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September 23, 2015

Ms. Jackie Drummond
North Carolina Department of Environment and Natural Resources
Division of Waste Management, Solid Waste Section
2090 US Highway 70
Swannanoa, NC 28778
Via email:

RE: Piedmont Landfill and Recycling Center, Permit No. 34-06
Request for Reduction in Monitoring Requirements
JOYCE Project No. 392.1502.12, Task No. 01

Dear Ms. Drummond:

On behalf of Waste Management of Carolinas, Inc., Joyce Engineering (JOYCE) has prepared this request for a reduction in monitoring requirements for the Piedmont Landfill and Recycling Center (PLRC).

SITE DESCRIPTION

The PLRC is a closed municipal solid waste (MSW) landfill located on approximately 108 acres in Forsyth County, North Carolina, approximately 10 miles north of the city of Kernersville. The location of the site is shown in Figure 1 and the layout of the facility is shown in Drawing 1. The facility is permitted under North Carolina Solid Waste Permit Number 34-06. Waste Management of Carolinas, Inc. owns the facility, which opened in June 1990 and closed in 2004. Closure construction was completed October 29, 2004, and the closure was certified by the North Carolina Department of Environment and Natural Resources (DENR) on December 28, 2004.

Phase I, Modules 1 and 2A, have a composite liner system consisting of 18 inches compacted cohesive soil with a maximum hydraulic conductivity of $1x10^{-7}$ cm/sec overlain by a 60 mil high-density polyethylene (HDPE) geomembrane. Phase I, Modules 3, 5 and 6, and Phase II, Modules 1 and 2A, have a double synthetic liner system with primary and secondary leachate collection systems. All liner systems meet the requirements of the NCSWMR.

SITE GEOLOGY AND HYDROGEOLOGY

The PLRC is located in the Piedmont physiographic province of North Carolina and is underlain by intrusive granitic rocks of Pennsylvanian to Permian age, which are part of the

Charlotte Belt Geologic Unit. Granitic bedrock is overlain by approximately 10-40 feet of saprolitic soil and regolith consisting of gray to brown sandy silt to silty sand, which grades downward to weathered bedrock.

The site is located in the Roanoke River Basin, on a topographic high between creeks located north and southwest of the landfill. Both creeks are unnamed tributaries of East Belews Creek. The southwestern creek converges with East Belews Creek just west of the facility, and the northern creek converges with East Belews Creek about half a mile farther north. East Belews Creek flows northward to Belews Lake.

The uppermost aquifer is unconfined and includes both the saprolite and uppermost fractured bedrock, which are strongly connected. The groundwater level measurements taken during the March 2015 sampling event were used to construct the groundwater potentiometric surface contours shown in Drawing 1. Regional groundwater flow in the vicinity of the site is generally to the northwest; however, the site is located on a topographic high and groundwater flow is divided. On the north side of the landfill, groundwater flow is toward the north and discharges to the creek on the north side of the facility. One the south side of the landfill, groundwater flow is toward the west-southwest in discharges to the creek on the southwest side of the property.

CURRENT MONITORING NETWORK

The current monitoring network for this facility consists of 15 monitoring wells: MW-01, MW-02, MW-03, MW-04, MW-04D, MW-05, MW-06, MW-07, MW-08, MW-9R, MW-10, MW-11, MW-11D, MW-12, MW-12D. MW-01 and MW-06 are upgradient background wells and the others are downgradient compliance wells. There are also four surface water points currently sampled at this facility: S-02, S 03, S-04, and S-05. The locations of the monitoring wells are shown on Drawing 1. Table 1 presents the construction data for the monitoring wells. The monitoring wells are sampled semiannually in accordance with the North Carolina Solid Waste Management regulations (NCSWMR) and the Water Quality Monitoring Plan for this facility.

MONITORING PROGRAM HISTORY

The site entered into an Assessment Monitoring Program for background wells MW-01 and MW-06 and downgradient well MW-09 after volatile organic constituents were detected in MW-09 during the second semiannual event of 1996. Two organic compounds (chloroethane and 1,1-dichloroethane) were historically detected in monitoring well MW-09. Chloroethane exhibited a declining trend to the point where chloroethane was reported at less than the laboratory reporting limit during the January 1998 sampling event. The concentration of 1,1-dichloroethane in MW-09 also decreased below the laboratory reporting limit during the July 1998 sampling event. Following receipt of approval from the DENR, all wells at the site reverted to the Detection Monitoring Program as of the second semiannual event in 1999, as allowed by 15A NCAC 13B.1634 (b).

Monitoring well MW-09 was replaced by well MW-09R in November 1999. No chloroethane concentration above the laboratory reporting limit or Solid Waste Section Limit (SWSL) has been detected in MW-09R since the well was installed; however, 1,1-dichloroethane was detected in MW-09R at a concentration of 23 µg/L during the initial sampling event conducted in January 2000. The concentration of 1,1-dichlorothane remained relatively consistent until 2009, ranging in concentration from 7 µg/L to 28 µg/L; however, it has not been detected at quantifiable levels since September 2009. The constituent cis-1,2-dichloroethene was detected in MW-09R above the laboratory reporting limit for the first time during the July 2002 event at a concentration of 6.5 µg/L, and has been detected at concentrations ranging from 5-28 µg/L; however, it has not been detected at quantifiable levels since September 2009. The presence of organic constituents in MW-09 and MW-09R is attributed to landfill gas (LFG). The LFG extraction network was expanded in this area in January 2003, and the following decrease in concentrations of organic constituents in MW-9R is attributed to the control of LFG.

Due to the detection of 1,1-dichloroethane in MW-09R during the first semiannual event in 2000, the site performed Assessment Monitoring on wells MW-01, MW-06, and MW-09R through the second semiannual event of 2001. Following DENR approval of an August 20, 2001 request by Waste Management, MW-01 and MW-06 again reverted to Detection Monitoring. Monitoring well MW-09R remained in assessment monitoring until the DENR approved reverting back to detection monitoring in a letter dated March 15, 2012.

In the September 2007 sampling event, benzene and vinyl chloride were detected in MW-02 at concentrations in exceedance of the groundwater standards established in 15A NCAC 2L.020 (NC 2L). A resampling event confirmed the vinyl chloride, but not the benzene exceedance. An *Alternate Source Demonstration* (ASD) was submitted to DENR on March 14, 2008. The ASD demonstrated that the organic constituents detected in MW-02 are related to LFG impacts. In January 2008, improvements to the active LFG recovery system at the site were initiated to help mitigate these impacts. The ASD was accepted by DENR in a letter dated May 7, 2008 with the condition that if vinyl chloride and benzene concentrations in MW-02 are not sufficiently reduced by Spring 2009, MW-02 would enter Assessment Monitoring. Neither benzene nor vinyl chloride have had confirmed detections above the NC 2L standards in MW-02 since September 2008, so MW-02 remains in detection monitoring.

During the March 2010 sampling event, chromium was detected in MW-03 at a statistically significant concentration above the NC 2L groundwater standard. An ASD was submitted on July 26, 2010 demonstrating that the chromium was naturally occurring in the soil and groundwater of the facility. DENR approved the ASD for chromium at the facility in a letter dated April 28, 2011.

RECENT MONITORING RESULTS

Table 2 summarizes the historical constituent detections for the PLRC. There have been no exceedances of groundwater protection standards (GPS) as defined in 15A NCAC 13B.1634.(g) in any of the sites' monitoring wells since September 2009, except for chromium in MW-3 and MW-4D. DENR approved the ASD for chromium at the facility in a letter dated April 28, 2011. There has been no quantified detection of any organic constituent in any monitoring well or surface water point since September 2009.

RISK ASSESSMENT – POTENTIAL RECEPTORS

Assessment of the potential risk from the PLRC to human health and the environment is based on available pathways of exposure. In the case of a release of landfill contaminants to groundwater in the immediate vicinity of the landfill, the primary risk of exposure will be to site workers engaged in groundwater sampling activities. Since these workers are expected to be well-trained professionals, and since their exposure will be limited to a few hours a year, this risk is minimal. If a theoretical groundwater contaminant plume migrates away from the landfill, nearby potable water supply wells will become the most likely potential exposure pathway.

Private groundwater wells are the primary source of potable water in the vicinity of the landfill as there is no public water supply available. Drawing 2 shows an aerial photograph of the PLRC and surrounding area with property boundaries and known or suspected locations of supply wells. Known supply well locations are labeled "WS-#" and suspected but not confirmed supply well locations are labeled "SWS-#". Three supply wells are known or suspected to exist within 1000 feet of the edge of waste at the PLRC. These are labeled WS-1, WS-2, and SWS-3 on Drawing 2.

The PLRC facility supply well is located near the former scale house at the location labeled WS-1 on Drawings 2. This well is approximately 140 feet from the edge of waste; however, it is clearly upgradient of the waste, and therefore unlikely to be impacted by a release from the waste or leachate to groundwater. WS-1 is used for cleaning, pressure-washing, and for the bathroom at the site; however, bottled water is provided for drinking.

