad	bent casing	sediment buildup	unable to sample	replaced lock
MW-13					x
MW-101	x	x	unknown	x	
MW-102					x
MW-102I			x		
MW-103					
MW-104			x		
MW-105S			x		
MW-106S					x
MW-107I			x		x
MW-107S			x		
MW-108I					x
MW-108S					x
MW-109D					
MW-109I	x	x	unknown	x	
MW-109S			x		
MW-110I			x		x
MW-110S			x		x
MW-111I			x		x
MW-111S			x		

Items for all wells:

New locks with same key for all wells

Paint casing

Add soil around pads

Table 2.

Town of Carroll Landfill Groundwater Monitoring
NYSDEC Site #9-07-017

Monitoring Well Specifications/Ground Water Elevations

Monitoring Well ID	Ground Elevation (ft MSL)	Top of PVC Casing elevation (ft MSL)	Well Depth (ft BTOC)	Well Depth measured 2010 (ft BTOC)	Screen Interval (ft MSL)	Ground Water Elevation (ft MSL)		
						10/11/2004	3/7/2005	8/16-20/2010
Shallow								
MW-101	1259.11	1261.24	17.8	NM	1243.44 - 1253.44	1254.72	1257.26	NM
MW-104	1252.36	1254.61	21.6	21.76	1233.01 - 1243.01	1249.15	1249.97	1247.46
MW-105S	1252.63	1254.97	20.0	19.93	1234.97 - 1244.97	1250.41	1251.17	1249.46
MW-106S	1252.71	1255.14	22.5	22.70	1232.64 - 1242.64	1249.54	1251.12	1249.48
MW-107S	1252.39	1254.56	22.4	22.58	1232.16 - 1242.16	1249.75	1249.05	1249.84
MW-108S	1255.07	1257.68	22.6	22.70	1235.08 - 1245.08	1251.28	1252.45	1252.30
MW-109S	1255.2	1257.52	22.9	23.13	1234.62 - 1244.62	1245.84	1249.8	1254.2
MW-110S	1249.72	1253.16	22.5	22.45	1230.66 - 1240.66	1247.85	1249.98	1248.02
MW-111S	1251.4	1253.66	21.9	19.76	1231.76 - 1241.76	1248.86	1249.53	1248.52
Intermediate								
MW-102	1254.56	1256.58	32.0	32.24	1224.56 - 1234.56	1245.82	1249.63	1254.78
MW-102I	1254.92	1257.47	41.1	43.83	1216.37 - 1226.37	1245.74	1249.56	1254.99
MW-103	1250.78	1253.21	34.2	36.28	1219.01 - 1229.01	1246.93	1250.33	1253.11
MW-107I	1252.45	1254.87	45.2	44.63	1209.67 - 1219.67	1249.17	1251.37	1249.76
MW-108I	1255.13	1257.59	47.2	47.33	1210.39 - 1220.39	1248.79	1251.31	1251.55
MW-109I	1254.93	1257.25	43.8	NM	1213.45 - 1223.45	1245.91	1249.56	1254.98
MW-110I	1249.78	1252.03	44.0	43.97	1208.03 - 1218.03	1246.59	1249.14	1248.09
MW-111I	1251.26	1253.71	48.1	46.27	1205.61 - 1215.61	1248.11	1250.31	1248.89
Deep								
MW-109D	1255.00	1257.31	71.1	73.23	1186.21 - 1196.21	1246.03	1249.56	1254.98
Other								
MW-13	1260.00	1262.50		70.97				1253.66
Test well #12	1260.00	1262.00		NM				1249.46

Notes: ft MSL - feet mean sea level
ft BTOC - feet below top of casing
NM - not measured

Table 3. Groundwater Sample Water Quality Measurements
Carroll Landfill

Sample ID	Sample Date	Well Depth (ft TOIC)	Initial Water Depth (ft TOIC)	pH (s.u.)	Temperature (°C)	ORP (mV)	Conductivity (µS/cm)	Turbidity (NTU)	PID reading (PPM)	Comments
MW-102	8/17/2010	32.24	1.80	7.48	10.8	-7	545.7	1.7	0	
MW-102I	8/17/2010	43.83	2.48	7.51	11.4	27	518.1	7.46	0	
MW-103	8/18/2010	36.28	0.10	7.75	11.3	`	404.5	0.76	0	MS/MSD
MW-104	8/18/2010	21.76	7.15	7.88	16.1[(1)]	21	359.8	308	0	Purged dry with pump, sampled with bailer after recharge.
MW-105S	8/19/2010	19.93	5.51	8.24	17.2[(1)]	104	282.9	211	0	Purged dry with pump, sampled with bailer after recharge.
MW-106S	8/19/2010	22.70	5.66	7.78	17.2[(1)]	165	341.5	62.0	0	Purged dry with pump, sampled with bailer after recharge.
MW-107I	8/17/2010	44.63	5.11	7.86	10.8	-124	305.1	168	0	Well has very soft bottom; duplicate sample collected (MW-107I/Q).
MW-107S	8/17/2010	22.58	4.72	7.64	12.5	-107	350.7	>1000	0	Well has very soft bottom.
MW-108I	8/20/2010	47.33	5.04	7.63	11.0	-131	435.6	13.8	0	
MW-108S	8/19/2010	22.70	5.38	6.99	17.8[(1)]	-120	945.0	100.5	0	Purged dry with pump, sampled with bailer after recharge.
MW-109D	8/19/2010	73.23	2.30	7.76	10.2	39	417.9	7.46	0	
MW-109S	8/19/2010	23.13	3.35	7.74	16.8[(1)]	74	413.1	81.8	0	Purged dry with pump, sampled with bailer after recharge.
MW-110I	8/20/2010	43.97	3.94	7.98	17.2[(1)]	-57	313.4	39.5	0	Purged dry with pump, sampled with bailer after recharge.
MW-110S	8/20/2010	22.45	5.14	7.80	17.6[(1)]	-4	343.4	29.3	0	Purged dry with pump, sampled with bailer after recharge.
MW-111I	8/16/2010	46.27	4.82	7.81	10.9	-123	355.3	18.8	0	Well has very soft bottom.
MW-111S	8/16/2010	19.76	5.14	7.75	18.7[(1)]	47	486.9	>1000	0	Well has very soft bottom; purged dry and sampled with pump after recharge.
MW-13 (Sentinel well	8/19/2010	70.97	8.84	7.62	10.5	83	402.6	6.04	0	Well screen is approx. 40ft
Supply Well #5	8/16/2010	NM	12.54	7.24	13.7	138	326.7	2.33	0	Sampled at raw water faucet, water level measured at nearby test well.

