ATTACHMENT 4

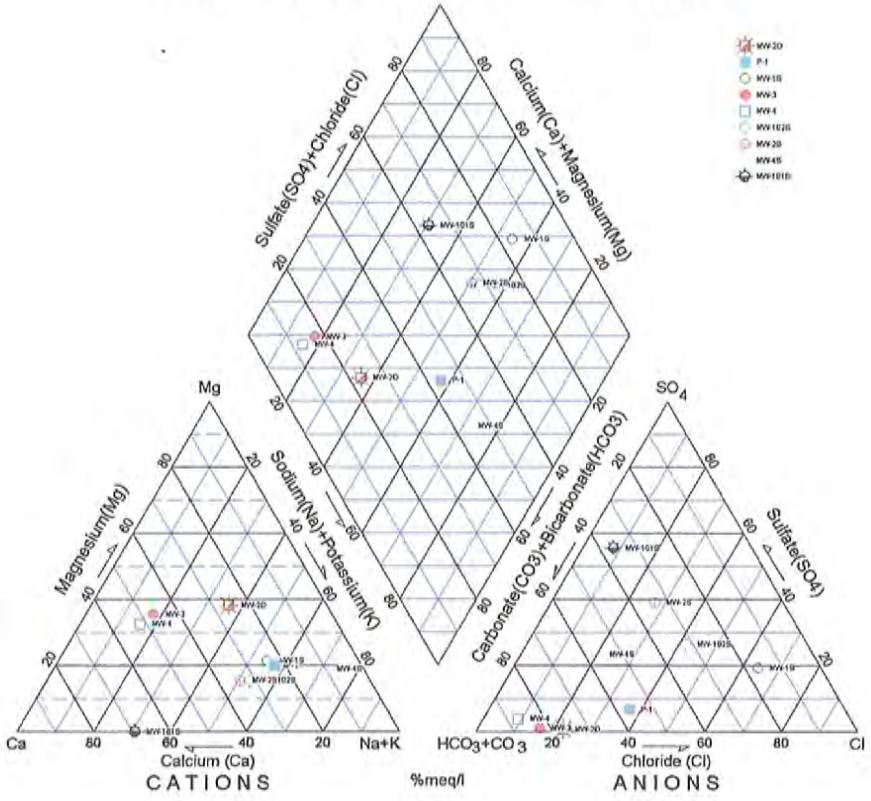
PIPER DIAGRAMS AND GRAPHICAL STIFF PLOTS

