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David Garrett & Associates

Engineering and Geology

October 31, 2008

Ms. Elizabeth S. Werner, Hydrogeologist
NCDENR Division of Waste Management
Solid Waste Section
1646 Mail Service Center
Raleigh, North Carolina 27699-1646

RE: Response to Regulatory Review Comments
C&D Landfill, Inc. Phase 2 Design Hydrogeology
NDENR Solid Waste Permit #74-07

Dear Ms. Werner:

On behalf of Judson Whitehurst, I am pleased to present the following responses to your comments pertaining to the referenced project, which you presented in a letter to Mr. Whitehurst dated May 29, 2008. Those comments pertained to a Design Hydrogeologic Study that was submitted in February 2008 as part of a Permit to Construct Application prepared by John Tucker, P.E., and myself. Your letter is attached for the reader's convenience (**Attachment 1**). Some issues were addressed in May 2008, others required some time for acquiring additional data and preparing appropriate responses. The responses are in the order presented in your letter.

1. **Drawing E1** has been corrected to show the estimated long-term seasonal high water table, with supporting potentiometric data at each boring location, along with existing topography and proposed base grades. Please see **Attachment 2**.

2. **Drawing S4** has been revised per a recent evaluation of the Phase 2 site for the presence of wetlands. Earlier versions of this map – including those submitted for this application WERE NOT CERTIFIED by the US Army Corps of Engineers, an oversight on our part. The current version of the map, which shows no wetlands in the Phase 2 footprint, was certified by the US Army Corps of Engineers on August 4, 2008 and represents actual conditions at the site. No wetlands will be impacted for this project, thus no mitigation plan is forthcoming. Please see **Attachment 3**.

3. The Facility Monitoring Plan map, **Drawing MP-1**, is included in the updated Water Quality Monitoring Plan update (see Comment #4). Please see **Attachment 4**.

4. The Water Quality Monitoring Plan in **Appendix 6** has been updated to include new wells for Phase 2 (see **Drawing MP-1**) and a discussion of the selection criteria for new well locations. Please see **Attachment 5**.

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5. The Financial Assurance documents scheduled for **Appendix 10** were intended to include an actual instrument (bond, letter of credit, etc.), to be submitted once the Section had reviewed and commented on the calculations presented in **Section 11** of the report (starting on page 50). A document titled "Closure and Post-Closure Plan with Financial Assurance Calculations" was submitted to the Solid Waste Section prior to July 1, 2008 for Phase 1, which was intended to fulfill the requirements of Rule .0547 with respect to closure plan documentation and financial assurance obligations for the existing phase. This document was acknowledged by the Solid Waste Section as complete, but to date, the Financial Assurance requirements have not been finalized based on a Solid Waste Section review. Presumably, the same unit rates and terms of the bond associated with Phase 2 would follow suit.

   Per your comment, **Section 11** of the Phase 2 application has been modified to reflect the calculations used for Phase 1 and has been presented in response to Donna Wilson's comments under separate cover. The actual instrument for **Appendix 10** of the Phase 2 application will be submitted once the financial assurance bond amount is negotiated with the Section.

6. Please see attached a copy of the current deeds and survey plat showing the recombination of the Phase 2 site with the original facility boundary for Phase 1, presented as **Attachment 6**. The most recent franchise renewal documentation was presented in response to Donna Wilson's comments under separate cover.

As indicated in your letter, Items 1, 3 and 4 were previously discussed and resubmitted. Please notify me if there are any further requirements on these points. Thank you for your comments.

Cordially yours,

G. David Garrett, PG, PE

Attachments

cc John Tucker, P.E., Consulting Engineer

Judson Whitehurst, President, C&D Landfill, Inc.

ATTACHMENT 1

NCDENR

NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

Dexter R. Matthews, Director | Division of Waste Management | Michael F. Easley, Governor
William G. Ross Jr., Secretary

May 29, 2008

Mr. Judson Whitehurst
C&D Landfill, Inc.
802 Recycling Lane
Greenville, NC 27834

Re: Permit to Construct – Design Hydrogeology – Phase 2 (20 Acres)
C&D Landfill, Inc.
Greenville, NC
Pitt County
Permit No. 74-07
DOC ID# 4546

Dear Mr. Whitehurst:

A review of the Permit to Construct Application dated February 2008 for the Construction and Demolition Debris Landfill (Phase 2) in Pitt County, prepared on your behalf by David Garrett and John Tucker, for the above referenced facility has been completed by the Division of Waste Management, Solid Waste Section (Section). More specifically, a technical review of the design hydrogeologic report has been completed according to 15A NCAC 13B .0535(a)(1) and .0538(b). A letter detailing the engineering technical review of the application will be received under separate cover in the near future.

The following issues need to be addressed.

1. Drawing E1 - Rule 15A NCAC 13B .0538(b)(2)(E) states that the groundwater contour map based on the estimated long-term seasonal high water table should be superimposed on a topographic map and include the locations of all borings with the water table elevations or potentiometric data at each location used to generate the groundwater contours. Please update Drawing E1 that shows existing ground surface elevations, base grades, and labeled boring locations which indicate maximum seasonal high groundwater levels.
2. Drawing S4 – There are two separate wetland areas indicated on the map with comments concerning future re-evaluation and/or mitigation. The base grade and final cover contour figures show that these wetland areas will be impacted. The body of the application does not mention any mitigation of these wetlands. Please submit a discussion based on Rule(s) 15A NCAC 13B .0536(5)(A) through (H), which outlines wetlands location restrictions. In addition, any approval from the Corps of Engineers (COE) and/or the Division of Water Quality (DWQ) must be submitted to the Section.

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Phone 919-508-8400 \ FAX 919-733-4810 \ Internet http://wastenotnc.org

However, any permits issued by the COE and/or DWQ do not supercede the Solid Waste Rules.

3. The groundwater monitoring plan figure, MP1 is missing. Submit this figure.
4. Appendix 6 – Water Quality Monitoring Plan: There is no discussion concerning the monitoring plan for Phase 2. Please update the monitoring plan to include Phase 2 and resubmit.
5. Appendix 10 – Financial Assurance Documents: There were no financial assurance documents submitted. Please submit these documents.
6. The Site Suitability Notification letter dated February 8, 2008 requested the submittal of a copy of the original property deed including any recent property expansions/purchases, documentation of the franchise renewal, and a copy of the facility Permit that was recorded with the Pitt County Register of Deed's Office. Please provide. Also provide a survey plat.

Items 1, 3 and 4 have been discussed with your consultant, David Garrett. Mr. Garrett is taking care of these requests and will submit them in the near future.