[(1)] Sample temperature affected by contact with warm bailer/tubing during post-recharge sampling.

Key:

TOIC = Below top of inner casing
°C = Degrees Celsius
µS/cm = Microsiemens per centimeter
s.u. = Standard units
NM = Not measured

Table 4 Summary of Positive Analytical Results for August 2010 Groundwater Samples - Metals
Town of Carroll Landfill, Frewsburg, NY

Table 4 - Hits Metals

Analyte	Sample ID: / Date: / Screening Criteria [1]	MW-102 08/17/10	MW-102I 08/17/10	MW-103 08/18/10	MW-104 08/18/10	MW-105S 08/19/10	MW-106S 08/19/10	MW-107I 08/17/10	MW-107I/Q 08/17/10	MW-107S 08/17/10	MW-108I 08/20/10	MW-108S 08/19/10
Metals by Method E200.7 (mg/L)												
ALUMINUM	NA	0.051 UJ	0.308 U	0.121 UJ	**0.856**	**7.97**	**1.1**	**9.18**	**10.3**	**32.6**	0.191 UJ	**1.49**
BARIUM	1	**0.0944**	**0.103**	**0.237**	**0.245**	**0.349**	**0.328**	**0.292**	**0.298**	**0.618**	**0.233**	**1.38**
BERYLLIUM	0.003	**0.0003 J**	**0.0004 J**	0.0002 U	**0.0002 J**	**0.0003 J**	**0.0003 J**	**0.0005 J**	**0.0005 J**	**0.0016 J**	0.0002 U	0.0002 U
CADMIUM	0.005	0.0003 U	0.0003 U	0.0003 U	0.0003 U	**0.0003 J**	0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.0003 U
CALCIUM	NA	**91.2 J**	**85.3 J**	**60.4 J**	**45 J**	**39.3 J**	**55.1 J**	**53.4 J**	**53.3 J**	**106 J**	**67.7 J**	**155 J**
CHROMIUM, TOTAL	0.05	0.0009 U	0.0009 U	0.0009 U	0.0015 UJ	**0.0089**	0.0019 UJ	**0.0101**	**0.0121**	**0.0371**	0.0009 U	0.0021 UJ
COBALT	NA	0.0006 U	0.0006 U	0.0006 UJ	0.0006 UJ	**0.0044 J**	0.0006 UJ	**0.0048**	**0.0063**	**0.0267**	0.0006 U	0.0006 UJ
COPPER	0.2	0.0015 U	0.0015 U	0.0015 U	0.0015 U	**0.0055 J**	0.0015 U	**0.0098 J**	**0.0116**	**0.0472**	0.0015 U	**0.0028 J**
IRON	0.3	0.023 UJ	0.277 U	0.273 UJ	2.07 UJ	**9.87 J**	1.61 UJ	**12.5**	**15**	**60.2**	0.634 U	**17.8 J**
MAGNESIUM	35	**19**	**18.1**	**13.2**	**11.8**	**9.51**	**11.6**	**14**	**14.3**	**35.1**	**13.1 J**	**29.1**
MANGANESE	0.3	**0.152 J**	**0.187 J**	**0.254**	**0.24**	**1.41**	**0.228**	**0.426 J**	**0.451 J**	**1.47 J**	**0.262 J**	**0.721**
NICKEL	0.1	0.0013 U	0.0013 U	**0.0014 J**	**0.002 J**	**0.01**	**0.0025 J**	**0.0117**	**0.014**	**0.0574**	0.0013 U	**0.0041 J**
POTASSIUM	NA	**0.714**	**0.927**	**0.763**	**1.73**	**3.79**	**1.06**	**3.23**	**3.52**	**8.08**	**1.1**	**4.47**
SILVER	0.05	0.0012 U	0.0012 U	0.0012 U	0.0012 U	0.0012 U	0.0012 U	0.0012 U	0.0012 U	0.0012 U	**0.0018 J**	0.0012 U
SODIUM	20	**3.7 J**	**3.8 J**	**3.9**	**18.1**	**10.9**	**5**	**7.5 J**	**7.7 J**	**7.1 J**	**5.4**	**13.1**
VANADIUM	NA	0.0011 U	0.0011 U	0.0011 U	0.0023 UJ	**0.0136**	0.0022 UJ	**0.0136**	**0.0147**	**0.0472**	0.0011 U	0.0024 UJ
ZINC	2	0.0017 U	0.0022 UJ	0.0017 U	0.0058 UJ	**0.0375**	0.0077 UJ	**0.0323**	**0.0374**	**0.133**	0.0017 U	0.0193 U
Metals by Method E200.8 (µg/L)												
ANTIMONY	3	0.2 U	0.2 U	**0.3 J**	**0.4 J**	**0.5 J**	**0.4 J**	0.2 U	0.2 U	**0.4 J**	0.2 UJ	**0.2 J**
ARSENIC	25	**0.2 J**	**0.3 J**	**2.4**	**30.6**	**9.6**	**2.2**	**21.1**	**16.4**	**7.7**	**4.7**	**8.8**
LEAD	25	0.1 UJ	0.4 UJ	0.7 UJ	0.5 UJ	**3.7**	0.9 UJ	**4.5**	**6.4**	**23.8**	0.4 UJ	**2.7**
THALLIUM	0.5	**0.01 J**	**0.02 J**	0.008 U	**0.01 J**	**0.09 J**	**0.01 J**	**0.05 J**	**0.09 J**	**0.2**	**0.02 J**	**0.02 J**
Mercury by Method E245.1 (mg/L)												
MERCURY	0.0007	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U

Key:

J = Estimated value.

U = Not detected (lab reporting limit shown).

UJ = Not detected/Estimated Value.

µg/L = Micrograms per liter.

mg/L = Milligrams per liter.

-- = Analyte not analyzed for.

VOCs = Volatile organic compounds.

/Q Designates field duplicate sample.

Note:

[1] New York State Department of Environmental Conservation, Technical and Operational Guidance Series Memorandum #1.1.1: *Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations*, 1998 (with updates), Class GA Groundwater Standards and Guidance Values.