WASTE MANAGEMENT
DELAWARE RECYCLABLE PRODUCTS, INC.
DRPI INDUSTRIAL WASTE LANDFILL

PROPOSED DISPOSAL CELL 6 EXPANSION
HYDROGEOLOGIC ASSESSMENT SUMMARY

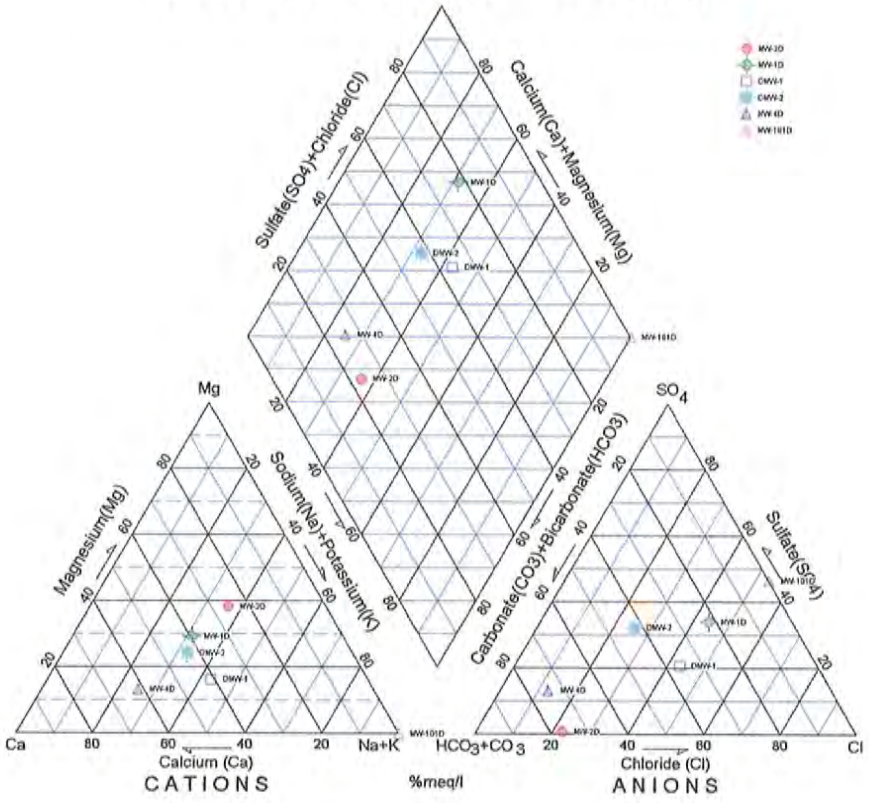
DRPI INDUSTRIAL WASTE LANDFILL PROPOSED CELL 6 EXPANSION

SHALLOW ZONE MONITORING WELLS PIPER DIAGRAM



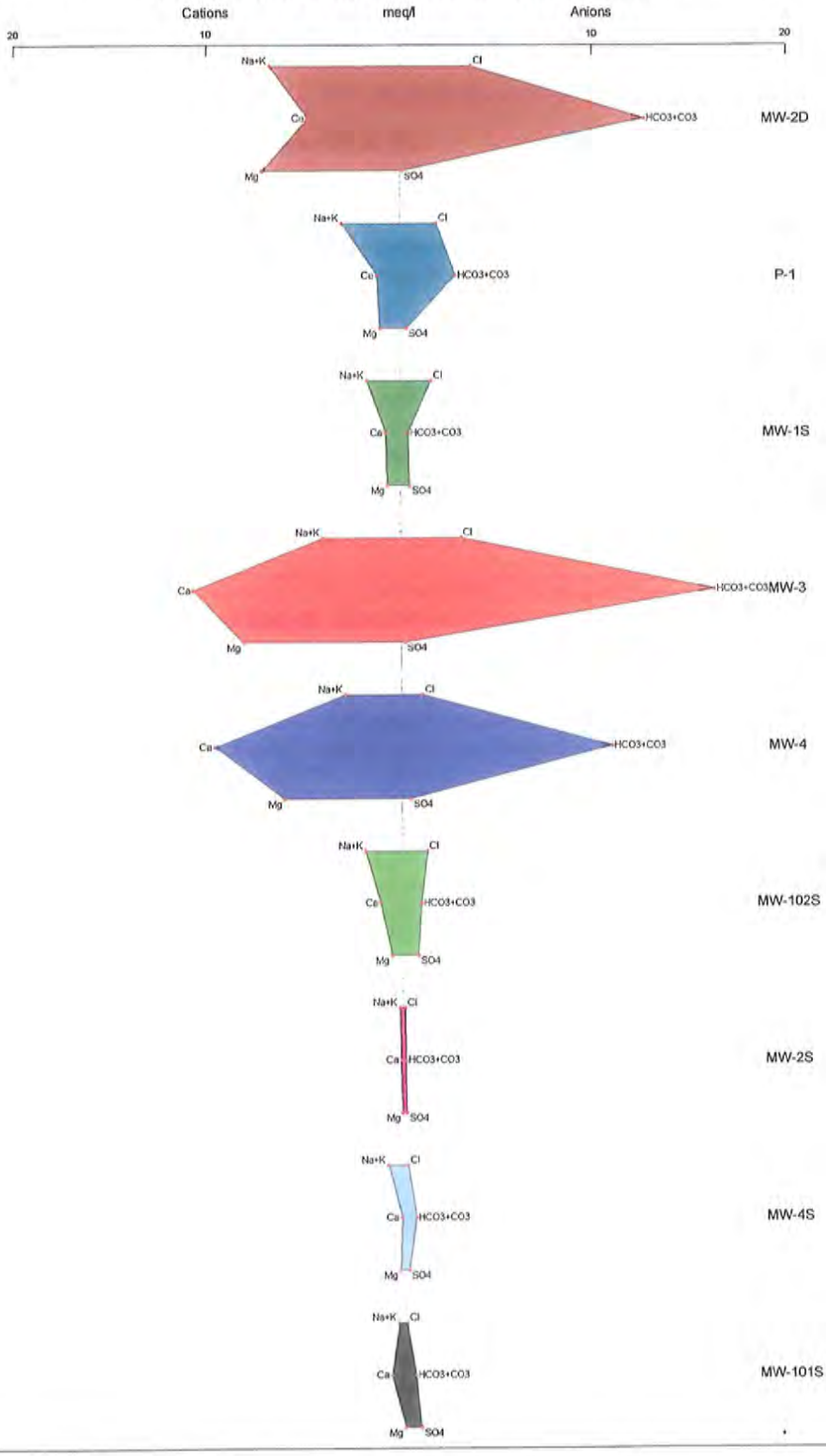
DRPI INDUSTRIAL WASTE LANDFILL PROPOSED CELL 6 EXPANSION

DEEP ZONE MONITORING WELLS PIPER DIAGRAM



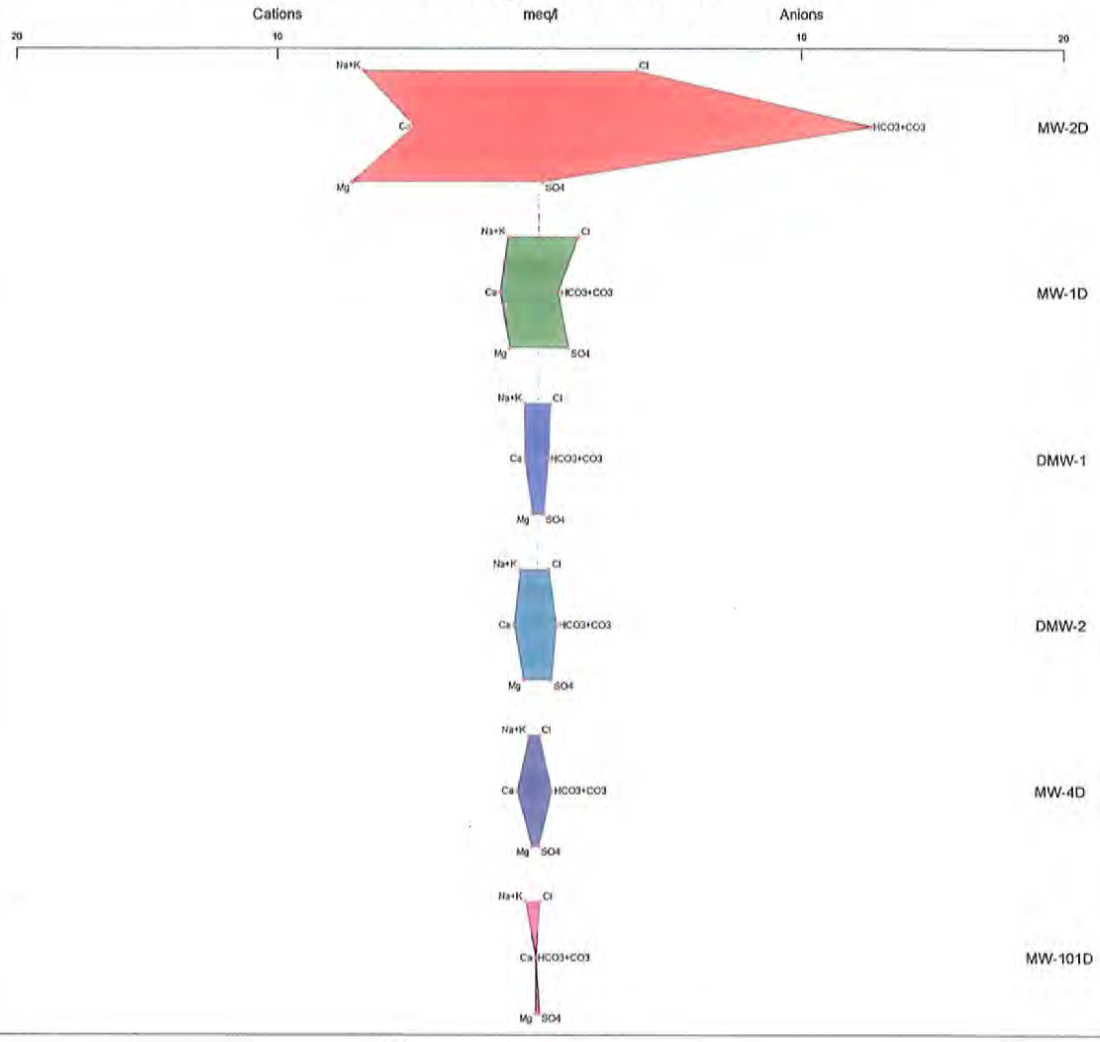
DRPI INDUSTRIAL WASTE LANDFILL PROPOSED CELL 6 EXPANSION

SHALLOW ZONE MONITORING WELLS STIFF DIAGRAM



DRPI INDUSTRIAL WASTE LANDFILL PROPOSED CELL 6 EXPANSION

DEEP ZONE MONITORING WELLS STIFF DIAGRAM



ATTACHMENT 5

GROUNDWATER, LEACHATE AND STORMWATER

MONITORING AND REPORTING PROGRAM PLAN CELLS 1, 2, 3, 4, 5 AND 6

WASTE MANAGEMENT DELAWARE RECYCLABLE PRODUCTS, INC. DRPI INDUSTRIAL WASTE LANDFILL

PROPOSED DISPOSAL CELL 6 EXPANSION HYDRO GEOLOGICAL ASSESSMENT SUMMARY

WASTE MANAGEMENT

DELAWARE RECYCLABLE PRODUCTS, INC.
DRPI INDUSTRIAL WASTE LANDFILL

UPDATED
GROUNDWATER, LEACHATE
AND
STORMWATER

MONITORING AND REPORTING PROGRAM PLAN

CELLS 1, 2, 3, 4, 5 AND 6

JUNE 2009

WASTE MANAGEMENT

DELAWARE RECYCLABLE PRODUCTS, INC.
DRPI INDUSTRIAL WASTE LANDFILL

UPDATED
GROUNDWATER, LEACHATE
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June 2009

1.0 INTRODUCTION

This Monitoring and Reporting Program Plan (Plan) for the Delaware Recyclable Products, Inc., Industrial Waste Landfill (DRPI) was originally submitted as part of the permit application for the Cell 6 Expansion in February 2005. It was ultimately approved by DNREC and incorporated into the solid waste permit (SW-05/01) for the DRPI Landfill. The purpose of revising the plan in 2008 is to bring it up to date with revisions made to the monitoring program since the solid waste permit (SW-05/01) was issued for the new Disposal Cell 6.

This plan has been adapted from previously approved plans for DRPI and is designed to provide technical guidance for personnel performing site monitoring during the active life of the facility and during closure and post-closure periods. This plan presents the groundwater, surface water and leachate sampling and analysis procedures for the DRPI site as well as a site-specific method for data analysis.

1.1 Site Location and Physical Description

As shown on the attached Site Location Map (Figure 1), the DRPI facility is located in Minquadale Borough, which is approximately three miles north of New Castle, Delaware. The current DRPI landfill is bound to the east and southeast by residential communities. Along the northeast side, the residential community is separated from the landfill by the offices and operations buildings of an earth-moving contractor, (Corrado American). Corrado also operates a concrete, asphalt and wood waste recycling and processing facility bordering the extreme northeast corner of the DRPI property. Interstate 495 and the Christina River bound the site to the north. To the west is a large tidal lake and associated estuary that drain, via a concrete culvert under I-495, to the

Christina River. On the south side, the DRPI landfill is bound by a ravine that separates the landfill property from various commercial and industrial properties that front to Route 13 further to the south.

The disposal area at DRPI currently consists of six defined disposal cells (Cells 1, 2, 3, 4, 5 and 6). Cells 1, 2 and 3 are unlined disposal cells that received waste by a previous site owner. Both Cells 4 and 5 have a composite liner system made up of a single synthetic liner underline by a clay layer. Both also have active leachate collection systems above the liner system and groundwater dewatering systems below the liner.

