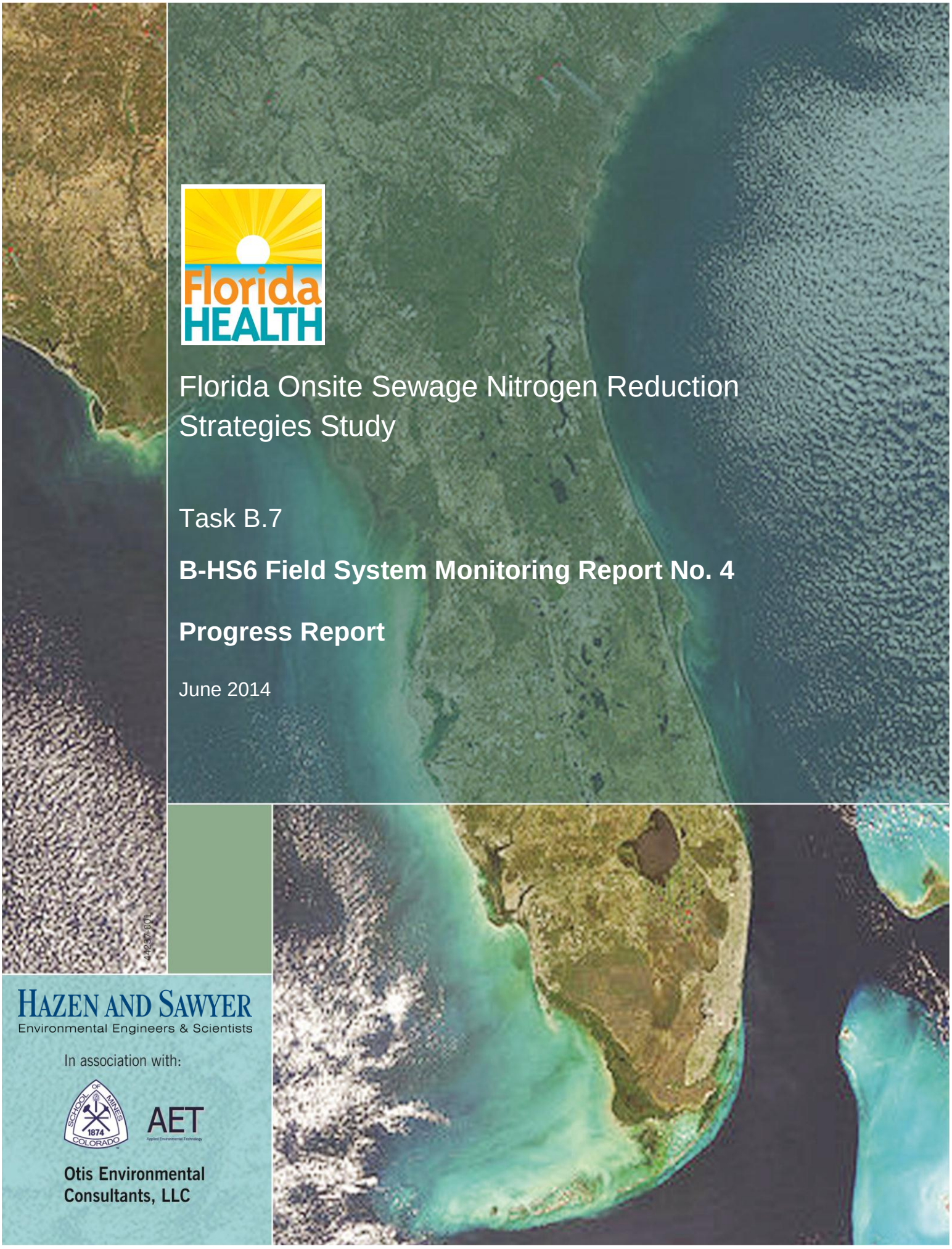

Florida HEALTH

Florida Onsite Sewage Nitrogen Reduction Strategies Study

Task B.7

B-HS6 Field System Monitoring Report No. 4

Progress Report

June 2014

4423-001

HAZEN AND SAWYER
Environmental Engineers & Scientists

In association with:

SCHOOL OF MINES 1874 COLORADO

AET
Applied Environmental Technology

Otis Environmental Consultants, LLC

Florida Onsite Sewage Nitrogen Reduction Strategies Study

TASK B.7
PROGRESS REPORT

B-HS6 Field System
Monitoring Report No. 4

Prepared for:

Florida Department of Health
Division of Disease Control and Health Protection
Bureau of Environmental Health
Onsite Sewage Programs
4042 Bald Cypress Way Bin #A-08
Tallahassee, FL 32399-1713

FDOH Contract CORCL

June 2014

Prepared by:

HAZEN AND SAWYER
Environmental Engineers & Scientists

In Association With:

AET
Applied Environmental Technology

B-HS6 Field System
Monitoring Report No. 4

1.0 Background

Task B of the Florida Onsite Sewage Nitrogen Reduction Strategies Study (FOSNRS) includes performing field experiments to critically evaluate the performance of nitrogen removal technologies that were identified in FOSNRS Task A.9 and pilot tested in PNRS II. To meet this objective, full scale treatment systems are being installed at various residential sites in Florida and monitored over an extended timeframe under actual onsite conditions. The Task B Quality Assurance Project Plan (Task B.5) documents the objectives, monitoring framework, sample frequency and duration, and analytical methods to be used at the home sites. This report documents the fourth sample event of the passive nitrogen reduction system at home site B-HS6 in Wakulla County, Florida.

2.0 Purpose

This monitoring report documents data collected from the fourth B-HS6 monitoring and sampling event conducted on May 7, 2014 (Experimental Day 174). This monitoring event consisted of collecting flow measurements from the household water use meter, treatment system flow meters, recording electricity use, monitoring of field parameters, collection of water samples from seven points in the treatment system, and chemical analyses of water samples by a NELAC certified laboratory.

3.0 Materials and Methods

3.1 Project Site

The B-HS6 field site is located in Wakulla County, FL. The nitrogen reducing onsite treatment system for the single family residence was installed in November 2013. Operation commenced on November 14, 2013. Design and construction details were presented previously in the Task B.6 document. Figure 1 is a system schematic showing the system components and layout of the installation. A flow schematic of the system is shown in Figure 2. The new system replaced the previously installed PNRS system installed at field site B-HS1. The previously installed Aerocell™ unsaturated media filter chamber, Nitrex™ media and split recirculation device were removed from the system.

The existing 1,500 gallon dual chamber septic tank will continue to provide primary treatment for the new PNRS system. However, the effluent screen was moved to the outlet and a vented tee was installed between the chambers per 64E-6.013(2)(h). The existing pump and floats were moved from the second chamber of the primary tank into a new 275 gallon pump tank. A 1,650 gallon concrete combined Stage 1 and Stage 2a media biofilter was installed. The existing 1,500 gallon concrete single chamber tank which contained the Nitrex™ media was converted to a Stage 2b saturated sulfur media biofilter. The denitrified treated effluent is discharged into the soil via the existing drain-field (standard trenches).

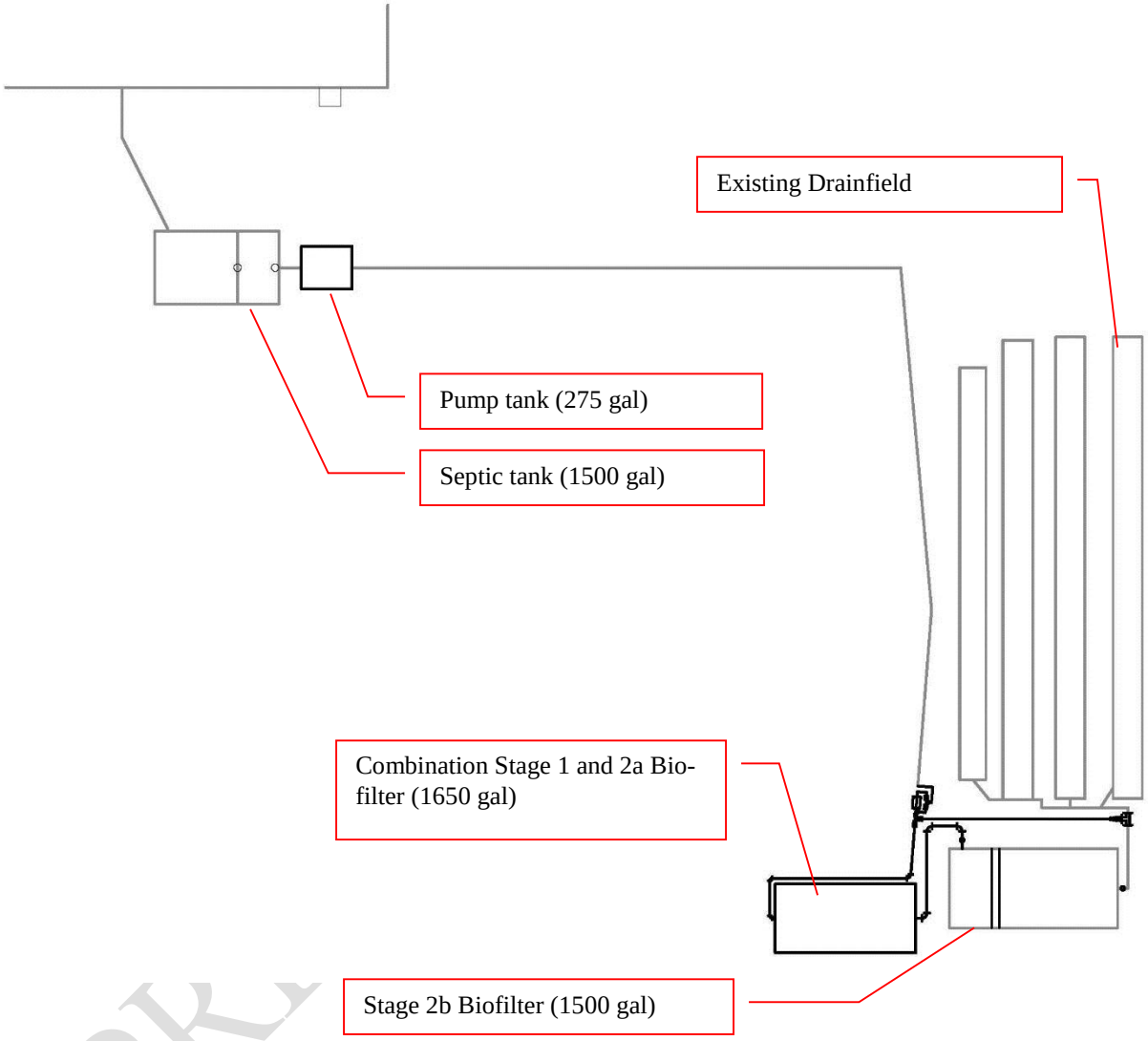

Figure 1
Plan view of B-HS6 system layout installed in Wakulla County

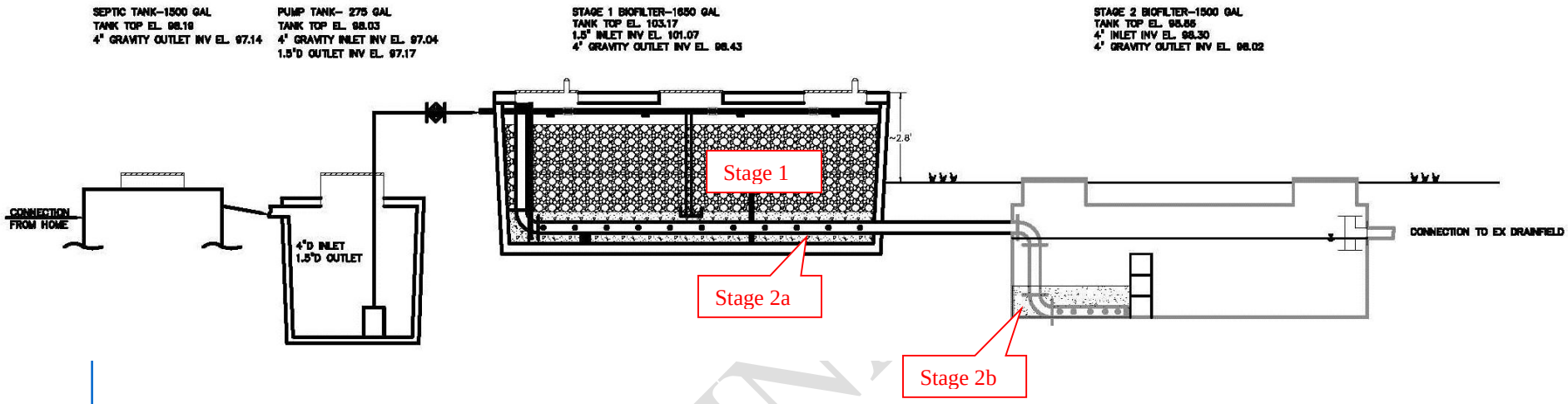

Figure 2
Flow Schematic of B-HS6 PNRS installed in Wakulla County

3.2 Monitoring and Sample Locations and Identification

Seven of the eight monitoring points shown in Figure 3 were sampled for this sample event. Monitoring point B-HS6-ST2-T was not sampled as the water quality was very similar to the adjacent monitoring point B-HS6-ST-P. Household wastewater enters the 1st chamber of the primary tank and exits the second chamber as septic tank effluent through an effluent screen into the pump tank (which contains the pump and float switches). The first monitoring point, B-HS6-STE, is the effluent sampled from a sample port on the pump discharge line (Figure 4), which is referred to as primary effluent or septic tank effluent (STE). Samples from monitoring point B-HS6-STE are representative of the whole household wastewater and represent the influent to the remainder of the onsite nitrogen reduction system.

