REPORT

CONSTRUCTION RECORD DOCUMENTATION REPORT GAS COLLECTION AND CONTROL SYSTEM PHASE I—SEQUENCE 3A

J.E.D. Solid Waste Management Facility

Osceola County, Florida

Submitted To: Florida Department of Environmental Protection
Waste Management Program, Central District
3319 Maguire Boulevard, Suite 232
Orlando, FL 32803-3767

Prepared For: Omni Waste of Osceola County, LLC
1501 Omni Way
St. Cloud, FL 34773

Submitted By: Golder Associates Inc.
9428 Baymeadows Road
Suite 400
Jacksonville, FL 32256 USA

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September 2010 **083-82734.13**

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September 30, 2010 083-82734.13

F. Thomas Lubozynski, P.E.
Florida Department of Environmental Protection
Waste Management Program, Central District
3319 Maguire Boulevard, Suite 232
Orlando, FL 32803-3767

RE: CONSTRUCTION RECORD DOCUMENTATION REPORT
GAS COLLECTION AND CONTROL SYSTEM PHASE I – SEQUENCE 3A
J.E.D. SOLID WASTE MANAGEMENT FACILITY
OSCEOLA COUNTY, FLORIDA
PERMIT NUMBERS: SC49-0199726-004 AND SO49-0199726-005

Dear Mr. Lubozynski:

On behalf of the Omni Waste of Osceola County, LLC (Omni), Golder Associates Inc. (Golder) is pleased to submit the enclosed report documenting the construction quality assurance (CQA) monitoring of the construction of the landfill gas collection and control system (GCCS) Phase I, Sequence 3A expansion at the J.E.D. Solid Waste Management Facility (JED Facility) located in Osceola County, Florida.

The enclosed report contains a narrative describing the construction procedures employed by the contractors and the CQA monitoring of the construction activities performed by Golder. The report also includes a summary of changes with respect to the construction drawings, a CQA certification, an as-built survey for the GCCS expansion, an as-built well schedule, well boring logs, photographic documentation of construction activities, gravel laboratory test results, the CQA engineer field monitoring reports, and the Florida Department of Environmental Protection (FDEP) Certification of Construction Completion of a Solid Waste Management Facility. An electronic copy of the report has been included on CD as well.

If there are any questions on any of the information presented herein, please feel free to call Mr. Mike Kaiser at (904) 673-0446 or the undersigned.

Sincerely,

GOLDER ASSOCIATES INC.

Veronica K. Figueroa, E.I.
Staff Engineer

Don E. Grigg, P.E.
Senior Project Engineer

Kevin S. Brown, P.E.
Senior Consultant and Associate

cc: Mr. Mike Kaiser - Waste Services, Inc.
Ms. Caroline Shine - FDEP Air Resources Management, Central District

Golder Associates Inc.
9428 Baymeadows Road, Suite 400
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Table of Contents

List of Tables

List of Appendices

1.0 INTRODUCTION

The J.E.D. Solid Waste Management Facility (JED Facility) is located southeast of St. Cloud, Florida, in Osceola County. The JED Facility is required under its Solid Waste Permits to Construct and Operate, SC49-0199726-004 and SO49-0199726-005, issued March 22, 2007 by the Florida Department of Environmental Protection (FDEP), to install a gas collection and control system (GCCS) at the facility. The GCCS must meet the design drawings and specifications provided in the vertical expansion permit application approved under permit modifications SC49-0199726-006 and SO49-0199726-007, issued on April 4, 2008 by FDEP. Additionally, the facility's Title V Air Permit, 0970079-007-AV, issued on May 23, 2010 by the FDEP, also requires installation of a GCCS meeting the requirements of 40 CFR 60, Subpart WWW Standards of Performance for Municipal Solid Waste Landfills (New Source Performance Standards [NSPS]). The JED Facility became subject to the GCCS requirements of Subpart WWW on December 23, 2008. The GCCS is required to be operational in all waste that is in place for two years or more for areas at final grade, and five years or more for areas at interim grade.

1.1 Background

Golder Associates Inc. (Golder) was retained by Omni Waste of Osceola County, LLC (Omni) to provide construction quality assurance (CQA) services during the construction of the GCCS Phase I, Sequence 3A expansion at the JED Facility. Initial GCCS installation at the facility (Sequence 1 and 2) included approximately 45 vertical gas extraction wells, one skid mounted flare system, and header and lateral piping in the Cells 1-4 disposal areas. Installation of Sequence 1 and 2 was completed in December 2008 and March 2009, respectively, and approved by the FDEP on June 22, 2009. Installation of Sequence 3A described herein fulfills the requirement to install a GCCS within the entire limits of Cells 1, 2 and 4 to meet the five year requirement of NSPS, Subpart WWW.

The main components of the Sequence 3A construction monitored by Golder were:

- Installation of 16 gas extraction wells (12 new wells and 3 replacement wells, and 1 test well)
- Installation of 2,831 feet (ft) of lateral gas conveyance pipe

This report includes a description of the project and the activities observed by Golder during the construction of the GCCS Sequence 3A expansion. Section 2 provides a summary of the changes in the design that were necessitated generally by field conditions. Descriptions of the construction activities and the CQA services provided by Golder are presented in Sections 3 and 4, respectively. Section 5 presents the CQA certification by a Florida registered professional engineer.

1.2 Project Description

Construction activities for the GCCS Phase I, Sequence 3A expansion were performed in accordance with the Phase I, Sequence 3A Construction Drawings and Phase I Technical Specifications prepared by Geosyntec and submitted to the FDEP on May 10, 2010. A copy of the drawings and specifications

are provided in Appendices A and B, respectively. As previously discussed, the project involved an expansion of the existing GCCS (Sequence 1 and 2), including the installation of 12 new 8-inch polyvinyl chloride (PVC) schedule (SCH) 80 gas extraction wells, 3 replacement 8-inch PVC SCH 80 gas extraction wells, 1 test 8-inch PVC SCH 80 gas extraction well, and the installation of approximately 2,831 ft of 6-inch high-density polyethylene (HDPE) standard dimension ratio (SDR) 17 lateral gas conveyance pipe.

All of the gas wells were installed in the area of the landfill with intermediate cover or within the active filling area. Lateral gas conveyance piping was generally installed below ground. However, lateral pipes to GW-15R and to GW-30 were temporarily installed above ground due to current waste filling grades; clean soil was used as necessary to maintain the minimum 5 percent slope for the aboveground laterals. The lateral gas conveyance piping connects the gas extraction wells to the main header system that directs gas to the existing flare system. Construction activities for the GCCS Phase I, Sequence 3A expansion commenced on July 7, 2010 and were completed on August 4, 2010.

1.3 Scope of Services

The services Golder provided included observation and documentation of the installation of the gas extraction wells, lateral gas conveyance piping, and tie-ins of the laterals to the existing GCCS. This report documents the CQA services provided during the observation of the above-listed components.

Golder conducted its services during this project in accordance with the following documents:

- Proposal titled “Proposal for Construction Quality Assurance Services Phase I Sequence 3A GCCS Expansion, J.E.D. Solid Waste Management Facility, Osceola, Florida,” prepared by Golder, dated June 29, 2010;
- Construction drawings titled “J.E.D. Solid Waste Management Facility, St. Cloud, Florida Gas Collection and Control System (GCCS) Phase I Disposal Area – Sequence 3A,” prepared by Geosyntec, dated April 2010, and provided in Appendix A of this report; and
- Specifications titled “ Technical Specifications, Gas Collection and Control System – Phase I Disposal Area, J.E.D. Solid Waste Management Facility” prepared by Geosyntec, dated April 18, 2008, and provided in Appendix B of this report.

Omni retained Peavey & Associates Surveying and Mapping, PA (Peavey & Associates) to fulfill all surveying needs, including development and certification of the as-built survey. As part of its services, Golder reviewed the as-built survey to check that the major components of the construction were shown.

2.0 SUMMARY OF CHANGES

The construction was conducted in general accordance with the Phase I, Sequence 3A Construction Drawings, prepared by Geosyntec, dated April 2010 (Appendix A), with some modifications. This section details the modifications to the construction drawings for this project, which were primarily necessitated by field conditions encountered at the time of construction. These modifications did not alter the performance or design intent of the system.

2.1 Extraction Well Locations

Extraction well GW-21 was relocated approximately 50 ft south of the proposed well location described in Table 1 of the construction drawings because saturated subsurface conditions were encountered during drilling activities that prevented advancement of the borehole beyond the depth noted. A total of two boreholes were drilled for extraction well GW-21, with one of them requiring abandonment because of insufficient bore depth. Extraction well GW-51 was relocated approximately 40 ft northwest of the proposed well location described in Table 1 of the construction drawings because saturated subsurface conditions were encountered during drilling activities that prevented advancement of the borehole beyond the depth noted. A total of three boreholes were drilled for extraction well GW-51, with two of them requiring abandonment because of insufficient bore depths. The boreholes abandoned during drilling of the above noted wells was performed by backfilling the borehole with clean soil, compacting the soils at ground surface, placing additional clean soil on top of the abandoned borehole location to form a soil mound, and visibly inspecting the location on a daily basis.

Extraction wells GW-4, GW-15, and GW-40 were redrilled in close proximity to their existing locations (within 10-15 feet) as shown in the as-built survey provided in Appendix C. These wells were redrilled due to damage that occurred during extension of the wells during waste fill activities. Although the wells were producing landfill gas, the wells had been compromised to a degree that warranted redrilliing based on Omni's opinion. After completion of the installation of redrilled extraction wells GW-4R, GW-15R, and GW-40R, the compromised extraction wells were abandoned by excavating to a depth of approximately 4 feet below ground surface (ft-bgs) around the pipe, cutting approximately 4 ft of pipe below ground surface, capping the top of the pipe with an 8-inch PVC cap, lag bolting the cap to the well casing, and backfilling the excavation with clean surrounding materials.

Extraction wells GW-30, GW-35, and GW-36 were relocated in the field by an approximate 15-ft radius because of current waste filling grades. The as-built well schedule presented in Appendix D provides the northing and easting for the relocated wells. Well boring logs for all installed extraction wells are presented in Appendix E.

2.2 Extraction Well Construction

Because of current waste filling grades, extraction well GW-36 was installed as a downslope extraction well. The location of the remote well head for GW-36 is shown on the as-built survey provided in Appendix C. An 8-inch PVC tee was installed approximately 4 ft-bgs at the well casing as shown in Appendix F.

Appendix G documents the laboratory test results of the aggregate backfill placed at the annulus of the borehole around the slotted pipe of the gas extraction wells. A gravel sample was tested for graduation and showed the gravel sample to have rock sizes slightly greater than American Association of State Highway and Transportation Officials (AASHTO) No. 57 stone which is specified in the construction drawings; Omni accepted the larger size aggregate backfill. The carbonate content of the gravel sample was 0.1% which meets construction specifications.

2.3 Lateral Gas Conveyance Pipes

The layout of the lateral gas conveyance pipes to GW-51 and to GW-36 was modified in the field from the original design (Appendix A) due to current waste filling grades. A minimum of 5% slope was maintained on piping installed during the GCCS Phase I, Sequence 3A expansion. The as-built drawings provided in Appendix C show the lateral gas conveyance pipes as constructed.

At the July 7, 2010 pre-construction meeting, Omni directed that the lateral gas conveyance pipes need not be pressure tested since the lateral lines were short in length. Omni did request that all mechanical fittings be soap tested prior to being backfilled. All mechanical fittings were soap tested with a concentrated soap and water mixture. All mechanical fittings installed during the Phase 1, Sequence 3A GCCS expansion passed the soap test and no leaks were detected.

2.4 Extraction Well Depths

The design depths of the wells were based upon preconstruction survey elevations obtained by JED FACILITY and the bottom liner system elevations provided by Geosyntec. The extraction well design depth criteria utilized a safety factor of 15 feet from the top of protective cover. The as-built well schedule is provided in Appendix D. The following table summarizes the differences in design versus as-built well depths. As noted in Table 1, saturated subsurface conditions were encountered which prevented drilling depth advancement using the bucket auger for a number of extraction wells. Note that a bottom fixture was added to the bucket auger to assist in removing drill cuttings in an attempt to achieve drilling depth advancement of an affected borehole. Generally, this did not improve the ability to advance the boreholes beyond the saturated conditions. The saturated material appeared to consist of auto shredder material, soil, sludges and other non-MSW wastes.

TABLE 1
EXTRACTION WELL DESIGN DEPTH TO ACTUAL DEPTH COMPARISON

Well ID	Design Well Depth (ft-bgs)	Actual Well Depth (ft-bgs)	Difference Between Design and Actual Well Depth (ft)
GW-45	121	80	41
GW-50	121	77	44
GW-51 Location #3[a]	113	65	48
GW-40R	117	80	37
GW-4R	117	110	7
GW-18	120	100	20
GW-21 Location #2[b]	115	80	35
GW-27	124	75	49
GW-15R	116	80	36
GW-54	108	75	33
GW-33	65	65	0
GW-36	47	47	0
GW-35	54	54	0
GW-30	85	85	0
GW-60A	75	75	0
GW-63	27	28	(1)

[a] GW-51 Location #1 and #2 were abandoned at depths 58 and 82 ft-bgs, respectively.
[b] GW-21 Location #1 was abandoned at depth 70 ft-bgs.

3.0 CONSTRUCTION ACTIVITIES

3.1 Project Participants

The parties involved in the construction of the GCCS Phase I, Sequence 3A expansion included:

- Omni, as the owner
- Geosyntec, as the design engineers
- Golder, as the CQA Engineer
- Shaw Environmental, Inc. (Shaw), as construction contractor
- Peavey & Associates, as the surveyor

The FDEP approved construction of the GCCS in the Phase 1 through 3 disposal areas via issuance of site's construction and operation permits SC49-0199726-004 and SO49-0199726-005. Subsequently, Omni submitted GCCS Phase 1, Sequence 1-3 drawings and specifications to the FDEP for review and approval. Approval was provided by the FDEP in an e-mail correspondence date May 20, 2008. This report covers half of the Sequence 3 expansion since the sequence has been divided into two sub-sequences (3A and 3B) because of current waste filling operations.

3.2 Gas Extraction Well Installation

Shaw performed the drilling and installation of 16 gas extraction wells during the GCCS Phase I, Sequence 3A expansion. The installation of the gas wells commenced on July 7, 2010 and was completed on July 24, 2010. The drill rig utilized was an IMT AF-120 with a 3-ft-diameter bucket auger. Shaw used an air-monitoring device during all drilling activities to monitor for potentially hazardous conditions created by landfill gas. Peavey & Associates surveyed the locations of the completed gas wells; the certified as-built survey is provided in Appendix C.

Gas extraction well installation depths were field-adjusted to the existing ground elevation of the landfill based on the ground surface survey conducted prior to drilling. Wells were drilled to a maximum depth of at least 15 feet above the top of protective cover of the base liner system. Waste material excavated during drilling was hauled to the active working face of the landfill for disposal. The wells were constructed using 8-inch SCH 80 PVC slotted and solid pipe. The as-built well schedule, found in Appendix D, provides the well depths along with the screen and solid pipe lengths. The well pipes were bell and spigot type, and each joint was glued and four lag bolts installed to provide additional support at each joint.

The procedure used for the installation of the extraction wells is summarized below:

- Backfill borehole to approximately 1 ft above top of slotted pipe with approved stone;
- Place geocomposite ring (georing) above stone backfill;
- Install 2-ft-thick granular hydrated bentonite plug #1;

- Above bentonite plug #1, backfill borehole with clean cover soil to within approximately 3 ft of existing ground surface;
- Install 2-ft-thick granular hydrated bentonite plug #2;
- Backfill remaining borehole with clean cover soil;
- Place a 6-ft by 6-ft hydrated geosynthetic clay liner (GCL) sheet over cover soil at ground surface; and
- Place clean cover soil over hydrated GCL sheet and slope at the surface to promote surface water runoff.

Some of the extraction wells had well casings installed approximately 15 ft above ground surface in anticipation of future waste filling grades; these wells received a larger amount of clean cover soil, which made mounds suitable for easy access to the wellhead for monitoring and wellhead tuning. Appendix E includes well boring logs that show the well construction details, including the materials placed in the borehole annulus. As construction of the lateral pipe system progressed, wellheads were installed and connected to laterals. Appendix F provides photographs of the drilling of the extraction wells, the installation of the extraction wells, the installation of laterals to provide a vacuum source to the extraction wells, and the installation of the wellheads at the extraction wells.

3.3 Lateral Gas Conveyance Pipe Installation

Shaw performed the installation of the lateral gas conveyance piping associated with GCCS Phase I, Sequence 3A expansion. Pipe installation commenced on July 8, 2010 and was completed on August 4, 2010. Two excavators (Kobelco 135 SF LC and Kobelco 210 LC) were utilized for trench excavation for the lateral gas conveyance pipe installation. The lateral gas conveyance piping was installed at a minimum 5 percent slope using a slope construction laser.

At the completion of the trench grading, 6 inches of clean pipe bedding material (soil) was placed. The 6-inch HDPE SDR 17 pipe was then placed in the trench and covered with clean fill. Excavated material was disposed of at the active working face. A 12-inch HDPE SDR 17 pipe was used at the road crossing of the lateral from GW-53 to GW-54, as shown in the as-built survey provided in Appendix C.

4.0 CONSTRUCTION MONITORING

Construction monitoring was documented by the CQA engineer in daily field monitoring reports, as provided in Appendix H. The field monitoring reports document the overall construction activities and the specific issues encountered during construction on a day-to-day basis.

4.1 Technical Specifications

The construction of the GCCS Phase I, Sequence 3A expansion was performed in general accordance with the technical specifications prepared by Geosyntec and provided in Appendix B. Materials utilized in the Phase I, Sequence 3A GCCS construction were reviewed for compliance with the requirements of the technical specifications.

4.2 Gas Extraction Well Installation

Golder monitored the drilling and the well construction of all gas extraction wells. Logs showing the installation details for each well are included in Appendix E, and a summary of the well construction details is found in the as-built well schedule included in Appendix D.

4.3 Lateral Gas Conveyance Pipe Installation

Golder monitored the welding and the installation of the lateral pipes during the GCCS Phase I, Sequence 3A expansion. The CQA engineer watched pipe welding to ensure that the interior of the pipe was generally clean, that pipe shavings from the cutting process were removed, and that the manufacturer's recommended iron temperature and gauge pressure were followed. As agreed upon during the pre-construction meeting on July 7, 2010, all mechanical fittings were soap tested. A number of soap tests were performed during the construction of the GCCS Phase I, Sequence 3A expansion, and were passed with no signs of landfill gas leakage. Per standard practice and the construction specifications, all below grade bolts and flanges were protected by covering with a polyethylene wrap and duct taped to HDPE pipe

5.0 SUMMARY AND CERTIFICATION

Omni retained Golder to provide CQA services during the installation of the GCCS Phase I, Sequence 3A expansion at JED Facility. These services included the quality assurance monitoring, documentation, and/or testing of the items listed below:

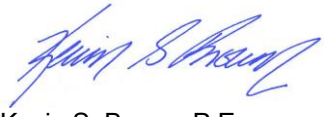
- Installation of 16 gas extraction wells (12 new wells, 3 replacement wells, and 1 test well)
- Installation of 2,831 ft of lateral gas conveyance pipe

Based on the field observations, submittal information from the contractor, field testing results, and the data presented herein, it is Golder's professional opinion that the GCCS Phase I, Sequence 3A expansion at JED Facility was installed in substantial conformance with the FDEP-approved construction drawings and technical specifications as referenced herein. Modifications and deviations from the technical specifications are discussed in Section 2. These modifications did not alter the performance and design intent of the GCCS. Attachment I provides the signed and sealed FDEP Certification of Construction Completion of a Solid Waste Management Facility form, 62-701.900(2).

GOLDER ASSOCIATES INC.

Veronica K. Figueroa, E.I.
Staff Engineer

Don E. Grigg, P.E.
Senior Project Engineer



Kevin S. Brown, P.E.
Florida Professional Engineer No. 57819

September 30, 2010
Date

FN: G:\Projects\083\083-82\083-82734\083-82734.13\200_Draft_Reports\Submission Folder\R-08382734 13_Cert_Report.docx

APPENDIX A

CONSTRUCTION DRAWINGS

File Copy

RECEIVED
MAY 20 2010
DEP Central Dist.

WSI Waste Services, Inc.

1501 Omni Way, St. Cloud, FL 34773

May 10, 2010

Mr. F. Thomas Lubozynski, P.E.
Waste Program Administrator
Florida Department of Environmental Protection, Central District
3319 Maguire Boulevard, Suite 232
Orlando, Florida 32803-3767

Re: Construction Drawings, Landfill Gas Collection and Control System - Sequence 3A, Phase 1 Disposal Area
JED Solid Waste Management Facility
Osceola County, Florida
Permit Nos. SC-0197726-004 and S049-0199726-005

Dear Mr. Lubozynski:

Omni Waste of Osceola County, LLC (Omni) is submitting the enclosed construction drawings for installation of the Gas Collection and Control System (GCCS), Sequence 3A, for the JED Solid Waste Management Facility. The landfill gas wells and lateral piping shown on the drawings consist of remaining wells and piping required in Cells 1, 2 & 4 and two additional wells in the sideslope area of Cell 3. The layout of the wells and piping for this Sequence 3A are consistent with the design drawings submitted for the Phase 1 area, which were approved by the Florida Department of Environmental Protection, Central District, on May 20, 2008.

Please note the Phase 1 design submitted in 2008 only included a Sequence 3 series of landfill gas wells and lateral piping. Due to filling progress, the Sequence 3 system has been divided into two subsequences (3A and 3B). Installation of Sequence 3A is planned for June of this year and Sequence 3B for this fall or early spring of 2011. Both schedules meet the five-year/two-year criteria of the New Source Performance Standards §60.752(b)(2)(ii)(A)(2)(i)&(ii).

If you have any questions or require any additional information, please contact me at (904) 673-0446 or mkaiser@wsii.us at your earliest convenience.

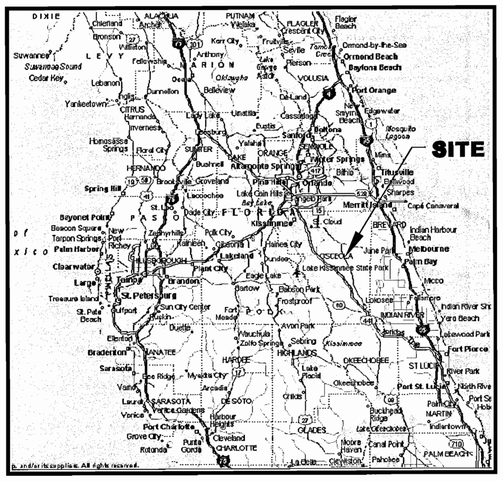
Sincerely,

Mike Kaiser

Mike Kaiser
V.P., Environmental Management and Engineering, US

Attachments
1-Copy Drawings

Cc: Ms. Caroline Shine, FDEP Air Resources Management – Central District (1 Copy Drawing Set)



FILE COPY

WSI
Waste Services, Inc.

J.E.D. SOLID WASTE MANAGEMENT FACILITY

ST.CLOUD, FLORIDA

GAS COLLECTION AND CONTROL SYSTEM (GCCS)
PHASE I DISPOSAL AREA

APRIL 2010

LOCATION MAP

0 32
SCALE: 1" = 32 MILES

LIST OF DRAWINGS	
DRAWING NO.	DRAWING TITLE
1	TITLE SHEET
2	TOPOGRAPHY MAP
3	PLAN LAYOUT OF GCCS IN PHASE 1
4	PLAN LAYOUT OF GCCS IN PHASE 1 (SEQUENCE 3A)
5	CONTROL POINTS
6	GAS EXTRACTION WELLS DETAILS
7	GCCS DETAILS I
8	GCCS DETAILS II

VICINITY MAP

0 4
SCALE: 1" = 4 MILES

RECEIVED
MAY 20 2010
DEP Central Dist.

DETAIL REFERENCE KEY

DETAIL BAR REFERENCE KEY

EXAMPLE: DETAIL 1 WHICH IS PRESENTED ON SHEET 5 WAS FIRST REFERENCED ON SHEET 3.

SECTION REFERENCE KEY

SECTION BAR REFERENCE KEY

EXAMPLE: SECTION A WHICH IS PRESENTED ON SHEET 8 WAS FIRST REFERENCED ON SHEET 8.

CONSTRUCTION DRAWINGS

REV	DATE	DESCRIPTION	DRN	APP

Geosyntec consultants
1200 RIVERPLACE BOULEVARD, SUITE 710
JACKSONVILLE, FLORIDA 32207 USA
PHONE: 904.858.1818 – FAX: 904.396.1143
AUTHORIZATION CERTIFICATE NO. 4321

WSI Waste Services, Inc.
1501 OMNI WAY
ST. CLOUD, FLORIDA 34773
TEL: 407-891-3720 FAX: 407-891-3730

TITLE: TITLE SHEET

PROJECT: GAS COLLECTION AND CONTROL SYSTEM (GCCS)
PHASE I DISPOSAL AREA – SEQUENCE 3A

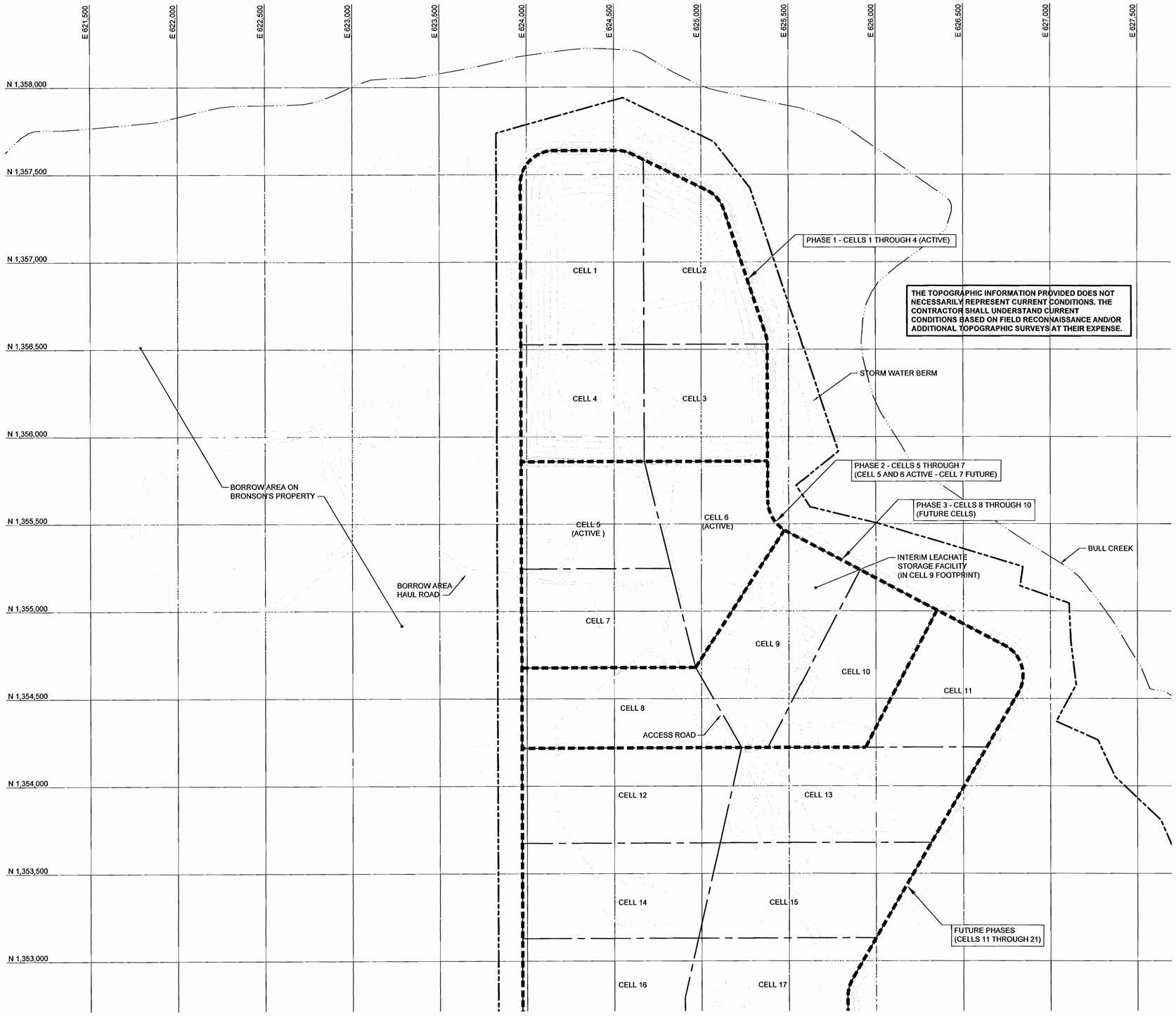
SITE: J.E.D. SOLID WASTE MANAGEMENT FACILITY

THIS DRAWING MAY NOT BE ISSUED FOR PROJECT TENDER OR CONSTRUCTION, UNLESS SEALED.

SIGNATURE
4/28/10
DATE

No. 42460
KWASI BADU-TWENEBOAH
LICENSE NO. 42460

DESIGN BY:	WT	DATE:	April 2010
DRAWN BY:	JJA	PROJECT NO.:	FL1832.01
CHECKED BY:	WT	FILE:	FL1452.03P010
REVIEWED BY:	KBT	DRAWING NO.:	1 OF 8
APPROVED BY:	KBT		



NORTH

0 300' 600'

SCALE IN FEET

LEGEND

- PROPERTY BOUNDARY
- APPROXIMATE LOCATION OF INTERMITTENT STREAM
- EXISTING GROUND ELEVATION (FEET) (SEE NOTE 4)
- EXISTING FENCE LINE
- 313 EXISTING TOPOGRAPHY SPOT ELEVATION (FEET)
- TREE LINE
- PHASE BOUNDARY
- CELL BOUNDARY

NOTES:

1. NORTHING AND EASTING COORDINATES SHOWN REPRESENT FLORIDA STATE PLANE EAST ZONE NORTH AMERICAN DATUM OF 1983 (NAD83).
2. THE ELEVATIONS SHOWN REPRESENT NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD29)(FEET).
3. THE PROPERTY BOUNDARY BASED ON A COMPOSITE BOUNDARY SURVEY PROVIDED BY JOHNSTON SURVEYING INC., KISSIMMEE FLORIDA, DATED AUGUST 12, 1999.
4. THE TOPOGRAPHIC INFORMATION SHOWN ON THIS DRAWING WAS PROVIDED BY BASE MAPPING, INC. BASED ON AN AERIAL PHOTOGRAPH TAKEN ON 17 MAY 2007.
5. THE TOPOGRAPHIC INFORMATION PROVIDED DOES NOT NECESSARILY REPRESENT CURRENT CONDITIONS. THE CONTRACTOR SHALL UNDERSTAND CURRENT CONDITIONS BASED ON FIELD RECONNAISSANCE AND/OR ADDITIONAL TOPOGRAPHIC SURVEYS AT THEIR EXPENSE.

REV	DATE	DESCRIPTION	DRN	APP

Geosyntec consultants
1200 RIVERPLACE BOULEVARD, SUITE 710
JACKSONVILLE, FLORIDA 32207 USA
PHONE: 904.858.1818 – FAX: 904.398.1143
AUTHORIZATION CERTIFICATE NO. 4321

WSI Waste Services, Inc.
1501 OMNI WAY
ST. CLOUD, FLORIDA 34773
TEL: 407-891-3720 FAX: 407-891-3730

TITLE: TOPOGRAPHY MAP

PROJECT: GAS COLLECTION AND CONTROL SYSTEM (GCCS) PHASE I DISPOSAL AREA – SEQUENCE 3A

SITE: J.E.D. SOLID WASTE MANAGEMENT FACILITY

THIS DRAWING MAY NOT BE ISSUED FOR PROJECT TENDER OR CONSTRUCTION, UNLESS SEALED.

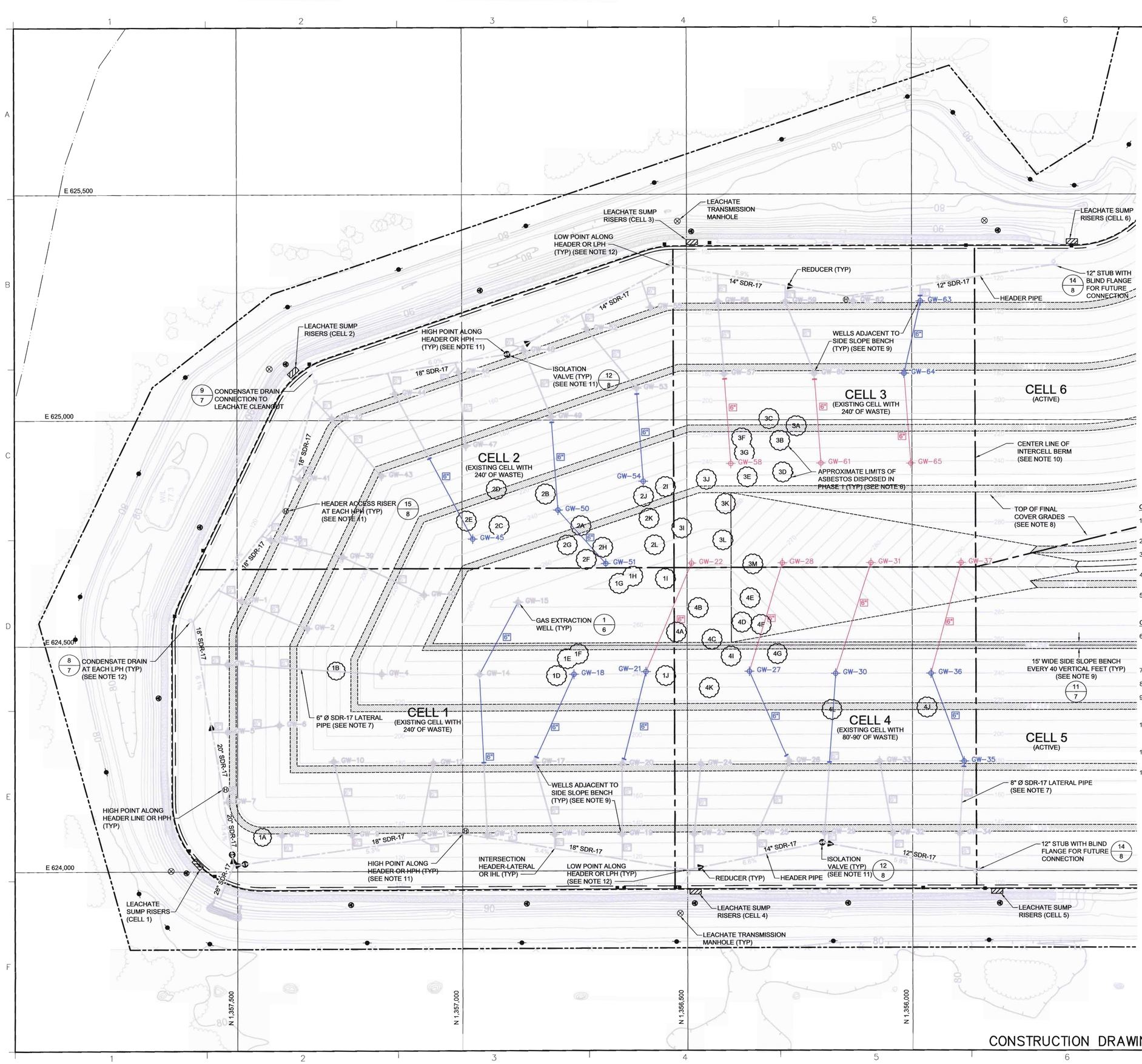
SIGNATURE

4/29/10
DATE

KWASI BADU-TWENEBOAH
LICENSE NO. 42460

DESIGN BY:	WT	DATE:	April 2010
DRAWN BY:	JJA	PROJECT NO.:	FL1832.01
CHECKED BY:	WT	FILE:	FL1452.03P020
REVIEWED BY:	KBT	DRAWING NO.:	2 OF 8
APPROVED BY:	KBT		

CONSTRUCTION DRAWINGS



GENERAL NOTES:

1. NORTHING AND EASTING COORDINATES SHOWN REPRESENT FLORIDA STATE PLANE EAST ZONE NORTH AMERICAN DATUM OF 1983 (NAD83)
2. THE ELEVATIONS SHOWN REPRESENT NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD29)(FEET).
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5. THE TOPOGRAPHIC INFORMATION PROVIDED DOES NOT NECESSARILY REPRESENT CURRENT CONDITIONS. THE CONTRACTOR SHALL UNDERSTAND CURRENT CONDITIONS BASED ON FIELD RECONNAISSANCE AND/OR ADDITIONAL TOPOGRAPHIC SURVEYS AT THEIR EXPENSE.

GCCS NOTES:

6. APPROXIMATE LIMITS OF ASBESTOS SHOWN WERE BASED ON GRID AND GPS TRACKING BY SITE OPERATIONS. THE LIMITS OF ASBESTOS WERE ASSUMED TO BE WITHIN 20-FT RADIUS OF THE COORDINATES PROVIDED BY WSI. CONTRACTOR SHALL MARK THE INDICATED AREAS IN FIELD TO PREVENT INSTALLATION OF GAS EXTRACTION WELLS IN AREAS WHERE ASBESTOS WAS DISPOSED.
7. LATERAL PIPES SHALL BE 6" OR 8" DIA. SDR-17 HDPE PIPES AS SHOWN ON THIS SHEET.
8. GRADES INDICATED ON THIS SHEET WITHIN THE LANDFILL ARE TOP OF FINAL COVER SYSTEM GRADES.
9. A 15-FT WIDE BENCH WILL BE PROVIDED ON THE SIDE SLOPE OF THE LANDFILL EVERY 40 VERTICAL FEET. GAS EXTRACTION WELLS ADJACENT TO THESE BENCHES SHALL BE OFFSET FROM THE EDGE OF THE BENCH AS INDICATED IN DETAIL 11.
10. THE BOTTOM LINER SYSTEM IS AT A RELATIVELY HIGHER ELEVATION ADJACENT TO THE INTERCELL BERMS. CONTRACTOR SHALL PROVIDE ADDITIONAL ATTENTION DURING INSTALLATION OF GAS EXTRACTION WELLS ADJACENT TO THE INTERCELL BERMS.
11. A HEADER ACCESS RISER SHALL BE PROVIDED AT EACH HIGH POINT ALONG HEADER (I.E., AT EACH HPH) AS NOTED ON SHEET 8, WITH THE EXCEPTION OF HIGH POINTS THAT HAVE AN ISOLATION VALVE.
12. A CONDENSATE DRAIN SHALL BE PROVIDED AT EACH LOW POINT ALONG HEADER (I.E., AT EACH LPH) EXCEPT AT LPH-3 AS NOTED ON SHEET 7. SEE SHEET 5 FOR LOCATION OF LPH-3.