The Town of Kernersville operates a shooting range on the former Kernersville Landfill Property, adjacent to and southeast of the PLRC property. The supply well that services the shooting range, labeled WS-2 on Drawing 2, is approximately 750 feet southeast and upgradient of the PLRC edge of waste; however, it is about 320 feet east (upgradient) of the edge of waste for the Town of Kernersville Landfill.

A residence assumed to have a supply well (labeled SWS-3 on Drawing 2) is located approximately 700 feet south of the PLRC waste unit. SWS-3 is also approximately 1250 feet west (downgradient) of the Town of Kernersville Landfill. A perennial creek believed to be a groundwater discharge feature is located between the PLRC and SWS-3. We believe this creek

acts as a groundwater divide, effectively preventing any migration of groundwater from the PLRC to the area near SWS-3.

The two creeks that are located north and southwest of the PLRC are potential environmental receptors. Both of these creeks are unnamed tributaries to East Belews Creek. East Belews Creek is classified "C" by DENR, for waters protected for uses such as secondary recreation, fishing, wildlife, fish consumption, aquatic life including propagation, survival and maintenance of biological integrity, and agriculture. There is no known or suspected use of the water from these unnamed creeks or from East Belews Creek as potable water. Although there is no known impact, should there be a significant future impact to groundwater that discharged to these creeks, dilution and volatilization would likely reduce the contaminant concentrations to below detectable levels in a very short time.

The PLRC is a lined landfill with a leachate collection system that has been closed for over 10 years. There have been historic detections of volatile organic compounds (VOCs) in the groundwater during the post-closure period, some in exceedance of GPS; however, these have been attributed to partitioning of vapors carried in migrating landfill gas to the groundwater rather than indicating a release of leachate or failure of the liner system. The active landfill gas extraction system has effectively controlled the migration of landfill gas, and as a result, there have been no quantified detections of VOCs in the groundwater monitoring wells in over 5 years. Furthermore, there have been no historical quantified detections of VOCs in any surface water samples downstream of the landfill. These factors minimize the potential risk to the identified potential human or environmental receptors. Based on the available data and JOYCE's professional judgement, the PLRC poses very little risk of significant harm to either human health or the environment.

DIMINISHING LEACHATE PRODUCTION

The PLRC has been closed for over 11 years and is past its peak for leachate production. With decreasing leachate production there is a decreasing risk of leachate being released and impacting the groundwater at the facility. Graph 1 shows the monthly leachate production between January 2005 and July 2015, along with a six-month running average and a linear trend line. The trend line indicates an approximate 75% reduction in average leachate production over the last 10 years. This indicates a decreasing risk of a significant release of leachate from the landfill, and therefore a reduced risk to human health and the environment.

REQUESTED MODIFICATIONS OF THE DETECTION MONITORING PROGRAM

Removal of Wells from the Compliance Monitoring Network

Currently, there are two upgradient wells in the monitoring network, MW-1 and MW-6. Both wells are screened across the same elevation interval. There have never been any GPS exceedances, and very few quantified detections in either well. We believe the two background

wells are redundant. We request that MW-6 be removed from the monitoring network. MW-6 may be maintained for water level information, or it may be abandoned.

Currently, there are three nested pairs of wells, each consisting of one shallow-screened well and one deep-screened well in close proximity to each other. These pairs are: MW-4 and MW-4D; MW-11 and MW-11D; and MW-12 and MW-12D. None of the deep wells has ever had a GPS exceedance. None of the deep wells has ever had a quantified detection of any organic constituent, except for an isolated detection of toluene in MW-4D in March 2009 that was two orders of magnitude below the GPS. The shallow wells adequately monitor the uppermost aquifer for potential releases of landfill constituents to the groundwater. We request that the deep wells MW-4D, MW-11D, and MW-12D be removed from the monitoring network. These wells will continue to be maintained by the facility so that they can be sampled in the event that there is an exceedance detected in the corresponding shallow well at some time in the future.

Reduction of the Sampling Frequency to Annual

The PLRC is a lined landfill that has been closed for over ten years. There have been no exceedances of groundwater protection standards (GPS) as defined in 15A NCAC 13B.1634.(g) in any of the sites' monitoring wells since September 2009, except for chromium, which is coved by an approved ASD. There has been no quantified detection of any organic constituent in any monitoring well or surface water point since September 2009. The historical GPS exceedances for organic constituents were attributed to migration of landfill gas, and the current active landfill gas extraction system has effectively eliminated those exceedances. Therefore, we believe that there is little risk of a release from this landfill significantly affecting groundwater or surface water.

There are three potable supply wells within 1000 feet of the waste unit; however, two of them are upgradient and the other is separated from the landfill by a creek, which is a groundwater divide and is expected to act as a barrier to groundwater migration. We believe that the risk to these wells is minimal. The creeks north and southwest of the landfill are potential environmental receptors; however, these creeks are not sources of potable water and no impacts have been documented. For these reasons, we believe the actual risk to human health or the environment from this landfill is low.

If a release were to occur, it would not migrate quickly. Table 3 shows the groundwater flow velocity calculations based on the March 2015 groundwater surface map shown in Drawing 1. The average flow velocity for groundwater is estimated at only 12.3 feet/year. The distances from the downgradient monitoring wells to the facility boundary range from about 40 feet to over 120 feet. If a GPS exceedance were detected at one of the wells closer to the boundary, it would take over 3 years before the constituent migrated to the boundary. This would allow sufficient time to develop and implement appropriate corrective action.

Based on the above factors, we believe annual groundwater sampling will be adequate to detect any future release from this landfill before it can create a significant risk to human health or the environment. Therefore, we request that the groundwater monitoring frequency be reduced to annual for the PLRC. In the event that there is a future GPS exceedance in one or more monitoring wells during an annual sampling event, the affected wells could revert to semiannual monitoring.

We request that these changes be effective before the first semiannual sampling event of 2016, tentatively scheduled for March 2016. Please feel free to contact me at (336) 323-0092 if you have any questions regarding this request.

Sincerely,
JOYCE ENGINEERING

Van Burbach, Ph.D., P.G.
Senior Technical Consultant

Attachments: Table 1, Table 2, Table 3, Graph 1
Figure 1, Drawing 1, Drawing 2

Copy: Al Lacsamana, Waste Management of Carolinas, Inc.
Seth Ramaley, Waste Management of Carolinas, Inc.

TABLE 1
MONITORING WELL CONSTRUCTION DATA

WELL ID	INSTAL. DATE	CASING DIAMETER (inches)	WELL ELEVATIONS (feet AMSL)		TOTAL DEPTH		TOP OF BEDROCK		SCREENED INTERVAL				GROUNDWATER *		LITHOLOGY OF SCREENED INTERVAL
			Ground Surface	TOC	Depth (feet BGS)	Elevation (feet AMSL)	Depth (feet BGS)	Elevation (feet AMSL)	Depth (feet BGS)		Elevation (feet AMSL)		Depth to Water (feet below TOC)	Water Table Elevation (feet AMSL)	
									Top	Bottom	Top	Bottom			
MW-01	07/13/89	2.00	821.40	823.93	49.00	772.40	47.00	774.40	44.00	49.00	777.4	772.40	45.71	778.22	WEATHERED GNEISS BEDROCK
MW-02	08/05/89	2.00	767.30	778.04	25.50	741.80	-	-	20.20	25.20	747.1	742.10	28.81	749.23	SILTY SAND
MW-03	08/06/89	2.00	767.30	770.08	38.00	729.30	-	-	32.50	37.50	734.8	729.80	25.73	744.35	SILTY SAND
MW-04	07/14/89	2.00	754.50	756.92	27.00	727.50	-	-	20.00	25.00	734.5	729.50	12.73	744.19	SILTY SAND
MW-04D[#1]	02/18/94	2.00	754.30	757.33	62.00	692.30	62.00	692.30	53.25	58.25	701.05	696.05	13.20	744.13	SAPROLITE/WEATHERED BEDROCK
MW-05	08/02/89	2.00	740.40	743.17	20.50	719.90	-	-	14.45	19.45	725.95	720.95	4.68	738.49	SILTY SAND
MW-06	08/09/93	2.00	798.00	800.82	26.80	771.20	-	-	20.90	25.90	777.1	772.10	24.17	776.65	SILTY SAND
MW-07	08/25/94	2.00	768.87	771.57	33.50	735.37	-	-	17.00	32.40	751.87	736.47	24.98	746.59	SILTY SAND
MW-08	08/31/94	2.00	746.15	748.95	22.00	724.15	-	-	5.00	20.00	741.15	726.15	5.59	743.36	SILTY SAND
MW-09[#2]	08/30/94	2.00	767.82	770.62	35.00	732.82	-	-	19.81	34.81	748.01	733.01	-	-	SAND/SAPROLITE BEDROCK
MW-09R	11/09/99	2.00	762.95	764.95	41.20	721.75	28.00	734.95	32.00	42.50	730.95	720.45	26.23	738.72	BEDROCK
MW-10	10/24/94	2.00	774.20	777.20	38.00	736.20	-	-	20.00	36.99	754.2	737.21	30.48	746.72	CLAYEY SILT/SILT
MW-11	11/17/94	2.00	774.30	776.80	35.00	739.30	-	-	19.01	34.22	755.29	740.08	28.60	748.20	SILT/SANDY SILT
MW-11D	11/15/94	2.00	773.86	776.36	93.50	680.36	-	-	81.82	91.79	692.04	682.07	28.61	747.75	SANDY SILT/GRAVELY SILT
MW-12	10/21/94	2.00	748.58	751.48	18.00	730.58	-	-	3.33	17.22	745.25	731.36	6.08	745.40	SILTY CLAY/SILTY SAND/SANDY SILT
MW-12D	10/27/94	2.00	748.73	751.53	43.30	705.43	-	-	31.98	42.20	716.75	706.53	5.50	746.03	SILTY GRAVEL/

TOC = Top of PVC Well Casing. BGS = Below ground surface. AMSL = Above mean sea level. * - Groundwater data from March 18, 2015.