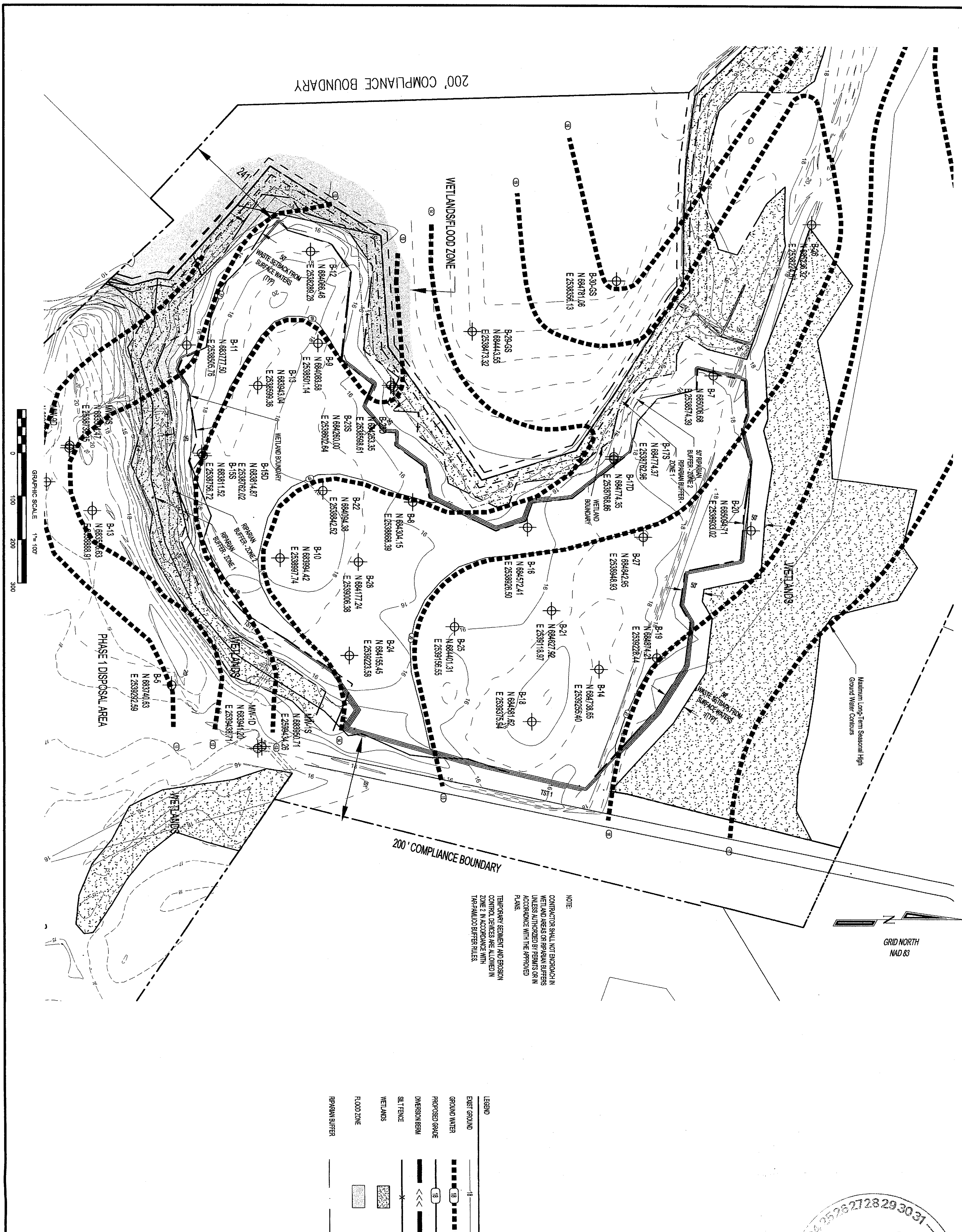
If you have any questions or would like to schedule a meeting to discuss this matter further, please contact me via email at elizabeth.werner@ncmail.net or phone (919) 508-8512.

Sincerely,

Elizabeth S. Werner

Elizabeth S. Werner
Hydrogeologist
Solid Waste Section

Cc: David Garrett
John Tucker
Ed Mussler, SWS
Ben Barnes, SWS
Donna Wilson, SWS



Received NOV 2008 Solid Waste Section

ATTACHMENT 2

1.	REVISED PER DSW COMMENTS		10-28-08
	REVISIONS		

E1

C&D LANDFILL - PHASE 2
PERMIT TO CONSTRUCT
BASE GRADE CONTOURS

C & D LANDFILL, INC.
802 Recycling Lane
Greenville, NC 27834

John A. K. Tucker, P.E.
Consulting Engineer
P.O. Box 297 Fuquay-Varina, North Carolina 27526
(919) 567-0483 fax (919) 567-3611
Email: johnak@johntuckerpe.com

February 18, 2008

ATTACHMENT 3

David Garrett, P.G., P.E.
Engineering and Geology
1408 Rock Drive, Raleigh, North Carolina 27610 Telephone/Fax (919) 231-1818

GRID NORTH
NAD 83

LEGEND

- EXIST GROUND — 18
- GROUND WATER — 16
- PROPSED GRADE — 18
- DIVERSION BERM
- SILT FENCE
- WETLANDS
- FLOOD ZONE

GENERAL NOTES:

1. Boundary, topographic and wetland information taks from maps prepared by James A. Burgess, PLS, P.O. Box 881, Greenville, NC 27834, 252-758-4900
2. All work shall be in accordance with applicable Federal, State and Local regulations.
3. Contractor shall at all times maintain adequate safety measures , activities, and barricades, for the protection of all persons on or about the site.
   ALL CONSTRUCTION OPERATIONS SHALL BE ACCOMPLISHED IN ACCORDANCE WITH THE APPLICABLE REGULATIONS OF THE OCCUPATIONAL SAFETY AND HEALTH DIVISION OF THE NC DEPARTMENT OF LABOR.

   Contractor shall be responsible for the design of adequate shoring and bracing in all trenches and excavations that are a part of the construction operations of this project. Contractor shall be responsible for installation and maintenance of adequate shoring and bracing, and the protection of all persons and property on or about the site.

GRAPHIC SCALE 1"= 200'
0 200 400 600

February 18, 2008

John A. K. Tucker, P.E.
Consulting Engineer
P.O. Box 297 Fuquay-Varina, North Carolina 27526
(919) 567-0483 fax (919) 567-3611
Email: johnak@johnkuckerpe.com

C & D LANDFILL, INC.
802 Recycling Lane
Greenville, NC 27834

C&D LANDFILL - PHASE 2
PERMIT TO CONSTRUCT
SITE BOUNDARY & TEST BORINGS

		10-30-08	
		3-11-08	
2	REVISED PER DSW COMMENTS		
1	Cross Section Line added		

REVISIONS

S 4

ATTACHMENT 3

Water Quality Monitoring Plan Amendment

C&D Landfill, Inc., CDLF (Phases 1 and 2)
Pitt County, North Carolina
NCDENR Solid Waste Permit #74-07

Prepared for

May 2008

David Garrett and Associates
Engineering and Geology

5105 Harbour Towne Drive, Raleigh, NC 27604 *Telephone/Fax (919) 231-1818*

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1.0 Introduction

1.1 Background

Water quality monitoring for C&D Landfill, Inc., (the "Facility"), located 15 miles east of Greenville, North Carolina, in rural Pitt County, commenced in 2001 with the opening of Phase 1. The monitoring well network consists of eleven (11) wells and three (3) surface sampling locations, shown on Drawing MP-1. The plan was most recently amended in late 2007 to accommodate two replacement wells (MW-3s and MW-3d, which replaced MW-9s and MW-9d), required to allow the full build-out of Phase 1 to permitted limits, and to incorporate new regulatory requirements pertaining to reporting limits. The CDLF is undergoing detection monitoring under 15A NCAC 13B .0544 (b) (5) (B). This monitoring plan amendment reflects the current site-wide monitoring network conditions, i.e., wells locations and depths and surface water sampling locations, along with proposed new monitoring wells for the CDLF Phase 2 expansion, shown on Drawing MP-1. This plan is scheduled to go into effect concurrent with the opening of Phase 2, with the background sampling of the new wells to be scheduled prior to opening the new footprint.

Changes to the sampling and analysis protocols include "Solid Waste Section Limits" that replace the formerly required Practical Quantification Limits (PQL's). This Facility is required to undergo semi-annual sampling for Appendix I constituents with selected additional field and laboratory parameters (see Tables). The monitoring wells provide water quality data on both the upper and lower aquifers identified in various site studies. The facility background wells (MW-1s and MW-1d) will be augmented by a new background well upgradient (north) of Phase 2 (MW-9A). Compliance wells are located west and south (i.e., the primary ground water flow direction); one compliance well located along a shallow drainage canal north of Phase 1 (MW-8) is considered redundant to new wells proposed for Phase 2 (MW-11 and MW-12), thus the potential for eliminating this well is under consideration. Eight new compliance wells are proposed to the south and west (downgradient) of Phase 2 (MW-10 through MW-16), including one new shallow/deep couplet (MW-14s and MW-14d). No new surface water sampling stations are proposed.

