

January 14, 2013

Mr. John Murray, P.E.
Regional Engineer
NC DENR - Division of Waste Management
610 E. Center Ave.
 Mooresville, NC 28115

DIN 18141 Approved
1/15/2013 JM

**RE: Davidson County Landfill Facility (Permit No. 29-06)
Landfill Gas to Energy Project
Phase 2 Landfill Gas Header
Construction Quality Assurance (CQA) Report**

Dear John:

On behalf of Davidson Gas Producers, LLC, Smith Gardner, Inc. (S+G) would like to submit the enclosed construction quality assurance (CQA) report for the construction of the Phase 2 landfill gas (LFG) header for your review. This header is part of the active landfill gas collection system at the Davidson County Landfill facility which delivers LFG to the on-site electrical generation facility owned and operated by Davidson Gas Producers.

Should you have any questions or comments on this report, please contact me at your earliest convenience.

Sincerely,
SMITH GARDNER, INC.



Pieter K. Scheer, P.E.
Project Manager
pieter@smithgardnerinc.com

Enclosure

cc: Mark Hill, DTE Biomass
Ken Shelton, DTE Biomass
Jon Manninen, DTE Biomass
Charlie Brushwood, Davidson County
Ed Mussler, P.E., NCDWM
Hugh Jernigan, NCDWM

This page intentionally left blank.

Construction Quality Assurance Report

Davidson County MSW Landfill Phase 2 Landfill Gas Header Lexington, North Carolina

Prepared for:

Davidson Gas Producers, LLC
Ann Arbor, Michigan

January 2013

Prepared by:

NC LIC. NO. C-0828 (ENGINEERING)

SMITH+GARDNER

14 N. Boylan Avenue, Raleigh NC 27603 | 919.828.0577



PRINTED ON 100% RECYCLED PAPER

© 2012 Smith Gardner, Inc.

This document may not be copied without the express written authorization of Smith Gardner, Inc.

This page intentionally left blank.

Construction Quality Assurance Report

**Davidson County MSW Landfill
Phase 2 Landfill Gas Header
Lexington, North Carolina**

Prepared For:

**Davidson Gas Producers, LLC
Ann Arbor, Michigan**

S+G Project No. DTEDC-12-2



Pieter K. Scheer, P.E.
Project Manager



January 2013

NC LIC. NO. C-0828 (ENGINEERING)

SMITH+GARDNER

14 N. Boylan Avenue, Raleigh NC 27603 | 919.828.0577

This page intentionally left blank.

**Davidson County MSW Landfill
Phase 2 Landfill Gas Header
Lexington, North Carolina**

Construction Quality Assurance Report

Table of Contents

		<u>Page</u>
1.0	OVERVIEW	1
2.0	PROJECT DESCRIPTION	1
2.1	General	1
2.2	Reference Documents.....	1
2.3	Project Participants.....	2
2.3.1	Owner	2
2.3.2	Davidson County.....	2
2.3.3	Engineer/CQA Engineer	2
2.3.4	Contractor	2
2.3.5	Surveyor.....	3
3.0	SUMMARY OF CONSTRUCTION ACTIVITIES	3
3.1	LFG Header Piping	3
4.0	CQA PROGRAM	4
4.1	Scope of Services	4
5.0	LANDFILL GAS (LFG) COLLECTION SYSTEM CQA	4
5.1	Material Approval	4
5.2	Contractor CQC Testing	4
6.0	RECORD DRAWINGS.....	5
7.0	PROJECT CERTIFICATION	5

APPENDICES

Appendix A	DWM Approval Letter
Appendix B	Photographic Log
Appendix C	CQA Reports
Appendix D	Landfill Gas (LFG) Collection System CQA Data
	D1. Manufacturer’s Product Data Submittals
	D2. Quality Control Test Results - Pressure Testing
Appendix E	Record Drawings

This page intentionally left blank.

1.0 OVERVIEW

This Construction Quality Assurance (CQA) Report has been prepared to document the CQA activities performed during the construction of a portion of the landfill gas (LFG) collection and control system (GCCS) at the Davidson County Landfill facility. The landfill facility is located on Davidson County Landfill Road near Lexington, North Carolina and is owned and operated by Davidson County under State Solid Waste Permit No. 29-06. Davidson Gas Producers, LLC (DGP) owns and operates the landfill gas management system under agreement with the County. An approval for the construction was issued by the North Carolina Division of Waste Management (NCDWM) on June 14, 2012 (see **Appendix A**).

Specifically, this construction even included the installation of 12-inch and 8-inch HDPE header piping between the Davidson Gas Producers electrical generation facility and the active Phase 2 - Area 1 MSW landfill unit.

2.0 PROJECT DESCRIPTION

2.1 General

This portion of the site's GCCS was designed by Smith Gardner, Inc. (S+G) and includes the following components:

- Approximately 2,800 LF of 12-inch diameter header piping (HDPE (DR 17));
- Approximately 2,200 LF of 8-inch diameter header piping (HDPE (DR 17));
- Approximately 1,100 LF of 2-inch diameter condensate piping (HDPE (DR 11));
- Approximately 1,100 LF of 2-inch diameter air piping (HDPE (DR 11));
- A Condensate Pump Station;
- A Steel-Cased Rail Crossing with Isolation Valves; and
- Connections to Leachate Cleanout Piping.

2.2 Reference Documents

The project was constructed in accordance with the following documents:

Construction Documents – Davidson County Landfill – Phase 2 Landfill Gas Header Pipe:

Includes technical specifications and construction drawings prepared by Smith Gardner, Inc. (S+G) and dated June, 2012.

Permit Modification – Davidson County Landfill (NC Permit No. 29-06) - Landfill Gas to Energy Project, Phase 2 Header and Initial Collection System:

Includes technical specifications, CQA manual, and permit drawings prepared by S+G and dated April 2012 (Approved by NCDWM on June 14, 2012 (copy of approval letter provided in **Appendix A**)).

2.3 Project Participants

The following parties were involved in the construction and CQA for the project:

2.3.1 Owner

Davidson Gas Producers, LLG (DGP) (DTE Biomass Energy)
425 S. Main Street
Ann Arbor, MI 48104
Phone: (734) 302-5359

Contact: Mark Hill, Regional Operations Director

2.3.2 Davidson County

Davidson County Integrated Solid Waste Management Department
1242 Old U.S. Highway 29
Thomasville, NC 27360
Phone: (336) 242-2284
Fax: (336) 249-7524

Contacts: Charlie Brushwood, Director
Steven Sink, Landfill Manager

2.3.3 Engineer/CQA Engineer

Smith Gardner, Inc. (S+G)
14 N. Boylan Ave.
Raleigh, NC 27603
Phone: (919) 828-0577
Fax: (919) 828-3899

Contacts: Pieter Scheer, P.E., Project Manager
Randy Berarducci, Field Technician

2.3.4 Contractor

Piedmont Industrial Services, Inc. (Piedmont)
1680 Lowery Street
Winston-Salem, NC 27101
Phone: (336) 722-6505
Fax: (336) 722-6529

Contacts: Todd Scott, Project Manager

2.3.5 Surveyor

Michael Green Associates, P.A.
4513 West Old Hwy 64
Lexington, NC 27295
Phone: (336) 248-8102

Contacts: Michael Green, PLS, Project Manager

3.0 SUMMARY OF CONSTRUCTION ACTIVITIES

Major elements of the project are discussed below. Photos documenting the construction can be found in **Appendix B**.

3.1 LFG Header Piping

The installation of LFG header piping began the week of July 16, 2012. The piping installation was performed by Piedmont Industrial Services (Piedmont) under contract to Davidson Gas Producers.

A total of approximately 2,800 LF of 12" diameter and 2,200 LF of 8" diameter HDPE piping was installed as the header pipe leading to and connecting to existing leachate cleanout piping within the Phase 2 - Area 1 MSW landfill unit. Along the header pipe, one condensate pump station (CPS-4) was installed at a low point in the line. A pneumatic pump was installed in this pump station to remove collected condensate. This condensate is pumped via HDPE force main to the DGP electrical generation facility.

S+G also observed the backfill and compaction of the LFG header piping. Based on our observations, the bottom of the trench and backfill materials appeared to be free of sharp stones or other material that would be potentially damaging to the piping. Satisfactory compaction of the trench was verified by trafficking of the finished grade.

Approximately 210 LF of the 12" diameter header piping crosses the existing NC Railroad Company (NCRR) right-of-way (ROW) at the site. Approvals were obtained from the NCRR and Norfolk Southern Corporation (railway operator) prior to installation of an 18" diameter steel casing through the entire ROW. The 12" diameter HDPE header pipe was placed within spacers inside the steel casing. Isolation valves and vents (for the casing pipe) were installed at each end of the steel casing per NCRR requirements.

4.0 CQA PROGRAM

4.1 Scope of Services

In satisfying the requirements of the site's approved CQA Manual, the following activities were performed:

- Review of submittals from the Contractor for conformance with project specification and CQA requirements.
- Observation and documentation of the installation of system piping and appurtenances.
- Review/preparation of record drawings.
- Preparation of the final CQA report.

5.0 LANDFILL GAS (LFG) COLLECTION SYSTEM CQA

5.1 Material Approval

S+G reviewed and approved the landfill gas collection system product submittals provided by Piedmont. The selected materials included the following:

HDPE Pipe/Fittings:	Vacuum/Gravity Piping: Driscoplex 6400 (DR 17) - 8" & 12" Diam. Condensate Force Main: Driscoplex 6400 (DR 11) - 2" Diam. Air Line: Driscoplex 6400 (DR 11) - 2" Diam.
Valves:	Asahi/America, Inc. Type 57 Butterfly Valves: Gear Operated - 12"
Condensate Pump Stations:	Fabricated by Lee Supply Co., Inc.

Copies of submittal information for these products can be found in **Appendix D1**.

5.2 Contractor CQC Testing

During construction of the GCCS, Piedmont performed pressure testing of all HDPE piping. Pressure testing of header, condensate, and air piping was conducted using low pressure air in accordance with ASTM F 1417. Additionally, hydrostatic pressure testing in accordance with ASTM F 2164 was performed on the portion of the 12" diameter header pipe installed through the railroad right-of-way. Documentation of the successful testing can be found in **Appendix D2**.

6.0 RECORD DRAWINGS

The following record (as-built) drawings depicting the construction of the Phase 2 LFG header can be found in Appendix E:

- LFG Header As-Built (3 Sheets) (prepared by Michael Green Associates, P.A.).

7.0 PROJECT CERTIFICATION

Based on the observations and results of the CQA program documented herein, it is my professional opinion that the construction of the Phase 2 LFG header of the Davidson County MSW Landfill was completed in accordance with the following:

- The Project CQA Manual;
- The conditions of the Permit;
- The requirements of 15A NCAC 13B.1624; and
- Acceptable engineering practices.

SMITH GARDNER, INC.



Pieter K. Scheer, P.E.
Project Manager



This page intentionally left blank.

Appendix A

DWM Approval Letter

**Construction Quality Assurance Report
Davidson Gas Producers, LLC - Phase 2 LFG Header
Davidson County, North Carolina**

This page intentionally left blank.



North Carolina Department of Environment and Natural Resources
Division of Waste Management

Beverly Eaves Perdue
Governor

Dexter R. Matthews
Director

Dee Freeman
Secretary

June 14, 2012

Charles Brushwood
Davidson County Integrated Solid Waste
220 Landfill Road
Lexington, NC 27292

Re: Authorization for Constructing Landfill Gas Header System
Davidson County MSW Phase 2 Lined Landfill
Davidson County, North Carolina
Permit No. 29-06, DIN 16746

Dear Mr. Brushwood:

The Solid Waste Section (SWS) of the Division of Waste Management (Section) has reviewed your Application entitled;

Landfill Gas to Energy Project, Phase 2 Header and Initial Collection System, Davidson County Phase 2 Landfill. Prepared by: Richardson Smith Gardner and Associates, Inc., Raleigh, NC. April 23, 2012. DIN 16745.

In accordance with GS 130A-295.8(e), the Section has found it to be complete. A determination of completion means that the application includes all required components but does not mean that the required components provide all the information that is required for the Section to make a decision on the application

Therefore, since all required components were included and they were found acceptable, the SWS hereby approves the construction of this project.

Please note that this authorization for installing the header and initial collection system does not remove any responsibilities from Davidson County to comply with any permit condition, or any other local, state or federal regulation.

Mr. Charles Brushwood
June 14, 2012
Page 2 of 2

The Solid Waste Section will be glad to assist the County in the successful completion of this LFGCCS project, if you have any questions regarding the matters described above, please contact John Murray at (704) 235-2163 or by email john.murray@ncdenr.gov.

Sincerely,

Edward F. Mussler, P.E., Supervisor
Permitting Branch
Solid Waste Section

cc: Pieter K. Scheer, P.E., Richardson Smith Gardner & Associates
Joan A. Smyth, P.G. Richardson Smith Gardner & Associates
John Murray, P.E., SWS
Hugh Jernigan, SWS
Central File

Appendix B

Photographic Log

**Construction Quality Assurance Report
Davidson Gas Producers, LLC - Phase 2 LFG Header
Davidson County, North Carolina**

This page intentionally left blank.

Client Name:
Davidson Gas Producers, LLC

Site Location:
Davidson County, NC

Project No.
DTEDC 12-2

Photo No.
1

Date:
7/20/12

Direction Photo Taken:

N/A

Description:

12" HDPE LFG header pipe being prepared for low pressure air testing in accordance with ASTM F 1417.



Photo No.
2

Date:
7/24/12

Direction Photo Taken:

Northwest

Description:

Installation of 12" HDPE LFG header, 2" HDPE condensate force main, and 2" HDPE air piping into trench located near the electrical generation facility.



Client Name:
Davidson Gas Producers, LLC

Site Location:
Davidson County, NC

Project No.
DTEDC 12-2

Photo No.
3

Date:
7/24/12

Direction Photo Taken:

North

Description:

Compaction of backfill in the pipe trench using a BMG 8500 BOMAG compactor.



Photo No.
4

Date:
7/31/12

Direction Photo Taken:

North

Description:

View of bore pit on the south side of the NC Railroad Company right-of-way.