[#1] MW-4D originally called PZ-13. [#2] MW-9 was abandoned in 1999.

TABLE 2: Historical Quantified Detections in Groundwater

WELL	CONSTITUENT	DATE	RESULT	DL	RL	GPS	Source
3406-MW01	Barium, total	2/17/1993	47	---	10	700	NC2L
3406-MW01	Copper, total	09/17/2014	12	0.56	10	1000	NC2L
3406-MW01	Zinc, total	9/13/1994	47.8	---	20	1000	NC2L
3406-MW01	Zinc, total	7/27/1999	65.4	---	50	1000	NC2L
3406-MW01	Zinc, total	1/20/2005	57	---	50	1000	NC2L
3406-MW01	Zinc, total	9/11/2008	18	---	10	1000	NC2L
3406-MW02	Benzene	9/13/2007	1.1	---	1	6000	NC2L
3406-MW02	**Benzene**	**3/19/2008**	**1.4**	**---**	**1**	**1**	**NC2L**
3406-MW02	**Vinyl chloride**	**9/13/2007**	**1.3**	**---**	**1**	**0.03**	**NC2L**
3406-MW02	**Vinyl chloride**	**11/15/2007**	**1.3**	**---**	**1**	**0.03**	**NC2L**
3406-MW02	**Vinyl chloride**	**3/19/2008**	**1.4**	**---**	**1**	**0.03**	**NC2L**
3406-MW02	**Vinyl chloride**	**9/11/2008**	**3.2**	**---**	**1**	**0.03**	**NC2L**
3406-MW02	**Vinyl chloride**	**3/10/2009**	**1.6**	**---**	**1**	**0.03**	**NC2L**
3406-MW02	Arsenic, total	1/30/1998	10.1	---	10	10	NC2L
3406-MW02	Barium, total	2/17/1993	18	---	10	700	NC2L
3406-MW02	Barium, total	1/23/2007	130	---	100	700	NC2L
3406-MW02	Barium, total	9/13/2007	110	---	100	700	NC2L
3406-MW02	Barium, total	3/19/2008	130	---	100	700	NC2L
3406-MW02	Barium, total	9/11/2008	130	---	100	700	NC2L
3406-MW02	Barium, total	3/10/2009	130	---	100	700	NC2L
3406-MW02	Barium, total	9/16/2009	130	---	100	700	NC2L
3406-MW02	Barium, total	3/10/2010	110	---	100	700	NC2L
3406-MW02	Barium, total	9/16/2010	140	---	100	700	NC2L
3406-MW02	Barium, total	3/15/2011	130	---	100	700	NC2L
3406-MW02	Barium, total	9/14/2011	130	---	100	700	NC2L
3406-MW02	Barium, total	3/14/2012	140	---	100	700	NC2L
3406-MW02	Barium, total	9/12/2012	140	---	100	700	NC2L
3406-MW02	Barium, total	3/20/2013	140	---	100	700	NC2L
3406-MW02	Barium, total	9/18/2013	150	---	100	700	NC2L
3406-MW02	Barium, total	3/19/2014	150	---	100	700	NC2L
3406-MW02	Barium, total	09/17/2014	180	0.58	100	700	NC2L
3406-MW02	Barium, total	03/18/2015	160	0.58	100	700	NC2L
3406-MW02	Zinc, total	4/11/1994	22.8	---	20	1000	NC2L
3406-MW02	Zinc, total	9/13/2007	15	---	10	1000	NC2L
3406-MW03	Barium, total	2/17/1993	11	---	10	700	NC2L
3406-MW03	Chromium, total	1/18/2006	11	---	10	10	NC2L
3406-MW03	Chromium, total	1/24/2007	11	---	10	10	NC2L
3406-MW03	Chromium, total	9/13/2007	12	---	10	10	NC2L
3406-MW03	Chromium, total	3/19/2008	13	---	10	10	NC2L
3406-MW03	Chromium, total	9/11/2008	12	---	10	10	NC2L
3406-MW03	Chromium, total	3/10/2009	12	---	10	10	NC2L
3406-MW03	Chromium, total	9/16/2009	12	---	10	10	NC2L
3406-MW03	**Chromium, total**	**3/10/2010**	**12 (13)**	**---**	**10**	**10**	**NC2L**
3406-MW03	**Chromium, total**	**4/16/2010**	**13**	**---**	**10**	**10**	**NC2L**
3406-MW03	Chromium, total	9/16/2010	12	---	10	10	NC2L
3406-MW03	**Chromium, total**	**3/15/2011**	**13**	**---**	**10**	**10**	**NC2L**
3406-MW03	Chromium, total	9/14/2011	13	---	10	10	NC2L
3406-MW03	Chromium, total	3/14/2012	13	---	10	10	NC2L
3406-MW03	**Chromium, total**	**9/12/2012**	**12**	**---**	**10**	**10**	**NC2L**
3406-MW03	Chromium, total	3/20/2013	13	---	10	10	NC2L
3406-MW03	Chromium, total	9/18/2013	11	---	10	10	NC2L
3406-MW03	**Chromium, total**	**3/19/2014**	**12**	**---**	**10**	**10**	**NC2L**
3406-MW03	**Chromium, total**	**09/17/2014**	**12**	**0.66**	**10**	**10**	**NC2L**
3406-MW03	**Chromium, total**	**03/19/2015**	**10**	**0.66**	**10**	**10**	**NC2L**
3406-MW03	Cobalt, total	2/7/1995	5.1	---	5	1	GWPS
3406-MW03	Copper, total	2/7/1995	28.8	---	25	1000	NC2L
3406-MW03	Vanadium, total	2/7/1995	22	---	10	0.3	GWPS
3406-MW03	Zinc, total	2/7/1995	22.9	---	20	1000	NC2L