Notes:

1. Shaded cells exceed the screening value.
2. Bold values denote positive hits.

Table 4 Summary of Positive Analytical Results for August 2010 Groundwater Samples - Metals
Town of Carroll Landfill, Frewsburg, NY

Table 4 - Hits Metals

Analyte	Sample ID: / Date: / Screening Criteria [1]	MW-109D 08/19/10	MW-109S 08/19/10	MW-110I 08/20/10	MW-110S 08/20/10	MW-111I 08/16/10	MW-111S 08/16/10	MW-13 08/19/10	SUPPLY WELL #5 08/16/10
Metals by Method E200.7 (mg/L)									
ALUMINUM	NA	0.327 U	**3.01**	**1.97**	**1.36**	0.603 U	**8.41**	0.445 U	0.045 U
BARIUM	1	**0.137**	**0.145**	**0.231**	**0.237**	**0.258**	**0.568**	**0.0928**	**0.0682**
BERYLLIUM	0.003	0.0002 U	**0.0002 J**	0.0002 U	0.0002 U	0.0002 U	**0.0006 J**	0.0002 U	0.0002 U
CADMIUM	0.005	0.0003 U	**0.0008 J**	0.0003 U	0.0003 U	0.0003 U	0.0003 U	**0.0003 J**	0.0003 U
CALCIUM	NA	**68.4 J**	**73 J**	**46.6 J**	**49.7 J**	**47.1**	**136**	**61.6 J**	**45.2**
CHROMIUM, TOTAL	0.05	0.0009 U	0.0033 UJ	0.003 UJ	0.0037 UJ	0.0009 U	**0.0083**	0.0011 UJ	0.0009 U
COBALT	NA	0.0006 U	0.0006 UJ	0.0006 U	**0.0008 J**	0.0006 UJ	**0.0158 J**	0.0006 U	0.0006 UJ
COPPER	0.2	0.0015 U	**0.0018 J**	0.0015 U	0.0015 U	0.0015 U	**0.0386 J**	0.0015 U	0.0015 UJ
IRON	0.3	0.453 UJ	**4.22 J**	1.67 U	1.11 U	1.06 U	**24.1**	0.501 UJ	0.021 UJ
MAGNESIUM	35	**13.3**	**12.8**	**10.8 J**	**12.1 J**	**13.5**	**41.6**	**11.7**	**9.27**
MANGANESE	0.3	**0.0548**	**0.375**	**0.175 J**	**0.232 J**	**0.227**	**1.68**	0.0156 U	0.0108 U
NICKEL	0.1	0.0013 U	**0.0046 J**	**0.002 J**	0.0013 U	0.0013 U	**0.0176**	**0.0016 J**	0.0013 U
POTASSIUM	NA	**0.818**	**1.64**	**1.77**	**1.3**	**1.46**	**3.56**	**0.992**	**0.598**
SILVER	0.05	0.0012 U	0.0012 U	0.0012 U	0.0012 U	0.0012 U	0.0012 U	0.0012 U	0.0012 U
SODIUM	20	**3.9**	**3.4**	**5.7**	**6**	**10.5**	**10.8**	**10.8**	**7.8**
VANADIUM	NA	0.0012 UJ	0.005 U	0.0033 UJ	0.0023 UJ	0.0011 UJ	**0.0156 J**	0.0014 UJ	0.0011 UJ
ZINC	2	0.0017 U	0.0146 U	0.0053 UJ	0.0042 UJ	0.0021 UJ	**0.0435**	0.0033 UJ	0.0055 UJ
Metals by Method E200.8 (µg/L)									
ANTIMONY	3	0.2 U	**0.5 J**	0.2 UJ	0.2 UJ	0.2 U	**0.4 J**	0.2 U	**0.2 J**
ARSENIC	25	**0.3 J**	**2.2**	**9.8**	**8.1**	**17.4**	**5.7**	**0.6 J**	**0.6 J**
LEAD	25	0.4 UJ	1.6 U	0.7 UJ	0.4 UJ	**4.5**	**28.9**	0.6 UJ	0.8 UJ
THALLIUM	0.5	0.008 U	**0.04 J**	**0.02 J**	**0.02 J**	**0.01 J**	**0.1 J**	0.008 U	**0.01 J**
Mercury by Method E245.1 (mg/L)									
MERCURY	0.0007	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	**0.0001 J**	0.0001 U

Key:

J = Estimated value.

U = Not detected (lab reporting limit shown).

UJ = Not detected/Estimated Value.

µg/L = Micrograms per liter.

mg/L = Milligrams per liter.

-- = Analyte not analyzed for.

VOCs = Volatile organic compounds.

/Q Designates field duplicate sample.

Notes:

1. Shaded cells

2. Bold values

Note:

[1] New York State Department of Environmental Conservation, Technical and Operational Guidance Series Memorandum #1.1.1: *Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations*, 1998 (with updates), Class GA Groundwater Standards and Guidance Values.

Table 5 Summary of Positive Analytical Results for Volatile Organic Compounds, August 2010 Groundwater Samples
Town of Carroll Landfill, Frewsburg, NY

Analyte	Sample ID: / Date: / Screening Criteria [1]	MW-102 08/17/10	MW-102I 08/17/10	MW-103 08/18/10	MW-104 08/18/10	MW-105S 08/19/10	MW-106S 08/19/10	MW-107I 08/17/10	MW-107I/Q 08/17/10
VOCs by Method E524.2 (µg/L)									
BENZENE	1	0.13 U	0.13 U	0.13 UJ	0.13 UJ	0.13 UJ	0.13 UJ	0.13 U	0.13 U
CHLOROBENZENE	5	0.12 U	0.12 U	0.12 UJ	0.12 UJ	0.12 UJ	0.12 UJ	0.12 U	0.12 U
CHLOROETHANE	5	**2**	0.07 U	0.07 UJ	0.07 UJ	0.07 UJ	0.07 UJ	0.07 U	0.07 U
CIS-1,2-DICHLOROETHYLENE	5	**24**	**2.4**	0.12 UJ	**1.6 J**	0.12 UJ	0.12 UJ	0.12 U	0.12 U
DICHLORODIFLUOROMETHANE	5	**0.2 J**	0.07 U	**0.21 J**	0.07 UJ	0.07 UJ	0.07 UJ	0.07 U	0.07 U
TRICHLOROETHYLENE (TCE)	5	**6.4**	**3.2**	0.06 UJ	0.06 UJ	0.06 UJ	0.06 UJ	0.06 U	0.06 U
VINYL CHLORIDE	2	**3.5**	0.059 U	**4.9 J**	**0.22 J**	0.059 UJ	0.059 UJ	0.059 U	0.059 U

Key:

J = Estimated value.

U = Not detected (lab reporting limit shown).

UJ = Not detected/Estimated Value.

µg/L = Micrograms per liter.

mg/L = Milligrams per liter.

-- = Analyte not analyzed for.

VOCs = Volatile organic compounds.

/Q Designates field duplicate sample.

Notes:

1. Shaded cells exceed the screening value.
2. Bold values denote positive hits.

Note:

[1] New York State Department of Environmental Conservation, Technical and Operational Guidance Series Memorandum #1.1.1: *Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations*, 1998 (with updates), Class GA Groundwater Standards and Guidance Values.