Client Name: Davidson Gas Producers, LLC		Site Location: Davidson County, NC	Project No. DTEDC 12-2
Photo No. 5	Date: 7/31/12	 A photograph showing a deep, narrow excavation pit. The soil is reddish-brown and appears to be a mix of sand and silt. There are some roots and vegetation at the top edge of the pit. The pit is roughly rectangular and extends into the distance.	
Direction Photo Taken: South			
Description: View of receiving pit on the north side of the NC Railroad Company right-of-way.			

Photo No. 6	Date: 7/31/12	 A photograph showing a laser-guided boring operation. Two workers in safety gear (hard hats and high-visibility vests) are operating a large piece of machinery. The machinery is mounted on a concrete structure and is drilling a hole into the ground. The ground is reddish-brown soil. The workers are looking at a control panel on the machinery.	
Direction Photo Taken: East			
Description: View of laser guided boring of a pilot hole for the railroad crossing.			

Client Name:
Davidson Gas Producers, LLC

Site Location:
Davidson County, NC

Project No.
DTEDC 12-2

Photo No.
7

Date:
7/31/12

Direction Photo Taken:

East

Description:

View of 18" steel casing prior to jack and bore installation along the pilot hole.

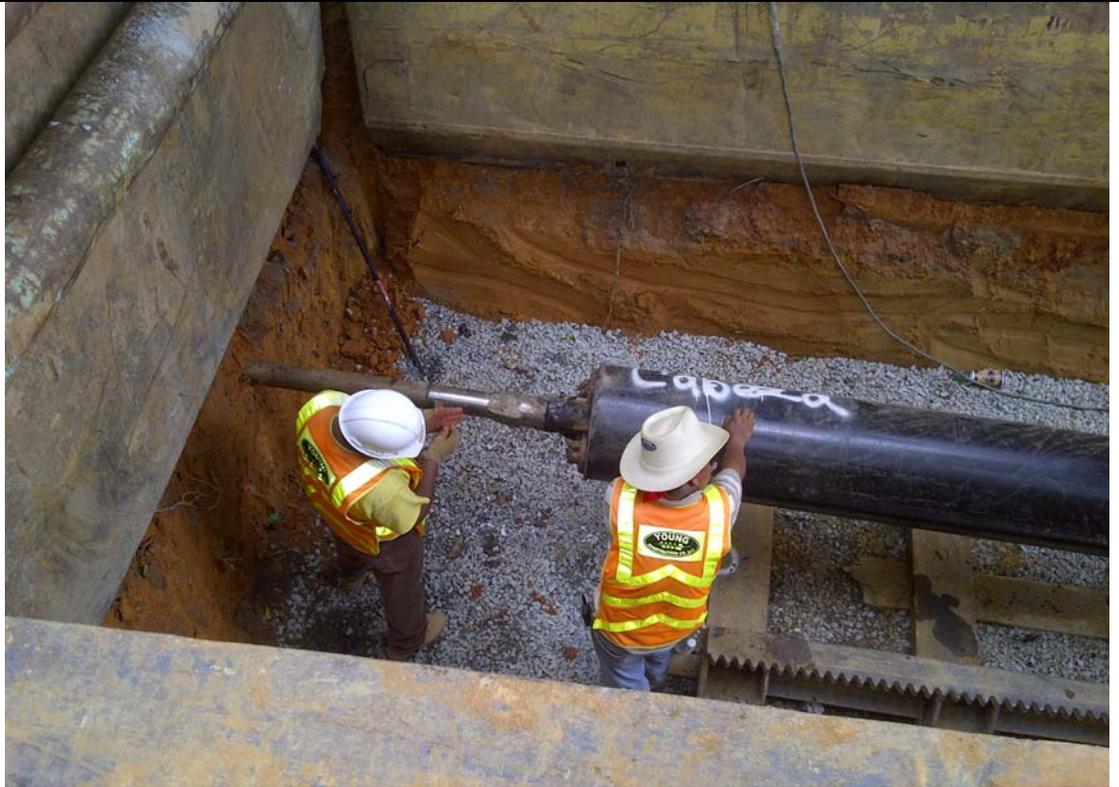


Photo No.
8

Date:
7/31/12

Direction Photo Taken:

Northeast

Description:

Welding of 20' section of 18" steel casing during the jack and bore installation.



Client Name: Davidson Gas Producers, LLC		Site Location: Davidson County, NC	Project No. DTEDC 12-2
Photo No. 9	Date: 8/2/12		
Direction Photo Taken: North			
Description: Steel casing after installation at south end of bore.			

Photo No. 10	Date: 8/2/12		
Direction Photo Taken: South			
Description: Steel casing after installation at north end of bore.			

Client Name: Davidson Gas Producers, LLC		Site Location: Davidson County, NC	Project No. DTEDC 12-2
Photo No. 11	Date: 8/2/12		
Direction Photo Taken: South			
Description: View of inside of 18" steel casing.			

Photo No. 12	Date: 8/6/12		
Direction Photo Taken: West			
Description: Installation of condensate pump station along existing access road.			

Client Name:
Davidson Gas Producers, LLC

Site Location:
Davidson County, NC

Project No.
DTEDC 12-2

Photo No.
13

Date:
8/6/12

Direction Photo Taken:

Northeast

Description:

Hydrostatic pressure testing on 220' of 12" HDPE LFG header piping in accordance with ASTM F2164. This section of HDPE pipe was installed within the steel casing under the railroad right of way.



Photo No.
14

Date:
8/9/12

Direction Photo Taken:

East

Description:

Centralized spacers were placed along the 12" (DR17) HDPE pipe before placement inside the steel casing.



Client Name:
Davidson Gas Producers, LLC

Site Location:
Davidson County, NC

Project No.
DTEDC 12-2

Photo No.
15

Date:
8/17/12

Direction Photo Taken:

South

Description:

Installation of 12" gear-operated butterfly valve with flanged connection and vent pipe on steel casing on north side of railroad crossing.



Photo No.
16

Date:
9/25/12

Direction Photo Taken:

North

Description:

Installation of 8" HDPE LFG header near leachate collection system cleanout at NW end of Phase 2 – Area 1.



Client Name:
Davidson Gas Producers, LLC

Site Location:
Davidson County, NC

Project No.
DTEDC 12-2

Photo No.
17

Date:
9/25/12

Direction Photo Taken:
South

Description:
Installation of 8" LFG header on west side of Phase 2 – Area 1.



Photo No.
18

Date:
9/25/12

Direction Photo Taken:
South

Description:
8" LFG header crossing over drainage channel on NW side of Phase 2 – Area 1.



This page intentionally left blank.

Appendix C

CQA Reports

**Construction Quality Assurance Report
Davidson Gas Producers, LLC - Phase 2 LFG Header
Davidson County, North Carolina**

This page intentionally left blank.

DAILY CQA REPORT

PROJECT INFORMATION			
Project Name: Davidson Co. Ph 2 LFG Header Pipe		S+G Project No.: DTEDC 11-1	
Client Name: Davidson Gas Producers, LLC		Client Contact(s): Steve Sink	
Site Location: Davidson Co., N.C.			
General Contractor: Piedmont Industrial Services		General Contractor's Rep.: Todd Scott	
Subcontractor(s):		Subcontractor's Rep.(s):	
DAILY INFORMATION			
S+G Representative(s) Time(s) on Site:			
Rep: Randy Berarducci	Rep:	Rep:	
Arrived: 8:30 AM	Arrived:	Arrived:	
Departed: 2:00 PM	Departed:	Departed:	
Weather Conditions:		Ground Conditions:	
Clear, Sunny		Dry	
		Temperature:	
		High: 92	
		Low: 78	
Contractor's Equipment:			
JCB 214 Backhoe, Daewoo 175 LCV Excavator, McElroy 618 Rolling Butt Fusion Welder, BMG 8500 BOMAG Multipurpose Compactor, CAT 252 Skid Steer Loader, Takeuchi TB135 Compact Excavator			
Contractor's Personnel:			
Materials Received:			
Material(s)		Description	
Visitor Information:			
Firm Name(s)		Representative's Name	Representative's Title
Important Conversation(s):			
Conversation(s)		Description	
Pieter Scheer (S+G)/Todd Scott (PIS)		Pieter Scheer (S+G) gave approval for Todd Scott (PIS) to move the LFG corridor to the center of the existing path north of the railroad. Mr. Scheer also approved testing the condensate force main with low-pressure air (ASTM F 1417) instead of hydrostatic test.	
Description of Daily Activities and Events:			
<ul style="list-style-type: none"> WRB spoke with Pieter Scheer (S+G and Todd Scott (PIS) concerning the correct placement of the LFG pipeline, and testing procedures (See Important Conversations). I observed the installation the welding of 12" DR 17 HDPE piping to be utilized in the LFG System. PIS completed a 886' run of 12" DR 17 HDPE Pipe and prepared it for air testing by welding two end caps that have treaded locations for air valves. A release valve will be placed at one end, with a pressure gauge and inflow valve at the other. The ambient temperature was too great to achieve an accurate air test of the 886' run of pipe. Testing was scheduled for 7:30am on 7/20/12. S+G Rep. departed site at 2:00 pm 			
Prepared By: Randy Berarducci		Date : 7/19/12	Reviewed By: PKS

DAILY CQA REPORT

PROJECT INFORMATION		
Project Name: Davidson Co. Ph 2 LFG Header Pipe	S+G Project No.: DTEDC 11-1	
Client Name: Davidson Gas Producers, LLC	Client Contact(s): Steve Sink	
Site Location: Davidson Co., N.C.		
General Contractor: Piedmont Industrial Services	General Contractor's Rep.: Todd Scott	
Subcontractor(s):	Subcontractor's Rep.(s):	
DAILY INFORMATION		
S+G Representative(s) Time(s) on Site:		
Rep: Randy Berarducci	Rep:	Rep:
Arrived: 8:30 AM	Arrived:	Arrived:
Departed: 2:30 PM	Departed:	Departed:
Weather Conditions:	Ground Conditions:	Temperature:
Clear, Sunny to Partly Cloudy	Dry	High: 96 Low: 80
Contractor's Equipment:		
JCB 214 Backhoe, Daewoo 175 LCV Excavator, McElroy 618 Rolling Butt Fusion Welder, BMG 8500 BOMAG Multipurpose Compactor, CAT 252 Skid Steer Loader, Takeuchi TB135 Compact Excavator		
Contractor's Personnel:		
Materials Received:		
Material(s)	Description	
Visitor Information:		
Firm Name(s)	Representative's Name	Representative's Title
Important Conversation(s):		
Conversation(s)	Description	
Pieter Scheer (S+G)/Todd Scott (PIS)	Pieter Scheer (S+G) gave approval for Todd Scott (PIS) to add a high point at Sta. 27+00, so condensate will not flow into the new pipeline. Also after excavating the location of the existing LFG Header road crossing there was concern about the flow direction.	
Description of Daily Activities and Events:		
<ul style="list-style-type: none"> I observed PIS excavate a test pit near the tie in location. At a depth of 38" a 10" DR17 HDPE Pipe was located. Along the east side of the pipe was a dual contained 4" DR 11 HDPE Pipe. During excavation it was discovered that the flow direction of the existing 10" LFG Header was sloped toward the LF. I contacted Pieter Scheer (S+G) and he was concerned that the existing pipe was installed incorrectly. PIS excavated the entire pipe run under the all weather perimeter access road. After measuring the depth of the pipe using a laser level total station, the flow was 1.1% flowing toward the Power Plant. PIS and I noticed that there was a small elevation increase in the middle of the pipe trench which caused the initial inquiry. PIS will excavate around this bulge and correct it during the tie-in process. The existing pipe has 1% fall from the LF across the road. After adjusting the depth of the trench at Sta. 27+00, the adjusted directional flow is as follows, from Sta. 26+25 to 27+00 1.13%, and from Sta. 27+00 to Sta. 28+00 -1.8%. I observed the use of the remote Multipurpose Compactor in the LFG trench backfill. S+G Rep. departed site at 3:00 pm 		
Prepared By: Randy Berarducci	Date : 7/24/12	Reviewed By: PKS

DAILY CQA REPORT

PROJECT INFORMATION		
Project Name: Davidson Co. Ph 2 LFG Header Pipe	S+G Project No.: DTEDC 11-1	
Client Name: Davidson Gas Producers, LLC	Client Contact(s): Steve Sink	
Site Location: Davidson Co., N.C.		
General Contractor: Piedmont Industrial Services	General Contractor's Rep.: Todd Scott	
Subcontractor(s): Young Construction CO. LLC Micheal Green & Associates, Surveying	Subcontractor's Rep.(s): Charles F. Barbee Micheal Green	
DAILY INFORMATION		
S+G Representative(s) Time(s) on Site:		
Rep: Randy Berarducci	Rep:	Rep:
Arrived: 8:50 AM	Arrived:	Arrived:
Departed: 3:00 PM	Departed:	Departed:
Weather Conditions:	Ground Conditions:	Temperature:
Clear to Partly Cloudy		High: 95 (Heat Index 107) Low: 80
Contractor's Equipment:		
JCB 214 Backhoe, Daewoo 175 LCV Excavator, McElroy 618 Rolling Butt Fusion Welder, BMG 8500 BOMAG Multipurpose Compactor, CAT 252 Skid Steer Loader - Young Construction: 320CL Cat Excavator (2), Jack and Bore Drill Rig		
Contractor's Personnel:		
Materials Received:		
Material(s)	Description	
Visitor Information:		
Firm Name(s)	Representative's Name	Representative's Title
Important Conversation(s):		
Conversation(s)	Description	
Pieter Scheer (S+G)/Micheal Green (MGS)/ Jon Manninen (DTE)/WRB (S+G)	Pieter discussed the movement of the alignment of the pipe to the center of the road. Micheal Green will send elevations of moved stakes to S+G. Jon also discussed the relocation of the temporary 8" line along Phase 2 to allow fall and ease of access.	
Description of Daily Activities and Events:		
<ul style="list-style-type: none"> I observed PIS weld approximately 360 liner feet of pipe. Air test will be performed at a later date. Micheal Green Surveyors relocated survey stakes along the centerline of the existing road. They will survey the elevations of the relocated stakes and send the informtion to S+G. PIS Shipped Mini-Excavator off site to another job. Young Construction on site, staging equipment. S+G Rep. departed site at 3:00 pm 		
Prepared By: Randy Berarducci	Date : 7/27/12	Reviewed By: PKS