.

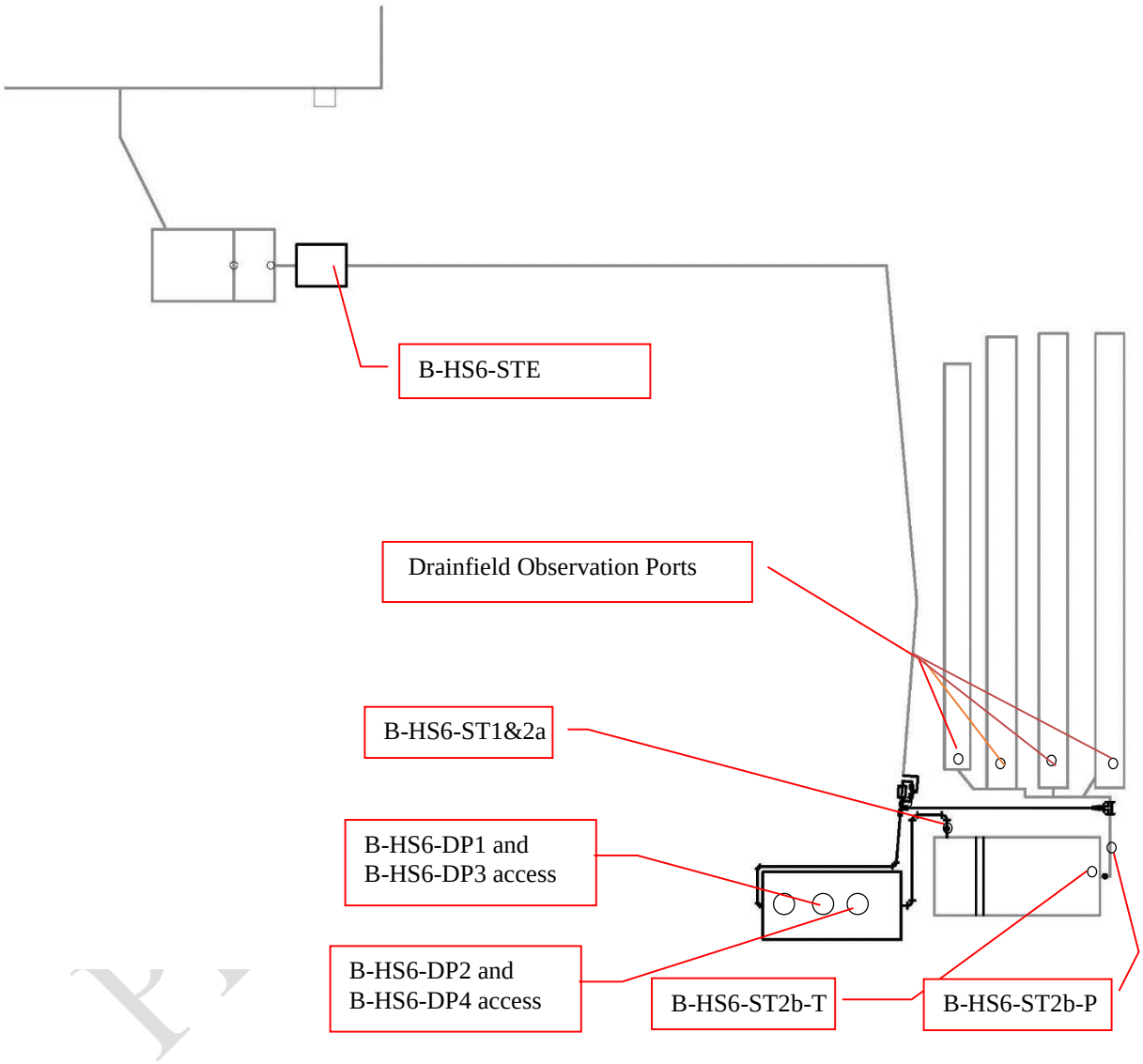

Figure 3
B-HS6 Treatment System Sampling and Monitoring Locations

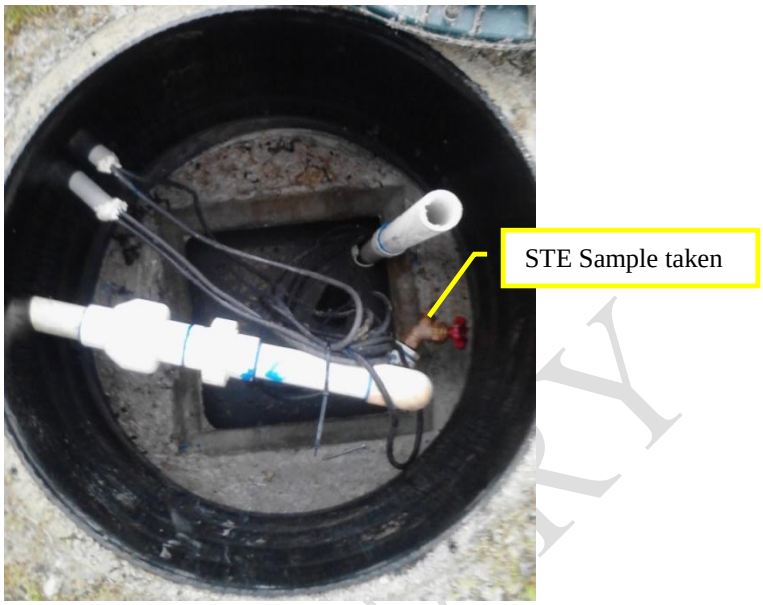

Figure 4
Primary Effluent (B-HS6-STE sample)

The pump tank contents are discharged to the top of the Stage 1 biofilter through three Orenco™ spin nozzles. The four spray nozzles that were originally installed were replaced with the three spin nozzles sprayers on March 20, 2014. In the Stage 1 biofilter, wastewater percolates downward through the unsaturated expanded clay media where nitrification occurs. The Stage 1 biofilter contains 30 inches of coarse expanded clay media (Riverlite™ 1/4; 1.1 to 4.8 mm). Two shallow pans, each containing a drive point sampler, were installed underneath the expanded clay layer and on top of the Stage 2a lignocellulosic media (see Figure 5). The second and third sampling points (B-HS6-DP1 and B-HS6-DP2) are sampled by connecting a peristaltic pump to the drivepoint tubing, representing the Stage 1 biofilter effluent.

Figure 5
Stage 1 Unsaturated Biofilter Effluent (B-HS6-DP1 and B-HS6-DP2 sample)

Twelve inches of lignocellulosic media, a blended waste wood from AAA Tree Experts, Tallahassee, FL, was installed underneath the expanded clay media as a supplemental carbon source for denitrification. The combination Stage 1&2a tank outlet pipe invert was installed 4-inches above the interior bottom of the tank. Therefore, approximately 4-inches of the lignocellulosic media is saturated, promoting oxygen depletion and denitrification of the nitrified effluent. Two additional stainless steel drive points were installed at the bottom of the Stage 2a saturated lignocellulosic media (see Figure 6). The fourth and fifth sampling points (B-HS6-DP3 and B-HS6-DP4) are sampled by connecting a peristaltic pump to the drivepoint tubing, representing the Stage 2a saturated biofilter effluent.

Figure 6
Stage 2a Saturated Biofilter Effluent (B-HS6-DP3 and B-HS6-DP4) sample tubing

The tubing for sample points B-HS6-DP1 and B-HS6-DP3 are accessed via the middle tank cover (Figure 7), and B-HS6-DP2 and B-HS6-DP4 are accessed through the tank cover on the outlet side of the tank.

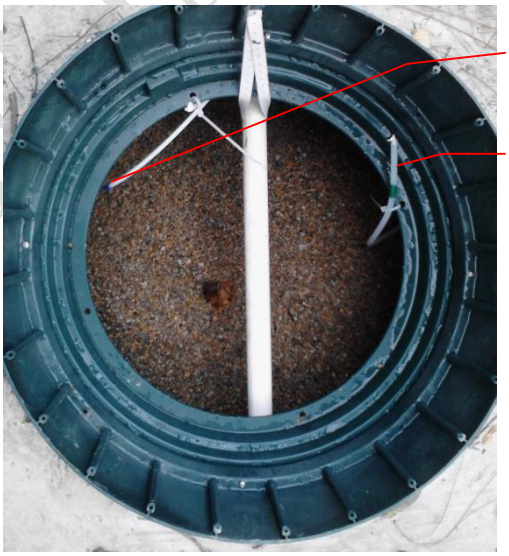

Figure 7
Drivepoint tubing access (B-HS6-DP1 and B-HS6-DP3 sample)

The effluent from the Stage 1&2a biofilter flows into the Stage 2b biofilter by gravity. The sixth sampling point (B-HS6-ST1&2a) is taken from a sample port in the gravity pipe connecting the Stage 1&2a biofilter outlet to the Stage 2b biofilter inlet representing the Stage 1&2a biofilter effluent (see Figure 8).

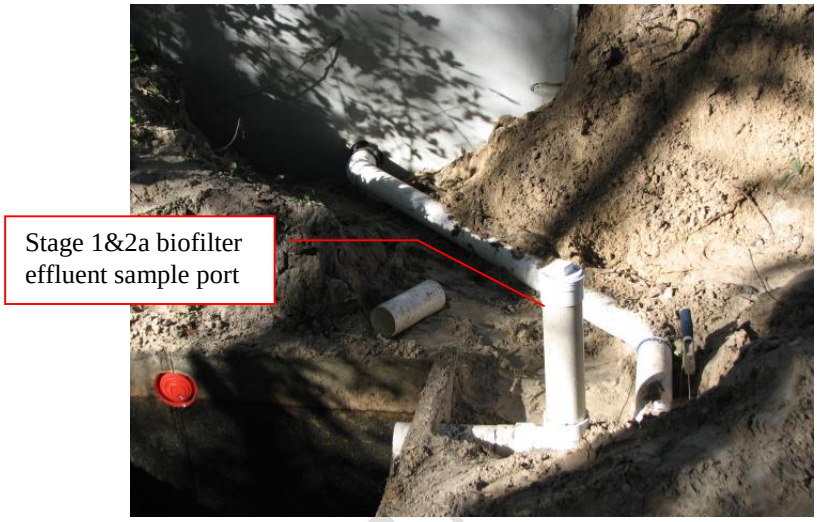

Figure 8
Stage 1&2a Biofilter Effluent Sample Port (B-HS6-ST1&2a sample)

Effluent from the Stage 1&2a biofilter enters the saturated denitrification (Stage 2b) biofilter at the bottom of the tank through a 4-inch diameter perforated pipe, flows upward through the 12-inches of elemental sulfur and oyster shell media mixture, and moves laterally over a concrete block wall to the second chamber. The Stage 2b biofilter effluent discharges near the top of the tank; therefore denitrification occurs in the saturated environment. The seventh primary sampling point, (B-HS6-ST2b-T) is the second chamber of the Stage 2 biofilter effluent which is sampled approximately 1 foot below the surface of the effluent baffle tee. This sample location is after passage through the sulfur media; it is the final effluent from the treatment system prior to being discharged to the soil infiltration system, or drainfield (Figure 9).

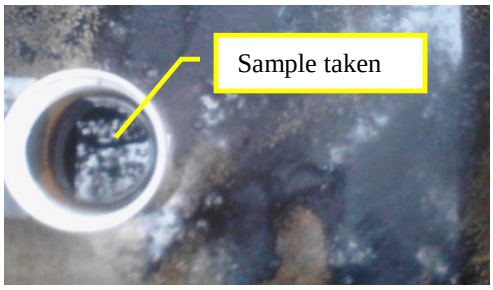

Figure 9
Stage 2b Biofilter Effluent (B-HS6-ST2b-T sample)

The eighth sampling point (B-HS6-ST2b-P) is taken from a sample port in the gravity pipe connecting the Stage 2b biofilter outlet to the drainfield inlet also representing the treated effluent (Figure 10).