TABLE 2: Historical Quantified Detections in Groundwater

WELL	CONSTITUENT	DATE	RESULT	DL	RL	GPS	Source
3406-MW04	Barium, total	2/17/1993	27	---	10	700	NC2L
3406-MW04	Zinc, total	4/11/1994	22.9	---	20	1000	NC2L
3406-MW04	Zinc, total	09/17/2014	12	2	10	1000	NC2L
3406-MW04D	Toluene	3/11/2009	1.2	---	1	600	NC2L
3406-MW04D	Beryllium, total	3/13/1996	8	---	2	4	GWPS
3406-MW04D	Cadmium, total	1/29/1998	2.1	---	1	2	NC2L
3406-MW04D	Cadmium, total	7/16/1998	1.4	---	1	2	NC2L
3406-MW04D	Chromium, total	7/16/1998	15.7	---	10	10	NC2L
3406-MW04D	Chromium, total	7/18/2002	17.5	---	10	10	NC2L
3406-MW04D	Chromium, total	1/22/2004	11	---	10	10	NC2L
3406-MW04D	Chromium, total	7/11/2005	12	---	10	10	NC2L
3406-MW04D	Chromium, total	3/20/2008	12	---	10	10	NC2L
3406-MW04D	Chromium, total	9/11/2008	15	---	10	10	NC2L
3406-MW04D	Chromium, total	9/18/2013	12	---	10	10	NC2L
3406-MW04D	**Chromium, total**	**09/17/2014**	**13**	**0.66**	**10**	**10**	**NC2L**
3406-MW04D	**Chromium, total**	**03/18/2015**	**12**	**0.66**	**10**	**10**	**NC2L**
3406-MW04D	Cobalt, total	3/13/1996	26	---	10	1	GWPS
3406-MW04D	Lead, total	1/10/1995	5.8	---	5	15	NC2L
3406-MW04D	Lead, total	2/7/1995	5.1	---	5	15	NC2L
3406-MW04D	Lead, total	5/8/1995	8.6	---	5	15	NC2L
3406-MW04D	Lead, total	7/18/2002	12.1	---	10	15	NC2L
3406-MW04D	Lead, total	7/11/2005	83 (ND)	---	10	15	NC2L
3406-MW04D	Vanadium, total	2/7/1995	15	---	10	0.3	GWPS
3406-MW04D	Vanadium, total	3/13/1996	120	---	50	0.3	GWPS
3406-MW04D	Zinc, total	1/10/1995	23.6	---	20	1000	NC2L
3406-MW04D	Zinc, total	2/7/1995	49.3	---	20	1000	NC2L
3406-MW04D	Zinc, total	5/8/1995	76.8	---	20	1000	NC2L
3406-MW04D	Zinc, total	3/13/1996	81.6	---	50	1000	NC2L
3406-MW04D	Zinc, total	9/19/1996	160	---	50	1000	NC2L
3406-MW04D	Zinc, total	7/16/1998	73.6	---	50	1000	NC2L
3406-MW04D	Zinc, total	7/18/2002	116	---	50	1000	NC2L
3406-MW04D	Zinc, total	1/22/2004	73	---	50	1000	NC2L
3406-MW04D	Zinc, total	7/27/2004	100	---	50	1000	NC2L
3406-MW04D	Zinc, total	7/11/2005	220	---	50	1000	NC2L
3406-MW04D	Zinc, total	9/12/2007	43	---	10	1000	NC2L
3406-MW04D	Zinc, total	3/20/2008	27	---	10	1000	NC2L
3406-MW04D	Zinc, total	9/11/2008	85	---	10	1000	NC2L
3406-MW04D	Zinc, total	3/11/2009	15	---	10	1000	NC2L
3406-MW04D	Zinc, total	3/20/2013	19	---	10	1000	NC2L
3406-MW04D	Zinc, total	9/18/2013	16	---	10	1000	NC2L
3406-MW04D	Zinc, total	09/17/2014	14	2	10	1000	NC2L
3406-MW04D	Zinc, total	03/18/2015	18	2	10	1000	NC2L
3406-MW05	Arsenic, total	1/28/1998	11.9	---	10	10	NC2L
3406-MW05	Barium, total	2/17/1993	14	---	10	700	NC2L
3406-MW05	Zinc, total	7/24/2003	110	---	50	1000	NC2L
3406-MW06	Antimony, total	4/11/1994	94.9	---	90	1	GWPS
3406-MW06	Beryllium, total	11/21/2000	2.6	---	2	4	GWPS
3406-MW06	Vanadium, total	11/21/2000	45.6	---	40	0.3	GWPS
3406-MW06	Zinc, total	7/23/2003	310	---	50	1000	NC2L
3406-MW06	Zinc, total	3/10/2010	15	---	10	1000	NC2L
3406-MW06	Zinc, total	9/12/2012	12	---	10	1000	NC2L
3406-MW07	Arsenic, total	1/30/1998	10.6	---	10	10	NC2L
3406-MW07	Copper, total	9/14/1994	28.7	---	25	1000	NC2L
3406-MW07	Copper, total	11/17/1994	43.9	---	25	1000	NC2L
3406-MW07	Silver, total	11/17/1994	13.6	---	10	20	NC2L
3406-MW07	Zinc, total	11/17/1994	37.3	---	20	1000	NC2L
3406-MW07	Zinc, total	3/10/2010	12	---	10	1000	NC2L
3406-MW07	Zinc, total	3/20/2013	16	---	10	1000	NC2L

TABLE 2: Historical Quantified Detections in Groundwater

WELL	CONSTITUENT	DATE	RESULT	DL	RL	GPS	Source
3406-MW08	Arsenic, total	1/28/1998	11.3	---	10	10	NC2L
3406-MW08	Barium, total	3/15/2011	110	---	100	700	NC2L
3406-MW08	Cadmium, total	1/28/1998	1.3	---	1	2	NC2L
3406-MW08	Chromium, total	11/17/1994	11.5	---	10	10	NC2L
3406-MW08	Cobalt, total	12/7/1994	10.3	---	10	1	GWPS
3406-MW08	Cobalt, total	9/18/1995	12	---	10	1	GWPS
3406-MW08	Cobalt, total	11/8/1995	14	---	10	1	GWPS
3406-MW08	Cobalt, total	3/11/1996	19	---	10	1	GWPS
3406-MW08	Cobalt, total	4/29/1996	15	---	10	1	GWPS
3406-MW08	Cobalt, total	9/13/1996	15	---	10	1	GWPS
3406-MW08	Cobalt, total	4/10/1997	22	---	10	1	GWPS
3406-MW08	Cobalt, total	6/5/1997	18	---	10	1	GWPS
3406-MW08	Cobalt, total	10/9/1997	12.6	---	10	1	GWPS
3406-MW08	Cobalt, total	1/28/1998	25.5	---	10	1	GWPS
3406-MW08	Cobalt, total	4/3/1998	12.6	---	10	1	GWPS
3406-MW08	Cobalt, total	7/10/1998	12.4	---	10	1	GWPS
3406-MW08	Cobalt, total	7/18/2002	12.6	---	10	1	GWPS
3406-MW08	Lead, total	9/13/1994	6.5	---	5	15	NC2L
3406-MW08	Lead, total	11/17/1994	45	---	10	15	NC2L
3406-MW08	Lead, total	1/10/1995	56.8	---	18	15	NC2L
3406-MW08	Silver, total	11/17/1994	11.6	---	10	20	NC2L
3406-MW08	Thallium, total	10/9/1997	3.6	---	2	0.28	GWPS
3406-MW08	Zinc, total	9/13/1994	36.2	---	20	1000	NC2L
3406-MW08	Zinc, total	11/17/1994	79.1	---	20	1000	NC2L
3406-MW08	Zinc, total	12/7/1994	24.7	---	20	1000	NC2L
3406-MW08	Zinc, total	1/10/1995	21.1	---	20	1000	NC2L
3406-MW09R	**1,1-Dichloroethane**	**1/22/1997**	**9**	**---**	**5**	**6**	**NC2L**
3406-MW09R	**1,1-Dichloroethane**	**6/5/1997**	**7**	**---**	**5**	**6**	**NC2L**
3406-MW09R	**1,1-Dichloroethane**	**10/16/1997**	**8**	**---**	**5**	**6**	**NC2L**
3406-MW09R	**1,1-Dichloroethane**	**1/27/1998**	**8**	**---**	**5**	**6**	**NC2L**
3406-MW09R	**1,1-Dichloroethane**	**1/20/2000**	**23**	**---**	**5**	**6**	**NC2L**
3406-MW09R	**1,1-Dichloroethane**	**2/16/2000**	**24**	**---**	**5**	**6**	**NC2L**
3406-MW09R	**1,1-Dichloroethane**	**7/12/2000**	**20**	**---**	**5**	**6**	**NC2L**
3406-MW09R	**1,1-Dichloroethane**	**11/21/2000**	**26**	**---**	**5**	**6**	**NC2L**
3406-MW09R	**1,1-Dichloroethane**	**1/24/2001**	**28**	**---**	**5**	**6**	**NC2L**
3406-MW09R	**1,1-Dichloroethane**	**7/18/2001**	**19**	**---**	**5**	**6**	**NC2L**
3406-MW09R	**1,1-Dichloroethane**	**1/31/2002**	**21**	**---**	**5**	**6**	**NC2L**
3406-MW09R	**1,1-Dichloroethane**	**7/18/2002**	**24**	**---**	**5**	**6**	**NC2L**
3406-MW09R	**1,1-Dichloroethane**	**1/21/2003**	**7**	**---**	**5**	**6**	**NC2L**
3406-MW09R	**1,1-Dichloroethane**	**7/24/2003**	**14**	**---**	**5**	**6**	**NC2L**
3406-MW09R	**1,1-Dichloroethane**	**1/22/2004**	**22**	**---**	**5**	**6**	**NC2L**
3406-MW09R	**1,1-Dichloroethane**	**7/27/2004**	**20**	**---**	**5**	**6**	**NC2L**
3406-MW09R	**1,1-Dichloroethane**	**1/19/2005**	**16**	**---**	**5**	**6**	**NC2L**
3406-MW09R	**1,1-Dichloroethane**	**7/12/2005**	**18**	**---**	**5**	**6**	**NC2L**
3406-MW09R	**1,1-Dichloroethane**	**1/18/2006**	**12**	**---**	**5**	**6**	**NC2L**
3406-MW09R	**1,1-Dichloroethane**	**7/12/2006**	**11**	**---**	**5**	**6**	**NC2L**
3406-MW09R	**1,1-Dichloroethane**	**1/24/2007**	**6.1**	**---**	**5**	**6**	**NC2L**
3406-MW09R	**1,1-Dichloroethane**	**9/12/2007**	**12**	**---**	**5**	**6**	**NC2L**
3406-MW09R	**1,1-Dichloroethane**	**3/19/2008**	**6.3**	**---**	**5**	**6**	**NC2L**
3406-MW09R	**1,1-Dichloroethane**	**9/11/2008**	**6.1**	**---**	**5**	**6**	**NC2L**
3406-MW09R	1,1-Dichloroethane	9/16/2009	5.1	---	5	6	NC2L
3406-MW09R	**Acetone**	**4/29/1996**	**35**	**---**	**34**	**6**	**NC2L**
3406-MW09R	**Chloroethane**	**9/17/1996**	**25**	**---**	**10**	**1**	**NC2L**
3406-MW09R	Chloroethane	11/18/1996	27	---	10	3000	NC2L
3406-MW09R	Chloroethane	1/22/1997	32	---	10	3000	NC2L
3406-MW09R	Chloroethane	6/5/1997	16	---	10	3000	NC2L
3406-MW09R	Chloroethane	10/16/1997	14	---	10	3000	NC2L