DAILY CQA REPORT

PROJECT INFORMATION			
Project Name: Davidson Co. Ph 2 LFG Header Pipe		S+G Project No.: DTEDC 11-1	
Client Name: Davidson Gas Producers, LLC		Client Contact(s): Steve Sink	
Site Location: Davidson Co., N.C.			
General Contractor: Piedmont Industrial Services		General Contractor's Rep.: Todd Scott	
Subcontractor(s): Young Construction CO. LLC J.R. Rich		Subcontractor's Rep.(s): Charles F. Barbee Norfolk Southern	
DAILY INFORMATION			
S+G Representative(s) Time(s) on Site:			
Rep: Randy Berarducci	Rep: Lori Phillips	Rep:	
Arrived: 8:00 AM	Arrived: 10:45 AM	Arrived:	
Departed: 5:30 PM	Departed: 4:00 PM	Departed:	
Weather Conditions: Cloudy		Ground Conditions: Dry	
		Temperature: High: 90 Low: 72	
Contractor's Equipment: JCB 214 Backhoe, Daewoo 175 LCV Excavator, McElroy 618 Rolling Butt Fusion Welder, BMG 8500 BOMAG Multipurpose Compactor, CAT 252 Skid Steer Loader - Young Construction: 320CL Cat Excavator (2), Jack and Bore Drill Rig			
Contractor's Personnel:			
Materials Received:			
Material(s)		Description	
Visitor Information:			
Firm Name(s)		Representative's Name	Representative's Title
Important Conversation(s):			
Conversation(s)		Description	
JR Rich (NS)		JR will have a safety meeting early am on 8/1, no boring can commence under the rail until he arrives. Young can stop 20' prior to the rail line.	
Randy (S+G)/Pieter Scheer (S+G)/Todd Scott (PIS)		Pieter checked the requirements, standard welding for the casing, no x-ray required.	
Description of Daily Activities and Events:			
<ul style="list-style-type: none"> I observed an air test for 286' of 12" (DR 17) HDPE, test passed with 0 psi loss over 9 minutes. I observed Young dig a receiving pit for the jack/bore. I observed Young drill a pilot bore at 1%. Young encountered hard clay material and the bore had refusal 60' from the receiving pit. Young received permission from JR (NS) to excavate existing drainage ditch to find the head of the pilot bore. I observed Young excavate the existing trench and locate the pilot bit. Todd Scott (PIS) placed caution tape around the excavation per the request of Norfolk Southern, since the excavation was inside the Rail Line ROW. Once the head was found the bore continued and successfully reached the receiving pit. I observed Young welding/installing 60' of casing for the jack/bore. The pilot bore was removed sectionally in the receiving pit as the casing was installed. PIS welded ~420' of 12" (DR 17) HDPE Pipe. S+G Rep. departed site at 5:30 pm 			
Prepared By: Randy Berarducci		Date : 7/31/12	Reviewed By: PKS

DAILY CQA REPORT

PROJECT INFORMATION		
Project Name: Davidson Co. Ph. 2 LFG Header Pipe	S+G Project No.: DTEDC 11-1	
Client Name: Davidson Gas Producers, LLC	Client Contact(s): Steve Sink	
Site Location: Davidson Co., N.C.		
General Contractor: Piedmont Industrial Services	General Contractor's Rep.: Todd Scott	
Subcontractor(s): Young Construction CO. LLC J.R. Rich	Subcontractor's Rep.(s): Charles F. Barbee Norfolk Southern	
DAILY INFORMATION		
S+G Representative(s) Time(s) on Site:		
Rep: Randy Berarducci	Rep:	Rep:
Arrived: 8:30 AM	Arrived:	Arrived:
Departed: 4:00 PM	Departed:	Departed:
Weather Conditions:	Ground Conditions:	Temperature:
Clear - Partly Cloudy	Dry	High: 94 Low: 72
Contractor's Equipment:		
JCB 214 Backhoe, Daewoo 175 LCV Excavator, McElroy 618 Rolling Butt Fusion Welder, BMG 8500 BOMAG Multipurpose Compactor, CAT 252 Skid Steer Loader - Young Construction: 320CL Cat Excavator (2), Jack and Bore Drill Rig		
Contractor's Personnel:		
Materials Received:		
Material(s)	Description	
Visitor Information:		
Firm Name(s)	Representative's Name	Representative's Title
Important Conversation(s):		
Conversation(s)	Description	
JR Rich (NS)/Todd Scott (PIS)	JR got a time window from 2:00 pm to 3:00 pm to move ~850 of 12" (DR 17) HDPE across the rail line. If more time is needed NS will have to hold a small train.	
Description of Daily Activities and Events:		
<ul style="list-style-type: none"> Young pushed up to 80' of casing and stopped until the NS Flagman JR arrived on site at 10:30. I observed Young completely install all 200' of casing. Receiving pit had to be excavated further to locate the beginning of the casing. Young pushed the remaining casing through once found. PIS welded ~430' 12" (DR 17) HDPE, and prepared both runs of pipe to pull across the rail line. I observed PIS pull both segments of pipe across the rail line from 2:15 to 2:34 pm. JR cleared the track so rail travel could commence. Young completed removing the pilot bore sections and cleaned the casing pipe. PIS staged HDPE pipe along existing road north of rail line row. PIS began preparations for hydrostatic testing of 220' 12" (DR 17) HDPE that will go under through the casing under the rail line ROW. 2:45 Flagman for Norfolk Southern left site, no further need for flagman on site. S+G Rep. departed site at 4:00 pm 		
Prepared By: Randy Berarducci	Date : 8/1/12	Reviewed By: PKS

DAILY CQA REPORT

PROJECT INFORMATION		
Project Name: Davidson Co. Ph 2 LFG Header Pipe	S+G Project No.: DTEDC 11-1	
Client Name: Davidson Gas Producers, LLC	Client Contact(s): Steve Sink	
Site Location: Davidson Co., N.C.		
General Contractor: Piedmont Industrial Services	General Contractor's Rep.: Todd Scott	
Subcontractor(s): Young Construction CO. LLC	Subcontractor's Rep.(s): Charles F. Barbee	
DAILY INFORMATION		
S+G Representative(s) Time(s) on Site:		
Rep: Randy Berarducci	Rep:	Rep:
Arrived: 8:30 AM	Arrived:	Arrived:
Departed: 4:30 PM	Departed:	Departed:
Weather Conditions:	Ground Conditions:	Temperature:
Partly Cloudy	Dry	High: 94 Low: 79
Contractor's Equipment:		
JCB 214 Backhoe, Daewoo 175 LCV Excavator, McElroy 618 Rolling Butt Fusion Welder, BMG 8500 BOMAG Multipurpose Compactor, CAT 252 Skid Steer Loader - Young Construction: 320CL Cat Excavator (2), Jack and Bore Drill Rig		
Contractor's Personnel:		
Materials Received:		
Material(s)	Description	
Valve Extension Handles and Casings	Extension Handles and protective casing pipes for the valves that get buried.	
Visitor Information:		
Firm Name(s)	Representative's Name	Representative's Title
Important Conversation(s):		
Conversation(s)	Description	
Lori Phillips, P.E. (S+G)	Lori confirmed that the sump should not rise with the induction of high ground water around the base of the sump.	
Description of Daily Activities and Events:		
<ul style="list-style-type: none"> I observed PIS install flanged cast iron end caps on 12" (DR 17) pipe. Todd Scott recommended flanged end caps to handle the hydrostatic pressure. I observed Young Construction load and mobilizing the remaining equipment that was left on site. I observed PIS conduct a hydrostatic test on the 12" hdpe pipe that will go through the railroad ROW casing. PIS filled equalized the pipe to 60 psi for 4 hours, the pressure was bled to 50 psi and tested for 1 hour. There was 0 psi loss during the test, test was documented. S+G Rep. departed site at 4:30 pm 		
Prepared By: Randy Berarducci	Date : 8/6/12	Reviewed By: PKS

DAILY CQA REPORT

PROJECT INFORMATION		
Project Name: Davidson Co. Ph 2 LFG Header Pipe	S+G Project No.: DTEDC 11-1	
Client Name: Davidson Gas Producers, LLC	Client Contact(s): Steve Sink	
Site Location: Davidson Co., N.C.		
General Contractor: Piedmont Industrial Services	General Contractor's Rep.: Todd Scott	
Subcontractor(s):	Subcontractor's Rep.(s):	
DAILY INFORMATION		
S+G Representative(s) Time(s) on Site:		
Rep: Randy Berarducci	Rep: Lori Phillips	Rep:
Arrived: 8:00 AM	Arrived: 10:00 AM	Arrived:
Departed: 4:00 PM	Departed: 3:00 PM	Departed:
Weather Conditions:	Ground Conditions:	Temperature:
Cloudy	Dry	High: 94 Low: 71
Contractor's Equipment:		
JCB 214 Backhoe, Daewoo 175 LCV Excavator, McElroy 618 Rolling Butt Fusion Welder, BMG 8500 BOMAG Multipurpose Compactor, CAT 252 Skid Steer Loader		
Contractor's Personnel:		
Materials Received:		
Material(s)	Description	
Visitor Information:		
Firm Name(s)	Representative's Name	Representative's Title
DTE	Mark Hill	Project Manager
DTE	Ken Shelton	Regional Manager
Important Conversation(s):		
Conversation(s)	Description	
Mark Hill (DTE)/Lori Phillips (S+G)/Todd Scott (PIS)	Mark Hill and Todd Scott discussed with Lori about changing the slope of the pipe exiting the casing under the railroad, 7% until the trench, Todd to keep 1% minimum after. Lori took notes on the revisions to the 8" temporary pipe.	
Description of Daily Activities and Events:		
<ul style="list-style-type: none"> Mark Hill arrived on site to go over site modifications, noted in Important Conversations. Also Phase 2 pipe to follow anchor trench and move high point on other side of access road. PIS to use stakes to hold pipe in place until berms over pipe are installed. Lori (S+G) discussed using larger pipe diameter on casing vents (to discuss with Pieter and inform PIS). I observed PIS place centralizers on 12" pipe as it was installed into casing under railroad right of way. PIS is 3 centralizers short, should be on site Tuesday, pipe to be shored up until then. S+G Rep. departed site at 4:00 pm 		
Prepared By: Randy Berarducci	Date : 8/9/12	Reviewed By: PKS

DAILY CQA REPORT

PROJECT INFORMATION		
Project Name: Davidson Co. Ph 2 LFG Header Pipe	S+G Project No.: DTEDC 11-1	
Client Name: Davidson Gas Producers, LLC	Client Contact(s): Steve Sink	
Site Location: Davidson Co., N.C.		
General Contractor: Piedmont Industrial Services	General Contractor's Rep.: Todd Scott	
Subcontractor(s): Young Construction CO. LLC	Subcontractor's Rep.(s): Charles F. Barbee	
DAILY INFORMATION		
S+G Representative(s) Time(s) on Site:		
Rep: Randy Berarducci	Rep:	Rep:
Arrived: 8:30 AM	Arrived:	Arrived:
Departed: 3:30 PM	Departed:	Departed:
Weather Conditions:	Ground Conditions:	Temperature:
Partly Cloudy	Wet	High: 92 Low: 75
Contractor's Equipment:		
JCB 214 Backhoe, Daewoo 175 LCV Excavator, McElroy 618 Rolling Butt Fusion Welder, BMG 8500 BOMAG Multipurpose Compactor, CAT 252 Skid Steer Loader - Young Construction: 320CL Cat Excavator (2), Jack and Bore Drill Rig		
Contractor's Personnel:		
Materials Received:		
Material(s)	Description	
Visitor Information:		
Firm Name(s)	Representative's Name	Representative's Title
Important Conversation(s):		
Conversation(s)	Description	
Pieter Scheer (S+G)/Todd Scott (PIS)	Erosion around Station 13+00 can be maintained with possible fill and rip rap placement, Pieter will send Todd Scott specifications.	
Description of Daily Activities and Events:		
<ul style="list-style-type: none"> I observed PIS install 2" air line and water line to sump. I observed moderate erosion, Pieter Scheer (S+G) to discuss Erosion Control with PIS. PIS rotated valves to allow extension handles to attach below ground. S+G Rep. departed site at 3:30 pm 		
Prepared By: Randy Berarducci	Date : 8/14/12	Reviewed By: PKS

Appendix D

Landfill Gas (LFG) Collection System CQA Data

**Construction Quality Assurance Report
Davidson Gas Producers, LLC - Phase 2 LFG Header
Davidson County, North Carolina**

This page intentionally left blank.



PerformancePipe.com

DRISCOPLEX® 6400

HDPE PIPE DATA SHEET

DriscoPlex® 6400 Pipe meets or exceeds:

API 15LE
ASTM D2513
ASTM D3350, cell classification PE445574C
PPI TR-4 designation PE4710/3408

DriscoPlex® 6400 Pipe for:

Oil & Gas Gathering, Coal Bed Methane,
Raw Water, Brine Water,
Landfill Methane, Landfill Leachate, etc.
Iron Pipe Size OD (IPS) ¾" to 54",
40' and 50' Joints / Solid Black
Coils available in sizes through 6"

NOMINAL PIPE PROPERTIES ⁽¹⁾	UNIT	TEST METHOD	VALUE PE4710
Density	gms / cm ³	ASTM D1505	.0960 (black)
Melt Index (MI) Condition 190°C / 2.16kg	gms / 10 minutes	ASTM D1238	0.08
Hydrostatic Design Basis 73° F (23° C)	psi	ASTM D2837	1600
Hydrostatic Design Basis 140° F (60° C)	psi	ASTM D2837	1000
Color: UV Stabilizer [C]	---	ASTM D3350	Min 2% Carbon Black
NOMINAL MATERIAL PROPERTIES ^{(1) (2)}	UNIT	TEST METHOD	VALUE PE4710
Flexural Modulus 2% Secant – 16:1 span: depth. 0.5 in / min.	psi	ASTM D790	>115,000
Tensile Strength at Yield	psi	ASTM D638 Type IV	>3500
Elongation at Break 2 in / min., Type IV Bar	%	ASTM D638	>800
Elastic Modulus	psi	ASTM D638	>175,000
Hardness	Shore D	ASTM D2240	62
PENT	hrs	ASTM F1473	>500
Vicat Softening Temperature	°F	ASTM D1525	256
Brittleness Temperature	°F	ASTM D746	< -103
Thermal Expansion	in / in / °F	ASTM D696	1.0 x 10 ⁻⁴

1. This is not a product specification and does not guarantee or establish specific minimum or maximum values or manufacturing tolerance for material or piping products to be supplied.
2. Values obtained from tests of specimens taken from piping product may vary from these typical values.