REV	DATE	DESCRIPTION	DRN	APP

Geosyntec consultants
1200 RIVERPLACE BOULEVARD, SUITE 710
JACKSONVILLE, FLORIDA 32207 USA
PHONE: 904.858.1818 – FAX: 904.396.1143
AUTHORIZATION CERTIFICATE NO. 4321

WSI Waste Services, Inc.
1501 OMNI WAY
ST. CLOUD, FLORIDA 34773
TEL: 407-891-3720 FAX: 407-891-3730

TITLE: PLAN LAYOUT OF GCCS IN PHASE 1

PROJECT: GAS COLLECTION AND CONTROL SYSTEM (GCCS) PHASE I DISPOSAL AREA – SEQUENCE 3A

SITE: J.E.D. SOLID WASTE MANAGEMENT FACILITY

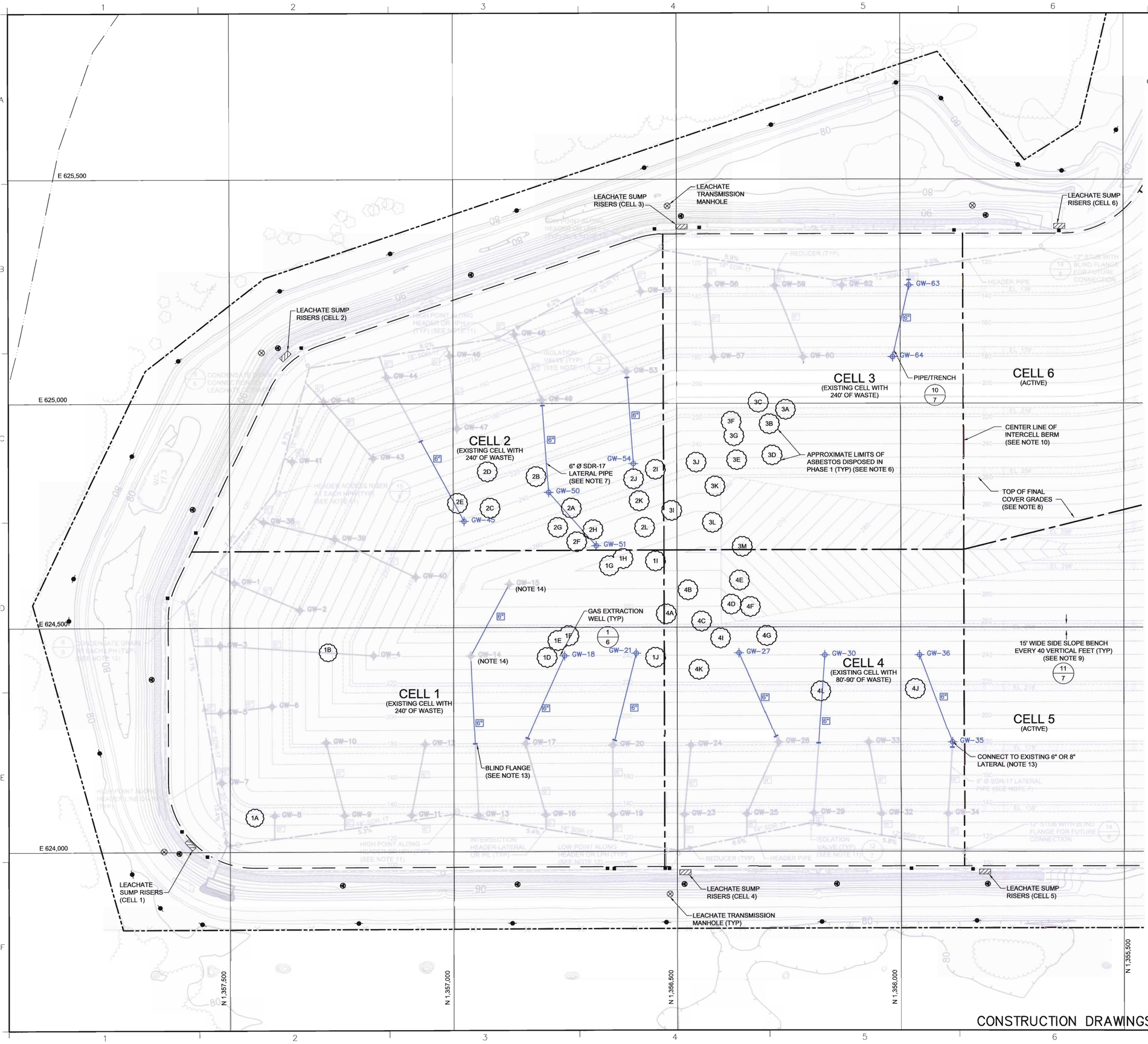
THIS DRAWING MAY NOT BE ISSUED FOR PROJECT TENDER OR CONSTRUCTION, UNLESS SEALED.

SIGNATURE

DATE

KWASI BADU-TWENEBOAH
LICENSE NO. 42460

DESIGN BY:	WT	DATE:	April 2010
DRAWN BY:	JJA	PROJECT NO.:	FL1832.01
CHECKED BY:	WT	FILE:	FL1452.03P030
REVIEWED BY:	KBT	DRAWING NO.:	3 OF 8
APPROVED BY:	KBT		



NORTH

0 100' 200'
SCALE IN FEET

LEGEND

- PROPERTY BOUNDARY
- APPROXIMATE LOCATION OF INTERMITTENT STREAM
- EXISTING GROUND ELEVATION (FEET) (SEE NOTE 4)
- EXISTING FENCE LINE
- TREE LINE
- GW-10 GAS EXTRACTION WELL IN CELLS 1 THRU 4 (TYP)
- GROUNDWATER MONITORING WELL CLUSTER
- LEACHATE TRANSMISSION MANHOLE
- LEACHATE SUMP RISERS
- LEACHATE CLEANOUT
- EXISTING ELECTRIC POLES
- APPROXIMATE LIMITS OF ASBESTOS (SEE NOTE 6)
- REDUCER
- ISOLATION VALVE
- CONDENSATE DRAIN (SEE NOTE 12)
- CONDENSATE TRANSFER LINE
- LATERAL PIPE (SEE NOTE 7)
- HEADER PIPE
- INSIDE EDGE OF BOTTOM LINER AT ELEVATION 96'
- CENTER LINE OF INTERCELL BERM (SEE NOTE 10)
- HEADER ACCESS RISER (SEE NOTE 11)
- LATERAL PIPE SIZE
- SCREEN = EXISTING
- BLUE = TO BE CONSTRUCTED IN SEQUENCE 3A (CURRENT SEQUENCE)
- RED = TO BE CONSTRUCTED IN FUTURE SEQUENCE

GENERAL NOTES:

1. NORTHING AND EASTING COORDINATES SHOWN REPRESENT FLORIDA STATE PLANE EAST ZONE NORTH AMERICAN DATUM OF 1983 (NAD83)
2. THE ELEVATIONS SHOWN REPRESENT NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD29)(FEET).
3. THE PROPERTY BOUNDARY BASED ON A COMPOSITE BOUNDARY SURVEY PROVIDED BY JOHNSTON SURVEYING INC., KISSIMMEE FLORIDA, DATED AUGUST 12, 1999.
4. THE TOPOGRAPHIC INFORMATION SHOWN ON THIS DRAWING WAS PROVIDED BY BASE MAPPING, INC. BASED ON AN AERIAL PHOTOGRAPH TAKEN ON 17 MAY 2007.
5. THE TOPOGRAPHIC INFORMATION PROVIDED DOES NOT NECESSARILY REPRESENT CURRENT CONDITIONS. THE CONTRACTOR SHALL UNDERSTAND CURRENT CONDITIONS BASED ON FIELD RECONNAISSANCE AND/OR ADDITIONAL TOPOGRAPHIC SURVEYS AT THEIR EXPENSE.

GCCS NOTES:

6. APPROXIMATE LIMITS OF ASBESTOS SHOWN WERE BASED ON GRID AND GPS TRACKING BY SITE OPERATIONS. THE LIMITS OF ASBESTOS WERE ASSUMED TO BE WITHIN 20-FT RADIUS OF THE COORDINATES PROVIDED BY WSI. CONTRACTOR SHALL MARK THE INDICATED AREAS IN FIELD TO PREVENT INSTALLATION OF GAS EXTRACTION WELLS IN AREAS WHERE ASBESTOS WAS DISPOSED.
7. LATERAL PIPES SHALL BE 4", 6" OR 8" DIA. SDR-17 HDPE PIPES AS SHOWN ON THIS SHEET.
8. GRADES INDICATED ON THIS SHEET WITHIN THE LANDFILL ARE TOP OF FINAL COVER SYSTEM GRADES.
9. A 15-FT WIDE BENCH WILL BE PROVIDED ON THE SIDE SLOPE OF THE LANDFILL EVERY 40 VERTICAL FEET. GAS EXTRACTION WELLS ADJACENT TO THESE BENCHES SHALL BE OFFSET FROM THE EDGE OF THE BENCH AS INDICATED IN DETAIL 11.
10. THE BOTTOM LINER SYSTEM IS AT A RELATIVELY HIGHER ELEVATION ADJACENT TO THE INTERCELL BERMS. CONTRACTOR SHALL PROVIDE ADDITIONAL ATTENTION DURING INSTALLATION OF GAS EXTRACTION WELLS ADJACENT TO THE INTERCELL BERMS.
11. A HEADER ACCESS RISER SHALL BE PROVIDED AT EACH HIGH POINT ALONG HEADER (I.E., AT EACH HPH) AS NOTED ON SHEET 8, WITH THE EXCEPTION OF HIGH POINTS THAT HAVE AN ISOLATION VALVE.
12. A CONDENSATE DRAIN SHALL BE PROVIDED AT EACH LOW POINT ALONG HEADER (I.E., AT EACH LPH) EXCEPT AT LPH-3 AS NOTED ON SHEET 7. SEE SHEET 4 FOR LOCATION OF LPH-3.
13. LOCATIONS OF EXISTING GCCS COMPONENTS ARE BASED ON CONSTRUCTION DRAWINGS FOR PREVIOUS CONSTRUCTION SEQUENCES. AS-BUILT LOCATIONS FOR EXISTING COMPONENTS, SUCH AS TIE-IN LOCATIONS FOR EXISTING LATERALS SHALL BE PROVIDED TO THE CONTRACTOR BY THE OWNER AS NEEDED.
14. GW-14 AND GW-15 WERE INSTALLED PREVIOUSLY. THESE WELLS NEED TO BE CONNECTED VIA LATERALS PIPES AS SHOWN.

REV	DATE	DESCRIPTION	DRN	APP

Geosyntec consultants
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JACKSONVILLE, FLORIDA 32207 USA
PHONE: 904.858.1818 – FAX: 904.398.1143
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WSI Waste Services, Inc.
1501 OMNI WAY
ST. CLOUD, FLORIDA 34773
TEL: 407-891-3720 FAX: 407-891-3730

TITLE: PLAN LAYOUT OF GCCS IN PHASE 1 (SEQUENCE 3A)

PROJECT: GAS COLLECTION AND CONTROL SYSTEM (GCCS) PHASE I DISPOSAL AREA – SEQUENCE 3A

SITE: J.E.D. SOLID WASTE MANAGEMENT FACILITY

THIS DRAWING MAY NOT BE ISSUED FOR PROJECT TENDER OR CONSTRUCTION, UNLESS SEALED.

SIGNATURE

DATE

KWASI BADU-TWENEBOAH
LICENSE NO. 42460

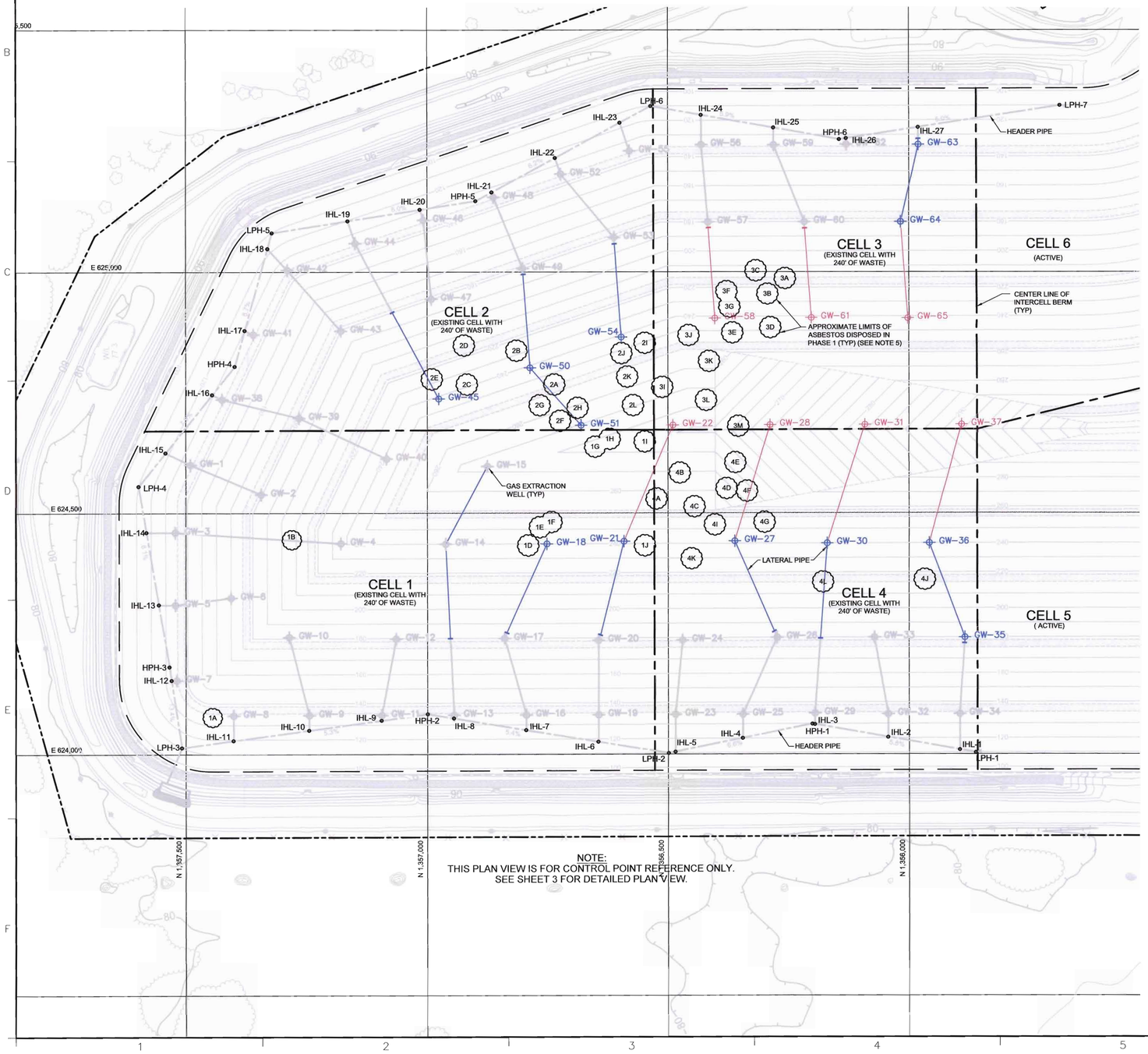
DESIGN BY:	WT	DATE:	April 2010
DRAWN BY:	JJA	PROJECT NO.:	FL1832.01
CHECKED BY:	WT	FILE:	FL1452.03P0300
REVIEWED BY:	KBT	DRAWING NO.:	4 OF 8
APPROVED BY:	KBT		

LEGEND

- PROPERTY BOUNDARY
- APPROXIMATE LOCATION OF INTERMITTENT STREAM
- 80 EXISTING GROUND ELEVATION (FEET) (SEE NOTE 2)
- X EXISTING FENCE LINE
- TREE LINE
- LATERAL PIPE
- HEADER PIPE
- INSIDE EDGE OF BOTTOM LINER AT ELEVATION 96'
- SCREEN = EXISTING
- BLUE = TO BE CONSTRUCTED IN SEQUENCE 3A (CURRENT SEQUENCE)
- RED = TO BE CONSTRUCTED IN FUTURE SEQUENCE

NORTH

0 120' 240'
SCALE IN FEET



NOTE:
THIS PLAN VIEW IS FOR CONTROL POINT REFERENCE ONLY.
SEE SHEET 3 FOR DETAILED PLAN VIEW.

TABLE 1
GAS EXTRACTION WELLS (NOTES 3 AND 4)

GAS WELL	NORTHING	EASTING	TOP OF FINAL COVER ELEVATION	TOP OF LINER PROTECTIVE LAYER ELEVATION	BOTTOM OF GAS WELL ELEVATION	TOTAL WELL DEPTH	SCREEN LENGTH (SLOTTED PIPE)
GW-01	1,357,490.54	624,600.24	136.63	86.86	101.86	34.77	19.77
GW-02	1,357,344.14	624,538.95	179.46	89.39	104.39	75.07	55.07
GW-03	1,357,522.31	624,460.19	136.59	85.54	100.54	36.05	21.05
GW-04	1,357,179.60	624,437.67	235.82	92.07	107.07	128.75	108.75
GW-05	1,357,522.06	624,310.19	136.67	84.80	99.80	36.87	21.87
GW-06	1,357,406.86	624,324.81	170.07	87.10	102.10	67.97	47.97
GW-07	1,357,519.47	624,153.88	137.42	84.03	99.03	38.39	23.39
GW-08	1,357,401.60	624,080.39	136.56	84.25	99.25	37.31	22.31
GW-09	1,357,245.24	624,080.98	136.67	85.03	100.03	36.64	21.64
GW-10	1,357,286.56	624,243.93	181.01	87.99	102.99	78.02	58.02
GW-11	1,357,095.20	624,081.22	136.67	85.78	100.78	35.89	20.89
GW-12	1,357,065.11	624,240.18	179.64	89.01	104.01	75.63	55.63
GW-13	1,356,945.21	624,081.49	136.67	86.53	101.53	35.14	20.14
GW-14	1,356,962.05	624,436.45	240.00	93.33	108.33	131.67	111.67
GW-15	1,356,875.68	624,596.77	262.56	96.86	111.86	150.70	130.70
GW-16	1,356,795.21	624,081.74	136.67	87.28	102.28	34.39	19.39
GW-17	1,356,840.24	624,241.23	179.86	90.15	105.15	74.71	54.71
GW-18	1,356,752.05	624,436.79	239.99	94.38	109.38	130.62	110.62
GW-19	1,356,645.21	624,082.00	136.67	88.03	103.03	33.64	18.64
GW-20	1,356,645.16	624,237.19	178.40	91.04	106.04	72.36	52.36
GW-21	1,356,592.06	624,442.14	241.69	95.28	110.28	131.41	111.41
GW-22	1,356,490.09	624,682.33	265.12	102.38	117.38	147.74	127.74
GW-23	1,356,485.25	624,082.25	136.66	84.00	99.00	37.66	22.66
GW-24	1,356,470.65	624,237.19	178.30	86.10	101.10	77.20	57.20
GW-25	1,356,345.25	624,082.50	136.67	85.43	100.43	36.24	21.24
GW-26	1,356,274.31	624,242.63	180.00	88.77	103.77	76.23	56.23
GW-27	1,356,362.06	624,442.48	241.67	90.62	105.62	136.05	116.05
GW-28	1,356,288.60	624,682.67	271.49	102.63	117.63	153.86	133.86
GW-29	1,356,195.85	624,084.63	137.29	87.44	102.44	34.85	19.85
GW-30	1,356,170.37	624,437.80	240.00	93.38	108.08	131.92	111.92
GW-31	1,356,091.80	624,683.01	281.33	102.83	117.83	163.50	143.50
GW-32	1,356,043.78	624,083.03	136.67	89.42	104.42	32.25	17.25
GW-33	1,356,072.57	624,242.98	180.00	91.44	106.44	73.56	53.56
GW-34	1,355,895.25	624,083.28	136.67	91.58	106.58	30.09	15.09
GW-35	1,355,885.07	624,243.04	179.92	93.92	108.92	71.00	51.00
GW-36	1,355,958.71	624,438.16	240.00	95.88	110.88	129.12	109.21
GW-37	1,355,891.59	624,683.35	291.34	103.03	118.03	173.31	153.31
GW-38	1,357,425.10	624,735.61	136.65	84.98	99.98	36.67	21.67
GW-39	1,357,265.80	624,697.17	180.05	88.51	103.51	76.54	56.54
GW-40	1,357,084.69	624,612.57	241.67	95.20	110.20	131.47	111.47
GW-41	1,357,360.42	624,869.82	136.62	84.23	99.23	37.39	22.39
GW-42	1,357,289.74	625,004.20	136.60	83.47	98.47	38.13	23.13
GW-43	1,357,178.96	624,877.33	180.01	86.88	101.88	78.13	58.13
GW-44	1,357,149.27	625,058.86	136.60	84.20	99.20	37.40	22.40
GW-45	1,356,976.24	624,737.01	241.66	91.49	106.49	135.17	115.17
GW-46	1,357,007.62	625,106.59	136.54	84.95	99.95	36.59	21.59
GW-47	1,356,991.30	624,943.50	179.81	87.86	102.86	76.95	56.95
GW-48	1,356,862.60	625,154.20	136.87	86.00	101.00	35.87	20.87
GW-49	1,356,801.73	625,007.25	179.77	88.86	103.86	75.91	55.91
GW-50	1,356,682.70	624,657.01	241.48	92.48	107.48	134.00	114.00
GW-51	1,356,680.72	624,681.97	262.11	101.59	116.59	145.52	125.52
GW-52	1,356,722.92	625,202.03	136.57	86.45	101.45	35.12	20.12
GW-53	1,356,611.96	625,070.39	179.94	89.87	104.87	75.07	55.07
GW-54	1,356,597.09	624,864.48	241.59	93.48	108.48	133.11	113.11
GW-55	1,356,580.23	625,249.59	136.67	87.23	102.23	34.44	19.44
GW-56	1,356,430.88	625,262.50	136.67	84.33	99.33	37.34	22.34
GW-57	1,356,417.14	625,102.47	180.02	86.90	101.90	78.12	58.12
GW-58	1,356,402.74	624,903.48	241.36	90.08	105.08	136.28	116.28
GW-59	1,356,280.88	625,262.00	136.92	86.32	101.32	35.60	20.60
GW-60	1,356,217.14	625,102.88	180.00	89.55	104.55	75.45	55.45
GW-61	1,356,202.74	624,904.53	241.13	92.71	107.71	133.42	113.42
GW-62	1,356,130.26	625,263.03	136.67	88.30	103.30	33.37	18.37
GW-63	1,355,980.89	625,262.92	136.79	90.28	105.28	31.51	16.51
GW-64	1,356,017.14	625,103.23	180.00	92.20	107.20	72.80	52.80
GW-65	1,356,002.74	624,903.94	241.44	95.37	110.37	131.07	111.07

TABLE 2
HEADER PIPE (SEE NOTE 4)

POINTS ALONG HEADER PIPE	Northing	Easting	Elevation
LPH-1	1,355,861.85	624,003.33	107.00
LPH-2	1,356,498.81	624,002.24	107.00
LPH-3	1,357,508.30	624,013.69	107.00
LPH-4	1,357,597.61	624,555.64	107.00
LPH-5	1,357,321.55	625,080.16	107.00
LPH-6	1,356,535.71	625,342.24	107.00
LPH-7	1,355,686.49	625,343.79	107.00
HPH-1	1,356,200.81	624,062.75	127.00
HPH-2	1,356,999.37	624,083.47	134.36
HPH-3	1,357,534.15	624,181.95	129.64
HPH-4	1,357,398.58	624,803.68	131.75
HPH-5	1,356,899.39	625,146.33	132.46
HPH-6	1,356,144.50	625,273.50	130.17
IHL-1	1,355,895.12	624,009.16	---
IHL-2	1,356,043.70	624,035.20	---
IHL-3	1,356,195.81	624,061.87	---
IHL-4	1,356,345.17	624,033.44	---
IHL-5	1,356,485.12	624,005.02	---
IHL-6	1,356,645.11	624,025.98	---
IHL-7	1,356,795.16	624,050.33	---
IHL-8	1,356,945.20	624,074.68	---
IHL-9	1,357,095.18	624,070.33	---
IHL-10	1,357,245.19	624,049.77	---
IHL-11	1,357,401.51	624,028.33	---
IHL-12	1,357,529.84	624,153.88	---
IHL-13	1,357,556.92	624,310.19	---
IHL-14	1,357,581.40	624,460.19	---
IHL-15	1,357,541.92	624,625.04	---
IHL-16	1,357,445.36	624,745.38	---
IHL-17	1,357,377.81	624,878.22	---
IHL-18	1,357,330.59	625,047.75	---
IHL-19	1,357,164.67	625,104.75	---
IHL-20	1,357,014.89	625,128.23	---
IHL-21	1,356,865.99	625,164.32	---
IHL-22	1,356,734.11	625,235.36	---
IHL-23	1,356,599.75	625,307.74	---
IHL-24	1,356,430.98	625,323.84	---
IHL-25	1,356,280.94	625,297.47	---
IHL-26	1,356,130.28	625,275.68	---
IHL-27	1,355,980.95	625,298.60	---

HPH = HIGH POINT ALONG HEADER PIPE
LPH = LOW POINT ALONG HEADER PIPE
IHL = INTERSECTION HEADER-LATERAL

TABLE 3
APPROXIMATE ASBESTOS LOCATIONS (SEE NOTE 5)

ASBESTOS LOCATION	NORTHING	EASTING
1A	1,357,444.76	624,076.99
1B	1,357,280.64	624,445.17
2A	1,356,735.77	624,766.60
2B	1,356,814.48	624,836.54
2C	1,356,917.55	624,766.75
2D	1,356,923.54	624,847.37
2E	1,356,990.25	624,777.55
3A	1,356,256.90	624,986.59
3B	1,356,293.28	624,954.37
3C	1,356,317.48	625,002.76
3D	1,356,267.28	624,884.49
3E	1,356,366.06	624,873.80
3F	1,356,378.11	624,959.81
3G	1,356,372.07	624,927.56

NOTES:

1. NORTHING AND EASTING COORDINATES SHOWN REPRESENT FLORIDA STATE PLANE EAST ZONE NORTH AMERICAN DATUM OF 1983 (NAD83)
2. THE ELEVATIONS SHOWN REPRESENT NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD29)(FEET).
3. SEE DETAIL 1 ON SHEET 5 TO EVALUATE LENGTHS OF STICK-UP, SOLID PIPE, AND SLOTTED PIPE.
4. LOCATIONS OF EXISTING GCCS COMPONENTS ARE BASED ON CONSTRUCTION DRAWINGS FOR PREVIOUS CONSTRUCTION SEQUENCES. AS-BUILT LOCATIONS FOR EXISTING COMPONENTS SHALL BE PROVIDED TO THE CONTRACTOR BY THE OWNER AS NEEDED.
5. ASBESTOS COORDINATES INDICATED WERE PROVIDED BY WSI ON 4 MARCH 2008. THE LIMITS OF ASBESTOS WERE ASSUMED TO BE WITHIN 20-FT RADIUS OF THE COORDINATES PROVIDED BY WSI.

REV	DATE	DESCRIPTION	DRN	APP

Geosyntec consultants
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JACKSONVILLE, FLORIDA 32207 USA
PHONE: 904.858.1818 – FAX: 904.396.1143
AUTHORIZATION CERTIFICATE NO. 4321

WSI Waste Services, Inc.
1501 OMNI WAY
ST. CLOUD, FLORIDA 34773
TEL: 407-891-3720 FAX: 407-891-3730

TITLE: CONTROL POINTS

PROJECT: GAS COLLECTION AND CONTROL SYSTEM (GCCS) PHASE I DISPOSAL AREA – SEQUENCE 3A

SITE: J.E.D. SOLID WASTE MANAGEMENT FACILITY

THIS DRAWING MAY NOT BE ISSUED FOR PROJECT TENDER OR CONSTRUCTION, UNLESS SEALED.

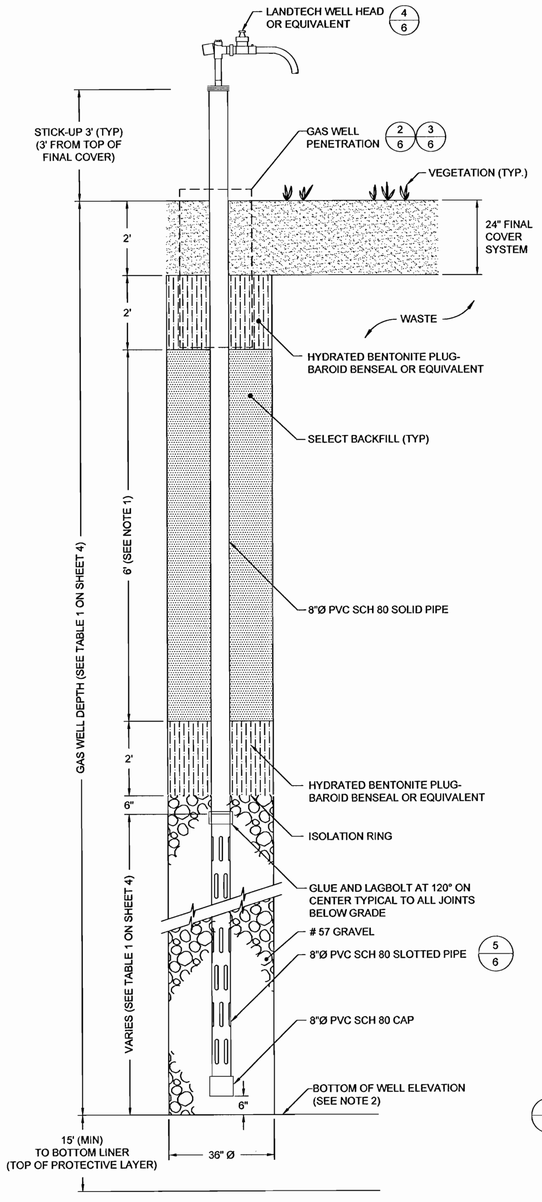
SIGNATURE

DATE

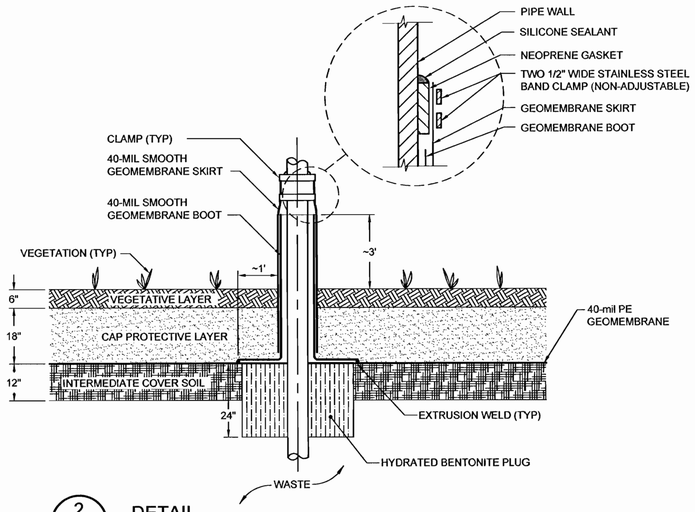
KWASI BADU-TWENEBOAH
LICENSE NO. 42460

DESIGN BY:	WT	DATE:	April 2010
DRAWN BY:	JJA	PROJECT NO.:	FL1832.01
CHECKED BY:	WT	FILE:	FL1452.03P040
REVIEWED BY:	KBT	DRAWING NO.:	5 OF 8
APPROVED BY:	KBT		

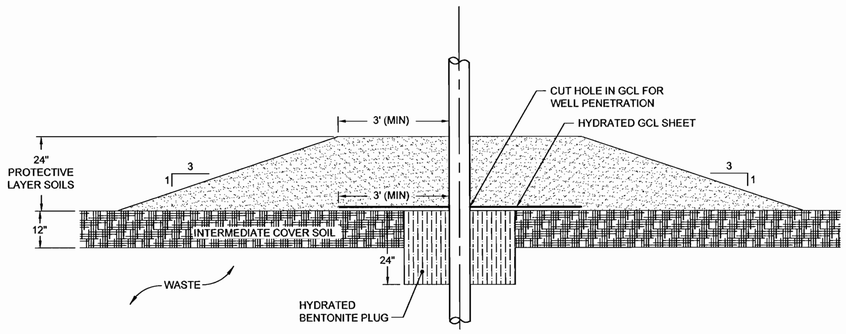
CONSTRUCTION DRAWINGS



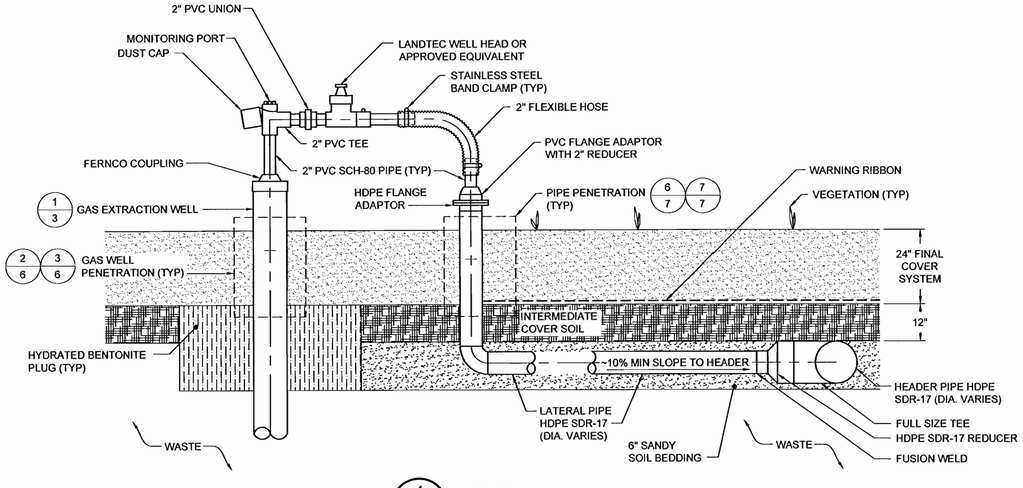
1/3 DETAIL
GAS EXTRACTION WELL
SCALE: N.T.S.
XREF: FL1452.03X021



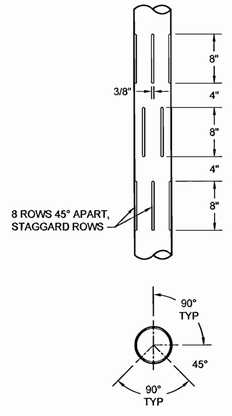
2/6 DETAIL
GAS WELL FINAL COVER PENETRATION
SCALE: N.T.S.
XREF: FL1452.03X022



3/6 DETAIL
GAS WELL SOIL COVER PENETRATION (PRE-FINAL COVER)
SCALE: N.T.S.
XREF: FL1452.03X039



4/6 DETAIL
WELLHEAD TO LATERAL
SCALE: N.T.S.
XREF: FL1452.03X024.DWG



5/6 DETAIL
PIPE SLOTS
SCALE: N.T.S.
XREF: 1452.03X020

NOTES:

1. THE LENGTH OF SOLID PIPE EXTENDING BELOW THE GEOMEMBRANE SHALL BE NO LESS THAN 10 FEET.
2. BOTTOM ELEVATION OF ALL GAS EXTRACTION WELLS SHALL BE MINIMUN 15' FROM THE BOTTOM LINER (TOP OF PROTECTIVE COVER LAYER).

NOTE:

1. ALL GAS SYSTEM COMPONENTS SHALL BE CONSTRUCTED IN ACCORDANCE WITH DETAILS SHOWN HEREIN AND TECHNICAL SPECIFICATIONS. CONTRACTOR SHALL REFER TO BOTH THESE DOCUMENTS.
2. SCREENED DETAILS ARE PROVIDED FOR INFORMATION PURPOSES ONLY AND ARE NOT INTENDED FOR CONSTRUCTION DURING THIS SEQUENCE.

REV	DATE	DESCRIPTION	DRN	APP

Geosyntec consultants
1200 RIVERPLACE BOULEVARD, SUITE 710
JACKSONVILLE, FLORIDA 32207 USA
PHONE: 904.858.1818 – FAX: 904.396.1143
AUTHORIZATION CERTIFICATE NO. 4321

WSI Waste Services, Inc.
1501 OMNI WAY
ST. CLOUD, FLORIDA 34773
TEL: 407-891-3720 FAX: 407-891-3730

TITLE: GAS EXTRACTION WELLS DETAILS

PROJECT: GAS COLLECTION AND CONTROL SYSTEM (GCCS) PHASE I DISPOSAL AREA – SEQUENCE 3A

SITE: J.E.D. SOLID WASTE MANAGEMENT FACILITY

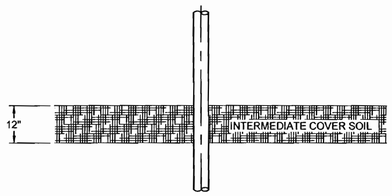
THIS DRAWING MAY NOT BE ISSUED FOR PROJECT TENDER OR CONSTRUCTION, UNLESS SEALED.

SIGNATURE
4/20/10
DATE

KWASI BADU-TWENEBOAH
LICENSE NO. 42460

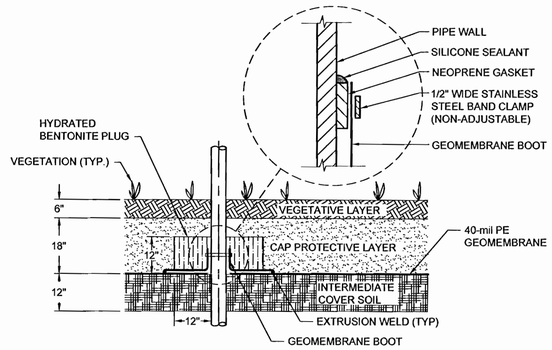
DESIGN BY:	WT	DATE:	April 2010
DRAWN BY:	JJA	PROJECT NO.:	FL1832.01
CHECKED BY:	WT	FILE:	FL1452.03P050
REVIEWED BY:	KBT	DRAWING NO.:	6 OF 8
APPROVED BY:	KBT		

CONSTRUCTION DRAWINGS



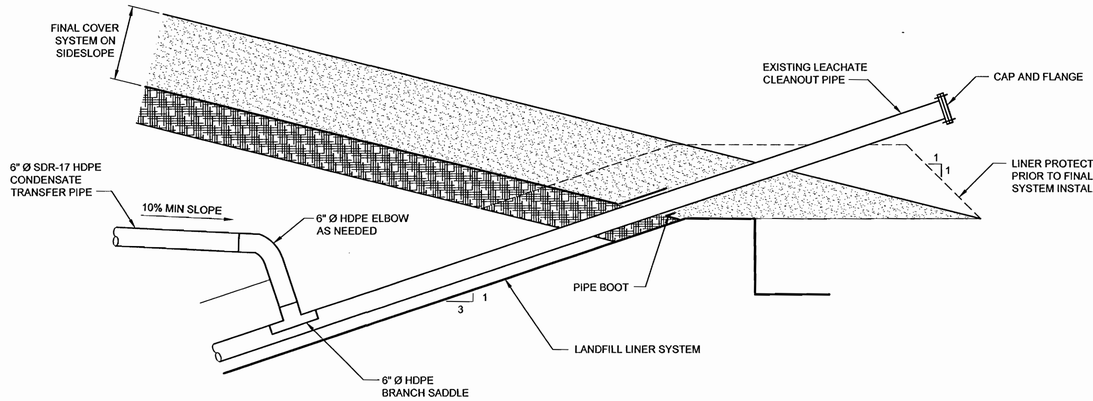
6/6 DETAIL
PIPE SOIL COVER PENETRATION
(PRE-FINAL COVER)

SCALE: N.T.S.
XREF: FL1452.03X040



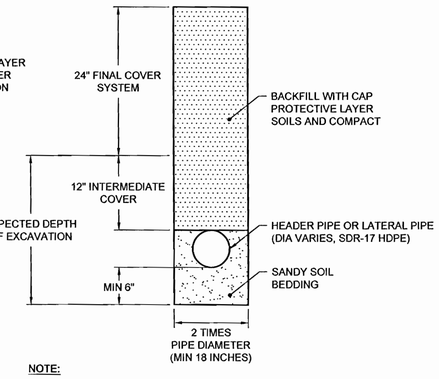
7/6 DETAIL
PIPE FINAL COVER PENETRATION

SCALE: N.T.S.
XREF: FL1452.03X023



9/3 DETAIL
CONDENSATE DRAIN CONNECTION
TO LEACHATE CLEANOUT

SCALE: N.T.S.
XREF: FL1452.03X037



NOTE:

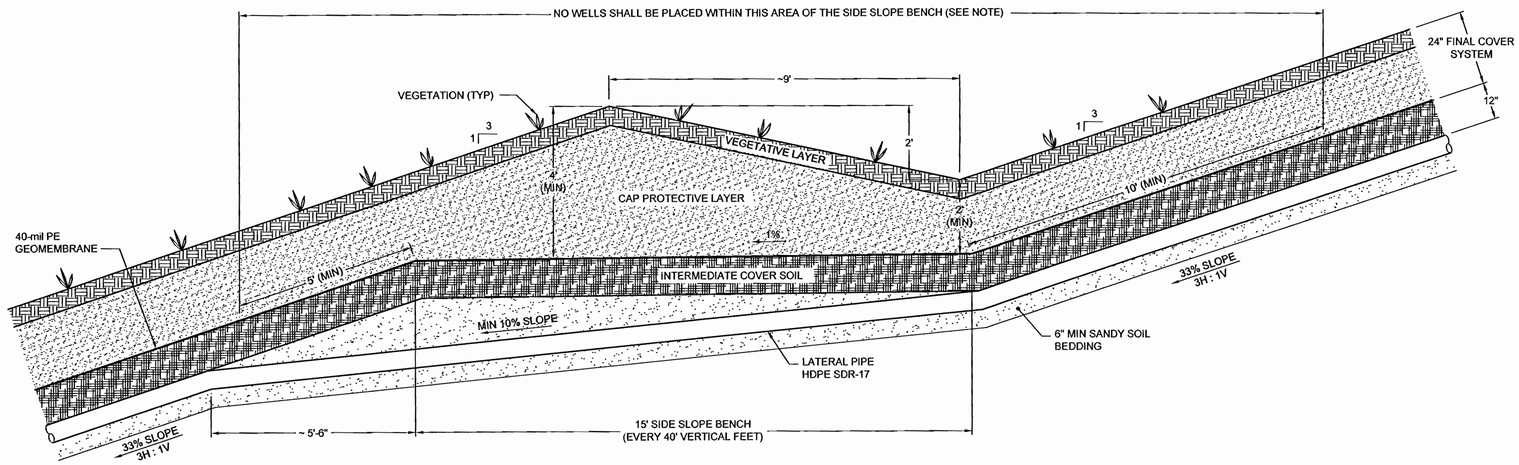
HEADER AND LATERAL PIPES SHALL TYPICALLY BE INSTALLED 3-FT BELOW THE TOP OF FINAL COVER AS INDICATED. HOWEVER, ALL PIPES SHALL BE INSTALLED AT CONSTANT SLOPE BETWEEN THE END POINTS.

