From: Blalock, Susan <susan.blalock@deq.virginia.gov>
Sent: Tuesday, January 4, 2022 3:02 PM
To: Susan Blalock
Subject: Fwd: FW: EMO - 21 1230 - Hall (EPA) - Bristol (Reg# 11184) - 12/31/2021 Status Report
Attachments: Bristol - Construction Bid Drawings 2.5_11-15-21 - Sht 3 wdk annotated.pdf; LFG Sys Improvements - Wells.Pumps.pdf

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From: Don Marickovich <dmarickovich@daa.com>
Sent: Friday, December 31, 2021 11:03 AM
To: Crystal Bazyk <crystal.bazyk@deq.virginia.gov>; hall.kristen@epa.gov
Cc: Randall Eads <CityManager@bristolva.org>; Sam Hess <sam.hess@bristolva.org>; zac.mitchell@bristolva.org; Ernie Hoch <ehoch@daa.com>; Anthony Tomlin <atomlin@daa.com>; Hurst, Jeffrey (DEQ) <jeff.hurst@deq.virginia.gov>; Stacy Bowers <stacy.bowers@deq.virginia.gov>; Willard, Erin <Willard.ErinM@epa.gov>; Wendy Karably <wkarably@daa.com>; Cynthia Garrett <cgarrett@daa.com>; Carrie Blankenship <CBlankenship@daa.com>
Subject: EMO - 21 1230 - Hall (EPA) - Bristol (Reg# 11184) - 12/31/2021 Status Report

Ms. Hall and Ms. Bazyk,

In accordance with EPA's letter, "Approval of Higher Operating Temperature Values of Landfill Gas Wells and Submission of Gas Treatment Alternatives at the Bristol Virginia Integrated Solid Waste Facility" from August 2021, I am providing the December 31, 2021 status report on the existing wells, well drilling operations, and the expansion of the gas collection system.

Existing/New Well Temperatures

During August to December 2021, existing wells 39, 40, 46, and 47 were monitored periodically for temperature. Starting on October 21st the staff also began monitoring gas well 37 and gas well 35 on November 19th. Monitoring results are provided in the tables below. Temperatures marked as "ok" were below the 145-degree threshold. Temperatures in red are above 145-degrees. staff began monitoring the new wells for temperature on December 1st. In the last table below temperatures are provided for any well, new or previously existing, that have had temperatures above 145-degrees.

Temperature Data (Fahrenheit)																									
Gas Well	August Monitoring Dates																								
	2	3	4	5	6	7	8	9	10	11	12	13	14	16	17	18	19	21	23	24	25	27	28	30	31
39	104.4	100.1	99.5	100.8	107.8	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok
37																									
40	156.5	165.8	165.7	170.5	172.6	171.5	172.5	176.3	173.1	175.2	183.8	178	175.5	177.6	176.5	163.8	162.9	94.8	84.6	69.1	72.1	70.4	72.2	96.5	86.3
46	183.2	184.7	181.3	182.3	183.4	184	184.9	170.3	168.6	179.8	186.7	178.6	172.6	170.1	183.8	183.4	181.5	183	167.1	178.2	181.7	148.6	168.1	172.6	170.8

47	194.3	196.5	196.9	197.3	196.4	194.8	195.6	195.9	195.1	195.7	195.9	197.5	197.2	196.5	194.2	194.7	194.3	194.8	193.3	193.1	193.4	190.5	178.7	178.6	180.3

Temperature Data (Fahrenheit)																									
Gas Well	September Monitoring Dates																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
39	ok	ok	ok	ok			ok	ok	ok	ok	ok		ok	ok	ok	ok				ok	ok	ok	ok	ok	
37																									
40	94.8	117.5	118.2	121.4			135.5	142.6	157.3	162.5	174.7		178.8	178.6	175.3	173.7				110.4	112.8	145.5	147.9	146.3	
46	145.9	175.3	176.9	177.5			187.7	188.6	187.5	187.2	184.8		183.6	181.3	178.3	180.7				181.2	181.7	182.3	181.9	182.4	
47	179.4	180.2	180.7	179.3			190.2	194.5	192.6	188.2	182.5		178.2	183.5	187.2	184.8				184.5	185.3	186.4	187.3	185.2	