Table 5 Summary of Positive Analytical Results for Volatile Organic Compounds, August 2010 Groundwater Samples
Town of Carroll Landfill, Frewsburg, NY

Analyte	Sample ID: / Date: / Screening Criteria [1]	MW-107S 08/17/10	MW-108I 08/20/10	MW-108S 08/19/10	MW-109D 08/19/10	MW-109S 08/19/10	MW-110I 08/20/10	MW-110S 08/20/10	MW-111I 08/16/10
VOCs by Method E524.2 (µg/L)									
BENZENE	1	0.13 U	0.13 UJ	**0.21 J**	0.13 UJ	0.13 UJ	0.13 UJ	0.13 UJ	0.13 U
CHLOROBENZENE	5	0.12 U	0.12 UJ	**0.33 J**	0.12 UJ	0.12 UJ	0.12 UJ	0.12 UJ	0.12 U
CHLOROETHANE	5	**0.33 J**	0.07 UJ	0.07 UJ	0.07 UJ	0.07 UJ	0.07 UJ	0.07 UJ	0.07 U
CIS-1,2-DICHLOROETHYLENE	5	**3**	0.12 UJ	0.12 UJ	**1.4 J**	0.12 UJ	0.12 UJ	0.12 UJ	0.12 U
DICHLORODIFLUOROMETHANE	5	**0.46 J**	0.07 UJ	**0.34 J**	0.07 UJ	0.07 UJ	0.07 UJ	0.07 UJ	0.07 U
TRICHLOROETHYLENE (TCE)	5	0.06 U	0.06 UJ	0.06 UJ	**0.73 J**	0.06 UJ	0.06 UJ	0.06 UJ	0.06 U
VINYL CHLORIDE	2	**28**	0.059 UJ	**0.32 J**	0.059 UJ	0.059 UJ	0.059 UJ	0.059 UJ	0.059 U

Key:

J = Estimated value.

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µg/L = Micrograms per liter.

mg/L = Milligrams per liter.

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VOCs = Volatile organic compounds.

/Q Designates field duplicate sample.

Notes:

1. Shaded cells

2. Bold values c

Note:

[1] New York State Department of Environmental Conservation, Technical and Operational Guidance Series Memorandum #1.1.1: *Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations*, 1998 (with updates), Class GA Groundwater Standards and Guidance Values.

Table 5 Summary of Positive Analytical Results for Volatile Organic Compounds, August 2010 Groundwater Samples
Town of Carroll Landfill, Frewsburg, NY

Analyte	Sample ID: / Date: / Screening Criteria [1]	MW-111S 08/16/10	MW-13 08/19/10	SUPPLY WELL #5 08/16/10
VOCs by Method E524.2 (µg/L)				
BENZENE	1	0.13 U	0.13 UJ	0.13 U
CHLOROBENZENE	5	0.12 U	0.12 UJ	0.12 U
CHLOROETHANE	5	0.07 U	0.07 UJ	0.07 U
CIS-1,2-DICHLOROETHYLENE	5	0.12 U	0.12 UJ	0.12 U
DICHLORODIFLUOROMETHANE	5	0.07 U	0.07 UJ	0.07 U
TRICHLOROETHYLENE (TCE)	5	0.06 U	0.06 UJ	0.06 U
VINYL CHLORIDE	2	0.059 U	0.059 UJ	0.059 U

Key:

J = Estimated value.

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UJ = Not detected/Estimated Value.

µg/L = Micrograms per liter.

mg/L = Milligrams per liter.

-- = Analyte not analyzed for.

VOCs = Volatile organic compounds.

/Q Designates field duplicate sample.

Notes:

1. Shaded cells

2. Bold values c

Note:

[1] New York State Department of Environmental Conservation, Technical and Operational Guidance Series Memorandum #1.1.1: *Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations*, 1998 (with updates), Class GA Groundwater Standards and Guidance Values.

Table 6 Complete Analytical Results for August 2010 Groundwater Samples - Other Water Parameters
Town of Carroll Landfill, Frewsburg, NY

Analyte	Sample ID: / Date: / Screening Criteria (1)	MW-13 08/19/10	SUPPLY WELL #5 08/16/10
Oil and Grease by Method 1664A (mg/L)			
OIL & GREASE, TOTAL REC	NA	1.4 U	1.4 U
Alkalinity by Method E310.2 (mg/L)			
ALKALINITY, TOTAL (AS CACO3)	NA	**176 J**	**136 J**
BOD by Method 5210B (mg/L)			
BIOCHEMICAL OXYGEN DEMAND (BOD)	NA	2 U	2 U
COD by Method 410.4 (mg/L)			
COD - CHEMICAL OXYGEN DEMAND	NA	2.5 U	2.5 U
Chloride by Method SM4500-Cl-E (mg/L)			
CHLORIDE (AS CL)	250	**6.38**	**6.99**
Hardness by Method SM2340C (mg/L)			
HARDNESS (AS CACO3)	NA	**183**	**142**
Nitrate/Nitrite by Method E353.2 (mg/L-N)			
NITROGEN, NITRATE-NITRITE	NA	**1.14**	**0.153**
Sulfate by Method D-516-90 (mg/L)			
SULFATE (AS SO4)	250	**33.1**	**31 J**
TSS by Method SM2540D (mg/L)			
TOTAL SUSPENDED SOLIDS	NA	**17.6**	4 U
TDS by Method SM2540C (mg/L)			
TOTAL DISSOLVED SOLIDS	NA	**150 J**	**200**

Key:

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µg/L = Micrograms per liter.

mg/L = Milligrams per liter.

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VOCs = Volatile organic compounds.

/Q Designates field duplicate sample.