10/4 DETAIL
PIPE TRENCH

SCALE: N.T.S.
XREF: FL1452.03X038

8/3 DETAIL
CONDENSATE DRAIN (NOTE 2)

SCALE: N.T.S.
XREF: FL1452.03X036



NOTE:

GAS EXTRACTION WELLS ADJACENT TO THE SIDE SLOPE BENCHES SHALL BE OFFSET FROM THE EDGE OF THE 15-FT WIDE BENCH AS INDICATED.

11/3 DETAIL
LATERAL PIPE TRENCH AT BENCH CROSSING

SCALE: N.T.S.
XREF: FL1452.03X034

NOTE:

1. ALL GAS SYSTEM COMPONENTS SHALL BE CONSTRUCTED IN ACCORDANCE WITH DETAILS SHOWN HEREIN AND TECHNICAL SPECIFICATIONS. CONTRACTOR SHALL REFER TO BOTH THESE DOCUMENTS.
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Geosyntec consultants
1200 RIVERPLACE BOULEVARD, SUITE 710
JACKSONVILLE, FLORIDA 32207 USA
PHONE: 904.858.1818 – FAX: 904.396.1143
AUTHORIZATION CERTIFICATE NO. 4321

WSI Waste Services, Inc.
1501 OMNI WAY
ST. CLOUD, FLORIDA 34773
TEL: 407-891-3720 FAX: 407-891-3730

TITLE: GCCS DETAILS I

PROJECT: GAS COLLECTION AND CONTROL SYSTEM (GCCS)
PHASE I DISPOSAL AREA – SEQUENCE 3A

SITE: J.E.D. SOLID WASTE MANAGEMENT FACILITY

THIS DRAWING MAY NOT BE ISSUED FOR PROJECT TENDER OR CONSTRUCTION, UNLESS SEALED.

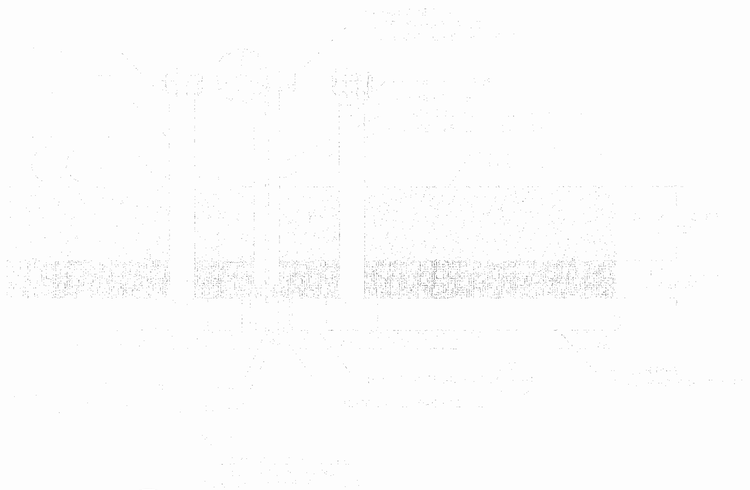
SIGNATURE

DATE

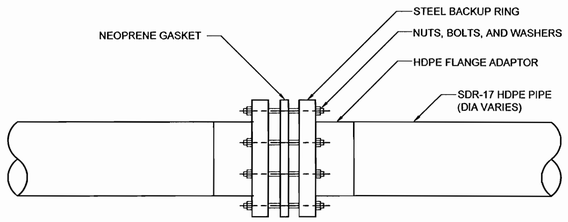
KWASI BADU-TWENEBOAH
LICENSE NO. 42460

DESIGN BY:	WT	DATE:	April 2010
DRAWN BY:	JJA	PROJECT NO.:	FL1832.01
CHECKED BY:	WT	FILE:	FL1452.03P060
REVIEWED BY:	KBT	DRAWING NO.:	
APPROVED BY:	KBT		7 OF 8

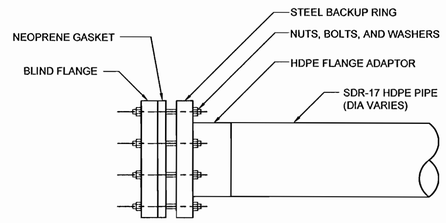
CONSTRUCTION DRAWINGS



12 / - DETAIL
ISOLATION VALVE (NOTE 2)
SCALE: N.T.S.
XREF: FL1452.03X025



13 / 8 DETAIL
FLANGE CONNECTION (TYP.)
SCALE: N.T.S.
XREF: FL1452.03X026



14 / 3 DETAIL
BLIND FLANGE (TYP)
SCALE: N.T.S.
XREF: FL1452.03X027

15 / 3 DETAIL
HEADER ACCESS RISER (NOTE 2)
SCALE: NTS
XREF: FL1452.03X028

16 / - DETAIL
ANTI-SEEP COLLAR (NOTE 2)
SCALE: N.T.S.
XREF: FL1452.03X030

CONSTRUCTION DRAWINGS

NOTE:

1. ALL GAS SYSTEM COMPONENTS SHALL BE CONSTRUCTED IN ACCORDANCE WITH DETAILS SHOWN HEREIN AND TECHNICAL SPECIFICATIONS. CONTRACTOR SHALL REFER TO BOTH OF THESE DOCUMENTS.
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REV	DATE	DESCRIPTION	DRN	APP

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JACKSONVILLE, FLORIDA 32207 USA
PHONE: 904.858.1818 – FAX: 904.396.1143
AUTHORIZATION CERTIFICATE NO. 4321

WSI Waste Services Inc.
1501 OMNI WAY
ST. CLOUD, FLORIDA 34773
TEL: 407-891-3720 FAX: 407-891-3730

TITLE: GCCS DETAILS II

PROJECT: GAS COLLECTION AND CONTROL SYSTEM (GCCS)
PHASE I DISPOSAL AREA – SEQUENCE 3A

SITE: J.E.D. SOLID WASTE MANAGEMENT FACILITY

THIS DRAWING MAY NOT BE ISSUED FOR PROJECT TENDER OR CONSTRUCTION, UNLESS SEALED.

SIGNATURE

DATE

KWASI BADU-TWENEBOAH
LICENSE NO. 42460

DESIGN BY:	WT	DATE:	April 2010
DRAWN BY:	JJA	PROJECT NO.:	FL1832.01
CHECKED BY:	WT	FILE:	FL1452.03P070
REVIEWED BY:	KBT	DRAWING NO.:	8 OF 8
APPROVED BY:	KBT		

APPENDIX B
TECHNICAL SPECIFICATIONS

WSI
Waste Services, Inc.

1501 Omni Way, St. Cloud, FL 34773

April 22, 2008

Mr. F. Thomas Lubozynski, P.E.
Waste Program Administrator
Florida Department of Environmental Protection
Central District
3319 Maguire Boulevard, Suite 232
Orlando, Florida 32803-3767

Re: Construction Drawings – Gas Collection and Control System
Phase 1 Disposal Area
J.E.D. Solid Waste Management Facility
Osceola County, Florida
Permit Nos. SC-0197726-004 and S049-0199726-005

Dear Mr. Lubozynski:

Omni Waste of Osceola County, LLC (Omni) is submitting the enclosed Construction Drawings and Specifications for installation of a Gas Collection and Control System (GCCS) in the Phase 1 disposal area at the J.E.D. Solid Waste Management Facility (JED Facility). Omni believes the GCCS shown for the Phase 1 area is consistent with the layout and details approved by the Florida Department of Environmental Protection (FDEP) for the Vertical Expansion - Major Modification of Permit Nos. SC-0197726-004 and S049-0199726-005.

Omni plans to begin installation of the GCCS for Phase 1 by beginning with Sequence 1 as shown on Drawing 3A. Sequence 1 includes a flare system, gas collection wells, header and lateral piping, and other controls for the entire Cell 1 area and partial areas of Cell 4. Cell 1 was the first area constructed at the facility and began receiving waste on January 26, 2004.

The requirements of the following JED Facility permit conditions will be met upon installation of the GCCS as shown on Drawing 3A (Sequence 1):

- Air Construction Permit No. 0970079-001-AC, Specific Condition No. 4, and Title V Permit No. 0970079-003-AV, Condition A4, requires installation and operation of at least one flare in the Phase 1 area. The design shown on Drawing 3A (Sequence 1) provides for installation of one 3,600 scfm flare adjacent to the Cell 1 disposal area meeting these permit conditions.

- Title V Permit No. 0970079-003-AV requires compliance with 40 CFR 60 Subpart WWW. Accordingly, an active GCCS must be installed in the Cell 1 area by January 26, 2009 (since no areas are at final grades, the 5-year waste age criteria applies). Omni plans to begin installation of the GCCS system within the next month and complete installation by the end of 2008. This installation schedule will meet the requirements of Subpart WWW if completed as planned.

  Please note that Omni intends to further expand the GCCS in Cells 2-4 as shown on Drawings 3B and 3C (Sequence 2 and 3) in accordance with Subpart WWW. Based on the 5-year waste age criteria, the GCCS will require complete expansion into Cell 4 by September 3, 2010, Cell 2 by April 20, 2011, and Cell 3 by November 1, 2011, or within 2 years of achieving permitted final grades. Until the GCCS is expanded into Cells 2-4, Omni will continue to operate the solar flare units connected to the leachate cleanout risers to aid in controlling possible objectionable odors and emissions.

- As noted in your facility inspection letter dated March 13, 2008, supporting application documents for the Permit to Construct and Operate Nos. SC-0197726-004 and S049-0199726-005 reference installation of gas collection wells in the Phase 1 area. The design shown on Drawing 3A (Sequence 1) provides for installation of gas collection wells, therefore meeting the statements noted in the application documents.

If you have any questions or require any additional information, please contact me as soon as possible at (904) 673-0446 or mkaiser@wsii.us at your earliest convenience.

Sincerely,

Mike Kaiser

Mike Kaiser
V.P., Environmental Management and Engineering, US

Attachments
2-Copies Drawings and Specifications

Cc: Mr. Jim Bradner, P.E., FDEP Air Resources Management – Central District (1 Copy Drawing Set and Specifications)
Mr. Matt Orr, WSI
Mr. Shawn McCash, WSI

FILE COPY

TECHNICAL SPECIFICATIONS

GAS COLLECTION AND CONTROL SYSTEM – PHASE I DISPOSAL AREA
J.E.D. SOLID WASTE MANAGEMENT FACILITY

Geosyntec Project No. FL1452

APRIL 2008

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APR 22 2008
DEP Central Dist.

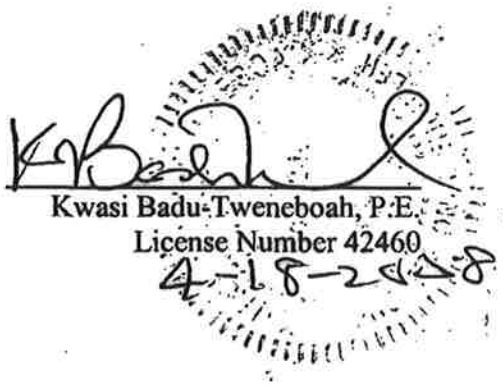


TABLE OF CONTENTS
TECHNICAL SPECIFICATIONS
GAS COLLECTION AND CONTROL SYSTEM – PHASE I
DISPOSAL AREA
J.E.D. SOLID WASTE MANAGEMENT FACILITY
APRIL 2007

SECTION 02221

TRENCHING AND BACKFILLING INSIDE THE LIMITS OF WASTE

SECTION 02221 - TRENCHING AND BACKFILLING INSIDE THE LIMITS OF WASTE

PART 1. GENERAL

1.01 SCOPE OF APPLICATION

A. Furnish all labor, material, tools, equipment and incidentals required to perform trench excavation and backfill operations necessary to achieve the specified grades and elevations shown on the Drawings. Review with the Owner's Representative the location, limits, and methods to be used prior to commencing work under this section. Provide support for as-built survey work by installing and removing survey markers.

1.02 REFERENCES

A. ASTM D2488 - Standard Practice for Description of Soils (Visual-Manual Procedure).

1.03 SUBMITALS (RESERVED)

PART 2- PRODUCTS

2.01 PIPE BEDDING

A. Clean sandy soils or equivalent material approved by the Owner's Representative.

2.02 GENERAL FILL

A. Mineral soil, substantially free from organic materials, loam, wood, trash and other objectionable materials that may be compressible or that cannot be properly compacted. Common fill shall not contain stones larger than 4 in. in the largest diameter, broken concrete, masonry rubble, or other similar materials. Natural soils visually classified as SP-SM, SW-SM, SM, ML, SP-SC, SW-SC, SC, and CL or as mixtures of these soil types in Unified Soil Classification System (USCS) are acceptable soil types. Soils classifying as SW and SP can be used if they are mixed with adequate quantities of SM, ML, SC, and CL or amendments such as bentonite to facilitate tight compaction as approved by the Owner's Representative.

B. The soil shall be visually inspected and approved by the Owner's Representative before use. Contractor shall notify the Owner's Representative of any changes in the soil borrow source and submit new soil samples for inspection and approval.

2.03 STOCKPILES

A. All pipe bedding and other material purchased by the Contractor can be stockpiled on site as directed by the Owner's Representative.

B. General fill material soils are available onsite or in a borrow area adjacent to the site. The Contractor shall load and haul this material as directed by the Owner.

PART 3- EXECUTION

3.01 EXCAVATION

A. Trench excavation is anticipated to be through daily or intermediate soil cover and refuse.

B. Safety precautions must be taken during these construction activities that conform to all OSHA regulations, safety requirements of these specifications, and project Health and Safety Plan.

C. Contours of existing ground elevations are approximate and are based on aerial topographic mapping. The contours of the final cover are design future grades and may not represent conditions at the time of construction. The Contractor shall satisfy himself as to the existing contours and elevations at the time of construction.

D. Trenches shall be excavated to the alignments shown on the Drawings. Contractor shall be responsible for reviewing the field stakeouts along proposed trench alignments in the field before starting trenching work. Minimum bottom trench width shall be 2 times the pipe diameter but not less than 18 inches. If more than one pipe is to be installed in a common trench, pipes shall be separated by a horizontal distance of at least 1/4 times the larger pipe diameter.

E. Excavated cover material shall be separated from excavated refuse wherever possible and any cover material free of refuse shall be used as backfill material. Any material not suitable for backfill will be loaded and hauled to the working face by the Contractor for disposal as directed by the Owner.

F. The work area shall be cleared of refuse and litter at the end of each work day. The excavated refuse and collected litter are to be loaded and hauled by the Contractor to the operating portion of the landfill for disposal.

G. If waste disposal operations at the working face are not going on at a particular day or time, the Contractor shall store the excavated materials in stockpiles on the landfill

surface. These stock piles shall either be covered with: (i) temporary plastic covers that are anchored firmly by use of weights to prevent uplift by winds; or (ii) a minimum of 12 in of soil cover. The contractor shall haul and dispose the stored materials as soon as the waste disposal operations at the working face commence. The Contractor shall also clean the storage location of all excavated materials.

H. To the extent possible, the trench invert shall slope uniformly in accordance with the Drawings. Minimum trench slope will be 5 percent for all gas collection pipe trenches within waste footprint.

I. The Contractor may not excavate more trench than can be completely backfilled after installation of the pipe. Excavations shall not be left open overnight.

J. All excavation shall be open cut unless otherwise permitted by the Owner's Representative.

3.02 LIQUIDS & WATER

A. Perched pockets of leachate may be encountered during trenching operations. The Contractor shall notify the Owner's Representative immediately if leachate is encountered. The Owner's Representative will furnish revised construction plans which may include backfilling the affected area, realignment of the trench, sump installation, or placement of a gravel French drain (or some combination of these alternatives).

B. The Contractor shall take every precaution to prevent water from entering an open trench. Should water enter the trench the water shall be removed so as to return the trench bottom to a firm, dry condition.

3.03 ROAD CROSSING

A. Schedule all road crossings with Owner's Representative to minimize disruption to waste disposal operations and traffic.

B. Corrugated metal pipe or an equivalent approved by the Owner's Representative shall be used as a casing to protect pipes along the road crossing. The annulus between the pipes and casing shall be filled with cement grout. Owner's Representative may approve construction of road crossing without a sleeve depending on the nature of traffic expected on the road, size and strength of pipe, pipe cover, etc.

3.04 BLASTING

A. Blasting will not be permitted for purposes of excavation.

3.05 BACKFILL

A. Pipe bedding shall be placed and compacted (maximum of 9 inch lifts) using hand compaction tools, as required. The depth of bedding shall be a minimum of 6 inches below and above the pipe. This bedding material shall provide continuous support for the pipe and be well-compacted and free of rocks and other debris.

B. Next, the trench shall, be backfilled with general fill, placed and compacted in 8-12 inch layers using mechanical compaction equipment. The compaction of this material shall conform to the surrounding material and to the satisfaction of the Owner's Representative. During common fill placement all roots, debris and stones larger than 4 inches in largest dimension shall be completely removed from the backfill material.

3.06 FINISH GRADING

A. All areas covered by the work, including excavated and filled sections, shall be uniformly back-bladed to the finished ground elevations. The finish surface shall be reasonably smooth and free of irregularities and shall provide a presentable and well-drained area.

B. Excess backfill material shall be stockpiled onsite as directed by the Owner's Representative.

C. The work area shall be cleaned and restored by the Contractor to a condition ready for re-vegetation or final cover construction by the Owner.

3.07 COMPACTION

A. Compaction of backfill material shall be by tracking over the fill material with Contractor's onsite pipeline equipment to be consistent with the surrounding daily or intermediate cover material.

3.08 PROTECTION OF UNDERGROUND PIPING AND UTILITIES

A. The Contractor shall take all necessary precautions to protect underground piping during the course of the construction. The Owner's Representative/Owner shall make available information pertaining to the location and existence of underground piping and utilities. Contractor shall be responsible for field verification of the locations. Contractor shall perform excavation using hand tools close to the anticipated pipe locations.

3.09 FIELD SURVEYING SUPPORT

A. Proposed trench routes shall be marked on the ground using stakes by the surveyor. The Contractor shall review the staked out route and discuss with the Owner's Representative and obtain approval before commencing work.

B. The Contractor shall provide markers to perform as-built survey along the trench location to survey the pipe line route and elevations generally at 100 feet intervals and more frequently if the alignment of the route changes. The markers shall be 6-in diameter PVC pipes or equivalent installed to stand vertically while touching the buried pipes. As an alternative, the contractor may choose to leave the top of pipe exposed at similar intervals, to be backfilled with soil following completion of the as-built survey. All marker pipes shall be removed by the Contractor after the as-built survey to be performed by the Owner. The marker pipe locations shall be backfilled with soil by the Contractor.

3.10 FIELD QUALITY CONTROL AND QUALITY ASSURANCE

A. Field quality control shall be the responsibility of the Contractor. Field quality assurance shall be the responsibility of the Owner's Representative.

B. Visual soil classification and approval of soil by the Owner's Representative.

C. Field inspection of all construction materials and approval by the Owner's Representative.

D. Field inspection of trenching and backfilling work and approval by the Owner's Representative.

END OF SECTION

SECTION 02222

TRENCHING AND BACKFILLING OUTSIDE THE LIMITS OF WASTE

SECTION 02222 - TRENCHING AND BACKFILL OUTSIDE THE LIMITS OF WASTE

PART 1. GENERAL

1.01 SCOPE OF APPLICATION

A. Furnish all labor, material, tools, equipment and incidentals required to perform trench excavation and backfill operations necessary to achieve the specified grades and elevations shown on the Drawings. Review with the Owner's Representative the location, limits and methods to be used prior to commencing work under this section. Provide support for as-built survey work by installing and removing survey markers.

1.02 REFERENCES

A. ASTM D2488 - Standard Practice for Description of Soils (Visual-Manual Procedure).

1.03 SUBMITALS (RESERVED)

PART 2- PRODUCTS

2.01 PIPE BEDDING

A. Clean sandy soils or equivalent material approved by the Owner's Representative.

2.02 GENERAL FILL

A. Mineral soil, substantially free from organic materials, loam, wood, trash and other objectionable materials that may be compressible or that cannot be properly compacted. Common fill shall not contain stones larger than 4 in. in the largest diameter, broken concrete, masonry rubble, or other similar materials. Natural soils visually classified as SP-SM, SW-SM, SM, ML, SP-SC, SW-SC, SC, and CL or as mixtures of these soil types in Unified Soil Classification System (USCS) are acceptable soil types. Soils classifying as SW and SP can be used if they are mixed with adequate quantities of SM, ML, SC, and CL or amendments such as bentonite to facilitate tight compaction as approved by the Owner's Representative.

B. The soil shall be visually inspected and approved by the Owner's Representative before use. Contractor shall notify the Owner's Representative of any changes in the soil borrow source and submit new soil samples for inspection and approval.

2.03 STOCKPILES

A. All pipe bedding and other material purchased by the Contractor can be stockpiled on site as directed by the Owner's Representative.

B. General fill material soils are available onsite at the designated borrow area. The Contractor shall load and haul this material as directed by the Owner.

PART 3- EXECUTION

3.01 EXCAVATION

A. Trench excavation is anticipated to be in the berms constructed on-site and/or in the native soils.

B. Safety precautions must be taken during these construction activities that conform to all OSHA regulations, safety requirements of these specifications, and project Health and Safety Plan. If refuse is encountered, inform the Owner's Representative immediately.

C. Contours of existing ground elevations are approximate and are based on aerial topographic mapping. The contours and elevations of the present ground are believed to be reasonably correct, and are presented only as an approximation. However, the Contractor shall satisfy himself as to the existing contours and elevations.

D. Trenches shall be excavated to the alignments shown on the Drawings. Contractor shall be responsible for reviewing the field stakeouts along proposed trench alignments in the field before starting trenching work. Minimum bottom trench width shall be 2 times the pipe diameter but not less than 18 inches. If more than one pipe is to be installed in a common trench, pipes shall be separated by a horizontal distance of at least 1/4 times the larger pipe diameter.

E. Excavated material shall be reused as backfill material. Any material not suitable for backfill will be loaded and hauled to the working face by the Contractor for disposal as directed by the Owner.

F. The Contractor may not excavate more trench than can be completely backfilled after installation of the pipe. Excavations shall not be left open overnight.

G. If waste disposal operations at the working face are not going on at a particular day or time, the Contractor shall store the excavated materials in stockpiles near the excavation without obstruction to traffic and other landfill operations. These stock piles shall be covered with temporary plastic covers and anchored firmly by use of weights to prevent uplift by winds. The contractor shall haul and dispose the stored materials as soon as the

waste disposal operations at the working face commence. The Contractor shall also clean the storage location of all excavated materials.

H. To the extent possible, the trench invert shall slope uniformly in accordance with the Drawings. Minimum trench slope will be 1 percent for gas pipe trenches. Slight adjustments in the depths and alignments may be necessary to maintain a minimum cover of 2 feet. Decrease in pipe slope is not acceptable. There are no minimum slope requirements for trenches that will not have gas collection pipes installed in them (i.e. no minimum slope requirements for compressed air, condensate forcemain, and leachate forcemain pipe trenches).

I. All excavation shall be open cut or ditch witched unless otherwise permitted by the Owner's Representative.

3.02 LIQUIDS & WATER

A. The Contractor will be responsible for the furnishing, operation, and maintaining of dry excavations, and shall pump out or otherwise remove and dispose of as fast as it may collect, any water, other liquids, which may be found or may accumulate in the excavations, regardless of whether it be water or liquid from groundwater, storm water runoff, or from existing conduits and works. If such water be muddy or carrying settleable solids, it shall be disposed of in a proper manner.

B. There shall be at the work site, at all times during construction, proper and approved machinery of sufficient capacity to meet the maximum requirements for the removal and disposal of water or other liquids, in such manner as not to interfere with the proper laying of pipeline or other work under this or other contract, nor endanger existing structures.

C. The Contractor shall take every precaution to prevent water from entering an open trench. Should water enter the trench the water shall be removed so as to return the trench bottom to a firm, dry condition.

3.03 ROAD CROSSING

A. Schedule all road crossings with Owner's Representative to minimize disruption to waste disposal operations and traffic.

B. Corrugated metal pipe or an equivalent approved by the Owner's Representative shall be used as a casing to protect pipes along the road crossing. The annulus between the pipes and casing shall be filled with cement grout. Owner's Representative may approve construction of road crossing without a sleeve depending on the nature of traffic expected on the road, size and strength of pipe, pipe cover, etc.

3.04 BLASTING

A. Blasting will not be permitted for purposes of excavation without approval of the Owner's Representative and obtaining all relevant permits.

3.05 BACKFILL

A. Pipe bedding shall be placed and compacted (maximum of 9 inch lifts) using hand compaction tools, as required. The depth of bedding shall be a minimum of 6 inches below and above the pipe. This bedding material shall provide continuous support for the pipe and be well-compacted and free of rocks and other debris.

B. Next, the trench shall be backfilled with general fill, placed and compacted in 8-12 inch layers using mechanical compaction equipment. The compaction of this material shall conform to Part 3, Section 3.07 of this specification. During common fill placement all roots, debris and stones larger than 4 inches in largest dimension shall be completely removed from the backfill material.

C. Remove excessively wet soil before placement or additional lifts.

3.06 FINISH GRADING

A. All areas covered by the work, including excavated and filled sections, shall be uniformly back-bladed to the finished ground elevations. The finish surface shall be reasonably smooth and free of irregularities and shall provide a presentable and well-drained area.

B. Excess backfill material shall be stockpiled onsite as directed by the Owner's Representative.

C. The work area shall be cleaned and restored to a condition ready for revegetation by the Owner.

3.07 COMPACTION

A. Compaction of backfill material within the waste footprint shall be accomplished by tracking with construction equipment (e.g. bulldozer) to match the grades of the surrounding cover material.

B. For compaction of backfill outside the waste boundary, backfill shall be compacted to at least 95 percent of the maximum standard Proctor dry unit weight at a moisture content generally within ±3 percent of the optimum moisture content as determined by ASTM D 698, or as directed by the Owner's Representative.

C. After completion of the work, or when so ordered by the Owner's Representative, the material remaining in stockpile areas and not needed for other works, shall be rough graded to the grades and elevations directed by the Owner's Representative.

3.08 PROTECTION OF UNDERGROUND PIPING AND UTILITIES

A. The Contractor shall take all necessary precautions to protect underground piping during the course of the construction. The Owner's Representative/Owner shall make available information pertaining to the location and existence of underground piping and utilities. Contractor shall be responsible for field verification of the locations. Contractor shall perform excavation using hand tools close to the anticipated pipe locations.

3.09 FIELD SURVEYING SUPPORT

A. Proposed trench routes shall be marked on the ground using stakes by the surveyor. The Contractor shall review the staked out route and discuss with the Owner's Representative and obtain approval before commencing work.

B. The Contractor shall provide markers to perform as-built survey along the trench location to survey the pipe line route and elevations generally at 100 feet intervals and more frequently if the alignment of the route changes. The markers shall be 2-in diameter PVC pipes or equivalent installed to stand vertically while touching the buried pipes. All marker pipes shall be removed by the Contractor after the as-built survey to be performed by the Owner. The marker pipe locations shall be backfilled with bentonite by the Contractor.

3.10 FIELD QUALITY CONTROL AND QUALITY ASSURANCE

A. Field quality control shall be the responsibility of the Contractor. Field quality assurance shall be the responsibility of the Owner's Representative.

B. Visual soil classification and approval of soil by the Owner's Representative.

C. Field inspection of all construction materials and approval by the Owner's Representative.

D. Field inspection of trenching and backfilling work and approval by the Owner's Representative.

END OF SECTION

SECTION 02610

LANDFILL GAS WELL

SECTION 02610 - LANDFILL GAS WELL

PART 1 - GENERAL

1.01 SCOPE OF APPLICATION

A. Supply all equipment, materials, and labor needed to install landfill gas (LFG) extraction wells, wellheads, well hoses, and connections to lateral gas collection pipes as specified herein and as indicated on the Drawings.

1.02 REFERENCES

A. ASTM D2488 - Standard Practice for Description of Soils (Visual-Manual Procedure).

1.03 SUBMITTALS

A. Submit to the Owner's Representative Certificates of Compliance on materials furnished, and manufacturer's brochures containing complete information and instructions pertaining to the storage, handling, installation, and inspection of pipe and appurtenances furnished.

B. The Contractor shall submit to the Owner's Representative samples of all well backfill materials furnished.

C. The Contractor shall keep detailed well logs and construction diagrams for all wells drilled, including the total depth of the well, the static water level, the temperature of spoils, depth, thickness, and description of soil or waste strata, (including dates from any readable material), and the occurrence of any water bearing zones. Well logs shall be submitted to the Owner's Representative.

D. The Contractor shall obtain the ground surface elevation and location survey data from the Owner after the as-built survey and include them on the well construction logs.

1.04 SITE CONDITIONS

A. Obstructions and saturated conditions such as sludge, and foundry sands are sometimes encountered when drilling in a landfill, many of which can be drilled through. Contractor is expected to make reasonable effort to drill through obstructions and saturated conditions and will be paid for offset re-drilling and boring abandonment only if approval is given by the Owner's Representative. Contractor will be paid for abandonment of abandoned hole and for well installation at new location. Wells shall not be relocated under any circumstances without the permission of the Owner's Representative.

PART 2- PRODUCTS

2.01 AGGREGATE

A. The aggregate shall be classified as GP in accordance with the Unified Soil Classification System (per ASTM D 2487), and shall meet the AASHTO M43 gradation requirements for No. 57 coarse aggregate. Sieve analysis for this coarse aggregate shall be performed in accordance with ASTM C 136. The gradation for #57 coarse aggregate, by AASHTO standards, is as follows:

- 100% passing a 1.5 inch sieve;
- 95-100% passing a 1 inch sieve;
- 25-60% passing a ½ inch sieve;
- 0-10% passing the #4 sieve; and
- 0-5% passing the #8 sieve.

B. The aggregate shall have less than 2 percent by weight passing the No. 200 sieve when tested in accordance with ASTM C 136.

C. The aggregate shall be tested for carbonate content by means of ASTM D 3042 – "Standard Test Method for Insoluble Residue in Carbonate Aggregates" with the following revision to the method: the aggregate shall have less than 5 percent loss of weight when tested at a pH of 4 instead of the pH specified in ASTM D 3042.

2.02 BENTONITE SLURRY MIX

A. Coarse-ground, granualized bentonite from an approved source is to be mixed thoroughly with potable water at a ratio of 5 gallons of water to every 50 lbs. of bentonite.

B. "Soil/bentonite plug," if used, shall refer to a mixture consisting of four parts soil backfill to one part bentonite.

2.03 GENERAL FILL

A. Mineral soil that is substantially free from organic materials, loam, wood, trash, and other objectionable materials that may be compressible or that cannot be properly compacted. Common fill shall not contain stones larger than 4 in. in the largest diameter, broken concrete, masonry rubble, or other similar materials. Natural soils visually classified as SP-SM, SW-SM, SM, ML, SP-SC, SW-SC, SC, and CL or as mixtures of these soil types in Unified Soil Classification System (USCS) are acceptable soil types. Soils classifying as SW and SP can be used if they are mixed with adequate quantities of bentonite to facilitate construction of low permeability backfill around the wells as approved by the Owner's Representative.

B. The soil shall be visually inspected and approved by the Owner's Representative before use. Contractor shall notify the Owner's Representative of any changes in the soil borrow source and submit new soil samples for inspection and approval.

2.04 FILTER FABRIC

A. 8 oz/yd^2 Non-woven Geotextile donut shaped filter fabric isolation ring with a 36-in diameter and 8-in opening.

2.05 SOLID WALL PIPE

A. All pipe and fittings shall be rigid PVC Schedule 80. Refer to Section 15061 for PVC pipe.

2.06 SLOTTED PIPE

A. Slots in PVC extraction well piping shall be 8 inch long by 3/8 inch wide, spaced 90° around the circumference of pipe and 4 inch along the length of the pipe. Contractor shall present other configuration types to the Owner's Representative for approval. Slotting may be done in the factory, or in the field. If slotting is performed in the field, the slotting must be completed per the specs and approved by the Owner's Representative on site.

2.07 WELLHEAD

A. All wellheads shall be 2-in LandTec Accu-Flo wellheads or equivalent approved by the Owner's Representative and consistent with the Drawings.

2.08 WELLHOSE

A. All well hoses shall be standard 2-in LandTec well hoses or equivalent approved by the Owner's Representative and consistent with the Drawings.

PART 3- EXECUTION

3.01 DRILLING

A. Extraction wells shall be drilled at the locations marked on the field by the Owner's Representative. Contractor shall verify all field markings with the Owner's Representative before starting drilling work. Wells shall not be relocated under any circumstances without the permission of the Owner's Representative.

B. Extraction wells are to be 36 inch diameter, drilled to the depth shown on the Drawings. Contractor must use dry drilling equipment; wet rotary drilling equipment may not be used. All borings shall be made with bucket type augers.

C. The boring depths shall be evaluated based on the information presented on the Drawings. The boring depths may be adjusted in the field by the Owner's Representative. Three reasons limiting depth might be as follows:

1. If water is encountered in a boring, the Contractor may be directed to drill beyond the point at which it was encountered. If wet conditions remain, the boring may be terminated and the length of perforated pipe adjusted by the Owner's Representative, or the well may be relocated. If wet conditions cease (e.g. due to trapped water layer), then drilling will continue to the design depth.

2. If a no-progress obstruction is encountered, the Contractor shall make a conscious effort to drill through the obstruction. If drilling through is not possible, the Contractor shall immediately contact the Owner's Representative and as directed by the Owner's Representative install a shorter well or relocate the well and abandon the drill hole. If the drill rates drop below 2 linear feet of drilling per hour due to the presence of any obstructions, the Contractor shall immediately contact the Owner's Representative/Owner to inform them of the situation. If the Owner's Representative/Owner asks the Contractor to continue drilling through the obstruction, the Contractor can charge the Owner at the hourly drilling rate provided in the bid form until the drilling rate increases above 2 linear feet of drilling per hour or the Owner's Representative/Owner instructs the Contractor to stop the drilling.

3. If for any reason the Contractor suspects that drilling may have advanced to or beyond the liner system. The Contractor shall immediately notify the Owner and the Owner's Representative in this case.

E. As soon as drilling is completed, a safety screen shall be placed over the top of the bore. This screen shall stay in place until backfilling is within 4 feet of the surface. Safety screen size should be large enough to accommodate all backfill materials and any tools used during backfill yet not large enough for any human to accidentally fall through.

F. The bore for the well shall be both vertical and straight and the well pipe shall be installed in the center of the bore hole. The Contractor will take all tension off of the pipe by mechanical means and center the pipe in the middle of the borehole before starting to backfill. Contractor shall use clamping devices, or other method approved by Owner's Representative, to aid in centering of the pipe. Wells that are leaning more than 5 degrees from the vertical shall be replaced by the Contractor at his own expense.

G. PVC well pipe shall be solvent cemented and lag bolted.

H. Contractor shall leave a minimum 5 feet stickup of the solid well casing above the existing landfill grades (daily or intermediate cover) at the well location.

I. Contractor shall remove all working platforms constructed for the drill rig after the installation of the well. Hauling, construction, removal and other work tasks related to well installation shall be carried out with minimal disturbance to the vegetation on the landfill.

3.02 BACKFILLING

A. Backfilling of the well shall commence immediately after well drilling is completed and the well piping has been installed in the borehole. Backfill materials shall be installed as indicated on the Drawings and as approved by the Owner's Representative.

B. Gravel pack shall be poured or scooped through the screen at a rate that will not endanger the integrity of the well casing. Care shall be taken during backfilling to prevent bridging.

C. The filter fabric shall be installed after the gravel backfill reached the level shown on the Drawings.

D. The well seal will be formed by evenly distributing two 50 lb. bags of bentonite material around the annulus of the well and then adding 10 gallons of fresh water in a manner that will allow for a thorough saturation of the bentonite material. This process will be continued until a minimum plug thickness of 2 feet has been achieved. Alternatively, well seal can be formed by mixing bentonite with water in a surface mixer and then pouring the slurry down hole.

E. Soil backfill shall be rodded in the boring to provide even distribution and compaction. Finished grade at the well location shall prevent any water accumulation near the well location by promoting drainage away from the well.

F. All material layer thicknesses shall be verified by taking measurements before, during, and after installation of each layer.

3.03 WELLHEAD AND HOSE INSTALLATION

A. Wellheads and hoses shall be installed per the manufacturer specifications.

B. Wellhead and hose installations shall provide the flexibility to make adjustments to accommodate differential settlements. Installation shall be at 1 feet above minimum wellhead adjustment.

C. Well hose connection shall be about 4 feet length and shall be fitted in a manner that prevents the accumulation of condensate.

D. The well pipe and lateral pipe vertical extension shall be spaced at 2 feet ± 6 inches. The lateral pipe vertical extension shall be sticking up about 4 feet from the existing grades (daily or intermediate cover) of the landfill. This would result in the well casing pipe being 1 feet above the lateral pipe vertical extension.

3.04 DISPOSAL

A. Excavated refuse is to be loaded and hauled by the Contractor to the operating portion of the landfill for disposal as directed by the Owner.

B. If waste disposal operations at the working face are not going on at a particular day or time, the Contractor shall store the excavated materials in stockpiles on the landfill surface. These stock piles shall either be covered with: (i) temporary plastic covers that are anchored firmly by use of weights to prevent uplift by winds; or (ii) a minimum of 12 in of soil cover. The contractor shall haul and dispose the stored materials as soon as the waste disposal operations at the working face commence. The Contractor shall also clean the storage location of all excavated materials.

3.05 INITIAL DEWATERING

A. The Contractor shall dewater the wells after the installation if needed. The Contractor shall provide all materials required to dewater and shall also dispose of the pumped liquid as directed by the Owner/Owner's Representative.

3.06 FIELD QUALITY CONTROL AND QUALITY ASSURANCE

A. Field quality control shall be the responsibility of the Contractor. Field quality assurance shall be the responsibility of the Owner's Representative.

B. Visual soil classification and approval of soil by the Owner's Representative.

C. Field inspection of all construction materials and approval by the Owner's Representative.

D. Field inspection of well installation work and approval by the Owner's Representative.

E. All wells shall be inspected by the Owner's Representative after setting the well casing in the borehole and backfilling with gravel, but before placement of bentonite, unless as directed otherwise by the Owner's Representative on a case by case basis. The Contractor shall inform the Owner's Representative before backfilling with bentonite for each well.

END OF SECTION

SECTION 15051

HIGH DENSITY POLYETHYLENE (HDPE) PIPE AND FITTINGS

SECTION 15051 - HIGH DENSITY POLYETHYLENE (HDPE) PIPE AND FITTINGS

PART I GENERAL

1.01 SCOPE OF APPLICATION

A. Supply and installation of SDR 17 High Density Polyethylene (HDPE) single contained gas collection pipe and fittings in nominal pipe sizes of 2, 4, 6, 8, 12, 14, 18, 20, and 26 inches.

B. Supply and installation of SDR 17 High Density Polyethylene (HDPE) single contained condensate gravity drain or transfer pipe and fittings in nominal pipe size of 4 and 6 inches.

1.02 REFERENCES (Reserved)

1.03 SUBMITTALS

A. The Contractor shall submit all manufacturer quality assurance certificates to the Owner's Representative and obtain approval before using the materials in construction.

B. The Contractor shall submit all field pressure testing results to the Owner's Representative for approval.

1.04 MANUFACTURER'S QUALITY ASSURANCE

A. The pipe and fittings manufacturer shall have an established quality assurance program responsible for inspecting incoming and outgoing materials.

B. The pipe and fittings manufacturer shall have an established quality assurance program responsible for assuring the long term performance of materials and products.

C. The pipe and fitting manufacturer shall maintain permanent QC and QA records.

1.05 PACKAGING DELIVERY AND HANDLING

A. The pipe and fitting manufacturer shall package products for shipment in a manner suitable for safe transport by commercial carrier. When delivered, a receiving

inspection shall be performed by the Contractor, and any shipping damage reported to the pipe and fittings manufacturer. Pipe and fittings shall be handled, installed, and tested in accordance with manufacturer's recommendations, and the requirements of this specification.

PART 2- PRODUCTS

2.01 PHYSICAL PROPERTIES:

A. Materials used for the manufacture of polyethylene pipe and fittings shall meet all industry standards.

B. The pipe and fittings shall be homogenous throughout and free from visible cracks, holes, foreign inclusions or other injurious defects. The pipe shall be as uniform as commercially practical in color, opacity, density and other physical properties.