When Performance Matters Rely on
Performance Pipe



PE 4710 (PE3408) Energy - DriscoPlex® 6400 Series PE4710 IPS Pipe Data

Pipe weights are calculated in accordance with PPI TR-7. Average inside diameter calculated using nominal OD and minimum wall plus 6% for use in estimating fluid flows. Actual ID will vary. When designing components to fit the pipe ID, refer to pipe dimensions and tolerances in applicable pipe specifications. Pressure Ratings are for water at 73.4° F. For other fluid and service temperature, ratings may differ. Refer to Engineering Manual for Chemical and Environmental Considerations.

IPS Pipe Size	400 psi			335 psi			250 psi			200 psi			160 psi			125 psi			
	Min Wall (in)	Avg ID (in)	Wgt (lbs/ft)	Min Wall (in)	Avg ID (in)	Wgt (lbs/ft)	Min Wall (in)	Avg ID (in)	Wgt (lbs/ft)	Min Wall (in)	Avg ID (in)	Wgt (lbs/ft)	Min Wall (in)	Avg ID (in)	Wgt (lbs/ft)	Min Wall (in)	Avg ID (in)	Wgt (lbs/ft)	
1"	0.219	0.851	0.33	0.180	0.933	0.29	0.184	1.270	0.37	0.151	1.340	0.31	0.123	1.399	0.26				
1 1/4"	0.277	1.073	0.52	0.227	1.179	0.46	0.211	1.453	0.49	0.173	1.533	0.41	0.141	1.601	0.34				
1 1/2"	0.317	1.228	0.69	0.260	1.349	0.61	0.264	1.815	0.77	0.216	1.917	0.64	0.176	2.002	0.53	0.140	2.078	0.43	2"
2"	0.396	1.535	1.07	0.325	1.686	0.95	0.389	2.675	1.66	0.318	2.826	1.39	0.259	2.951	1.16	0.206	3.063	0.94	3"
3"	0.583	2.264	2.33	0.479	2.485	2.06	0.500	3.440	2.75	0.409	3.633	2.31	0.333	3.794	1.92	0.265	3.938	1.55	4"
4"	0.750	2.910	3.85	0.616	3.194	3.40	0.736	5.065	5.96	0.602	5.349	5.00	0.491	5.584	4.15	0.390	5.798	3.36	6"
6"	1.104	4.285	8.35	0.908	4.700	7.37	0.958	6.594	10.11	0.784	6.963	8.47	0.639	7.270	7.04	0.507	7.550	5.69	8"
8"	1.438	5.576	14.15	1.182	6.119	12.50	1.194	8.219	15.70	0.977	8.679	13.16	0.796	9.062	10.93	0.632	9.410	8.83	10"
10"	1.792	6.951	21.98	1.473	7.627	19.42	1.417	9.746	22.08	1.159	10.293	18.51	0.944	10.749	15.38	0.750	11.160	12.43	12"
12"	2.125	8.245	30.92	1.747	9.046	27.31	1.556	10.701	26.63	1.273	11.301	22.32	1.037	11.802	18.54	0.824	12.253	14.98	14"
14"				1.918	9.934	32.93	1.778	12.231	34.78	1.455	12.915	29.15	1.185	13.488	24.22	0.941	14.005	19.57	16"
16"				2.192	11.353	43.01	2.000	13.760	44.02	1.636	14.532	36.89	1.333	15.174	30.65	1.059	15.755	24.77	18"
18"				2.466	12.772	54.43	2.222	15.289	54.34	1.818	16.146	45.54	1.481	16.860	37.84	1.176	17.507	30.58	20"
20"				2.740	14.191	67.20	2.444	16.819	65.75	2.000	17.760	55.10	1.630	18.544	45.79	1.294	19.257	37.00	22"
22"				3.014	15.610	81.32	2.667	18.346	78.25	2.182	19.374	65.58	1.778	20.231	54.49	1.412	21.007	44.03	24"
24"				3.288	17.029	96.77	2.889	19.875	91.84	2.364	20.988	76.96	1.926	21.917	63.95	1.529	22.759	51.67	26"
26"							3.111	21.405	106.51	2.545	22.605	89.26	2.074	23.603	74.17	1.647	24.508	59.93	28"
28"							3.333	22.934	122.27	2.727	24.219	102.47	2.222	25.289	85.14	1.765	26.258	68.80	30"
30"										2.909	25.833	116.58	2.370	26.976	96.87	1.882	28.010	78.28	32"
32"										3.091	27.447	131.61	2.519	28.660	109.36	2.000	29.760	88.37	34"
34"										3.273	29.061	147.55	2.667	30.346	122.60	2.118	31.510	99.07	36"

Pressure ratings are calculated using 0.63 design factor for HDS at 73°F as listed in PPI TR-4 for PE4710 materials. Temperature, chemical and environmental use considerations may require use of additional design factors.

Other Sizes and Dimensions Available

Bulletin: PP 155-4710 (PE 3408)

Page 1 of 1

April 2009 supersedes all previous publications

© 2001-2008 Chevron Phillips Chemical Company LP

www.performancepipe.com

Performance Pipe, a division of
Chevron Phillips Chemical Company LP

PO Box 269006
Plano, TX 75026-9006

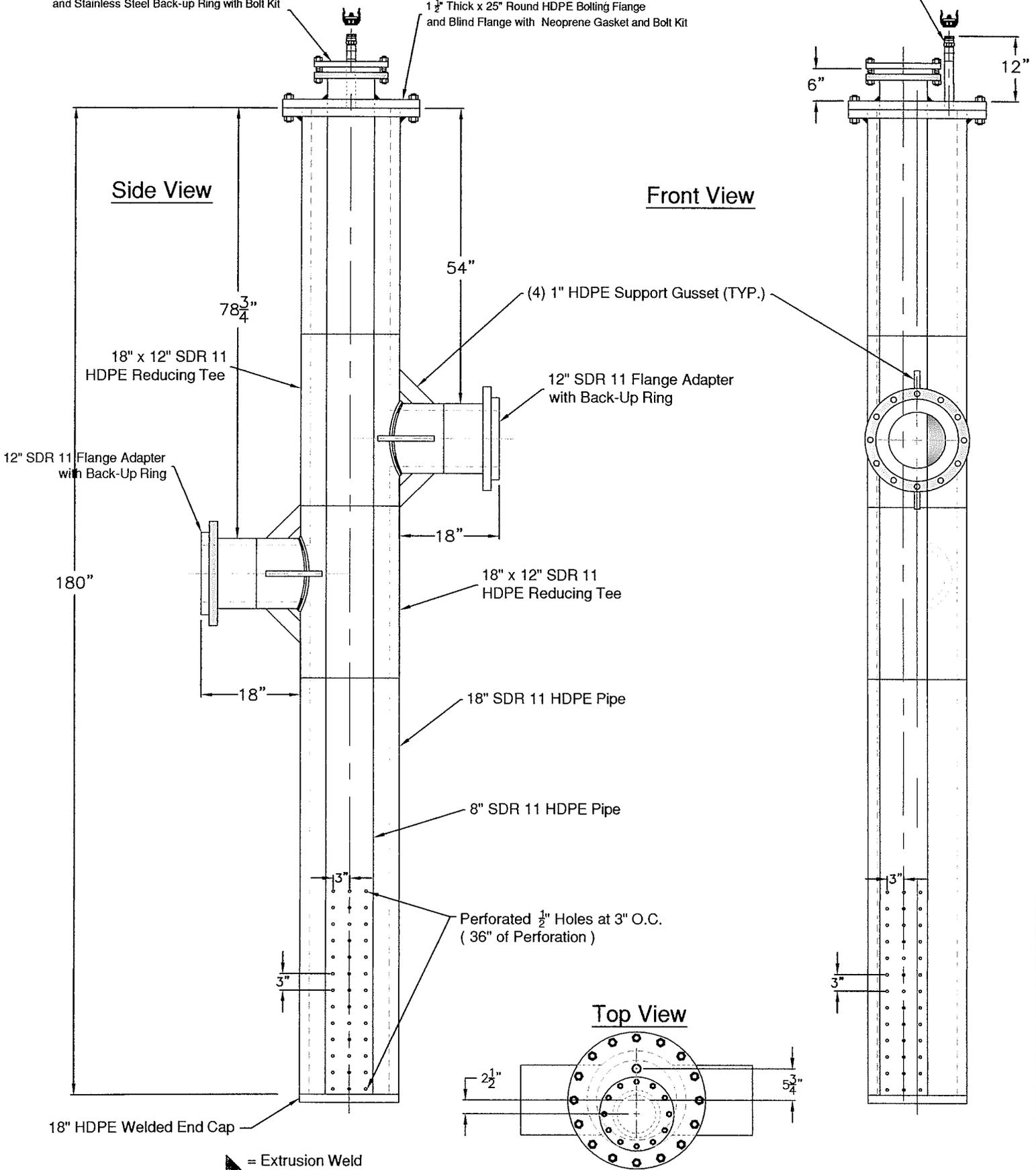
Lee Supply Co., Inc
Charleroi, PA
1-800-353-3747

Phone: 800-527-0662
Fax: 972-599-7348

8" SDR 11 HDPE Flange Adapter and Blind Flange with Neoprene Gasket and Stainless Steel Back-up Ring with Bolt Kit

1 1/2" Thick x 25" Round HDPE Bolting Flange and Blind Flange with Neoprene Gasket and Bolt Kit

1 1/2" Stainless Steel Transition Fitting with Cam Lock and Dust Cap



▲ = Extrusion Weld

18" SDR 11 Pump Station

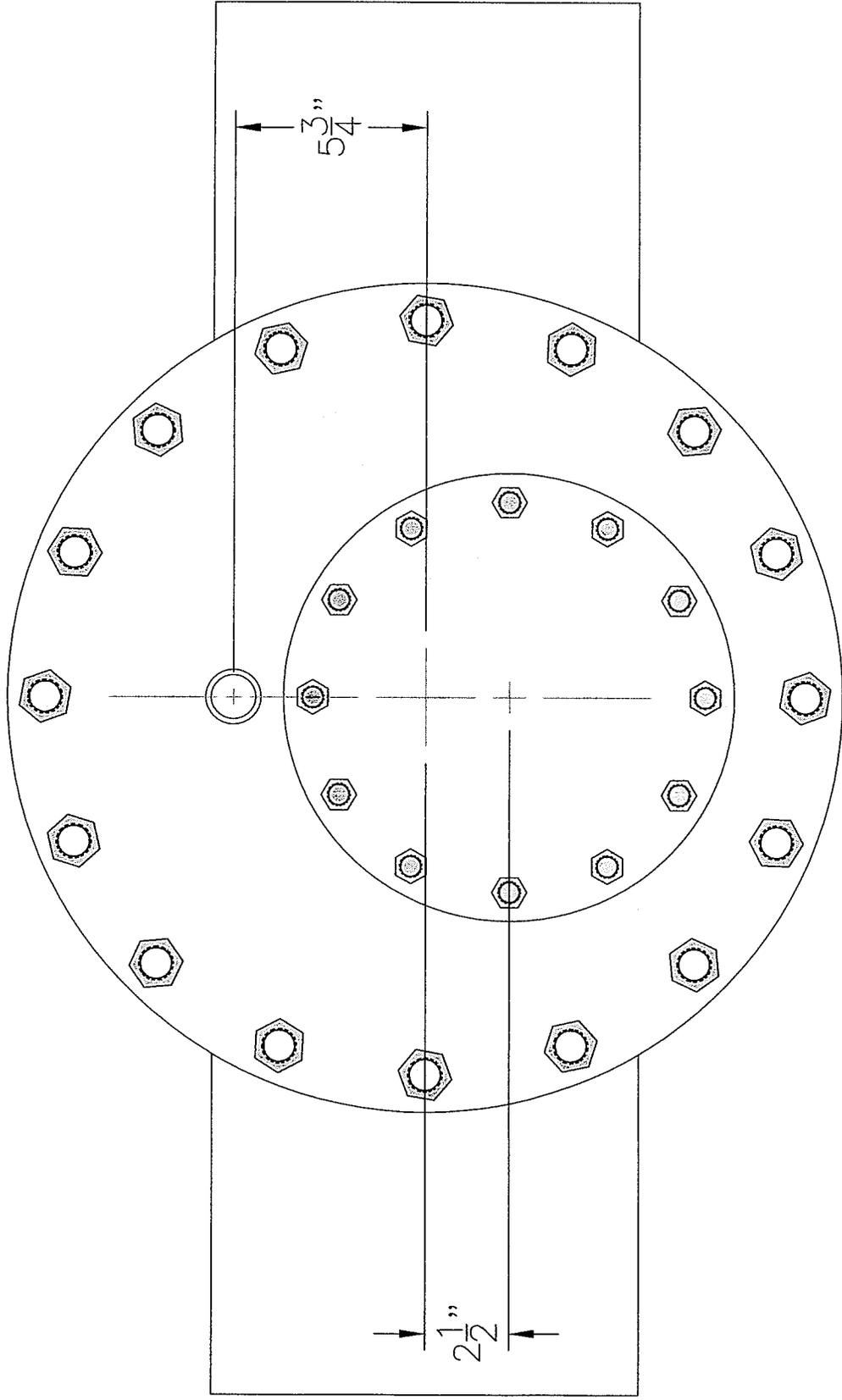
THIS DRAWING/DESIGN PROVIDED BY AND PROPERTY OF LEE SUPPLY CO. INC. IT IS INTENDED FOR MANUFACTURE INSTALLATION, AND IDENTIFICATION USES OF PRODUCT DEPICTED AND SHALL NOT BE CIRCULATED OR REPRODUCED WITHOUT SPECIFIC PERMISSION FROM MANAGEMENT OF "LEE SUPPLY CO. INC."—ALL RIGHT RESERVED

*EXTRUSION WELDS ARE NOT PRESSURE RATED.
 *DRAWINGS MUST BE SIGNED FOR APPROVAL. ONCE APPROVED ALL MATERIALS ARE NON-CANCELLABLE/NON-RETURNABLE.
 *ALL FABRICATIONS WILL BE BASED ON APPROVED DRAWINGS.