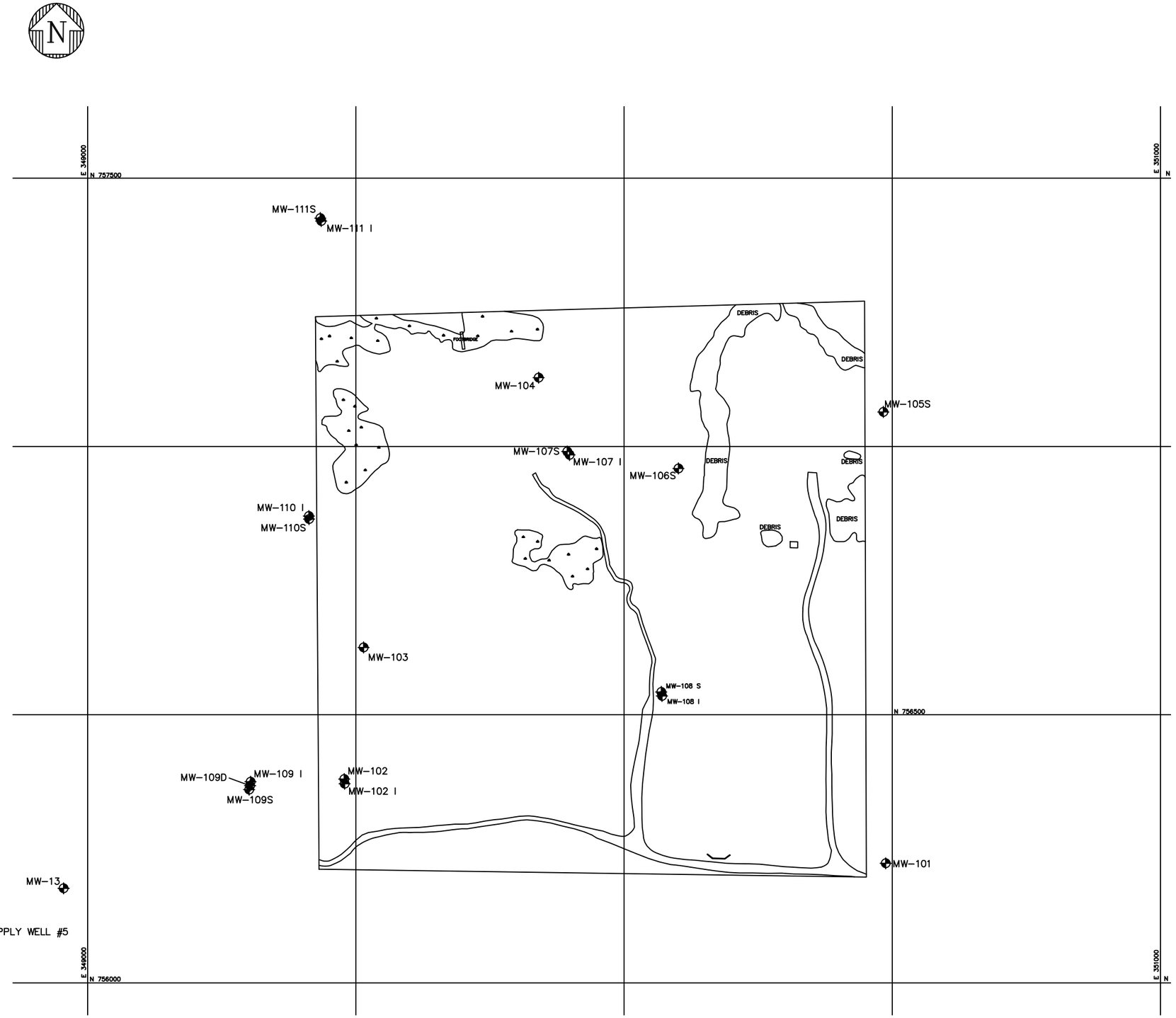
Note:

[1] New York State Department of Environmental Conservation, Technical and Operational Guidance Series Memorandum #1.1.1: *Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations*, 1998 (with updates), Class GA Groundwater Standards and Guidance Values.

Notes:

1. Shaded cells exceed the screening value.
2. Bold values denote positive hits.

F:\Carroll Landfill\GW contours 8-27-10\Sitemap.dwg



LEGEND

MONITORING WELL LOCATION

NOTES

1. THIS DRAWING IS A COMBINATION OF CARROL.dwg and ACAD2000-CARROLL LANDFILL.dwg PROVIDED BY THE NYSDEC FROM THE REMEDIAL INVESTIGATION.
2. THE INFORMATION DEPICTED ON THIS MAP REPRESENTS THE RESULTS OF AERIAL MAPPING AND CAN ONLY BE CONSIDERED AS INDICATING THE GENERAL CONDITION EXISTING ON THE DATE OF PHOTOGRAPHY.
3. CONTROL: PROVIDED BY TVGA CONSULTANTS. COORDINATES SHOWN HEREON ARE EXPRESSED IN U.S. SURVEY FEET AND REFERENCED TO THE NORTH AMERICAN DATUM OF 1927 (NAD27) - NEW YORK STATE PLANE GRID. ELEVATIONS SHOWN HEREON ARE EXPRESSED IN FEET AND ARE REFERENCED TO THE NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD29).
4. MAPPING COMPILED BY TVGA CONSULTANTS (TVGA) USING PHOTOGRAMMETRIC METHODS. AERIAL PHOTOGRAPHY FLOWN 1 APRIL 2005. THIS MAPPING COMPILED IN ACCORDANCE WITH (NMAS) NATIONAL MAP ACCURACY STANDARDS FOR MAPS AT 1 INCH EQUAL 50 FT. SCALE.

SCALE IN FEET

0 200 400 600

FIGURE 1
SITE MAP
CARROLL LANDFILL
FREWSBERG, CHAUTAUQUA COUNTY, NEW YORK

ecology and environment

02:002700.DC08.03\Fig2.CDR-10/18/10-GRA

MW-111S

CHEMICAL NAME	10/13/04	03/09/05	08/28/08	08/16/10
Inorganics	**µg/L**	**µg/L**	**µg/L**	**µg/L**
Arsenic	**30.5***	NS	NA	5.7
Iron	**48,800***	NS	NA	**24,100***
Lead	**NA**	NA	NA	**28.9***
Magnesium	**NA**	NA	NA	**41,600***
Manganese	**NA**	NA	NA	**1,680***

MW-111I

CHEMICAL NAME	10/13/04	03/09/05	08/28/08	08/16/10
Inorganics	**µg/L**	**µg/L**	**µg/L**	**µg/L**
Iron	**20,700***	NS	NA	1,060 U

MW-110I

CHEMICAL NAME	10/13/04	03/10/05	08/28/08	08/20/10
Inorganics	**µg/L**	**µg/L**	**µg/L**	**µg/L**
Arsenic	**87.8***	23.0	NA	**9.8**
Beryllium	**3.6 B***	0.72 B	NA	0.200 U
Chromium	**112***	24.5	NA	3.00
Iron	**191,000***	**37,000***	NA	1,670 U
Lead	**92.4***	15.7	NA	0.7 UJ
Magnesium	**70,900***	26,300	NA	10,800 J
Manganese	**3,720***	880	NA	175 J
Thallium	**14***	4.5 U	NA	0.02 J

MW-110S

CHEMICAL NAME	10/13/04	03/10/05	08/28/08	08/20/10
Inorganics	**µg/L**	**µg/L**	**µg/L**	**µg/L**
Arsenic	**35.1***	10.9	NA	8.1
Iron	**74,900***	**6,310***	NA	1,100
Lead	**26.8***	2.1B	NA	0.4 UJ