2.02 PIPE AND FITTINGS:

A. DIMENSIONS:

1. Pipe Dimensions: The nominal inside diameter of the pipe shall be true to the specified pipe size in accordance with ASTM D 2513. Standard laying lengths shall be 40 feet ±2". Exceptions may be made for 2 inch diameter pipes in coils if suitable strengthening devices are used.

2. Fitting Dimensions: Fittings such as coupling, flanges, wyes, tees, adaptors, etc. for use in laying pipe shall have standard dimensions that conform to ASTM.

B. Where possible, pipe and fittings should be produced by the same manufacturer from identical materials meeting the requirements of this specification. Special or custom fittings may be exempted from this requirement.

C. Pipe and fittings shall be pressure rated to meet the service pressure requirements specified by the Owner's Representative. Whether molded or fabricated, fittings shall be fully pressure rated to at least the same service pressure rating as the pipe to which joining is intended.

D. Marking:

A. Each standard and random length of pipe and fitting in compliance with this standard shall be clearly marked with the following information:

1. ASTM Standard Designation

2. Pipe Size

3. Class & Profile Number

4. Production Code

5. Standard Dimension Ratio

PART 3 EXECUTION

3.01 FIELD QUALITY CONTROL

A. Field quality control is the responsibility of the Contractor. The Owner's Representative shall inspect and approve the Contractor's field quality control measures.

B. Pipe shall be rejected for failure to conform to Specifications or the following:

1. Fractures or cracks passing through pipe wall, except single crack not exceeding 2 in. in length at either end of pipe which could be cut off and discarded. Pipes within one shipment shall be rejected if defects exist in more than 5% of shipment or delivery.

2. Cracks sufficient to impair strength, durability or serviceability of pipe.

3. Defects indicating improper proportioning, mixing, and molding.

4. Damaged ends, where such damage prevents making satisfactory joint.

C. Acceptance of fittings, stubs or other specifically fabricated pipe sections shall be based on visual inspection at job site and documentation of conformance to these Specifications.

3.02 INSTALLATION

A. Trench, backfill, and compact in accordance with Sections 02221 and 02222.

B. Heat Fusion of Pipe:

1. Weld in accordance with manufacturer's recommendation for butt fusion methods. Provide at least one fusion operator certified by the pipe manufacturer and with prior field experience in at least 3 projects to manage the fusing operations for the project.

2. Butt fusion equipment for joining procedures shall be capable of meeting conditions recommended by pipe manufacturer including, but not limited to, temperature requirements, alignment, and fusion pressures.

3. For cleaning pipe ends, solutions such as detergents and solvents, when required, shall be used in accordance with manufacturer's recommendations.

4. Do not bend pipe to greater degree than minimum radius recommended by manufacturer for type and grade.

5. Do not subject pipe to strains that will overstress or buckle piping or impose excessive stress on joints.

6. Branch saddle fusions shall be joined in accordance with manufacturer's recommendations and procedures. Branch saddle fusion equipment shall be of size to facilitate saddle fusion within trench.

7. Before butt fusing pipe, inspect each length for presence of dirt, sand, mud, shavings, and other debris or animals. Remove debris from pipe.

8. Cover at end of each working day open ends of fused pipe. Cap to prevent entry by animals or debris.

9. Use compatible fusion techniques when polyethylenes of different melt indexes are fused together. Refer to manufacturer's specifications for compatible fusion.

C. Flange Jointing:

1. Use on flanged pipe connection sections.

2. Connect slip-on carbon steel backup flanges with stainless steel nuts and bolts.

3. Butt fuse fabricated flange adapters to pipe.

4. Observe following precautions in connection of flange joints.

a. Align flanges or flange valve connections to provide tight seal. Require nitrile-butadiene gaskets if needed to achieve seal. Gaskets are required for flange/valve connections.

b. Place U.S. Standard round washers as may be required on some flanges in accordance with manufacturer's recommendations. Bolts shall be lubricated in accordance with manufacturers recommendations.

c. Tighten flange bolts in sequence and accordance with manufacturer's recommendations. Do not over-torque bolts.

5. Pull bolt down by degrees to uniform torque in accordance with manufacturer's recommendation.

6. Protect below grade bolts and flanges by covering with a polyethylene wrap. Duct tape warp to HDPE pipe.

7. Electrofusion couplers, where used, installed per manufacturer's specifications.

D. Pipe Placement:

1. Grade control equipment shall be of type to accurately maintain design grades and slopes during installation of pipe.

2. Dewatering: Remove standing water in trench before pipe installation.

3. Unless otherwise specifically stated, install pipe in accordance with manufacturer's recommendations.

4. Maximum lengths of fused pipe to be handled as one section shall be placed according to manufacturer's recommendations as to pipe size, pipe SDR, and topography so as not to cause excessive gouging or surface abrasion; but not to exceed 500 ft.

5. Cap pipe sections longer than single joining (usually 40 ft.) on both ends during placement except during fusing operations.

6. Notify Owner's Representative prior to installing pipe into trench and allow time for Owner's Representative's inspection. Correct irregularities found during inspection.

7. Complete tie-ins within trench whenever possible to prevent overstressed connections.

8. Allow pipe sufficient time to adjust to trench temperature prior to testing, segment tie-ins or backfilling activity.

9. Install reducers adjacent to laterals and tees.

10. To reduce branch saddle stress, install saddles at slope equal to and continuous with lateral piping.

11. Place in trench by allowing minimum 12 inch/100 ft for thermal contraction and expansion.

12. Coordinate construction of pipes near access roads with OWNER to limit impediment of landfill operations or operations of other Contractors.

3.03 PIPE TESTING

A. Air Test all pipe sections and fittings after placement in trench, in accordance with manufacturer's recommendations. Wells and other system openings should be blocked off for testing. Pressure test below ground systems (only). Special precautions are required for this type of testing. It is not recommended that above ground systems be pressure tested.

B. Keep all persons at a safe distance during pressure testing.

C. Disconnect the test section from all GCCS components that are not being tested. Failure of a section should result in compressed air being released to atmosphere.

D. Completely backfill extraction pipes before pressure testing to provide adequate restraint.

E. Heat fusion joints most be properly cooled before pressure testing. Mechanical connections should be installed and tightened per manufacturer instructions.

F. Repair work should be carried out only after release of pressure. Release pressure gradually.

3.04 VALVES

A. Valves shall be provided at the locations specified on the Drawings.

B. Valves shall be provided in accordance with the details provided on the project construction drawings. All valves shall meet the industry standard requirements.

C. Valves shall include monitoring ports at either side in accordance with the details provided by the Owner's Representative.

END OF SECTION

SECTION 15061

POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS

SECTION 15061 - POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS

PART 1 GENERAL

1.01 SCOPE OF APPLICATION

A. Supply 8 inch diameter polyvinyl chloride (PVC) Schedule 80 pipe and fittings for well casings. Both solid and slotted pipes are required to be provided.

1.02 REFERENCES

A. ASTM D-2855: Standard Practice for Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and fittings

B. ASTM D-402: Standard Practice for Safe Handling of Solvent Cements Primers, and Cleaners used for Joining Thermoplastic Pipe and Fittings

1.03 SUBMITTALS

A. The Contractor shall submit all manufacturer quality assurance certificates to the Owner's Representative and obtain approval before using the materials in construction.

PART 2 PRODUCTS

2.01 PIPE & FITTINGS

A. Materials used for the manufacture of polyethylene pipe and fittings shall meet all industry standards.

B. The pipe and fittings shall be homogenous throughout and free from visible cracks, holes, foreign inclusions or other injurious defects. The pipe shall be as uniform as commercially practical in color, opacity, density and other physical properties.

2.02 SLOTTED PIPE

A. Refer to Section 02610 for Gas Well slotting requirements.

PART 3 EXECUTION

3.01 PVC PIPE HANDLING

A. PVC pipe and pipe fittings shall be handled carefully in loading and unloading. They shall be lifted by hoists and lowered on skidways in such a manner as to avoid shock. Derricks, ropes, or other suitable equipment shall be used for lowering the pipe into the extraction well borings. Pipe and pipe fittings shall not be dropped or dumped.

3.02 PVC PIPE INSTALLATION

A. PVC pipe installation shall conform to these specifications and manufacturer's recommendations.

3.03 JOINING OF PVC PIPES

A. Joining of pipes shall be in accordance with ASTM D-2855.

B. All pipe shall be inspected for cuts, scratches, or other damages prior to installation. Pipe with imperfections shall not be used.

C. All burrs, chips, etc., shall be removed from pipe interior and exterior.

D. All loose dirt and moisture shall be wiped from the interior and exterior of the pipe end and the interior of the fitting.

E. All pipe cuts shall be square, perpendicular to the center line of pipe.

F. Pipe ends shall be beveled prior to applying primer and solvent cement so that the cement does not get wiped off during insertion into the fitting socket.

G. A coating of CPS primer as recommended by pipe supplier shall be applied to the entire interior surface of the fitting socket, and to an equivalent area on the exterior of the pipe prior to applying solvent cement.

H. The solvent cement shall be applied in strict accordance with manufacturer's specifications.

I. Pipe shall not be primed or solvent welded when it is raining or when atmospheric temperature is below 40°F or above 90°F when under direct exposure to the sun. This requirement may be waived by the Owner's Representative for extraction well pipe joining vertically by utilizing lag screws as specified in Section 02610.

J. After solvent welding, the pipe shall remain undisturbed until cement has thoroughly set. As a guideline for joint settling time, use 1 hour for ambient temperatures 60-

100°F, or 2 hours when ambient temperature is 40-60°F. This requirement may be waived for extraction well piping utilizing lag screws as specified in Section 02610.

K. Pipe and pipe fittings shall be selected so that there will be as small a deviation as possible at the joints, and so that inverts present a smooth surface. Pipe and fittings which do not fit together to form a tight fitting will be rejected.

END OF SECTION

SECTION 11315

CONDENSATE MANAGEMENT SYSTEM

SECTION 11315 - CONDENSATE MANAGEMENT SYSTEM

PART 1 GENERAL

1.01 SCOPE OF APPLICATION

A. This section covers the minimum requirements for the supply, installation, and startup of: (i) six condensate "U tube" drains installed at all low points along the header (i.e., at all LPHs except LPH-3) with gravity drain connections to existing leachate cleanouts; (ii) one 36 inch diameter condensate knockout pot with gravity drain connection to the proposed condensate sump tank; (iii) one condensate "U tube" drain with connections to condensate drains from flare and blower on the pressure side stub and the two knockout pots near the flare station on the vacuum side stub, and a condensate gravity drain connection to the proposed condensate sump tank; and (iv) one 36 inch diameter condensate sump tank with an electrical pump and force main line connection to Cell 1 leachate sump/cleanout.

B. Equipment supplied under this section shall have a proven performance of not less than two years in actual landfill condensate liquid collection and pump service.

1.02 SITE CONDITIONS

A. Condensate liquid from the gas collected from several wells will flow through a section of the gas collection pipe to an engineered low point within the gas piping system. Condensate liquid shall freely drain to a sealed condensate "U tube" drain to be installed at this engineered low point within waste limits. Liquid collected in the condensate "U tube" drain shall gravity drain through a 6 inch diameter pipe to an existing cleanout as shown on the Drawings.

B. A 36-inch diameter condensate knockout pot with gravity drain connection to the proposed condensate sump tank will be installed outside the waste limits as shown on the Drawings to remove condensate before the gas enters the knockout pot (provided by the Manufacturer) located on the flare skid.

C. A condensate "U tube" drain is installed near the flare station to provide separation of drain pipes under positive pressure (flare and blower condensate connections) and vacuum (two knockout pots) before connecting the drain to the proposed condensate sump tank.

D. A 36-inch diameter condensate sump tank with an electrical pump and force main line connection to Cell 1 leachate sump/cleanout is installed to provide adequate storage for condensate in case of pump failure.

1.03 GENERAL PRODUCT DESCRIPTION

A. The condensate "U tube" drain shall be 6 inch diameter HDPE SDR 17 with dimensions as shown on the Drawings.

B. The condensate knockout pot shall be 36-inch diameter HDPE SDR 17 with dimensions as shown on the Drawings.

C. The condensate sump tank shall be 36 inch diameter HDPE SDR 17 with dimensions as shown on the Drawings.

D. Integral to the condensate sump shall be an automatic electrical pump that meets the requirements set forth in Part 2, Section 2.06 of this specification.

C. The equipment shall be rated for service in harsh and potentially explosive environments.

1.04 CONDENSATE SYSTEM DIMENSIONS

A. The condensate system dimensions shall be as shown on the drawings.

1.05 SUBMITTALS

A. The condensate knockout pot, sump tank, and pump manufacturer's specifications.

B. A piping and instrumentation diagram showing the workings of the automatic electrical pump system.

1.06 REFERENCES

A. Pipe Material

1. The sump used as part of the condensate liquid sump shall meet the following ASTM specifications:
   HDPE Pipe 03350 standard specifications for polyethylene plastic pipe and fittings materials.

PART 2 PRODUCTS

2.01 CONDENSATE "U TUBE" DRAIN

A. The condensate "U tube" drain shall be 6 inch diameter HDPE SDR 17 with dimensions as shown on the Drawings.

B. The condensate "U tube" drain shall have 6 inch diameter HDPE SDR 17 gravity drain connections to existing leachate cleanouts as shown on the Drawings.

2.02 CONDENSATE KNOCKOUT POT

A. The condensate knockout pot shall be 36-inch diameter HDPE SDR 17 with dimensions as shown on the Drawings. The knockout pot shall be liquid and gas tight and shall be designed to withstand vacuum of 100 inches of water and pressure of 5 psig.

B. The condensate knockout pot shall have 4 inch diameter HDPE SDR 17 gravity drain connection to the proposed condensate sump tank as shown on the Drawings.

2.03 CONDENSATE SUMP TANK AND "U TUBE"

A. The condensate sump tank shall be 36-inch diameter HDPE SDR 17 with dimensions as shown on the Drawings. A 6-inch HDPE "U tube" connection shall be used to drain liquid into the sump. The sump shall be liquid and gas tight and shall be designed to withstand vacuum of 100 inches of water and pressure of 5 psig.

B. The condensate "U tube" drain shall have connections to condensate drains from flare and blower on the pressure side stub and the two knockout pots near the flare station on the vacuum side stub, and a condensate gravity drain connection to the proposed condensate sump tank. Isolation valves shall be installed on drain lines as shown on the Drawings.

C. The sump shall be designed to have an 8 inch deep solids settling area. Further, the design shall be such that solids will not affect the pump or control system operation.

2.04 EQUIPMENT ENCLOSURE HOUSING (VAULT)

A. All operable components of the condensate pump and control assembly shall be located in a polyethylene vault assembly that is integrally mounted to the top of the condensate liquid sump. The vault shall be able to withstand continuous high temperatures near the flare station.

B. All equipment in the vault shall be arranged to be easily accessible for operation and maintenance.

C. Service connections including the liquid discharge and electrical lines shall be bulkhead mounted on a common wall of the vault.

2.05 PIPING

A. Piping requirements are addressed in HDPE specifications Section 15051.

2.06 LIQUID PUMP

A. The pump installed in the condensate sump shall be an EPG Companies SurePump Vertical Sump Drainer. The specific model selected must use 3-phase power and be capable of pumping rates of 20 to 30 gallons per minute with 20 feet of head. Equivalent pumps must be approved by the Owner's Representative.

2.07 LEVEL CONTROL AND ALARM

A. An adjustable level control shall be provided for the pump. Peak head levels that determine initiation of pumping shall be decided upon when actual field conditions are known. The upper limit shall not exceed 1 foot below the height of the equalization line or condensate inlet pipe (whichever is lower), as installed on the condensate sump. The lower limit should not exceed the point at which air will be pulled into the pump as installed.

B. An alarm display shall be provided for high level alarm conditions.

2.08 CONNECTIONS

A. All materials used in the high pressure liquid discharge line shall be rated for 100 psig pressure with a safety factor of 3.

B. The pressure equalizing line which runs between the landfill condensate liquid pump system and the top of the LFG header shall be PVC hose, PVC or PE pipe, or other non-corrosive material with 1 inch diameter or larger.

2.09 SEALS

A. A PVC flexible membrane seal shall be used to seal the excavation as part of the backfill operations.

2.10 BACKFILL MATERIAL

A. Soil backfill shall not have any large stones or other foreign materials present and should be suitable for adequate compaction as approved by the Owner's Representative. Care shall be taken that the materials adjacent to the condensate sump are fine graded and that no objects are present that could cause damage to the sump.

PART 3 EXECUTION

3.01 HANDLING AND SETTING THE CONDENSATE SUMP UNIT

A. The condensate sump unit and the knockout pot unit shall be lifted and handled according to written procedures supplied by the manufacturer.

B. The units are to be set within 1/4 percent of vertical.

C. The units shall be set so that it is concentrically located in the prepared hole.

D. The units shall be installed in an area that does not allow accumulation or ponding of water. The vault assembly shall be at least 6 inches higher than surrounding grade unless installed in a water tight vault

3.02 CONDENSATE SUMP AND PUMP CONNECTIONS

A. Prior to making connections, all lines shall be purged of debris and thoroughly cleaned.

C. Condensate liquid discharge: The condensate liquid discharge line shall be connected to the condensate sump using good engineering practices. Materials and installation shall be as indicated on the Drawings.

D. Equalizing line: A pressure equalizing line shall be connected between the condensate sump and the top of the LFG header. The equalizing line shall be free draining to either the landfill gas collection pipe or the sump and shall be free of kinks or other obstructions to liquid or air flow.

3.03 TESTING

A. Check sump storage tank, lines and block valve positions prior to operation.

B. Testing shall include the minimum operations:

1. Pressure test to verify that all connections are tight.
2. Leak test connections prior to setting and backfill.
3. Dry operation of the pump for two minutes.

3.04 ACCEPTANCE

A. Prior to acceptance the following verifications shall be made:

1. Verify units are installed vertically.
2 Verify units have been installed per manufacturer's recommendations.
3. Verify all connections have been: pressure tested per the manufacturer's recommendations.
4. Verify the pipes and connections are clean and free of debris.
5. Verify the level switch displacers are installed at elevations appropriate for the installation. As-built displacer elevations shall be recorded and

submitted to the Owner's Representative by the Contractor prior to project acceptance.

6. Verify all required functional testing has been completed.

END OF SECTION

SECTION 11910

LANDFILL GAS FLARE/BLOWER SKID

SECTION 11910 - LANDFILL GAS FLARE/BLOWER SKID

PART 1 - GENERAL

1.01 SCOPE OF APPLICATION

A. Provide all materials, equipment, and labor needed to install the blower/flare skid assemblies and appurtenances in accordance with the Drawings.

1.02 REFERENCES (RESERVED)

1.03 SUBMITTALS

A. Submit to the Owner's Representative for approval manufacturer's literature, shop drawings, or other information pertaining to the assembly, operation, lubrication, adjustments, and other maintenance and repairs of equipment installed under this Section, together with detailed parts lists, drawings, and/or photographs. The Contractor shall also prepare and submit shop drawings showing the layout, orientation and dimensions of the flare, blower/motor assembly, condensate knockout pot, piping, valves and fittings to be installed. All electrical and mechanical drawings for the flare control system shall be submitted.

B. Submit blower characteristic curves indicating capacity for flow versus pressure head and efficiency as tested at the factory for approval prior to shipment.

C. Submit signage layout drawings.

D. Submit operation and maintenance manual.

E. Submit all applicable warranty documents.

F. Submit additional field services rate information for a year.

PART 2- PRODUCTS

2.01 FLARE

A. A utility flare manufactured by John Zink, LFG Specialties, Perennial Energy, or equivalent approved by the Owner's Representative can be used. The flare shall be designed in accordance with the United States of Environmental Protection Agency (USEPA) established criteria for open flares, 40 CFR 60.18. The flare shall be capable of burning low Btu gas and shall include a burner; automatic pilot ignition;

electric igniter; pilot gas automatic valves and pilot gas pressure regulator; stack; automatic gas safety shut-off valve; high and low pressure switches; control panel; flame arrester; piping and all other necessary appurtenances to have a complete operational system. The flare shall be capable of combusting LFG with the following composition:

1. Btu Content - 300 to 600 Btu/scf
2. LFG Flow Rate – 360 to 3600 scfm
3. Carbon Dioxide - 20 to 45 percent
4. Hydrogen Sulfide - up to 1,500 ppm
5. Moisture Content - saturated
6. LFG Supply Pressure - 1 to 15 in. w.c.

The flare shall have a minimum destruction efficiency of 98%. The emission factors for the flare shall not exceed the following:

1. CO: 0.37 lb/MMbtu or 374 lb/million dscf of methane (using conversion factor of 1012 Btu/scf)
2. NOx: 0.07 lb/MMbtu or 71 lb/million dscf of methane (using conversion factor of 1012 Btu/scf)

B. Stack: The flare stack shall be carbon steel with rust preventive coating, fitted with necessary connections. The portion of the stack exposed to flame and high temperatures shall be stainless steel. The flare shall be designed for 110 mph wind loading.

C. The electrical connections shall be 480 volts, 60 Hz, and 3 phase.

2.02 FLAME ARRESTER

A. Supply a flame arrester compatible with the required LFG flow rates. Flame arrester shall be sized to match the blower discharge pipe or flare inlet pipe, whichever is larger, with 125 lb. rating ANSI flanged connections. The housing construction shall be cast aluminum. Maximum head loss through the flame arrester shall not exceed 5

in. w.c. at 3,600 cfm as supplied by Varec, Groth, Protectoseal, or other manufacturer approved by Owner's Representative.

2.03 PILOT PROPANE (LPG) TANK AND PIPING

A. The propane tank shall be a standard 200 lb tank equipped with fuel gauges. The pressure of the gas shall meet the requirements of the flare pilot system. Mechanical force shall be provided to boost the gas pressure as required.

2.04 CONDENSATE DRAIN PIPES FOR FLARE COMPONENTS

A. The flame arrester, flare stack, and other parts of the system recommended by the flare manufacturer shall be equipped with condensate drain piping. Pipes shall be sized in accordance with the manufacturer's recommendations.

B. Condensate drains on the pressure side of the blower shall include an automatic drip trap as supplied by Varec, Groth, Protectoseal, or other manufacturer approved by the Owner's Representative.

2.05 AUTOMATIC GAS INLET (SHUTOFF) VALVE

A. Supply electrically operated automatic inlet (shutoff) valve at the discharge of the blower. Automatic valve shall also include a mechanism to close upon loss of power.

2.06 CONTROLS

A. The controls shall provide for automatic and manual operation and ignition of the flare unit, and shall include a weatherproof control panel, trouble light contacts, automatic start/stop for pilot ignition, controllers, spark plugs, orifices, ultraviolet (UV) scanners, thermocouplers, timers, and all other necessary components for a complete operational, automatic system. The controls shall include an automatic dialer with capacity to store and dial up to 6 phone numbers in a hierarchical order, with the provision to stop dialing other receivers as soon as the call is acknowledged as accepted by one receiver.

2.07 IGNITION PROCEDURE AND CONTROL SEQUENCE

A. Remote spark ignition of propane gas/air mixture creates pilot flame that ignites LFG main flame.

B. Once pilot is proven, blower turns on and electric gas inlet valve is opened.

C. When main flame is successfully ignited (as detected by an UV scanner), pilot gas is automatically shut off.

D. If pilot is not ignited within the preselected time interval (as set on the timer), pilot gas is shut off and "Pilot Ignition Failure" is signalled with trouble light.

E. If main flame is not ignited within the preselected time interval, pilot gas is shut off and "Flare Ignition Failure" is signaled with trouble light.

F. If main flame is extinguished after successful ignition, pilot is automatically turned on and reignition attempted for a designated time interval. The waiting time before starting reignition procedures after a main flame failure should be programmable by the operator.

G. If the main flame is not successfully reignited in the designated time interval after being extinguished during normal operation or upon initial ignition, the automatic shutoff valve is closed, the blower(s) shut down, and the telephone dialer and alarm is activated to notify the locations stored in memory.

2.08 BLOWER ASSEMBLIES

A. The blower assemblies shall be, variable frequency drive (VFD), multistage centrifugal-type blowers capable of delivering 3,600 cubic feet per minute (cfm) of landfill gas at 55 inches of water column (in-w.c.) total pressure head. Blowers manufactured by Gardener Denver, New York Blower, Aerovent, Hoffman, Hauck or equivalent approved by the Owner's Representative can be used. The assembly shall be factory mounted on the flare steel skid and delivered to the site as a complete unit. A total of two blowers (to be used alternatively with one serving as a backup) shall be supplied and installed.

B. The motor and blower housings shall each be provided with a nameplate which states the manufacturer, model number, serial number, and the pertinent information regarding electrical requirements, size, capacity, etc.

C. Each blower motor shall be 25 HP, or as recommended by the blower manufacturer to be compatible with electrical service of 480-volt, 3-phase, and 60-hertz. The blower motors shall be high efficiency, non-sparking, totally enclosed, fan cooled (TEFC), explosion proof motor.

D. Motor starter shall be equipped with ammeter (meter relay), Hand-Off Automatic switch, red run light, time switch, and hour meter. Combination controller shall incorporate I-T-E Type ETI, or equal, motor circuit protector and full-voltage, non-reversible starter, in NEMA 1 enclosure with acrylic window for viewing indicators.

E. The blowers shall be supplied with a factory applied phenolic coating or other coating to protect all internal parts that will be in contact with landfill gas and to provide resistance to corrosion. Impellers, if constructed of aluminum or stainless steel, shall not require coating.

F. The blower controls shall include a thermal protection package to monitor the blower inlet and outlet bearing temperatures. Sufficient wiring shall be provided by the Contractor to span the distance between the control panel and the blower bearings.

2.09 EXPANSION JOINTS

A. Expansion joints between the blower inlet and outlet and connected piping shall be supplied by the blower manufacturer and shall be manufactured by Lamson or equivalent approved by the Owner's Representative.

2.10 VALVES

A. Butterfly valves located on the inlet of each blower shall be supplied by the blower manufacturer and shall be a Lamson, wafer-type with a lever or equivalent approved by the Owner's Representative.

B. Flanged butterfly valves may require spacers between the flange adapters and the valve body in order to allow full travel of the internal disk. If spacers are necessary for any butterfly valve, the Contractor will install valve spacers subject to approval by the Owner's Representative.

C. Butterfly control valves shall be provided upstream and downstream side of the blower as shown on the Drawings. These valves shall have wheel-type controls.

2.11 CONDENSATE KNOCKOUT POT

A. A 36-in diameter and 72-inch high condensate knockout pot shall be provided with flanged inlet and outlet connectors.

B. The knockout pot shall include a stainless steel demister pad with a 98% filtration efficiency for free liquid and solid particles of 20 micron or larger.

C. The knockout pot shall have an appropriate internal coating to resist acidic condensate. The external finish shall be rust resistant.

D. The knockout pot shall have a removable lid for inspection and repair.

E. The knockout pot shall have a heavy duty gage glass liquid level indicator, a liquid level switch for high condensate level alarm/shutdown, and a 2-in gravity drain connection with a manual valve.

2.12 SIGNAGE

A. Gas direction arrows shall be placed on all piping in the blower pad area. The moisture trap shall be marked "MOISTURE TRAP". Letters and numerals shall be at least 3 inches high. Numerals identifying Blower Nos. 1 and 2 shall be mounted on the blower coupling guard.

B. "Danger - No Smoking" signs shall be prominently displayed on all tour sides of the fenced enclosure. Signs shall be metal or approved equivalent construction with 2" high lettering. The Contractor shall submit signage layout Drawings for the Owner's Representative's approval.

2.13 SPARE PARTS

A. The Contractor shall provide the following spare parts:

1. 20 ounces of approved grease, or equivalent
2. One each vacuum and pressure gauge
3. Parts recommended by the blower manufacturer.

2.14 INTRUMENTATION

A. Provide a pressure gauge on the outlet and a vacuum gauge on the inlet side of each blower. Pressure and vacuum gauges shall be capable of measuring 0 to 20 and 0 to 70 in w.c., respectively, with the smallest measurement unit of at least 1 in. w.c. Gauges shall have at least a 2.5-inch-diameter dial as supplied by the blower manufacturer.

B. Instrumentation for the flare such as thermocouples as specified in Section 2.06 shall be provided.

C. Provide a digital flow meter manufactured by Fluid Components, Thermal Instruments, or equivalent approved by the Owner's Representative. The flow meter shall be capable of measuring 0 to 4,000 scfm landfill gas flow rate, with the smallest measurement unit of at least 1 scfm. The flow meter shall be capable of directly reading the flow rate in standard cubic feet per minute (scfm). The flow meter shall be installed in a straight section of the gas pipe away from installations such as valves and reducers that may cause flow disturbances.

D. Provide a temperature gage capable of measuring from 0 to 200°F with the smallest measurement unit of at least 1°F at the upstream side of the blower.

2.15 DATA RECORDER

A. Provide an electronic data recorder manufactured by Yokogawa or equivalent manufacturer approved by the Owner's Representative capable of recording data from all electronic gages on the flare/blower skid. Flare temperature and gas flow rate are required by regulations to be recorded. Some other gages that should be recorded are vacuum (inlet side of blower), pressure (out let side of blower), landfill gas temperature etc.

2.16 SKID

A. Provide a heavy duty structural steel sub-base with non-skid floor plate welded over all open areas. The skid shall be constructed to withstand all loads and hauling forces. All necessary bracing, mounting pads, and piping supports shall be provided for proper equipment installation and alignment.

B. The skid shall have adequate grounding and lightening protection.

PART 3- EXECUTION

3.01 INSTALLATION

A. Installation shall be in accordance with the Drawings and Specifications.

B. Install the blower assemblies in compliance with the manufacturer's recommendations, the referenced codes, the Drawings, and as specified below. The flare and controls shall be installed in accordance with manufacturer's recommendations. All necessary support angles and anchor bolts shall be furnished and installed per the flare manufacturer's recommendations. The connection requirements and stack sizes vary from one manufacturer to another. The Contractor shall prepare the installation surfaces only after the flare unit is approved by the Owner's Representative and stack sizes and piping connections are determined.

C. The blower assemblies shall be mounted on neoprene isolation pads provided with the blower. Do not bolt down the blower motor assemblies directly to the skid without isolation pads.

D. The Contractor shall check and, if necessary, adjust the alignment of the motor coupling in accordance with the instructions of the blower manufacturer.

E. Equipment shall be field-tested to verify proper alignment and operation, including: freedom from binding, scraping, vibration, shaft runout, or other defects.

F. Shop-painted items which have damage to the shop coatings shall be touched up to match the basic color of the equipment, as approved by the Owner's Representative.

3.02 STARTUP AND TESTS

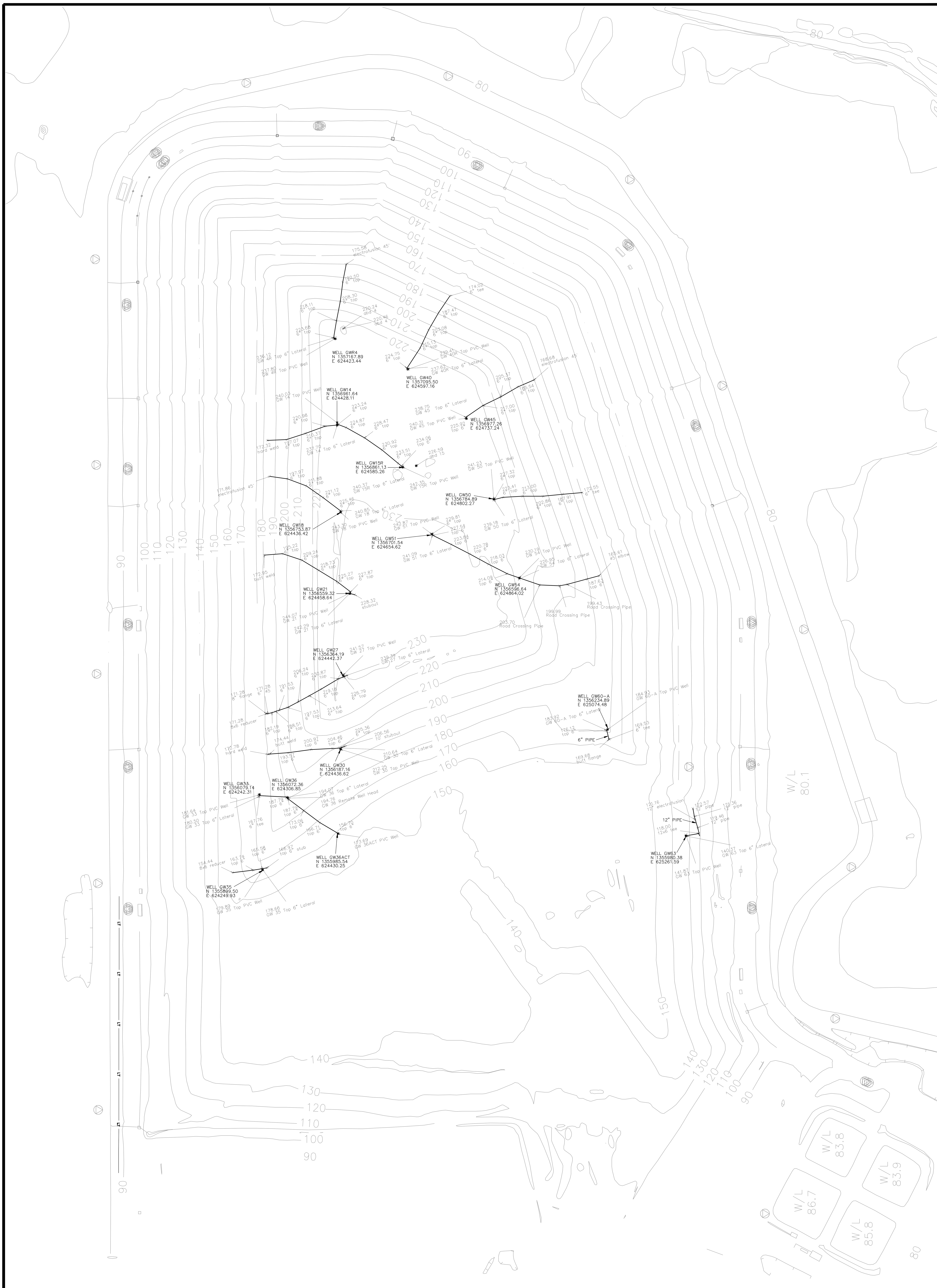
A. Furnish all equipment, materials, and labor necessary for testing the operation of the complete system, valves and appurtenances, upon completion of the installation. The blowers shall be tested to assure proper operation and delivery of specified flow rates and vacuums.

B. Adequate startup training shall be provided. Training schedule shall be submitted and approved by the Owner.

END OF SECTION

APPENDIX C

AS-BUILT SURVEY



GRAPHIC SCALE

(IN FEET)
1 inch = 100 ft.

LEGEND:

NO.	NUMBER
ELEV.	ELEVATION
CONC.	CONCRETE
GW	GAS WELL
×166.97	ELEAVTION TAKEN ON TOP OF PIPE

SURVEYOR's NOTES:

1.) North and coordinate basis is the East Zone of the Florida State Plane Coordinate System, and are based on NGS Control Station Numbers AJ7660(J496) and verified Pickett & Associates Targets 1 and 2 from Topographic Survey dated 12/13/01 as provided. The published values used for this survey are NAD 83 2007 adjustment. The Mapping data shown hereon is based on Pickett & Associates Survey as provided by client.

2.) Underground improvements, encroachments, foundations and/or utilities were not located as a part of this survey.

3.) Vertical information depicted on this report are GPS derived elevations based on the National Geodetic Vertical Datum of 1929 (NGVD29) utilizing site control as provided PK13 with an elevation of 92.92 and OC1406 with an elevation of 80.91.

4.) Symbols shown hereon are not to scale.

DEBORAH L. PEAVEY, P.S.M.
FLORIDA REGISTRATION
NUMBER 6345
FLORIDA BUSINESS
NUMBER 7779

7/21/2010&8/31/2010
SURVEY DATES

SCALE	DRAWING NO.
1"=100'	176
PROJECT NO.	SHEET
612	1 OF 1

ASBUILT SURVEY - GCCS SEQUENCE 3A
J.E.D. SOLID WASTE MANGEMENT FACILITY
1501 OMNI WAY ST. CLOUD, FL

CLIENT:

Omni Waste of Osceola County, LLC
Waste Services, Inc.
1501 Omni Way
St. Cloud, Fl 34773

PEAVEY & ASSOCIATES
SURVEYING AND MAPPING, PA

690 ALICE PLACE
BARTOW, FLORIDA 33830
PHONE: (863) 738-4960
FAX: (863) 533-6972

Drawn By: DLP
Party Chief: DR
Field Book:
Page:

THIS SURVEY IS NOT VALID WITHOUT THE SIGNATURE AND ORIGINAL RAISED SEAL OF A FLORIDA LICENSED SURVEYOR AND MAPPER.

FILE NAME: 612WSI-JED-GAS.dwg

NO.	DATE	REVISION

APPENDIX D
AS-BUILT WELL SCHEDULE

AS-BUILT WELL SCHEDULE - SEQUENCE 3A GCCS EXPANSION
J.E.D. Solid Waste Management Facility

Well ID	Top of Well Casing Elevation[1] (ft)	Ground Elevation[2] (ft)	Northing [1]	Easting[1]	Total BGS[3] Well Depth (ft)	Slotted Length (ft)	Solid Length (ft)	AGS[4] Solid Length (ft)
GW-45	240.31	227.54	1,356,977.26	624,737.24	80	60	25	15
GW-50	241.23	228.94	1,356,784.89	624,802.27	77	60	25	15
GW-51	242.87	230.36	1,356,701.54	624,654.62	65	40	25	15
GW-40R	239.41	227.58	1,357,095.50	624,597.16	80	60	25	15
GW-4R	237.80	224.50	1,357,167.89	624,423.44	110	100	25	15
GW-18	243.30	229.57	1,356,753.87	624,436.42	100	80	25	15
GW-21	244.07	230.67	1,356,559.32	624,458.64	80	70	25	15
GW-27	241.57	230.21	1,356,364.19	624,442.37	75	60	25	15
GW-15R	242.35	228.60	1,356,861.13	624,585.26	80	60	23	7
GW-54	230.19	216.81	1,356,596.64	624,864.02	75	60	25	15
GW-33	181.64	172.30	1,356,079.14	624,242.31	65	50	25	10
GW-36	173.69	167.81	1,355,985.54	624,430.25	47	37	25	15
GW-35	179.89	166.50	1,355,899.50	624,249.93	54	44	25	15
GW-30	212.25	198.20	1,356,187.16	624,436.62	85	75	25	15
GW-60A	184.93	180.10	1,356,234.89	625,074.48	75	55	25	5
GW-63	141.87	132.42	1,355,980.38	625,261.59	28	16	20	9
Totals	---	---	---	---	**1,176**	**927**	**393**	**211**

Notes:

[1] Top of well casings elevations, northings, and eastings provided by Peavey & Associates Surveying and Mapping, PA dated July 21, 2010 and August 31, 2010.

[2] Ground elevations provided by JED.