These monitoring network changes are based on the Site Suitability Evaluation and the Design Hydrogeologic Report for Phase 2. The following Sampling and Analysis Plan (SAP) has been prepared to meet North Carolina's sampling and analysis requirements and describes amendments to the detection-stage monitoring program, prepared in accordance with the following applicable rules, which are hereby incorporated by reference:

- 15A NCAC 13B .0544 (Solid Waste Rules)
- 15A NCAC 2C (Well Construction Rules)
- 15A NCAC 2L (Ground Water Classifications and Standards)
- 15A NCAC 27 (Well Contractor Certification Rules)
- 15A NCAC 2H (Water Quality Laboratory Certification Rules)

1.2 Purpose & Scope

This WQMP has been designed to insure accurate and representative field and laboratory results are obtained for all-round and surface water quality monitoring points. The WQMP addresses the following subjects:

- Ground water sample collection
- Surface water sample collection
- Sample preservation and shipment
- Laboratory analytical procedures
- Sample Chain-of-custody control
- Quality assurance/quality control programs.

The methods and procedures described in the following sections are intended to facilitate the collection of true and representative samples and test data. Field procedures are presented in the following Sections 3.0 through 6.0 in their general order of implementation. Equipment requirements for each field task are presented within the applicable section. Laboratory procedures, quality assurance methods and record keeping requirements are presented in Sections 7.0 through 9.0. Strict adherence to these procedures stipulated in this plan is required. Any variation from these procedures should be thoroughly documented in the assessment report.

1.3 New Monitoring Location Criteria

The compliance well network for Phase 2 shall consist of seven (7) wells within the uppermost aquifer, shown as MW-10 through MW-16 on Drawing MP-1. The relatively close spacing of these wells is based on advection-dispersion analyses performed during the original permitting of Phase 1. One (1) new well within the deep aquifer is identified as MW-14d on Drawing MP-1. Historically, the shallower wells for Phase 1 have been sampled semi-annually and the deep wells have been sampled on a bi-annual basis. A partial confining unit (normally consolidated marine silt-clay) provides separation of the upper aquifer unit (silty to relatively clean fluvial sand) from the deeper aquifer unit (silty sand with shell hash). The depth of the partial confining unit varies from 8 to 16 feet within the Phase 2 footprint, whereas the thickness of the confining unit is on the order of 20 feet, or more. A new background well, MW-9A, is proposed to the north of Phase 2 to augment MW-1s and MW-1d, which could be influenced by Phase 2 due to cross-gradient relationships. Refer to Table 1 following this text.

Three surface water sampling points are present: SW-1 is located up gradient of Phase 1, SW-3 is down gradient of Phase 1 on the same stream, SW-2 is located down gradient of both Phase 1 and Phase 2 along the drainage feature that separates the phases. The drainage feature begins near the Phase 2 footprint and presents little opportunity for an upgradient sampling location - no new surface sampling locations are proposed.

2.0 Ground Water Sample Collection

This section presents details of the procedures and equipment required to perform sampling from monitoring wells for each ground water monitoring event. Monitoring wells and surface sampling locations are shown on the attached map and are described in the Tables following this text.

For this discussion, it is assumed that well evacuation and sampling will be accomplished by bailing. A suitable alternative will be the use of dedicated sampling equipment, including low-flow purging and sampling techniques.

2.1 Water Level Measurements

Static water level and total depth to the bottom shall be measured in each well prior to any purging or sampling activities. Static water level and well depth measurements are necessary to calculate the volume of stagnant water in the well prior to purging. Additionally these measurements provide a field check on well integrity, degree of siltation, and are used to prepare potentiometric maps, calculate aquifer flow velocities and monitor changes in site hydrogeologic conditions.

Prior to opening each well, new latex or nitrile surgical gloves shall be donned. New gloves shall be when taking, water level measurements at each well. Appropriate measures shall be taken during all measurement activities to prevent soils, decontamination supplies, precipitation, and other potential contaminants from entering, the well or contacting clean equipment.

An electronic water level indicator shall be used to accurately measure depth to ground water in each well and/or piezometer. Ground water depths shall measured to a vertical accuracy of 0.01 feet relative to established wellhead elevations. Each well shall have a permanent, easily identified reference point on the lip of the well riser from which all water level measurements shall be taken. The elevation of the reference point shall be established by a Registered Land Surveyor.

The electronic water level indicator shall be constructed of inert materials such as stainless steel and Teflon. Between well measurements the device shall be thoroughly decontaminated by washing, with non-phosphate soap and triple rinsing with de-ionized water to prevent cross contamination from one well to another. Te following measurements shall be recorded in a dedicated field book prior to sample collection:

- Depth to static water level and well bottom (to the nearest 0.01 foot)
- Height of water column in the riser (based upon known depth of well)
- Condition of wellhead protective casing, base pad and riser
- Changes in condition of well and surroundings.

2.2 Monitor Well Evacuation

Water accumulated in each well may be stagnant and unrepresentative of surrounding aquifer conditions, and therefore must be removed to ensure that fresh formation water is sampled. Each well will be purged of standing water following the measurement of the static water level.

New latex or nitrile surgical gloves shall be donned for all well purging and sampling activities and whenever handling decontaminated field equipment. Appropriate measures shall be taken during all measurement, purging and sampling activities to prevent surface soils, decontamination supplies, precipitation, and other potential contaminants from entering the well or contacting the equipment.

The volume of standing water in the well riser and screen shall be calculated immediately before well evacuation during each monitoring event. A standing water volume shall be calculated for each well using measured static water level, well depth and well casing diameter according to the equation:

$$V = (TD - SWL) \times C$$

Where: V = One well volume
TD = Total depth of the well (in feet)
SWL = Static water level (in feet)
C = Volume constant for given well diameter (gallons/foot)
C = 0.163 gal/ft for two-inch wells and C = 0.653 gal/ft for four-inch wells.

After the volume of standing water within the casing, is established, a minimum of three and a maximum of five well casing, volumes of water shall be evacuated from each well. New, disposable bailers with either double or bottom check-valve shall be used to purge each well. Disposable purge bailers shall be constructed of fluorocarbon resin (Teflon) or inert plastic suitable for the well and ground conditions. Each bailer shall be factory-clean and remain sealed in a plastic sleeve until use. A new Teflon-coated stainless steel, inert mono-filament line or nylon cord shall be used for each well to retrieve the bailers. **Dedicated purging and sampling equipment may be used.**

Wells shall be purged at a rate that will not cause recharge water to be excessively agitated or cascade through the screen. Care will also be taken to minimize disturbance to the well sidewalls and bottom which could result in the suspension of silt and fine particulate matter. The volume of water pureed from each well and the relative rate of recharge shall be documented in sampling field notes Wells which are of very low recharge rates shall be purged once until dry. Damaged, dry or low yielding, and high turbidity wells shall noted for reconsideration before the next sampling event.

Purge water shall be managed to prevent possible soil and surface water contamination.

Durable, non-dedicated equipment to be lowered into the well or which may contact the water shall be thoroughly decontaminated before each use. Equipment shall be disassembled to the degree practical, washed with (non-phosphate) soapy potable tap water, and triple rinsed using de-ionized water. Detailed equipment decontamination procedures are detailed in Section 2.6.

2.3 Ground Water Sample Collection

After purging activities are complete, ground water samples will be collected for laboratory analysis. Sampling shall occur within 24 hours of the purging of each well and as soon after well recovery as possible. Wells which fail to recharge or produce an adequate sample volume within 24 hours of purging shall not be sampled. High turbidity wells (>1000 units/ml) shall be noted and scheduled for redevelopment following the sampling event.