MW-103

CHEMICAL NAME	10/12/04	03/09/05	08/28/08	08/18/10
Inorganics	**µg/L**	**µg/L**	**µg/L**	**µg/L**
Iron	**1,030***	NS	NA	273
VOCs				
Vinyl Chloride	10 U	10 U	2	4.9 J

MW-102

CHEMICAL NAME	10/11/04	03/08/05	08/28/08	08/17/10
Inorganics	**µg/L**	**µg/L**	**µg/L**	**µg/L**
Cadmium	0.2 U	**8.4***	NA	0.30 U
Iron	32.7 B	**6,220***	NA	23.0
VOCs				
Vinyl Chloride	2 J	1 J	**30 D***	3.5
Chloroethane	1 J	1 J	**11***	2
Trichloroethene	10 U	10 U	**9***	6.4
cis-1,2-Dichloroethene	2 J	1 J	**130 D***	24

MW-102I

CHEMICAL NAME	10/11/04	03/09/05	08/28/08	08/17/10
Inorganics	**µg/L**	**µg/L**	**µg/L**	**µg/L**
Iron	**3,800***	**12,200***	NA	277 U
VOCs				
Vinyl Chloride	**5.0 J***	**3.0 J***	0.6 J	0.059 U
Chloroethane	**7.0 J***	5.0 J	1 U	0.07 U
cis-1,2-Dichloroethene	**14***	**6.0 J***	**12***	2.4
Trichloroethene	10 U	10 U	**20***	3.2

MW-109I

CHEMICAL NAME	10/12/04	03/08/05	08/28/08	08/2010
Inorganics	**µg/L**	**µg/L**	**µg/L**	**µg/L**
Arsenic	17.8	**37***	NA	NS
Iron	**36,000***	**68,300***	NA	NS
Lead	**40.7***	**87.1***	NA	NS
Manganese	1,970 U	**3,720***	NA	NS
Thallium	3.7 U	**7.2 B***	NA	NS

MW-109D

CHEMICAL NAME	10/12/04	03/08/05	08/28/08	08/19/10
Inorganics	**µg/L**	**µg/L**	**µg/L**	**µg/L**
Iron	**8,440***	**29,900***	NA	453 UJ
VOCs				
Vinyl Chloride	1.0 J	**108***	0.4 J	0.059
cis-1,2-Dichlorethene	10 U	1 J	**9***	1.4 J

MW-109S

CHEMICAL NAME	03/13/04	03/09/05	08/28/08	08/19/10
Inorganics	**µg/L**	**µg/L**	**µg/L**	**µg/L**
Iron	**2,520***	**18,400***	NA	**4,220 J***
Manganese	NA	NA	NA	375

MW-104

CHEMICAL NAME	10/14/04	03/10/05	08/28/08	08/18/10
Inorganics	**µg/L**	**µg/L**	**µg/L**	**µg/L**
Arsenic	**53.2***	24.1	NA	**30.6***
Iron	**13,200***	**37,300***	NA	2,070 UJ
Magnesium	R	**39,500***	NA	11,800
Sodium	**R**	**27,100***	NA	18,100

MW-107I

CHEMICAL NAME	10/12/04	03/09/05	08/28/08	08/17/10
Inorganics	**µg/L**	**µg/L**	**µg/L**	**µg/L**
Iron	**12,100***	NS	NA	**15,000***
Manganese	NA	NA	NA	**451 J***

MW-107S

CHEMICAL NAME	10/12/04	03/10/05	08/28/08	08/17/10
Inorganics	**µg/L**	**µg/L**	**µg/L**	**µg/L**
Iron	**24,900***	**679***	NA	**60,200***
Magnesium	**R**	**37,600***	NA	**35,100***
Manganese	NA	NA	NA	**1,470 J***
VOCs				
Dichlorodifluoromethane	**9.0 J***	3.0 J	0.8 J	0.46 J
Vinyl Chloride	**600.0 D***	**250***	**48 D***	28
cis-1,2-Dichloroethene	**69.0 J***	**25.0***	1	3
1,2-Dichloroethane	**2.0 J***	0.6 J	1 U	0.14 U

MW-105S

CHEMICAL NAME	10/14/04	03/10/05	08/28/08	08/19/10
Inorganics	**µg/L**	**µg/L**	**µg/L**	**µg/L**
Arsenic	**29.2***	22.1	NA	9.6
Iron	**53,400***	**50,100***	NA	**9,870 J***
Manganese	**NA**	NA	NA	**1,410***

MW-106S

CHEMICAL NAME	10/14/04	03/10/05	08/28/08	08/19/10
Inorganics	**µg/L**	**µg/L**	**µg/L**	**µg/L**
Iron	**8,440***	NS	NS	1,610 UJ

MW-108I

CHEMICAL NAME	10/13/04	03/07/05	08/28/08	08/20/10
Inorganics	**µg/L**	**µg/L**	**µg/L**	**µg/L**
Iron	**15,300***	**1,740***	NA	634 U