Temperature Data (Fahrenheit)																									
Gas Well	September/October Monitoring Dates																								
	26	27	28	29	30	10/1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
39		ok	ok	ok	ok	ok			ok	ok	ok		ok			ok		ok	ok	ok	ok		ok	ok	120.5
37																									
40		152.5	154.7	151.5	157.2	162.4			161.4	158.9	159.4		158.1			160.2		159.9	161.6	161.1	161		160.8	158.8	157.7
46		182.7	180.3	179.5	180.2	184.3			184.9	183.2	183.7		180.2			182.5		181.4	182.1	183.4	181.4		175.2	171.3	161.1
47		189.4	188.3	187.2	186.9	187.2			187.3	188.5	188.7		186.9			187.3		186.8	188.4	187.1	186.9		186.9	187.1	186.3

Temperature Data (Fahrenheit)																									
Gas Well	October/November Monitoring Dates																								
	21	22	23	24	25	26	27	28	29	30	31	11/1	2	3	4	5	6	7	8	9	10	11	12	13	14
39	121.6	119.6	120.6		121.1	119.4	117.7	116.6	118.3	116		116	115	112	110	109	108		107	105	104	104	103	103	
37	147	144.6	145.8		146.3	146.8	146.3	145.9	144.8	146		146	145	145	144	146	146		147	145	146	146	145	146	
40	147.1	148.4	147.2		145.7	144.5	141.8	139.9	140.7	137		136	135	131	127	125	122		120	117	117	114	112	109	
46	166.8	182.1	182.7		183.4	184.9	184.4	184.7	183.4	183		183	180	180	182	183	183		183	182	182	179	178	177	
47	185.8	185.3	186.5		187.1	187.4	185.7	185.5	184.7	184		184	184	184	184	184	183		183	183	182	182	182	184	

Temperature Data (Fahrenheit)																									
Gas Well	November/December Monitoring Dates																								
	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	12/1	2	3	4	5	6	7	8	9
35					112	110	110	121	117	111	132	128	128	121	123	135	127	125	124	134	120	130	121	124	132

39	102	102	100	100	103	90	93	98	98	99	115	113	112	110	110	111	108	109	112	113	110	111	109	104	108
37	145	144	144	143	141	145	144	141	140	139	154	141	144	149	148	145	140	143	144	152	150	145	151	151	144
40	104	96	94	89	89	79	74	78	90	108	120	119	123	121	120	93	119	108	89	82	78	88	119	124	125
46	177	179	180		181	182	189	190	188	190	186	187	183	181	180	179	191	189	182	190	160	173	183	179	180
47	184	186	186		189	189	188	189	189	189	185	183	185	183	183	189	190	187	180	184	183	182	182	179	174
60																	162	158		145	170	162	161	162	163
64				153	150	149	152	150	145	158						145	144.6	144.8		148	148	148	149	144	150

Temperature Data (Fahrenheit)																									
Gas Well*	December 2021/January 2022 Monitoring Dates																								
	10	11	12	13	14**	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	01/1	2	3
35	131	130	98	101	45	88	97	106	111	106	103	106	105	118	110	110	110	114							
39	110	118	103	109	60	94	104	106	107	106	106	106	107	110	70	110	110	107							
37	144	151	150	150	70	150	152	149	152	149	152	153	154	150	150	150	150	153							
40	119	130	125	117	60	115	111	117	117	118	114	113	111	110	100	100	90	117							
46	193	170	182	180	80	190	185	187	182	179	191	187	189	183	190	190	190	179							
47	160	178	163	171	130	150	169	174	192	185	183	185	187	183	195	200	190	194							
42				146	80	140	143	144	144	147	146	144	140	140	140	140	140	143							
31R				148	132	149	149	147	149	147	148	149	149	150	150	150	150	148							
49	140			153	100	140	140	142	140	143	138							140							
54	141			146	60	140	149	146	144	145	148	149	151	150	150	150	150	152							
60	157	158	153	150	80	150	154	165	171	168	162	164	153	150	140	150	150	149							
61				163	60	120	142	129	119	122	119							122							
64	148	151	146	150	95	149	151	147	148	149	149	149	150	150	150	150	150	151							

Gas wells 35, 39, 40, 46 and 47 are approved to operate at temperatures about 145-degrees. Gas wells 32R and 49 through 68 are the new wells installed in the fall of 2021.