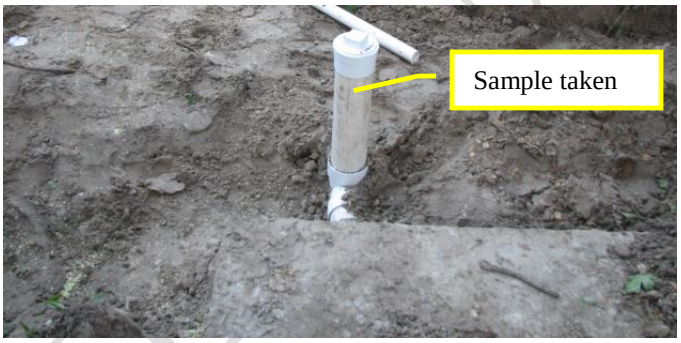

Figure 10
Stage 2b Biofilter Effluent (B-HS6-ST2b-P sample)

Treated effluent is discharged to a soil dispersal system (drainfield) consisting of four Infiltrator trenches. Three of the four Infiltrator trenches are 40 feet in length, and the fourth is 36 feet. A flow schematic of the system is depicted in Figure 2.

3.3 Operational Monitoring

Start-up of the system occurred on November 14, 2013 (Experimental Day 0). The PNRS system has operated continually since that date. For this fourth formal sampling event, the water meter for the house and treatment system flow meters were read and recorded on June 23, 2014 (Experimental Day 221). The household water meter is located on the potable water line from the onsite well prior to entering the household plumbing. The water meter does not include the irrigation water use. Therefore, the water meter reading should be indicative of the wastewater flow to the system.

The PNRS treatment system flow meter (Figure 11) is located on the pump tank discharge line and records the cumulative flow in gallons pumped from the pump chamber to the combined Stage 1&2a biofilter. The control panel includes telemetry where reports are generated regarding alarms, pump cycles, and other information using a Vericomm control panel system.

Figure 11
Treatment system flow meter

3.4 Energy Consumption

Energy consumption was monitored using an electrical meter installed between the main power box for the house and the control panel. The electrical meter records the cumulative power usage of the system in kilowatt-hours. The power usage of the system is primarily due to the single lift station pump installed within the pump tank, although a small amount of power is used by the control panel itself. There are no chemicals added to the system. However, the Stage 2 biofilter media (lignocellulosic and sulfur) are "reactive" media which will be consumed during operation. The Stage 1&2a biofilter was ini-

tially filled with 12 inches of lignocellulosic media. The Stage 2b biofilter was filled with 12 inches of sulfur and oyster shell mixture media, which ostensibly will last for many years without replenishment or replacement.

3.5 Water Quality Sample Collection and Analyses

The fourth formal sample event (Sample Event No. 4), which is the subject of this report, was conducted on June 23, 2014 (Experimental Day 221). A full suite of influent, intermediate and effluent water quality samples were collected from the system for water quality analysis. Samples were collected at seven monitoring points described in Section 3.2: B-HS6-STE, B-HS6-DP1, B-HS6-DP2, B-HS6-DP3, B-HS6-DP4, B-HS6-ST1&2a, B-HS6-ST2b-P. A duplicate sample was also taken at B-HS6-ST1&2a. A peristaltic pump was used to collect samples and route them directly into analysis-specific containers after sufficient flushing of the tubing had occurred. Field parameters were then recorded. For sample B-HS6-STE, the system pump was briefly turned on to collect sample from the spigot.

The analysis-specific containers were supplied by the analytical laboratory and contained appropriate preservatives. The analysis-specific containers were labeled, placed in coolers and transported on ice to the analytical laboratories. Each sample container was secured in packing material as appropriate to prevent damage and spills, and was recorded on chain-of-custody forms supplied by the laboratory. Chain of custody forms, provided in Appendix A, were used to document the transfer of samples from field personnel to the analytical laboratory.

Field parameters were measured using portable electronic probes and included temperature (Temp), dissolved oxygen (DO), oxidation-reduction potential (ORP), pH, and specific conductance. Field parameters were measured directly in the tank/port for the B-HS6-STE, B-HS6-ST1, and B-HS6-ST2-P samples. Due to the design of the probe, ORP was measured in a container overflowing with sample water. All field parameters were measured in an overflowing container for samples B-HS6-DP3 and B-HS6-DP4. Due to low sample volume, no field parameters were taken during sampling of B-HS6-DP1 and B-HS6-DP2.

The influent, intermediate, and effluent samples were analyzed by the laboratory for: total alkalinity, chemical oxygen demand (COD), total Kjeldahl nitrogen (TKN-N), ammonia nitrogen (NH_3-N), nitrate nitrogen (NO_3-N), nitrite nitrogen (NO_2-N), total phosphorus (TP), orthophosphate (Ortho P), total suspended solids (TSS), volatile suspended solids (VSS), total organic carbon (TOC), fecal coliform (fecal), and E. coli. The influent and sulfur media samples included sulfate, sulfide, and hydrogen sulfide (unionized). Due to sample size, B-HS6-DP1 and B-HS6-DP2 were only analyzed for the nitrogen

species and $CBOD_5$. All analyses were performed by independent and fully NELAC certified analytical laboratories (Southern Analytical Laboratory and Ackuritlabs, Inc.). Table 1 lists the analytical parameters, analytical methods, and detection limits for laboratory analyses.

Table 1
Analytical Parameters, Method of Analysis, and Detection Limits

Analytical Parameter	Method of Analysis	Method Detection Limit (mg/L)
Total Alkalinity as $CaCO_3$	SM 2320B	2 mg/L
Chemical Oxygen Demand (COD)	EPA 410.4	10 mg/L
Total Kjeldahl Nitrogen (TKN-N)	EPA 351.2	0.05 mg/L
Ammonia Nitrogen (NH_3-N)	EPA 350.1	0.005 mg/L
Nitrate Nitrogen (NO_3-N)	EPA 300.0	0.01 mg/L
Nitrite Nitrogen (NO_2-N)	EPA 300.0	0.01 mg/L
Nitrate+Nitrite Nitrogen (NOX-N)	EPA 300.0	0.02 mg/L
Total Phosphorus (TP)	SM 4500P-E	0.01 mg/L
Orthophosphate as P (Ortho P)	EPA 300.0	0.01 mg/L
Carbonaceous Biological Oxygen Demand ($CBOD_5$)	SM5210B	2 mg/L
Total Solids (TS)	EPA 160.3	.01 % by wt
Total Suspended Solids (TSS)	SM 2540D	1 mg/L
Volatile Suspended Solids (VSS)	EPA 160.4	1 mg/L
Total Organic Carbon (TOC)	SM5310B	0.06 mg/L
Sulfate	EPA 300.0	2.0 mg/L
Sulfide	SM 4500SF	0.10 mg/L
Hydrogen Sulfide (unionized)	SM 4550SF	0.01 mg/L
Fecal Coliform (fecal)	SM9222D	1 ct/100mL
E.coli	EPA1603	2 ct/100mL

4.0 Results and Discussion

4.1 Operational Monitoring

Table 2 provides a summary of the household water use since the new treatment system installation on November 6, 2013. The treatment system flow meter readings for the B-HS6 field site are summarized in Table 2. The operation and maintenance log which includes actions taken since start-up is provided in Appendix B. Summary tables of the Vericomm PLC recorded data are provided in Appendix C. These include daily and cumulative pump runtime and system alarms that are used to check general pump operation and performance.

Table 2
Summary of Flowmeters

Date and Time Read	Household Water Meter Reading	Average Daily Household Flow between readings	PNRS Flow Meter Reading	Average Daily PNRS Flow between readings
	Cumulative Volume (gallons)	gallons/ day	Cumulative Volume (gallons)	gallons/ day
11/6/2013 12:15	99,030.4	Installed	1,027,435.3	Installed
11/14/2013 12:30	100,113.9	135.3	1,027,435.3	0.0
11/20/2013 8:04	100,925.7	139.6	1,028,375.4	161.7
12/4/2013 7:52	102,616.8	120.9	1,030,645.4	162.3
12/20/2013 12:46	104,570.6	120.6	1,033,374.2	168.4
1/9/2014 11:49	107,163.1	129.9	1,036,306.1	146.9
1/22/2014 8:55	109,061.5	147.4	1,038,248.5	150.8
3/7/2014 10:30	115,093.0	136.9	1,045,302.0	160.1
3/20/2014 11:45	116,543.0	111.1	1,047,111.1	138.6
3/24/2014 10:50	116,979.0	110.1	1,047,597.8	122.9
4/10/2014 9:29	118,873.3	111.8	1,050,015.7	142.7
4/14/2014 19:15	119,370.5	112.8	1,050,622.9	137.8
4/16/2014 14:29	119,594.6	124.4	1,050,904.4	156.3
4/28/2014 12:47	120,956.3	114.1	1,052,696.0	150.2
5/7/2014 9:33	122,109.1	130.0	1,054,174.5	166.8
5/27/2014 12:26	124,623.2	125.0	1,057,401.8	160.4
5/30/2014 9:45	124,853.9	79.9	1,057,698.3	102.6
6/23/2014 9:00	127,482.8	109.7	1,060,658.0	123.5
Average since start-up to June 23, 2014		123.9		150.4

On November 14, 2014, an alarm indicated a pump failure and upon inspection loose wiring was discovered and repaired. PNRS flow readings indicated that the pump had not run since installation until the time the wiring was repaired, therefore the official start-up of the PNRS system was November 14, 2014. From system installation through June 23, 2014, the household water use average was 123.8 gallons per day with periods of higher and lower flows (Table 2). The average pumped flow to the PNRS was 150.4 gallons per day from start-up through June 23, 2014.

While purging the Stage 1 effluent drive points DP1 and DP2 during Sample Event No. 2, it was observed that the water level in the Stage 1&2a tank was elevated above the pans holding the drive points. The water level in the Stage 1&2a tank was found to be elevated approximately 10-inches during this sample event. This water level would saturate all 12-inches of the lignocellulosic media and approximately 2-inches of the expand-

ed clay media. The elevated water level could quite possibly have affected the performance of the system. A piezometer was installed within the Stage 1&2a tank on April 10, 2014 to allow for observation of the water level (Figure 12).

Figure 12
Piezometer installed on April 19, 2014 in the Stage 1&2a Tank

Table 3 summarizes the water level readings recorded. On April 14, 2014, it was determined the clog in the system was in the inlet pipe on the Stage 2b sulfur tank. An unsuccessful attempt was made with a plumbing snake to clear the clog. On April 16, 2014, the clog was cleared using compressed air and a 4-inch rubber bladder; the normal operational water level was restored in the Stage 1&2a tank. During Sample Event No. 3, the water level in the Stage 1&2a tank was at normal operational levels. A system check on May 27, 2014 indicated that the water level was elevated approximately 8 inches. A repair on the inlet pipe to the Stage 2 sulfur tank was completed on May 31, 2014. The water level in the Stage 1&2a tank was at normal operational levels during Sample Event No. 4, the subject of this report.

Table 3
Summary of Stage 1&2a Water Level

Date and Time Read	Water level In Stage1&2a PZ from TOC	Water Elev	Water level above bottom of tank[1]	Water level above outlet invert
	(ft)	(ft)	(in)	(in)
4/14/2014 19:20	3.74	99.57	17.63	13.63
4/14/2014 19:35	3.75	99.56	17.51	13.51
4/16/2014 14:35	3.77	99.54	17.27	13.27
4/16/2014 16:16	4.76	98.55	5.39	1.39
4/16/2014 16:25	4.79	98.52	5.03	1.03
4/16/2014 16:49	4.81	98.50	4.79	0.79
5/6/2014 9:35	4.71	98.60	5.99	1.99
5/6/2014 9:58	4.66	98.65	6.59	2.59
5/7/2014 9:39	4.68	98.63	6.35	2.35
5/7/2014 10:51	4.70	98.61	6.11	2.11
5/27/2014 12:00	4.02	99.29	14.27	10.27
5/30/2014 9:51	4.09	99.22	13.43	9.43
5/30/2014 15:10	4.79	98.52	5.03	1.03
5/31/2014 19:03	4.79	98.52	5.03	1.03
6/23/2014 9:06	4.61	98.70	7.19	3.19
6/23/2014 12:25	4.52	98.79	8.27	4.27

[1]Stage 1&2a tank interior bottom elev = 98.10 ft

4.2 Energy Consumption

Energy consumption is monitored using an electrical meter installed between the main power box for the house and the control panel to record cumulative power usage of the pump in kilowatt-hours. The recorded electrical use for the system is summarized in Table 4.

Table 4
Summary of System Electrical Use

Date and Time Read	Electrical Meter Reading	Average Daily Electrical Use	Average Electrical Use per Gallon Treated	Average Electrical Use per 1,000 Gallons Treated
	Cumulative (kWh)	(kWh/day)	(kWh/gal)	(kWh/ 1,000 gal)
11/6/2013 12:22	2,749	0.00		
11/14/2013 12:32	2,749	0.00		
11/20/2013 8:08	2,751	0.34	0.0021	2.127
12/4/2013 7:54	2,757	0.43	0.0026	2.643
12/20/2013 12:48	2,764	0.43	0.0026	2.565
1/9/2014 11:53	2,772	0.40	0.0027	2.729
1/22/2014 8:57	2,777	0.39	0.0026	2.574
3/7/2014 10:32	2,797	0.45	0.0028	2.836
3/20/14 11:47	2,802	0.38	0.0028	2.764
3/24/2014 10:51	2,803	0.25	0.0021	2.054
4/10/2014 9:32	2,811	0.47	0.0033	3.309
4/14/2014 19:17	2,813	0.45	0.0033	3.293
4/16/2014 14:31	2,814	0.56	0.0036	3.552
4/28/2014 12:48	2,820	0.50	0.0033	3.349
5/7/2014 9:34	2,825	0.99	0.0034	3.382
5/27/2014 12:27	2,835	0.50	0.0031	3.099
5/30/2014 9:47	2,836	0.35	0.0034	3.373
6/23/2014 9:01	2,846	0.42	0.0034	3.379
Total average start-up to 6/23/2014		0.44	0.0029	2.920

The total average electrical use through June 23, 2014 was 0.44 kWh per day. The average electrical use per 1,000 gallons treated was 2.92 kWh per 1,000 gallons treated, and this parameter has been fairly stable since start-up.