At the time of this writing, a portion of the newest Disposal Cell 6 Cell 6-1A has been constructed and is accepting waste. As with cells 4 and 5, Cell 6 is also constructed with a synthetic liner overlaying a clay layer. No groundwater control system, however is incorporated into the Cell 6 design as portions of it are constructed overtop of previously disposed dry waste of the former Petrillo Dry Waste Landfill. A single groundwater drain pipe with a low permeability grout wall was installed along the northern edge of Cell 6 where it joins along the southern sides of Cells 3 and 5. The purpose of this drain is to limit northward flowing shallow groundwater from entering the groundwater underdrain systems of Cells 4 and 5.

The layout of the disposal cells at the DRPI Site, are depicted on the attached Environmental Compliance Monitoring Plan (Figure 2).

1.2 Overview

As with the previously approved plan, the activities described in this new plan constitute the Detection Monitoring Program for DRPI. Detection monitoring involves the effective use of monitoring parameters and locations to provide the earliest possible indication of a potential release from the landfill.

Also, as previously approved for the DRPI landfill by DNREC, this new plan proposes to continue using the intra-well comparison approach for groundwater monitoring at the site. However, two new upgradient shallow monitoring wells (MW-1S and MW-102S), both of which are located upgradient of the new Disposal Cell 6, will be incorporated into the monitoring plan. The purpose of these two wells is to monitor the quality of upgradient groundwater flowing onto the DRPI site from the south and to provide advance detection of possible contaminants migrating from upgradient locations.

With regard to the intra-well comparison monitoring approach, groundwater chemistry data for a sample collected from a detection well will continue to be compared to its own historical data from the same individual well. Since the intra well approach has been successfully used at the site for more than ten years and does not warrant the need for comparison to upgradient conditions, monitoring of the two new upgradient wells MW-1S and MW-102S has been approved to be conducted annually. It is also noted that performance of groundwater monitoring using intra-well data comparisons is consistent with ASTM Standards (e.g., ASTM PS-64-96) and is fully endorsed by the

U.S. Environmental Protection Agency (USEPA).

1.3 State-Specific Regulations

The Delaware Regulations Governing Solid Waste (adopted December 1988 and updated May 2001) describe provisions for monitoring groundwater at industrial landfills. The aspects of this plan have been developed to meet or exceed the requirements of these regulations.

2.0 HYDROGEOLOGIC SETTING[1]

The Hydrogeologic data obtained as part of the proposed Cell 6 Expansion, previous site investigations, and from on-going site monitoring provides the technical basis for the environmental monitoring strategy presented in this Plan.

2.1 Regional Geology and Hydrogeology

DRPI is located within the Atlantic Coastal Plain Physiographic Province. The Pleistocene-age Columbia Formation and the underlying Cretaceous-age Potomac Formation are the principle geologic units present beneath the site and nearby vicinity. The Columbia formation is generally considered to be fluvial in origin, and has been derived from glaciated areas to the northeast and south. The Columbia deposits are composed principally of sands that occur in channel fillings in northern Delaware, and as a broad sheet across central and southern Delaware. These deposits comprise the upper-most and the most permeable section of saturated sands in the water table aquifer throughout most of Delaware. In addition to sand, the Columbia sediments contain subordinate amounts of gravel, clay, and silt. The color of this unit varies widely, from reddish brown and purplish black, through shades of brown, to tan, yellow, or light gray. The thickness of the Columbia deposits varies widely in the vicinity of the site (from 0 near the site to about 100 feet, about two miles east of the site). The Columbia sediments have been largely removed at DRPI as a result of previous sand and gravel quarrying operations.

2.2 DRPI Site Hydrogeology

Two groundwater flow systems are present in the vicinity of DRPI: the "Shallow Groundwater Zone" (SGZ) which includes Columbia Formation sediments, and the deeper, "Lower Potomac Aquifer" (LPA). The SGZ is unconfined and recharge to this aquifer occurs through infiltration in the topographically higher areas to the south and east of the DRPI site. Groundwater in the SGZ regionally flows towards the north and northwest with discharge to the Christina River and associated wetlands.

The underlying LPA is confined in the upper sandy zone of the Potomac Formation. Recharge to this aquifer occurs in the subcrop area of the upper sandy zone

1 Section 2.0 was taken in whole from the 1998 Proposed Plan

that includes an area northwest of DRPI. Groundwater in the LPA is confined below a thick sequence of clay that separates the SGZ from the LPA.

Hydraulic gradients in the LPA are very low and groundwater in the LPA regionally flows towards the southeast. At the DRPI site, however, groundwater in the LPA appears to have a bi-directional flow to both the southwest and to the northeast. This flow direction it directly attributed to the extremely low hydraulic gradient which results in a very flat groundwater piezometric surface.

In summary, groundwater underlying the entire DRPI site occurs in the unconfined SGZ and in the deeper confined LPA (which is effectively separated from the SGZ by a low-permeability fine grained confining unit).

3.0 GROUNDWATER MONITORING

This section presents the details of the compliance monitoring network, the monitoring parameters, and the sampling schedule for DRPI as approved in the solid waste permit.

3.1 Current Groundwater Monitoring Network Description

This section details the final groundwater monitoring network at DRPI as it has been approved by DNREC. As approved by DNREC the current Detection Monitoring Network at DRPI consists of eight shallow zone groundwater monitoring wells (C4-E1RS, C4-N1S, C5-N1S, C5-W1RS, C5-W2S, MW-101S, MW-102S and MW-1S) and six deep flow zone groundwater monitoring wells (MW-4RD, MW-7D, MW-9D and MW-101D DMW-1 and DMW-1). Wells MW-1S and DMW-1 were installed as part of the hydrogeologic characterization work for the Cell 6 Expansion but are not scheduled to be added to the permanent monitoring network until the final phase of disposal Cell 6 is developed in approximately 2010.

In addition to these, there are three other shallow zone wells (MW-4RS, MW-7S, and MW-8S) and one shallow zone piezometer (P-8S) that will continue to be used to gauge groundwater elevations only. Two additional piezometer (P-2RSand P-3S), which are currently used to gauge water levels will be abandoned and deleted from the plan as Cell 6 is developed.

The six deep zone groundwater wells (MW-4RD, MW-7D, MW-9D, MW-101D, DMW-1 and DMW-2) are also included in the Detection Monitoring Network. These wells are screened in the Lower Potomac Aquifer (LPA) with one well, MW-4RD located at an upgradient position from the disposal area.

3.1.1 Contingency Groundwater Monitoring Network

Regarding wells MW-7(S) and MW-7(D), both are located on property that is currently owned by Corrado American, Inc. (Corrado). Although the aea where these

wells are located is considered developable, DRPI has prepared a contingency plan in the event that modification or relocation of these wells becomes necessary due to potential development of the property.

Well head modification would be the preferred contingency method as this would maintain the continuity associated with historic groundwater quality analyses. Although, development plans have not been prepared for the area, it is assumed that both wells could possibly be maintained either by reducing or extending the well casings to accommodate the development. The casings could then be completed with a normal wellhead extending above the ground surface, or they could be flush mounted with the ground surface with an appropriate steel manhole cover.

Well decommissioning and relocation would be the second contingency option. In the event that development of the area precludes the continued use of the wells, they would have to be decommissioned and relocated. It is currently proposed that the wells could be relocated southeast of their current location across Marsh Lane and adjacent to the southeast corner of the DRPI disposal Cell 1. At this location, both wells will be located entirely on property owned by DRPI. They will also be positioned such that they will each continue to function in their current capacity; well MW-7(S) will be an upgradient well in the shallow flow zone and MW-7(D) will be a downgradient well in the deep flow zone.

If it becomes necessary to implement either of the above referenced contingency option, DRPI fully intends to comply with required DNREC regulations. DRPI will also develop a work plan detailing the specifications associated with wellhead modification or well decommissioning and relocation.

3.2 Groundwater Monitoring Parameters

The approved detection monitoring parameters for the groundwater monitoring wells are listed in the facility permit and are summarized below. Per the previously approved plan, these parameters were selected based on historic background groundwater quality data from the site and on the characteristics of the leachate generated by the waste material.