Field measurements of temperature, pH, specific conductivity and turbidity shall be made immediately prior to sampling each monitoring point. The field test specimens shall be collected with the sampling bailer acid placed in a clean, non-conductive glass or plastic container for observation. The calibration of the pH, temperature, conductivity and turbidity meters shall be completed according to the manufacturers' specifications and consistent with *Test Methods for Evaluating Solid Waste -Physical/Chemical Methods* (SW-846). A pocket thermometer and litmus paper will be available in case of meter malfunction.

Each well shall be sampled using, a new, factory-cleaned, disposable Teflon bailer with bottom check-valve and sample discharge mechanism. A new segment of Teflon-coated stainless steel wire, inert mono-filament line or nylon cord shall be used to lower and retrieve each bailer. The bailer will be lowered into each well to the point of ground water contact, then allowed to fill as it is sinks below the water table. Bottom contact will be avoided in order to avoid suspending sediment in the samples. The bailer will be retrieved and emptied in a manner which minimizes sample agitation.

Samples shall be transferred directly from the Teflon bailer into a sample container that has been specifically prepared for the preservation and storage of compatible parameters. A bottom emptying device provided with the bailer shall be used to transfer samples from bailer to sample container. The Generation of air bubbles and sample agitation will be minimized during bailer discharge.

Ground water samples shall be collected and contained in the order of volatilization sensitivity. Initially, only purgeable organics and total metals specimens shall be collected for laboratory analysis. Subsequently, other analytical methods may required. When collected, the following order of sampling, shall be observed:

1. Initial measurements of pH, temperature, conductivity and turbidity
2. Volatile and Purgeable Organics
3. Base Neutral and Acid Extractable Organics
4. Total Metals
5. Dissolved Metals
6. Final measurements of pH, temperature, conductivity and turbidity

All samples shall be collected and analyzed in an unfiltered state during all sampling events. If excessively silty ground water conditions persist, analyses of dissolved metal analysis may be proposed to the DWM, although DWM typically does not consider filtered sample data. Any optional dissolved metals sampling, which can be performed in addition, shall be completed on samples prepared by field filtration using a decontaminated peristaltic pump and a disposable 0.45 micron filter cartridge specifically manufactured for this purpose.

All reusable sampling equipment including water level probes, pH/conductivity meters, interface probes, and filtering, pumps which might contact aquifer water or samples shall be thoroughly decontaminated between wells by washing with non-phosphate soapy, de-ionized water and triple rinsing, with de-ionized water. Equipment decontamination procedures are detailed in Section 2.6.

2.4 Field Quality Assurance

Field and trip blanks shall be prepared, handled and analyzed as ground water samples to ensure cross-contamination has not occurred. One set of trip blanks, as described later in this document, shall be prepared before leaving the laboratory to ensure that the sample containers or handling processes have not affected the quality of the samples. One set of field (equipment) blanks shall be created in the field at the time of sampling to ensure that the field conditions, equipment, and handling during sampling collection have not affected the quality of the samples. A duplicate ground water sample may be collected from a single well as a check of laboratory accuracy. Blanks and duplicate containers, preservatives, handling, and transport procedures for surface water samples shall be identical to those noted for around water samples.

2.5 Sample Containers

Sample containers shall be provided by the laboratory for each sampling event. Containers must be either new and factory-certified analytically clean by the manufacturer, or cleaned by the laboratory prior to shipment for sampling. Laboratory cleaning methods shall be based on the bottle type and analyte of interest. Metal containers are thoroughly washed with non-phosphate detergent and tap water, and rinsed with 1:1 nitric acid, tap water, 1:1 hydrochloric acid, tap water, and de-ionized water, in that order. Organic sample containers are thoroughly washed with non-phosphate detergent in hot water and rinsed

with tap water, distilled water, acetone, and pesticide-quality hexane, in that order. Other sample containers are thoroughly washed with non-phosphate detergent and tap water, rinsed with tap water, and rinsed with de-ionized water. The laboratory shall provide proper preservatives in the sample containers prior to shipment (see Section 7.0).

2.6 Equipment Decontamination

All non-dedicated equipment that shall come in contact with the well casing and water shall be decontaminated. The procedure for decontaminating non-dedicated equipment is as follows:

1. Clean item with tap water and phosphate-free laboratory detergent (Liquinox or equivalent), using, a brush if necessary to remove particulate matter and surface films.

2. Rinse thoroughly with tap water

3. Rinse thoroughly with de-ionized or distilled water and allow to air dry

4. Rinse thoroughly with high grade isopropanol and allow to air dry

5. Wrap with aluminum foil to prevent contamination of equipment during storage or transport.

2.7 Detection of Immiscible Layers

The detection of non-aqueous phase liquids (fluids that are immiscible in water and vary in density from 1.0 g/ml) is highly unlikely. Should organic constituents be detected that suggest the presence of immiscible liquids, a plan for the detection of these liquids shall be submitted to DWM.

3.0 Surface Water Sample Collection

This section presents details of the procedures and equipment required to perform surface water field measurements and sampling. Surface water monitoring station locations are shown in Drawing MP-1. Surface water samples shall be obtained from areas of minimal turbulence and aeration. New latex or nitrile surgical gloves shall be donned prior to sample collection. The following procedure shall be implemented regarding sampling of surface waters:

1. Put on new latex or nitrile surgical gloves.

2. Hold the bottle in the bottom with one hand, remove the cap with the other.

3. Push the sample container slowly into the water and tilt up towards the current to fill. A water depth of six inches is generally satisfactory. Care shall be taken to avoid breaching the surface or losing, sample preservatives while filling the container.

4. If there is little current movement, the container should be moved slowly, in side to side direction, with the mouth of the container pointing upstream.

Temperature, pH, specific conductivity and turbidity shall be taken at the start of sampling as a measure of field conditions and check on the stability of the water samples over time. Measurements of temperature, pH, specific conductivity and turbidity shall be recorded for all surface water samples. The calibration of the pH, temperature, conductivity, and turbidity meters shall be completed at the beginning, of each sampling event, according to the manufacturers' specifications and consistent with *Test Methods for Evaluating Solid Waste Physical/Chemical Methods (SW-846).*

Surface water samples shall be collected and contained in the order of volatilization sensitivity of the parameters as follows:

1. Measurements of pH, temperature, conductivity and Turbidity

2. Volatile and Purgeable Organics

3. Base Neutral and Acid Extractable Organics

4. Total Metals

5. Dissolved Metals

All surface water samples shall be collected unfiltered in each sampling event. If future dissolved metal analysis is required, samples shall be prepared by field filtration using a decontaminated peristaltic pump, hand-operated filtering pump (or equivalent) and a disposable 0.45 micron filter cartridge specifically manufactured for this purpose. All field meters which might contact surface water samples shall be thoroughly decontaminated between stations by washing with non-phosphate soapy, de-ionized water and triple rinsing with de-ionized water.

Samples shall be collected directly from the station in the container that has been specifically prepared for the preservation and storage of compatible parameters. Samples shall be collected in a manner that assures minimum agitation. Sample containers shall be prepared and provided by the analytical laboratory, following the procedures presented in Section 2.5, for each surface water sampling event.

4.0 Field QA/QC Program

Field Quality Assurance/Quality Control (QA/QC) requires the routine collection and analysis of trip blanks to verify that the handling process has not affected the quality of the samples. Any contaminants found in the trip blanks could be attributed to:

- Interaction between the sample and the container,
- Contaminated source water, or
- Handling procedures that alter the sample.

The laboratory shall prepare a trip blank by filling each type of sample bottle with distilled or de-ionized water. Trip blanks shall be placed in bottles of the specific type required for the analyzed parameters and taken from a bottle pack specifically assembled by the laboratory for each -round water sampling event. Trip blanks shall be taken prior to the sampling event and transported with the empty bottle packs. The blanks shall be analyzed for volatile and purgeable organics only.

The concentration levels of any contaminants found in the trip blank shall be reported but shall not be used to correct the ground water data. In the event that elevated parameter concentrations are found in a blank, the analysis will be flagged for future evaluation and possible re-sampling.