MW-108S

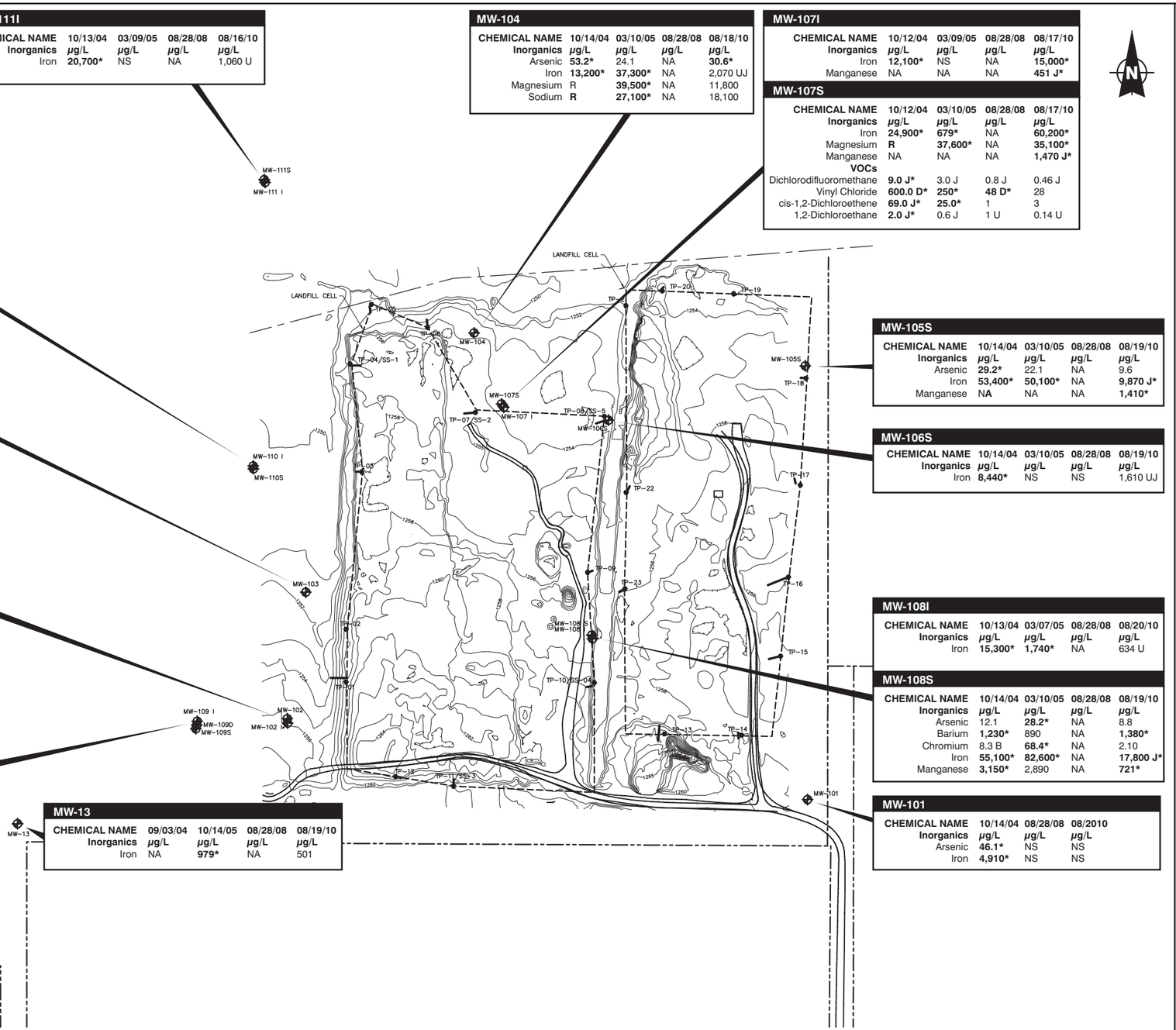
CHEMICAL NAME	10/14/04	03/10/05	08/28/08	08/19/10
Inorganics	**µg/L**	**µg/L**	**µg/L**	**µg/L**
Arsenic	12.1	**28.2***	NA	8.8
Barium	**1,230***	890	NA	**1,380***
Chromium	8.3 B	**68.4***	NA	2.10
Iron	**55,100***	**82,600***	NA	**17,800 J***
Manganese	**3,150***	2,890	NA	**721***

MW-101

CHEMICAL NAME	10/14/04	08/28/08	08/2010
Inorganics	**µg/L**	**µg/L**	**µg/L**
Arsenic	**46.1***	NS	NS
Iron	**4,910***	NS	NS

MW-13

CHEMICAL NAME	09/03/04	10/14/05	08/28/08	08/19/10
Inorganics	**µg/L**	**µg/L**	**µg/L**	**µg/L**
Iron	NA	**979***	NA	501



SOURCE: O'Brien & Gere Engineers, Inc., 2005.

APPROXIMATE SCALE IN FEET

0 150 300

Town of Carroll
Landfill Site
Frewsburg, New York
NYSDEC SITE #9-07-017
October 2010

LEGEND

- Property Line
- Edge of Creek
- Access Road
- TP-18 Test Pit Locations
- MW-105S Monitoring Well Locations

NOTES

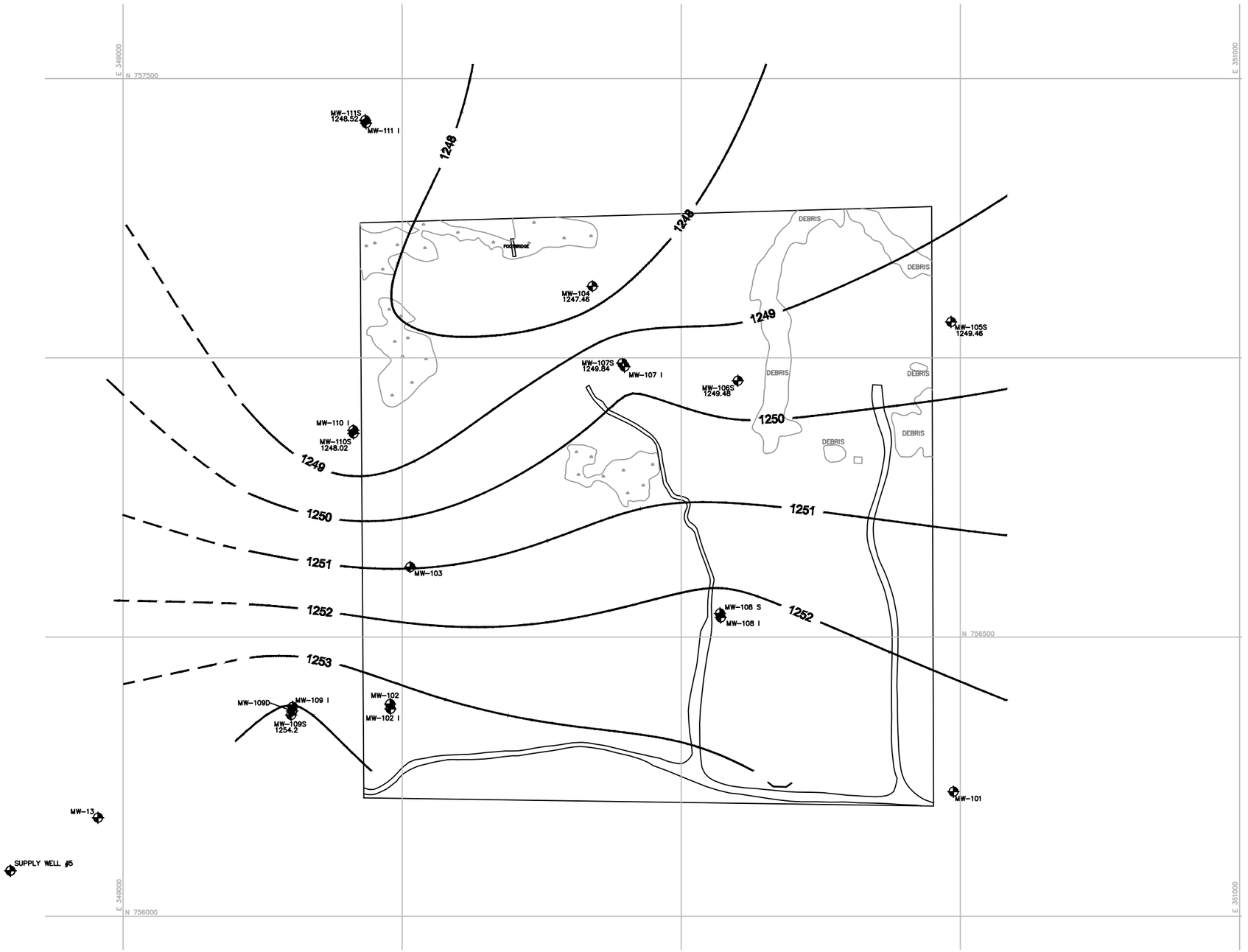
- NA Not Applicable
- NS Not Sampled
- U Analyte Not Detected
- B Value is Greater than IDL but less than CRDL
- * Concentration Exceeds Water Quality Standard
- J Estimated Concentration
- R Analytical Result Rejected During Validation
- D Compound Identified at Secondary Dilution Factor