**There was no system vacuum on December 14th.

New Gas Well Installation

Aptim was contracted to install new wells. Well drilling began September 10, 2021. Approximately one well per day was drilled and installed; with stoppages due to mechanical issues. A total of 17 wells had initially been planned to be installed. However, as the drilling proceeded, the City decided to install 4 additional wells; 66, 67, 68, and 32R for a total of 21. The as-built locations of all 21 wells are shown on the attached drawing.

Below is the summary of the gas wells Installed:

Summary of Gas Well Installation							
Gas Well	September/October 2021						
	Date Installed	Design Depth (ft)	Actual Depth (ft)	Max. Waste Temp. (°F)	Decomposition	Water Content	Comments
49	10/4/2021	120	110	162	High	Wet	Hit Refusal
50	9/24/2021	120	96	151	High	Wet	Hit Refusal
51	9/21/2021	120	114	150	High	Wet	Hit Refusal
52	9/22/2021	120	108.7	149	High	Wet	Hit Refusal
53	9/15/2021	120	91	148	High	Wet	Hit Refusal
54	9/16/2021	120	91	169	High	Wet	Hit Refusal
55	9/29/2021	120	104	151	High	wet	Hit Refusal
56	9/25/2021	120	109	150	High	Wet	Hit Refusal
57	9/20/2021	120	103	148	High	Wet	Hit Refusal
58	9/27/2021	120	92	146	High	Wet	Hit Refusal
59	9/17/2021	120	72	147	High	Wet	Hit Refusal
60	9/30/2021	120	120	152	High	Wet	Design Depth
61	10/1/2021	120	105	175	High	Wet	Hit Refusal
62	10/13/2021	120	120	168	High	Wet	Design Depth
63	10/12/2021	117	110	141	High	Wet	Hit Refusal
64	10/2/2021	120	120	158	High	Wet	Design Depth
65	10/11/2021	120	100	142	High	Wet	Hit Refusal
66	10/7/2021	120	102	142	High	Wet	Hit Refusal
67	10/8/2021	120	100	156	High	Wet	Hit Refusal
68	10/15/2021	120	75	133	High	Wet	Hit Refusal
32R	10/14/2021	120	120	168	High	Dry	Design Depth

Drilling operations were completed on October 15th.

Gas Collection System Expansion

The City contracted with SCS Field Services to expand the gas collection system (GCS) to connect the 21 new gas wells. Construction began November 6th. The construction was substantially complete on December 15th. All 21 new gas wells have been connected to the GCS. The wellheads on these new wells have been opened and are currently undergoing tuning and balancing, and associated air pressure and water discharge lines have been extended to them. Gas well pumps have been installed in 14 of these new wells and are operational; the remaining 7 gas wells (53, 56, 62, 63, 65, 66, 32R) do not have any significant water in them. Please see the attached table which presents measured well depths and monitored water levels in each well.

Gas Rental Blower Flare Station/Existing Blower Flare Station Control Upgrades

A trailer mounted, 6-inch candlestick, Perennial Energy Inc. rental blower flare station was delivered to the site, connected to the GCS, and became operational during the week of December 13th. The flare station, with a design flow rate of about 750 SCFM will be used along with the existing flare station to treat the additional flow from the GCS during periods when the Ingenco plant is not operational. In addition, during the week of December 13th, Ingenco/Parnel upgraded the control system of the existing flare station so that both the station and Ingenco can operate at the same time.

The next bi-weekly status report will be provided by January 15, 2022. If you have any questions on the information provided, please, contact either me or Mr. Ernest Hoch at (540) 537-0404 or via email at ehoch@daa.com.