4.3 Water Quality

As discussed in the Sample Event No. 1 (SE1) report, the preliminary sampling results indicated that ammonia reduction through the Stage 1 biofilter was limited. During preliminary sampling, it was observed that the sprayers were not spraying uniformly over the Stage 1 media surface. Therefore on December 21, 2013, the sprayers were rotated to spray up on the tank lid rather than straight down for better distribution over the media surface. The results from the SE1 DP1 and DP2 samples indicated significant nitrification was occurring with this sprayer set-up; however, the long-term operation and maintenance of the sprayers in this set-up was a concern. Therefore, on March 20, 2014, the four originally installed spray nozzles were replaced by three Orenco™ spin nozzles positioned under the tank lids allowing for easy maintenance and maximum spray coverage.

Water quality results for the fourth full sampling event (Sample Event No. 4) are listed in Table 5. Nitrogen results are graphically displayed in Figure 13. The laboratory report containing the raw analytical data is included in Appendix A. The following discussion summarizes the water quality analytical results for Sample Event No. 4. The performance of the various system components was compared by considering the changes through treatment of nitrogen species (TKN, NH_3-N, and NO_X-N), as well as supporting water quality parameters.

$CBOD_5$ mg/L	61	5	2	33	26	16	5
TKN mg N/L	7.4[1]	3.2	7.4	3.8	3.0	9.9	5.9
NH_3 mg N/L	95	3.1	5.6	2.0	0.4	8.7	4.9
NO_x mg N/L	0.02	0.11[2]	0.02[2]	1.8	0.8	0.94	0.02
TN mg N/L	95[1]	3.2[2]	5.6[2]	5.6	3.8	10.8	5.9
Sulfate mg/L	6.9	NA	NA	NA	3.5	15	140
Fecal Coliform (Ct/100mL)	600,000	NA	NA	NA	NA	10,000	1,000

NA = not analyzed

[1]TKN-N value is likely an analytical error and has been requested to be re-run by the laboratory. This may also affect the Total Nitrogen concentration, which is calculated.

[2]NO_3-N value is likely an analytical error and has been requested to be re-run by the laboratory. This may also affect the Total Nitrogen concentration, which is calculated.

Figure 13
Graphical Representation of Nitrogen Results
Sample Event 4 June 23, 2014 (Experimental Day 221)

Septic Tank Effluent (STE) Quality: The water quality characteristics of STE collected in Sample Event 4 were within the typical range generally expected for domestic STE. The measured NH_3-N concentration for this sample event was 95 mg-N/L, which is in the upper end of the range typically seen for this household.

Stage 1 Unsaturated Effluent (DP1 and DP2): Stage 1 effluent (DP1 and DP2) NO_x-N concentration were 0.11 and below the method detection limit of 0.02 mg/L for samples DP1 and DP2, respectively. This is likely an analytical error and has been requested to be re-run by the laboratory. The TKN and NH_3-N concentrations in sample DP1 were lower, 3.2 mg/L and 3.1 mg/L, than in the DP2 sample 7.4 mg/L and 5.6 mg/L, respectively. The low NH_3-N concentrations indicate approximately 94% reduction from STE NH_3-N concentrations.

Stage 2a Saturated Effluent (DP3 and DP4): Stage 2a saturated effluent is collected from two drive points (DP3 and DP4) located on the bottom of the Stage 1&2a combination tank. DP3 and DP4 saturated effluent TKN concentrations were similar from both drive points, 3.8 mg/L and 3.0 mg/L as were the NH_3-N concentrations of 2.0 mg/L and 0.38 mg/L, respectively. DP3 and DP4 NO_x-N concentrations were 1.8 mg/L and 0.83 mg/L, respectively, and were accompanied by a measured 0.3 and 0.16 mg/L DO and

-184 and -176 mV ORP, respectively. The TN concentrations in samples DP3 (5.6 mg/L) and DP4 (3.8 mg/L) indicate that the Stage 1&2a combination tank is effectively reducing nitrogen. The $CBOD_5$ concentrations were 33 mg/L and 26 mg/L, respectively.

Stage 1&2a Tank Effluent (ST1&2a): The sample port between the Stage 1&2a combination tank and the Stage 2b sulfur tank represents the influent to the Stage 2b biofilter. The Stage 1&2a sample port effluent TKN was 9.9 mg/L of which 8.7 mg/L was NH_3-N. The NO_x-N concentration was 0.94 mg/L was accompanied by a measured 0.21 mg/L DO and -109 mV ORP. The Stage 1&2a effluent TSS concentration was 5 mg/L and $CBOD_5$ was 16 mg/L. The ST1&2a NH_3-N concentration indicates approximately 91% reduction from STE NH_3-N concentrations.

As discussed above, the samples from inside the Stage 1&2a tank (DP3 and DP4) had different water quality characteristics as compared to the effluent from the outlet sample port (ST1&2a). The ST1&2a sample TKN and NH_3-N concentrations were higher than the 2a tank samples. These results suggest that the water at the bottom of the tank is different than what is actually entering the exit pipe of the tank.

Stage 2b Tank Effluent (ST2b): In Sample Events SE1 and SE2 the monitoring points, B-HS6-ST2-T and B-HS6-ST2-P had nearly identical nitrogen concentrations. For this sample event, B-HS6-ST2-T was not sampled. B-HS6-ST2-P was chosen as the preferred sample point as it is located in the pipe leading from the PNRS system to the drainfield.

Effluent NO_x-N from the Stage 2b biofilter was below the detection limit of 0.02 mg/L. The low NO_x-N was accompanied by a measured DO of 0.34 mg/L DO and -186 mV ORP. The Stage 2b biofilter produced a highly reducing environment and achieved complete NO_x-N reduction. However, the only partially successful NH_3-N reduction through the Stage 1 biofilter, was evidenced in the Stage 2 effluent NH_3-N concentration of 4.9 mg/L and TKN of 5.9 mg/L. Final total nitrogen (TN) in the treatment system effluent was 5.9 mg/L. The Stage 2b effluent sulfate concentration was 140 mg/L.

Table 5
Water Quality Analytical Results

Sample ID	Sample Date/Time	Temp (°C)	pH	Total Alkalinity (mg/L)	DO (mg/L)	ORP (mV)	Specific Conductance (µS)	TSS (mg/L)	VSS (mg/L)	$CBOD_5$ (mg/L)	COD (mg/L)	TN (mg/L N)[1]	TKN (mg/L N)	Organic N (mg/L N)[2]	NH_3-N (mg/L N)	NO_3-N (mg/L N)	NO_2-N (mg/L N)	NOx (mg/L N)	TIN (mg/L N)[3]	TP (mg/L)	Ortho P (mg/L P)	Sulfate (mg/L)	H_2S (mg/L)	Sulfide (mg/L)	Fecal (Ct/100 mL)	E-coli (Ct/100 mL)
BHS6-STE	6/23/14 10:48	24.2	7.13	530	0.23	-245	1278	16	15	61	200	95.0	7.4	-87.6	95	0.01	0.01	0.02	95.02	6.3	6.3	6.9	2.2	4.9	600,000	580,000
BHS6-DP01	6/23/14 11:56									5		3.3	3.2	0.1	3.1		0.11	0.11	3.21							
BHS6-DP02	6/23/14 12:12									2		7.4	7.4	1.8	5.6		0.01	0.02	5.62							
BHS6-DP03	6/23/14 11:26	25.3	6.36	360	0.3	-184	898	4	3	33		5.6	3.8	1.8	2.0	1.8		1.8	3.8							
BHS6-DP04	6/23/14 11:38	25.5	6.39	400	0.16	-176	930	9	9	26	110	3.8	3.0	2.6	0.38	0.56	0.27	0.83	1.21			3.5				
BHS6-ST1&2a	6/23/14 10:44	21.1	6.25	240	0.21	-109	852	5	4	16	60	10.8	9.9	1.2	8.7		0.94	0.94	9.64	4.5	2.7	15	0.01	0.1	10,000	7,700
BHS6-ST1&2a-DUP	6/23/14 10:45	21.1	6.25	250	0.2	-109	857	2	2	18	54	11.1	10	2.2	7.8		1.1	1.1	8.9	4.5	2.5	16	0.01	0.1	9,000	7,200
BHS6-ST2b-Port	6/23/14 10:30	24.1	6.61	350	0.34	-186	1085	2	2	5	58	5.9	5.9	1.0	4.9	0.01	0.01	0.02	4.92	3.6	2.5	140	1.6	2.2	1,000	1,000
BHS6-EB	1/0/00 11:48	25.9	5.05	2.2	0.76	43	2.1	1	1	2	10	0.19	0.15	0.0	0.17	0.01	0.04	0.04	0.21	0.053	0.01	0.31	0.01	0.1	2.0	2.0

Notes:
1Total Nitrogen (TN) is a calculated value equal to the sum of TKN and NOX.
2Organic Nitrogen (ON) is a calculated value equal to the difference of TKN and NH3.
3Total Inorganic Nitrogen (TIN) is a calculated value equal to the sum of NH3 and NOX.
D.O. - Dissolved oxygen
G - Grab sample
Gray-shaded data points indicate values below method detection level (mdl), mdl value used for statistical analyses.
Yellow-shaded data points indicate the reported value is between the laboratory method detection limit and the laboratory practical quantitation limit, value used for statistical analysis.
Orange-shaded data points indicate results based upon colony counts exceeded the ideal range of 20-60 (fecal coliform) or 20-80 (E. coli) colonies per plate.
Green-shaded data points indicate sample held beyond the accepted holding time

5.0 B-HS6 Sample Event No. 4: Summary

5.1 Summary

The Sample Event No. 4 results indicate that:

- Septic tank effluent (STE) quality is characteristic of typical household STE quality, although in the upper range seen at this household. The ammonia concentration of 95 mg/L is in the upper range of values typically reported for Florida single family residence STE.

- The Stage 1 biofilter samples DP1 and DP2 showed 97% and 94% reduction in ammonium concentration, respectively; effluent in the DP1 sample contained 3.1 mg/L ammonia-N and the DP2 sample contained 5.6 mg/L ammonia-N.

- The Stage 2a biofilter lignocellulosic media produced significant denitrification with effluent NO_x-N concentration less than 2 mg/L.

- TKN and NH_3-N concentrations in Stage 2a biofilter effluent were less than 4 mg/L and less than 2 mg/L, respectively.

- The Stage 1&2a effluent sample port (ST1&2a) between the Stage 1&2a combination tank outlet and the Stage 2b sulfur tank inlet, showed 91% reduction in ammonium concentration from STE.

- The Stage 2b sulfur biofilter (ST2b) produced a highly reducing environment and effluent NO_x-N was less than the method detection limit of 0.02 mg N/L.

- The total nitrogen concentration in the final effluent from the total treatment system was 5.9 mg/L, of which 4.9 mg/L was NH_3-N, an approximately 95% reduction from STE.