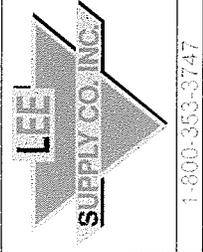


CUSTOMER:	Piedmont Industrial
DRAWN BY:	Jason
DATE:	5/29/2012
APPROVED:	XXX
REVISIONS:	6/12/2012 7/11/2012 7/12/2012 7/16/2012 7/17/2012

Top View



ONCE APPROVED ALL MATERIALS ARE NON CANCELLABEL/NON RETURNABLE.
 *ALL FABRICATIONS WILL BE BASED O*EXTRUSION WELDS ARE NOT PRESSURE RATED.
 *DRAWINGS MUST BE SIGNED FOR APPROVAL. N APPROVED DRAWINGS.



CUSTOMER:	Paidmont Industrial
DRAWN BY:	Jason
DATE:	5/29/2012
APPROVED BY:	XXX
REVISIONS:	6/12/2012
	XXX

18" SDR 11 HDPE Pump Station

THIS DRAWING/DESIGN PROVIDED BY AND PROPERTY OF LEE SUPPLY CO. INC. IT IS INTENDED FOR MANUFACTURE, INSTALLATION, AND IDENTIFICATION USES OF PRODUCT DEPICTED AND SHALL NOT BE CIRCULATED OR REPRODUCED WITHOUT SPECIFIC PERMISSION FROM MANAGEMENT OF LEE SUPPLY CO. INC. - ALL RIGHT RESERVED

Low Pressure Air Test Documentation

Test Procedure: ASTM F 1417

Date: 7/20/2012

Project: Davidson Co. Ph 2 LFG Header Pipe

Contractor: Piedmont Industrial Services

Test Observed by: Randy Berarducci

Pipeline Description*: 12" (DR17) HDPE

**(Material, Thickness, Pressure Rating, Etc.)*

Section Tested: From: Sta. 19+20 (unburied)

To: Sta 28+06.83 (unburied)

Test Section: Diam. (D) (in): 12.0 Length (L) (ft): 886

Test Start Time: 7/20/12 8:26 AM Maximum Start Pressure (psig): 5.0

Test End Time: 7/20/12 8:51 AM Maximum End Pressure (psig): 5.0

Total Test Time (Minutes): 25 (See Min. Below) Total Pressure Drop (psig): 0.0

Test Result: PASS (Pressure Drop <= 0.5 psig)

Leak Location (if Fail):

Notes:

Minimum Test Time Calculation: NOTE - This formula should be used for pipes with nominal diameters from 4" to 30". Consult with pipe/fitting manufacturer if pipe size is outside of this range.

Time test (T) is determined using the following formula from **Section 9.2 of ASTM standard F 1417**, and modified for 0.5 psig, as directed in Section 9.5 of the standard. Input 1) pipe diameter and 2) length for the section tested in the shaded cells below. For multiple diameters, perform this calculation for each pipe diameter being tested, and take the sum total T.

$$T = 10.085 DK/Q/2$$

where:

D =	12	nominal pipe size, inches (From Above)
L =	886	length of test section, feet (From Above)
K =	4.454808	0.000419 DL (not less than 1.0)
Q =	0.0015	leak rate in cfm/square feet of internal surface = 0.0015 CFM/SF
T =	1,515	seconds
	25	minutes
	0.42	hours

Low Pressure Air Test Documentation

Test Procedure: ASTM F 1417

Date: 7/20/2012

Project: Davidson Co. Ph 2 LFG Header Pipe

Contractor: Piedmont Industrial Services

Test Observed by: Randy Berarducci

Pipeline Description*: 2" (DR11) HDPE for Water Force Main

**(Material, Thickness, Pressure Rating, Etc.)*

Section Tested: From: Water Force Main (unburied) Sta. 17+00

To: Water Force Main (unburied) Sta. 27+00

Test Section: Diam. (D) (in): 2.0 Length (L) (ft): 1,000

Test Start Time: 7/20/12 9:46 AM Maximum Start Pressure (psig): 5.0

Test End Time: 7/20/12 9:47 AM Maximum End Pressure (psig): 5.0

Total Test Time (Minutes): 0.99999993 (See Min. Below) Total Pressure Drop (psig): 0.0

Test Result: PASS (Pressure Drop <= 0.5 psig)

Leak Location (if Fail):

Notes:

Minimum Test Time Calculation: NOTE - This formula should be used for pipes with nominal diameters from 4" to 30". Consult with pipe/fitting manufacturer if pipe size is outside of this range.

Time test (T) is determined using the following formula from **Section 9.2 of ASTM standard F 1417**, and modified for 0.5 psig, as directed in Section 9.5 of the standard. Input 1) pipe diameter and 2) length for the section tested in the shaded cells below. For multiple diameters, perform this calculation for each pipe diameter being tested, and take the sum total T.

$$T = 10.085 DK/Q/2$$

where:

D =	2	nominal pipe size, inches (From Above)
L =	1,000	length of test section, feet (From Above)
K =	1	0.000419 DL (not less than 1.0)
Q =	0.0015	leak rate in cfm/square feet of internal surface = 0.0015 CFM/SF
T =	57	seconds
	1	minutes
	0.02	hours

Low Pressure Air Test Documentation

Test Procedure: ASTM F 1417

Date: 7/20/2012

Project: Davidson Co. Ph 2 LFG Header Pipe

Contractor: Piedmont Industrial Services

Test Observed by: Randy Berarducci

Pipeline Description*: 2" (DR11) HDPE for Air Line

**(Material, Thickness, Pressure Rating, Etc.)*

Section Tested: From: Air Line (unburied) Sta. 17+00

To: Air Line (unburied) Sta. 27+00

Test Section: Diam. (D) (in): 2.0 Length (L) (ft): 1,000

Test Start Time: 7/20/12 10:16 AM Maximum Start Pressure (psig): 5.0

Test End Time: 7/20/12 10:17 AM Maximum End Pressure (psig): 5.0

Total Test Time (Minutes): 1.000000003 (See Min. Below) Total Pressure Drop (psig): 0.0

Test Result: PASS (Pressure Drop <= 0.5 psig)

Leak Location (if Fail):

Notes:

Minimum Test Time Calculation: NOTE - This formula should be used for pipes with nominal diameters from 4" to 30". Consult with pipe/fitting manufacturer if pipe size is outside of this range.

Time test (T) is determined using the following formula from **Section 9.2 of ASTM standard F 1417**, and modified for 0.5 psig, as directed in Section 9.5 of the standard. Input 1) pipe diameter and 2) length for the section tested in the shaded cells below. For multiple diameters, perform this calculation for each pipe diameter being tested, and take the sum total T.

$$T = 10.085 DK/Q/2$$

where:

D =	2	nominal pipe size, inches (From Above)
L =	1,000	length of test section, feet (From Above)
K =	1	0.000419 DL (not less than 1.0)
Q =	0.0015	leak rate in cfm/square feet of internal surface = 0.0015 CFM/SF
T =	57	seconds
	1	minutes
	0.02	hours

Low Pressure Air Test Documentation

Test Procedure: ASTM F 1417

Date: 7/20/2012

Project: Davidson Co. Ph 2 LFG Header Pipe

Contractor: Piedmont Industrial Services

Test Observed by: Randy Berarducci

Pipeline Description*: 12" (DR17) HDPE

**(Material, Thickness, Pressure Rating, Etc.)*

Section Tested: From: Condensate Pump Station (unburied) Sta. 16+60

To: Sta 20+00 (unburied)

Test Section: Diam. (D) (in): 12.0 Length (L) (ft): 341

Test Start Time: 7/20/12 11:42 AM Maximum Start Pressure (psig): 5.0

Test End Time: 7/20/12 11:52 AM Maximum End Pressure (psig): 5.0

Total Test Time (Minutes): 9.999999991 (See Min. Below) Total Pressure Drop (psig): 0.0

Test Result: PASS (Pressure Drop <= 0.5 psig)

Leak Location (if Fail):

Notes:

Minimum Test Time Calculation: NOTE - This formula should be used for pipes with nominal diameters from 4" to 30". Consult with pipe/fitting manufacturer if pipe size is outside of this range.

Time test (T) is determined using the following formula from **Section 9.2 of ASTM standard F 1417**, and modified for 0.5 psig, as directed in Section 9.5 of the standard. Input 1) pipe diameter and 2) length for the section tested in the shaded cells below. For multiple diameters, perform this calculation for each pipe diameter being tested, and take the sum total T.

$$T = 10.085 DK/Q/2$$

where:

D =	12	nominal pipe size, inches (From Above)
L =	341	length of test section, feet (From Above)
K =	1.712034	0.000419 DL (not less than 1.0)
Q =	0.0015	leak rate in cfm/square feet of internal surface = 0.0015 CFM/SF
T =	582	seconds
	10	minutes
	0.16	hours

Low Pressure Air Test Documentation

Test Procedure: ASTM F 1417

Date: 7/20/2012

Project: Davidson Co. Ph 2 LFG Header Pipe

Contractor: Piedmont Industrial Services

Test Observed by: Randy Berarducci

Pipeline Description*: 12" (DR17) HDPE

**(Material, Thickness, Pressure Rating, Etc.)*

Section Tested: From: (unburied) Sta. 13+35

To: Condensate Pump Station (unburied) Sta. 16+60

Test Section: Diam. (D) (in): 12.0 Length (L) (ft): 325

Test Start Time: 7/20/12 2:10 PM Maximum Start Pressure (psig): 5.0

Test End Time: 7/20/12 2:20 PM Maximum End Pressure (psig): 5.0

Total Test Time (Minutes): 9.99999991 (See Min. Below) Total Pressure Drop (psig): 0.0

Test Result: PASS (Pressure Drop <= 0.5 psig)

Leak Location (if Fail):

Notes:

Minimum Test Time Calculation: NOTE - This formula should be used for pipes with nominal diameters from 4" to 30". Consult with pipe/fitting manufacturer if pipe size is outside of this range.

Time test (T) is determined using the following formula from **Section 9.2 of ASTM standard F 1417**, and modified for 0.5 psig, as directed in Section 9.5 of the standard. Input 1) pipe diameter and 2) length for the section tested in the shaded cells below. For multiple diameters, perform this calculation for each pipe diameter being tested, and take the sum total T.

$$T = 10.085 DK/Q/2$$

where:

D =	12	nominal pipe size, inches (From Above)
L =	325	length of test section, feet (From Above)
K =	1.6341	0.000419 DL (not less than 1.0)
Q =	0.0015	leak rate in cfm/square feet of internal surface = 0.0015 CFM/SF
T =	556	seconds
	9	minutes
	0.15	hours

Low Pressure Air Test Documentation

Test Procedure: ASTM F 1417

Date: 7/31/2012

Project: Davidson Co. Ph 2 LFG Header Pipe

Contractor: Piedmont Industrial Services

Test Observed by: Randy Berarducci

Pipeline Description*: 12" (DR17) HDPE

**(Material, Thickness, Pressure Rating, Etc.)*

Section Tested: From: Sta. 11+00 (unburied)

To: Sta 13+80 (unburied)

Test Section: Diam. (D) (in): 12.0 Length (L) (ft): 286

Test Start Time: 7/31/12 8:58 AM Maximum Start Pressure (psig): 5.0

Test End Time: 7/31/12 9:06 AM Maximum End Pressure (psig): 5.0

Total Test Time (Minutes): 7.99999995 (See Min. Below) Total Pressure Drop (psig): 0.0

Test Result: PASS (Pressure Drop <= 0.5 psig)

Leak Location (if Fail):

Notes:

Minimum Test Time Calculation: NOTE - This formula should be used for pipes with nominal diameters from 4" to 30". Consult with pipe/fitting manufacturer if pipe size is outside of this range.

Time test (T) is determined using the following formula from **Section 9.2 of ASTM standard F 1417**, and modified for 0.5 psig, as directed in Section 9.5 of the standard. Input 1) pipe diameter and 2) length for the section tested in the shaded cells below. For multiple diameters, perform this calculation for each pipe diameter being tested, and take the sum total T.

$$T = 10.085 DK/Q/2$$

where:

D =	12	nominal pipe size, inches (From Above)
L =	286	length of test section, feet (From Above)
K =	1.438008	0.000419 DL (not less than 1.0)
Q =	0.0015	leak rate in cfm/square feet of internal surface = 0.0015 CFM/SF
T =	489	seconds
	8	minutes
	0.14	hours

Low Pressure Air Test Documentation

Test Procedure: ASTM F 1417

Date: 8/16/2012

Project: Davidson Co. Ph 2 LFG Header Pipe

Contractor: Piedmont Industrial Services

Test Observed by: Randy Berarducci

Pipeline Description*: 12" (DR17) HDPE

**(Material, Thickness, Pressure Rating, Etc.)*

Section Tested: From: Sta. 0+00 (unburied)

To: Sta 8+50 (unburied)

Test Section: Diam. (D) (in): 12.0 Length (L) (ft): 850

Test Start Time: 8/16/12 3:05 PM Maximum Start Pressure (psig): 5.0

Test End Time: 8/16/12 3:29 PM Maximum End Pressure (psig): 5.0

Total Test Time (Minutes): 24 (See Min. Below) Total Pressure Drop (psig): 0.0

Test Result: PASS (Pressure Drop <= 0.5 psig)

Leak Location (if Fail):

Notes:

Minimum Test Time Calculation: NOTE - This formula should be used for pipes with nominal diameters from 4" to 30". Consult with pipe/fitting manufacturer if pipe size is outside of this range.