Parameter	Reporting Limit	Parameter	Reporting Limit
Total Calcium	0.5	Ammonia (As N)	0.05
Total Magnesium	0.2	Chemical Oxygen Demand (COD)	10
Total Potassium	0.5	Chloride	1
Total Sodium	1	Total Dissolved Solids	10
Dissolved Iron	0.06	Nitrate (As N)	0.05
Dissolved Manganese	0.003	Sulfate	10
Specific Conductance	1	Alkalinity Total (As $CaCO_3$)	10
pH	0.05	Total Organic Carbon (TOC)	1
Barium	0.002	Lead	0.005
Arsenic	0.01	Vanadium	0.0055

In addition to above analytical sample parameters, samples from each well are also analyzed in the field for pH, specific conductivity, oxidation reduction potential, turbidity, temperature and dissolved oxygen. These field parameters are measured periodically during the well purge event as well as one time just prior to or following collection of the analytical sample.

3.2.1 Assessment Monitoring

In the event that a potential release from the DRPI landfill is identified through detection monitoring, a verification sampling event will be conducted as soon as practical following the initial detection. If constituents of concern are identified to be present in the verification sample(s), an alternate source investigation will be conducted. If no alternate sources are identified, an assessment investigation would then be initiated. The scope of any such assessment investigation, however, would be developed and presented to DNREC for approval prior to conducting work.

3.3 Groundwater Sampling Schedule

The current groundwater monitoring schedule for the DRPI site consists of both annual and semi-annual monitoring. However, the parameter lists for both the annual and semi-annual events are the same. The only difference between the two events is that all six of the deep zone monitoring wells (MW-4RD, MW-7D, MW-9D, MW-101D, DMW-1 and DMW-2) and three of the eight shallow zone monitoring wells (MW-1S, MW-101S and MW-102S) are sampled once annually in April, while the remaining five shallow zone wells (MW-4RS, C4-N1S, C5-N1S, C5W-1Rs and C5W-2S) are sampled twice; both during the annual event in April and during the semi-annual event in October.

3.4 Monitoring Point Inspection Program

Visual inspections of groundwater wells are to be performed during field monitoring activities. During this inspection, the conditions of the well and the surrounding area are to be examined and recorded on a well inspection form for each well sampled by the sampling team. Information documented as part of each well inspection is presented on the field forms presented in Attachment 2.

4.0 LEACHATE MONITORING

Per the permit, raw leachate representative samples are collected from the four separate disposal cell areas (Cell 3, Cell 4A, Cell-5A and Cell 6-1A). These samples are collected directly from the leachate collection sumps at the identified subcells and provide representative data for each of the separate disposal cells.

4.1 Leachate Collection/Monitoring System

Sampling of leachate will be conducted in a manner that is consistent with industry standard practices. Laboratory analyses will be performed for those chemical parameters listed below.

Parameter	Reporting Limit	Parameter	Reporting Limit
Total Calcium	0.5	Ammonia (As N)	0.05
Total Magnesium	0.2	Chemical Oxygen Demand (COD)	10
Total Potassium	0.5	Chloride	1
Total Sodium	1	Total Dissolved Solids	10
Dissolved Iron	0.06	Nitrate (As N)	0.05
Dissolved Manganese	0.003	Sulfate	10
Specific Conductance	1	Alkalinity Total (As $CaCO_3$)	10
pH	0.05	Total Organic Carbon (TOC)	1
Barium	0.002	Lead	0.005
Arsenic	0.01	Vanadium	0.0055

In addition to above, the raw leachate will also be analyzed in the field for pH, specific conductivity, oxidation reduction potential, turbidity, temperature and dissolved oxygen. These field parameters will be measured once on a single sample of leachate drawn directly from each collection sump and prior to any treatment.

4.2 Leachate Monitoring Schedule

Similar to the current groundwater monitoring schedule for the shallow zone wells, the four leachate samples will be collected during both the annual (in April) and

semi-annual (in October) monitoring events with the parameter lists for both the annual and semi-annual events being the same.

5.0 GROUNDWATER CONTROL SYSTEM MONITORING

The groundwater control system (GWCS) at DRPI was designed to create a hydraulic barrier that maintains separation between the base of the liner system and the top of groundwater in the shallow flow zone. Both disposal cells 4 and 5 have GWCSs that continuously remove groundwater from beneath the landfill liner system. For Cell 6, no control system exists, however, a groundwater drain and barrier wall were approved and installed between Cell 6 and southern limits of Cells 1 and 5 as part of Cell 6 construction. This drain and wall serve to prevent shallow groundwater from moving from the upgradient recharge areas to the south and flowing beneath Cells 1, 2, 3, 4 and 5). The intent is to limit shallow groundwater flow into the underdrain systems of Cells 4 and 5 such that active groundwater control measures can possibly be eliminated.

Groundwater samples are collected for chemical analysis from the two groundwater control system sumps at Cell 4A and Cell 5A and from the new Cell 6 groundwater drain. These sampling locations are referred to as GU-1 (Cell 4A) and GU-2 (Cell 5A) and GWCD Cell 6. Sampling of these locations is conducted in a manner that is consistent with the industry standard practices and laboratory analyses of samples is consistent with those same chemical parameters as analyzed for the groundwater monitoring wells.

Parameter	Reporting Limit	Parameter	Reporting Limit
Total Calcium	0.5	Ammonia (As N)	0.05
Total Magnesium	0.2	Chemical Oxygen Demand (COD)	10
Total Potassium	0.5	Chloride	1
Total Sodium	1	Total Dissolved Solids	10
Dissolved Iron	0.06	Nitrate (As N)	0.05
Dissolved Manganese	0.003	Sulfate	10
Specific Conductance	1	Alkalinity Total (As $CaCO_3$)	10
pH	0.05	Total Organic Carbon (TOC)	1
Barium	0.002	Lead	0.005
Arsenic	0.01	Vanadium	0.0055

In addition to the above, field analyses consisting of pH, specific conductivity, oxidation reduction potential, turbidity, temperature and dissolved oxygen are performed on samples from the other two groundwater control system sumps (Cell 4C and Cell 5D). These field parameters are measured once on a single sample of groundwater drawn directly from the sump via the GWCS pump.

5.1 GWCS Monitoring Schedule

As with the sampling schedule for the leachate, the groundwater control system sumps and Cell 6 GWCD are sampled both annually (in April) and semi-annually (in October), with the parameter lists for both the annual and semi-annual events being the same.

6.0 STORMWATER MONITORING

Stormwater monitoring at DRPI is based on criteria outlined in the Stormwater Pollution Prevention Plan that was prepared for the site by GZA GeoEnvironmental, Inc. in January 2000 and revised December 2001. Actual procedures for conducting quarterly stormwater inspections and semi-annual sampling are presented in the Stormwater Monitoring Procedures, which are included as part of this Monitoring Plan in Attachment 3.

6.1 Stormwater Monitoring Program

The approved stormwater monitoring program consists of quarterly visual examination of stormwater discharge and semi-annual sampling at both permitted outfalls (Outfall 001 and 002). Outfall 001 is located at the East Sedimentation Basin while Outfall 002 is located at the West Sedimentation Basin. Both of these sampling locations are depicted on the attached Environmental Compliance Monitoring Plan (Figure 2).

Procedures for conducting the quarterly visual examination and semi-annual sampling are presented in Attachment 3 of this plan. As request by DNREC, reporting associated with the Stormwater Monitoring program will be submitted to the Solid and Hazardous Waste Management Branch (SHWMB) of DNREC as part of the respective April and October Semi Semi-Annual Environmental Monitoring Reports.

7.0 SAMPLE SHIPMENT PLAN

Immediately following sample collection, all samples shall be placed in a durable cooler and maintained at approximately 4^{o}C until delivery to the laboratory. Typically, samples will be shipped to the laboratory, via overnight courier, for analysis. In no instance should this interfere with the timely analysis of those parameters with short holding times. This will necessitate daily shipments to the laboratory if all sampling cannot be completed in one day. In addition, sample preservation requirements must be observed and maintained. A chain-of-custody record must be completed and must accompany the samples to the laboratory. The chain-of-custody record will be filed with the sampling notes.