Appendix A: Laboratory Report

SOUTHERN ANALYTICAL LABORATORIES, INC.
110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677 813-855-1844 FAX 813-855-2218

Hazen and Sawyer
10002 Princess Palm Ave, Suite 200
Tampa, FL 33619

July 22, 2014
Work Order: 1406489

Laboratory Report

Project Name **BHS6 SE#5**

Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description		**BHS6-STE**						
Matrix		**Wastewater**						
SAL Sample Number		**1406489-01**						
Date/Time Collected		**06/23/14 10:48**						
Collected by		**Harmon Harden**						
Date/Time Received		**06/24/14 09:25**						
Volatile Organic Compounds								
Acetone	ug/L	41 J5	EPA 8260b	4.0	2.0		07/01/14 22:33	1
Acrylonitrile	ug/L	1.3 U	EPA 8260b	4.0	1.3		07/01/14 22:33	1
Benzene	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 22:33	1
Bromobenzene	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 22:33	1
Bromochloromethane	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 22:33	1
Bromodichloromethane	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 22:33	1
Bromoform	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 22:33	1
Bromomethane	ug/L	0.4 U,J5	EPA 8260b	0.8	0.4		07/01/14 22:33	1
2-Butanone	ug/L	6.8	EPA 8260b	4.0	2.0		07/01/14 22:33	1
n-Butylbenzene	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 22:33	1
sec-Butylbenzene	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 22:33	1
t-Butylbenzene	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 22:33	1
Carbon disulfide	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 22:33	1
Carbon tetrachloride	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 22:33	1
Chlorobenzene	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 22:33	1
Chloroethane	ug/L	0.4 U,J5	EPA 8260b	1.6	0.4		07/01/14 22:33	1
Chloroform	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 22:33	1
Chloromethane	ug/L	0.4 U	EPA 8260b	1.6	0.4		07/01/14 22:33	1
1,2-Dibromoethane	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 22:33	1
1,2-Dibromo-3-chloropropane	ug/L	0.3 U	EPA 8260b	0.8	0.3		07/01/14 22:33	1
2-Chlorotoluene	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 22:33	1
2-Chloroethylvinyl Ether	ug/L	0.5 U	EPA 8260b	1.6	0.5		07/01/14 22:33	1
4-Chlorotoluene	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 22:33	1
Dibromochloromethane	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 22:33	1
Dibromomethane	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 22:33	1
1,2-Dichlorobenzene	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 22:33	1
1,3-Dichlorobenzene	ug/L	0.07 U	EPA 8260b	0.8	0.07		07/01/14 22:33	1
1,4-Dichlorobenzene	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 22:33	1
trans-1,4-Dichloro-2-butene	ug/L	0.3 U,J5	EPA 8260b	0.8	0.3		07/01/14 22:33	1
Dichlorodifluoromethane	ug/L	0.5 U	EPA 8260b	1.6	0.5		07/01/14 22:33	1
1,1-Dichloroethane	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 22:33	1
1,2-Dichloroethane	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 22:33	1
1,1-Dichloroethene	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 22:33	1
cis-1,2-Dichloroethene	ug/L	0.09 U	EPA 8260b	0.8	0.09		07/01/14 22:33	1
trans-1,2-Dichloroethene	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 22:33	1
1,2-Dichloropropane	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 22:33	1
2,2-Dichloropropane	ug/L	0.3 U	EPA 8260b	0.8	0.3		07/01/14 22:33	1

Hazen and Sawyer
10002 Princess Palm Ave, Suite 200
Tampa, FL 33619

July 22, 2014
Work Order: 1406489

Laboratory Report

Project Name **BHS6 SE#5**

Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description		**BHS6-STE**						
Matrix		**Wastewater**						
SAL Sample Number		**1406489-01**						
Date/Time Collected		**06/23/14 10:48**						
Collected by		**Harmon Harden**						
Date/Time Received		**06/24/14 09:25**						
1,1-Dichloropropene	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 22:33	1
cis-1,3-Dichloropropene	ug/L	0.2 U,J5	EPA 8260b	0.8	0.2		07/01/14 22:33	1
trans-1,3-Dichloropropene	ug/L	0.1 U,J5	EPA 8260b	0.8	0.1		07/01/14 22:33	1
Ethylbenzene	ug/L	0.08 U	EPA 8260b	0.8	0.08		07/01/14 22:33	1
Hexachlorobutadiene	ug/L	0.4 U	EPA 8260b	0.8	0.4		07/01/14 22:33	1
2-Hexanone	ug/L	2.1 U	EPA 8260b	4.0	2.1		07/01/14 22:33	1
Iodomethane	ug/L	0.2 U,J5	EPA 8260b	0.8	0.2		07/01/14 22:33	1
Isopropylbenzene	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 22:33	1
4-Isopropyltoluene	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 22:33	1
Methyl-t-butyl ether	ug/L	0.2 U	EPA 8260b	1.6	0.2		07/01/14 22:33	1
Methylene Chloride	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 22:33	1
4-Methyl-2-pentanone	ug/L	2.6 U	EPA 8260b	4.0	2.6		07/01/14 22:33	1
Naphthalene	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 22:33	1
n-Propylbenzene	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 22:33	1
Styrene	ug/L	0.05 U	EPA 8260b	0.8	0.05		07/01/14 22:33	1
1,1,1,2-Tetrachloroethane	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 22:33	1
1,1,2,2-Tetrachloroethane	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 22:33	1
Tetrachloroethene	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 22:33	1
Toluene	ug/L	5.7	EPA 8260b	0.8	0.09		07/01/14 22:33	1
1,2,3-Trichlorobenzene	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 22:33	1
1,2,4-Trichlorobenzene	ug/L	0.3 U	EPA 8260b	0.8	0.3		07/01/14 22:33	1
1,1,1-Trichloroethane	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 22:33	1
1,1,2-Trichloroethane	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 22:33	1
Trichloroethene	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 22:33	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ug/L	0.6 U	EPA 8260b**	1.6	0.6		07/01/14 22:33	1
Trichlorofluoromethane	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 22:33	1
1,2,3-Trichloropropane	ug/L	0.4 U	EPA 8260b	0.8	0.4		07/01/14 22:33	1
1,2,4-Trimethylbenzene	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 22:33	1
1,3,5-Trimethylbenzene	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 22:33	1
Vinyl chloride	ug/L	0.3 U	EPA 8260b	1.6	0.3		07/01/14 22:33	1
Xylene-m,p	ug/L	0.2 U	EPA 8260b	1.6	0.2		07/01/14 22:33	1
Xylene-o	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 22:33	1
Xylenes- Total	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 22:33	1
Total Trihalomethanes	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 22:33	1
1,4-Dioxane	ug/L	0.0	EPA 8260b**				07/01/14 22:33	1
Surrogate for EPA 8260b	*Dibromofluoromethane*		*103 %*	*Limits*	*65-135*			

Pesticide Analyses

SOUTHERN ANALYTICAL LABORATORIES, INC.
110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677 813-855-1844 FAX 813-855-2218

Hazen and Sawyer
10002 Princess Palm Ave, Suite 200
Tampa, FL 33619

July 22, 2014
Work Order: 1406489

Laboratory Report

Project Name **BHS6 SE#5**

Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description		**BHS6-STE**						
Matrix		**Wastewater**						
SAL Sample Number		**1406489-01**						
Date/Time Collected		**06/23/14 10:48**						
Collected by		**Harmon Harden**						
Date/Time Received		**06/24/14 09:25**						
1,2-Dibromo-3-chloropropane	ug/L	0.0052 U	EPA 504.1	0.021	0.0052	06/30/14 09:53	06/30/14 20:07	1
1,2-Dibromoethane	ug/L	0.0052 U	EPA 504.1	0.021	0.0052	06/30/14 09:53	06/30/14 20:07	1
Surrogate for EPA 504.1	*2-Bromo-1-chloropropane*	*115 %*	*Limits*	*70-130*				
Inorganics								
Hydrogen Sulfide (Unionized)	mg/L	2.2	SM 4550SF	0.04	0.01		06/30/14 09:29	1
Carbonaceous BOD	mg/L	61	SM 5210B	2	2	06/25/14 09:07	06/30/14 15:55	1
Chemical Oxygen Demand	mg/L	200	EPA 410.4	25	10	06/30/14 13:20	07/01/14 14:58	1
Nitrate (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		06/25/14 09:56	1
Nitrite (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		06/25/14 09:56	1
Orthophosphate as P	mg/L	6.3	EPA 300.0	0.040	0.010		06/25/14 09:56	1
Sulfate	mg/L	6.9	EPA 300.0	0.60	0.20		06/25/14 09:56	1
Sulfide	mg/L	4.9	SM 4500SF	0.40	0.10		06/30/14 09:29	1
Total Alkalinity	mg/L	530	SM 2320B	8.0	2.0		06/27/14 12:52	1
Total Suspended Solids	mg/L	16	SM 2540D	1	1	06/27/14 12:35	06/30/14 15:58	1
Volatile Suspended Solids	mg/L	15	EPA 160.4	1	1	06/27/14 12:35	06/30/14 15:58	1
Nitrate+Nitrite (N)	mg/L	0.02 U	EPA 300.0	0.08	0.02		06/25/14 09:56	1
		TestAmerica Savannah						
Nitrogen, Ammonia								
Ammonia (as N)	mg/L	95	350.1	2.5	1.3		07/15/14 10:42	50
Nitrogen, Total Kjeldahl								
Nitrogen, Kjeldahl	mg/L	7.4	351.2	2.0	1.5	07/14/14 15:00	07/18/14 18:25	10
Phosphorus, Total								
Phosphorus	mg/L	6.3	365.4	1.0	0.41	07/14/14 15:00	07/18/14 09:44	10
Sample Description		**BHS6-DP01**						
Matrix		**Wastewater**						
SAL Sample Number		**1406489-02**						
Date/Time Collected		**06/23/14 11:56**						
Collected by		**Harmon Harden**						
Date/Time Received		**06/24/14 09:25**						
Inorganics								
Carbonaceous BOD	mg/L	5	SM 5210B	2	2	06/25/14 09:07	06/30/14 15:55	1
Nitrite (as N)	mg/L	0.11	EPA 300.0	0.04	0.01		06/25/14 10:07	1
Nitrate+Nitrite (N)	mg/L	0.11	EPA 300.0	0.04	0.01		06/25/14 10:07	1
		TestAmerica Savannah						

SOUTHERN ANALYTICAL LABORATORIES, INC.
110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677 813-855-1844 FAX 813-855-2218

Hazen and Sawyer
10002 Princess Palm Ave, Suite 200
Tampa, FL 33619

July 22, 2014
Work Order: 1406489

Laboratory Report

Project Name **BHS6 SE#5**

Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description		**BHS6-DP01**						
Matrix		**Wastewater**						
SAL Sample Number		**1406489-02**						
Date/Time Collected		**06/23/14 11:56**						
Collected by		**Harmon Harden**						
Date/Time Received		**06/24/14 09:25**						
		TestAmerica Savannah						
Nitrogen, Ammonia								
Ammonia (as N)	mg/L	3.1	350.1	0.10	0.052		07/15/14 09:45	2
Nitrogen, Total Kjeldahl								
Nitrogen, Kjeldahl	mg/L	3.2	351.2	0.20	0.15	07/14/14 15:00	07/17/14 19:33	1
Sample Description		**BHS6-DP02**						
Matrix		**Wastewater**						
SAL Sample Number		**1406489-03**						
Date/Time Collected		**06/23/14 12:12**						
Collected by		**Harmon Harden**						
Date/Time Received		**06/24/14 09:25**						
Inorganics								
Carbonaceous BOD	mg/L	2 U	SM 5210B	2	2	06/25/14 09:07	06/30/14 15:55	1
Nitrite (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		06/25/14 10:18	1
Nitrate+Nitrite (N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		06/25/14 10:18	1
		TestAmerica Savannah						
Nitrogen, Ammonia								
Ammonia (as N)	mg/L	5.6	350.1	0.25	0.13		07/15/14 09:56	5
Nitrogen, Total Kjeldahl								
Nitrogen, Kjeldahl	mg/L	7.4	351.2	2.0	1.5	07/14/14 15:00	07/18/14 09:46	10
Sample Description		**BHS6-DP03**						
Matrix		**Wastewater**						
SAL Sample Number		**1406489-04**						
Date/Time Collected		**06/23/14 11:26**						
Collected by		**Harmon Harden**						
Date/Time Received		**06/24/14 09:25**						
Inorganics								
Carbonaceous BOD	mg/L	33	SM 5210B	2	2	06/25/14 09:07	06/30/14 15:55	1
Nitrate (as N)	mg/L	1.8	EPA 300.0	0.04	0.01		06/25/14 10:29	1
Total Alkalinity	mg/L	360	SM 2320B	8.0	2.0		06/27/14 13:05	1
Total Suspended Solids	mg/L	4	SM 2540D	1	1	06/27/14 12:35	06/30/14 15:58	1
Volatile Suspended Solids	mg/L	3	EPA 160.4	1	1	06/27/14 12:35	06/30/14 15:58	1
Nitrate+Nitrite (N)	mg/L	1.8	EPA 300.0	0.04	0.01		06/25/14 10:29	1