All instruments utilized in the field to measure ground water characteristics shall be calibrated prior to entering the field, and recalibrated in the field as required, to insure accurate measurement for each sample. The specific conductivity and pH meter shall be recalibrated utilizing two prepared solutions of known concentration in the range of anticipated values (between 4 and 10).

A permanent thermometer, calibrated against a National Bureau of Standards Certified thermometer, will be used for temperature meter calibration. The turbidity meter shall be calibrated using Lucite standard blocks provided by the manufacturer.

5.0 Sample Preservation and Shipment

Methods of sample preservation, shipment, and chain-of-custody procedures to be observed between sampling and laboratory analysis are presented in the following sections. Proper storage and transport conditions must be maintained in order to preserve the integrity of specimens between collection and analysis. Ice and chemical cold packs shall be used to cool and preserves samples, as directed by the analytical laboratory. Samples will be maintained at a temperature of 4° C. **Dry ice is not to be used.**

Pre-measured chemical preservatives shall be provided in the sample containers provided by the analytical laboratory. Hydrochloric acid shall be used as a chemical stabilizer and preservative for volatile and purgeable organic specimens. Nitric acid shall be used as the preservative for samples for metals analysis.

Upon collection, samples shall be placed on ice in high impact polystyrene coolers and cooled to a temperature of 4° C. Samples shall be packed and/or wrapped in plastic bubble wrap to inhibit breakage or accidental spills. Chain-of-Custody control documents shall be placed in a waterproof pouch and sealed inside the cooler with the shipped samples. Tape and/or custody seals shall be placed on the outside of the shipping coolers to prevent and aid in the detection tampering.

Samples shall be delivered to the analytical laboratory within a 24-hour period in person or using an overnight delivery service. Shipment and receipt of samples shall be coordinated with the laboratory to insure holding times are not exceeded and to maintain samples at the proper temperature. Chain-of-Custody control shall be maintained from sampling through analysis to prevent tampering with analytical specimens. Chain-of-Custody forms shall be used to transfer direct deliveries from the sampler to the laboratory. A coded express delivery shipping bill shall constitute the Chain-of-Custody between the sampler and laboratory for overnight courier deliveries. Chain-of-Custody control procedures follow:

1. Chain-of-Custody shall originate at the laboratory with the shipment of prepared sample bottles and a sealed trip blank. Identical container kits shall be shipped by express carrier to the sampler or site or picked up at the laboratory in sealed coolers.

2. Upon receipt of the sample kit, the sampler shall inventory the container kit and check its consistency with number and types of containers indicated in the Chain-of-Custody forms and required for the sampling event.

3. Labels for individual sample containers shall be completed in the field, indicating the site, time of sampling, date of sampling, sample location/well number, and preservation methods used.

4. Collected specimens shall be placed in the iced coolers and shall remain in the continuous possession of the field technician until shipment or transferral via the Chain-of-Custody form. If the field technician cannot maintain continuous possession, the coolers shall be stored in a secured area.

5. Upon delivery to the laboratory, samples are logged in and the laboratory director or his designee shall sign the Chain-of-Custody control forms and formally receive the samples.

6. Copies of the complete Chain-of-Custody forms shall be placed in the laboratory's analytical project file and attached results of laboratory analysis report upon completion.

6.0 Field Logbook

The field technician shall keep an up-to-date logbook documenting important information pertaining to the technician's field activities. The field logbook shall document the following:

- Site Name and Location
- Date and Time of Sampling
- Climatic Conditions During Sampling Event
- Sampling Point/Well Identification Number
- Well Static Water Level
- Height of Water Column in Well
- Purged Water Volume and Well Yield (High or Low)
- Presence of Immiscible Layers and Detection Method
- Observations on Purging and Sampling Event
- Time of Sample Collection
- Temperature, pH, Turbidity, and Conductivity Readings
- Signature of Field Technician.

7.0 Laboratory Analysis

The ground and surface water parameters to be analyzed shall be those specified by DWM for detection monitoring purposes. These shall include field indicators of water quality (pH, conductivity, temperature and turbidity) and selected purgeable organic and metals constituents listed in RCRA Subtitle-D, Appendix I of 40 CFR 258, plus additiona parameters required by the Division of Waste Management per guidance effective as of January 1, 2007 (see Table 1). All analytical methods are taken from *Test Methods For Evaluating Solid Waste - Physical/Chemical Methods* (SW-846) or *Methods For the Chemical Analysis of Water and Wastes* and will be consistent with DWM's policies regarding analytical methods and Solid Waste3 Section Limits (SWSL's). Table 2 presents a summary of proposed analytical methods. **Analysis shall be performed by a laboratory certified by the North Carolina DENR for the analyzed parameters.**

Formal environmental laboratory Quality Assurance/Quality Control (QA/QC) procedures are to be utilized at all times. The owner/operator of the landfill is responsible for selecting a laboratory contractor and insuring that the laboratory is utilizing proper QA/QC procedures. The laboratory must have a QA/QC program based upon specific routine procedures outlined in a written laboratory Quality Assurance/Quality Control Manual. The QA/QC procedures listed in the manual shall provide the lab with the necessary assurances and documentation that accuracy and precision goals are achieved in all analytical determinations. Internal quality control checks shall be undertaken regularly by the lab to assess the precision and accuracy of analytical procedures. During the course of the analyses, quality control data and sample data shall be reviewed by the laboratory manager to identify questionable data and determine if the necessary QA/QC requirements are being followed. If a portion of the lab work is subcontracted, it is the responsibility of the contracted laboratory to verify that all subcontracted work is completed by certified laboratories, using identical QA/QC procedures.

8.0 Record Keeping and Reporting

8.1 Sampling Reports

Copies of all laboratory analytical data shall be forwarded the DWM within 45 calendar days of the sample collection date. In addition to the sampling results being submitted in Table format with a written report, the laboratory analytical data shall also be submitted electronically on the Solid Waste Section's **Electronic Data Template**. The submittal shall specify the date of sample collection, the sampling point identification, and a map of the sampling locations. Should significant concentrations of contaminants be detected in ground and surface water during monitoring (as defined in North Carolina Solid Waste Rules or Ground Water Quality Standards), the owner/operator shall notify the DWM and shall place a notice in the landfill records as to which constituents were detected.

8.2 Well Abandonment/Rehabilitation

Should wells become irreversibly damaged or require rehabilitation, the DWM shall be notified. If monitoring wells and/or piezometers are damaged irreversibly they shall be abandoned under the direction of the DWM. The abandonment procedure in unconsolidated materials shall consist of over-drilling and/or pulling the well casing and plugging the well with an impermeable, chemically-inert sealant such as neat cement grout and/or bentonite clay. For bedrock well completions the abandonment shall consist of plugging the interior well riser and screen with an impermeable neat cement grout and/or bentonite clay sealant. Piezometers in the waste footprint shall be abandoned by over drilling the boring and backfilling with a bentonite-cement grout. **All well abandonments shall be certified by a NC-licensed geologist or engineer.**

8.3 Additional Well Installations

All additional monitoring wells (new or replacement) shall be installed under the supervision of a qualified geologist or engineer who is registered in North Carolina and who shall certify to the DWM that the installation complies with the North Carolina Regulations. Upon installation of future wells the documentation for the construction of each well shall be submitted by the registered geologist or engineer within 30 days after well construction.

8.4 Implementation Schedule

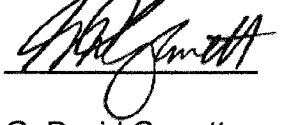
The Ground Water Quality Monitoring Program shall be implemented upon approval. Analyses shall be performed at a minimum on a semi-annual basis.