8.0 RECORD KEEPING AND CHAIN-OF-CUSTODY

The sampler's field records should contain sufficient information such that someone else can reconstruct the sampling event without reliance on the sampler's memory. Entries in the field records must include, at a minimum, the following:

- Site name and location;
- Project number;
- Name and affiliation of Field Manager and samplers involved;
- Sampling point name and description;
- Type of sample container(s) and preservative(s) used;
- Well purging procedure and equipment;
- Well specifics such as static water level, depth, and volume purged;
- Sample collection procedure and equipment;
- Date and time of collection;
- Collector's sample identification number(s);
- Laboratory's sample identification number(s);
- Field observations;
- Pertinent weather factors such as temperature, wind direction, and precipitation; and
- Any field measurements made such as pH, temperature, specific conductivity, appearance, etc.

Chain-of-custody records for all samples shall be maintained. A sample shall be considered to be "in custody" of an individual if said sample is either in direct view of or otherwise directly controlled by that individual. Storage of samples during custody shall be accomplished according to established preservation techniques, in appropriately sealed and numbered storage containers. Chain-of-custody shall be established when the samples or sealed sample shuttles are directly transferred from one individual to the next, with the first individual witnessing the signature of the recipient upon the chain-of-custody record.

The chain-of-custody records will contain the following information:

- Respective sample numbers of the laboratory and sampling team, if available;
- Signature of collector;
- Date and time of collection;
- Sample type (e.g., groundwater, surface water);
- Identification number of well or sampling point;
- Number of containers;
- Parameters requested for analysis, if appropriate;
- Signature of person(s) involved in the chain of possession;
- Description of sample bottles and preservatives and their condition;
- Problems associated with sample collection (i.e., breakage, no preservatives), if any.

The chain-of-custody form(s) will remain with the samples throughout their lifetime (i.e. wellhead through completion of analyses). The completed form(s) will be returned with the analytical results, upon completion by the laboratory, and filed with the laboratory report forms and field sampling notes. This information will be maintained in the facility files through final closure of the site.

9.0 GROUNDWATER DATA EVALUATION

This section describes the criteria by which data will be evaluated at the DRPI site. Groundwater chemistry at the DRPI site is evaluated using an intra-well monitoring approach, a procedure in which the chemistry of a sample collected from each point-of-compliance is compared to its own historical data. Performance of groundwater monitoring using intra-well data comparisons is common practice and is fully supported by the USEPA (see Appendix A of the 1998 proposed plan). Intra-well monitoring is preferable to inter-well monitoring because it eliminates the spatial component of natural groundwater chemistry variability.

9.1 Detection Monitoring Data Evaluation

Groundwater samples collected during detection monitoring will be evaluated through: 1) review of laboratory QA/QC data, as appropriate, 2) tabular and graphical displays of sample data (e.g., Stiff, Piper, or other appropriate diagrams), 3) trend analyses of detected parameters, 4) comparisons with Primary and Secondary Drinking Water Standards or Guidance values, and 5) evaluation of groundwater potentiometric surface maps for evidence of hydraulic changes or mounding. A parameter detected to be present at a level significantly above historical levels will be evaluated on a regional basis and identified outliers will be removed from future data evaluation efforts. Results that indicate the possibility of landfill impacts will be verified after a reasonable period of time.

9.2 Assessment Monitoring Data Evaluation

Assessment monitoring will be conducted if during detection monitoring, a chemical constituent is confirmed to be present at levels that indicate a potential release from the waste management unit. Upon commencement of assessment monitoring, a groundwater sample will be collected from the monitor well(s) for which the apparent exceedance was detected. This sampling will occur within a period of 90 days from the verified exceedance or other time frame deemed appropriate by DNREC. Samples collected for assessment monitoring will be analyzed for parameters deemed appropriate for the individual situation.

Subsequent to this monitoring, an evaluation will be made and submitted to the DNREC, determining whether: the anomalous detection monitoring result is due to regional or upgradient off-site conditions, the constituent is present in the LPA, or the result is or is not due to a release from the waste disposal cells. This evaluation will include recommendations for further data collection or evaluation methods, if necessary.

Should assessment monitoring reveal that a verified exceedance has resulted from a leachate release (and not from some alternate source), an assessment of corrective measures will be performed. In addition, an action plan to address the exceedance will be prepared. This plan will be based on site-specific conditions present when the exceedance is verified.

10.0 SAMPLING PLAN

The objective of the Detection Monitoring Program is to detect at the earliest possible time, whether the waste in disposal cells has adversely impacted the environment. Proper sampling procedures/protocols are the most important and fundamental aspect in an effective monitoring program. The environmental quality sampling performed at this site is conducted by personnel trained in proper sampling protocol and in accordance with current industry standards. This approach incorporates applicable ASTM standards, and is consistent with procedures used at other operating landfill sites.

The monitor wells at the DRPI site are currently have dedicated air drive bladder pumps installed and are sampled using the low flow purging technique. In most cases, the site monitoring wells are to be purged at flow rates of less than one-gallon per minute. During the purge event water quality parameters consisting of pH, temperature, turbidity, conductivity, dissolved oxygen and oxidation reduction potential are monitored periodically in the field at an interval of approximately every five minutes. The stabilization of these parameters during purging indicates when the discharge water is representative of formation water and that the water is suitable for collection and analysis.

Furthermore, groundwater samples collected from network monitor wells at DRPI are also filtered in the field (using a 0.45 micron membrane pressure filter) to determine the concentration of ions and compounds that are dissolved in solution (rather than those that are present as particulates). Monitoring wells often contain silts and sediment that must be removed by filtration. If the water is not filtered, ions and compounds naturally present in, or adsorbed to, the suspended particles may be released when samples are preserved and analyzed. This release can result in inappropriately high concentrations of certain constituents than are actually present in the groundwater.

As site conditions change, activities related to monitoring at the site will be continually reviewed and scrutinized for completeness and integrity. Modifications to the sampling procedures will be made to the plan periodically. Updated versions will be submitted to the DNREC when appropriate.

11.0 LABORATORY ANALYSIS PLAN

This section describes the procedures for completing successful laboratory analyses of the samples that are collected from the site.

11.1 Program Quality Assurance/Quality Control Procedures

Duplicate samples, field blanks and method blanks provide quality assurance/quality control measures for the monitoring program. Discussions regarding these types of quality assurance/quality control samples are presented in following subsections.

11.1.1 Duplicate Samples

Duplicate samples are a required part of the field sampling QA/QC program for DRPI. A minimum of one duplicate sample will be prepared during the sampling event for both groundwater monitoring well samples, the groundwater control system samples and the leachate samples. The purpose of the duplicate sample is to confirm accuracy of analytical protocol. The samples must be prepared in the field (at the sampling site) using laboratory-supplied bottles. They must be retrieved at the same time and in a manner similar to that used to collect the original sample. Once a duplicate sample is collected, it is handled and shipped in the same manner as the rest of the samples.

Results for duplicate sample analyses will be reported separate from the original sample results, using a sample identification number that coincides (in appearance) with numbers provided to other samples. The duplicate sample number will be noted in the field log. Identification of the duplicate sample should not be made known to the analytical laboratory prior to analysis.

11.1.2 Field Blanks

Field blank samples are also a required part of the field sampling QA/QC program for DRPI. These field blanks will permit the evaluation of analytical results for changes that may occur after sample collection, preservation, storage, and transport. At a minimum, one field blank will be prepared during the sampling event for both groundwater monitoring well samples and the groundwater control system samples. No field blank is required for the leachate samples. Because the proposed sampling method incorporates the use of dedicated purging and sampling equipment, preparation of an equipment blank is not necessary.

Field blanks will be prepared on site utilizing the identical procedures and bottles used for the monitoring samples. The specific location at which the field blank is to be prepared will be selected at random. Preparation of this sample will consist of transferring laboratory supplied deionized water into laboratory supplies sample bottles at the randomly selected field location.

11.1.3 Method Blanks

Laboratory method blanks are used during the analytical process to detect laboratory introduced contamination that may occur during analysis.

11.2 Laboratory Quality Control Procedures

The quality assurance program for the selected analytical laboratory will be documented in their Quality Assurance Program Plan (QAPP). This document describes mechanisms employed by the laboratory to ensure that all data reported meet or exceed all applicable USEPA and State requirements. It describes the laboratory's experience, its organizational structure, and procedures in place to ensure quality of the analytical data. The QAPP outlines the sampling, analysis, and reporting procedures used by the

laboratory. The laboratory is responsible for the implementation of and adherence to the quality assurance and quality control requirements outlined in the QAPP. A copy of the laboratory's QAPP will be available to the DNREC, upon request from Waste Management.