[3] BGS - Below ground surface

[4] AGS - Above ground surface

Golder Associates

APPENDIX E
WELL BORING LOGS

Landfill Gas Extraction Well Boring and Construction Log

Project #: 083-82734.13

Well ID: GW-45 **Site:** J.E.D. SWMF

Onsite GAI Rep: Veronica Figueroa

Date/Time Began Drilling:	7/7/10 12:39 PM		Date/Time Began Well Install:	7/8/10 10:45 AM	
Date/Time Complete Drilling:	7/8/10 10:15 AM		Date/Time Complete Well Install:	7/8/10 11:30 AM	
Northing:	1,356,977.26		Easting:	624,737.24	
			Top of Well Casing Elevation:	240.31'	
			Ground Elevation:	227.54'	

		Design	Actual
A	Total Depth:	121'	80'
B	Screen Length:	115'	60'
C	Solid Pipe Length:	20'	25'
	# of Centralizers:	0	0

	Checklist		BGS *(to top of layer)*
D	10' of #57 Stone?	☑	80' (ends at 70' BGS)
E	◉ #57 Stone? ○ #89 Stone?	☑	70' (ends at 9' BGS)
F	GeoDisc?	☑	9'
G	1st Bentonite Seal?	☑	9' (ends at 7' BGS)
H	Soil Fill to 3' bgs?	☑	7' (ends at 3' BGS)
I	2nd Bentonite Seal?	☑	3' (ends at 1' BGS)

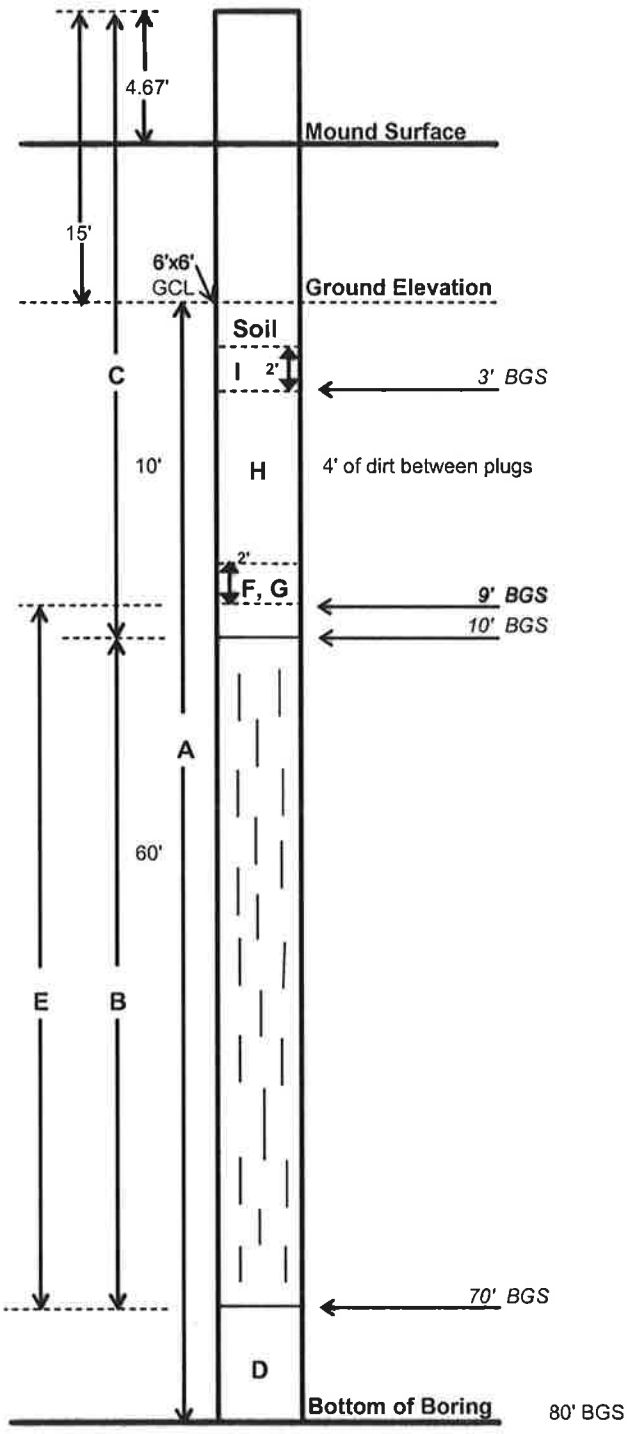
Depth to Top Liner: 15' (As provided by Geosyntec)

Depth to Waste: 2'-3' BGS

Depth (bgs)	Description*	Temp (F)	Time
0-2	Soil	N/A	12:41
2-10	MSW **M=15%, D=Little**	96.9	12:48
10-20	MSW **M=15%, D=Little**	110.3	12:59
20-30	MSW/Muck **M=15%, D=Little**	137.1	13:11
30-40	MSW/Muck/Sandy Soil **M=15%, D=Little**	139.0	13:28
40-50	MSW/Muck/Sandy Soil **M=15%, D=Little**	128.4	14:33
50-60	MSW/Muck (Wet) **M=20%, D=Some**	145.2	14:52
60-70	MSW/Muck **M=20%, D=Some**	140.1	15:24
70-77	Liquid at 76' MSW/Muck (Wet) M=20%,D=Some	133.4	16:00
77-80	Wet Muck/Liquid **M=50%, D=severe**	135.7	8:11 (7/8/10)

*Key: M=Moisture Content, D=Decomposition

Notes: Stopped drilling on 7/7/10 at 77' and resumed drilling on 7/8/10. Top of muck at 70'. Encountered saturated materials that could not be excavated using a bucket auger.



CQA Tech Signature:

Date: 7/8/2010

Landfill Gas Extraction Well Boring and Construction Log

Project #: 083-82734.13
Onsite
GAI Rep: Veronica Figueroa

Well ID: GW-50 **Site:** J.E.D. SWMF

Date/Time Began Drilling: 7/8/10 11:25 AM
Date/Time Complete Drilling: 7/9/10 9:30 AM
Northing: 1,356,784.89

Date/Time Began Well Install: 7/9/10 9:35 AM
Date/Time Complete Well Install: 7/9/2010 111:12 AM
Easting: 624,802.27
Top of Well Casing Elevation: 241.23'
Ground Elevation: 228.94'

		Design	Actual
A	Total Depth:	121'	77'
B	Screen Length:	114'	60'
C	Solid Pipe Length:	20'	25'
	# of Centralizers:	0	0

	Checklist		BGS *(to top of layer)*
D	7' of #57 Stone?	☑	77' (ends at 70' BGS)
E	◉ #57 Stone? ○ #89 Stone?	☑	70' (ends at 9' BGS)
F	GeoDisc?	☑	9'
G	1st Bentonite Seal?	☑	9' (ends at 7' BGS)
H	Soil Fill to 3' bgs?	☑	7' (ends at 3' BGS)
I	2nd Bentonite Seal?	☑	3' (ends at 1' BGS)

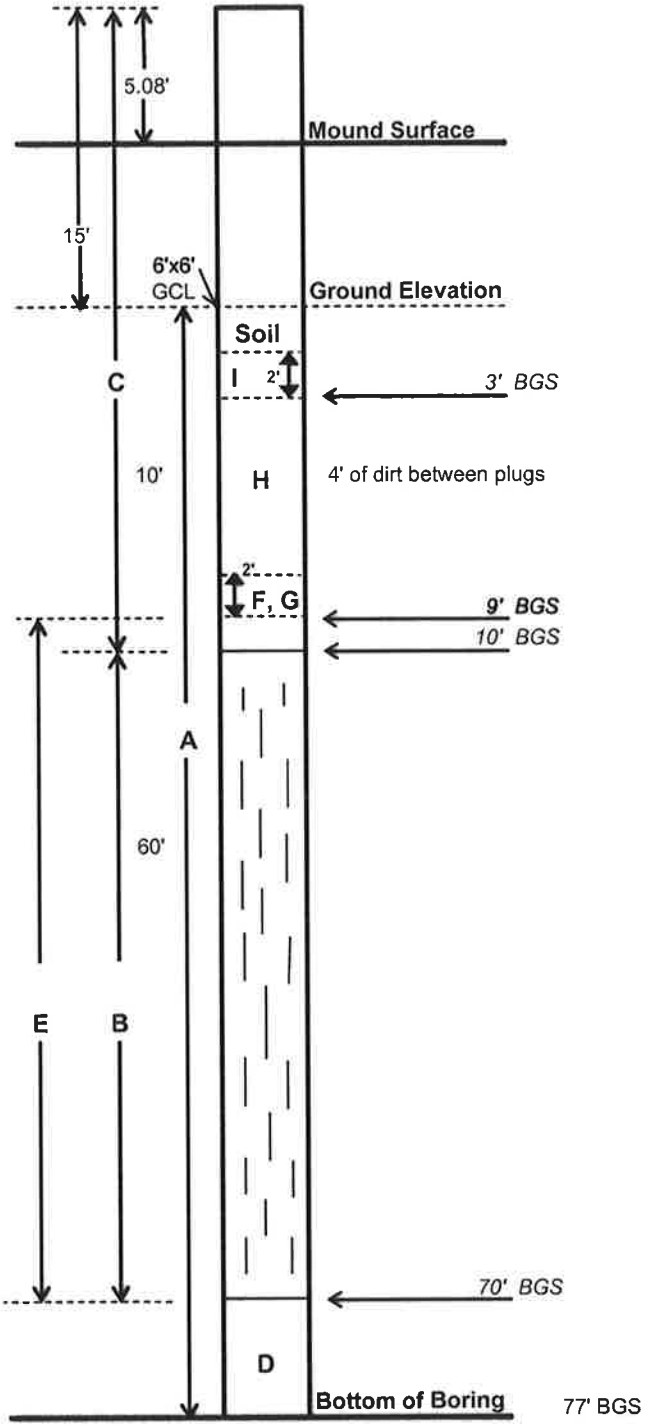
Depth to Top Liner: 15' (As provided by Geosyntec)

Depth to Waste: 2'-3' BGS

Depth (bgs)	Description*	Temp (F)	Time
0-2	Soil	N/A	11:29
2-10	MSW **M=10%, D=Little**	115.5	11:35
10-20	MSW **M=15%, D=Little**	119.1	11:57
20-30	MSW **M=15%, D=Little**	117.8	14:07
30-40	MSW **M=15%, D=Little**	134.7	14:18
40-50	MSW **M=20%, D=Some**	136.9	14:30
50-60	Liquid at 58' MSW, muck (dark) **M=30%, D=Some**	137.4	15:02
60-70	Muck/MSW/Liquid **M=35%, D=Moderate**	144.9	15:21
70-77	MSW/Liquid **M=35%, D=Severe**	142.1	16:30

*Key: M=Moisture Content, D=Decomposition

Notes: Stopped drilling on 7/8/10 at 77' and resumed drilling on 7/9/10. Top of muck at 70'. Encountered saturated materials that could not be excavated using a bucket auger.



CQA Tech Signature:

Date: 7/9/2010

Landfill Gas Extraction Well Boring and Construction Log

Location #1
Location abandoned

Well ID: GW-51 **Site:** J.E.D. SWMF

Project #: 083-82734.13
Onsite
GAI Rep: Veronica Figueroa

Date/Time Began Drilling: 7/9/2010
Date/Time Complete Drilling: Backfilled
Northing: 1,356,680.66

Date/Time Began Well Install: -
Date/Time Complete Well Install: -
Easting: 624,681.97
Ground Elevation: 230.36'

		Design	Actual
A	Total Depth:	113'	-
B	Screen Length:	93'	-
C	Solid Pipe Length:	23'	-
	# of Centralizers:	0	-

	Checklist		BGS *(to top of layer)*
D	#57 Stone?	☐	-
E	○ #57 Stone? ○ #89 Stone?	☐	-
F	GeoDisc?	☐	-
G	1st Bentonite Seal?	☐	-
H	Soil Fill to 3' bgs?	☐	-
I	2nd Bentonite Seal?	☐	-

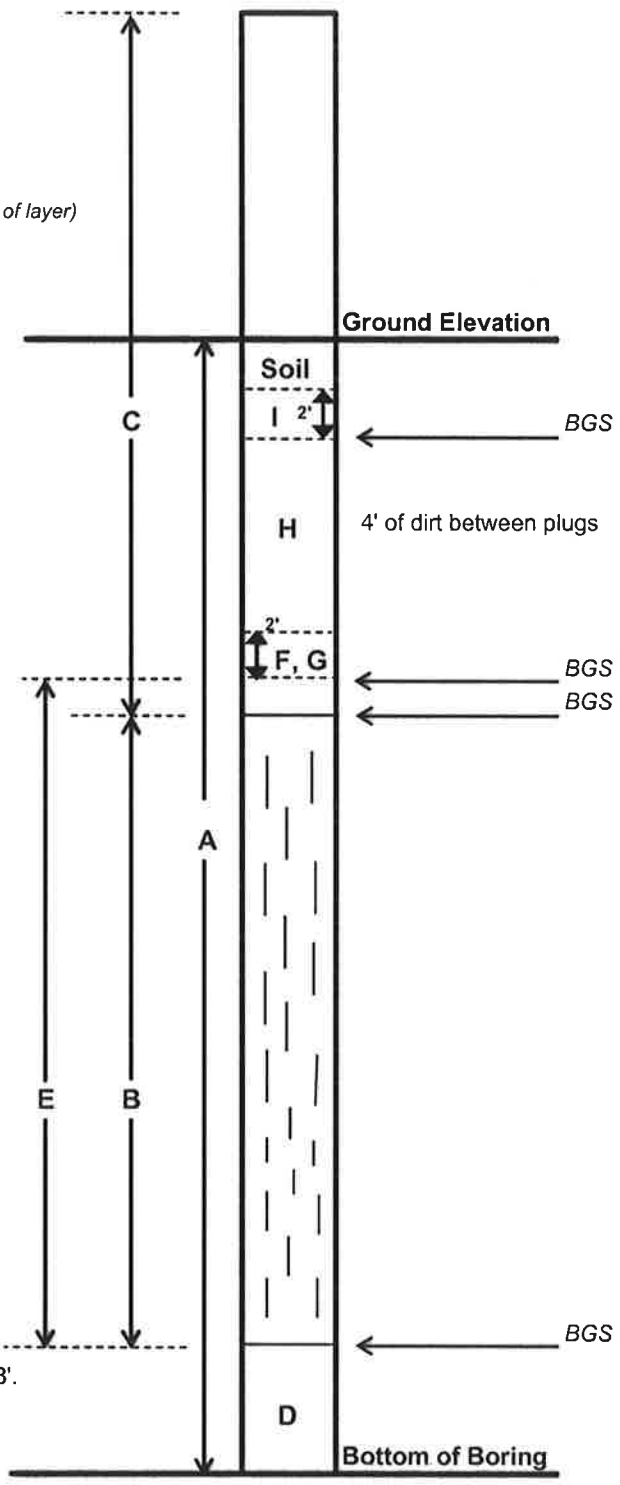
Depth to Top Liner: 15' (As provided by Geosyntec)

Depth to Waste: 2'-3' BGS

Depth (bgs)	Description*	Temp (F)	Time
0-2	Soil	N/A	10:00
2-10	MSW M=10%, D=Little	116.9	10:08
10-20	MSW M=15%, D=Little	126.5	10:40
20-30	MSW/Black muck M=15%, D=Little	129.9	10:57
30-40	MSW/Black muck M=15%, D=Some	127.1	11:23
40-50	MSW/Liquid at 47' M=20%, D=Moderate	131.4	11:52
50-60	Muck/Liquid M=50%, D=Severe	N/A	13:21

*Key: M=Moisture Content, D=Decomposition

Notes: Encountered saturated materials that could not be excavated using a bucket auger. Max depth achievable is 58'. Per WSI request, borehole was backfilled. Well will be drilled in a new location.



CQA Tech Signature:

Date: 7/9/2010

Landfill Gas Extraction Well Boring and Construction Log

Location #2
Location abandoned

Well ID: GW-51 **Site:** J.E.D. SWMF

Project #: 083-82734.13
Onsite
GAI Rep: Veronica Figueroa

Date/Time Began Drilling: 7/9/2010
Date/Time Complete Drilling: Backfilled
Northing: Approx. 1,356,680.66

Date/Time Began Well Install: -
Date/Time Complete Well Install: -
Easting: Approx. 624,681.97
Ground Elevation: Approx. 230.36'

		Design	Actual
A	Total Depth:	113'	-
B	Screen Length:	93'	-
C	Solid Pipe Length:	23'	-
	# of Centralizers:	0	-

	Checklist		BGS *(to top of layer)*
D	4' of #57 Stone?	☐	-
E	○ #57 Stone? ○ #89 Stone?	☐	-
F	GeoDisc?	☐	-
G	1st Bentonite Seal?	☐	-
H	Soil Fill to 3' bgs?	☐	-
I	2nd Bentonite Seal?	☐	-

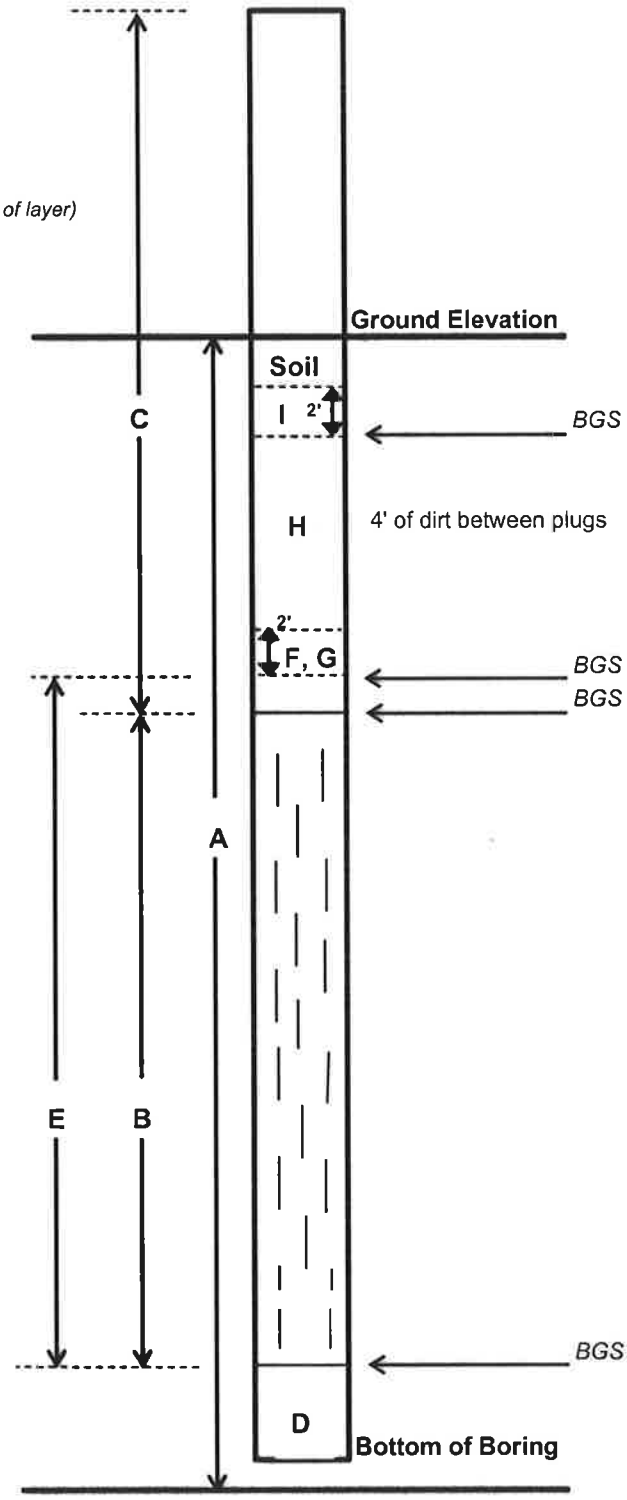
Depth to Top Liner: 15' (As provided by Geosyntec)

Depth to Waste: 2'-3' BGS

Depth (bgs)	Description*	Temp (F)	Time
0-2	Soil	N/A	14:15
2-10	MSW **M=10%, D=Little**	119.4	14:24
10-20	MSW **M=10%, D=Little**	123.9	14:33
20-30	MSW **M=15%, D=Little**	127.7	14:46
30-40	MSW **M=20%, D=Some**	133.7	15:02
40-50	MSW/Liquid at 50' **M=25%, D=Some**	142.2	15:21
50-60	Muck/Liquid **M=50%, D=Severe**	140.1	15:57
60-69	Muck/Liquid **M=50%, D=Severe**	146.5	16:33
69-82	Liquid **M=100%**	N/A	9:15 **(7/10/10)**

*Key: M=Moisture Content, D=Decomposition

Notes: New location for GW-51 is approx. 30' S/SE of original location. Encountered saturated materials that could not be excavated using a bucket auger (drilled two additional hrs per WSI request). Top of muck at 58', bucket can go to 82'. Per WSI request, borehole was backfilled. Well will be drilled in a new location.



CQA Tech Signature

Date: 7/10/2010

Landfill Gas Extraction Well Boring and Construction Log

Project #: 083-82734.13
Onsite
GAI Rep: Veronica Figueroa

Well ID: GW-51 (3rd location) **Site:** J.E.D. SWMF

Date/Time Began Drilling: 7/19/2010
Date/Time Complete Drilling: 7/20/10 9:55 AM
Northing: 1,356,701.54

Date/Time Began Well Install: 7/20/10 10:05 AM
Date/Time Complete Well Install: 7/21/10 9:15 AM
Easting: 624,654.62
Top of Well Casing Elevation: 242.87'
Ground Elevation: Approx. 230.36'

		Design	Actual
A	Total Depth:	112'	65'
B	Screen Length:	93'	40'
C	Solid Pipe Length:	23'	25'
	# of Centralizers:	0	0

	Checklist		BGS *(to top of layer)*
D	15' of #57 Stone?	☑	65' (ends at 50' BGS)
E	◉ #57 Stone? ○ #89 Stone?	☑	50' (ends at 9' BGS)
F	GeoDisc?	☑	9'
G	1st Bentonite Seal?	☑	9' (ends at 7' BGS)
H	Soil Fill to 3' bgs?	☑	7' (ends at 3' BGS)
I	2nd Bentonite Seal?	☑	3' (ends at 1' BGS)

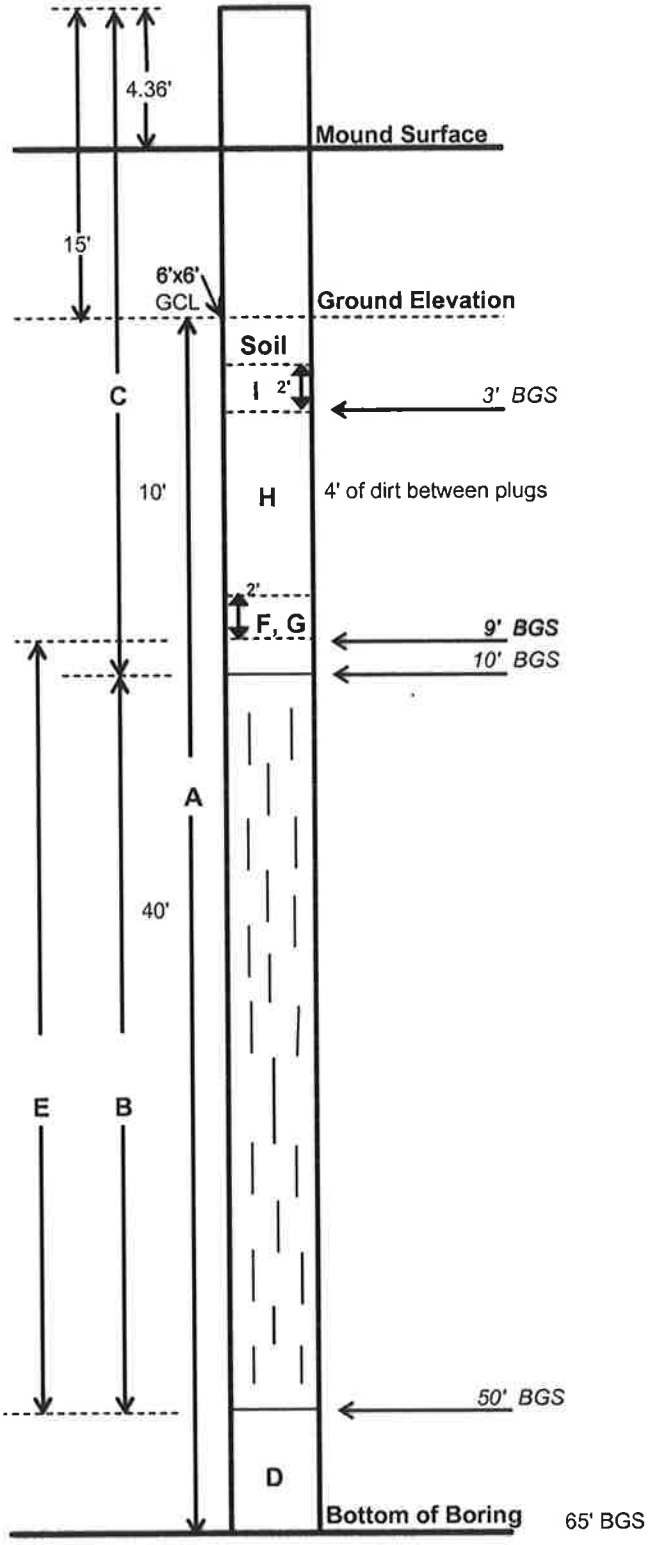
Depth to Top Liner: 15' (As provided by Geosyntec)

Depth to Waste: 2'-3' BGS

Depth (bgs)	Description*	Temp (F)	Time
0-10	Coversoil, MSW M=10%, D=Little	113.2	15:58
10-20	MSW M=10%, D=Little	125.9	16:10
20-30	MSW M=15%, D=Little	123.8	16:21
30-40	MSW M=15%, D=Little	127.5	16:39
40-50	Liquid/muck at 40' M-50%, D=Severe	130.8	7:45 (7/20/10)
50-60	Liquid/muck/MSW M-35%, D=Moderate	128.4	8:28 (7/20/10)
60-65	Liquid/Muck/MSW, M=50%, D=Severe D=Moderate	131.9	9:50 (7/20/10)

*Key: M=Moisture Content, D=Decomposition

Notes: New location for GW-51 is approx. 40' NW of original location. Encountered saturated materials that could not be excavated using a bucket auger. Top of muck at 51'.



CQA Tech Signature: Date: 7/20/2010

Well ID: GW-40R **Site:** J.E.D. SWMF

Project #: 083-82734.13
Onsite
GAI Rep: Veronica Figueroa

Date/Time Began Drilling: 7/12/10 7:33 AM
Date/Time Complete Drilling: 7/13/2010
Northing: 1,357,095.50

Date/Time Began Well Install: 7/13/10 8:30 AM
Date/Time Complete Well Install: 7/13/10 9:15 AM
Easting: 624,597.16
Top of Well Casing Elevation: 239.41'
Ground Elevation: 227.58'

		Design	Actual
A	Total Depth:	117'	80'
B	Screen Length:	111'	60'
C	Solid Pipe Length:	20'	25'
	# of Centralizers:	0	0

	Checklist		BGS *(to top of layer)*
D	10' of #57 Stone?	☑	80 (ends at 70' BGS)
E	(◉) #57 Stone? ( ) #89 Stone?	☑	70 (ends at 9' BGS)
F	GeoDisc?	☑	9'
G	1st Bentonite Seal?	☑	9' (ends at 7' BGS)
H	Soil Fill to 3' bgs?	☑	7' (ends at 3' BGS)
I	2nd Bentonite Seal?	☑	3' (ends at 1' BGS)

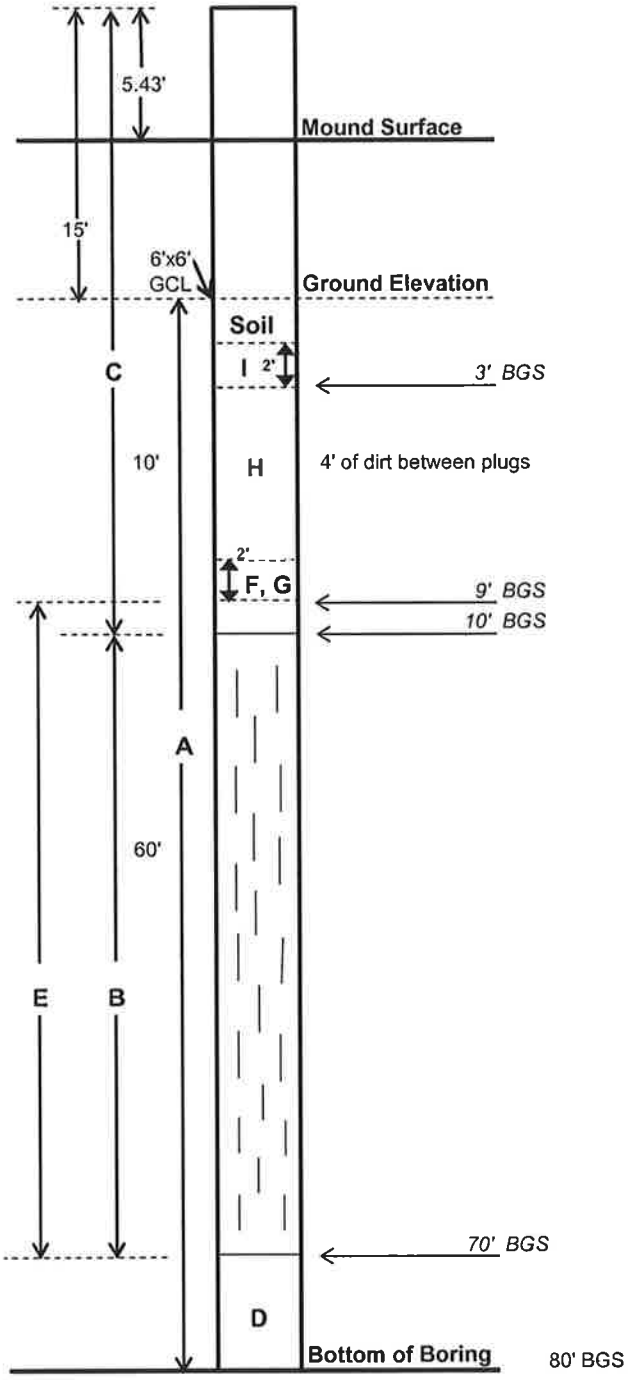
Depth to Top Liner: 15' (As provided by Geosyntec)

Depth to Waste: 2' BGS

Depth (bgs)	Description*	Temp (F)	Time
0-10	2' topsoil, MSW M=10%, D=Little	117.4	7:45
10-20	MSW, yard waste M=15%, D=Little	127.8	8:07
20-30	MSW/yard waste M=15%, D=Little	129.8	8:32
30-40	MSW/muck M=20%, D=Some	126.1	8:41
40-50	MSW/muck/liquids M=25%, D=Some	139.4	8:58
50-60	Muck/liquid at 53' M=45%, D=Moderate	136.2	9:36
60-70	Muck/MSW/Liquid M=50%, D=Severe	140.8	10:14
70-80	Muck/Liquid M=50%, D=Severe	133.7	10:52

*Key: M=Moisture Content, D=Decomposition

Notes: Encountered saturated materials that could not be excavated using a bucket auger. Muck at 70'.



Landfill Gas Extraction Well Boring and Construction Log

Project #: 083-82734.13
Onsite
GAI Rep: Veronica Figueroa

Well ID: GW-4R **Site:** J.E.D. SWMF

Date/Time Began Drilling: 7/13/2010 9:50
Date/Time Complete Drilling: 7/13/2010 15:30 PM
Northing: 1,357,167.89

Date/Time Began Well Install: 7/13/10 3:35 PM
Date/Time Complete Well Install: 7/14/10 8:15 AM
Easting: 624,423.44
Top of Well Casing Elevation: 237.8'
Ground Elevation: 224.50'

		Design	Actual
A	Total Depth:	117'	110'
B	Screen Length:	108'	100'
C	Solid Pipe Length:	20'	25'
	# of Centralizers:	0	0

	Checklist		BGS *(to top of layer)*
D	#57 Stone?	☑	110' (ends at 110 BGS)
E	◉ #57 Stone? ○ #89 Stone?	☑	110' (ends at 9' BGS)
F	GeoDisc?	☑	9'
G	1st Bentonite Seal?	☑	9' (ends at 7' BGS)
H	Soil Fill to 3' bgs?	☑	7' (ends at 3' BGS)
I	2nd Bentonite Seal?	☑	3' (ends at 1' BGS)

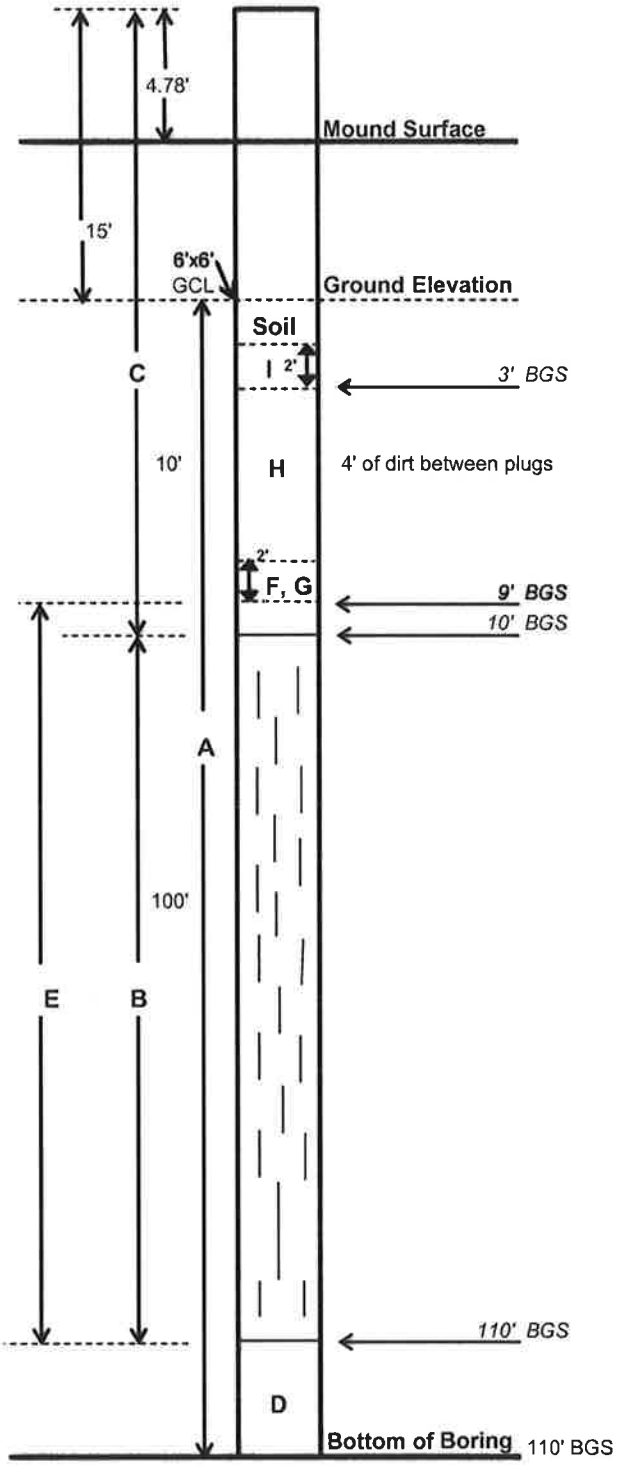
Depth to Top Liner: 15' (As provided by Geosyntec)

Depth to Waste: 2' BGS

Depth (bgs)	Description*	Temp (F)	Time
0-10	2' topsoil, MSW **M=15%, D=Little**	109.4	9:58
10-20	MSW **M=15%, D=Little**	128.7	10:12
20-30	MSW **M=15%, D=Little**	130.8	10:28
30-40	MSW/Liquid at 38' **M=20%, D=Some**	133.2	10:35
40-50	MSW/dirt **M=25%, D=Some**	135.6	10:58
50-60	MSW/muck **M=25%, D=Moderate**	137.2	11:31
60-70	MSW/muck **M=30%, D=Severe**	139.6	11:50
70-80	MSW/muck/dirt **M=30%, D=Severe**	145.5	12:37
80-90	MSW/muck **M=30%, D=Severe**	146.3	13:43
90-100	MSW/muck/dirt **M=35%, D=Severe**	149.8	14:19
100-110	MSW/muck/liquids **M=40%, D=Severe**	141.1	15:30

*Key: M=Moisture Content, D=Decomposition

Notes: Encountered saturated materials that could not be excavated using a bucket auger. Muck at 110'.



CQA Tech Signature: Date: 7/14/2010

Landfill Gas Extraction Well Boring and Construction Log

Project #: 083-82734.13
Onsite
GAI Rep: Veronica Figueroa

Well ID: GW-18 **Site:** J.E.D. SWMF

Date/Time Began Drilling: 7/14/2010 7:35
Date/Time Complete Drilling: 7/14/2010 13:15
Northing: 1,356,753.87

Date/Time Began Well Install: 7/14/2010 13:56
Date/Time Complete Well Install: 7/14/2010
Easting: 624,436.42
Top of Well Casing Elevation: 243.3'
Ground Elevation: 229.57'

		Design	Actual
A	Total Depth:	120'	100'
B	Screen Length:	110'	80'
C	Solid Pipe Length:	20'	25'
	# of Centralizers:	0	0

	Checklist		BGS *(to top of layer)*
D	10' of #57 Stone?	☑	100' (ends at 90' BGS)
E	◉ #57 Stone? ○ #89 Stone?	☑	90' (ends at 9' BGS)
F	GeoDisc?	☑	9'
G	1st Bentonite Seal?	☑	9' (ends at 7' BGS)
H	Soil Fill to 3' bgs?	☑	7' (ends at 3' BGS)
I	2nd Bentonite Seal?	☑	3' (ends at 1' BGS)

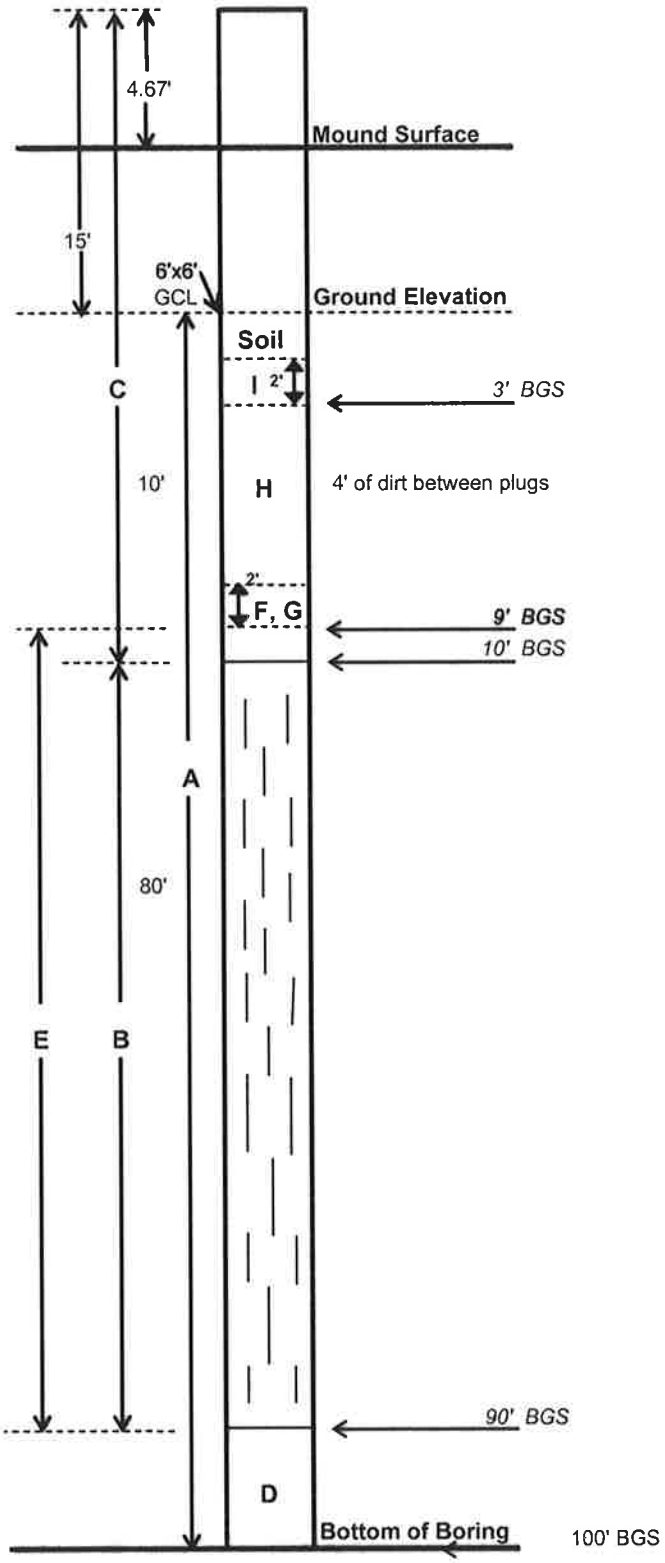
Depth to Top Liner: 15' (As provided by Geosyntec)

Depth to Waste: 1' BGS

Depth (bgs)	Description*	Temp (F)	Time
0-10	MSW **M=10%, D=Little**	114.2	7:49
10-20	MSW **M=10%, D=Little**	129.7	8:26
20-30	MSW **M=15%, D=Little**	138.5	8:47
30-40	MSW/muck-dry **M=15%, D=Some**	141.3	9:16
40-50	MSW/dirt/dry muck **M-20%, D=Some**	133.9	9:43
50-60	MSW/dirt **M=25%, D=Some**	134.7	10:03
60-70	MSW/dirt (dry) **M-30%, D=Moderate**	137.4	10:52
70-80	MSW/pocket of liquid at 80' M=30%, D=Moderate	142.7	11:06
80-90	Liquid at 89' MSW/dirt/wet muck M=35%, D=Severe	144.9	12:03
90-100	Muck/dirt **M=35%, D=Severe**	139.8	13:15

*Key: M=Moisture Content, D=Decomposition

Notes: Encountered saturated materials that could not be excavated using a bucket auger. Muck at 91'.