Thank you,

Don Marickovich

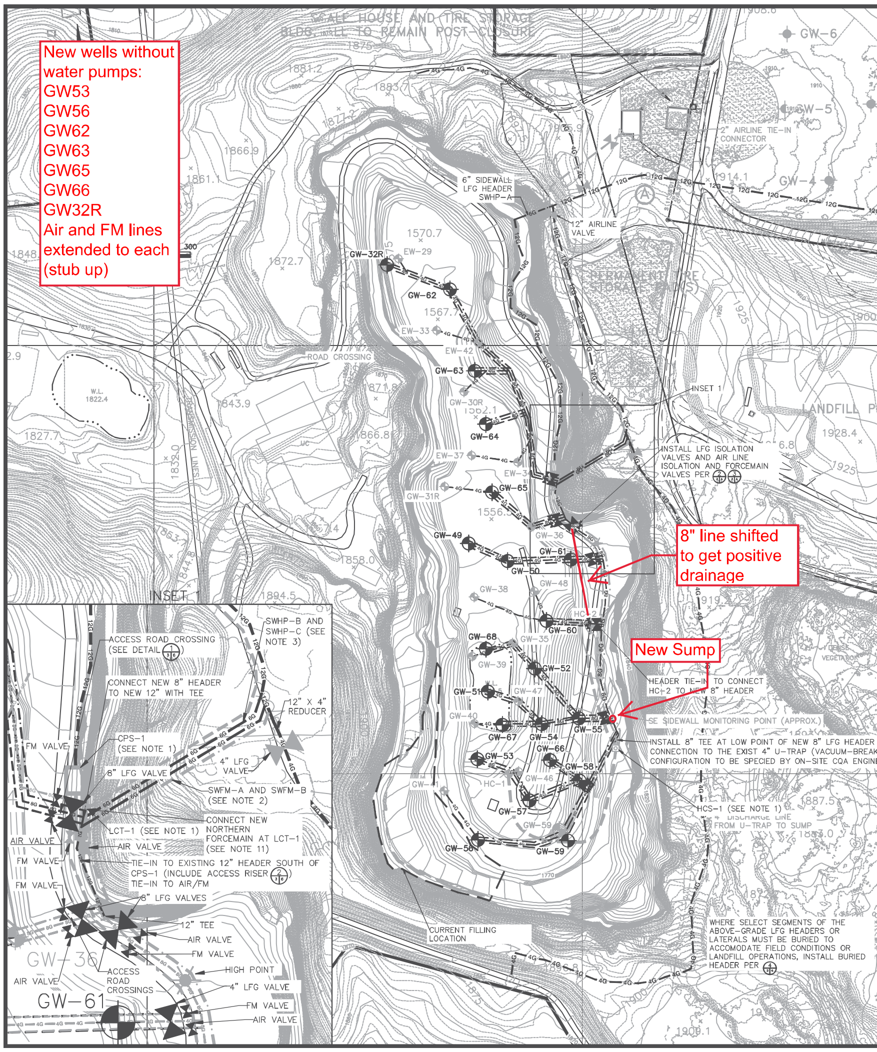
Senior Design Engineer

Draper Aden Associates

Engineering • Surveying • Environmental Services

Lasting Positive Impact®

Phone: 757.300.2608 • Mobile: 757.837.5206



NOTES

1. THE LANDFILL GAS SYSTEM LIQUIDS MANAGEMENT INFRASTRUCTURE THAT EXISTS AS OF JUNE 2021 INCLUDES THE FOLLOWING FEATURES:

A. CONDENSATE PUMP STATION CPS–1 IS AN IN–LINE STYLE CONDENSATE SUMP POSITIONED AT A LOWPOINT IN THE 12–INCH LFG HEADER PIPE. IT IS EQUIPPED WITH A DEDICATED SUBMERSIBLE PNUEMATIC PUMP THAT DISCHARGES INTO A DEDICATED 4–INCH SIDEWALL LIQUIDS FORCEMAIN (SWFM–A), WHICH ULTIMATELY CONVEYS THE CONDENSATE FOR DISCHARGE INTO THE SEWER MANHOLE.

B. HORIZONTAL COLLECTOR SUMP HCS–1 IS AN 18–INCH DIAMETER, 14–FEET DEEP, IN–LINE STYLE LEACHATE/CONDENSATE SUMP POSITIONED AT THE LOWPOINT IN A LFG HORIZONTAL COLLECTOR IN THE SOUTHEASTERN SECTION OF THE QUARRY LANDFILL WITH TOP OF SUMP AT ELEVATION 1,764 FEET. IT IS EQUIPPED WITH A DEDICATED SUBMERSIBLE PNEUMATIC PUMP THAT DISCHARGES INTO A DEDICATED 4–INCH FORCEMAIN THAT TERMINATES AT THE TEMPORARY ABOVEGRADE LIQUIDS CONTAINMENT TANK LCT–1.