TABLE 2: Historical Quantified Detections in Groundwater

WELL	CONSTITUENT	DATE	RESULT	DL	RL	GPS	Source
3406-MW09R	cis-1,2-Dichloroethene	7/18/2002	6.5	---	5	70	NC2L
3406-MW09R	cis-1,2-Dichloroethene	1/21/2003	6.9	---	5	70	NC2L
3406-MW09R	cis-1,2-Dichloroethene	7/24/2003	7.5	---	5	70	NC2L
3406-MW09R	cis-1,2-Dichloroethene	1/22/2004	12	---	5	70	NC2L
3406-MW09R	cis-1,2-Dichloroethene	7/27/2004	12	---	5	70	NC2L
3406-MW09R	cis-1,2-Dichloroethene	1/19/2005	11	---	5	70	NC2L
3406-MW09R	cis-1,2-Dichloroethene	7/12/2005	11	---	5	70	NC2L
3406-MW09R	cis-1,2-Dichloroethene	1/18/2006	8.4	---	5	70	NC2L
3406-MW09R	cis-1,2-Dichloroethene	7/12/2006	6.5	---	5	70	NC2L
3406-MW09R	cis-1,2-Dichloroethene	9/12/2007	5.1	---	5	70	NC2L
3406-MW09R	Chromium, total	12/6/1994	14.7	---	10	10	NC2L
3406-MW09R	Chromium, total	1/10/1995	49.9	---	10	10	NC2L
3406-MW09R	Cobalt, total	1/10/1995	18.2	---	10	1	GWPS
3406-MW09R	Cobalt, total	3/11/1996	12	---	10	1	GWPS
3406-MW09R	Cobalt, total	9/17/1996	16	---	10	1	GWPS
3406-MW09R	Cobalt, total	11/18/1996	14	---	10	1	GWPS
3406-MW09R	Cobalt, total	1/22/1997	12	---	5	1	GWPS
3406-MW09R	Cobalt, total	6/5/1997	14	---	10	1	GWPS
3406-MW09R	Copper, total	12/6/1994	49.3	---	25	1000	NC2L
3406-MW09R	Copper, total	1/10/1995	181	---	25	1000	NC2L
3406-MW09R	Lead, total	1/10/1995	8.1	---	5	15	NC2L
3406-MW09R	Vanadium, total	1/10/1995	106	---	40	0.3	GWPS
3406-MW09R	Zinc, total	12/6/1994	32	---	20	1000	NC2L
3406-MW09R	Zinc, total	1/10/1995	87.9	---	20	1000	NC2L
3406-MW09R	Zinc, total	1/24/2007	35	---	20	1000	NC2L
3406-MW09R	Zinc, total	9/12/2007	13	---	10	1000	NC2L
3406-MW09R	Zinc, total	3/19/2008	15	---	10	1000	NC2L
3406-MW09R	Zinc, total	3/15/2011	28	---	10	1000	NC2L
3406-MW09R	Sulfide	11/21/2000	4200	---	4000	-	NC2L
3406-MW10	Chromium, total	11/18/1994	25.5	---	10	10	NC2L
3406-MW10	Chromium, total	2/7/1995	10.8	---	10	10	NC2L
3406-MW10	Chromium, total	4/14/1997	12.8	---	10	10	NC2L
3406-MW10	Chromium, total	1/15/1999	12.7	---	10	10	NC2L
3406-MW10	Chromium, total	9/16/2009	12	---	10	10	NC2L
3406-MW10	Cobalt, total	11/18/1994	13.3	---	10	1	GWPS
3406-MW10	Lead, total	11/18/1994	5.9	---	5	15	NC2L
3406-MW10	Vanadium, total	2/7/1995	12	---	10	0.3	GWPS
3406-MW10	Zinc, total	11/18/1994	30.4	---	20	1000	NC2L
3406-MW10	Zinc, total	2/7/1995	27.7	---	20	1000	NC2L
3406-MW10	Zinc, total	9/16/2009	13	---	10	1000	NC2L
3406-MW10	Zinc, total	3/15/2011	14	---	10	1000	NC2L
3406-MW10	Zinc, total	9/12/2012	11	---	10	1000	NC2L
3406-MW10	Zinc, total	03/18/2015	10	2	10	1000	NC2L
3406-MW11	Zinc, total	9/13/2007	13	---	10	1000	NC2L
3406-MW11	Zinc, total	3/19/2008	12	---	10	1000	NC2L
3406-MW11	Zinc, total	9/11/2008	12	---	10	1000	NC2L
3406-MW11	Zinc, total	3/10/2010	11	---	10	1000	NC2L
3406-MW11	Zinc, total	3/20/2013	12	---	10	1000	NC2L
3406-MW11D	Acetone	12/7/1994	110	---	34	6000	NC2L
3406-MW11D	Barium, total	12/7/1994	230	---	200	700	NC2L
3406-MW11D	Barium, total	1/10/1995	482	---	200	700	NC2L
3406-MW11D	Beryllium, total	1/10/1995	2.4	---	2	4	GWPS
3406-MW11D	Cadmium, total	1/10/1995	1.2	---	1	2	NC2L
3406-MW11D	Cadmium, total	1/29/1998	1.4	---	1	2	NC2L

TABLE 2: Historical Quantified Detections in Groundwater

WELL	CONSTITUENT	DATE	RESULT	DL	RL	GPS	Source
3406-MW11D	Chromium, total	12/7/1994	33.1	---	10	10	NC2L
3406-MW11D	Chromium, total	1/10/1995	66.2	---	10	10	NC2L
3406-MW11D	Chromium, total	1/25/1995	31.7	---	10	10	NC2L
3406-MW11D	Chromium, total	2/7/1995	17.9	---	10	10	NC2L
3406-MW11D	Chromium, total	10/16/1997	11.6	---	10	10	NC2L
3406-MW11D	Chromium, total	1/29/1998	24	---	10	10	NC2L
3406-MW11D	Chromium, total	1/24/2001	11.5	---	10	10	NC2L
3406-MW11D	Cobalt, total	12/7/1994	23.1	---	10	1	GWPS
3406-MW11D	Cobalt, total	1/10/1995	50.3	---	10	1	GWPS
3406-MW11D	Cobalt, total	1/25/1995	21.6	---	10	1	GWPS
3406-MW11D	Cobalt, total	2/7/1995	8.7	---	5	1	GWPS
3406-MW11D	Cobalt, total	3/13/1996	18	---	10	1	GWPS
3406-MW11D	Cobalt, total	1/29/1998	16.5	---	10	1	GWPS
3406-MW11D	Copper, total	12/7/1994	169	---	25	1000	NC2L
3406-MW11D	Copper, total	1/10/1995	330	---	25	1000	NC2L
3406-MW11D	Copper, total	1/25/1995	142	---	25	1000	NC2L
3406-MW11D	Copper, total	2/7/1995	86.7	---	25	1000	NC2L
3406-MW11D	Copper, total	5/9/1995	111	---	25	1000	NC2L
3406-MW11D	Copper, total	3/10/2010	13	---	10	1000	NC2L
3406-MW11D	Copper, total	9/16/2010	17	---	10	1000	NC2L
3406-MW11D	Lead, total	12/7/1994	8.5	---	5	15	NC2L
3406-MW11D	Lead, total	1/10/1995	12.7	---	5	15	NC2L
3406-MW11D	Nickel, total	1/10/1995	41.2	---	40	100	NC2L
3406-MW11D	Vanadium, total	12/7/1994	89.9	---	40	0.3	GWPS
3406-MW11D	Vanadium, total	1/10/1995	174	---	40	0.3	GWPS
3406-MW11D	Vanadium, total	1/25/1995	74.6	---	40	0.3	GWPS
3406-MW11D	Vanadium, total	2/7/1995	51	---	10	0.3	GWPS
3406-MW11D	Vanadium, total	5/9/1995	65	---	10	0.3	GWPS
3406-MW11D	Vanadium, total	3/13/1996	94	---	40	0.3	GWPS
3406-MW11D	Vanadium, total	1/29/1998	77.7	---	40	0.3	GWPS
3406-MW11D	Zinc, total	12/7/1994	95.4	---	20	1000	NC2L
3406-MW11D	Zinc, total	1/10/1995	192	---	20	1000	NC2L
3406-MW11D	Zinc, total	1/25/1995	84	---	20	1000	NC2L
3406-MW11D	Zinc, total	2/7/1995	60.3	---	20	1000	NC2L
3406-MW11D	Zinc, total	5/9/1995	66.1	---	20	1000	NC2L
3406-MW11D	Zinc, total	3/13/1996	50.7	---	50	1000	NC2L
3406-MW11D	Zinc, total	1/29/1998	58.7	---	50	1000	NC2L
3406-MW11D	Zinc, total	7/24/2003	110	---	50	1000	NC2L
3406-MW11D	Zinc, total	3/10/2010	15	---	10	1000	NC2L
3406-MW11D	Zinc, total	9/16/2010	12	---	10	1000	NC2L
3406-MW12	Chromium, total	2/7/1995	10.7	---	10	10	NC2L
3406-MW12	Chromium, total	3/10/2010	14 (5.5 J)	---	10	10	NC2L
3406-MW12	Cobalt, total	2/7/1995	11	---	5	1	GWPS
3406-MW12	Lead, total	1/24/2001	10.7	---	10	15	NC2L
3406-MW12	Lead, total	7/18/2002	11.3	---	10	15	NC2L
3406-MW12	Lead, total	7/24/2003	21	---	10	15	NC2L
3406-MW12	Lead, total	1/21/2004	25	---	10	15	NC2L
3406-MW12	Lead, total	1/17/2006	25	---	10	15	NC2L
3406-MW12	Zinc, total	2/7/1995	37.2	---	20	1000	NC2L
3406-MW12	Zinc, total	7/18/2002	329	---	50	1000	NC2L
3406-MW12	Zinc, total	7/24/2003	130	---	50	1000	NC2L
3406-MW12	Zinc, total	1/21/2004	140	---	50	1000	NC2L
3406-MW12	Zinc, total	7/27/2004	78	---	50	1000	NC2L
3406-MW12	Zinc, total	1/17/2006	76	---	50	1000	NC2L
3406-MW12	Zinc, total	1/22/2007	24	---	20	1000	NC2L
3406-MW12	Zinc, total	9/13/2007	29	---	10	1000	NC2L
3406-MW12	Zinc, total	9/11/2008	63	---	10	1000	NC2L