Florida Certification Number: E84129
NELAP Accredited

Francis I. Daniels, Laboratory Director
Leslie C. Boardman, Q.A. Manager

Hazen and Sawyer
10002 Princess Palm Ave, Suite 200
Tampa, FL 33619

July 22, 2014
Work Order: 1406489

Laboratory Report

Project Name **BHS6 SE#5**

Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description		**BHS6-DP03**						
Matrix		**Wastewater**						
SAL Sample Number		**1406489-04**						
Date/Time Collected		**06/23/14 11:26**						
Collected by		**Harmon Harden**						
Date/Time Received		**06/24/14 09:25**						
		TestAmerica Savannah						
Nitrogen, Ammonia								
Ammonia (as N)	mg/L	2.0	350.1	0.050	0.026		07/15/14 09:01	1
Nitrogen, Total Kjeldahl								
Nitrogen, Kjeldahl	mg/L	3.8	351.2	0.20	0.15	07/14/14 15:00	07/17/14 19:35	1
Sample Description		**BHS6-DP04**						
Matrix		**Wastewater**						
SAL Sample Number		**1406489-05**						
Date/Time Collected		**06/23/14 11:36**						
Collected by		**Harmon Harden**						
Date/Time Received		**06/24/14 09:25**						
Inorganics								
Carbonaceous BOD	mg/L	26	SM 5210B	2	2	06/25/14 09:07	06/30/14 15:55	1
Chemical Oxygen Demand	mg/L	110	EPA 410.4	25	10	06/30/14 13:20	07/01/14 14:58	1
Nitrate (as N)	mg/L	0.56	EPA 300.0	0.04	0.01		06/25/14 11:03	1
Nitrite (as N)	mg/L	0.27	EPA 300.0	0.04	0.01		06/25/14 11:03	1
Sulfate	mg/L	3.5	EPA 300.0	0.60	0.20		06/25/14 11:03	1
Total Alkalinity	mg/L	400	SM 2320B	8.0	2.0		07/05/14 15:47	1
Total Suspended Solids	mg/L	9	SM 2540D	1	1	06/27/14 12:35	06/30/14 15:58	1
Volatile Suspended Solids	mg/L	9	EPA 160.4	1	1	06/27/14 12:35	06/30/14 15:58	1
Nitrate+Nitrite (N)	mg/L	0.83	EPA 300.0	0.08	0.02		06/25/14 11:03	1
		TestAmerica Savannah						
Nitrogen, Ammonia								
Ammonia (as N)	mg/L	0.38	350.1	0.050	0.026		07/15/14 09:01	1
Nitrogen, Total Kjeldahl								
Nitrogen, Kjeldahl	mg/L	3.0	351.2	0.20	0.15	07/14/14 15:00	07/17/14 19:38	1
Sample Description		**BHS6-ST1&2a**						
Matrix		**Wastewater**						
SAL Sample Number		**1406489-06**						
Date/Time Collected		**06/23/14 11:06**						
Collected by		**Harmon Harden**						
Date/Time Received		**06/24/14 09:25**						
Inorganics								

Hazen and Sawyer
10002 Princess Palm Ave, Suite 200
Tampa, FL 33619

July 22, 2014
Work Order: 1406489

Laboratory Report

Project Name **BHS6 SE#5**

Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description		**BHS6-ST1&2a**						
Matrix		**Wastewater**						
SAL Sample Number		**1406489-06**						
Date/Time Collected		**06/23/14 11:06**						
Collected by		**Harmon Harden**						
Date/Time Received		**06/24/14 09:25**						
Hydrogen Sulfide (Unionized)	mg/L	0.01 U	SM 4550SF	0.04	0.01		06/30/14 09:29	1
Carbonaceous BOD	mg/L	16	SM 5210B	2	2	06/25/14 09:07	06/30/14 15:55	1
Chemical Oxygen Demand	mg/L	60	EPA 410.4	25	10	06/30/14 13:20	07/01/14 14:58	1
Nitrite (as N)	mg/L	0.94 Q	EPA 300.0	0.04	0.01		06/25/14 11:14	1
Orthophosphate as P	mg/L	2.7 Q	EPA 300.0	0.040	0.010		06/25/14 11:14	1
Sulfate	mg/L	15	EPA 300.0	0.60	0.20		06/25/14 11:14	1
Sulfide	mg/L	0.10 U	SM 4500SF	0.40	0.10		06/30/14 09:29	1
Total Alkalinity	mg/L	240	SM 2320B	8.0	2.0		07/05/14 15:58	1
Total Suspended Solids	mg/L	5	SM 2540D	1	1	06/27/14 12:35	06/30/14 15:58	1
Volatile Suspended Solids	mg/L	4	EPA 160.4	1	1	06/27/14 12:35	06/30/14 15:58	1
Nitrate+Nitrite (N)	mg/L	0.94	EPA 300.0	0.04	0.01		06/25/14 11:14	1
		TestAmerica Savannah						
Nitrogen, Ammonia								
Ammonia (as N)	mg/L	8.7	350.1	0.25	0.13		07/15/14 09:56	5
Nitrogen, Total Kjeldahl								
Nitrogen, Kjeldahl	mg/L	9.9	351.2	2.0	1.5	07/14/14 15:00	07/18/14 09:47	10
Phosphorus, Total								
Phosphorus	mg/L	4.5	365.4	0.10	0.041	07/14/14 15:00	07/17/14 19:39	1
Sample Description		**BHS6-ST1&2a-DUP**						
Matrix		**Wastewater**						
SAL Sample Number		**1406489-07**						
Date/Time Collected		**06/23/14 11:08**						
Collected by		**Harmon Harden**						
Date/Time Received		**06/24/14 09:25**						
Inorganics								
Hydrogen Sulfide (Unionized)	mg/L	0.01 U	SM 4550SF	0.04	0.01		06/30/14 09:29	1
Carbonaceous BOD	mg/L	18	SM 5210B	2	2	06/25/14 09:07	06/30/14 15:55	1
Chemical Oxygen Demand	mg/L	54	EPA 410.4	25	10	06/30/14 13:20	07/01/14 14:58	1
Nitrite (as N)	mg/L	1.1 Q	EPA 300.0	0.04	0.01		06/25/14 11:25	1
Orthophosphate as P	mg/L	2.5 Q	EPA 300.0	0.040	0.010		06/25/14 11:25	1
Sulfate	mg/L	16	EPA 300.0	0.60	0.20		06/25/14 11:25	1
Sulfide	mg/L	0.10 U	SM 4500SF	0.40	0.10		06/30/14 09:29	1
Total Alkalinity	mg/L	250	SM 2320B	8.0	2.0		07/05/14 16:09	1
Total Suspended Solids	mg/L	2	SM 2540D	1	1	06/27/14 12:35	06/30/14 15:58	1
Volatile Suspended Solids	mg/L	2	EPA 160.4	1	1	06/27/14 12:35	06/30/14 15:58	1

Hazen and Sawyer
10002 Princess Palm Ave, Suite 200
Tampa, FL 33619

July 22, 2014
Work Order: 1406489

Laboratory Report

Project Name		**BHS6 SE#5**						
Parameters	**Units**	**Results ***	**Method**	**PQL**	**MDL**	**Prepared**	**Analyzed**	**Dilution**
Sample Description		**BHS6-ST1&2a-DUP**						
Matrix		**Wastewater**						
SAL Sample Number		**1406489-07**						
Date/Time Collected		**06/23/14 11:08**						
Collected by		**Harmon Harden**						
Date/Time Received		**06/24/14 09:25**						
Nitrate+Nitrite (N)	mg/L	1.1	EPA 300.0	0.04	0.01		06/25/14 11:25	1
		TestAmerica Savannah						
Nitrogen, Ammonia								
Ammonia (as N)	mg/L	7.8	350.1	0.25	0.13		07/15/14 09:56	5
Nitrogen, Total Kjeldahl								
Nitrogen, Kjeldahl	mg/L	10	351.2	2.0	1.5	07/14/14 15:00	07/18/14 09:48	10
Phosphorus, Total								
Phosphorus	mg/L	4.5	365.4	0.10	0.041	07/14/14 15:00	07/17/14 19:40	1
Sample Description		**BHS6-ST2b-T**						
Matrix		**Wastewater**						
SAL Sample Number		**1406489-08**						
Date/Time Collected		**06/23/14 10:30**						
Collected by		**Harmon Harden**						
Date/Time Received		**06/24/14 09:25**						
Volatile Organic Compounds								
Acetone	ug/L	6.7	EPA 8260b	4.0	2.0		07/01/14 23:05	1
Acrylonitrile	ug/L	1.3 U	EPA 8260b	4.0	1.3		07/01/14 23:05	1
Benzene	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 23:05	1
Bromobenzene	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 23:05	1
Bromochloromethane	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 23:05	1
Bromodichloromethane	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 23:05	1
Bromoform	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 23:05	1
Bromomethane	ug/L	0.4 U	EPA 8260b	0.8	0.4		07/01/14 23:05	1
2-Butanone	ug/L	7.2	EPA 8260b	4.0	2.0		07/01/14 23:05	1
n-Butylbenzene	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 23:05	1
sec-Butylbenzene	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 23:05	1
t-Butylbenzene	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 23:05	1
Carbon disulfide	ug/L	0.8	EPA 8260b	0.8	0.2		07/01/14 23:05	1
Carbon tetrachloride	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 23:05	1
Chlorobenzene	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 23:05	1
Chloroethane	ug/L	0.4 U	EPA 8260b	1.6	0.4		07/01/14 23:05	1
Chloroform	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 23:05	1
Chloromethane	ug/L	0.4 U	EPA 8260b	1.6	0.4		07/01/14 23:05	1
1,2-Dibromoethane	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 23:05	1
1,2-Dibromo-3-chloropropane	ug/L	0.3 U	EPA 8260b	0.8	0.3		07/01/14 23:05	1

Hazen and Sawyer
10002 Princess Palm Ave, Suite 200
Tampa, FL 33619

July 22, 2014
Work Order: 1406489

Laboratory Report

Project Name		**BHS6 SE#5**						
Parameters	**Units**	**Results ***	**Method**	**PQL**	**MDL**	**Prepared**	**Analyzed**	**Dilution**
Sample Description		**BHS6-ST2b-T**						
Matrix		**Wastewater**						
SAL Sample Number		**1406489-08**						
Date/Time Collected		**06/23/14 10:30**						
Collected by		**Harmon Harden**						
Date/Time Received		**06/24/14 09:25**						
2-Chlorotoluene	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 23:05	1
2-Chloroethylvinyl Ether	ug/L	0.5 U	EPA 8260b	1.6	0.5		07/01/14 23:05	1
4-Chlorotoluene	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 23:05	1
Dibromochloromethane	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 23:05	1
Dibromomethane	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 23:05	1
1,2-Dichlorobenzene	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 23:05	1
1,3-Dichlorobenzene	ug/L	0.07 U	EPA 8260b	0.8	0.07		07/01/14 23:05	1
1,4-Dichlorobenzene	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 23:05	1
trans-1,4-Dichloro-2-butene	ug/L	0.3 U	EPA 8260b	0.8	0.3		07/01/14 23:05	1
Dichlorodifluoromethane	ug/L	0.5 U	EPA 8260b	1.6	0.5		07/01/14 23:05	1
1,1-Dichloroethane	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 23:05	1
1,2-Dichloroethane	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 23:05	1
1,1-Dichloroethene	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 23:05	1
cis-1,2-Dichloroethene	ug/L	0.09 U	EPA 8260b	0.8	0.09		07/01/14 23:05	1
trans-1,2-Dichloroethene	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 23:05	1
1,2-Dichloropropane	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 23:05	1
2,2-Dichloropropane	ug/L	0.3 U	EPA 8260b	0.8	0.3		07/01/14 23:05	1
1,1-Dichloropropene	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 23:05	1
cis-1,3-Dichloropropene	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 23:05	1
trans-1,3-Dichloropropene	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 23:05	1
Ethylbenzene	ug/L	0.08 U	EPA 8260b	0.8	0.08		07/01/14 23:05	1
Hexachlorobutadiene	ug/L	0.4 U	EPA 8260b	0.8	0.4		07/01/14 23:05	1
2-Hexanone	ug/L	2.1 U	EPA 8260b	4.0	2.1		07/01/14 23:05	1
Iodomethane	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 23:05	1
Isopropylbenzene	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 23:05	1
4-Isopropyltoluene	ug/L	1.2	EPA 8260b	0.8	0.2		07/01/14 23:05	1
Methyl-t-butyl ether	ug/L	0.2 U	EPA 8260b	1.6	0.2		07/01/14 23:05	1
Methylene Chloride	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 23:05	1
4-Methyl-2-pentanone	ug/L	2.6 U	EPA 8260b	4.0	2.6		07/01/14 23:05	1
Naphthalene	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 23:05	1
n-Propylbenzene	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 23:05	1
Styrene	ug/L	0.05 U	EPA 8260b	0.8	0.05		07/01/14 23:05	1
1,1,1,2-Tetrachloroethane	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 23:05	1
1,1,2,2-Tetrachloroethane	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 23:05	1
Tetrachloroethene	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 23:05	1
Toluene	ug/L	3.5	EPA 8260b	0.8	0.09		07/01/14 23:05	1
1,2,3-Trichlorobenzene	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 23:05	1
1,2,4-Trichlorobenzene	ug/L	0.3 U	EPA 8260b	0.8	0.3		07/01/14 23:05	1