Audits are also an important component of the laboratory quality assurance program. Internal system and performance audits are required to be conducted by the contract laboratory periodically to ensure adherence by all laboratory departments to the QAPP. These reports are transmitted to Department Managers for review and response. Corrective measures must be taken for any finding or deficiency found in an audit.

Data Quality Reviews (DQRs), or equivalent, are requests submitted to the laboratory to formally review results that differ from historical results, or that exceed certain permit requirements or quality control criteria. The laboratory prepares a formal written response to each DQR explaining the discrepancy. The DQR is the first line of investigation following any anomalous result.

11.3 Analytical Methodologies

The analytical methodologies to be used by the laboratory for all of the parameters required in the monitoring program are presented below. The listed methods are USEPA approved and are described in the laboratory method and standard operating procedure documents. These documents can be provided by the laboratory for review upon request.

Analytical Methods

Parameter	Method Description	Reference Method
Alkalinity	Total, Methyl Orange	(A) 310.1
Chloride	Colorimetric, Ferri-cyanide AA II Automated	(A) 325.2
Metals	ICP/ICP-MS	(A) 200 Series (B) 6010/7000 series
Ammonia-N	Colorimetric, Automated Phenate	(A) 353.2
Sulfate	Turbidometric	(B) 9038
TDS	Gravimetric	(C) SM18-20 2540 C
TOC	Combustion or Oxidation	(A) 415.1

References:

(A): Methods for Chemical Analysis of Water and Wastes, EPA 600/4-79-020, EMSL, Cincinnati, OH (Revision March 1983).
(B): Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Edition, Update 0.
(C) Method Update Rule (MUR) as provide by TestAmerica Labs, March 2008

12.0 DATA QUALITY REVIEW, REPORTING AND RECORD KEEPING

Prior to the submittal of a monitoring report to the DNREC, several data evaluation, reporting, and record keeping tasks will be implemented. The following sections describe the evaluation, reporting and record keeping procedures that are followed upon receipt of the analytical report.

12.1 Data Quality Review

Each analytical report received from the laboratory will undergo two levels of quality assessment. These quality assessment procedures are described below.

12.1.1 Initial QA/QC Checks

Before the data are subjected to analysis, they will be evaluated by examining the quality control information accompanying the data report from the laboratory. Relevant quality control data include measures of accuracy (percent recovery), precision (relative percent difference, RPD), and sample contamination (blank determinations). Data that fail any of these checks will be flagged for further evaluation and a Data Quality Review (DQR) will be requested from the laboratory. Results of the DQR will be submitted with the analytical data in the routine monitoring report prepared by the analytical testing laboratory. A brief summary of these relevant quality control data follows. A more complete description is contained in the laboratory Quality Assurance Program Plan. A copy of this Plan can be obtained from the laboratory for review, upon request from the DNREC.

Accuracy defines the relationship between the laboratory's measurement of a given constituent concentration and the "true", but unknown concentration of the sample. Because the "true" concentration is unknown, accuracy must be measured indirectly by determining the percent recovery of a sample called the matrix spike (MS). It is the responsibility of the laboratory to ensure that MSs are conducted properly and in accordance with their QAPP. The MS is analyzed under the same conditions as the groundwater sample and its concentration is determined. Because the MS has a known concentration its percent recovery can be calculated. It is assumed that the groundwater sample behaves exactly like the MS and thus the "true" concentration of the submitted groundwater sample can be surmised or estimated. Control criteria for percent recovery are taken from regulatory method requirements.

Precision is the assessment of the variability that can be expected in data that result from the analytical procedures employed. It provides a measure of the reproducibility, which is estimated through duplicate measurements of a matrix spike. Two matrix spike samples are prepared as described above, a MS and a matrix spike duplicate (MSD). Both spikes are analyzed along with the unknown sample and the "relative percent difference" (RPD) between the two spikes is determined. Control

criteria for RPD are taken from regulatory method requirements.

The potential for sample contamination is assessed by measurements of "blank" samples. Blanks are samples of ultra-pure laboratory water that are not spiked with a known constituent and are carried through the field sampling and laboratory environments. These samples are known as lab, method, equipment and field blanks. It is assumed that any monitoring parameters that occur in the field or laboratory, which might add to the concentration of the constituent introduced to the sample, will be picked up by the blank samples and measured. If any of the monitoring parameters of interest are detected in a blank sample, the detection of the same monitoring parameters in the groundwater samples may not indicate contamination of the water-bearing zone.

12.1.2 Qualitative Data Evaluation

Following the initial QA/QC checks, all data should undergo a second level of review by graphing historical time trends and comparing new results with these historical trends to flag visual outliers or other anomalous data. If a clearly anomalous result is found, a DQR will be conducted to ascertain if laboratory error is involved. In addition, field information will be checked for occurrences or observations that might have caused an anomalous result; thus, helping to explain an outlier result.

12.2 Data Reporting Requirements

Monitoring data is submitted to the DNREC in semi-annual reports that summarize all detection monitoring activities that took place during the preceding six months. An annual report will be submitted during the first calendar quarter for the previous year. This year-end report will include graphs of analytical data from each monitoring point and background monitoring point, as required, except for those constituents for which no new data were collected since the previous graph submittal.

The semi annual reports submitted to the DNREC, include water level measurements, potentiometric surface maps, groundwater and leachate quality data and facility operations data including weekly volumes and flow rates for all leachate and groundwater system control sumps and landfill gas monitoring data.

12.3 Data Record Keeping Requirements

The laboratory maintains all analytical data, indefinitely. The laboratory ensures that at each stage of a process where a permanent data record is required, security measures are in place to guarantee the integrity of the data. Standard Operating Procedures are in place for computer security, computer data storage and back-up. Copies of data will be kept on file at DRPI throughout the operational life and the post-closure period.

13.0 REFERENCES[2]

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2 All references site are from the 1998 proposed plan developed by Ed A. Baquerizo for USA Waste Services, Inc.

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TABLES

TABLE 1

GROUNDWATER MONITORING INSTALLATION SUMMARY

AND

SAMPLING SCHEDULE

WASTE MANAGEMENT

TABLE 1

DELAWARE RECYCLABLE PRODUCTS, INC
DRPI INDUSTRIAL WASTE LANDFILL

GROUNDWATER MONITORING INSTALLATION SUMMARY AND SAMPLING SCHEDULE
(Updated JUNE 2009)