8.5 Modifications and Revisions

At some future time it may be appropriate to modify this plan, e.g. add or delete sampling locations or analytical parameters. Such changes may require approval from NCDENR Division of Waste Management, Solid Waste Section. Also, this plan will be amended as new Phases are developed. Refer to the revision section for the latest edition.

9.0 Certification

The water quality monitoring plan for this facility has been prepared by a qualified geologist who is licensed to practice in the State of North Carolina. The plan has been prepared based on first-hand knowledge of site conditions and familiarity with North Carolina solid waste rules and industry standard protocol. In accordance with North Carolina Solid Waste Regulations, this Water Quality Monitoring Plan should provide early detection of any release of hazardous constituents to the uppermost aquifer, so as to be protective of public health and the environment. No other warranties, expressed or implied, are made.

Signed 

Printed G. David Garrett

Date May 21, 2008

Not valid unless this document bears the seal of the above-named licensed professional.

References to earlier versions of this plan include:

Water Quality Monitoring Plan
C&D Landfill, Inc., March 2001

Upon approval by NC DENR-Division of Waste Management, this plan will supercede all previous versions for the detection-phase monitoring of the CDLF.

10.0 Revisions

Rev 0.0	March 2001	Phase 1 Permit to Construct - review submittal
Rev 0.1	April 2, 2001	Phase 1 Permit to Construct - approved copy
Rev 0.2	Sept. 11, 2007	Replaced wells, added new DWM protocols
Rev 0.3	May 21, 2008	Phase 2 Permit to Construct - review submittal

TABLE 1A
Existing Monitoring Wells for Phase 1

Elevation Data				Test Boring Data								Piezometer Construction Data				
Boring Number	Boring Date	PVC Pipe Elev.	Ground Elev.	Drilling Method	Total Depth, ft.	Yorktown Fm. Depth, ft.	Yorktown Fm. Elev.	Castle Hayne Fm. Depth, ft.	Castle Hayne Fm. Elev.	Beaufort Fm. Depth, ft.	Beaufort Fm. Elev.	Top of Piez. Screen Depth, ft.	Top of Piez. Screen Elev.	Bot. of Piez. Screen Depth, ft.	Bot. of Piez. Screen Elev.	Stickup ft.
MW-1d	10/12/2000	21.14	17.40	HSA	50.0	7.5	**9.9**	30.5	**-13.1**			40.0	**-22.6**	50.0	**-32.6**	3.74
MW-1s	5/6/2001	20.91	17.59	HSA	13.0							3.0	**14.6**	13.0	**4.6**	3.32
MW-2d	10/9/2000	21.80	17.97	Rotary	70.0	12.5	**5.5**	33.5	**-15.5**	61.5	**-43.5**	39.0	**-21.0**	49.0	**-31.0**	3.83
MW-2s	5/5/2001	21.44	18.45	HSA	13.0							3.0	**15.5**	13.0	**5.5**	2.99
MW-3d	10/12/2000	22.83	19.37	HSA	50.0	14.0	**5.4**	27.5	**-8.1**			40.0	**-20.6**	50.0	**-30.6**	3.46
MW-3s	8/6/2007		19.37	HSA	20.0	12.9	**6.5**					5.0	**14.4**	20.0	**-0.6**	
MW-4	5/5/2001	18.42	14.83	HSA	13.0							3.0	**11.8**	13.0	**1.8**	3.59
MW-5	11/18/2002	17.90	14.80	HSA	18.0	18.4	**-3.6**					3.0	**11.8**	18.0	**-3.2**	3.10
MW-6	5/5/2001	20.03	16.87	HSA	13.0							3.0	**13.9**	13.0	**3.9**	3.16
MW-7	5/5/2001	19.40	16.03	HSA	13.0							3.0	**13.0**	13.0	**3.0**	3.37
MW-8	11/18/2002	21.21	18.30	HSA	18.0	17.6	**0.7**					3.0	**15.3**	18.0	**0.3**	2.91
MW-9d*	11/15/2002	22.88	19.88	HSA	39.0	16.5	**3.4**					33.0	**-13.1**	38.0	**-18.1**	3.00
MW-9s*	11/18/2002	22.95	19.91	HSA	18.5	16.5	**3.4**					3.0	**16.9**	18.0	**1.9**	3.04

Notes: *These wells were abandoned in August 2007 and replaced by activating existing MW-3d and installing MW-3s

TABLE 1B
Proposed Monitoring Wells for Phase 2

Elevation Data				Anticipated Conditions Based on Nearest Boring								Proposed Piezometer Construction Data				
Boring Number	Nearest Boring**	PVC Pipe Elev.	Ground Elev.	Drilling Method	Total Depth, ft.	Yorktown Fm. Depth, ft.	Yorktown Fm. Elev.	Castle Hayne Fm. Depth, ft.	Castle Hayne Fm. Elev.	Beaufort Fm. Depth, ft.	Beaufort Fm. Elev.	Top of Piez. Screen Depth, ft.	Top of Piez. Screen Elev.	Bot. of Piez. Screen Depth, ft.	Bot. of Piez. Screen Elev.	Stickup ft.
MW-10	B-24	TBD	TBD	HSA	15.0	13.3	**3.4**					5.0	TBD	15.0	TBD	TBD
MW-11	B-15s	TBD	TBD	HSA	15.0	15.5	**2.1**					5.0	TBD	15.0	TBD	TBD
MW-12	B-11	TBD	TBD	HSA	15.0	10.9	**4.3**					5.0	TBD	15.0	TBD	TBD
MW-13	B-12	TBD	TBD	HSA	20.0	17.9	**-1.2**					5.0	TBD	20.0	TBD	TBD
MW-14d	B-23d	TBD	TBD	HSA?	50.0	12.7	**1.8**	33.8	**-19.3**			40.0	TBD	50.0	TBD	TBD
MW-14s	B-23s	TBD	TBD	HSA	20.0	13.0	**0.9**					5.0	TBD	20.0	TBD	TBD
MW-15	B-16	TBD	TBD	HSA	15.0	8.1	**7.8**					5.0	TBD	15.0	TBD	TBD
MW-16	B-7	TBD	TBD	HSA	20.0	17.0	**1.3**					5.0	TBD	20.0	TBD	TBD

Notes: **Reference made to Phase 2 piezometers, installed ca. 2002 for the Design Hydro investigation

Convert B-23d and B-23s to MW-14d and MW-14s if possible

The upper Yorktown Formaton contains a marine silt-clay layer that comprises the upper confining unit

The upper Castle Hayne Formation contains a silty marine sand that comprises the deep aquifer

The upper Beaufort Formation contains a marine silt-clay layer that comprises a deep confining unit

TABLE 1C
Existing Surface Sampling Locations

Monitoring Location	Description of Monitoring Location
SW-1	Background on "south" stream at property line (northeast of Phase 1)
SW-2	Down gradient on "south" stream at property line (southeast of Phase 1)
SW-3	Down gradient on "north" drainage ditch (between Phases 1 and 2)

Table 2

Ground And Surface Water Analysis Methodology

C&D Landfill, Inc., Phases 1 and 2 CDLF Units
Permit No. 74-07, Pitt County, North Carolina

Inorganic Constituent	Required Solid Waste Section Limit (ug/l)*	North Carolina 2L** Ground Water Standard	
Antimony	6	1.4	***
Arsenic	10	50	
Barium	100	2000	
Beryllium	1	4	***
Cadmium	1	1.75	
Chromium	10	50	
Cobalt	10	2	***
Copper	10	1000	
Lead	10	15	
Nickel	50	100	
Selenium	10	50	
Silver	10	17.5	
Thallium	5.5	0.28	***
Vanadium	25	25	***
Zinc	10	1050	

New Field and Lab Parameters per 2007 rule changes:
Mercury
Chloride
Manganese
Sulfate
Iron
Alkalinity
Total Dissolved Solids
Specific Conductivity (field)
pH (field)
Temperature (field)
Turbidity (field)

All samples shall be unfiltered.