C. THE TEMPORARY ABOVEGRADE LIQUIDS CONTAINMENT TANK LCT–1 IS A PLASTIC STORAGE TANK APPROXIMATELY 10–FOOT DIAMETER AND 10–FOOT HIGH POSITIONED ALONG THE QUARRY CELL SIDEWALL ADJACENT TO CPS–1 AT ELEVATION 1,775 FEET. IT IS EQUIPPED WITH A DEDICATED SUBMERSIBLE PNEUMATIC PUMP THAT DISCHARGES INTO A DEDICATED 4–INCH SIDEWALL LIQUIDS FORCEMAIN (SWFM–B), WHICH ULTIMATELY CONVEYS THE LEACHATE/CONDENSATE FOR DISCHARGE INTO THE SEWER MANHOLE.

2. THE TWO (2) 4–INCH SIDEWALL LIQUID FORCEMAIN PIPES, SWFM–A AND SWFM–B, CONVEY LIQUIDS FROM CPS–1 AND LCT–1, RESPECTIVELY, AND CONVERGE TOGETHER ON THE EASTERN QUARRY RIM INTO A SINGLE 4–INCH FORCEMAIN PIPE THAT DISCHARGES INTO THE SEWER MANHOLE. EACH FORCEMAIN PIPE HAS AN ISOLATION VALVE AND SWFM–B HAS A CLEANOUT POSITIONED AT THE BASE OF THE QUARRY SIDEWALL.

3. THE TWO (2) 6–INCH LFG SIDEWALL HEADER PIPES, SWHP–B AND SWHP–C, CONNECT FROM AN ABOVEGRADE PORTION OF THE 12–INCH LFG HEADER SOUTH OF CPS–1 AND EXTEND UP THE QUARRY SIDEWALL AND CONVERGE INTO THE ABOVEGRADE 12–INCH LFG HEADER PIPE ON THE EASTERN QUARRY RIM.

4. ABANDON OLD WESTERN 12" LFG HEADER OFF THE BRANCH OF EXISTING 12" TEE.APPROX. 100' NORTH OF CPS–1.

5. TOPOGRAPHY OUTSIDE PERMIT 588 LIMITS IS BASED ON A JUNE 25, 2019 AERIAL LIDAR TOPOGRAPHY BY THE CITY OF BRISTOL PER DRAPER ADEN AND ASSOCIATES.

6. LANDFILL SURFACE ELEVATIONS WITHIN PERMIT 588 ARE BASED ON A SURVEY PERFORMED ON JUNE 15, 2021 BY THE CITY OF BRISTOL. GROUND CONTROL SURVEY OF FACILITY AND EXISTING WELL LOCATIONS BASED ON INFORMATION PROVIDED BY CITY OF BRISTOL, VA PER DRAPER ADEN AND ASSOCIATES.

7. THE INFORMATION PRESENTED ON THIS DRAWING PERTAINING TO THE EXISTING LFG COLLECTION AND CONTROL SYSTEM COMPONENT LOCATIONS ALIGNMENT AND CONFIGURATION AS OF JULY 2021 HAS BEEN COMPILED FROM AN AS–BUILT SURVEY PERFORMED BY THE CITY OF BRISTOL IN JULY 2021.

8. THE OBJECTIVE OF STAGE 1 OF THIS LFG AND DEWATERING SYSTEM EXPANSION PROJECT IS TO CONNECT APPROXIMATELY 17 EXISTING WELLS/COLLECTORS TO A NEW HEADER PIPING NETWORK DEPICTED IN THIS DRAWING AND DESIGNATED AS "STAGE 1"; INSTALL NEW WELLHEAD AND CONNECT 17 NEW VERTICAL WELLS (DRILLED BY OTHERS) TO A NEW HEADER PIPING NETWORK; AND EXTEND NEW STAGE 1 AIR/FORCEMAIN PIPING AND EQUIP THE 17 NEW VERTICAL WELLS WITH DEWATERING PUMPS.

9. LFG, AIR, AND FORCEMAIN VALVES TO BE INSTALLED BETWEEN THE QUARRY CELL WALL AND THE EXISTING ACCESS ROAD. ON SITE CQA ENGINEER TO SPECIFY EXACT LOCATION OF VALVES.

10. NEW 8" SOUTHEASTERN LFG HEADER SHALL REPLACE EXISTING 4" ABOVEGRADE LFG HEADER. THE EXISTING 2" AIR/ 4" FORCEMAIN PIPING SHALL BE PRESERVED AND BE ALIGNED WITH THE NEW 8" LFG HEADER PIPING.