TABLE 2: Historical Quantified Detections in Groundwater

WELL	CONSTITUENT	DATE	RESULT	DL	RL	GPS	Source
3406-MW12D	Barium, total	11/18/1994	402	---	200	700	NC2L
3406-MW12D	Barium, total	12/6/1994	402	---	200	700	NC2L
3406-MW12D	Barium, total	1/10/1995	224	---	200	700	NC2L
3406-MW12D	Barium, total	2/7/1995	240	---	200	700	NC2L
3406-MW12D	Barium, total	5/8/1995	264	---	200	700	NC2L
3406-MW12D	Beryllium, total	11/18/1994	2.5	---	2	4	GWPS
3406-MW12D	Beryllium, total	12/6/1994	2.6	---	2	4	GWPS
3406-MW12D	Chromium, total	11/18/1994	241	---	10	10	NC2L
3406-MW12D	Chromium, total	12/6/1994	230	---	10	10	NC2L
3406-MW12D	Chromium, total	1/10/1995	104	---	10	10	NC2L
3406-MW12D	Chromium, total	2/7/1995	145	---	10	10	NC2L
3406-MW12D	Chromium, total	5/8/1995	198	---	60	10	NC2L
3406-MW12D	Chromium, total	3/13/1996	11.6	---	10	10	NC2L
3406-MW12D	Chromium, total	9/19/1996	87.5	---	60	10	NC2L
3406-MW12D	Chromium, total	10/16/1997	10.8	---	10	10	NC2L
3406-MW12D	Cobalt, total	11/18/1994	89.9	---	10	1	GWPS
3406-MW12D	Cobalt, total	12/6/1994	88.2	---	10	1	GWPS
3406-MW12D	Cobalt, total	1/10/1995	48.4	---	10	1	GWPS
3406-MW12D	Cobalt, total	2/7/1995	41	---	5	1	GWPS
3406-MW12D	Cobalt, total	5/8/1995	44	---	5	1	GWPS
3406-MW12D	Cobalt, total	3/13/1996	12	---	10	1	GWPS
3406-MW12D	Cobalt, total	9/19/1996	17	---	10	1	GWPS
3406-MW12D	Copper, total	11/18/1994	208	---	25	1000	NC2L
3406-MW12D	Copper, total	12/6/1994	196	---	25	1000	NC2L
3406-MW12D	Copper, total	1/10/1995	111	---	25	1000	NC2L
3406-MW12D	Copper, total	2/7/1995	123	---	25	1000	NC2L
3406-MW12D	Copper, total	5/8/1995	122	---	25	1000	NC2L
3406-MW12D	Lead, total	11/18/1994	59	---	25	15	NC2L
3406-MW12D	Lead, total	12/6/1994	24	---	5	15	NC2L
3406-MW12D	Lead, total	1/10/1995	21.4	---	5	15	NC2L
3406-MW12D	Lead, total	2/7/1995	16.4	---	5	15	NC2L
3406-MW12D	Lead, total	5/8/1995	16	---	5	15	NC2L
3406-MW12D	Nickel, total	11/18/1994	108	---	40	100	NC2L
3406-MW12D	Nickel, total	12/6/1994	80.3	---	40	100	NC2L
3406-MW12D	Nickel, total	1/10/1995	52.8	---	40	100	NC2L
3406-MW12D	Nickel, total	2/7/1995	55.6	---	40	100	NC2L
3406-MW12D	Nickel, total	5/8/1995	56.7	---	40	100	NC2L
3406-MW12D	Vanadium, total	11/18/1994	361	---	40	0.3	GWPS
3406-MW12D	Vanadium, total	12/6/1994	316	---	40	0.3	GWPS
3406-MW12D	Vanadium, total	1/10/1995	148	---	40	0.3	GWPS
3406-MW12D	Vanadium, total	2/7/1995	180	---	10	0.3	GWPS
3406-MW12D	Vanadium, total	5/8/1995	223	---	10	0.3	GWPS
3406-MW12D	Vanadium, total	3/13/1996	48	---	40	0.3	GWPS
3406-MW12D	Vanadium, total	9/19/1996	81	---	40	0.3	GWPS
3406-MW12D	Zinc, total	11/18/1994	455	---	20	1000	NC2L
3406-MW12D	Zinc, total	12/6/1994	433	---	20	1000	NC2L
3406-MW12D	Zinc, total	1/10/1995	233	---	20	1000	NC2L
3406-MW12D	Zinc, total	2/7/1995	288	---	20	1000	NC2L
3406-MW12D	Zinc, total	5/8/1995	312	---	20	1000	NC2L
3406-MW12D	Zinc, total	9/12/2007	12	---	10	1000	NC2L

All results in micrograms per liter (µg/L). DL = Laboratory Detection Limit. RL = Reporting Limit (SWSL).
Values in parenthesis are the results of resample events. J = estimated concentraiton. ND = not detected.

TABLE 2: Historical Quantified Detections in Groundwater

WELL	CONSTITUENT	DATE	RESULT	DL	RL	GPS	Source

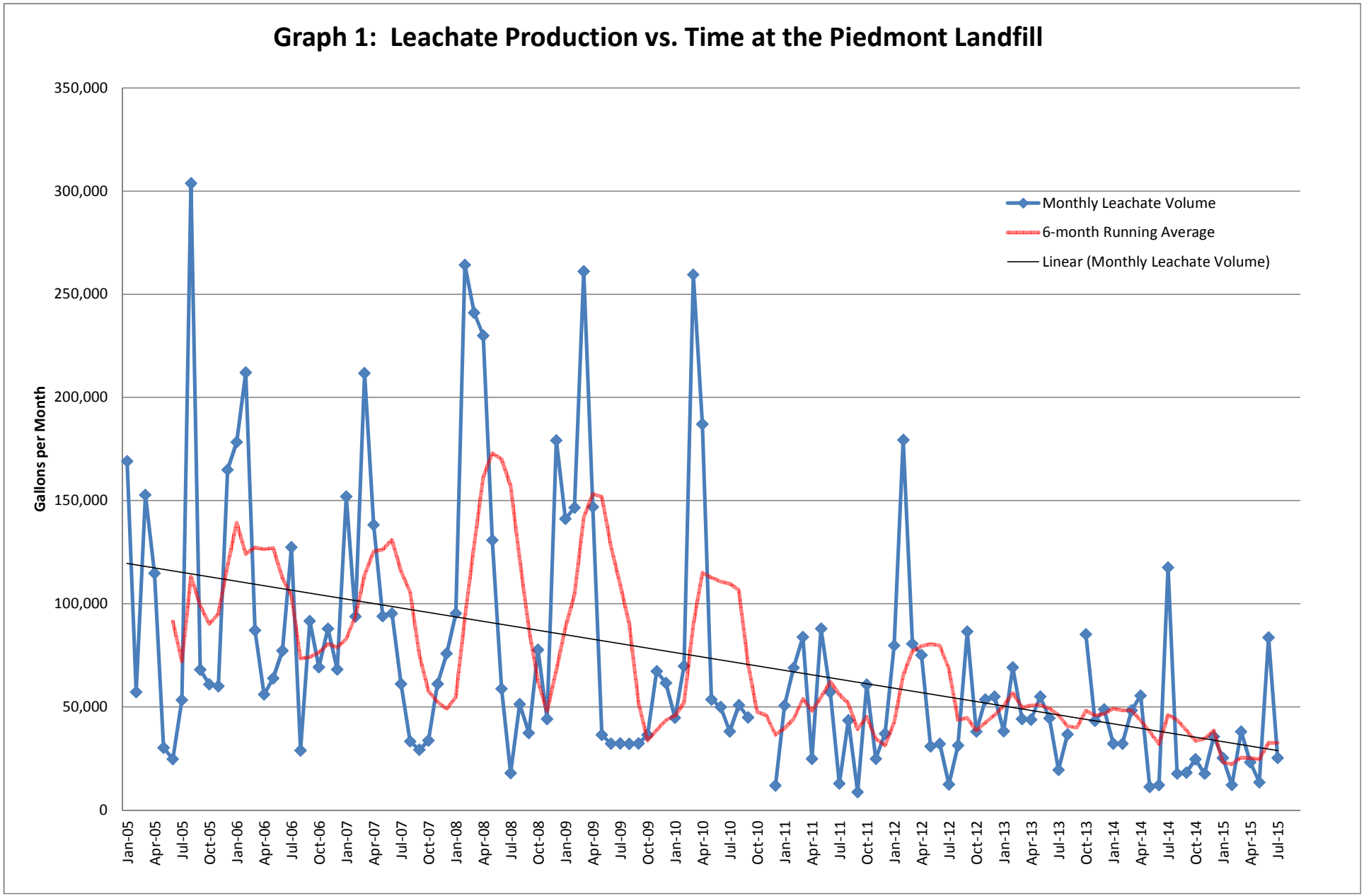
GPS = Groundwater Protection Standard as defined in 15A NCAC 13B.1634.(g).
Note that the listed GPS is the current standard at the time of this report (September 2015).
Earlier analytical results would have been compared to the standard in effect at the time of the sampling event.
Source = Reference source for the GPS, as follows:
GWPS = DENR-SWS standard for constituents with no NC2L;
NC2L = standard found in 15A NCAC 2L.0202;
BOLD = Results that were in exceedance of the GPS in effect at the time of the sampling event
and not refuted by resampling events or statistical background analyses.