Hazen and Sawyer
10002 Princess Palm Ave, Suite 200
Tampa, FL 33619

July 22, 2014
Work Order: 1406489

Laboratory Report

Project Name **BHS6 SE#5**

Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description		**BHS6-ST2b-T**						
Matrix		**Wastewater**						
SAL Sample Number		**1406489-08**						
Date/Time Collected		**06/23/14 10:30**						
Collected by		**Harmon Harden**						
Date/Time Received		**06/24/14 09:25**						
1,1,1-Trichloroethane	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 23:05	1
1,1,2-Trichloroethane	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 23:05	1
Trichloroethene	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 23:05	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ug/L	0.6 U	EPA 8260b**	1.6	0.6		07/01/14 23:05	1
Trichlorofluoromethane	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 23:05	1
1,2,3-Trichloropropane	ug/L	0.4 U	EPA 8260b	0.8	0.4		07/01/14 23:05	1
1,2,4-Trimethylbenzene	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 23:05	1
1,3,5-Trimethylbenzene	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 23:05	1
Vinyl chloride	ug/L	0.3 U	EPA 8260b	1.6	0.3		07/01/14 23:05	1
Xylene-m,p	ug/L	0.2 U	EPA 8260b	1.6	0.2		07/01/14 23:05	1
Xylene-o	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 23:05	1
Xylenes- Total	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 23:05	1
Total Trihalomethanes	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 23:05	1
1,4-Dioxane	ug/L	0.0	EPA 8260b**				07/01/14 23:05	1
Surrogate for EPA 8260b	*Dibromofluoromethane*		*107 %*	*Limits*	*65-135*			
Pesticide Analyses								
1,2-Dibromo-3-chloropropane	ug/L	0.0052 U	EPA 504.1	0.021	0.0052	06/30/14 09:53	06/30/14 20:30	1
1,2-Dibromoethane	ug/L	0.0052 U	EPA 504.1	0.021	0.0052	06/30/14 09:53	06/30/14 20:30	1
Surrogate for EPA 504.1	*2-Bromo-1-chloropropane*		*114 %*	*Limits*	*70-130*			
Inorganics								
Hydrogen Sulfide (Unionized)	mg/L	1.6	SM 4550SF	0.04	0.01		06/30/14 09:29	1
Carbonaceous BOD	mg/L	5	SM 5210B	2	2	06/25/14 09:07	06/30/14 15:55	1
Chemical Oxygen Demand	mg/L	58	EPA 410.4	25	10	06/30/14 13:20	07/01/14 14:58	1
Nitrate (as N)	mg/L	0.01 U,Q	EPA 300.0	0.04	0.01		06/25/14 11:36	1
Nitrite (as N)	mg/L	0.01 U,Q	EPA 300.0	0.04	0.01		06/25/14 11:36	1
Orthophosphate as P	mg/L	2.5 Q	EPA 300.0	0.040	0.010		06/25/14 11:36	1
Sulfate	mg/L	140	EPA 300.0	6.0	2.0		07/10/14 13:47	10
Sulfide	mg/L	2.2	SM 4500SF	0.40	0.10		06/30/14 09:29	1
Total Alkalinity	mg/L	350	SM 2320B	8.0	2.0		07/05/14 16:21	1
Total Suspended Solids	mg/L	2	SM 2540D	1	1	06/27/14 12:35	06/30/14 15:58	1
Volatile Suspended Solids	mg/L	2	EPA 160.4	1	1	06/27/14 12:35	06/30/14 15:58	1
Nitrate+Nitrite (N)	mg/L	0.02 U	EPA 300.0	0.08	0.02		06/25/14 11:36	1
		TestAmerica Savannah						
Nitrogen, Ammonia								
Ammonia (as N)	mg/L	4.9	350.1	0.25	0.13		07/15/14 09:56	5
Nitrogen, Total Kjeldahl								

Hazen and Sawyer
10002 Princess Palm Ave, Suite 200
Tampa, FL 33619

July 22, 2014
Work Order: 1406489

Laboratory Report

Project Name **BHS6 SE#5**

Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description		**BHS6-ST2b-T**						
Matrix		**Wastewater**						
SAL Sample Number		**1406489-08**						
Date/Time Collected		**06/23/14 10:30**						
Collected by		**Harmon Harden**						
Date/Time Received		**06/24/14 09:25**						
		TestAmerica Savannah						
Nitrogen, Kjeldahl	mg/L	5.9	351.2	2.0	1.5	07/14/14 15:00	07/18/14 09:49	10
Phosphorus, Total								
Phosphorus	mg/L	3.6	365.4	0.10	0.041	07/14/14 15:00	07/17/14 19:44	1
Sample Description		**BHS6-EB**						
Matrix		**Reagent Water**						
SAL Sample Number		**1406489-09**						
Date/Time Collected		**06/23/14 11:48**						
Collected by		**Harmon Harden**						
Date/Time Received		**06/24/14 09:25**						
Inorganics								
Hydrogen Sulfide (Unionized)	mg/L	0.01 U	SM 4550SF	0.04	0.01		06/30/14 09:29	1
Carbonaceous BOD	mg/L	2 U	SM 5210B	2	2	06/25/14 09:07	06/30/14 15:55	1
Chemical Oxygen Demand	mg/L	10 U	EPA 410.4	25	10	06/30/14 13:20	07/01/14 14:58	1
Nitrate (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		06/25/14 11:48	1
Nitrite (as N)	mg/L	0.04	EPA 300.0	0.04	0.01		06/25/14 11:48	1
Orthophosphate as P	mg/L	0.010 U	EPA 300.0	0.040	0.010		06/25/14 11:48	1
Sulfate	mg/L	0.31 I	EPA 300.0	0.60	0.20		06/25/14 11:48	1
Sulfide	mg/L	0.10 U	SM 4500SF	0.40	0.10		06/30/14 09:29	1
Total Alkalinity	mg/L	2.2 I	SM 2320B	8.0	2.0		07/05/14 16:24	1
Total Suspended Solids	mg/L	1 U	SM 2540D	1	1	06/27/14 12:35	06/30/14 15:58	1
Volatile Suspended Solids	mg/L	1 U	EPA 160.4	1	1	06/27/14 12:35	06/30/14 15:58	1
Nitrate+Nitrite (N)	mg/L	0.04 I	EPA 300.0	0.08	0.02		06/25/14 11:48	1
		TestAmerica Savannah						
Nitrogen, Ammonia								
Ammonia (as N)	mg/L	0.17	350.1	0.050	0.026		07/15/14 09:01	1
Nitrogen, Total Kjeldahl								
Nitrogen, Kjeldahl	mg/L	0.15 U,U	351.2	0.20	0.15	07/14/14 15:00	07/17/14 19:45	1
Phosphorus, Total								
Phosphorus	mg/L	0.053 I,I	365.4	0.10	0.041	07/14/14 15:00	07/17/14 19:45	1

Hazen and Sawyer
10002 Princess Palm Ave, Suite 200
Tampa, FL 33619

July 22, 2014
Work Order: 1406489

Volatile Organic Compounds - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BG40123 - VOC - Prep										
Blank (BG40123-BLK1)					Prepared & Analyzed: 07/01/14 18:41					
Acetone	2.0 U	4.0	2.0	ug/L						
Acrylonitrile	1.3 U	4.0	1.3	ug/L						
Benzene	0.1 U	0.8	0.1	ug/L						
Bromobenzene	0.2 U	0.8	0.2	ug/L						
Bromochloromethane	0.1 U	0.8	0.1	ug/L						
Bromodichloromethane	0.2 U	0.8	0.2	ug/L						
Bromoform	0.2 U	0.8	0.2	ug/L						
Bromomethane	0.4 U	0.8	0.4	ug/L						
2-Butanone	2.0 U	4.0	2.0	ug/L						
n-Butylbenzene	0.2 U	0.8	0.2	ug/L						
sec-Butylbenzene	0.2 U	0.8	0.2	ug/L						
t-Butylbenzene	0.1 U	0.8	0.1	ug/L						
Carbon disulfide	0.2 U	0.8	0.2	ug/L						
Carbon tetrachloride	0.2 U	0.8	0.2	ug/L						
Chlorobenzene	0.1 U	0.8	0.1	ug/L						
Chloroethane	0.4 U	1.6	0.4	ug/L						
Chloroform	0.2 U	0.8	0.2	ug/L						
Chloromethane	0.4 U	1.6	0.4	ug/L						
1,2-Dibromoethane	0.2 U	0.8	0.2	ug/L						
1,2-Dibromo-3-chloropropane	0.3 U	0.8	0.3	ug/L						
2-Chlorotoluene	0.1 U	0.8	0.1	ug/L						
2-Chloroethylvinyl Ether	0.5 U	1.6	0.5	ug/L						
4-Chlorotoluene	0.1 U	0.8	0.1	ug/L						
Dibromochloromethane	0.1 U	0.8	0.1	ug/L						
Dibromomethane	0.2 U	0.8	0.2	ug/L						
1,2-Dichlorobenzene	0.1 U	0.8	0.1	ug/L						
1,3-Dichlorobenzene	0.07 U	0.8	0.07	ug/L						
1,4-Dichlorobenzene	0.2 U	0.8	0.2	ug/L						
trans-1,4-Dichloro-2-butene	0.3 U	0.8	0.3	ug/L						
Dichlorodifluoromethane	0.5 U	1.6	0.5	ug/L						
1,1-Dichloroethane	0.2 U	0.8	0.2	ug/L						
1,2-Dichloroethane	0.1 U	0.8	0.1	ug/L						
1,1-Dichloroethene	0.2 U	0.8	0.2	ug/L						
cis-1,2-Dichloroethene	0.09 U	0.8	0.09	ug/L						
trans-1,2-Dichloroethene	0.2 U	0.8	0.2	ug/L						
1,2-Dichloropropane	0.2 U	0.8	0.2	ug/L						
2,2-Dichloropropane	0.3 U	0.8	0.3	ug/L						
1,1-Dichloropropene	0.2 U	0.8	0.2	ug/L						
cis-1,3-Dichloropropene	0.2 U	0.8	0.2	ug/L						
trans-1,3-Dichloropropene	0.1 U	0.8	0.1	ug/L						
Ethylbenzene	0.08 U	0.8	0.08	ug/L						
Hexachlorobutadiene	0.4 U	0.8	0.4	ug/L						
2-Hexanone	2.1 U	4.0	2.1	ug/L						
Iodomethane	0.2 U	0.8	0.2	ug/L						
Isopropylbenzene	0.1 U	0.8	0.1	ug/L						

Hazen and Sawyer
10002 Princess Palm Ave, Suite 200
Tampa, FL 33619

July 22, 2014
Work Order: 1406489

Volatile Organic Compounds - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BG40123 - VOC - Prep										
Blank (BG40123-BLK1)					Prepared & Analyzed: 07/01/14 18:41					
4-Isopropyltoluene	0.2 U	0.8	0.2	ug/L						
Methyl-t-butyl ether	0.2 U	1.6	0.2	ug/L						
Methylene Chloride	0.2 U	0.8	0.2	ug/L						
4-Methyl-2-pentanone	2.6 U	4.0	2.6	ug/L						
Naphthalene	0.2 U	0.8	0.2	ug/L						
n-Propylbenzene	0.1 U	0.8	0.1	ug/L						
Styrene	0.05 U	0.8	0.05	ug/L						
1,1,1,2-Tetrachloroethane	0.2 U	0.8	0.2	ug/L						
1,1,2,2-Tetrachloroethane	0.2 U	0.8	0.2	ug/L						
Tetrachloroethene	0.1 U	0.8	0.1	ug/L						
Toluene	0.09 U	0.8	0.09	ug/L						
1,2,3-Trichlorobenzene	0.2 U	0.8	0.2	ug/L						
1,2,4-Trichlorobenzene	0.3 U	0.8	0.3	ug/L						
1,1,1-Trichloroethane	0.2 U	0.8	0.2	ug/L						
1,1,2-Trichloroethane	0.2 U	0.8	0.2	ug/L						
Trichloroethene	0.2 U	0.8	0.2	ug/L						
1,1,2-Trichloro-1,2,2-trifluoroethane	0.6 U	1.6	0.6	ug/L						
Trichlorofluoromethane	0.2 U	0.8	0.2	ug/L						
1,2,3-Trichloropropane	0.4 U	0.8	0.4	ug/L						
1,2,4-Trimethylbenzene	0.1 U	0.8	0.1	ug/L						
1,3,5-Trimethylbenzene	0.1 U	0.8	0.1	ug/L						
Vinyl chloride	0.3 U	1.6	0.3	ug/L						
Xylene-m,p	0.2 U	1.6	0.2	ug/L						
Xylene-o	0.2 U	0.8	0.2	ug/L						
Xylenes- Total	0.1 U	0.8	0.1	ug/L						
Total Trihalomethanes	0.1 U	0.8	0.1	ug/L						
1,4-Dioxane	0.00			ug/L						
Surrogate: 4-Bromofluorobenzene	*20.3*			*ug/L*	*20*		*102*	*65-135*		
Surrogate: 1,2-Dichloroethane-d4	*20.5*			*ug/L*	*20*		*102*	*65-135*		
Surrogate: Toluene-d8	*19.5*			*ug/L*	*20*		*98*	*65-135*		
Surrogate: Dibromofluoromethane	*21.3*			*ug/L*	*20*		*106*	*65-135*		