11. THE NEW NORTHERN FORCEMAIN SHALL BE CONNECTED TO THE EXISTING SOUTHERN FORCEMAIN UPSTREAM OF LCT–1 SUCH THAT DEWATERING LIQUIDS FROM BOTH FORCEMAINS ARE DISCHARGED INTO LCT–1. EQUIP BOTH FORCEMAINS WITH 4" CHECK VALVES AT CONNECTION.

LEGEND

EXISTING WELLHEAD	EXISTING HORIZONTAL COLLECTOR
PROPOSED WELLHEAD	EXISTING 2" AIR LINE
EXISTING AIR RELEASE VALVE	PROPOPSED 2" AIR LINE
EXISTING ISOLATION VALVE	EXISTING 4" FORCE MAIN
PROPOSED ISOLATION VALVE	PROPOSED 4" FORCE MAIN
PROPOSED BLIND FLANGE	EXISTING LFG HEADER
EXISTING LEACHATE CLEANOUT	PROPOSED LFG HEADER
EXISTING CONDENSATE PUMP STATION	EXISTING 4" LFG HEADER
K.O. PROPOSED CONDENSATE KNOCK-OUT TANK	EXISTING 6" LFG HEADER
EXISTING HORIZONTAL COLLECTOR SUMP	PROPOSED 8" LFG HEADER
EXISTING LFG LIQUIDS CONTAINMENT TANK	EXISTING 12" LFG HEADER
ACCESS RISER	PROPOSED 12" LFG HEADER
	BUILDING
	WASTE MANAGEMENT BOUNDARY

COMMONWEALTH OF VIRGINIA
Robert E. Dick
Lic. No. 024815
10/29/21
PROFESSIONAL ENGINEER

NO.	REVISION	DATE
1	ACCESS RISER	8/6/21
2	POST-BID MODIFICATION	11/15/21

SHEET TITLE: STAGE 2 PROPOSED LFG SYSTEM LAYOUT

PROJECT TITLE: LFG AND DEWATERING SYSTEM IMPROVEMENT PROJECT

CLIENT: CITY OF BRISTOL INTEGRATED WASTE MANAGEMENT FACILITY
2125 SHAKESVILLE RD
BRISTOL, VA 24201

SCS ENGINEERS
STEARNS, CONRAD AND SCHMIDT CONSULTING ENGINEERS, INC.
15521 MIDLOTHIAN TNPK - MIDLOTHIAN, VA 23113
PH. (804) 378-7440 FAX. (804) 378-7433

PROJ. NO. 02218208.03 | DWN. BY: SRM | Q/A RVW BY: RED
DSN. BY: DBK/SRM | CHK. BY: DBK | APP. BY: RED

CADD FILE: LAYOUT
DATE: 10/2021
SCALE: 1" = 100'
DRAWING NO. 3 of 6

Bristol LFG System Improvements - 2021
Gas Well & Pump Installation Table - 12/20/21

Well Numbers	Well Depth Drilled (below GS)	Total Casing Length (incl. stick-up)	Casing Material	Depth measured inside well casing (below TOC)	Filled-in Thickness (ft)	Measured Water Level (below TOC)	Water Column Thickenss (ft)	Pump Depth
GW-49	110	110	STEEL	100	10	43	57	90
GW-50	96	105	PVC	93	12	36	57	83
GW-51	114	120	CPVC	105	15	39	66	95
GW-52	109	120	CPVC	103	17	45	58	93
GW-53	91	100	CPVC	38	62	NA	0	no pump
GW-54	91	100	CPVC	85	15	32	53	75
GW-55	104	110	STEEL	90	20	33	57	80
GW-56	109	120	PVC	58	62	NA	0	no pump
GW-57	103	110	CPVC	100	10	43	57	90
GW-58	92	100	PVC	92	8	29	63	82
GW-59	72	80	PVC	74	6	36	38	64
GW-60	120	130	CPVC	98	32	43	55	88
GW-61	105	115	CPVC	102	13	37	65	92
GW-62	120	130	CPVC	83	47	NA	0	no pump
GW-63	117	127	CPVC	64	63	NA	0	no pump
GW-64	120	130	PVC	123	7	85	38	113
GW-65	100	110	PVC	44	66	NA	0	no pump
GW-66	102	110	STEEL	33	77	32	1	no pump
GW-67	100	110	STEEL	104	6	42	62	94
GW-68	75	85	PVC	78	7	36	42	68
GW-32R	120	130	CPVC	126	4	117	9	no pump

Note: Measurements taken by SCS Field Services during LFG System Connections Construction