TABLE 3:
GROUNDWATER FLOW RATE CALCULATIONS

GRADIENT CALCULATION SEGMENT	HYDRAULIC CONDUCTIVITY (***K***, cm/s)	HYDRAULIC CONDUCTIVITY (***K***, ft/s)	EFFECTIVE POROSITY (***n***, unitless)	FLOW SEGMENT LENGTH (ft)	FLOW DIRECTION	March 18, 2015		
						Elevation (ft AMSL)	**Gradient** (***i***, ft/ft)	**Velocity** (***V***, ft/yr)
i_1	2.90E-04	9.51E-06	0.41	1320	NW-N	780 / 745	0.027	19.4
i_2	1.70E-04	5.58E-06	0.41	1255	W-SW	780 / 750	0.024	10.3
i_3	1.70E-04	5.58E-06	0.41	658	N	755 / 740	0.023	9.8
i_4	1.70E-04	5.58E-06	0.41	881	SW	755 / 740	0.017	7.3
						AVERAGE:	0.022	12.3

Notes:

An effective porosity ("***n***") of 41% was based on average laboratory-derived porosity as reported in the April 1994 Design Hydrogeologic Study, prepared by RUST Environment & Infrastructure.
Hydraulic conductivities ("***K***") were also taken from the Design Hydrogeologic Study, and were based on slug test data from piezometers originally located nearest the respective groundwater flow paths.
Groundwater Linear Flow Velocity calculated using the modified Darcy equation: $V = i K / n$.
Gradient Calculation Segments are shown on Drawing 1.


Graph 1: Leachate Production vs. Time at the Piedmont Landfill
Gallons per Month
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0
Monthly Leachate Volume
6-month Running Average
Linear (Monthly Leachate Volume)
Jan-05
Apr-05
Jul-05
Oct-05
Jan-06
Apr-06
Jul-06
Oct-06
Jan-07
Apr-07
Jul-07
Oct-07
Jan-08
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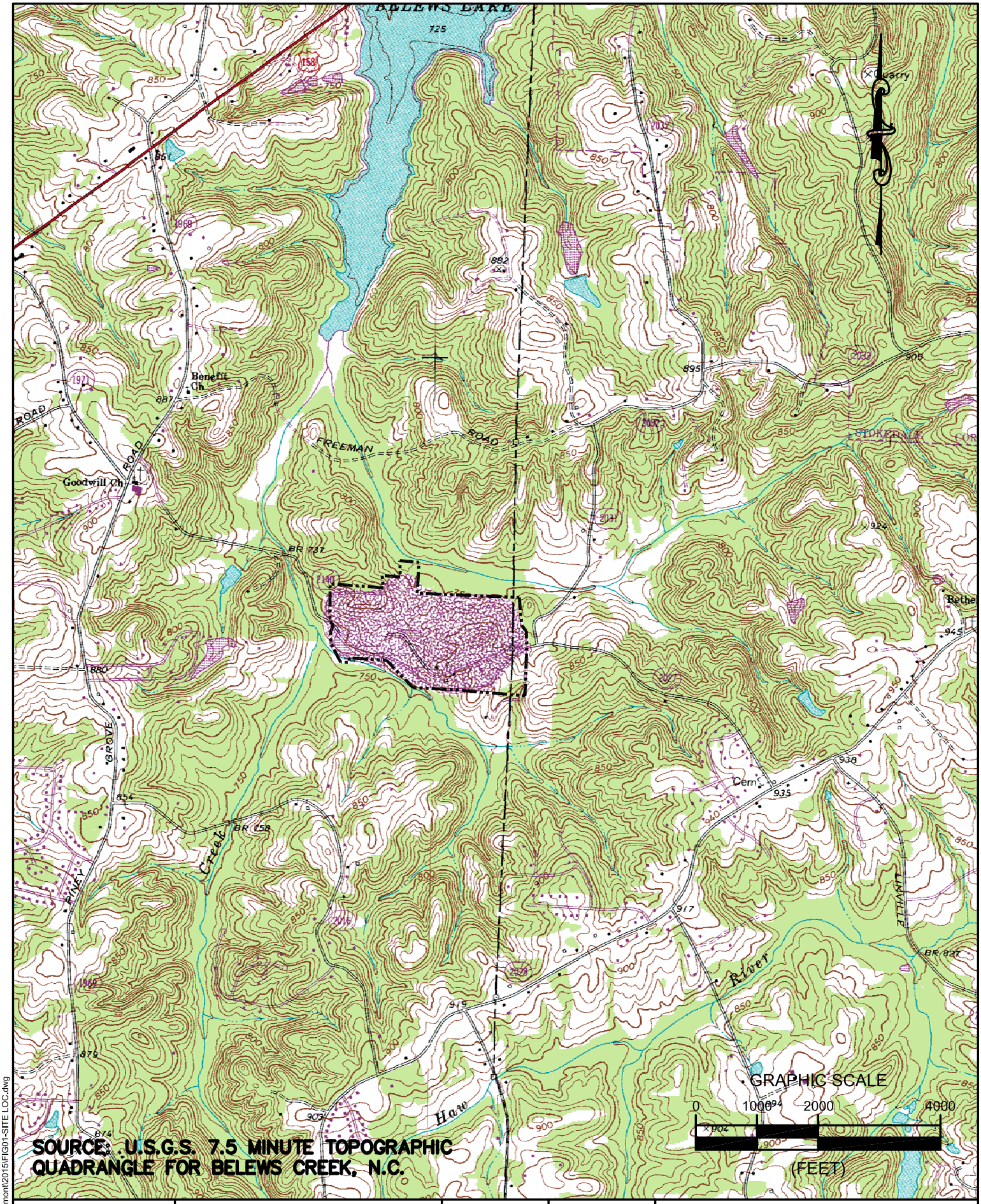
Apr-15
Jul-15



SOURCE: U.S.G.S. 7.5 MINUTE TOPOGRAPHIC QUADRANGLE FOR BELEWS CREEK, N.C.