Installation Identification	Delaware Well Permit #	Date Installed	Northing	Easting	TOC PVC Elevation (NGVD)	Surface Elevation (NGVD)	PVC Casing Diameter	Protective Casing Diameter	Screened Interval		Sand Pack Interval		Bentonite Holeplug Interval		Grout Interval		Screen Slot Size (inches)	Unit Screened	Sample Schedule	Comments
									Top (ft bgs)	Bottom (ft bgs)	Top (ft bgs)	Bottom (ft bgs)	Top (ft bgs)	Bottom (ft bgs)	Top (ft bgs)	Bottom (ft bgs)				
Groundwater Quality Monitoring Points																				
Shallow Zone Monitoring Wells																				
C4-E1S(R)	108336	6/20/1996	624215.70	456307.30	30.92	28.10	2" sch. 40 PVC	6" steel	25.5	30.0	22.0	31.0	20.0	22.0	0.0	20.0	0.010	Fill/ Upper Potomac	April & October	Water Level Only
C4-N1S	104746	7/28/1995	624606.20	455285.00	24.70	22.00	2" sch. 40 PVC	6" steel	5.5	25.5	3.5	26.0	1.0	3.5	none	none	0.010	Fill/ Upper Potomac	April & October	Semi-annual and Annual Monitoring
C5-N1S	162039	12/9/1998	624395.60	454680.70	32.96	29.80	2" sch. 40 PVC	6" steel	20.0	40.0	17.0	42.0	15.0	17.0	0.0	15.0	0.010	Fill/ Upper Potomac	April & October	Semi-annual and Annual Monitoring
C5-W1S(R)	175079	10/24/2000	622839.00	454301.32	19.74	17.4	2" sch. 40 PVC	6" steel	13.5	34.0	12.0	35.0	4.5	8.5	0.0	4.5	0.010	Upper Potomac	April & October	Semi-annual and Annual Monitoring
C5-W2S	162040	12/11/1998	623671.80	454413.10	20.46	17.80	2" sch. 40 PVC	6" steel	8.0	25.0	6.0	27.0	4.0	6.0	0.0	4.0	0.010	Fill/ Upper Potomac	April & October	Semi-annual and Annual Monitoring
MW-1S	166642	8/16/1999	621075.5	456722.5	63.93	61.6	2" sch. 40 PVC	6" steel	32	42	27	42	25	27	0.0	25	0.010	Fill/Upper Potomac	April	Annual Monitoring
MW-101S	197623-W	12/3/2003	621740.10	454640	24.84	22.0	2" sch. 40 PVC	6" steel	28.5	38.5	26.5	39.0	20.0	26.5	0.0	26.5	0.010	Fill/Upper Potomac	April	Semi-annual and Annual Monitoring
MW-102S	197625-W	12/3/2003	620712.30	455949.70	57.43	54.70	2" sch. 40 PVC	6" steel	47.0	57.0	45.0	59.0	43.0	45.0	0.0	43.0	0.010	Fill/Upper Potomac	April	Annual Monitoring
Deep Zone Monitoring Wells																				
MW-4D(R)	164759	4/29/1999	624634.90	455677.60	28.90	26.50	2" sch. 40 PVC	6" steel	58.0	74.9	56.5	74.9	54.5	56.5	0.0	54.5	0.010	Lower Potomac	April	Annual Monitoring
MW-7D	84794	11/28/1990	622404.81	457282.69	58.57	56.45	4" sch. 40 PVC	6" steel	122.0	132.0	117.0	137.0	113.0	117.0	0.0	113.0	0.020	Lower Potomac	April	Annual Monitoring
MW-9D	104772	8/30/1995	623640.30	456739.90	40.70	38.10	2" sch. 40 PVC	6" steel	95.0	110.0	92.0	115.0	76.0	92.0	0.0	76.0	0.010	Lower Potomac	April	Annual Monitoring
MW-101D	197624-W	11/25/2003	621730.10	454647.50	24.50	22.10	2" sch. 40 PVC	6" steel	68.0	78.0	66.0	82.0	63.0	66.0	0.0	63.0	0.010	Lower Potomac	April	Annual Monitoring
DMW-1	180355-W	8/16/2001	621054.80	456716.60	63.25	61.00	2" sch. 40 PVC	6" steel	136.2	151.2	132.8	154.0	none	none	0.0	132.8	0.010	Lower Potomac	April	Annual Monitoring
DMW-2	180426-W	8/20/2001	620725.60	455978.20	58.11	55.67	2" sch. 40 PVC	6" steel	121.0	141.0	118.0	146.0	none	none	0.0	118.0	0.010	Lower Potomac	April	Annual Monitoring
Water Level Measurement Locations																				
Shallow Zone Monitoring Wells																				
MW-7S	84790	11/21/1990	622385.88	457262.34	59.24	57.07	2" sch. 40 PVC	6" steel	19.0	34.0	17.0	34.0	15.0	17.0	0.0	15.0	0.020	Columbia	April & October	Water Level Only
MW-8S*	84791	11/26/1990	623807.06	457029.50	38.51	39.26	2" sch. 40 PVC	NONE	6.0	21.0	5.0	21.4	2.5	5.0	0.0	2.5	0.020	Upper Potomac	April & October	Water Level Only
MW-4S(R)	162041	12/8/1998	624632.10	455633.30	29.32	26.70	2" sch. 40 PVC	6" steel	14.0	34.0	12.0	37.0	10.0	12.0	0.0	10.0	0.010	Fill/ Upper Potomac	April & October	Semi-annual and Annual Monitoring
Shallow Zone Piezometers																				
P-8S	108337	6/20/1996	624783.90	456480.50	25.04	22.00	2" sch. 40 PVC	6" steel	10.0	30.0	7.0	31.0	2.5	7.0	0.0	2.5	0.010	Fill/ Upper Potomac	April & October	Water Level Only

* Well MW-8S is located inside the eastern most service bay of the tire warehouse building. It is flush mounted with the concrete floor

bgs denotes - below ground surface
R denotes Replacement Installation

S denotes shallow
D denotes Deep

TABLE 2

MONITORING SUMMARY:

GROUNDWATER CONTROL SYSTEM SUMPS

AND

LEACHATE SUMPS

TABLE 2

DELAWARE RECYCLABLE PRODUCTS, INC
DRPI INDUSTRIAL WASTE LANDFILL

MONITORING SUMMARY
GROUNDWATER CONTROL SYSTEM SUMPS
AND
RAW LEACHATE

Sampling Point Identification/Type	Sampling Frequency
Groundwater Control System Sumps	
Analytical Quality Monitoring	
Cell 4A GWCS (GU-1)	April/October
Cell 5A GWCS (GU-2)	April/October
Cell 6 GWCD	April/October
Field Parameter Monitoring Only	
Cell 4C GWCS	April/October
Cell 5D GWCS	April/October
Raw Leachate	
Analytical Quality Monitoring	
Cell 3	April/October
Cell A	April/October
Cell 5A	April/October
Cell 6-1A	April/October

Note:
Liquid levels for all groundwater control system sumps and leachate sumps will be collected from the digital panel displays during each semi-annual monitoring event in April and October. Liquid levels in the groundwater control sumps that do not have pumps will be obtained using the dedicated electronic transducers installed within them. These levels will be recorded during both annual and semi-annual monitoring events

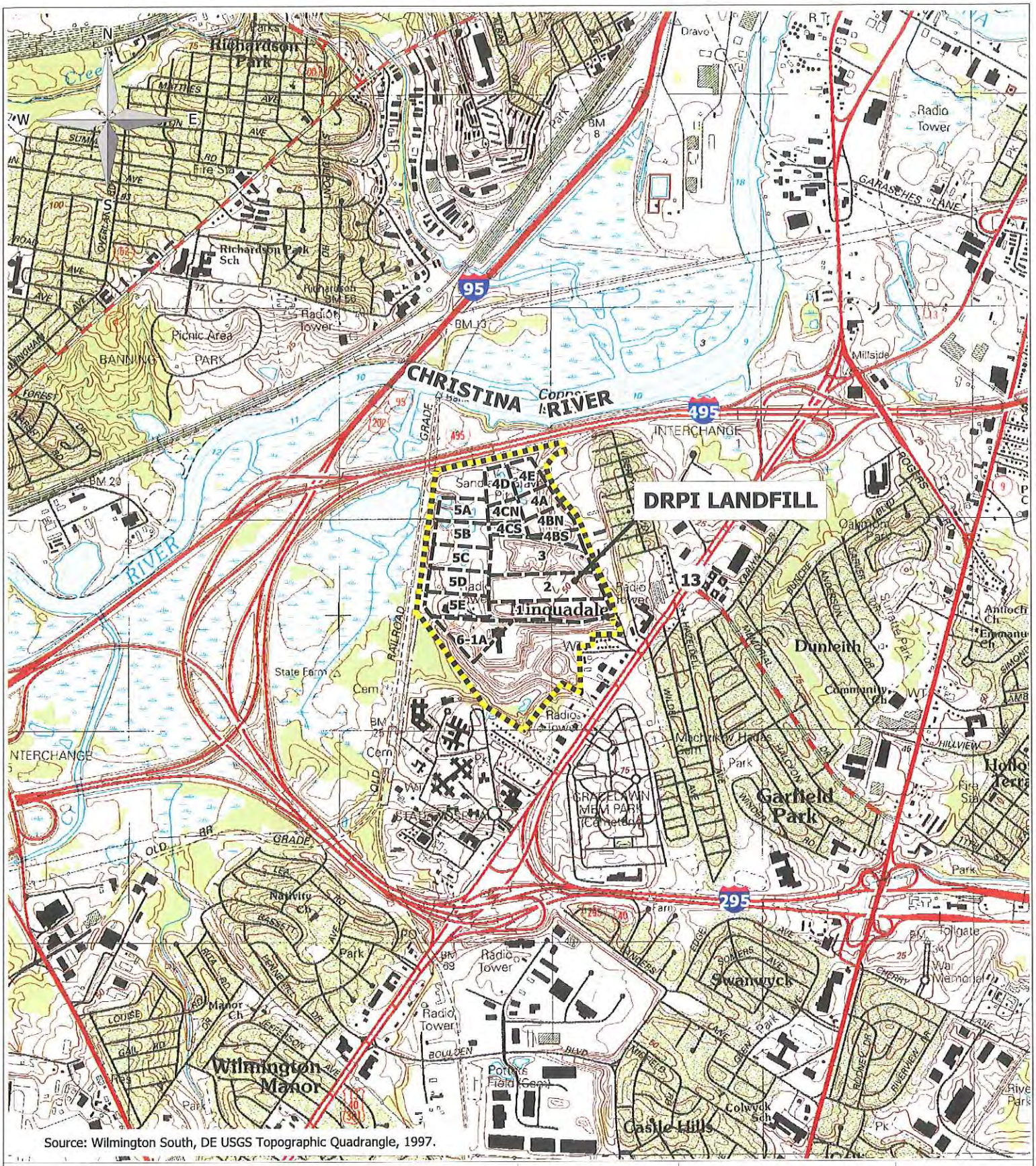
As part of both the annual and semi-annual monitoring events, field parameter measurements will be recorded at the groundwater and leachate sumps that are not required to have samples collected for laboratory analysis.