* Per North Carolina DENR Division of Waste Management guidelines, eff. 2006, equivalent to the PQL. Only SW-846 methodologies that are approved by the NC DENR Solid Waste Section shall be used for laboratory analyses. The laboratory must be certified by NC DENR for the specific lab methods.
** 15A NCAC 2L Standard for Class GA Ground Water – this applies unless otherwise noted (see below)

***North Carolina DWM Ground Water Protection Standard (quoted from site specific monitoring reports)

Table 2 (continued)

Ground And Surface Water Analysis Methodology

Organic Constituent	Required Solid Waste Section Limit (ug/l)*	North Carolina Ground Water Standard	
1,1,1,2-Tetrachloroethane	5	1.3	***
1,1,1-Trichloroethane	1	200	
1,1,2,2-Tetrachloroethane	1	0.17	
1,1,2-Trichloroethane	5	0.6	***
1,1-Dichloroethane	5	70	
1,1-Dichloroethylene	5	7	
1,2,3-Trichloropropane	1	0.005	
1,2-Dibromo-3-chloropropane	1	0.025	
1,2-Dibromoethane	1	0.0004	
1,2-Dichlorobenzene	5	24	
1,2-Dichloroethane	1	0.38	
1,2-Dichloropropane	1	0.51	
1,4-Dichlorobenzene	1	1.4	
2-Butanone	100	4200	
2-Hexanone	50	280	
4-Methyl-2-pentanone	100	560	***
Acetone	100	700	
Acrylonitrile	200		
Benzene	1	1	
Bromochloromethane	3	0.6	***
Bromodichloromethane	1	0.56	
Bromoform	4	4.43	
Bromomethane	10		
Carbon Disulfide	100	700	
Carbon Tetrachloride	1	0.269	
Chlorobenzene	3	50	
Chloroethane	10	2800	
Chloroform	5	70	
Chloromethane	1	2.6	
Cis-1,2-dichloroethylene	5	70	
Cis-1,3-dichloropropene	1	0.19	
Dibromochloromethane	1	0.41	
Dibromomethane	10		
Ethylbenzene	1	550	
Iodomethane	10		
Methylene chloride	1	4.6	
Styrene	1	100	
Tetrachloroethylene	1	0.7	
Toluene	1	1000	
Trans-1,2-dichloroethylene	5	100	

Table 2 (continued)

Ground And Surface Water Analysis Methodology

Organic Constituent	Required Solid Waste Section Limit (ug/l)*	North Carolina Ground Water Standard
Trans-1,3-dichloropropene	1	0.19
Trans-1,4-dichloro-2-butene	100	
Trichloroethylene	1	2.8
Trichloroflouromethane	1	2100
Vinyl acetate	50	88 ***
Vinyl chloride	1	0.015
Xylene (total)	4	530

Figure 1 – Type 3 Monitoring Well Construction Schematic (Lower Aquifer)