Time test (T) is determined using the following formula from **Section 9.2 of ASTM standard F 1417**, and modified for 0.5 psig, as directed in Section 9.5 of the standard. Input 1) pipe diameter and 2) length for the section tested in the shaded cells below. For multiple diameters, perform this calculation for each pipe diameter being tested, and take the sum total T.

$$T = 10.085 DK/Q/2$$

where:

D =	12	nominal pipe size, inches (From Above)
L =	850	length of test section, feet (From Above)
K =	4.2738	0.000419 DL (not less than 1.0)
Q =	0.0015	leak rate in cfm/square feet of internal surface = 0.0015 CFM/SF
T =	1,453	seconds
	24	minutes
	0.40	hours

Low Pressure Air Test Documentation

Test Procedure: ASTM F 1417

Date: 8/27/2012

Project: Davidson Co. Ph 2 LFG Header Pipe

Contractor: Piedmont Industrial Services

Test Observed by: Randy Berarducci

Pipeline Description*: 12" (DR17) HDPE

**(Material, Thickness, Pressure Rating, Etc.)*

Section Tested: From: Sta. 0+00

To: Sta 28+00

Test Section: Diam. (D) (in): 12.0 Length (L) (ft): 2,800

Test Start Time: 8/27/12 12:15 PM Maximum Start Pressure (psig): 5.0

Test End Time: 8/27/12 1:35 PM Maximum End Pressure (psig): 5.0

Total Test Time (Minutes): 80 (See Min. Below) Total Pressure Drop (psig): 0.0

Test Result: PASS (Pressure Drop <= 0.5 psig)

Leak Location (if Fail):

Notes:

Minimum Test Time Calculation: NOTE - This formula should be used for pipes with nominal diameters from 4" to 30". Consult with pipe/fitting manufacturer if pipe size is outside of this range.

Time test (T) is determined using the following formula from **Section 9.2 of ASTM standard F 1417**, and modified for 0.5 psig, as directed in Section 9.5 of the standard. Input 1) pipe diameter and 2) length for the section tested in the shaded cells below. For multiple diameters, perform this calculation for each pipe diameter being tested, and take the sum total T.

$$T = 10.085 DK/Q/2$$

where:

D =	12	nominal pipe size, inches (From Above)
L =	2,800	length of test section, feet (From Above)
K =	14.0784	0.000419 DL (not less than 1.0)
Q =	0.0015	leak rate in cfm/square feet of internal surface = 0.0015 CFM/SF
T =	4,787	seconds
	80	minutes
	1.33	hours

Low Pressure Air Test Documentation

Test Procedure: ASTM F 1417

Date: 8/30/2012

Project: Davidson Co. Ph 2 LFG Header Pipe

Contractor: Piedmont Industrial Services

Test Observed by: Randy Berarducci

Pipeline Description*: 8" (DR17) HDPE

**(Material, Thickness, Pressure Rating, Etc.)*

Section Tested: From: 8" HDPE (DR 17) Unburied

To:

Test Section: Diam. (D) (in): 12.0 Length (L) (ft): 1,160

Test Start Time: 8/30/12 8:50 AM Maximum Start Pressure (psig): 5.0

Test End Time: 8/30/12 9:05 AM Maximum End Pressure (psig): 5.0

Total Test Time (Minutes): 15 (See Min. Below) Total Pressure Drop (psig): 0.0

Test Result: PASS (Pressure Drop <= 0.5 psig)

Leak Location (if Fail):

Notes:

Minimum Test Time Calculation: NOTE - This formula should be used for pipes with nominal diameters from 4" to 30". Consult with pipe/fitting manufacturer if pipe size is outside of this range.

Time test (T) is determined using the following formula from **Section 9.2 of ASTM standard F 1417**, and modified for 0.5 psig, as directed in Section 9.5 of the standard. Input 1) pipe diameter and 2) length for the section tested in the shaded cells below. For multiple diameters, perform this calculation for each pipe diameter being tested, and take the sum total T.

$$T = 10.085 DK/Q/2$$

where:

D =	8	nominal pipe size, inches (From Above)
L =	1,160	length of test section, feet (From Above)
K =	3.88832	0.000419 DL (not less than 1.0)
Q =	0.0015	leak rate in cfm/square feet of internal surface = 0.0015 CFM/SF
T =	881	seconds
	15	minutes
	0.24	hours

Low Pressure Air Test Documentation

Test Procedure: ASTM F 1417

Date: 8/30/2012

Project: Davidson Co. Ph 2 LFG Header Pipe

Contractor: Piedmont Industrial Services

Test Observed by: Randy Berarducci

Pipeline Description*: 8" (DR17) HDPE

*(Material, Thickness, Pressure Rating, Etc.)

Section Tested: From: 8" HDPE (DR 17) Unburied

To:

Test Section: Diam. (D) (in): 8.0 Length (L) (ft): 1,050

Test Start Time: 8/30/12 3:00 PM Maximum Start Pressure (psig): 5.0

Test End Time: 8/30/12 3:14 PM Maximum End Pressure (psig): 5.0

Total Test Time (Minutes): 14 (See Min. Below) Total Pressure Drop (psig): 0.0

Test Result: PASS (Pressure Drop <= 0.5 psig)

Leak Location (if Fail):

Notes:

Minimum Test Time Calculation: NOTE - This formula should be used for pipes with nominal diameters from 4" to 30". Consult with pipe/fitting manufacturer if pipe size is outside of this range.

Time test (T) is determined using the following formula from **Section 9.2 of ASTM standard F 1417**, and modified for 0.5 psig, as directed in Section 9.5 of the standard. Input 1) pipe diameter and 2) length for the section tested in the shaded cells below. For multiple diameters, perform this calculation for each pipe diameter being tested, and take the sum total T.

$$T = 10.085 DK/Q/2$$

where:

D =	8	nominal pipe size, inches (From Above)
L =	1,040	length of test section, feet (From Above)
K =	3.48608	0.000419 DL (not less than 1.0)
Q =	0.0015	leak rate in cfm/square feet of internal surface = 0.0015 CFM/SF
T =	790	seconds
	13	minutes
	0.22	hours

Hydrostatic Pressure Test Documentation

Test Procedure: ASTM F 2164

Date: 8/6/2012

Project: DTEDC 11-1

Contractor: Piedmont Industrial Services

Test Observed by: Randy Berarducci

Pipeline Description*: 12" DR 17 HDPE, Pressurized to 60 psi for 4 hours, then reduced to 50 psi for 60 min test.

*(Material, Thickness, Pressure Rating, Etc.)

Section Tested: From: Sta. (Southern Norfolk Southern RR ROW) 11+00

To: Sta. (Northern Norfolk Southern RR ROW) 9+00

Test Section: Diam. (D) (in): 12.0 Length (L) (ft): 220

Test Start Time: 8/6/12 2:55 PM

Pressure Test Results (See Notes 1 and 2):

Time	Tt	Pt	Pc	% Pressure Drop
0	39	50.0	50.0	0.0%
10	40	52.0	52.2	4.3%
20	41	52.0	52.3	4.5%
30	41	52.0	52.3	4.5%
40	41	52.0	52.5	4.7%
50	42	52.0	52.6	4.9%
60	43	50.0	50.8	1.6%

Notes:

- Per ASTM F 2164, pressurize pipe for 4 hours, reduce pressure by 10 psi, and then begin the 1 hour test period.
- Per ASTM F 2164, a passing test is indicated by no visual leakage and the test pressure remaining steady (within 5% of the pressure at the start of the test) for the 1 hour test period.

Test Result (Pass/Fail): Pass

Leak Location (if Fail):

Notes: After 1st testing time, the pressure increased due to an ambient temperature rise.

Calculations:

$$\text{Pressure Correction: } P_c = \frac{(P_t + 14.7)(T_t + 273)}{(T_i + 273)} - 14.7$$

$$\% \text{ Pressure Drop: } \frac{P_c - P_i}{P_c} \times 100\%$$

where:

- T_t = Temperature in °C at time "t"
- T_i = Initial temperature in °C
- P_t = Test pressure in psig at time "t"
- P_i = Initial test pressure in psig =
- P_c = Pressure in psig corrected for temperature (Tt) at time "t"
- t = Time in minutes from start of the test

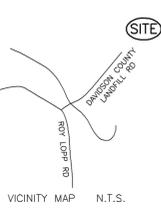
This page intentionally left blank.

Appendix E

Record Drawings

**Construction Quality Assurance Report
Davidson Gas Producers, LLC - Phase 2 LFG Header
Davidson County, North Carolina**

This page intentionally left blank.



TIE TO LANDFILL CONTROL DATUM

TOWER 101 (TOP BOLT SE CORNER)
 N: 763,248.44
 E: 1,650,365.45
 ELEVATION: 731.59'
 ALL DISTANCES SHOWN ARE HORIZONTAL.

BEARING AND DISTANCE FROM
 TOWER 101 TO TOWER 102
 N 63°29'02"E 783.71'

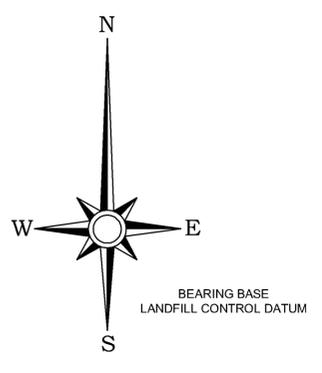
TOWER 102 (TOP BOLT NW CORNER)
 N: 763,598.33
 E: 1,651,066.72
 ELEVATION: 725.31'



NORTH CAROLINA, DAVIDSON COUNTY

I, MICHAEL D. GREEN, CERTIFY THAT THIS PLAT WAS DRAWN UNDER MY SUPERVISION FROM AN ACTUAL SURVEY MADE UNDER MY SUPERVISION (DEED DESCRIPTION RECORDED IN BOOK AS SHOWN HEREON); THAT THE BOUNDARIES NOT SURVEYED ARE INDICATED AS DRAWN FROM INFORMATION IN DEED BOOK AS SHOWN HEREON; THAT THE RATIO OF PRECISION AS CALCULATED IS 1:10,000+- THAT THE GLOBAL POSITIONING SYSTEM (GPS) OBSERVATIONS WERE PERFORMED TO THE GEOSPATIAL POSITIONING ACCURACY STANDARDS, PART 2: STANDARDS FOR GEODETIC NETWORKS AT THE 2CM ACCURACY CLASSIFICATION (95% CONFIDENCE) USING RTK NETWORK AND TRADITIONAL TRAVERSE; AND MEETS THE REQUIREMENTS OF THE STANDARDS OF PRACTICE FOR LAND SURVEYING IN NORTH CAROLINA (21 NCAC 98.1600). WITNESS MY ORIGINAL SIGNATURE AND SEAL THIS 27th DAY OF NOVEMBER, 2012.

PROFESSIONAL LAND SURVEYOR *Michael D. Green* L-3604 NC



Point	Northing	Easting	Elev.	Description
2166	764061.0	1649236.8	690.0	lfg/pvc
2168	763905.5	1649188.7	693.7	lfg/pvc
2169	763802.8	1649168.6	696.4	lfg/pvc
2171	763704.5	1649147.7	699.4	lfg/pvc
2172	763607.3	1649127.5	702.6	lfg/pvc
2173	763509.1	1649118.0	706.2	lfg/pvc
2174	763424.0	1649155.1	708.9	lfg/pvc
2176	764079.7	1649231.8	686.9	lfg/gnd
2177	764109.5	1649215.0	672.7	lfg/gnd
2178	764122.7	1649188.0	666.8	lfg/gnd
2179	764123.7	1649147.8	660.4	lfg/pvc
2180	763999.0	1649208.3	692.0	lfg/pvc
2181	763384.0	1649246.9	711.6	lfg/gnd
2182	763373.7	1649288.0	712.5	lfg/gv
2183	763358.2	1649347.7	708.9	lfg/pvc/end
2192	764117.8	1649108.8	657.4	lfg/gnd
2193	764085.8	1649047.1	653.5	lfg/valve/gnd
2194	764084.9	1649039.6	653.3	lfg/valve/gnd
2195	764085.1	1649043.0	656.9	lfg/pump_top
2196	764081.1	1648998.6	650.8	lfg/pvc
2197	764075.6	1648927.1	652.5	lfg/gnd
2198	764070.1	1648851.4	653.0	lfg/gnd
2199	764064.3	1648753.9	653.8	lfg/pvc
2200	764082.9	1648706.1	656.0	lfg/gnd
2203	764125.5	1648685.1	654.8	lfg/pvc
2204	764218.4	1648646.7	655.8	lfg/pvc
2205	764294.9	1648631.7	656.7	lfg/pvc
2206	764295.7	1648631.7	660.6	lfg/gv/gnd
2207	764296.7	1648632.0	656.7	lfg/valve/pvc
2208	764310.5	1648633.1	661.3	lfg/vent/gnd
2210	764353.9	1648634.4	661.5	lfg/gnd
2212	764414.2	1648642.2	669.8	lfg/gnd
2213	764448.1	1648644.4	672.2	lfg/gnd
2214	764509.3	1648650.3	665.0	lfg/vent/gnd
2215	764524.1	1648652.7	658.8	lfg/pvc
2216	764525.5	1648653.2	664.0	lfg/gv/gnd
2217	764526.1	1648652.9	658.8	lfg/valve/pvc
2218	764608.3	1648677.4	663.6	lfg/pvc
2219	764685.3	1648701.6	665.7	lfg/pvc
2220	764772.0	1648741.2	670.0	lfg/pvc
2224	764884.7	1648795.5	671.8	lfg/pvc
2225	764975.0	1648830.9	673.4	lfg/pvc
2226	764973.1	1648830.0	674.4	lfg/valve/gnd
2227	765070.6	1648865.8	683.8	lfg/pvc
2228	765163.7	1648905.9	695.8	lfg/pvc
2232	765212.7	1648927.7	702.8	lfg/gnd
2233	765258.4	1648924.2	707.7	lfg/pvc
2236	765354.2	1648914.0	718.0	lfg/pvc
2237	765340.1	1648813.4	712.8	lfg/pvc
2238	765324.3	1648716.3	711.7	lfg/pvc
2239	765313.4	1648617.8	710.3	lfg/pvc
2240	765317.7	1648518.0	708.8	lfg/pvc
2244	765349.6	1648424.1	708.3	lfg/pvc
2245	765399.2	1648336.7	706.7	lfg/pvc
2246	765422.7	1648294.0	706.1	lfg/pvc
2247	765447.0	1648263.5	705.3	lfg/pvc
2250	765533.2	1648248.2	703.5	lfg/pvc
2251	765611.0	1648253.1	704.4	lfg/gnd
2252	765691.0	1648259.8	697.6	lfg/pvc
2253	765788.3	1648272.5	691.7	lfg/pvc
2254	765889.6	1648290.5	688.8	lfg/pvc
2255	765936.5	1648307.5	688.8	lfg/gnd
2256	765966.3	1648323.0	688.4	lfg/gnd
2257	765976.3	1648343.6	686.8	lfg/cmp
2258	765979.6	1648361.0	686.2	lfg/cmp
2259	765977.2	1648392.2	685.7	lfg/gnd
2260	765974.3	1648404.3	685.9	lfg/gv/gnd
2263	765978.8	1648496.6	689.9	lfg/int/gnd
2264	766003.4	1648594.8	691.1	lfg/gnd
2265	766012.9	1648637.0	690.8	lfg/int/gnd
2266	766025.6	1648712.4	690.1	lfg/pipe
2267	766037.3	1648771.7	689.2	lfg/gnd
2268	766046.2	1648841.4	687.4	lfg/int/gnd
2271	766051.6	1648872.1	686.7	lfg/pipe/top
2272	766070.4	1648938.0	686.1	lfg/int/pipe/top
2273	766075.5	1648967.9	686.3	lfg/pipe/top
2274	766074.9	1648982.9	686.3	lfg/pipe/top
2275	766063.5	1649020.5	692.3	lfg/pipe/top
2276	766058.5	1649060.0	695.9	lfg/pipe/top
2277	766059.6	1649108.7	699.4	lfg/int/pipe/top
2278	766080.0	1649174.1	699.9	lfg/pipe/top/end
2279	766067.6	1649142.3	699.7	lfg/pipe/top