CQA Tech Signature: Date: 7/14/2010

Landfill Gas Extraction Well Boring and Construction Log

Well ID: GW-21 Location #1 Location abandoned **Site:** J.E.D. SWMF

Project #: 083-82734.13
Onsite
GAI Rep: Veronica Figueroa

Date/Time Began Drilling: 7/15/2010 7:20
Date/Time Complete Drilling: Backfilled
Northing: 1,356,591.96

Date/Time Began Well Install: -
Date/Time Complete Well Install: -
Easting: 624,442.26
Ground Elevation: 230.67'

		Design	Actual
A	Total Depth:	120'	-
B	Screen Length:	111'	-
C	Solid Pipe Length:	20'	-
	# of Centralizers:	0	-

	Checklist		BGS (to top of layer)
D	10' of #57 Stone?	☐	-
E	○ #57 Stone? ○ #89 Stone?	☐	-
F	GeoDisc?	☐	-
G	1st Bentonite Seal?	☐	-
H	Soil Fill to 3' bgs?	☐	-
I	2nd Bentonite Seal?	☐	-

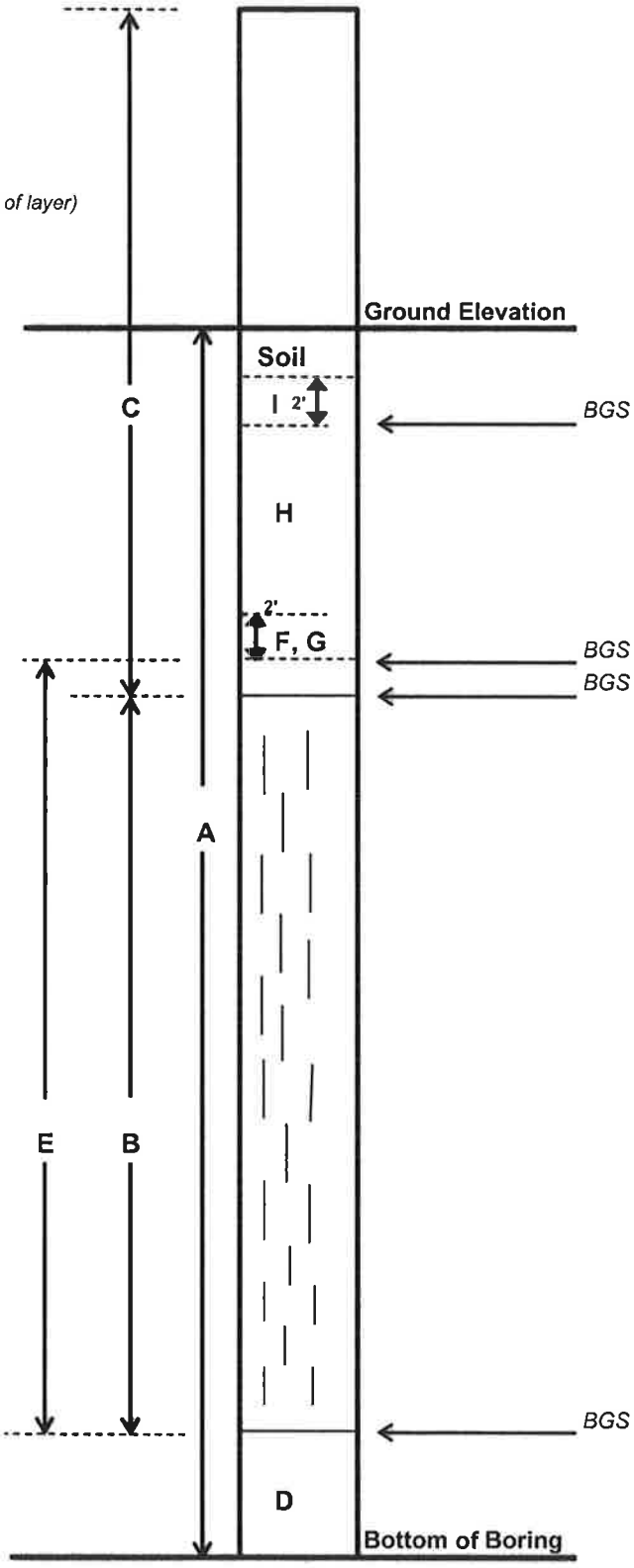
Depth to Top Liner: 15' (As provided by Geosyntec)

Depth to Waste: 1' BGS

Depth (bgs)	Description*	Temp (F)	Time
0-10	Topsoil 2', MSW M=10%. D=Little	117.5	7:31
10-20	MSW M=10%, D=Little	131.1	7:46
20-30	MSW/carpet M=15%. D=Little	132.9	8:05
30-40	MSW M=20%, D=Some	130.7	8:28
40-50	MSW, liquid at 50' M-20%, D=Some	128.4	8:52
50-60	MSW and liquid M=45%. D=Severe	130.3	9:21
60-65	MSW and liquid M=50%. D=Severe	129.8	9:45
65-70	Liquids- no progress in footage	N/A	11:05

*Key: M=Moisture Content, D=Decomposition

Notes: Encountered saturated materials that could not be excavated using a bucket auger. Muck at 65' and and bucket can go 70'. Per WSI request, borehole was backfilled. Well will be drilled in a new location.



CQA Tech Signature:

Date: 7/15/2010

Landfill Gas Extraction Well Boring and Construction Log

Project #: 083-82734.13
Onsite
GAI Rep: Veronica Figueroa

Well ID: GW-21 (Location #2) **Site:** J.E.D. SWMF

Date/Time Began Drilling: 7/16/10 7:45 AM
Date/Time Complete Drilling: 7/16/2010 15:15 PM
Northing: 1,356,559.32

Date/Time Began Well Install: 7/16/2010 15:30 PM
Date/Time Complete Well Install: 7/16/2010 16:20 PM
Easting: 624,458.64
Top of Well Casing Elevation: 244.07'
Ground Elevation: Approx. 230.67'

		Design	Actual
A	Total Depth:	115'	80'
B	Screen Length:	106'	70'
C	Solid Pipe Length:	20'	25'
	# of Centralizers:	0	0

	Checklist		BGS *(to top of layer)*
D	10' of #57 Stone?	☑	80' (ends at 70' BGS)
E	○ #57 Stone? ○ #89 Stone?	☑	70' (ends at 9' BGS)
F	GeoDisc?	☑	9'
G	1st Bentonite Seal?	☑	9' (ends at 7' BGS)
H	Soil Fill to 3' bgs?	☑	7' (ends at 3' BGS)
I	2nd Bentonite Seal?	☑	3' (ends at 1' BGS)

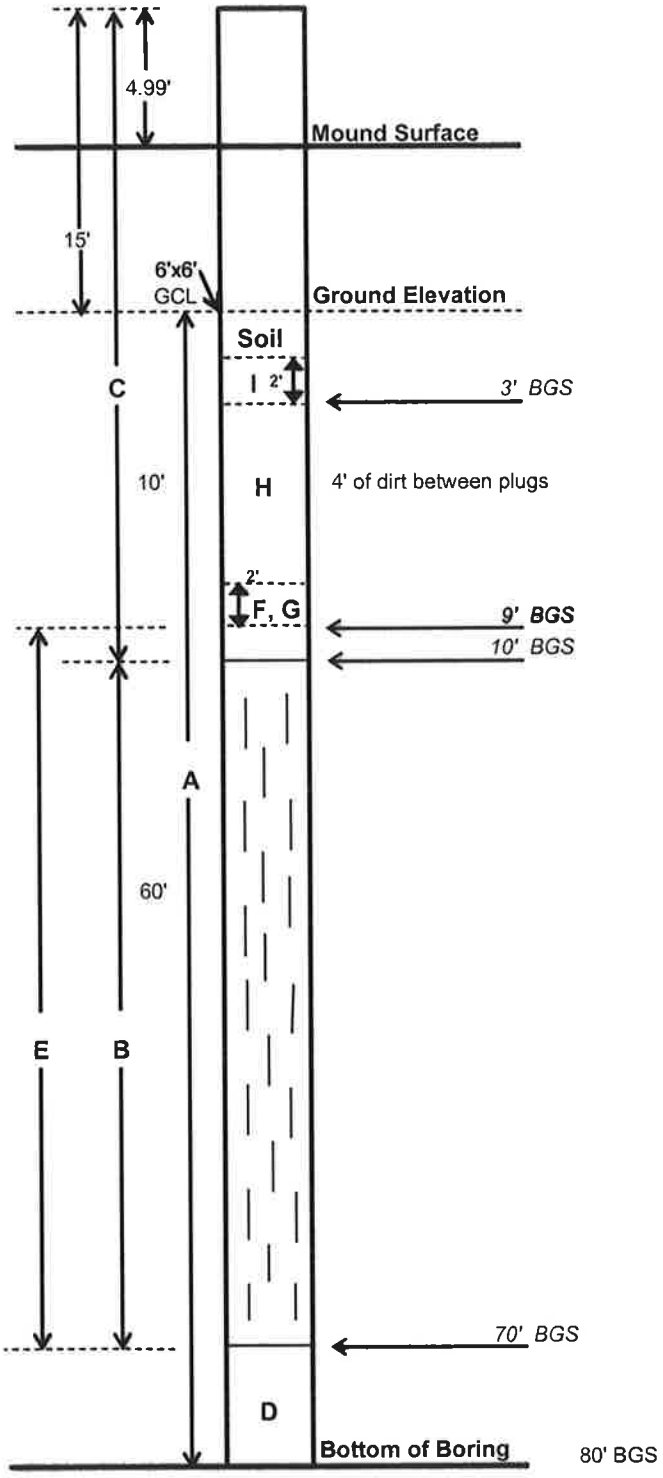
Depth to Top Liner: 15'

Depth to Waste: 2' BGS

Depth (bgs)	Description*	Temp (F)	Time
0-10	Topsoil/MSW M=10%. D=Little	109.3	7:55
10-20	MSW M=10% D=Little	117.7	8:20
20-30	MSW M=15% D=Little	124.1	9:02
30-40	MSW M=20% D=Some	133.4	9:25
40-45	MSW, liquid at 42' M-45%, D=Severe	129.8	9:48
45-50	Pocket of liquid M=50%, D=Severe	127.1	10:25
50-60	MSW/liquid M=30%, D=Moderate	134.2	11:00
60-65	MSW/liquid/muck M=45%, D=Severe	129.3	11:45
65-70	MSW/muck/liquid M=50%, D=Severe	126.4	14:08
70-80	MSW M=50%, D=Severe	126.1	15:08

*Key: M=Moisture Content, D=Decomposition

Notes: Relocated original well location 20' east and 40' south. Also decrease original depth of well by 5' to offset intercell berms. Top of muck at 72", but bucket can go to 80'. Encountered saturated materials that could not be excavated using a bucket auger.



CQA Tech Signature: Veronica Figueroa

Date: 7/16/2010

Landfill Gas Extraction Well Boring and Construction Log

Project #: 083-82734.13
Onsite
GAI Rep: Veronica Figueroa

Well ID: GW-27 **Site:** J.E.D. SWMF

Date/Time Began Drilling: 7/15/2010 12:45
Date/Time Complete Drilling: 7/15/210 16:53 PM
Northing: 1,356,364.19

Date/Time Began Well Install: 7/16/10 7:15 AM
Date/Time Complete Well Install: 7/16/10 10:08 AM
Easting: 624,442.37
Top of Well Casing Elevation: 241.57'
Ground Elevation: 230.21'

		Design	Actual
A	Total Depth:	124'	75'
B	Screen Length:	116'	60'
C	Solid Pipe Length:	20'	25'
	# of Centralizers:	0	0

	Checklist		BGS *(to top of layer)*
D	5' of #57 Stone?	☑	75' (ends at 70' BGS)
E	◉ #57 Stone? ○ #89 Stone?	☑	70' (ends at 9' BGS)
F	GeoDisc?	☑	9'
G	1st Bentonite Seal?	☑	9' (ends at 7' BGS)
H	Soil Fill to 3' bgs?	☑	7' (ends at 3' BGS)
I	2nd Bentonite Seal?	☑	3' (ends at 1' BGS)

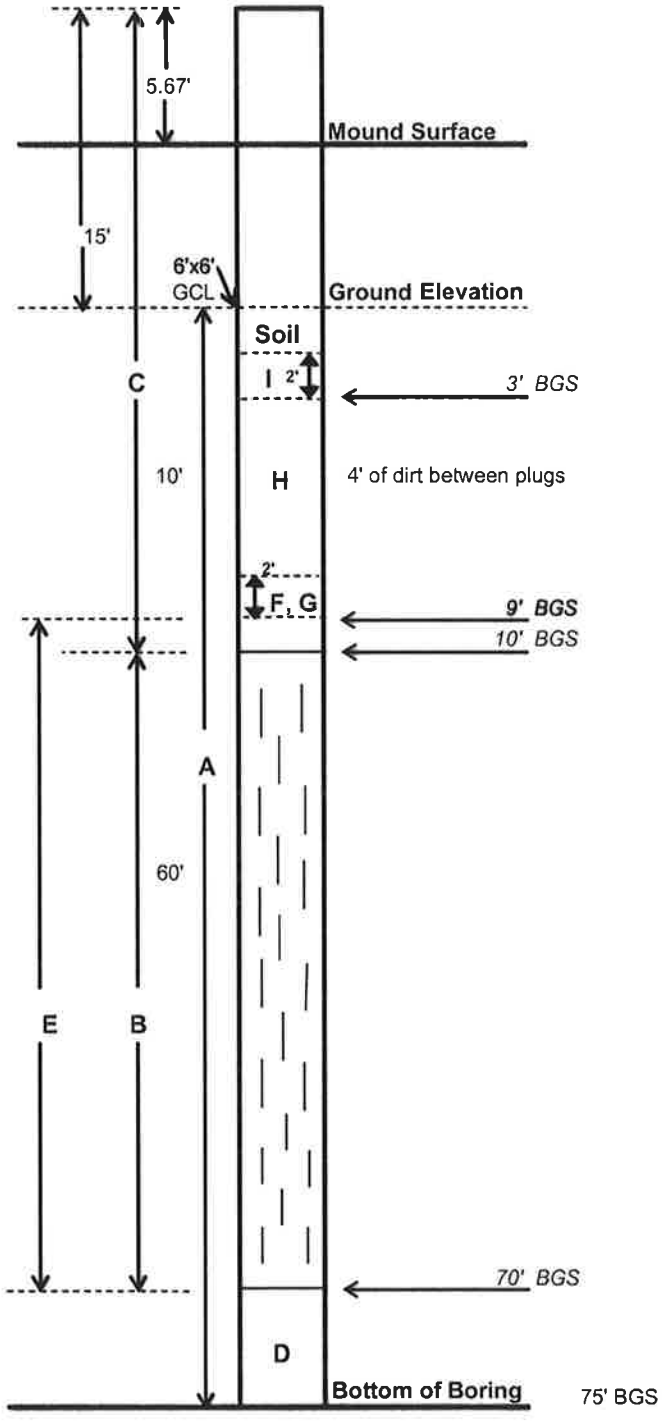
Depth to Top Liner: 15' (As provided by Geosyntec)

Depth to Waste: 2' BGS

Depth (bgs)	Description*	Temp (F)	Time
0-10	MSW **M=10%**	114.2	12:55
10-20	MSW **M=10%**	129.3	13:12
20-30	MSW/carpet **M=15%, D=Little**	127.7	13:27
30-40	MSW **M=15%, D=Little**	134.4	13:43
40-50	MSW, liquid at 48' **M=15%, D=Some**	126.0	14:08
50-60	MSW - liquid **M=35%, D=Some**	125.1	14:41
60-70	MSW and liquid **M=50%, D=Moderate**	127.4	15:23
75	Bucket goes to 75'	N/A	16:53

*Key: M=Moisture Content, D=Decomposition

Notes: Encountered saturated materials that could not be excavated using a bucket auger. Muck at 70'.



CQA Tech Signature: Date: 7/16/2010

Landfill Gas Extraction Well Boring and Construction Log

Project #: 083-82734.13

Well ID: GW-15R **Site:** J.E.D. SWMF

Onsite GAI Rep: Veronica Figueroa

Date/Time Began Drilling: 7/16/2010 16:10:00 PM
Date/Time Complete Drilling: 7/17/2010
Northing: 1,356,861.13

Date/Time Began Well Install: 7/17/2010
Date/Time Complete Well Install: 7/17/2010
Easting: 624,585.26
Top of Well Casing Elevation: 242.35'
Ground Elevation: 228.60'

		Design	Actual
A	Total Depth:	116	80'
B	Screen Length:	96	60'
C	Solid Pipe Length:	23	23'
	# of Centralizers:	0	0

	Checklist		BGS *(to top of layer)*
D	4' of #57 Stone?	☑	80' (end at 76' BGS)
E	○ #57 Stone? ○ #89 Stone?	☑	76' (ends at 15' BGS)
F	GeoDisc?	☑	15'
G	1st Bentonite Seal?	☑	15' (ends at 13' BGS)
H	Soil Fill to 3' bgs?	☑	13' (ends at 3' BGS)
I	2nd Bentonite Seal?	☑	3' (ends at 1' BGS)

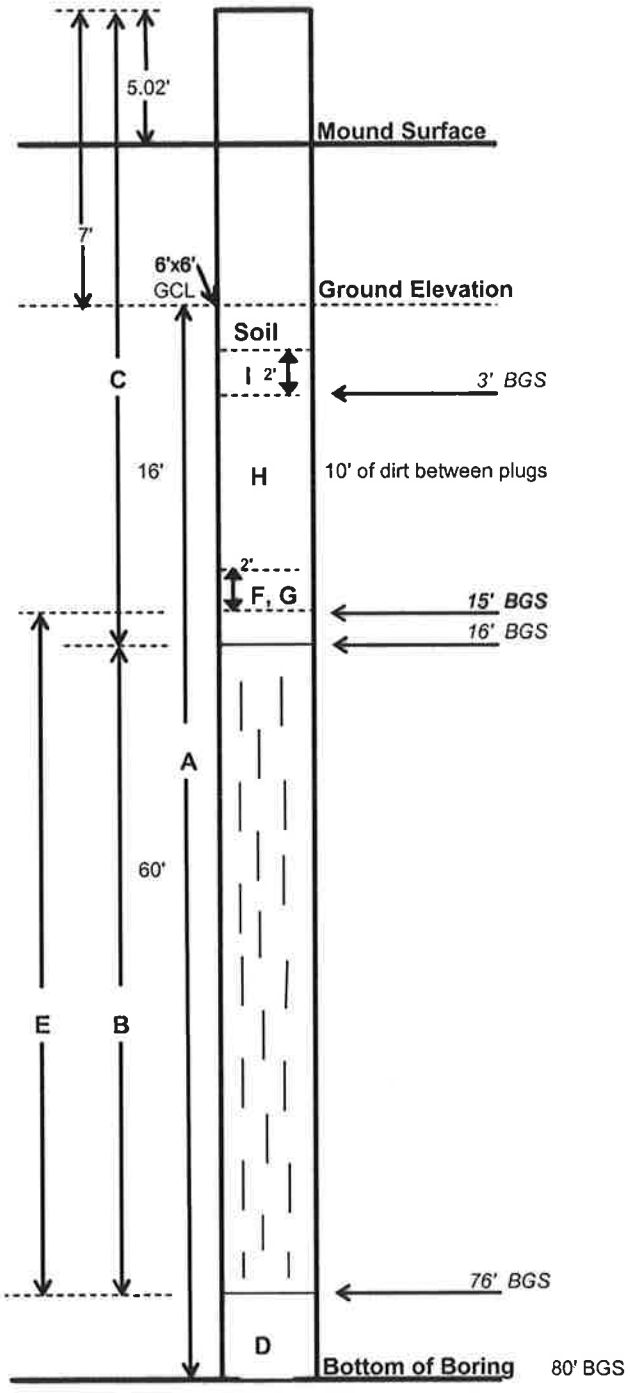
Depth to Top Liner: 15'

Depth to Waste: 2' BGS

Depth (bgs)	Description*	Temp (F)	Time
0-10	Topsoil/MSW M=10%, D=Little	114.6	16:35
10-22	~~MSW, dirt~~ M=10%, D=Little	123.9	17:00
22-30	MSW, dirt M=15%, D=Little	129.8	7:20
30-40	MSW, liquid at 38' M=25%, D=Some	138.2	8:12
40-50	MSW, liquid, dirt M-35%, D=Moderate	133.1	8:43
50-60	MSW, liquid M-35%, D=Moderate	133.6	9:02
60-65	~~M=50%, D=Severe~~ M=30%, D=Moderate	134.9	9:18
65-75	Muck/MSW M=50%, D=Severe	137.4	9:40
75	Top of muck at 65' Bucket at 75'	131.1	10:05
75-80	Top of muck at 65' Bucket at 80'	132.4	11:05

*Key: M=Moisture Content, D=Decomposition

Notes: Stopped drilling at 22' on 7/16/2010 and resumed drilling on 7/17/10. Top of muck at 65', but can go to 80'. Encountered saturated materials that could not be excavated using a bucket auger.



CQA Tech Signature: Date: 7/17/2010

Landfill Gas Extraction Well Boring and Construction Log

Project #: 083-82734.13
Onsite
GAI Rep: Veronica Figueroa

Well ID: GW-54 **Site:** J.E.D. SWMF

Date/Time Began Drilling: 7/19/10 9:55 AM
Date/Time Complete Drilling: 719/2010 13:35 PM
Northing: 1,356,596.64

Date/Time Began Well Install: 7/19/2010 13:45 PM
Date/Time Complete Well Install: 7/19/2010 16:30 PM
Easting: 624,864.02
Top of Well Casing Elevation: 230.19'
Ground Elevation: 216.81'

		Design	Actual
A	Total Depth:	108'	75'
B	Screen Length:	88'	60'
C	Solid Pipe Length:	23'	25'
	# of Centralizers:	0	0

	Checklist		BGS *(to top of layer)*
D	5' of #57 Stone?	☑	75' (ends at 70' BGS)
E	○ #57 Stone? ○ #89 Stone?	☑	70' (ends at 9' BGS)
F	GeoDisc?	☑	9'
G	1st Bentonite Seal?	☑	9' (ends at 7' BGS)
H	Soil Fill to 3' bgs?	☑	7' (ends at 3' BGS)
I	2nd Bentonite Seal?	☑	3' (ends at 1' BGS)

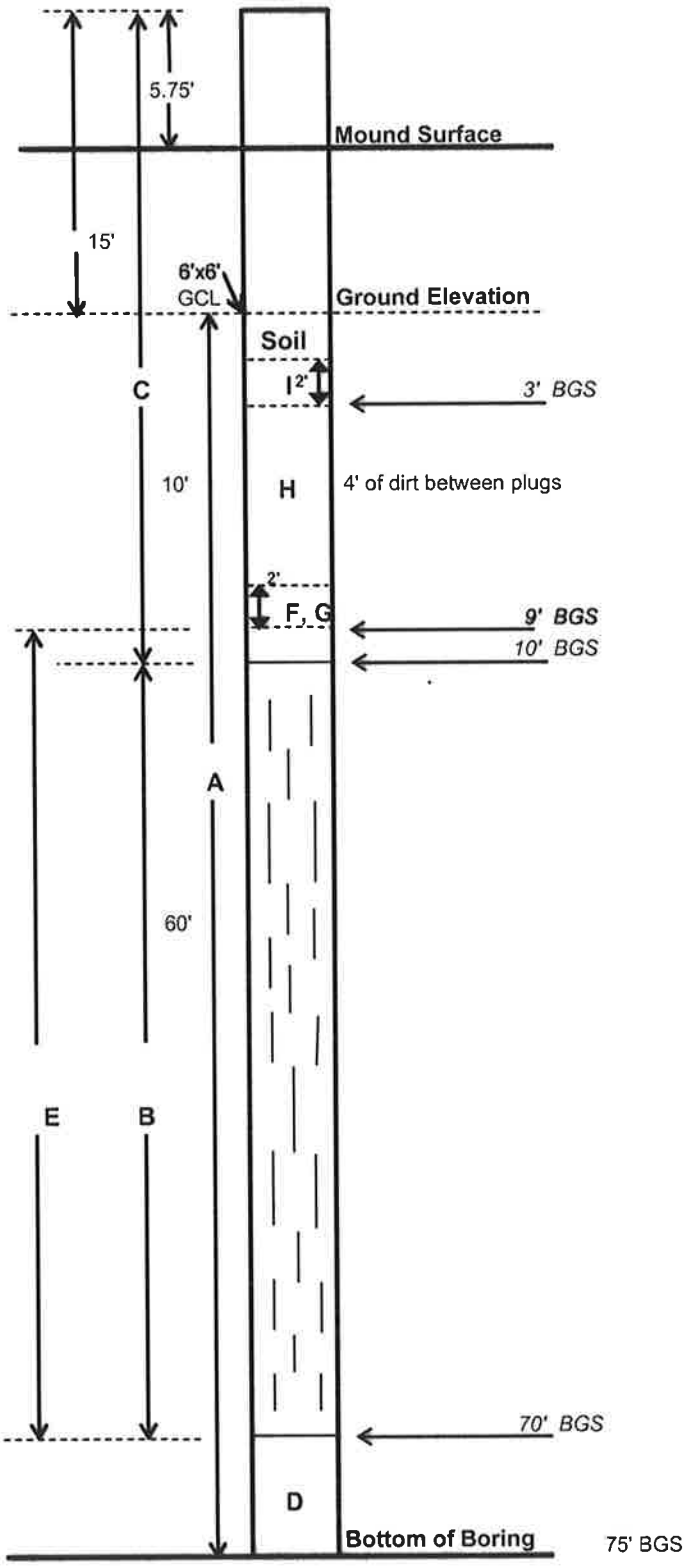
Depth to Top Liner: 15' (As provided by Geosyntec)

Depth to Waste: 2' BGS

Depth (bgs)	Description*	Temp (F)	Time
0-10	2' ±Topsoil/MSW M=10%, D=Little	118.1	10:11
10-20	MSW M=10%, D=Little	126.5	10:53
20-30	2' ± soil/sludge mix/MSW M=15%, D=Little	126.2	11:15
30-40	MSW/ash/soil M=20%, D=Some	131.7	11:37
40-50	Liquid/muck at 42' M-50%, D=Severe	138.4	12:15
50-60	Liquid/muck/MSW M-35%, D=Moderate	143.9	12:22
60-69	Liquid/muck M=50%, D=Severe	141.6	13:19
69-75	Liquid/muck M=50%, D=Severe	N/A	13:35

*Key: M=Moisture Content, D=Decomposition

Notes: Encountered saturated materials that could not be excavated using a bucket auger. Muck at 70'.



CQA Tech Signature: Veronica Figueroa Date: 7/19/2010

Landfill Gas Extraction Well Boring and Construction Log

Project #: 083-82734.13
Onsite
GAI Rep: Veronica Figueroa

Well ID: GW-33 **Site:** J.E.D. SWMF

Date/Time Began Drilling: 7/20/10 12:20 PM
Date/Time Complete Drilling: 7/20/2010 15:40 PM
Northing: 1,356,079.14

Date/Time Began Well Install: 7/20/2010 16:10 PM
Date/Time Complete Well Install: 7/21/2010 13:30 PM
Easting: 624,242.31
Top of Well Casing Elevation: 181.64'
Ground Elevation: 172.30'

		Design	Actual
A	Total Depth:	65'	65'
B	Screen Length:	50'	50'
C	Solid Pipe Length:	25'	25'
	# of Centralizers:	0	0

	Checklist		BGS *(to top of layer)*
D	#57 Stone?	☑	65'
E	◉ #57 Stone? ○ #89 Stone?	☑	65' (ends at 9' BGS)
F	GeoDisc?	☑	9'
G	1st Bentonite Seal?	☑	9' (ends at 7' BGS)
H	Soil Fill to 3' bgs?	☑	7' (ends at 3' BGS)
I	2nd Bentonite Seal?	☑	3' (ends at 1' BGS)

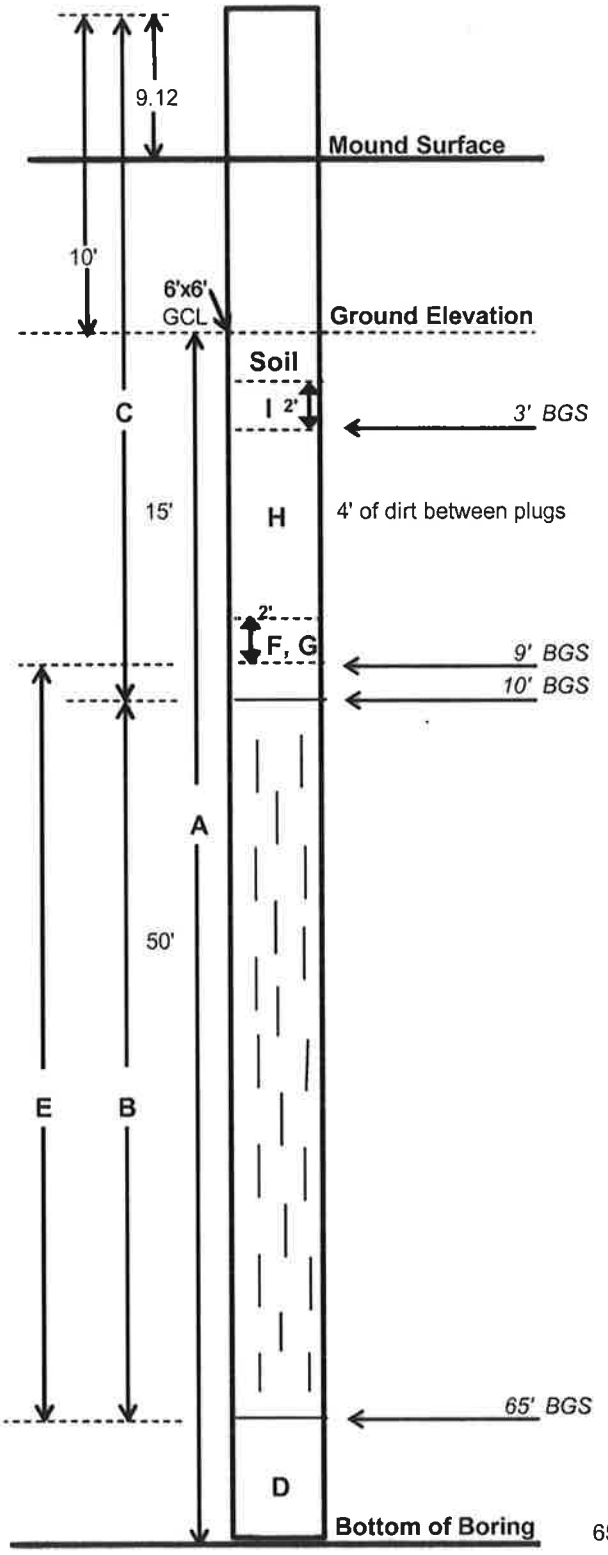
Depth to Top Liner: 15'

Depth to Waste: 2' BGS

Depth (bgs)	Description*	Temp (F)	Time
0-10	Topsoil, MSW **M=10%, D=Little**	117.6	12:27 PM
10-20	MSW **M=10%, D=Little**	123.7	13:11 PM
20-30	MSW **M=15%, D=Little**	130.1	13:35 PM
30-40	MSW **M=20%**	139.2	14:03 PM
40-50	MSW- liquid pocket **M=25%, D=Some**	134.4	14:48 PM
50-60	MSW- sand **M=25%, D=Some**	131.6	15:15 PM
60-65	MSW **M=30%, D=Some**	132.3	15:40 PM

*Key: M=Moisture Content, D=Decomposition

Notes: Drilled to design depth.



CQA Tech Signature:

Date: 7/21/2010

Landfill Gas Extraction Well Boring and Construction Log

Well ID: GW-36 **Site:** J.E.D. SWMF

Project #: 083-82734.13
Onsite
GAI Rep: Veronica Figueroa

Date/Time Began Drilling: 7/21/10 10:05 AM
Date/Time Complete Drilling: 7/21/10 11:42 AM
Northing: 1,355,985.54

Date/Time Began Well Install: 7/21/201012:05 PM
Date/Time Complete Well Install: 7/21/2010 14:15 PM
Easting: 624,430.25
Top of Well Casing Elevation: 173.69'
Ground Elevation: 167.81'

		Design	Actual
A	Total Depth:	47'	47'
B	Screen Length:	37'	37'
C	Solid Pipe Length:	25'	25'
	# of Centralizers:	0	0

	Checklist		BGS *(to top of layer)*
D	#57 Stone?	☑	47'
E	◉ #57 Stone? ○ #89 Stone?	☑	47' (ends at 9' BGS)
F	GeoDisc?	☑	9'
G	1st Bentonite Seal?	☑	9' (ends at 7' BGS)
H	Soil Fill to 3' bgs?	☑	7' (ends at 3' BGS)
I	2nd Bentonite Seal?	☑	3' (ends at 1' BGS)

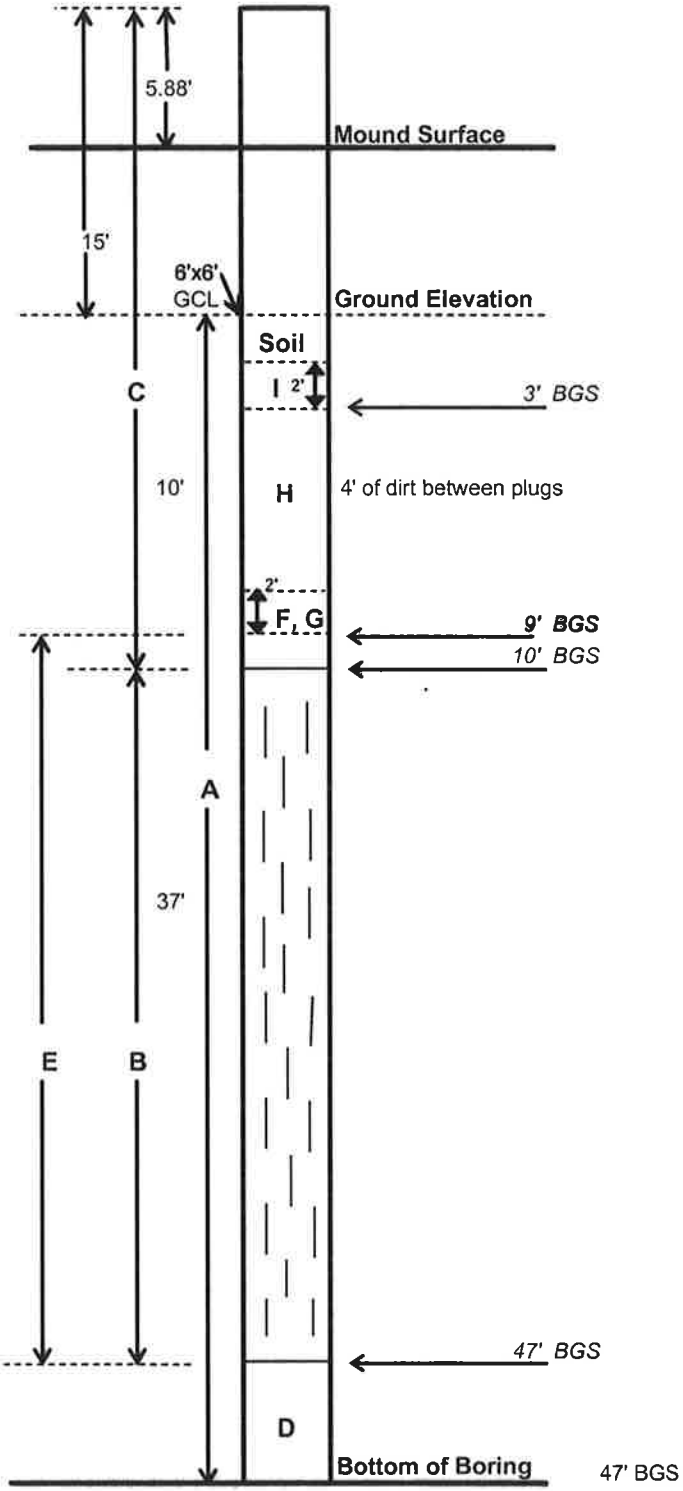
Depth to Top Liner: 15' (As provided by Geosyntec)

Depth to Waste: 2' ± BGS

Depth (bgs)	Description*	Temp (F)	Time
0-10	Topsoil, MSW M=10%, D=Little	117.9	10:17 AM
10-20	MSW, dry sludge M=10%, D=Little	128.9	10:30 AM
20-30	MSW M=15%, D=Little	126.2	10:46 AM
30-40	MSW, soils at 35' M=15%, D=Little	125.8	11:20 AM
40-47	MSW M=20%, D=Little	129.1	11:42 AM

*Key: M=Moisture Content, D=Decomposition

Notes: Drilled to design depth.



CQA Tech Signature: Veronica Figueroa Date: 7/21/2010

Landfill Gas Extraction Well Boring and Construction Log

Project #: 083-82734.13
Onsite
GAI Rep: Veronica Figueroa

Well ID: GW-35 **Site:** J.E.D. SWMF

Date/Time Began Drilling: 7/21/10 11:55 AM
Date/Time Complete Drilling: 7/21/2010 15:10 PM
Northing: 1,355,899.50

Date/Time Began Well Install: 7/21/2010 15:45 PM
Date/Time Complete Well Install: 7/21/2010 16:32 PM
Easting: 624,249.93
Top of Well Casing Elevation: 179.89
Ground Elevation: 166.50'

		Design	Actual
A	Total Depth:	54'	54'
B	Screen Length:	44'	44'
C	Solid Pipe Length:	25'	25'
	# of Centralizers:	0	0

	Checklist		BGS *(to top of layer)*
D	#57 Stone?	☑	54'
E	◉ #57 Stone? ○ #89 Stone?	☑	54' (ends at 9' BGS)
F	GeoDisc?	☑	9'
G	1st Bentonite Seal?	☑	9' (ends at 7' BGS)
H	Soil Fill to 3' bgs?	☑	7' (ends at 3' BGS)
I	2nd Bentonite Seal?	☑	3' (ends at 1' BGS)

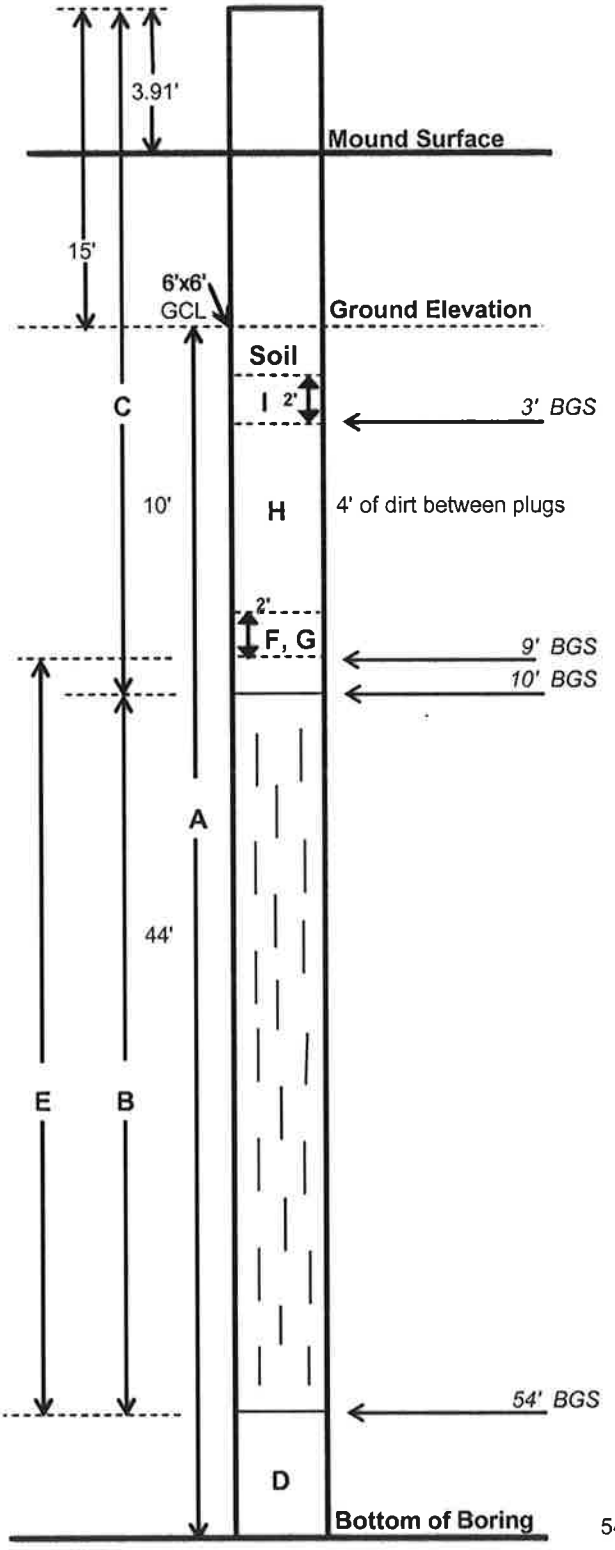
Depth to Top Liner: 15' (As provided by Geosyntec)

Depth to Waste: 2' ± BGS

Depth (bgs)	Description*	Temp (F)	Time
0-10	Topsoil, MSW **M=10%, D=Little**	109.8	12:07 PM
10-20	MSW, soil **M=10%, D=Little**	114.1	12:31 PM
20-30	MSW **M=10%, D=Little**	121.5	13:15 PM
30-40	MSW **M=15%, D=Little**	128.2	14:19 PM
40-50	MSW **M=15%, D=Little**	123.7	14:19 PM
50-54	MSW **M=15%, D=Little**	124.0	14:47 PM

*Key: M=Moisture Content, D=Decomposition

Notes: Drilled to design depth.