NYS CLASS GA WATER QUALITY STANDARDS AND GUIDANCE (6NYCRR Part 703 or TOGS 1.1.1)

CHEMICAL NAME	
Inorganics	**µg/L**
Arsenic	25
Barium	1000
Beryllium	3.0
Cadmium	5.0
Chromium	50
Iron	300
Lead	25
Magnesium	35000
Manganese	3000
Sodium	20000
Thallium	0.5
VOCs	
Dichlorodifluoromethane	5
Vinyl Chloride	2
Chloroethane	5
cis-1,2-Dichloroethene	5
1,2-Dichloroethane	0.6
Benzene	1
Xylene (Total)	5
Trichloroethene	5
SVOCs	
4-Methylphenol	1
4-chloro-3-Methylphenol	1
4-Nitrophenol	1

Figure 2 **Groundwater Detections Greater than Criteria Carroll Landfill Chautauqua County, New York**

F:\Carroll Landfill\GW contours 8-27-10\Shallow.dwg



LEGEND

- MONITORING WELL LOCATION WITH GROUND WATER ELEVATION
- 1251 — GROUNDWATER CONTOUR (DASHED WHERE INFERRED)

NOTES

1. THIS DRAWING IS A COMBINATION OF CARROL.dwg and ACAD2000-CARROLL LANDFILL.dwg PROVIDED BY THE NYSDEC FROM THE REMEDIAL INVESTIGATION.
2. THE INFORMATION DEPICTED ON THIS MAP REPRESENTS THE RESULTS OF AERIAL MAPPING AND CAN ONLY BE CONSIDERED AS INDICATING THE GENERAL CONDITION EXISTING ON THE DATE OF PHOTOGRAPHY.
3. CONTROL: PROVIDED BY TVGA CONSULTANTS. COORDINATES SHOWN HEREON ARE EXPRESSED IN U.S. SURVEY FEET AND REFERENCED TO THE NORTH AMERICAN DATUM OF 1927 (NAD27) – NEW YORK STATE PLANE GRID. ELEVATIONS SHOWN HEREON ARE EXPRESSED IN FEET AND ARE REFERENCED TO THE NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD29).
4. MAPPING COMPILED BY TVGA CONSULTANTS (TVGA) USING PHOTOGRAMMETRIC METHODS. AERIAL PHOTOGRAPHY FLOWN 1 APRIL 2005. THIS MAPPING COMPILED IN ACCORDANCE WITH (NMAS) NATIONAL MAP ACCURACY STANDARDS FOR MAPS AT 1 INCH EQUAL 50 FT. SCALE.

SCALE IN FEET

0 200 400 600

FIGURE 3
GROUNDWATER ELEVATION CONTOURS OF
SHALLOW MONITOR WELLS
CARROLL LANDFILL
FREWSBERG, CHAUTAUQUA COUNTY, NEW YORK

ecology and environment

F:\Carroll Landfill\GW contours 8-27-10\Shallow.dwg

N

E 349000
N 757500
E 351000
N 756500
N 756000
E 349000
E 351000

MW-111S
MW-111 I
1248.89
MW-110 I
1248.09
MW-110S
MW-104
MW-105S
MW-107S
MW-107 I
1249.76
MW-106S
MW-103
MW-108 S
MW-108 I
1251.55
MW-109D
MW-109 I
1254.98
MW-109S
MW-102
MW-102 I
1254.99
MW-13
SUPPLY WELL #5
MW-101
FOOTBRIDGE
DEBRIS

1249
1250
1251
1252
1253
1254
1255

LEGEND

MONITORING WELL LOCATION WITH GROUND WATER ELEVATION

1251 GROUNDWATER CONTOUR (DASHED WHERE INFERRED)

NOTES

1. THIS DRAWING IS A COMBINATION OF CARROL.dwg and ACAD2000-CARROLL LANDFILL.dwg PROVIDED BY THE NYSDEC FROM THE REMEDIAL INVESTIGATION.
2. THE INFORMATION DEPICTED ON THIS MAP REPRESENTS THE RESULTS OF AERIAL MAPPING AND CAN ONLY BE CONSIDERED AS INDICATING THE GENERAL CONDITION EXISTING ON THE DATE OF PHOTOGRAPHY.
3. CONTROL: PROVIDED BY TVGA CONSULTANTS. COORDINATES SHOWN HEREON ARE EXPRESSED IN U.S. SURVEY FEET AND REFERENCED TO THE NORTH AMERICAN DATUM OF 1927 (NAD27) - NEW YORK STATE PLANE GRID. ELEVATIONS SHOWN HEREON ARE EXPRESSED IN FEET AND ARE REFERENCED TO THE NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD29).
4. MAPPING COMPILED BY TVGA CONSULTANTS (TVGA) USING PHOTOGRAMMETRIC METHODS. AERIAL PHOTOGRAPHY FLOWN 1 APRIL 2005. THIS MAPPING COMPILED IN ACCORDANCE WITH (NMAS) NATIONAL MAP ACCURACY STANDARDS FOR MAPS AT 1 INCH EQUAL 50 FT. SCALE.

SCALE IN FEET

0 200 400 600

FIGURE 4
GROUNDWATER ELEVATION CONTOURS OF
INTERMEDIATE MONITOR WELLS
CARROLL LANDFILL
FREWSBERG, CHAUTAUQUA COUNTY, NEW YORK

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APPENDIX

Contents:
Lab report (rth0914)
Data Usability Summary Report (DUSR)
Field Collection Forms