ELEVATION ON TOP OF LFG HEADER LOCATED THROUGH PVC PIPE

ELEVATION ON GROUND OVER LFG HEADER

ELEVATION ON TOP OF PUMP

ELEVATION ON TOP OF 12" CORRUGATED METAL PIPE (LFG HEADER LOCATED INSIDE)

ELEVATION ON TOP OF EXPOSED LFG HEADER PIPE

NOTE: THIS PROPERTY IS SUBJECT TO ANY FACTS (PRIOR AGREEMENTS, CONVEYANCES, OR EASEMENTS OF RECORD) THAT MAY BE DISCLOSED BY A FULL AND ACCURATE TITLE SEARCH.

NOTE:
 1) LFG HEADER LOCATED FROM EXPOSED PIPE, EXISTING TRENCH, & PVC PIPES IN TRENCH.
 2) ALL ELEVATIONS SHOWN ARE GROUND ELEVATIONS, TOP OF HEADER THROUGH PVC PIPES, AND TOP OF PUMP.
 3) OVERALL TOPOGRAPHY PER NORTH CAROLINA DEPARTMENT OF TRANSPORTATION.

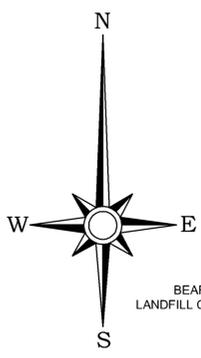
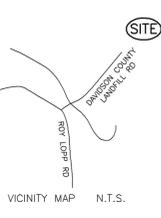
SHEET NO. 1

SURVEY FOR: DAVIDSON COUNTY LANDFILL LFG HEADER AS-BUILT

SURV'D	DRAWN	TOWNSHIP	COUNTY	STATE	DEED BOOK	PAGE
MDG	MDG	THOMASVILLE	DAVIDSON	N.C.		
TAX REFERENCE						
16-355-0-000-0009						
JOB NO.	DWG.	DATE	SCALE 1"= 40'			
3506	3506	11/27/12				

MICHAEL GREEN ASSOCIATES, P.A.
 CONSULTANTS - LAND PLANNERS - SURVEYORS
 P.O. BOX 539 • LEXINGTON, N.C. 27293 • 336-248-8102

This page intentionally left blank.



TIE TO LANDFILL CONTROL DATUM

TOWER 101 (TOP BOLT SE CORNER)
 N: 763,248.44'
 E: 1,650,365.45'
 ELEVATION: 731.59'
 ALL DISTANCES SHOWN ARE HORIZONTAL.

BEARING AND DISTANCE FROM
 TOWER 101 TO TOWER 102
 N 63°29'02"E 783.71'

TOWER 102 (TOP BOLT NW CORNER)
 N: 763,598.33'
 E: 1,651,066.72'
 ELEVATION: 725.31'



NORTH CAROLINA, DAVIDSON COUNTY

I, MICHAEL D. GREEN, CERTIFY THAT THIS PLAT WAS DRAWN UNDER MY SUPERVISION FROM AN ACTUAL SURVEY MADE UNDER MY SUPERVISION (DEED DESCRIPTION RECORDED IN BOOK AS SHOWN HEREON); THAT THE BOUNDARIES NOT SURVEYED ARE INDICATED AS DRAWN FROM INFORMATION IN DEED BOOK AS SHOWN HEREON; THAT THE RATIO OF PRECISION AS CALCULATED IS 1:10,000; THAT THE GLOBAL POSITIONING SYSTEM (GPS) OBSERVATIONS WERE PERFORMED TO THE GEOSPATIAL POSITIONING ACCURACY STANDARDS, PART 2: STANDARDS FOR GEODETIC NETWORKS AT THE 2CM ACCURACY CLASSIFICATION (95% CONFIDENCE) USING RTK NETWORK AND TRADITIONAL TRAVERSE; AND MEETS THE REQUIREMENTS OF THE STANDARDS OF PRACTICE FOR LAND SURVEYING IN NORTH CAROLINA (21 NCAC 98.1600). WITNESS MY ORIGINAL SIGNATURE AND SEAL THIS 27th DAY OF NOVEMBER, 2012.

PROFESSIONAL LAND SURVEYOR *Michael D. Green* L-3604 NC



Point	Northing	Eastng	Elev.	Description
2166	764061.0	1649236.8	690.0	Ifg/pvc
2168	763905.5	1649188.7	693.7	Ifg/pvc
2169	763802.8	1649168.6	696.4	Ifg/pvc
2171	763704.5	1649147.7	699.4	Ifg/pvc
2172	763607.3	1649127.5	702.6	Ifg/pvc
2173	763509.1	1649118.0	706.2	Ifg/pvc
2174	763424.0	1649155.1	708.9	Ifg/pvc
2176	764079.7	1649231.8	686.9	Ifg/gnd
2177	764109.5	1649215.0	672.7	Ifg/gnd
2178	764122.7	1649188.0	666.8	Ifg/gnd
2179	764123.7	1649147.8	660.4	Ifg/pvc
2180	763999.0	1649208.3	692.0	Ifg/pvc
2181	763384.0	1649246.9	711.6	Ifg/gnd
2182	763373.7	1649288.0	712.5	Ifg/gv
2183	763358.2	1649347.7	708.9	Ifg/pvc/end
2192	764117.8	1649108.8	657.4	Ifg/gnd
2193	764085.8	1649047.1	653.5	Ifg/valve/gnd
2194	764084.9	1649039.6	653.3	Ifg/valve/gnd
2195	764085.1	1649043.0	656.9	Ifg/pump_top
2196	764081.1	1648998.6	650.8	Ifg/pvc
2197	764075.6	1648927.1	652.5	Ifg/gnd
2198	764070.1	1648851.4	653.0	Ifg/gnd
2199	764064.3	1648753.9	653.8	Ifg/pvc
2200	764082.9	1648706.1	656.0	Ifg/gnd
2203	764125.5	1648685.1	654.8	Ifg/pvc
2204	764218.4	1648646.7	655.8	Ifg/pvc
2205	764294.9	1648631.7	656.7	Ifg/pvc
2206	764295.7	1648631.7	660.6	Ifg/gv/gnd
2207	764296.7	1648632.0	656.7	Ifg/valve/pvc
2208	764310.5	1648633.1	661.3	Ifg/vent/gnd
2210	764353.9	1648634.4	661.5	Ifg/gnd
2212	764414.2	1648642.2	669.8	Ifg/gnd
2213	764448.1	1648644.4	672.2	Ifg/gnd
2214	764509.3	1648650.3	685.0	Ifg/vent/gnd
2215	764524.1	1648652.7	658.8	Ifg/pvc
2216	764525.5	1648653.2	664.0	Ifg/gv/gnd
2217	764526.1	1648652.9	658.8	Ifg/valve/pvc
2218	764608.3	1648677.4	663.6	Ifg/pvc
2219	764685.3	1648701.6	665.7	Ifg/pvc
2220	764772.0	1648741.2	670.0	Ifg/pvc
2224	764884.7	1648785.5	671.8	Ifg/pvc
2225	764975.0	1648830.9	673.4	Ifg/pvc
2226	764973.1	1648830.0	674.4	Ifg/valve/gnd
2227	765070.6	1648865.8	683.8	Ifg/pvc
2228	765163.7	1648905.9	695.8	Ifg/pvc
2232	765212.7	1648927.7	702.8	Ifg/gnd
2233	765258.4	1648924.2	707.7	Ifg/pvc
2236	765354.2	1648914.0	718.0	Ifg/pvc
2237	765340.1	1648813.4	712.8	Ifg/pvc
2238	765324.3	1648716.3	711.7	Ifg/pvc
2239	765313.4	1648617.8	710.3	Ifg/pvc
2240	765317.7	1648518.0	708.8	Ifg/pvc
2244	765349.6	1648424.1	708.3	Ifg/pvc
2245	765399.2	1648336.7	706.7	Ifg/pvc
2246	765422.7	1648294.0	706.1	Ifg/pvc
2247	765447.0	1648263.5	705.3	Ifg/pvc
2250	765533.2	1648248.2	703.5	Ifg/pvc
2251	765611.0	1648253.1	704.4	Ifg/gnd
2252	765691.0	1648259.8	697.6	Ifg/pvc
2253	765788.3	1648272.5	691.7	Ifg/pvc
2254	765889.6	1648290.5	688.8	Ifg/pvc
2255	765936.5	1648307.5	688.8	Ifg/gnd
2256	765966.3	1648323.0	688.4	Ifg/gnd
2257	765976.3	1648343.6	686.8	Ifg/cmp
2258	765979.6	1648361.0	686.2	Ifg/cmp
2259	765977.2	1648392.2	685.7	Ifg/gnd
2260	765974.3	1648404.3	685.9	Ifg/gv/gnd
2263	765978.8	1648496.6	689.9	Ifg/int/gnd
2264	766003.4	1648594.8	691.1	Ifg/gnd
2265	766012.9	1648637.0	690.8	Ifg/int/gnd
2266	766025.6	1648712.4	690.1	Ifg/pipe
2267	766037.3	1648771.7	689.2	Ifg/gnd
2268	766046.2	1648841.4	687.4	Ifg/int/gnd
2271	766051.6	1648872.1	686.7	Ifg/pipe/top
2272	766070.4	1648938.0	686.1	Ifg/int/pipe/top
2273	766075.5	1648967.9	686.3	Ifg/pipe/top
2274	766074.9	1648982.9	686.3	Ifg/pipe/top
2275	766063.5	1649020.5	692.3	Ifg/pipe/top
2276	766058.5	1649060.0	695.9	Ifg/pipe/top
2277	766059.6	1649108.7	699.4	Ifg/int/pipe/top
2278	766080.0	1649174.1	699.9	Ifg/pipe/top/end
2279	766067.6	1649142.3	699.7	Ifg/pipe/top

ELEVATION ON TOP OF LFG HEADER LOCATED THROUGH PVC PIPE

ELEVATION ON GROUND OVER LFG HEADER

ELEVATION ON TOP OF PUMP

ELEVATION ON TOP OF 12" CORRUGATED METAL PIPE (LFG HEADER LOCATED INSIDE)

ELEVATION ON TOP OF EXPOSED LFG HEADER PIPE

NOTE:
 1) LFG HEADER LOCATED FROM EXPOSED PIPE, EXISTING TRENCH, & PVC PIPES IN TRENCH.
 2) ALL ELEVATIONS SHOWN ARE GROUND ELEVATIONS, TOP OF HEADER THROUGH PVC PIPES, AND TOP OF PUMP.
 3) OVERALL TOPOGRAPHY PER NORTH CAROLINA DEPARTMENT OF TRANSPORTATION.

SHEET NO. 2

NOTE: THIS PROPERTY IS SUBJECT TO ANY FACTS (PRIOR AGREEMENTS, CONVEYANCES, OR EASEMENTS OF RECORD) THAT MAY BE DISCLOSED BY A FULL AND ACCURATE TITLE SEARCH.

SURVEY FOR: DAVIDSON COUNTY LANDFILL LFG HEADER AS-BUILT

SURV/D	DRAWN	TOWNSHIP	COUNTY	STATE	DEED BOOK	PAGE
MDG	TAX	THOMASVILLE	DAVIDSON	N.C.		
TAX REFERENCE						
16-355-0-000-0009						
JOB NO.	DWG.	DATE	SCALE 1" = 40'			
3506	3506	11/27/12				

MICHAEL GREEN ASSOCIATES, P.A.
 CONSULTANTS - LAND PLANNERS - SURVEYORS
 P.O. BOX 539 • LEXINGTON, N.C. 27293 • 336-248-8102

This page intentionally left blank.



NORTH CAROLINA, DAVIDSON COUNTY
 I, MICHAEL D. GREEN, CERTIFY THAT THIS PLAN WAS DRAWN UNDER MY SUPERVISION FROM AN ACTUAL SURVEY MADE UNDER MY SUPERVISION (DEED DESCRIPTION RECORDED IN BOOK AS SHOWN HEREON); THAT THE BOUNDARIES NOT SURVEYED ARE INDICATED AS BEING FROM INFORMATION IN DEED BOOK AS SHOWN HEREON; THAT THE RATIO OF PRECISION AS CALCULATED IS 1:10,000; THAT THE GLOBAL POSITIONING SYSTEM (GPS) OBSERVATIONS WERE PERFORMED TO THE GEOSPATIAL POSITIONING ACCURACY STANDARDS, PART 2: STANDARDS FOR GEODETIC NETWORKS AT THE 2CM ACCURACY CLASSIFICATION (95% CONFIDENCE) USING RTK NETWORK AND TRADITIONAL TRAVERSE; AND MEETS THE REQUIREMENTS OF THE STANDARDS OF PRACTICE FOR LAND SURVEYING IN NORTH CAROLINA (21 N.C.A.C. 36.160). WITNESS MY ORIGINAL SIGNATURE AND SEAL THIS 27th DAY OF NOVEMBER, 2012.