WASTE MANAGEMENT

FIGURES

FIGURE 1

SITE LOCATION MAP



Site Location Map

Delaware Recyclable Products, Inc.
Industrial Waste Landfill
Minquadale Borough
New Castle County, Delaware

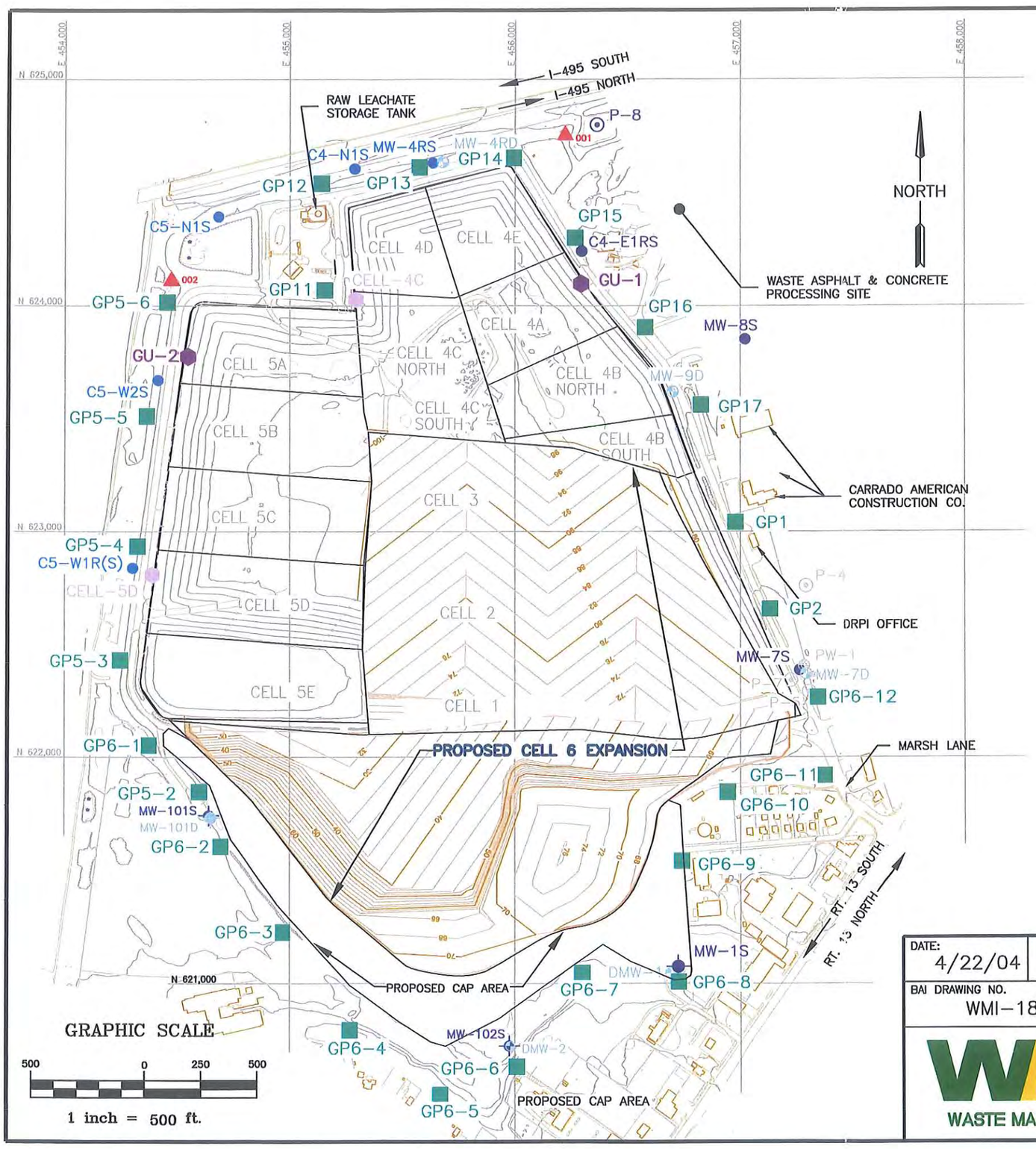
Figure 1

Drawn By: BG	0 2000 ft US	Date: 6/26/2009
Checked By: AS	All Locations are Approximate.	Project No:

Taylor GeoServices, Inc.
38 Bishop Hollow Road
Newtown Square, PA 19073
p. 610.325.5570 f. 610.325.5590

FIGURE 2

ENVIRONMENTAL COMPLIANCE MONITORING PLAN



LEGEND

(6)	DEEP ZONE MONITORING WELL (ANALYTICAL MONITORING)
(8)	SHALLOW ZONE MONITORING WELL (ANALYTICAL MONITORING)
(3)	SHALLOW ZONE MONITORING WELL (WATER LEVEL ONLY)
(1)	SHALLOW ZONE PIEZOMETER (WATER LEVEL ONLY)
(2)	GROUNDWATER CONTROL SYSTEM SUMP (ANALYTICAL MONITORING)
(2)	GROUNDWATER CONTROL SYSTEM SUMP (FIELD PARAMETER MONITORING)
30	PROPOSED CELL 6 CONTOURS (C.I. = 2')
(26)	GAS MONITORING PROBE
002	SURFACE WATER SAMPLING LOCATION

NOTES

1. BASE MAP COMPILED BY PHOTOGRAMMETRIC METHODS FROM AERIAL PHOTOGRAPHY DATED 12-31-03 BY AIR SURVEY, DULLES, VIRGINIA.
2. HORIZONTAL GRID IS DELAWARE STATE PLANE COORDINATE SYSTEM.
3. DATUM IS N.G.V.D., 1929.
4. MONITORING INSTALLATIONS DEPICTED IN GREYSCALE ARE NOT MONITORED AS PART OF THE FACILITY COMPLIANCE PROGRAM.
5. RAW LEACHATE SAMPLE TO BE COLLECTED FROM THE RAW LEACHATE STORAGE TANK.

DATE: 4/22/04 | FIGURE 2

BAI DRAWING NO. WMI-186B003

WASTE MANAGEMENT

BLAZOSKY Associates • INC. Balanced Environmental Solutions

DELAWARE RECYCLABLE PRODUCTS, INC. INDUSTRIAL WASTE LANDFILL

MINQUADALE BOROUGH NEW CASTLE COUNTY DELAWARE

ENVIRONMENTAL COMPLIANCE MONITORING PLAN

BALANCED ENVIRONMENTAL SOLUTIONS
State College, PA., Telephone:814/238-2060; Valley Forge, PA., Telephone:610/783-0125

ATTACHMENTS

ATTACHMENT 1

SUBSURFACE MONITORING INSTALLATION DRILL LOGS

AND

CONSTRUCTION DIAGRAMS