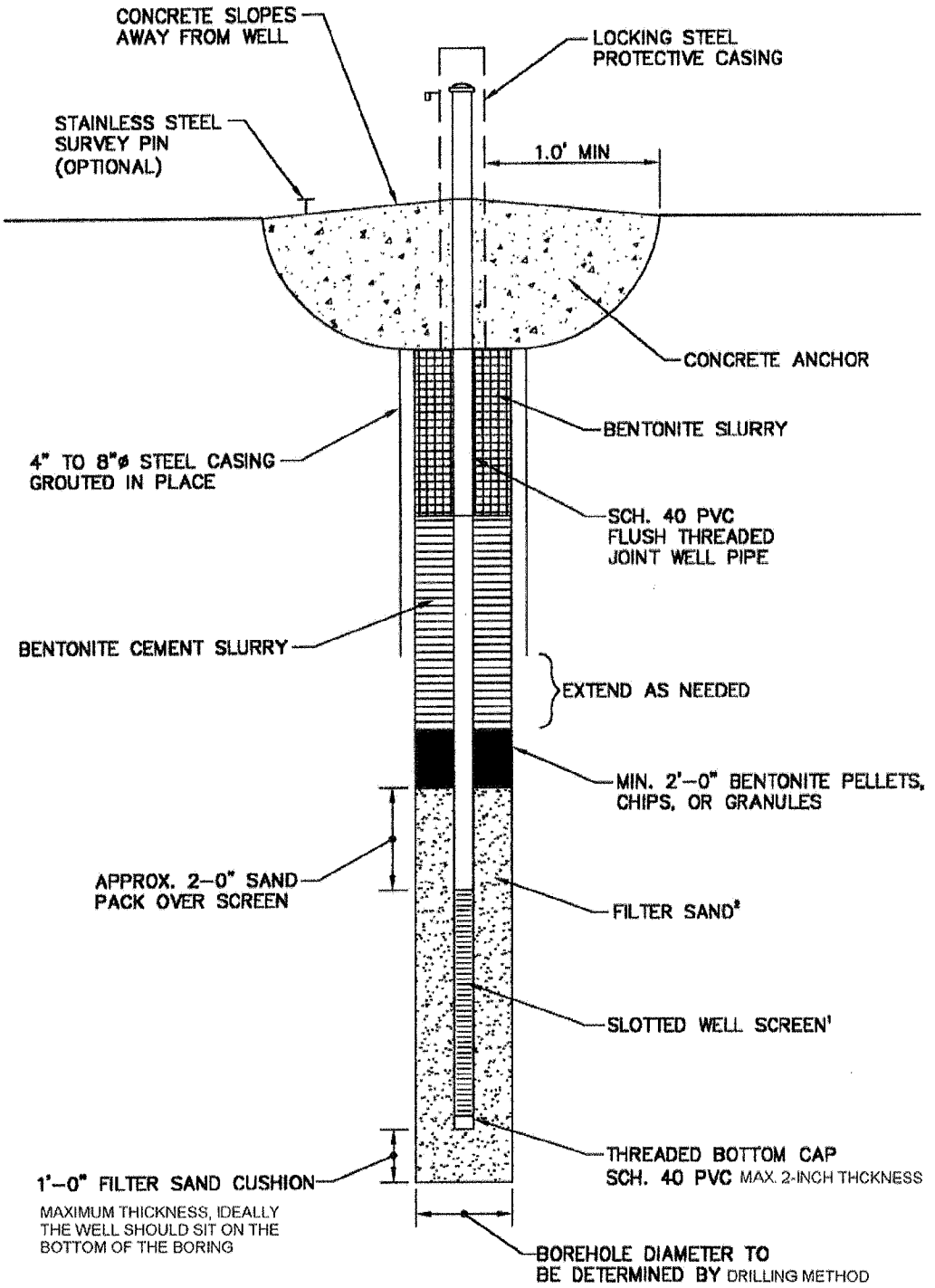
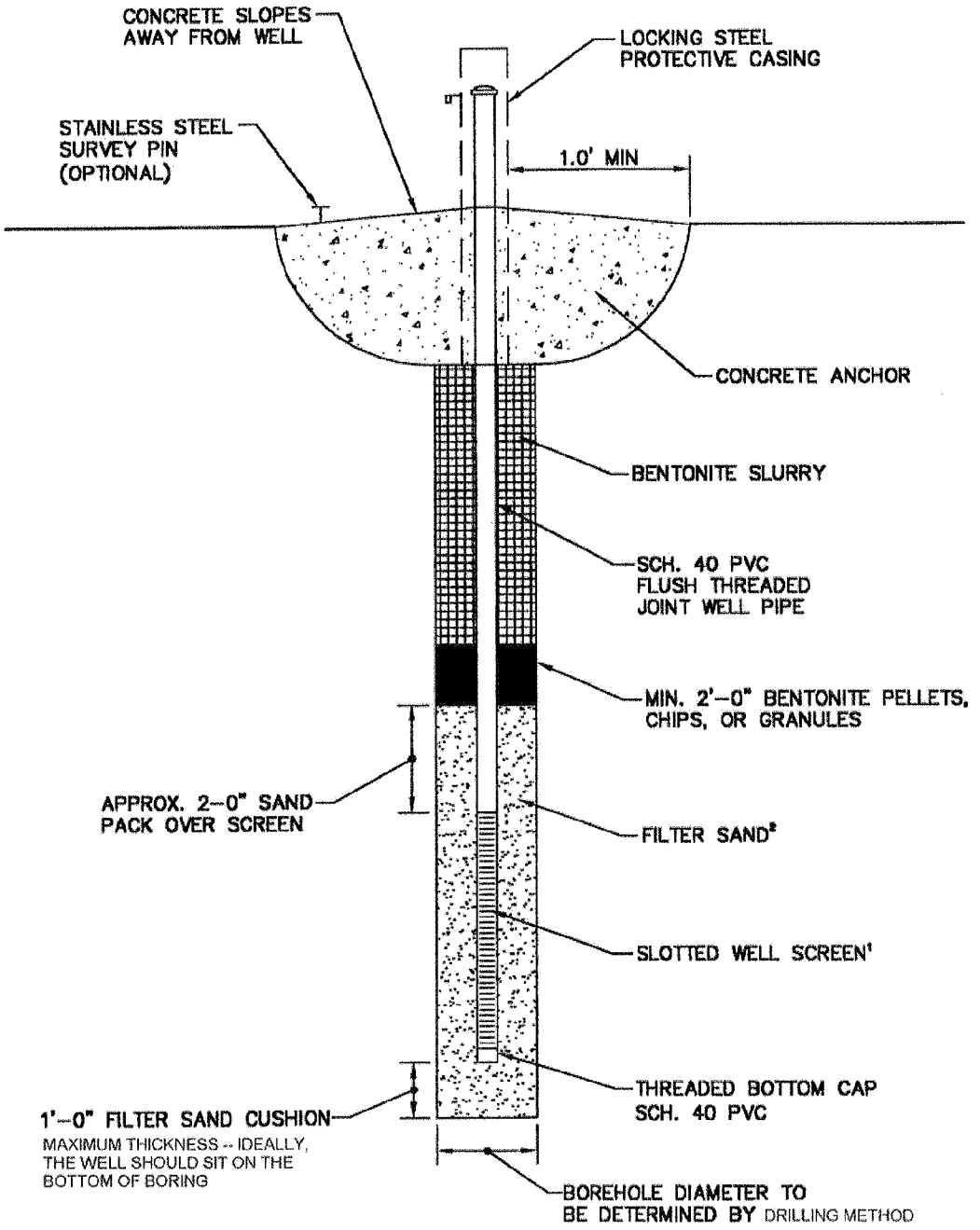
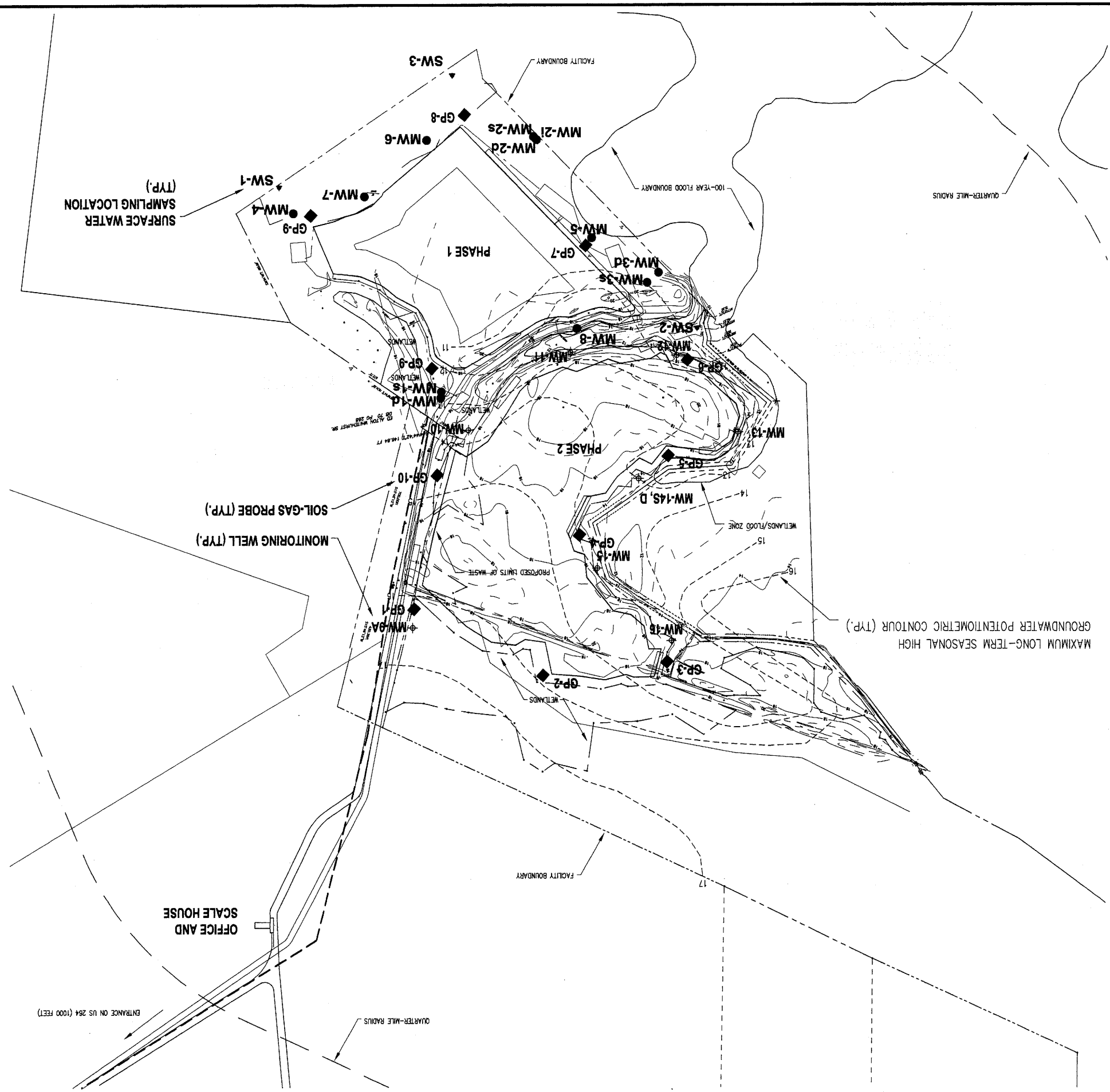


Figure 2 – Type 2 Monitoring Well Construction Schematic (Upper Aquifer)





REFERENCE NOTES:
1. SITE TOPOGRAPHY AND FACILITY DESIGN BY JOHN TUCKER, PE
2. HYDROGEOLOGIC INVESTIGATION BY DAVID GARRETT, PG, PE

NO.	DATE	REVISION
0	2-28-08	ISSUED FOR REGULATORY REVIEW
1	10-31-08	UPDATED WITH SOIL-GAS PROBES PER REGULATORY COMMENTS

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PROJECT TITLE:
C&D LANDFILL, INC.
PITT COUNTY, NC
PERMIT TO CONSTRUCT
PERMIT #74-07

SEAL
NORTH CAROLINA REGISTERED PROFESSIONAL ENGINEER DAVID GARRETT 10-31-2008

SEAL

DRAWING TITLE:
FACILITY MONITORING PLAN AMENDMENTS (PHASE 2 APPLICATION)

DESIGNED BY: G.D.G.	DRAWN BY:
CHECKED BY: J.A.T.	PROJECT NO.: C0LF-2
SCALE: AS SHOWN	DATE: FEBRUARY 2008
FILE NAME: C0LF-2-MONP	
SHEET NO.: 16	DRAWING NO.: MP1