CQA Tech Signature: Veronica Figueroa Date: 7/21/2010

Landfill Gas Extraction Well Boring and Construction Log

Project #: 083-82734.13
Onsite
GAI Rep: Veronica Figueroa

Well ID: GW-30 **Site:** J.E.D. SWMF

Date/Time Began Drilling: 7/22/10 8:30 AM
Date/Time Complete Drilling: 7/22/10 12:20 PM
Northing: 1,356,187.16

Date/Time Began Well Install: 7/22/10 12:30 PM
Date/Time Complete Well Install: 7/22/2010 15:08 PM
Easting: 624,436.62
Top of Well Casing Elevation: 212.25'
Ground Elevation: 198.20'

		Design	Actual
A	Total Depth:	85'	85'
B	Screen Length:	65'	75'
C	Solid Pipe Length:	23'	25'
	# of Centralizers:	0	0

	Checklist		BGS *(to top of layer)*
D	0' of #57 Stone?	☑	85'
E	◉ #57 Stone? ○ #89 Stone?	☑	85' (end at 9' BGS)
F	GeoDisc?	☑	9'
G	1st Bentonite Seal?	☑	9' (ends at 7' BGS)
H	Soil Fill to 3' bgs?	☑	7' (ends at 3' BGS)
I	2nd Bentonite Seal?	☑	3' (ends at 1' BGS)

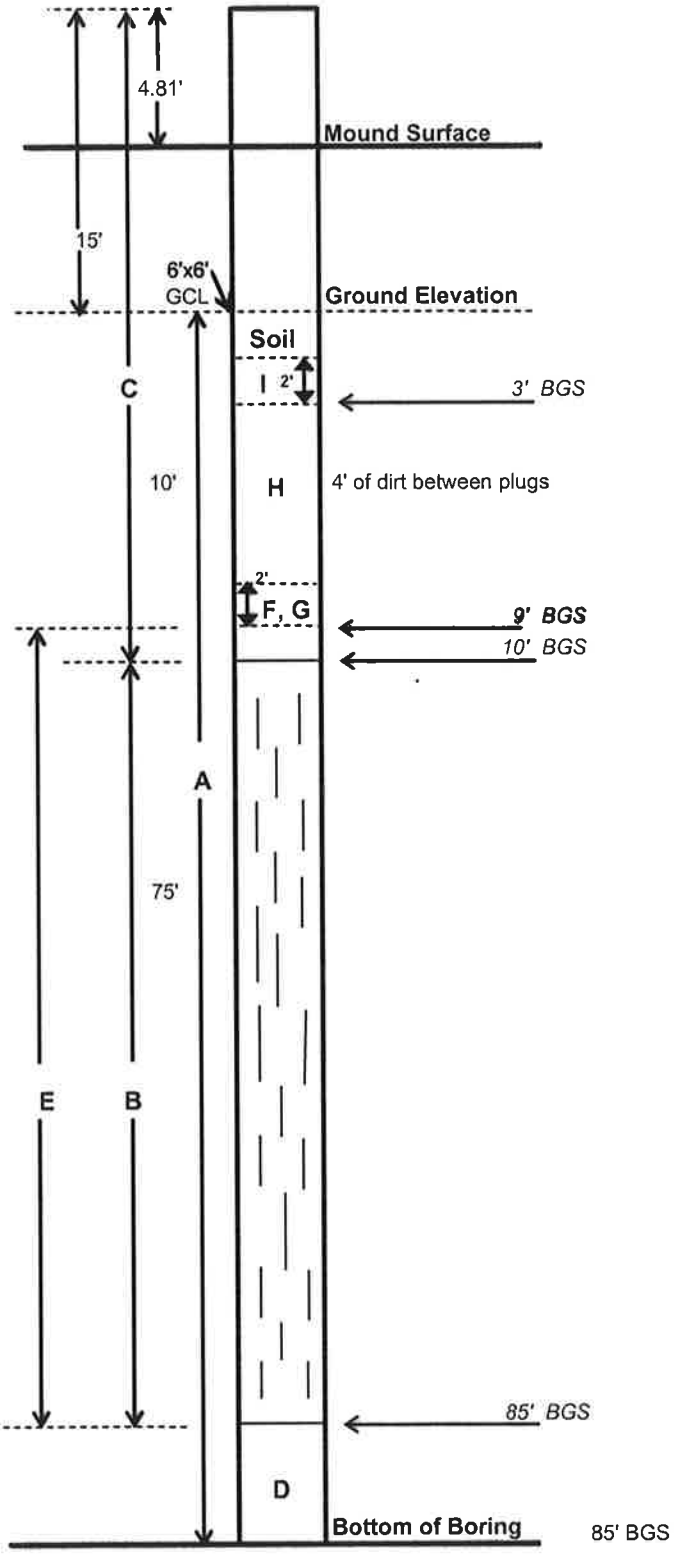
Depth to Top Liner: 15' (As provided by Geosyntec)

Depth to Waste: 2'-3' BGS

Depth (bgs)	Description*	Temp (F)	Time
0-10	Topsoil, MSW M=10%, D=Little	106.7	8:39 AM
10-20	MSW, pocket of liquid	118.9	8:50 AM
20-30	MSW, yard waste M=35%, D=Some	119.5	9:07 AM
30-40	MSW M=30%, D=Little	124.1	9:22 AM
40-50	MSW, dark mixed soils **M=20%, D=Some**	121.8	9:50 AM
50-60	MSW, yard, dark mixed soils **M=20%, D=Some**	125.0	10:35
60-70	MSW, mix soils M=25%, D=Some	131.3	11:05
70-80	MSW, liquid at 78' M=30%, D=Some	137.2	11:47
80-85	MSW/some liquids/soil M=30%, D=Some	137.7	12:18

*Key: M=Moisture Content, D=Decomposition

Notes: Drilled to design depth.



CQA Tech Signature: Date: 7/22/2010

Landfill Gas Extraction Well Boring and Construction Log

Project #: 083-82734.13
Onsite
GAI Rep: Veronica Figueroa

Well ID: GW-60A **Site:** J.E.D. SWMF

Date/Time Began Drilling: 7/22/2010 13:55 PM
Date/Time Complete Drilling: 7/22/2010
Northing: 1,356,234.89

Date/Time Began Well Install: 7/22/2010
Date/Time Complete Well Install: 7/22/2010 17:37 PM
Easting: 625,074.48
Top of Well Casing Elevation: 184.93
Ground Elevation: 180.10'

		Design	Actual
A	Total Depth:	75'	75'
B	Screen Length:	55'	55'
C	Solid Pipe Length:	25'	25'
	# of Centralizers:	0	0

	Checklist		BGS *(to top of layer)*
D	#57 Stone?	☑	75'
E	◉ #57 Stone? ○ #89 Stone?	☑	75' (ends at 9' BGS)
F	GeoDisc?	☑	9'
G	1st Bentonite Seal?	☑	9' (ends at 7' BGS)
H	Soil Fill to 3' bgs?	☑	7' (ends at 3' BGS)
I	2nd Bentonite Seal?	☑	3' (ends at 1' BGS)

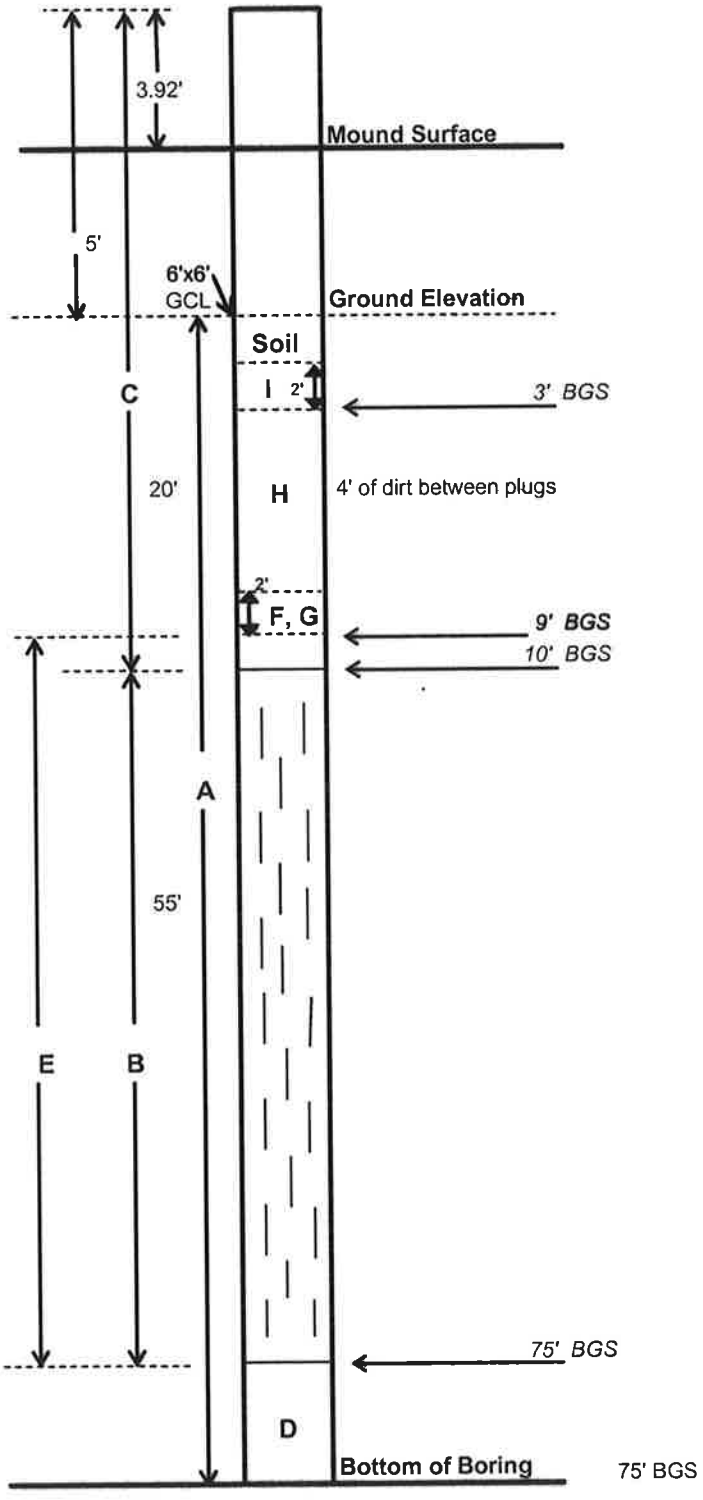
Depth to Top Liner: 15' (As provided by Geosyntec)

Depth to Waste: 2' BGS

Depth (bgs)	Description*	Temp (F)	Time
0-10	Top cover, MSW M=10%, D=Little	117.7	2:05 PM
10-20	MSW/Sand M=10%, D=Little	134.1	2:27 PM
20-30	MSW, yard waste M=15%, D=Little	136.6	3:15 PM
30-40	MSW, yard waste M=15%, D=Little	149.2	3:54 PM
40-50	MSW M=20%, D=Little	146.4	4:19 PM
50-60	MSW, dirt M=20%, D=Some	139.8	16:34
60-70	MSW, yard waste M=25%, D=Some	123.2	16:57
70-75	MSW, sand soils M=30%, D=Some	128.7	17:08

*Key: M=Moisture Content, D=Decomposition

Notes: Drilled to design depth.



CQA Tech Signature: Date: 7/22/2010

Landfill Gas Extraction Well Boring and Construction Log

Project #: 083-82734.13
Onsite
GAI Rep: Veronica Figueroa

Well ID: GW-63 **Site:** J.E.D. SWMF

Date/Time Began Drilling: 7/23/10 11:10 AM
Date/Time Complete Drilling: 7/23/10 12:30 PM
Northing: 1,355,980.38

Date/Time Began Well Install: 7/23/10 12:45 PM
Date/Time Complete Well Install: 7/23/2010 14:10 PM
Easting: 625,261.59
Top of Well Casing Elevation: 141.87'
Ground Elevation: 132.42'

		Design	Actual
A	Total Depth:	27'	28'
B	Screen Length:	16'	16'
C	Solid Pipe Length:	20'	20'
	# of Centralizers:	0	0

	Checklist		BGS *(to top of layer)*
D	1' of #57 Stone?	☑	28' (ends at 27' BGS)
E	◉ #57 Stone? ○ #89 Stone?	☑	27' (ends at 10' BGS)
F	GeoDisc?	☑	10'
G	1st Bentonite Seal?	☑	10' (ends at 8' BGS)
H	Soil Fill to 3' bgs?	☑	8' (ends at 3' BGS)
I	2nd Bentonite Seal?	☑	3' (ends at 1' BGS)

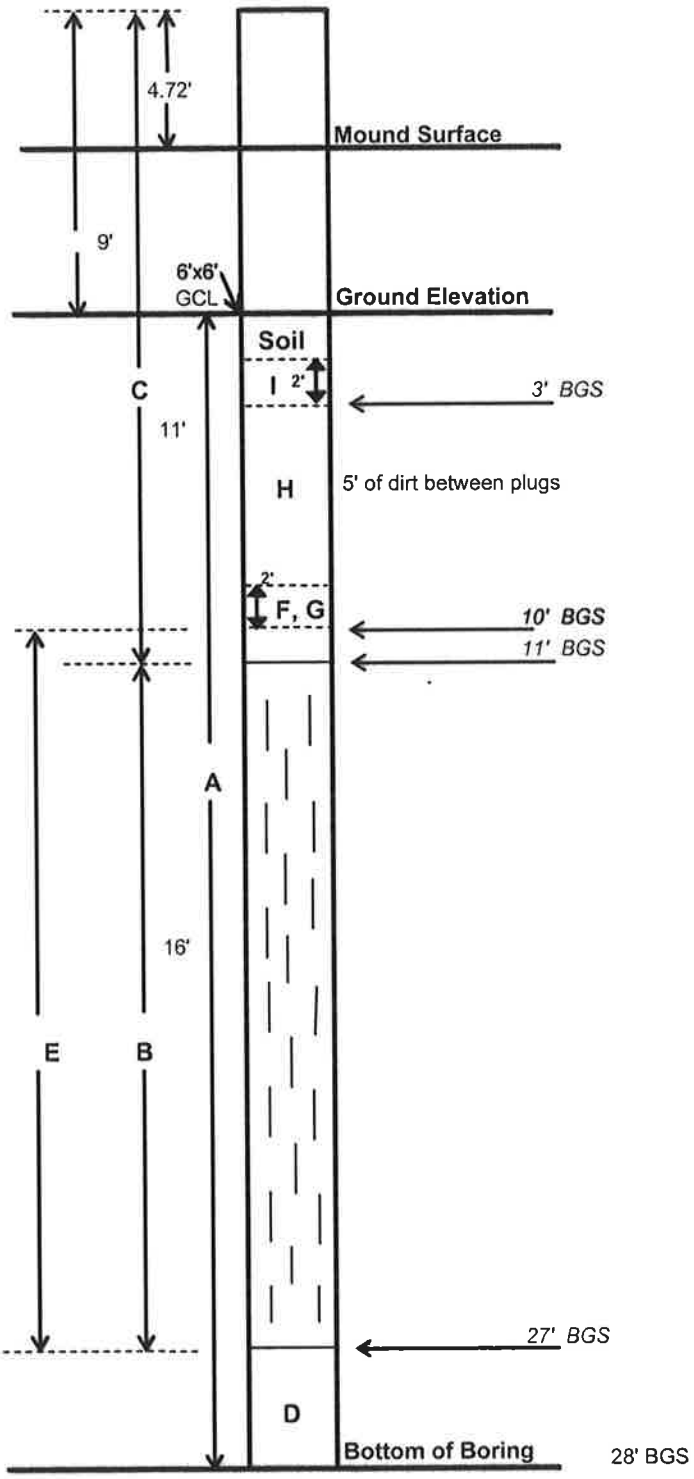
Depth to Top Liner: 15' (As provided by Geosyntec)

Depth to Waste: 2' BGS

Depth (bgs)	Description*	Temp (F)	Time
0-10	Soil, MSW M=10%, D=Little	108.8	11:23 AM
10-20	MSW M=10%, D=Little	109.7	11:56 AM
20-28	MSW M=10%, D=Little	114.2	12:30 PM

*Key: M=Moisture Content, D=Decomposition

Notes: Drilled to design depth.

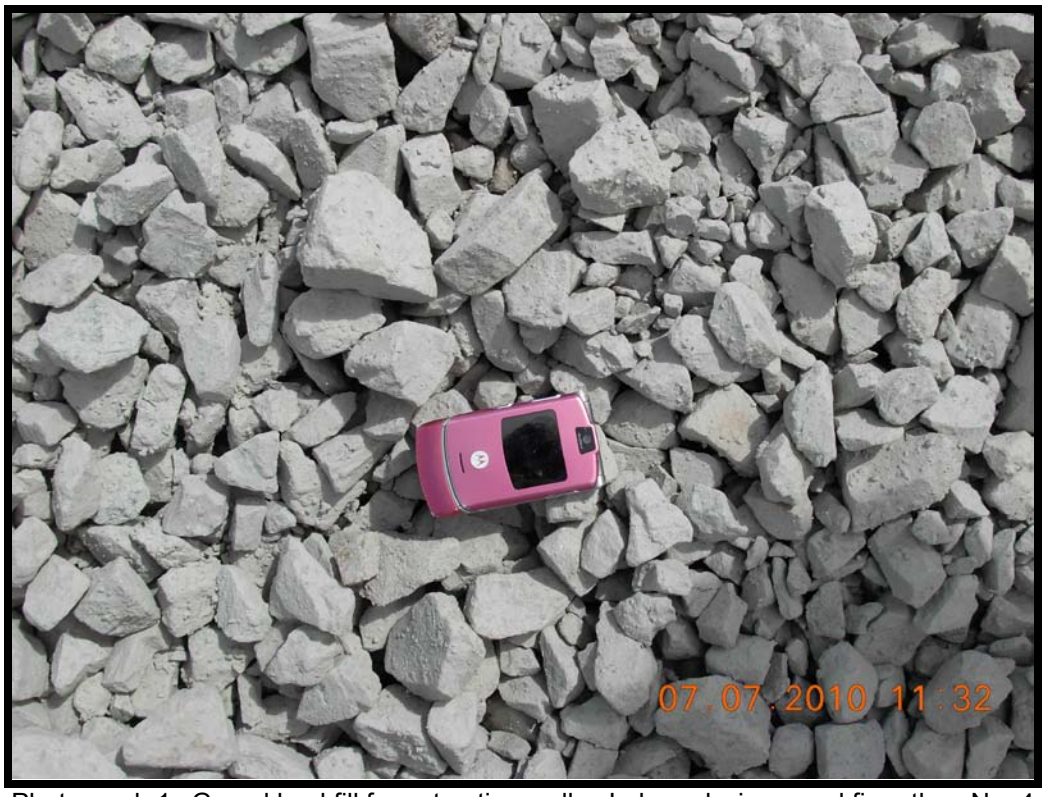


CQA Tech Signature: Date: 7/23/2010

APPENDIX F

PHOTOGRAPHIC DOCUMENTATION OF CONSTRUCTION ACTIVITIES

PHOTOGRAPHS



Photograph 1: Gravel backfill for extraction wells. Lab analysis: gravel finer than No. 4 sieve is 2.2%, gravel finer than No. 200 sieve is 0.03%, carbonate content is 0.1%.

Photograph 2: 6” SDR 17 HDPE pipe inventory.

Photograph 3: 8” SCH 80 PVC solid and slotted pipe inventory.

Photograph 4: 8” SCH 80 PVC slot width.

Photograph 5: 8” SCH 80 PVC 45° apart, staggered rows.

Photograph 6: 8” SCH 80 PVC slot length.

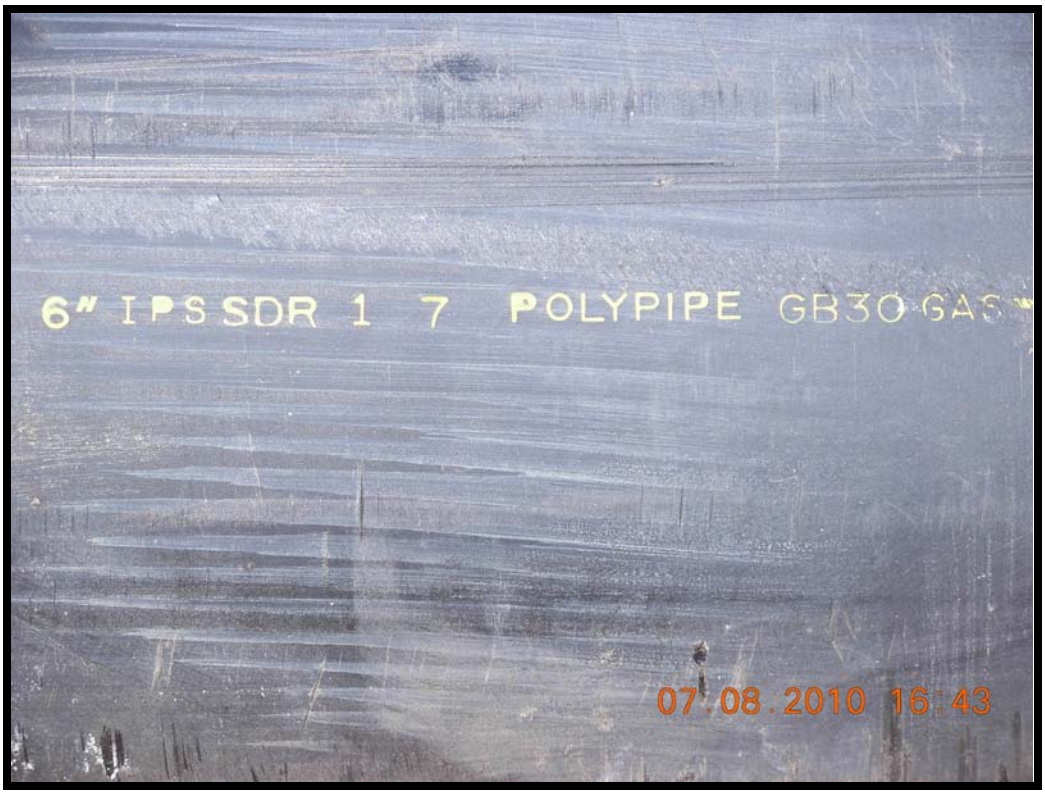
Photograph 7: 8” SCH 80 PVC pipe.

Photograph 8: 8” SCH 80 PVC cap.

Photograph 9: Drilling extraction well GW-45.

Photograph 10: Measuring bore hole depth at extraction well GW-45.

Photograph 11: Covering extraction well GW-45 bore hole.



Photograph 12: 6" HDPE SDR 17 pipe.

Photograph 13: 6” HDPE SDR 17 lateral strings with end caps.

Photograph 14: 6” HDPE SDR 17 lateral hard weld showing acceptable bead.

Photograph 15: 6” HDPE SDR 17 lateral hard welds.

Photograph 16: Green cylinder fusion machine.

Photograph 17: Backfilling extraction well GW-45 with stone.

Photograph 18: Geotextile donut at extraction well GW-45.

Photograph 19: Hydrating bentonite plug #1 at extraction well GW-45.

Photograph 20: Adding sandy soil backfill in between bentonite plugs at GW-45.

Photograph 21: Bentonite used for plugs at extraction wells.

Photograph 22: Hydrating bentonite plug #2 at extraction well GW-45.

Photograph 23: GCL sheet at extraction well GW-45.

Photograph 24: Encountered saturated materials that could not be excavated using a bucket auger at GW-50.

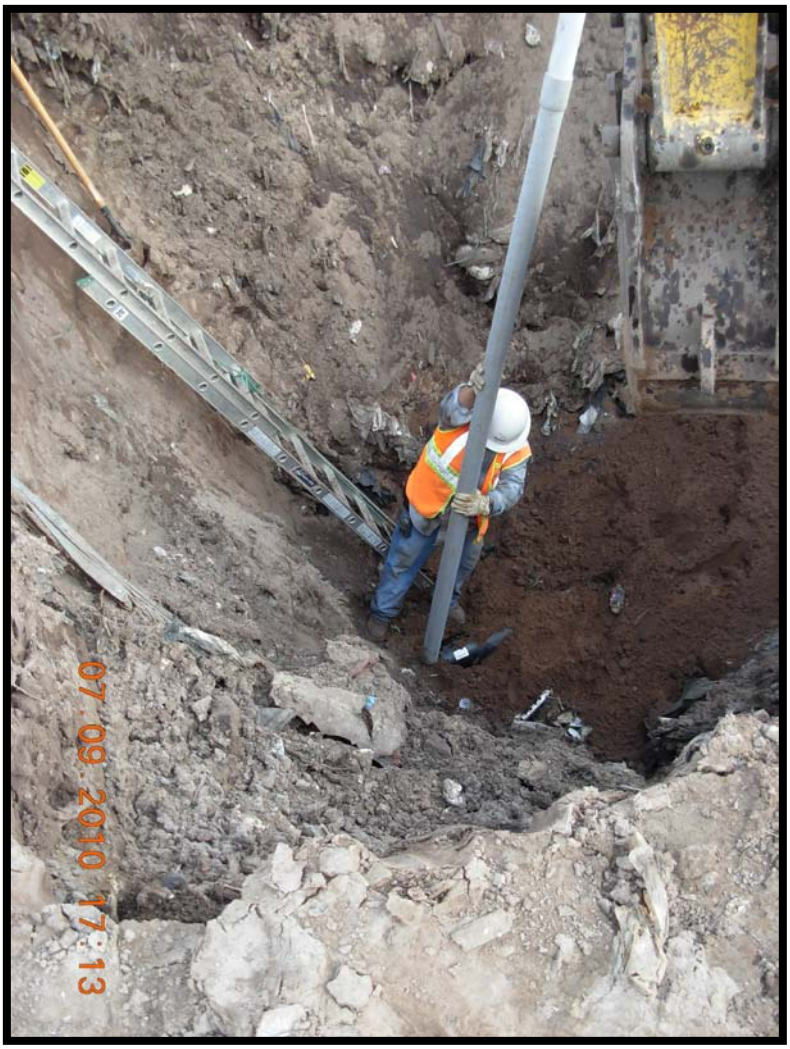
Photograph 25: Applying PVC cement to slotted pipe at GW-50.

Photograph 26: Lag bolting joints to provided additional support at GW-50.

Photograph 27: Drilling extraction well GW-51.

Photograph 28: Sanding trench for lateral to extraction well GW-45.

Photograph 29: Extraction well GW-45 lateral tie-in with 6” HDPE electrofusion coupling. Soap testing coupling – PASSED.



Photograph 30: Placing survey risers on top of lateral tie-in to GW-45.

Photograph 31: Encountered saturated materials that could not be excavated using a bucket auger at GW-50.

Photograph 32: Tie-in to GW-49 lateral riser for lateral to GW-50. Tie-in location above geomembrane skirt.

Photograph 33: Tie-in to GW-49 lateral riser for lateral to GW-50.

Photograph 34: Tie-in to GW-49 lateral riser for lateral to GW-50. Survey riser placed on top of top.

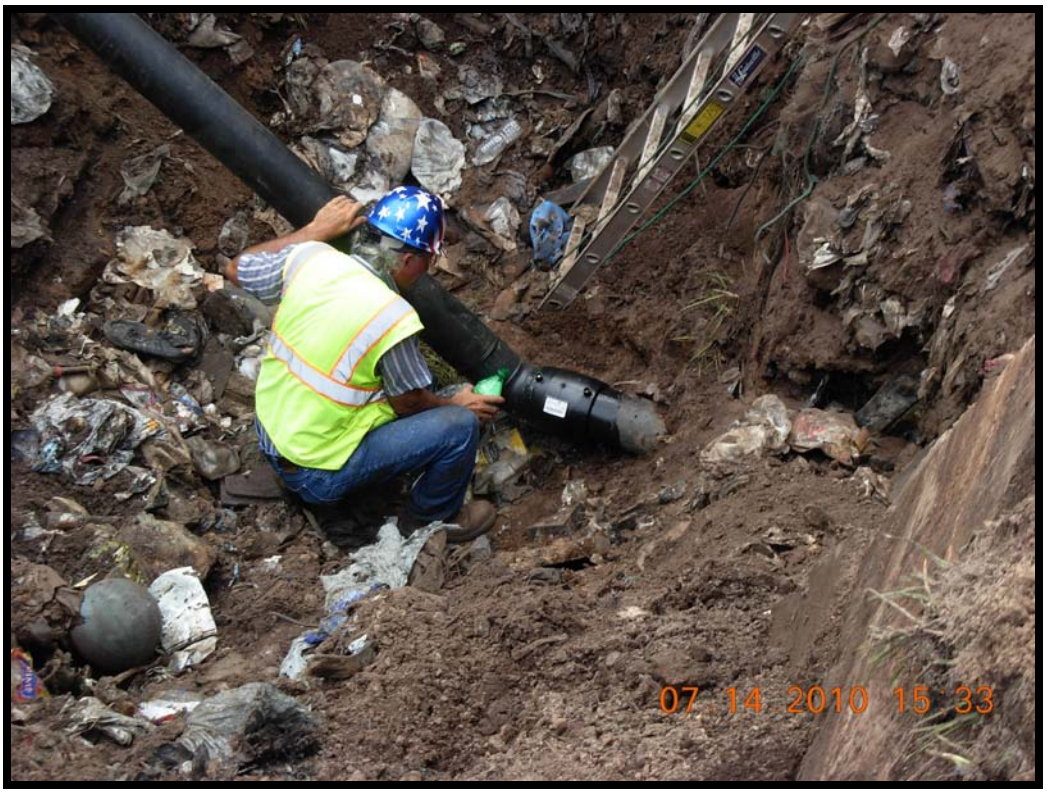
Photograph 35: Appling sand to lateral trench from GW-49 to GW-50.

Photograph 36: Sanding trench for lateral from tie-in location at GW-39 to GW-40R.

Photograph 37: Track truck ic 100 arrives on site July 14, 2010.

Photograph 38: Survey slope construction laser set at 6% for trenching lateral to GW-40R.

Photograph 39: Lateral to GW-40R.



Photograph 40: Extraction well GW-4R lateral tie-in with 6” HDPE electrofusion coupling. Soap testing coupling – PASSED.

Photograph 41: Placing survey risers on top of lateral tie-in to GW-4R.

Photograph 42: Abandoned extraction well GW-4 and lateral riser.

Photograph 43: Survey slope construction laser set at 6% for trenching lateral to GW-18.

Photograph 44: Encountered saturated materials that could not be excavated using a bucket auger at GW-54.

Photograph 45: Lateral riser to GW-21 with tee and 10 foot lateral stub-out for future tie-in.

Photograph 46: PVC primer used prior to PVC cement when joining well casing joints.

Photograph 47: Self taping screws used to supply additional support at each well casing joint.

Photograph 48: PVC primer used prior to PVC cement when joining well casing joints. Self taping screws used to supply additional support at each well casing joint.

Photograph 49: Extraction well GW-27 lateral tie-in to existing 8” HDPE flange. 8” reduces to 6”.

Photograph 50: Extraction well GW-27 lateral tie-in to existing 8” HDPE flange wrapped in plastic and duct-taped. 8” reduces to 6”.

Photograph 51: GCL sheet placed over built-up trash used to maintain a minimum 5 percent slope for the temporarily above ground lateral to GW-15R.

Photograph 52: Debris-free backfill soil placed over GCL sheet and trash used to maintain a minimum 5 percent slope for the temporarily above ground lateral to GW-15R.

Photograph 53: Debris-free backfill soil used to maintain a minimum 5 percent slope for the temporarily above ground lateral to GW-15R.

Photograph 54: Debris-free backfill soil used to maintain a minimum 5 percent slope for the temporarily above ground lateral to GW-15R.

Photograph 55: Debris-free backfill soil used to maintain a minimum 5 percent slope for the temporarily above ground lateral to GW-15R.

Photograph 56: Debris-free backfill soil used to maintain a minimum 5 percent slope for the temporarily above ground lateral to GW-15R.

Photograph 57: Extraction well GW-35 lateral tie-in with 8” flange that reduces to 6”.

Photograph 58: Extraction well GW-35 lateral tie-in with 8” flange that reduces to 6” wrapped in plastic and duct-taped.

Photograph 59: Lateral riser to GW-35 with tee and 10 foot lateral stub-out for future tie-in.

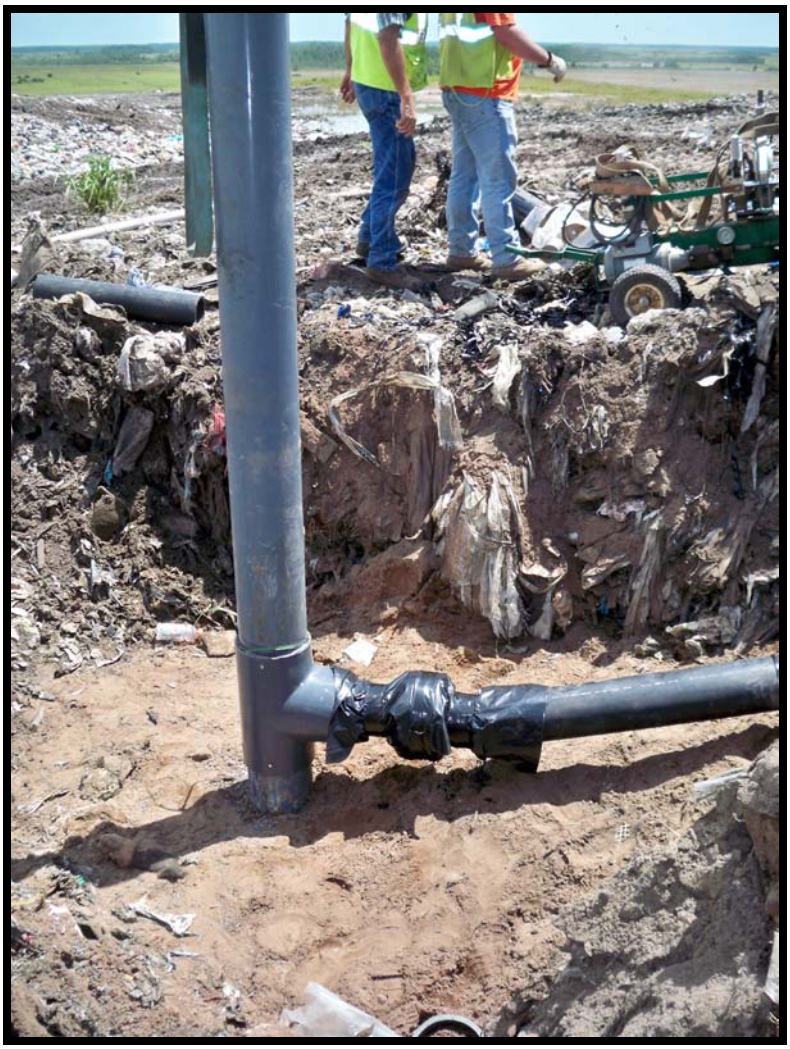
Photograph 60: Lateral riser to GW-35 with tee and 10 foot lateral stub-out for future tie-in with survey risers placed on top of pipe.

Photograph 61: 8” PVC tee that reduces to 6” with flange to be installed at remote well GW-36.

Photograph 62: Applying PVC primer and cement to 8” PVC tee at remote well GW-36.

Photograph 63: Lag bolting 8” PVC tee at remote well GW-36 to provide additional support at joints.

Photograph 64: 8” PVC tee at remote well GW-36. 6” PVC blind to 6” HDPE blind.



Photograph 65: 8” PVC tee at remote well GW-36 wrapped in plastic and duct-taped.

Photograph 66: Looking west, road crossing lateral trench going to GW-54.

Photograph 67: Looking west, road crossing lateral trench going to GW-54. Backfilling road crossing with stone.

Photograph 68: Looking west, road crossing lateral trench going to GW-54. Backfilling road crossing with stone.

Photograph 69: Looking west, lateral road crossing going to GW-54. Backfilled road crossing with stone.

Photograph 70: Looking west, lateral road crossing going to GW-54. Backfilled road crossing with stone.

Photograph 71: Extraction well GW-60A lateral tie-in with 6” blind. 6” tee to 60R with 6” blind flange for future tie-in. Flanges wrapped in plastic and duct tapped.

Photograph 72: GW-63 lateral tie-in to existing 12” header with electrofusion coupling

APPENDIX G
AGGREGATE BACKFILL LABORATORY TEST RESULTS

WSI/PHASE I - SEQ3A GCCS CQA/FL
SUMMARY OF SOIL DATA

Sample Identification	Sample Type	Sample Depth	Soil Classi-fication	Natural Moisture %	Atterberg Limits				Grain Size Distribution			Compaction		Gs	Unit Weight		Permeability (cm/sec)	Carbonate Content %	Additional Tests Conducted (See Notes)
					L.L.	P.L.	P.I.	L.I.	% Finer No. 4 Sieve	% Finer No. 200 Sieve	% Finer .005 mm	Maximum Dry Density (lb/cuft)	Optimum Moisture %		Moisture %	Dry (lb/cuft)			
JED-GCCS-AGG1	Bulk	-	GP	-	-	-	-	-	2.2	0.03	-	-	-	-	-	-	-	0.1	-

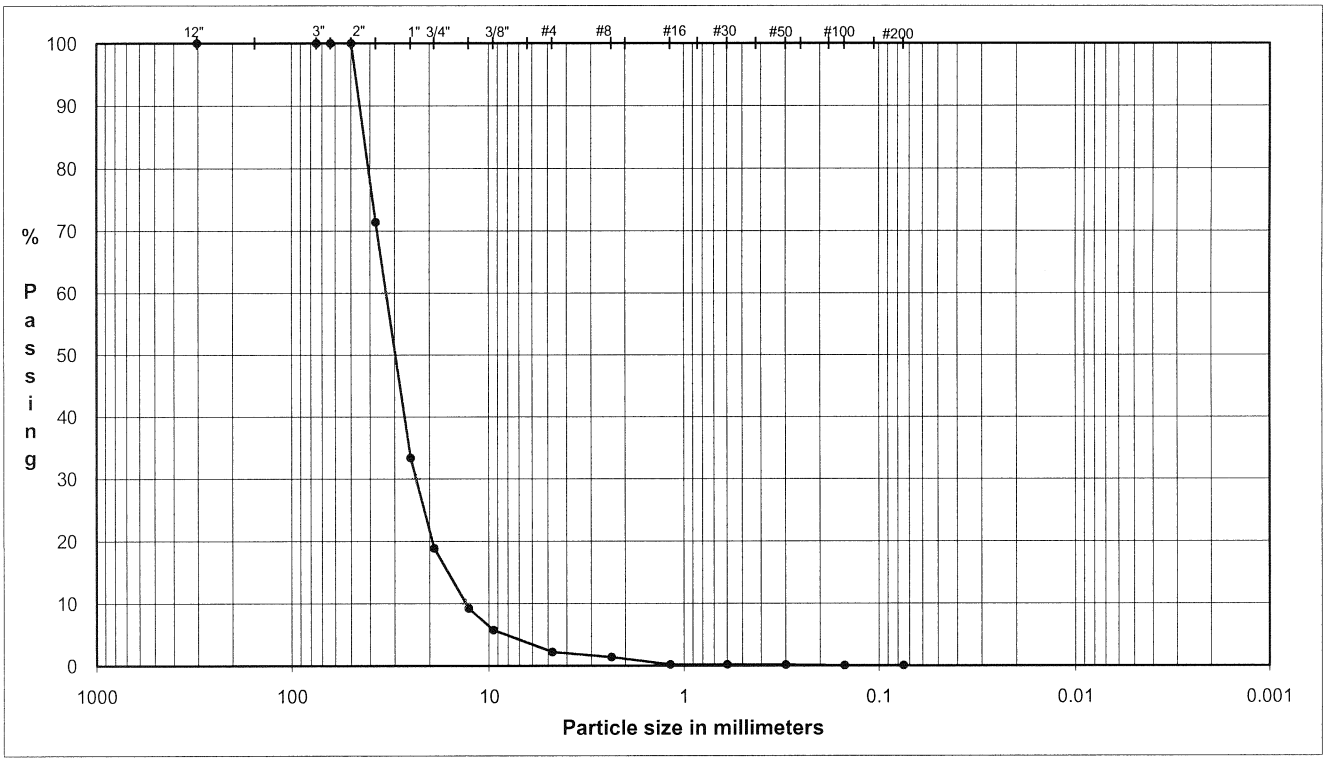
ABBREVIATIONS: LIQUID LIMIT (LL)
PLASTIC LIMIT (PL)
PLASTICITY INDEX (PI)
LIQUIDITY INDEX (LI)
SPECIFIC GRAVITY (Gs)
MOISTURE (Mc)

NOTES: T = TRIAXIAL TEST
U = UNCONFINED COMPRESSION TEST
C = CONSOLIDATION TEST
DS = DIRECT SHEAR TEST
O = ORGANIC CONTENT
P = pH

PARTICLE SIZE DISTRIBUTION

ASTM C 136, C 117

PROJECT NAME: **WSI/PHASE I - SEQ3A GCCS CQA/FL**
SAMPLE ID: **JED-GCCS-AGG1** - Depth: -
TYPE: **Bulk**



	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Particle Size Percentage
12.0"	304.8	**100.0**		
3.0"	75	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50	**100.0**		
1.5"	37.5	**71.4**		
1.0"	25	**33.4**		
0.75"	19	**18.9**	Coarse Gravel	**81.1**
0.50"	12.7	**9.2**		
0.375"	9.5	**5.8**		
#4	4.75	**2.2**	Fine Gravel	**16.6**
#8	2.36	**1.4**	Coarse Sand	**1.1**
#16	1.18	**0.2**		
#30	0.60	**0.2**	Medium Sand	**0.9**
#50	0.30	**0.2**		
#100	0.15	**0.1**		
#200	0.075	**0.0**	Fine Sand	**0.1**
			Fines	**0.0**

D_{60}= 33.2	D_{30}= 23.5	D_{10}= 13.1
Cu = D60/D10 =	**2.5**	< 4
Cc = D30^2/(D10*D60) =	**1.3**	> 1

DESCRIPTION: Multicolor, COARSE TO FINE GRAVEL, trace coarse to fine sand, trace fines.