PROFESSIONAL LAND SURVEYOR *Michael D. Green* 3604 NC

TIE TO LANDFILL CONTROL DATUM

TOWER 101 (TOP BOLT SE CORNER)
 N 783.248.44'
 E 1.650.365.45'
 ELEVATION: 731.59'
 ALL DISTANCES SHOWN ARE HORIZONTAL.

BEARING AND DISTANCE FROM
 TOWER 101 TO TOWER 102
 N 63°29'02"E 783.71'

TOWER 102 (TOP BOLT NW CORNER)
 N 763.598.33'
 E 1.651.066.72'
 ELEVATION: 725.31'

Point	Northing	Eastng	Elev.	Description
2166	764061.0	1649236.8	690.0	Ifg/pvc
2168	763905.5	1649188.7	693.7	Ifg/pvc
2169	763802.8	1649168.6	696.4	Ifg/pvc
2171	763704.5	1649147.7	699.4	Ifg/pvc
2172	763607.3	1649127.5	702.6	Ifg/pvc
2173	763509.1	1649118.0	706.2	Ifg/pvc
2174	763424.0	1649155.1	708.9	Ifg/pvc
2176	764079.7	1649231.8	686.9	Ifg/gnd
2177	764109.5	1649215.0	672.7	Ifg/gnd
2178	764122.7	1649188.0	666.8	Ifg/gnd
2179	764123.7	1649147.8	660.4	Ifg/pvc
2180	763999.0	1649208.3	692.0	Ifg/pvc
2181	763384.0	1649246.9	711.6	Ifg/gnd
2182	763373.7	1649286.0	712.5	Ifg/gv
2183	763358.2	1649347.7	708.9	Ifg/pvc/nd
2192	76417.8	1649108.8	657.4	Ifg/gnd
2193	764085.8	1649047.1	653.5	Ifg/valve/gnd
2194	764084.9	1649039.6	653.3	Ifg/valve/gnd
2195	764085.1	1649043.0	656.9	Ifg/pump top
2196	764081.1	1648998.6	650.8	Ifg/pvc
2197	764075.6	1648927.1	652.5	Ifg/gnd
2198	764070.1	1648851.4	653.0	Ifg/gnd
2199	764064.3	1648753.9	653.8	Ifg/pvc
2200	764082.9	1648706.1	656.0	Ifg/gnd
2203	764125.5	1648685.1	654.8	Ifg/pvc
2204	764218.4	1648646.7	655.8	Ifg/pvc
2205	764294.9	1648631.7	656.7	Ifg/pvc
2206	764295.7	1648631.7	660.6	Ifg/gv/gnd
2207	764296.7	1648632.0	656.7	Ifg/valve/pvc
2208	764310.5	1648633.1	661.3	Ifg/vent/gnd
2210	764353.9	1648634.4	661.5	Ifg/gnd
2212	764414.2	1648642.2	669.8	Ifg/gnd
2213	764448.1	1648644.4	672.2	Ifg/gnd
2214	764509.3	1648650.3	665.0	Ifg/vent/gnd
2215	764524.1	1648652.7	658.8	Ifg/pvc
2216	764525.5	1648653.2	664.0	Ifg/gv/gnd
2217	764526.1	1648653.9	658.8	Ifg/valve/pvc
2218	764508.3	1648677.4	663.6	Ifg/pvc
2219	764585.3	1648701.6	665.7	Ifg/pvc
2220	764772.0	1648741.2	670.0	Ifg/pvc
2224	764884.7	1648795.5	671.8	Ifg/pvc
2225	764975.0	1648830.9	673.4	Ifg/pvc
2226	764973.1	1648830.0	674.4	Ifg/valve/gnd
2227	765070.6	1648865.8	683.8	Ifg/pvc
2228	765163.7	1648905.9	695.8	Ifg/pvc
2232	765212.7	1648927.7	702.8	Ifg/gnd
2233	765258.4	1648924.2	707.7	Ifg/pvc
2236	765354.2	1648914.0	718.0	Ifg/pvc
2237	765340.1	1648813.4	712.8	Ifg/pvc
2238	765324.3	1648716.3	711.7	Ifg/pvc
2239	765313.4	1648617.8	710.3	Ifg/pvc
2240	765317.7	1648518.0	708.8	Ifg/pvc
2244	765349.6	1648424.1	708.3	Ifg/pvc
2245	765398.2	1648336.7	706.7	Ifg/pvc
2246	765422.7	1648294.0	706.1	Ifg/pvc
2247	765447.0	1648263.5	705.3	Ifg/pvc
2250	765533.2	1648248.2	703.5	Ifg/pvc
2251	765611.0	1648253.1	704.4	Ifg/gnd
2252	765691.0	1648259.8	697.6	Ifg/pvc
2253	765788.3	1648272.5	691.7	Ifg/pvc
2254	765889.6	1648290.5	688.8	Ifg/pvc
2255	765936.5	1648307.5	688.8	Ifg/gnd
2256	765966.3	1648323.0	688.4	Ifg/gnd
2257	765976.3	1648343.6	686.8	Ifg/cmp
2258	765979.6	1648361.0	686.2	Ifg/cmp
2259	765977.2	1648392.2	685.7	Ifg/gnd
2260	765974.3	1648404.3	685.9	Ifg/gv/gnd
2263	765978.8	1648496.6	689.9	Ifg/int/gnd
2264	766003.4	1648594.8	691.1	Ifg/gnd
2265	766012.9	1648637.0	690.8	Ifg/int/gnd
2266	766025.6	1648712.4	690.1	Ifg/pvc
2267	766037.3	1648771.7	689.2	Ifg/gnd
2268	766046.2	1648841.4	687.4	Ifg/int/gnd
2271	766051.6	1648872.1	686.7	Ifg/pvc/top
2272	766070.4	1648938.0	686.1	Ifg/int/pipe/top
2273	766075.5	1648967.9	686.3	Ifg/pipe/top
2274	766074.9	1648982.9	686.3	Ifg/pipe/top
2275	766083.5	1649020.5	692.3	Ifg/pipe/top
2276	766058.5	1649060.0	695.9	Ifg/pipe/top
2277	766059.6	1649108.7	699.4	Ifg/int/pipe/top
2278	766080.0	1649174.1	699.9	Ifg/pipe/top/nd
2279	766067.6	1649142.3	699.7	Ifg/pipe/top

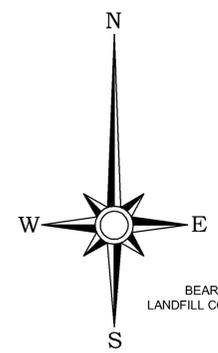
ELEVATION ON TOP OF LFG HEADER LOCATED THROUGH PVC PIPE

ELEVATION ON GROUND OVER LFG HEADER

ELEVATION ON TOP OF PUMP

ELEVATION ON TOP OF 12" CORRUGATED METAL PIPE (LFG HEADER LOCATED INSIDE)

ELEVATION ON TOP OF EXPOSED LFG HEADER PIPE



NOTE:
 1) LFG HEADER LOCATED FROM EXPOSED PIPE, EXISTING TRENCH, & PVC PIPES IN TRENCH.
 2) ALL ELEVATIONS SHOWN ARE GROUND ELEVATIONS, TOP OF HEADER THROUGH PVC PIPES, AND TOP OF PUMP.
 3) OVERALL TOPOGRAPHY PER NORTH CAROLINA DEPARTMENT OF TRANSPORTATION.

SHEET NO. 3

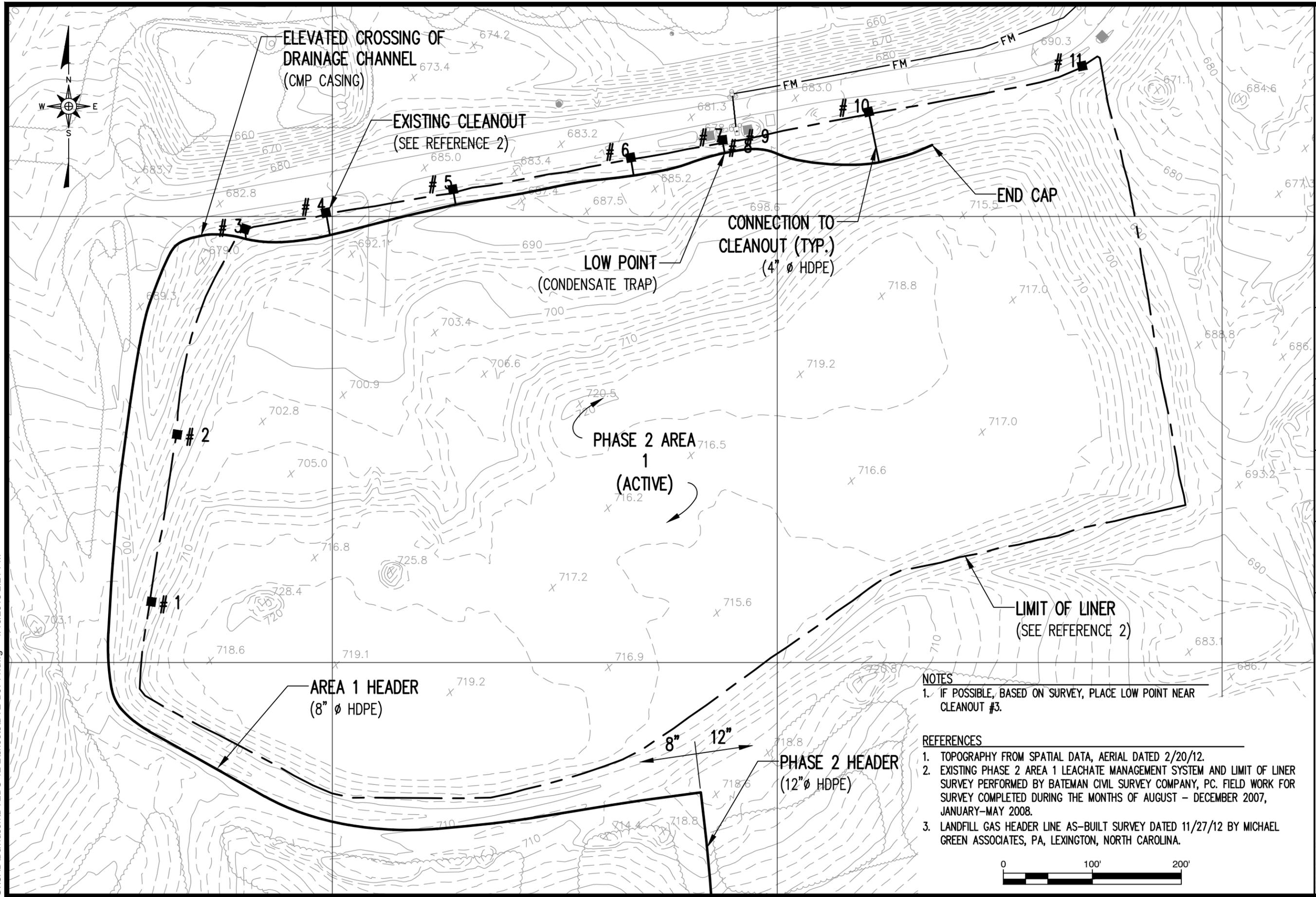
NOTE: THIS PROPERTY IS SUBJECT TO ANY FACTS (PRIOR AGREEMENTS, CONVEYANCES, OR EASEMENTS OF RECORD) THAT MAY BE DISCLOSED BY A FULL AND ACCURATE TITLE SEARCH.

SURVEY FOR: DAVIDSON COUNTY LANDFILL LFG HEADER AS-BUILT						
SURV'D MDS	DRAWN	TOWNSHIP	COUNTY	STATE	DEED BOOK	PAGE
		THOMASVILLE	DAVIDSON	N.C.		
TAX REFERENCE						
16-355-0-000-0009						
JOB NO.	DWG.	DATE				
3506	3506	11/27/12				

MICHAEL GREEN ASSOCIATES, P.A.
 CONSULTANTS - LAND PLANNERS - SURVEYORS (C-2732)
 P.O. BOX 539 - LEXINGTON, N.C. 27293 - 336-248-8102

This page intentionally left blank.

G:\CAD\Davidson\DTEDC 12-2\sheet\DTEDC-B0711.dwg - 1/10/2013 2:21 PM



NOTES

1. IF POSSIBLE, BASED ON SURVEY, PLACE LOW POINT NEAR CLEANOUT #3.

REFERENCES

1. TOPOGRAPHY FROM SPATIAL DATA, AERIAL DATED 2/20/12.
2. EXISTING PHASE 2 AREA 1 LEACHATE MANAGEMENT SYSTEM AND LIMIT OF LINER SURVEY PERFORMED BY BATEMAN CIVIL SURVEY COMPANY, PC. FIELD WORK FOR SURVEY COMPLETED DURING THE MONTHS OF AUGUST - DECEMBER 2007, JANUARY-MAY 2008.
3. LANDFILL GAS HEADER LINE AS-BUILT SURVEY DATED 11/27/12 BY MICHAEL GREEN ASSOCIATES, PA, LEXINGTON, NORTH CAROLINA.

PREPARED FOR: DAVIDSON COUNTY GAS PRODUCERS
DAVIDSON COUNTY LANDFILL
AREA 2 HEADER LINE
AREA 1 CLEANOUT CONNECTIONS

DRAWN: C.T.J. APPROVED: P.K.S. SCALE: AS SHOWN FIGURE NO: 1

DATE: Jan 2013 PROJECT NO: DTEDC 12-2 FILENAME: DTE-B0711

PREPARED BY: NC LIC. NO. C-0828 (ENGINEERING)
SMITH+GARDNER
14 N. Boylan Avenue, Raleigh NC 27603 | 919.828.0577

This page intentionally left blank.