L:\WM\dwg\Piedmont\2015\FIG01-SITE LOC.dwg

FIGURE NO. 1	JOYCE ENGINEERING 2211 WEST MEADOWVIEW ROAD GREENSBORO, N.C. 27407 PHONE: (336) 323-0092	SCALE 1"=2000'	PROJECT NO. 392	PIEDMONT LANDFILL KERNERSVILLE, NORTH CAROLINA SITE LOCATION MAP

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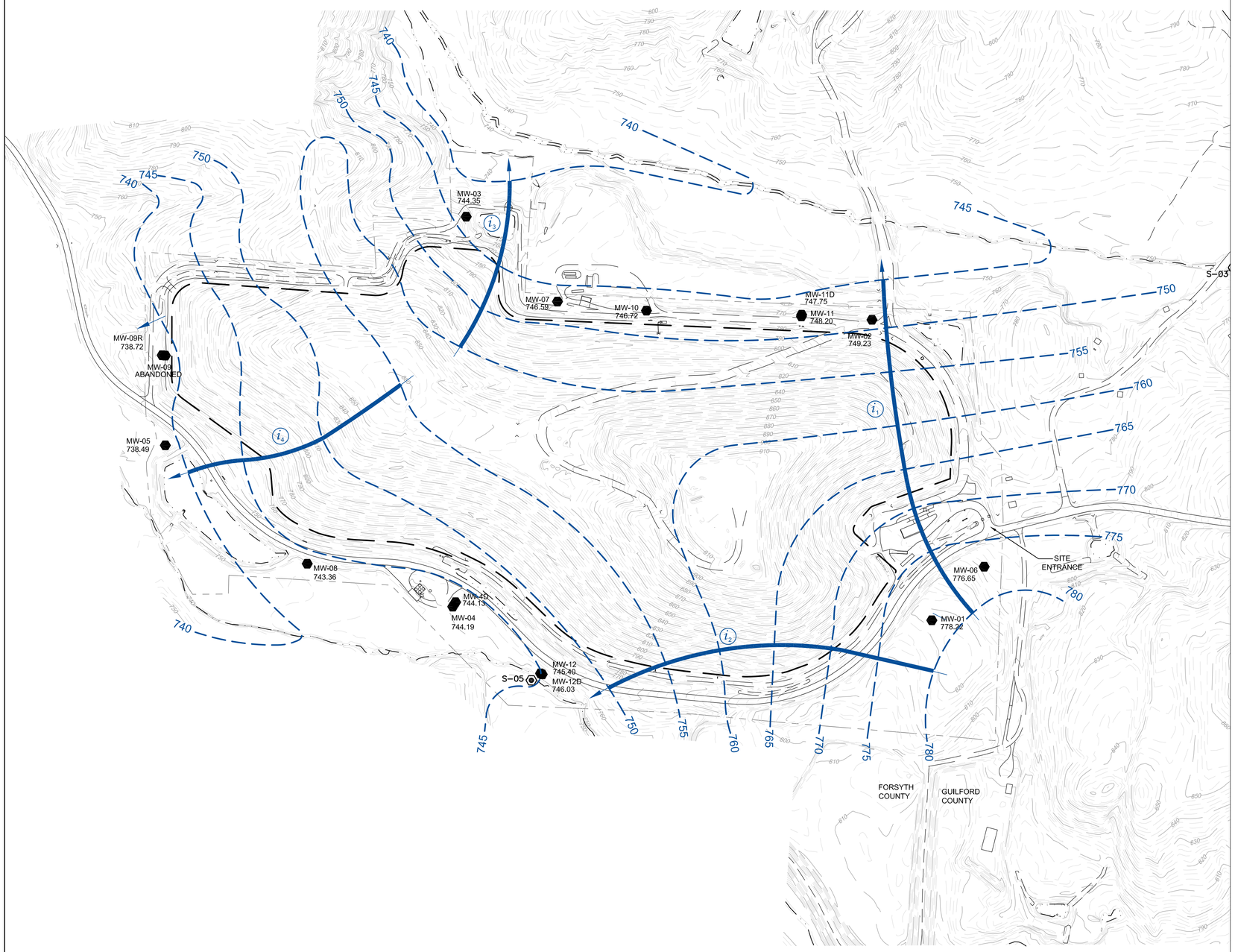

Well ID	Installation Date	Location Relative to Waste	Screened Interval (feet BGS)	Lithology of Screened Interval	Monitoring Program *
MW-01	07/13/89	Upgradient	44.0 - 49.0	WEATHERED GNEISS BEDROCK	Detection
MW-02	08/05/89	Downgradient	20.2 - 35.5	SILTY SAND	Detection
MW-03	08/06/89	Downgradient	32.5 - 37.5	SILTY SAND	Detection
MW-04	07/14/89	Downgradient	20.0 - 25.0	SILTY SAND	Detection
MW-04D	02/18/94	Downgradient	53.25-58.25	SAPROLITE/BEDROCK	Detection
MW-05	08/02/89	Downgradient	14.45 - 19.45	SILTY SAND	Detection
MW-06	08/09/93	Upgradient	20.9 - 25.9	SILTY SAND	Detection
MW-07	08/25/94	Downgradient	17.0 - 32.4	SILTY SAND	Detection
MW-08	08/31/94	Downgradient	5.0 - 20.0	SILTY SAND	Detection
MW-09	08/30/94	Downgradient	19.81 - 34.22	SAND/SAPROLITE BEDROCK	Abandoned
MW-09R	11/09/99	Downgradient	32.0 - 42.5	BEDROCK	Detection
MW-10	10/24/94	Downgradient	20.0 - 36.99	CLAYEY SILT/SILT	Detection
MW-11	11/17/94	Downgradient	19.01 - 34.22	SILT/SANDY SILT	Detection
MW-11D	11/15/94	Downgradient	81.82 - 91.79	SANDY SILT/GRAVELY SILT	Detection
MW-12	10/21/94	Downgradient	3.33 - 17.22	SILTY CLAY/SILTY SAND/SANDY SILT	Detection
MW-12D	10/27/94	Downgradient	31.98 - 42.2	SILTY GRAVEL	Detection

BGS = below ground surface.

* Monitoring Program = status as of April 2012

LEGEND

- EXISTING 10' TOPOGRAPHIC CONTOUR — 850
- EXISTING 2' TOPOGRAPHIC CONTOUR
- APPROXIMATE LIMITS OF WASTE
- GROUNDWATER SURFACE CONTOUR [FEET ABOVE MEAN SEA LEVEL (AMSL)] — 740
- GROUNDWATER FLOW DIRECTION
- EXISTING ROAD
- CENTERLINE OF STREAM
- PROPERTY LINE
- GROUNDWATER MONITORING WELL LOCATION AND IDENTIFICATION WITH STATIC WATER LEVEL ELEVATION (FEET AMSL) — MW-9R 738.72
- SURFACE WATER MONITORING POINTS — S-03
- SEGMENT USED FOR GRADIENT CALCULATIONS — i_4

FLOW PATH LENGTH

- i_1 = 1,320 LF
- i_2 = 1,255 LF
- i_3 = 658 LF
- i_4 = 881 LF

NOTES:

1. TOPOGRAPHIC CONTOUR INTERVAL = 2 FEET.
2. GROUNDWATER SURFACE CONTOUR INTERVAL = 5 FEET.
3. STATIC WATER LEVELS MEASURED ON 03/18/15.
4. GROUNDWATER CONTOURS BASED ON LINEAR INTERPOLATION BETWEEN AND EXTRAPOLATION FROM KNOWN DATA, TOPOGRAPHIC CONTOURS, AND KNOWN FIELD CONDITIONS. THEREFORE, GROUNDWATER CONTOURS MAY NOT REFLECT ACTUAL GROUNDWATER CONDITIONS.
5. TOPOGRAPHIC MAP AND SURVEYED WELL LOCATIONS PROVIDED TO JOYCE ENGINEERING, INC. BY PIEDMONT LANDFILL.
6. GROUNDWATER CONTOUR LINES SHOW THE WATER TABLE SHAPE AND ELEVATION. THESE CONTOURS ARE INFERRED LINES FOLLOWING THE GROUNDWATER SURFACE AT A CONSTANT ELEVATION ABOVE SEA LEVEL. THE GROUNDWATER FLOW DIRECTION IS GENERALLY PERPENDICULAR TO THE GROUNDWATER SURFACE CONTOURS, SIMILAR TO THE RELATIONSHIP BETWEEN SURFACE WATER FLOW AND TOPOGRAPHIC CONTOURS.
7. THE LOCATIONS OF SURFACE WATER MONITORING POINTS ARE APPROXIMATE AS SHOWN.

GRAPHIC SCALE

0 100 200 400

(FEET)

DATE	REVISIONS AND RECORD OF ISSUE	NO	BY	CK	APP

DESIGNED	ACE
DRAWN	RWH
CHECKED	ACE
APPROVED	GVB
DATE	04/22/15

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GREENSBORO, NC 27407
PHONE: (336) 323-0092

PIEDMONT LANDFILL AND RECYCLING CENTER
KERNERSVILLE, NORTH CAROLINA

GROUNDWATER SURFACE MAP
MARCH 18, 2015
PERMIT NO. 34-06

PROJECT NO.
392

SCALE
AS NOTED

DRAWING NO.
1

N:\Dwgs\Drawings-Current\WMI\Piedmont\GW EVENT MAPS\GW EVENT 03-15.dwg Layout=Layout1

LEGEND

APPROXIMATE LIMITS OF WASTE	
CENTERLINE OF STREAM	
PROPERTY LINE	
GROUNDWATER MONITORING WELL LOCATION	MW-9R
SURFACE WATER MONITORING POINTS	S-03
APPROXIMATE LOCATION OF SUPPLY WELLS	SWS-3

DATE	REVISIONS AND RECORD OF ISSUE	NO	BY	CK	APP

DESIGNED GVB
DRAWN RWH
CHECKED GVB
APPROVED GVB
DATE 08/31/15

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PHONE: (336) 323-0092

PIEDMONT LANDFILL AND RECYCLING CENTER
KERNERSVILLE, NORTH CAROLINA

AERIAL PHOTO WITH POTENTIAL RECEPTORS

PROJECT NO.
392

SCALE
AS NOTED

DRAWING NO.
2

L:\WM\dwg\Piedmont\2015\2-aerial photo with potential recepetors.dwg LayoutHLayout1