USCS: GP

TECH	TJ
DATE	7/8/10
CHECK	
REVIEW	

CARBONATE CONTENT
ASTM D 3042 - MODIFIED

PROJECT TITLE	**WSI/PHASE I - SEQ3A GCCS CQA/FL**
PROJECT NUMBER	**083-82734-13**
SAMPLE ID	**JED-GCCS-AGG1**

	1	2	3
Residue +Tare weight (g)	579.80	581.73	578.72
Tare Weight (g)	83.84	83.78	81.39
Residue weight (g)	495.96	497.95	497.33

After Acid Application and Wash

Residue + Tare weight (g)	579.43	581.39	578.46
Residue weight (g)	495.59	497.61	497.07
Carbonate Content (%)	0.1	0.1	0.1

Average Carbonate Content (%) **0.1**

REMARKS Used pH 4 acid.

SAMPLE DESCRIPTION Multicolor, COARSE TO FINE GRAVEL, trace coarse to fine sand, trace fines.

USCS GP

MODIFIED: Only the Plus No.200 Size material used in the test.

TECH	TJ/PM
DATE	7/8/10
CHECK	
REVIEW	

APPENDIX H
CONSTRUCTION QUALITY ASSURANCE
ENGINEER FIELD MONITORING REPORTS

FIELD MONITORING REPORT

PAGE 1 OF 1

PROJECT NUMBER: 083-82734.13 **PROJECT TITLE:** Sequence 3A GCCS Expansion
OWNER: WSI
LOCATION: JED. SWMF **CONTRACTOR:** Shaw

DATE 7/7/10 **S M T (W) T F S**

THE FOLLOWING WAS NOTED:

7:45am - Arrive on site

8:30am - Pre-Construction Meeting
1. Attendees: Mike, Keith, Dan, Eugene, Kenny, Veronica
2. Orange markers are limits of cap area
3. Laterals extended out of cap area recently
4. leave 30, 36, 63, & 64 ldst
5. 5% slope min.
6. Safety
7. Hours 5am - 5pm M-F (Shaw to work 6:30am-5pm); Saturday - ½ day
8. Working face closed at 4:30pm
9. Borrow pit for sandy soil - to be used as both bedding & backfill
10. Shaw to contact Keith each time they will tie-in to GCCS
11. QA to be with driller at all times
12. Survey shots every 50' w/ 2" arc
13. Laterals will not be air tested, only mechanical fittings must be soap tested
14. 6' base of bentonite = 1'
15. 1' to 2' above 2nd plug & then slope as needed
16. GCL over well casing after 1-2' backfill
17. 10' min. solid pipe BG
18. 10'-15' stick up AG w/ dirt mound
19. Walked project w/ JED & Shaw

Looked on well schedule for GW-45 & GW-50 and gave a signed copy to driller for GW-45 & GW-50.

Obtained rock samples for sieve & carbonate testing.

Confirmed well northings/eastings/elevations with Keith for the following wells:
GW-45, GW-50, GW-54, GW-27, GW-21, GW-18, GW-15, GW-14, GW-4, GW-40A, GW-5

SUBMITTED BY GOLDER ASSOCIATES

Veronica [signature]
MONITOR

GCS FORM R1
(JUNE 1992)

GOLDER ASSOCIATES

Began drilling GW-45. Noted high temps of 145°F. Stopped drilling for the day at 77'.

Left site at 5pm

FIELD MONITORING REPORT

PROJECT NUMBER: 083-82734.13 **PROJECT TITLE:** Sequoyah 3A GCCSE Expansion
OWNER: WSI
LOCATION: JED SWMF **CONTRACTOR:** Shaw

DATE 7/8/10 **S M T W (T) F S**

THE FOLLOWING WAS NOTED:

6:30 arrive on site & review schedule of activities for today with Shaw.

Fused 6" HDPE SDR 17 pipe for laterals. Fused pipe w/in manufacturer's recommended ranges for temperature & gauge pressure. Iron temp range 450-475°F & gauge pressure 140-150 psi. (pending drag). Green Cylinders.

Continued drilling GW-45 however driller had no luck drilling deeper due to liquids. Approval was given to set well 70' deep. (60' slotted, 25' solid). Dill depth 80'. Well setting complete & fill placed around well — final mound not completed.

Began drilling GW-50. Drilled 77' & stopped for the day. Highest recorded temp was 144.9°F.

- Total fused pipe for the day ≈ 1,890'; each string 315' (45'X7). Taped each end.

- Located lateral tie-in to GW-45. Blind flange was compromised during excavation. 6" PVC cap placed on compromised lateral. Anchor trench & geomembran. cap were located.

- Left site at 5:15 pm. Keith called at 5:30pm to request that lateral trenches have no less than 2' of dirt over pipe. Thus min. trench depth = 3' (0.5' sand bedding, 0.5' pipe, 2' backfill).

SUBMITTED BY GOLDER ASSOCIATES

Veronica Rivera
MONITOR

GCS FORM R1
(JUNE 1992)

FIELD MONITORING REPORT

PROJECT NUMBER: 083-82734.13 **PROJECT TITLE:** Sequence 3A GCS Expansion
OWNER: WSI
LOCATION: SED SWMF **CONTRACTOR:** - Shaw

DATE 7/9/10 **S M T W T F S**

THE FOLLOWING WAS NOTED:

- Arrived on site at 6:30am
- Uncovered GW-45 tie-in location and began trenching
- 8:15 began drilling GW-50 again. Recorded depth was 74' as compared to the recorded depth from the day before of 77'. Continued to have liquid/sludge. Client approved setting the well 70' (66' pvc, 25' solid).
- Mike Kaiser on site ground team
- Began drilling GW-51. At 47' hit liquids. Lots of liquids at 58'. Continued to try to drill on through. Well boring left overnight.
- Excavated lateral trench to GW-50, however no lock locating ring flange. Mike gave approval to tie-in to existing lateral riser instead of locating blind flange. COA reminded Shaw that trench depth had to be at least 3' deep (0.5' bedding, 0.5' pipe, & 2' cover to soils
- Unable to achieve max. design depth at GW-51; could only go 58'. Client gave permission to offset well 20-30 south/southeast of current proposed location. Confirmed top-of-liner elevations w/ PE and began drilling new location GW-51.
- Could not drill any deeper than 69' to 70' deep at new location of GW-51. Per client's request, Shaw will drill at this location at least 2hrs tomorrow to see if the liquid/sludge can be drilled through. Liquid at 50'.
- Hole for GW-45 lateral at least 15' deep. Electrofused 6" lateral to riser located for GW-45. Soap tested electrofusion coupling - passed. Completed backfill of the trench per specs - only ½ way up. Will complete tomorrow.
- Left site @ 6pm.

SUBMITTED BY GOLDER ASSOCIATES

Veronica Arguello
MONITOR

GCS FORM R1
(JUNE 1992)

FIELD MONITORING REPORT

PROJECT NUMBER: 083-82734.13 **PROJECT TITLE:** Sequoia 3A GCS Expansion
OWNER: WSI
LOCATION: JED SWMF **CONTRACTOR:** Shaw

DATE 7/10/10 **S M T W T F S**

THE FOLLOWING WAS NOTED:

- Arrived at site at 6:30pm.
- Resumed trenching of lateral GW-45 and completed per specs. Total footage is 200 of lateral and 14' risers. Added dirt around well GW-45 to create usable mound.
- Resumed drilling at No 2 GW-51. Still lots of liquid - no surprises. Drilled a total of 88' in two hours (started at depth = 69'. Rock starts at 58'. for client, No. 2 GW-51 location to be backfilled and a new location found.
- Driller will begins drilling GW-40 on Monday.
- Left site at 12pm

SUBMITTED BY GOLDER ASSOCIATES

Veronica Ingram
MONITOR

FIELD MONITORING REPORT

PROJECT NUMBER: 083-82734.13 **PROJECT TITLE:** Sequence 3A GCS Expansion
OWNER: WSI
LOCATION: JEB SWMF **CONTRACTOR:** Shaw

DATE 7/12/10 S (M) T W T F S

THE FOLLOWING WAS NOTED:

-Arrived on site at 7am.
-Excavated around GW-49 to expose geomembrane boots for both well casing & lateral.
-Began trenching to GW-50.
-Don approved the location for GW-49R. (north of existing well survey stake about 15'). The existing lateral is northeast of the existing well survey stake. Hit liquid at 53'. Highest temp. recorded to date is 140.8F. Stopped for day at 80' due to lightning and rain. Hole covered with plywood & bucket.
-Completed tie in at GW-49 lateral riser with hard weld tee. Fuse temp was at 500°F and a gauge pressure were at 165psi (includes drag). Sanded tie-in location very well. Completed lateral tie-in & backfilled. Lateral length = 223' and riser = 14'.
-Lightning and severe rain began at 1:45pm. Shaw left for day at this time.
-Spoke with client about the location of GW-51. Pending success at GW-15R, move GW-51 north 50'.
-Client would not like Shaw to install 6" lateral stub-ups.
-Client would like additional information on the sludge bucket. Will request additional information from Mike Parker
-Client would like us to try to locate GW-54 lateral before firing in to exist lateral riser.
-Client approved lateral tie-in change for GW-51. Vacuum source for GW-51 will come from GW-54 lateral as compared to GW-50
-Left site at 2:00pm.

SUBMITTED BY GOLDER ASSOCIATES

Veronica Agnew
MONITOR

GCS FORM R1
(JUNE 1992)

FIELD MONITORING REPORT

PROJECT NUMBER: 083-82734.13 **PROJECT TITLE:** Sequence 3A GCCSExpansion
OWNER: WSI
LOCATION: TED SWMF **CONTRACTOR:** Shaw

DATE 7/13/10 **S M (T) W T F S**

THE FOLLOWING WAS NOTED:

- Arrived onsite at 6:40am
- Additional dirt placed around GW-45 and GW-50 so that a person could walk the mound. Wellheads and flexhose were also added as well as labeling well casings with wax marker. Client requested the flexhose be made longer due to possible settling in near future. Shaw replaced flexhose on GW-45 and GW-50
- Driller started to drill again at GW-40R around 7:30am. For approx. 1hr. the driller was unable to gain any addtnl footage (still at 80') Total depth 80' & muck/sludge at 70' based on weight/tape measurements. Client gave approval to set well at current depth. Set well at 70' with 60' slotted and 25' solid (15' AG). Completed setting well as shown on details.
- Excavated GW-40's existing lateral to see if it has been pinched near the ground surface. Excavated for approx. 45 min. and did not find pinched lateral. Cut exist. lateral & butt-fused cap. Removed exist. wellhead (to be reused) & placed a PVC cap on it with screws.
- At GW-39 it is est. to be 19'-20' deep. Client gave approval to tie-in lateral to exist. lateral riser at GW-39. Will need to watch for temp. stormwater drain line. Client also gave permission to cut cap boot so lateral can have proper slope. Lowered cap boot approx 3' & replaced rubber gasket & used silicon sealant & metal clamp, soap tested boot seal & had to tighten clamp more. Re-tested seal and passed soap test. Used electrofusion coupling at lateral tie-in location (45° elbow & a tee). Soap tested coupling — passed. Completed backfilling trench ½ up the slope.
- Drilled 110.5' deep at GW-4R. Could not drill any deeper than 110'. Client approved setting well at current depth. Backfilled with stone & added geomembrane donut. Placed plastic tarp over bore hole (only 9' deep) & then bentonite bags around tarp. Will finish setting well tomorrow AM.
- Left site at 5:25pm

SUBMITTED BY GOLDER ASSOCIATES

Veronica Elysee
MONITOR

GCS FORM R1
(JUNE 1992)

FIELD MONITORING REPORT

PROJECT NUMBER: 083-827734.13 **PROJECT TITLE:** Sequence 3A GCS Expansion
OWNER: WSI
LOCATION: JED SWMF **CONTRACTOR:** TIC-Shaw

DATE 7/14/10 S M T (W) T F S

THE FOLLOWING WAS NOTED:

- Arrived on site at 5:30am
- Finished trenching lateral to GW-4R. Constructed per details. 210' lat. & 14' riser.
- Completed setting of well GW-4R per details
- Began drilling GW-5. Bore hole depth stopped at 100' with liquid/mud depth at 90'. Client gave permission
- Excavated near GW-3 to find lateral tie-in for GW-4R. Found lateral tie in at 14'. Lateral was compromised during excavation.
- Truck truck arrived
- Client gave approval for Shaw to use a 45° elbow at lateral tie in and that trash may be used to fill in large holes. Clean soil & warning tape placed around the pipe and at least 2' of clean soil placed at ground cover.
- Burned coupling onto 6" exist lateral from GW-3 going to GW-4. Soap tested electrofusion coupling - PASSED
- Lateral to GW-4 hand patted w/ clean backfill & back-filled (½ way).
- Left site at 5:15pm

SUBMITTED BY GOLDER ASSOCIATES

Veronica Engineer
MONITOR

GCS FORM R1
(JUNE 1992)

FIELD MONITORING REPORT

PAGE 1 OF 1

PROJECT NUMBER: 083-42734.13 **PROJECT TITLE:** Sequence 3A GCS Expansion
OWNER: INST
LOCATION: JED SWMF **CONTRACTOR:** Shaw

DATE 7/15/10 S M T W (T) F S

THE FOLLOWING WAS NOTED:

- Arrived on site at 6:30am
- Began trenching the rest of GW-4R lateral. Completed backfill per details. 191' lat. & 14' rise
- Heard welds at temp = 500°F and gauge = 160 psi.
- Abandoned GW-4 well with a PVC cap & screws BG at 4'. Put a PK cap on dead lateral. Put survey risers on abandoned well and laterals.
- Began drilling GW-21. Driller could only drill 65' due to liquids and muck. Client said to find another location for GW-21. Relocated GW-21 approx. 50' south.
- Driller began drilling at GW-27. Total depth driller could go was 75' due to liquids and muck. Set well at top of muck (70') per client approved
- Excavated lateral / tie-in for GW-18. Tie-in approx. 13' BG.
- Installed a wellhead at GW-4DR.
- Left site at 5pm

SUBMITTED BY GOLDER ASSOCIATES

Veronica Vazquez
MONITOR

GCS FORM R1
(JUNE 1992)

FIELD MONITORING REPORT

PAGE 1 OF 1

PROJECT NUMBER: 093-82734.13 **PROJECT TITLE:** Sequence 3A GCS Expansion
OWNER: WSI
LOCATION: JED SWMF **CONTRACTOR:** Shaw

DATE 7/16/10 **S M T W T F S**

THE FOLLOWING WAS NOTED:

- Arrived onsite at 6:45am
- Completed setting well GW-27. 60' of slotted and 25' of solid with 15' of solid BG.
- Relocated GW-21 20' east and 40' south of original drill location. Total drill depth 80' due to liquids / muck. Set well at 70' with 60' slotted and 25' solid (15' AG.), per client's approval.
- Tied into exist. lateral for GW-18 vacuum source using a 45° elbow. Electrofusion coupling used. Soap tested coupling — PASSED. Well sanded around & above pipe & backfilled per details. 205' lat. & 14' riser.
- Excavated exist. lateral for GW-14 vacuum source. Depth of tie-in area on 9'. Hard welded lateral to GW-14 and sanded well & backfilled per detail.
- Left site at 5:45pm

SUBMITTED BY GOLDER ASSOCIATES

MONITOR

GCS FORM R1
(JUNE 1992)

GOLDER ASSOCIATES

FIELD MONITORING REPORT

PAGE 1 OF 1

PROJECT NUMBER: 083-82734.13 **PROJECT TITLE:** Sequence 3A GCCS Expansion
OWNER: WSI
LOCATION: JED SWMF **CONTRACTOR:** Shaw

DATE 7/17/10 S M T W T F (S)

THE FOLLOWING WAS NOTED:

- Arrived on site at 6:30am
- Continued drilling GW-15R. Total drill depth 80' due to liquids/muck. Client approved setting well at 80'. Muck liquid level at 65'. Slotted at 60' and solid at 16' BG & 7' AG.
- Completed backfilling GW-21 per construction details.
- Completed backfilling lateral to GW-16 Total lateral length = 205' with 14' rise
- Excavated lateral tie-in to GW-21 and hard welded a 6" lateral. Sanded under and around pipe, put 2' of sand above, warning tape, and trash (only in large hole (10'x25') and back-filled with 2'-3' of clean sandy soils.
- Fused 6" HDPE SDR 17 pipe
- Left site at 1pm

SUBMITTED BY GOLDER ASSOCIATES

Veronica [signature]
MONITOR

GCS FORM R1
(JUNE 1992)

GOLDER ASSOCIATES

FIELD MONITORING REPORT

PAGE 1 OF 1

PROJECT NUMBER: 1663-82734.13 **PROJECT TITLE:** Sequence 3A GCS Expansion
OWNER: WSI
LOCATION: JED SWMF **CONTRACTOR:** Shaw

DATE 7/19/10 S (M) T W T F S

THE FOLLOWING WAS NOTED:

- On site at 7:50 due to dead stop traffic on HWY-60 (car fire).
- Trenched lateral from GW-20 to GW-21 and completed backfill per details. 10' lateral stub out for future tie-in.
- Client requested all lateral risers be 15' AG as compared to the well schedule.
- Completed drilling GW-54 to a total depth of 75' with 60' slotted and 25' solid (10' BG & 15' AG. Could not drill any deeper due to liquids. Muck at 70'. Client gave approval to set well at 70'.
- Client gave approval for AG laterals to GW-15R and GW-30.
- Began drilling the third location for GW-51. Well 40' NW from original proposed location. Drilled 40' for the day; will resume in the AM. Hole covered with plywood and grate and bucket.
- Client requested GW-33 be drilled and that GW-64 not be drilled.
- Client approved for a down slope well for GW-36 with a vacuum source tie-in at GW-33 lateral.
- Client requested that GW-36 be drilled next due to filling operations.
- Left site at 6pm

SUBMITTED BY GOLDER ASSOCIATES

Veronica Ochoa
MONITOR

GCS FORM R1
(JUNE 1992)

GOLDER ASSOCIATES

FIELD MONITORING REPORT

PAGE 1 OF 1

PROJECT NUMBER: 083-82734.13 **PROJECT TITLE:** Sequence 3A GCU Expansion
OWNER: WCI
LOCATION: STD SWMF **CONTRACTOR:** Straw

DATE 7/20/10 **S M T W T F S**

THE FOLLOWING WAS NOTED:

- Arrived at site @ 7am
- Completed lateral installation to GW-15R. Lateral A6 with trash as main material in creating 5% slope.
- Continued to drill GW-51. Lots of liquids. Muck at 51' even though bucket can go 65'. Client gave permission to set well at 50'.
- Began drilling GW-33. Approved well schedule based on actual elevation of 172.3'. Total drill depth met at 65' with 50' slotted and 15' solid B6 & 10' solid A6.
- Excavated near GW-26. Found blind flange tie-in location (8" exist.). Tied into exist lateral using 8" blind flange. 8x6" reducer & plastic wrap. Backfilled per details 10'0 lateral stub out for future tie-in.
- Left site at 5:45pm

SUBMITTED BY GOLDER ASSOCIATES

Veronica Vazquez
MONITOR

GCS FORM R1
(JUNE 1992)

FIELD MONITORING REPORT

PROJECT NUMBER: 083-827341.3 **PROJECT TITLE:** Sequence 3A GCCS Expansion
OWNER: WM
LOCATION: SWMF **CONTRACTOR:** Shaw

DATE 7/21/10 **S M T W T F S**

THE FOLLOWING WAS NOTED:

- Arrived onsite at 7am
- Began trenching up to GW-27 from GW-26 tie-in.
- Backfilled per details (rock, geotextile donut, plugs, sand) GW-51 and GW-33. GW-33 received too much rock & Shaw removed extra rock (9' BGS)
- Client and I confirmed northings, eastings, and elevations of wells not yet drilled
  - GW-60R elevation 180.1'
  - GW-36 elevation 159.4' (relocated ± 15'N of proposed original location)
  - GW-30 elevation 198.2' (relocated ± 15'N of proposed original location)
  - GW-35 elevation 166.5' (relocated ± 10' east of proposed original location)
- I realized I did not relocate GW-33 10' east of survey stack. I notified client.
- Excavated actual tie-in for GW-30. 6" blind flange existing. Hard welded lateral tie-in. Backfilled per details. Will start trench for lateral tomorrow AM. Hard weld at 475°F and 160psi.
- Drilled GW-36 and GW-35 to design depth and set well casing. Tomorrow Shaw will backfill per detail. Plastic wrap and bentonite placed over bags during night.
- Left site at 5:45 pm.

SUBMITTED BY GOLDER ASSOCIATES

Veronica Aguirre
MONITOR

GCS FORM R1
(JUNE 1992)

FIELD MONITORING REPORT

PROJECT NUMBER: 083-82734.13 **PROJECT TITLE:** Sequence 3A GCCS Expansion
OWNER: WSI
LOCATION: JED SWMF **CONTRACTOR:** ~~SEC~~ Shaw

DATE 7/22/10 S M T W (T) F S

THE FOLLOWING WAS NOTED:

- On site at 6:30 am
- Began excavating lateral tie-in at GW-33 to connect vacuum to GW-36 at lateral riser (existing)
- Tied in to exist. 8" blind flange for GW-35. 8" blind flange with 8x6" reducer. Bolts on very good & plastic wraped.
- Began drilling GW-30. Completed drilling per details & at design depth.
- Michael Scott from Golder on site for approx. 2hrs for training.
- Began drilling GW-60R. Reached total design depth and set well casing. Highest temp 149.2°F located 40' BGS.
- Completed lateral trench to GW-35 with 10' stub out for future tie-in.
- Half way completed trench for GW-30 & GW-36.
- left site at 6pm

SUBMITTED BY GOLDER ASSOCIATES

Veronica [signature]
MONITOR

GCS FORM R1
(JUNE 1992)

GOLDER ASSOCIATES

FIELD MONITORING REPORT

PAGE 1 OF 1

PROJECT NUMBER: 083-87734.13 **PROJECT TITLE:** Sequence 3A GCCS Expansion
OWNER: WSI
LOCATION: JED SWMF **CONTRACTOR:** Shaw

DATE 7/23/10 **S M T W T F S**

THE FOLLOWING WAS NOTED:

- Arrived on site at 7am
- Began excavating lateral tie-in at GW-53 for vacuum to GW-54 and GW-51. Found existing lateral 16' BG; very deep hole. Hard welded 45° elbow for tie-in. Sanded under and around pipe very well. 2' of sand above pipe. Trash to fill in deep hole. 2-3' of clean backfill on top at grade.
- Completed rock, donuts, plugs, and sand at GW-33, GW-30, and GW-60R.
- Drilled GW-63 to design depth (27') with 16' slotted and 20' solid. Backfilled boring with rock. Placed plastic wrap over bore hole and bentonite bags on top.
- Rain on/off the entire day.
- Left site at 5pm

SUBMITTED BY GOLDER ASSOCIATES

Veronica Figueroa
MONITOR

GCS FORM R1
(JUNE 1992)

GOLDER ASSOCIATES

FIELD MONITORING REPORT

PAGE 1 OF 1

PROJECT NUMBER: 083-82734.13 **PROJECT TITLE:** Sequence 3A GCS Expansion
OWNER: WSE
LOCATION: JED SWMF **CONTRACTOR:** Shaw

DATE 7/24/10 **S M T W T F (S)**

THE FOLLOWING WAS NOTED:

- Arrived on site at 6:45am
- Continued to trench lateral to GW-30 at 7% slope. Completed trench per details (AG lateral).
- Excavated GW-M since it is leaning to see if installing a 45° will straighten well casing. 45° elbow only made the well lean in the exact opposite direction. Excavated more to see if well could be moved however the well did not budge. Will need to order a 22° elbow.
- Completed geotextile donut, plugs, & backfill for GW-63 per details.
- Installed wellhead on GW-4R.
- Created dirt mounts around GW-4R and GW-27.
- Began trenching from GW-36 remote wellhead location to GW-36.
- Left site at 3pm (rain on/off throughout day).

SUBMITTED BY GOLDER ASSOCIATES

Veronica Olguin
MONITOR

GCS FORM R1
(JUNE 1992)

FIELD MONITORING REPORT

PAGE 1 OF 1

PROJECT NUMBER: 082-87734.13 **PROJECT TITLE:** Sequence 3A GCCS Expansion
OWNER: WSI
LOCATION: JED Swmf **CONTRACTOR:** -- Shaw

DATE 7/26/10 S (M) T W T F S

THE FOLLOWING WAS NOTED:

- Arrived on site at 6:45am
- Began trenching from GW-36 remote wellhead towards GW-36 well casing (continuation from Saturday's work.
- Completed installation of downslope GW-36 with 8" x 6" tee with PVC flange and HDPE flange. Sanded tee very well as well as rest of trench. Backfilled per details as well as added another bentonite plug (since plug near grade was removed to install downslope tee.
- Dirt to wells GW-27, GW-21, & GW-18
- Both track hoes died within 3 hours of each other, mechanic to be on site by 5pm tonight.
- Raised GW-15R eight feet to a total height of 15' AG.
- Kenny, Santos & Osman leave the site today & will not return.
- Left site at 5pm.

SUBMITTED BY GOLDER ASSOCIATES

Veronica Arguedas
MONITOR

GCS FORM R1
(JUNE 1992)

GOLDER ASSOCIATES

FIELD MONITORING REPORT

PAGE 1 OF 1

PROJECT NUMBER: 083-827734.13 **PROJECT TITLE:** Sequence 3A GCS Expansion
OWNER: WSI
LOCATION: JEN SWMF **CONTRACTOR:** Shaw

DATE 7/27/10 S M (T) W T F S

THE FOLLOWING WAS NOTED:

- On site at 7am
- Both tracknoes are still down. Mechanic arrives at 9:30am to fix them both (hoses went bad)
- Shaw on site at 9am.
- Don Grigg & Kevin Brown on site for walk through
- New supt. Ken 724-954-5815
- Continued to trench lateral towards GW-54. Backfilled ⅓ of total trench (total ≈ 432')
- Left site at 5:15pm

Punch list as of 7/27/10

1. Laterals/vacuum tie-in
   - a) GW-51 to GW-54 to tie-in location with road crossing (need GCL at 54) ✓
   - b) GW-60R (10' stub-out)
   - c) GW-63 (10' stub out & access on bottom road - not on grade)
2. Wells to raise
   - a) GW-18 (5')
   - b) GW-14 one 22" has been installed
3. Wellheads
   - a) GW-63
   - b) GW-60R
   - c) GW-54
   - d) GW-51
   - e) GW-15R
   - f) GW-18
   - g) GW-21
   - h) GW-24
   - i) GW-30
   - j) GW-35
   - k) GW-33
4. Mounds of Dirt around wells
   - a) GW-63
   - b) GW-60R
   - c) GW-54
   - d) GW-51
   - e) GW-15R
   - f) GW-18
   - g) GW-30
   - h) GW-35
   - i) GW-33 (need GCL around)
   - j) GW-14
5. Clean up staging area
6. Survey & removing survey risers
   - ↳ Per Mike K., Keith will do not work with surveyor.

SUBMITTED BY GOLDER ASSOCIATES

Veronica Aguilera
MONITOR

GCS FORM R1
(JUNE 1992)

GOLDER ASSOCIATES

FIELD MONITORING REPORT

PAGE 1 OF 1

PROJECT NUMBER: 083-827734.13 **PROJECT TITLE:** Sequence 3A GCCS Expansion
OWNER: WSI
LOCATION: JED SWMF **CONTRACTOR:** Shaw

DATE 7/28/10 **S M T (W) T F S**

THE FOLLOWING WAS NOTED:

- Arrived on site at 11:30. Client was notified on 7/27/10 that I would be late due to a conflict in schedule
- Still trenching from GW-51 to GW-54 to road crossing. Per client, road crossing needs to be width for road. Client gave approval to use on-site 12" HDPE SDR 17 pipe. Completed sanding trench, laying pipe, & road crossing, however, not enough time to start backfill. Placed 1' thick fill of rock over road crossing and blocked road with equipment.
- Remaining equipment
  - 1350 SR LC trackhoe
  - 210 SK LC trackhoe
  - IC 100 truck, truck
- Mike K. approved punch list.
- Left site at 6pm.

SUBMITTED BY GOLDER ASSOCIATES

Veronica [signature]
MONITOR

GCS FORM R1
(JUNE 1992)

GOLDER ASSOCIATES

FIELD MONITORING REPORT

PAGE 1 OF 1

PROJECT NUMBER: 063-827 34.13 **PROJECT TITLE:** Sequence 3A GCS Expansion
OWNER: WSE
LOCATION: SED SWMF **CONTRACTOR:** ~~SEC~~ Shaw

DATE 7/29/10 S M T W (T) F S

THE FOLLOWING WAS NOTED:

- Arrived on site at 6:45am
- Shaw on site at 7:30am (top of hill)
- Sod truck waited for Shaw to come and grade exist. stone at road crossing. Sod truck crossed road crossing at 7:45am
- An operator left yesterday, however I must Shaw guy will arrive this afternoon (3 labours & 1 super.)
- Shaw took lunch from 11:15 - 12:45. Normally lunch takes 45 mins (max.) for Shaw.
- Completed lateral tie-in for GW-51 & 54. Installed GCL over GW-54. Survey pipes on either side of road crossing. Backfilled per details (total length from GW-51 to tie-in location 432' with 2 14' lateral risers. Extra rock placed at road crossing.
- Excavated tie-in location to GW-60R, found 6" blind flange 9' down. Trenched lateral ditch to GW-60R. Will connect lateral tomorrow.
- Keith coordinated with ERC 40 loads of dirt for tomorrow.
- Left site at 5:15pm

SUBMITTED BY GOLDER ASSOCIATES

Veronica [illegible]
MONITOR

GCS FORM R1
(JUNE 1992)

FIELD MONITORING REPORT

PAGE 1 OF 1

PROJECT NUMBER: 083-82734.13 **PROJECT TITLE:** Sequence 3A GCCS Expansion
OWNER: WSI
LOCATION: JEDSWMF **CONTRACTOR:** SEC Shaw

DATE 7/30/10 **S M T W T F S**

THE FOLLOWING WAS NOTED:

- Arrived at 6:50am
- Shaw arrives at 7:45am
- Tied-in to exist 6" blind flange at GW-60R with a tee going in direction of GO-B. After tee, a 6" blind flange for future expansion. Approx 27' lateral.
- Installed 22° elbow 4' BG at GW-14 to straighten well. Added a 20' piece of PVC (minus bell = 4' BG & 15' AG)
- Extended 6" PE lateral at GW-18 by 6'. Will extend 8" well casing by 5' tomorrow.
- Excavated from location to GW-63 lateral. 6" blind flange not located in the correct direction. Built lateral (blind flange connector, lateral pipe, tee, lateral pipe, and 10' lateral stub-out with blind flange). Unbolted exist. 6" lateral and no vacuum. Could move lateral 360° around. Lateral (6") off of header (12") snapped at branch saddle tee — looks like header moved downslope & inward to the landfill; thus snapping the lateral connection. J trap positive. Header had no vacuum. Excavated approx. 20-30' of header going up slope & found that the pipe was compromised at a hard weld. One part of the header is pushed down into the trash while the other part is full of trash and @ 4' BG. Client said to backfill lateral trench & leave header exposed for them to see.
- Left site at 5pm

SUBMITTED BY GOLDER ASSOCIATES

Veronica Degenhardt
MONITOR

GCS FORM R1
(JUNE 1992)

GOLDER ASSOCIATES

FIELD MONITORING REPORT

PROJECT NUMBER: 083-88734.13 **PROJECT TITLE:** Sequence 3A GCL Expansion
OWNER: WSI
LOCATION: JED SWMF **CONTRACTOR:** JEC Shaw

DATE 7/31/10 **S M T W T F (S)**

THE FOLLOWING WAS NOTED:

- Arrive on site at 7:30
- Extended GW-18 well casing 5'.
- Made well heads
- Installed wellheads at the following extraction wells:
  GW-14 (exist wellhead; re-installed after raising well
  GW-15R
  GW-21
  GW-27
  GW-18
  GW-51
  GW-36
- Dirt mounds at the follow locations:
  GW-15R (including AG lateral)
  GW-14
  GW-21
  GW-27
  GW-18
  GW-51
  GW-54
  GW-35
- Will need to ask client about GW-33. On Friday, yesterday, sodders put grass over well. Still need to put GCL sheet and a couple loads of dirt. Can temp remove soil, place GCL on top, replace, sod, & cut well casing.
- Client wants Shaw to return on Monday to expose header
- Shaw will return on Monday to finish work & expose 12" header
- left site at 4pm

SUBMITTED BY GOLDER ASSOCIATES

Veronica Arguson
MONITOR

GCS FORM R1
(JUNE 1992)

FIELD MONITORING REPORT

PROJECT NUMBER: 083-827343 **PROJECT TITLE:** Sequence 3A GCS Expansion
OWNER: WSF
LOCATION: JED SUMF **CONTRACTOR:** Shaw

DATE 8/2/10 S (M) T W T F S

THE FOLLOWING WAS NOTED:

- Arrive on site at 7am
- Finished bringing dirt to wells GW-54 and GW-30
- Finished installing wellheads at GW-54, GW-60R, GW-30, GW-35, & GW-33
- Exposed 12" header near tie-in location of GW-63. 12" header compromised by a compactor (assuming due to teeth marks). Client would like Shaw to repair the header
- Exposed 6" J trap. Trap clogged with silt. Client requested that Shaw flush J trap.
- I went to Sperls (Orlando) to pick up a 12" PVC cap to temp. cap header (traveled during lunch)
- Left site at 5pm

SUBMITTED BY GOLDER ASSOCIATES

Veronica Chesser
MONITOR

FIELD MONITORING REPORT

PAGE 1 OF 1

PROJECT NUMBER: 083-827 34.13 **PROJECT TITLE:** Sequence 3A GCS Expansion
OWNER: WSF
LOCATION: SED SWMF **CONTRACTOR:** Shaw

DATE 8/3/10 S M (T) W T F S

THE FOLLOWING WAS NOTED:

- On site at 7.30am
- Excavated entire J trap, cut, removed, & flushed with water/hammer Lots of dirt came out of the 90° elbow.
- 8:30 am 12" SDR 17 header pipe & 2 12" electrofusion couplings arrived
- Electrofused 6" gravity drain line to 6" J trap, Soap tested coupling and it PASSED
- Made up header pipe with 6" lateral tee and 6" J trap tee and 12" blind flange for future expansion.
- Rained off/on approx 30 min
- Hard weld 12" pipe at 500°F and 250 psi (recommend 180+ drag)
- Surveyed exist 12" header, since that will be the grade of the replacement header. 30' distance, dropped 17" = 4.7% slope ≈ 5%
- Left site at 5pm

SUBMITTED BY GOLDER ASSOCIATES

Veronica Engineering
MONITOR

GCS FORM R1
(JUNE 1992)

FIELD MONITORING REPORT

PAGE 1 OF 1

PROJECT NUMBER: 083-82734.13 **PROJECT TITLE:** Sequence 3A GCS Expansion
OWNER: WSI
LOCATION: SED SWMF **CONTRACTOR:** Shaw

DATE 8/4/10 S M T (W) T F S

THE FOLLOWING WAS NOTED:

- On site at 7:30 am
- Electrofused 6" vert drain line from 12" header to J trap. checked coupling for air leaks - PASSED
- Electrofused 12" header (exist.) to new 12" repair pipe which includes 6" tee to GW-63 lateral, 6" tee to 6" J trap, and 12" blind flange for future expansion. Checked coupling for air leaks - PASSED.
- Surveyors on site today. Keith gave permission to remove all survey stakes (existing), and leave new ones (for today up to GW-63).
- Backfilled 6" J trap with stone, and then the top of hole with trash and then clean topsoil. J trap pipe surrounded by rock.
- Backfilled 12" header per construction drawing detail 5
- Trenched lateral to GW-63. Used a 6" electrofusion coupling to join 6" tee off of 12" header to 6" lateral to GW-63. Checked coupling for air leaks - passed
- Backfilled and put survey risers on lateral to GW-63 for details. 10' horizontal stub out for future expansion
- With permission from client, used site's dozer to clean up side slope by GW-63.
- Placed GCL sheet over well casing at GW-63 prior to mounding with dirt.
- Removed trash/spear pipe.
- Relocated 2 old wellheads from GW-40 & GW-4 to blue trailer.
- Removed survey risers from all areas except side slopes where site recently placed sod. (Client will remove these risers once sod has taken.
- Installed wellhead at GW-63
- Added 10-gal of water to J trap from GW-63 lateral riser & still had vacuum on J trap riser (after 4"). Added 10 more gallons & still had vac. but could hear water. Shaw will add more water tomorrow before they leave.

SUBMITTED BY GOLDER ASSOCIATES
Veronica Alguinaga
MONITOR

GCS FORM R1
(JUNE 1992)

GOLDER ASSOCIATES

- Items remaining:
  - (a) Add additional water to J trap tomorrow morning until no vacuum at sample port
  - (b) clean up staging area
- Left site at 8pm

APPENDIX I

CERTIFICATION OF CONSTRUCTION

COMPLETION OF A SOLID WASTE MANAGEMENT FACILITY

Florida Department of Environmental Protection
Twin Towers Office Bldg. • 2600 Blair Stone Road • Tallahassee, FL 32399-2400

DEP Form # 62-701.900(2)
Form Title Certification of Construction Completion
Effective Date May 19, 1994

DEP Application No. _____ (Filled by DEP)

Certification of Construction Completion of a Solid Waste Management Facility

DEP Construction Permit No: SC49-0199726-004 County: Osceola

Name of Project: J.E.D. Solid Waste Management Facility

Name of Owner: Omni Waste of Osceola County, LLC

Name of Engineer: Golder Associates, Inc.

Type of Project: Construction of Gas Collection and Control System (GCCS) Phase I, Sequence 3A

Cost: Estimate $ 268,033.00 Actual $ 275,000.00

Site Design: Quantity: 7,500 ton/day Site Acreage: Phase 1 - approximately 54 Acres

Deviations from Plans and Application Approved by DEP: The constuction was conducted in general accordance with the submitted Phase I Sequence 3A Construction Drawings with some modifications. Section 2 of the Construction Record Documentation Report, describes the modifications to the referenced construction drawings, which were primarily necessitated by field conditions encountered at time of construction. These modifications didn't alter the performance or design intent of the system.

Address and Telephone No. of Site: 1501 Omni Way, St. Cloud, Florida 34773; (407) 891-3720

Name(s) of Site Supervisor: Mike Kaiser

Date Site inspection is requested: As soon as possible

This is to certify that, with the exception of any deviation noted above, the construction of the project has been completed in substantial accordance with the plans authorized by Construction

Permit No. SC49-0199726-004 :Dated: April 4, 2008

Date: 9/30/10

Signature of Professional Engineer

Northwest District
160 Governmental Center
Pensacola, FL 32501-5794
850-595-8360

Northeast District
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Jacksonville, FL 32256-7590
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407-894-7555

Southwest District
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Tampa, FL 33619
813-744-6100

South District
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Fort Myers, FL 33901-3881
941-332-6975

Southeast District
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West Palm Beach, FL 33401
561-681-6600