Hazen and Sawyer
10002 Princess Palm Ave, Suite 200
Tampa, FL 33619

July 22, 2014
Work Order: 1406489

Volatile Organic Compounds - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BG40123 - VOC - Prep										
LCS (BG40123-BS1)					Prepared & Analyzed: 07/01/14 19:15					
Acetone	128	4.0	2.0	ug/L	100		128	70-130		
Acrylonitrile	127	4.0	1.3	ug/L	100		127	70-130		
Benzene	21.6	0.8	0.1	ug/L	20		108	70-130		
Bromobenzene	19.7	0.8	0.2	ug/L	20		98	70-130		
Bromochloromethane	23.7	0.8	0.1	ug/L	20		119	70-130		
Bromodichloromethane	23.0	0.8	0.2	ug/L	20		115	70-130		
Bromoform	21.0	0.8	0.2	ug/L	20		105	70-130		
Bromomethane	41.7	0.8	0.4	ug/L	40		104	70-130		
2-Butanone	129	4.0	2.0	ug/L	100		129	70-130		
n-Butylbenzene	19.0	0.8	0.2	ug/L	20		95	70-130		
sec-Butylbenzene	18.7	0.8	0.2	ug/L	20		94	70-130		
t-Butylbenzene	18.6	0.8	0.1	ug/L	20		93	70-130		
Carbon disulfide	22.6	0.8	0.2	ug/L	20		113	70-130		
Carbon tetrachloride	23.0	0.8	0.2	ug/L	20		115	70-130		
Chlorobenzene	20.7	0.8	0.1	ug/L	20		103	70-130		
Chloroethane	41.1	1.6	0.4	ug/L	40		103	70-130		
Chloroform	22.1	0.8	0.2	ug/L	20		111	70-130		
Chloromethane	42.0	1.6	0.4	ug/L	40		105	70-130		
2-Chlorotoluene	20.1	0.8	0.1	ug/L	20		100	70-130		
4-Chlorotoluene	20.1	0.8	0.1	ug/L	20		100	70-130		
Dibromochloromethane	21.9	0.8	0.1	ug/L	20		109	70-130		
Dibromomethane	23.2	0.8	0.2	ug/L	20		116	70-130		
1,2-Dichlorobenzene	19.4	0.8	0.1	ug/L	20		97	70-130		
1,3-Dichlorobenzene	19.6	0.8	0.07	ug/L	20		98	70-130		
1,4-Dichlorobenzene	19.6	0.8	0.2	ug/L	20		98	70-130		
trans-1,4-Dichloro-2-butene	23.2	0.8	0.3	ug/L	20		116	70-130		
Dichlorodifluoromethane	51.3	1.6	0.5	ug/L	40		128	70-130		
1,1-Dichloroethane	22.8	0.8	0.2	ug/L	20		114	70-130		
1,2-Dichloroethane	24.1	0.8	0.1	ug/L	20		121	70-130		
1,1-Dichloroethene	22.7	0.8	0.2	ug/L	20		114	70-130		
cis-1,2-Dichloroethene	22.7	0.8	0.09	ug/L	20		113	70-130		
trans-1,2-Dichloroethene	22.7	0.8	0.2	ug/L	20		113	70-130		
1,2-Dichloropropane	22.6	0.8	0.2	ug/L	20		113	70-130		
2,2-Dichloropropane	23.9	0.8	0.3	ug/L	20		120	70-130		
1,1-Dichloropropene	23.6	0.8	0.2	ug/L	20		118	70-130		
cis-1,3-Dichloropropene	23.7	0.8	0.2	ug/L	20		119	70-130		
trans-1,3-Dichloropropene	22.7	0.8	0.1	ug/L	20		113	70-130		
Ethylbenzene	20.1	0.8	0.08	ug/L	20		101	70-130		
Hexachlorobutadiene	17.6	0.8	0.4	ug/L	20		88	70-130		
2-Hexanone	128	4.0	2.1	ug/L	100		128	70-130		
Iodomethane	25.2	0.8	0.2	ug/L	20		126	70-130		
Isopropylbenzene	20.4	0.8	0.1	ug/L	20		102	70-130		
4-Isopropyltoluene	18.7	0.8	0.2	ug/L	20		93	70-130		
Methyl-t-butyl ether	23.6	1.6	0.2	ug/L	20		118	70-130		
Methylene Chloride	22.9	0.8	0.2	ug/L	20		115	70-130		

Hazen and Sawyer
10002 Princess Palm Ave, Suite 200
Tampa, FL 33619

July 22, 2014
Work Order: 1406489

Volatile Organic Compounds - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BG40123 - VOC - Prep										
LCS (BG40123-BS1)					Prepared & Analyzed: 07/01/14 19:15					
4-Methyl-2-pentanone	117	4.0	2.6	ug/L	100		117	70-130		
Naphthalene	20.2	0.8	0.2	ug/L	20		101	70-130		
n-Propylbenzene	19.3	0.8	0.1	ug/L	20		96	70-130		
Styrene	20.8	0.8	0.05	ug/L	20		104	70-130		
1,1,1,2-Tetrachloroethane	20.2	0.8	0.2	ug/L	20		101	70-130		
1,1,2,2-Tetrachloroethane	20.6	0.8	0.2	ug/L	20		103	70-130		
Tetrachloroethene	20.0	0.8	0.1	ug/L	20		100	70-130		
Toluene	20.2	0.8	0.09	ug/L	20		101	70-130		
1,2,3-Trichlorobenzene	18.5	0.8	0.2	ug/L	20		93	70-130		
1,2,4-Trichlorobenzene	18.5	0.8	0.3	ug/L	20		93	70-130		
1,1,1-Trichloroethane	23.1	0.8	0.2	ug/L	20		115	70-130		
1,1,2-Trichloroethane	21.2	0.8	0.2	ug/L	20		106	70-130		
Trichloroethene	22.0	0.8	0.2	ug/L	20		110	70-130		
Trichlorofluoromethane	21.0	0.8	0.2	ug/L	20		105	70-130		
1,1,2-Trichloro-1,2,2-trifluoroethane	23.0	1.6	0.6	ug/L	20		115	70-130		
1,2,3-Trichloropropane	21.2	0.8	0.4	ug/L	20		106	70-130		
1,2,4-Trimethylbenzene	19.4	0.8	0.1	ug/L	20		97	70-130		
1,3,5-Trimethylbenzene	19.5	0.8	0.1	ug/L	20		98	70-130		
Vinyl chloride	37.6	1.6	0.3	ug/L	40		94	70-130		
Xylene-m,p	41.1	1.6	0.2	ug/L	40		103	70-130		
Xylene-o	20.4	0.8	0.2	ug/L	20		102	70-130		
Surrogate: 4-Bromofluorobenzene	*19.7*			*ug/L*	*20*		*99*	*65-135*		
Surrogate: 1,2-Dichloroethane-d4	*20.3*			*ug/L*	*20*		*102*	*65-135*		
Surrogate: Toluene-d8	*19.1*			*ug/L*	*20*		*95*	*65-135*		
Surrogate: Dibromofluoromethane	*21.1*			*ug/L*	*20*		*105*	*65-135*		
Duplicate (BG40123-DUP1)		**Source: 1406489-08**			Prepared & Analyzed: 07/01/14 23:37					
Acetone	6.90	4.0	2.0	ug/L		6.72			3	20
Acrylonitrile	1.3 U	4.0	1.3	ug/L		ND				20
Benzene	0.1 U	0.8	0.1	ug/L		ND				20
Bromobenzene	0.2 U	0.8	0.2	ug/L		ND				20
Bromochloromethane	0.1 U	0.8	0.1	ug/L		ND				20
Bromodichloromethane	0.2 U	0.8	0.2	ug/L		ND				20
Bromoform	0.2 U	0.8	0.2	ug/L		ND				20
Bromomethane	0.4 U	0.8	0.4	ug/L		ND				20
2-Butanone	6.70	4.0	2.0	ug/L		7.19			7	20
n-Butylbenzene	0.2 U	0.8	0.2	ug/L		ND				20
sec-Butylbenzene	0.2 U	0.8	0.2	ug/L		ND				20
t-Butylbenzene	0.1 U	0.8	0.1	ug/L		ND				20
Carbon disulfide	0.710 I	0.8	0.2	ug/L		0.838			17	20
Carbon tetrachloride	0.2 U	0.8	0.2	ug/L		ND				20
Chlorobenzene	0.1 U	0.8	0.1	ug/L		ND				20
Chloroethane	0.4 U	1.6	0.4	ug/L		ND				20
Chloroform	0.2 U	0.8	0.2	ug/L		ND				20
Chloromethane	0.4 U	1.6	0.4	ug/L		ND				20

Hazen and Sawyer
10002 Princess Palm Ave, Suite 200
Tampa, FL 33619

July 22, 2014
Work Order: 1406489

Volatile Organic Compounds - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BG40123 - VOC - Prep										
Duplicate (BG40123-DUP1)		**Source: 1406489-08**			Prepared & Analyzed: 07/01/14 23:37					
1,2-Dibromoethane	0.2 U	0.8	0.2	ug/L		ND				200
2-Chlorotoluene	0.1 U	0.8	0.1	ug/L		ND				20
1,2-Dibromo-3-chloropropane	0.3 U	0.8	0.3	ug/L		ND				200
2-Chloroethylvinyl Ether	0.5 U	1.6	0.5	ug/L		ND				200
4-Chlorotoluene	0.1 U	0.8	0.1	ug/L		ND				20
Dibromochloromethane	0.1 U	0.8	0.1	ug/L		ND				20
Dibromomethane	0.2 U	0.8	0.2	ug/L		ND				20
1,2-Dichlorobenzene	0.1 U	0.8	0.1	ug/L		ND				20
1,3-Dichlorobenzene	0.07 U	0.8	0.07	ug/L		ND				20
1,4-Dichlorobenzene	0.2 U	0.8	0.2	ug/L		ND				20
trans-1,4-Dichloro-2-butene	0.3 U	0.8	0.3	ug/L		ND				20
Dichlorodifluoromethane	0.5 U	1.6	0.5	ug/L		ND				20
1,1-Dichloroethane	0.2 U	0.8	0.2	ug/L		ND				20
1,2-Dichloroethane	0.1 U	0.8	0.1	ug/L		ND				20
1,1-Dichloroethene	0.2 U	0.8	0.2	ug/L		ND				20
cis-1,2-Dichloroethene	0.09 U	0.8	0.09	ug/L		ND				20
trans-1,2-Dichloroethene	0.2 U	0.8	0.2	ug/L		ND				20
1,2-Dichloropropane	0.2 U	0.8	0.2	ug/L		ND				20
2,2-Dichloropropane	0.3 U	0.8	0.3	ug/L		ND				20
1,1-Dichloropropene	0.2 U	0.8	0.2	ug/L		ND				20
cis-1,3-Dichloropropene	0.2 U	0.8	0.2	ug/L		ND				20
trans-1,3-Dichloropropene	0.1 U	0.8	0.1	ug/L		ND				20
Ethylbenzene	0.08 U	0.8	0.08	ug/L		ND				20
Hexachlorobutadiene	0.4 U	0.8	0.4	ug/L		ND				20
2-Hexanone	2.1 U	4.0	2.1	ug/L		ND				20
Iodomethane	0.2 U	0.8	0.2	ug/L		ND				20
Isopropylbenzene	0.1 U	0.8	0.1	ug/L		ND				20
4-Isopropyltoluene	1.25	0.8	0.2	ug/L		1.25			0.3	20
Methyl-t-butyl ether	0.2 U	1.6	0.2	ug/L		ND				20
Methylene Chloride	0.2 U	0.8	0.2	ug/L		ND				20
4-Methyl-2-pentanone	2.6 U	4.0	2.6	ug/L		ND				20
Naphthalene	0.2 U	0.8	0.2	ug/L		ND				20
n-Propylbenzene	0.1 U	0.8	0.1	ug/L		ND				20
Styrene	0.05 U	0.8	0.05	ug/L		ND				20
1,1,1,2-Tetrachloroethane	0.2 U	0.8	0.2	ug/L		ND				20
1,1,2,2-Tetrachloroethane	0.2 U	0.8	0.2	ug/L		ND				20
Tetrachloroethene	0.1 U	0.8	0.1	ug/L		ND				20
Toluene	3.48	0.8	0.09	ug/L		3.51			0.7	20
1,2,3-Trichlorobenzene	0.2 U	0.8	0.2	ug/L		ND				20
1,2,4-Trichlorobenzene	0.3 U	0.8	0.3	ug/L		ND				20
1,1,1-Trichloroethane	0.2 U	0.8	0.2	ug/L		ND				20
1,1,2-Trichloroethane	0.2 U	0.8	0.2	ug/L		ND				20
Trichloroethene	0.2 U	0.8	0.2	ug/L		ND				20
Trichlorofluoromethane	0.2 U	0.8	0.2	ug/L		ND				20

Hazen and Sawyer
10002 Princess Palm Ave, Suite 200
Tampa, FL 33619

July 22, 2014
Work Order: 1406489

Volatile Organic Compounds - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BG40123 - VOC - Prep										
Duplicate (BG40123-DUP1)		**Source: 1406489-08**			Prepared & Analyzed: 07/01/14 23:37					
1,1,2-Trichloro-1,2,2-trifluoroethane	0.6 U	1.6	0.6	ug/L		ND				20
1,2,3-Trichloropropane	0.4 U	0.8	0.4	ug/L		ND				20
1,2,4-Trimethylbenzene	0.1 U	0.8	0.1	ug/L		ND				20
1,3,5-Trimethylbenzene	0.1 U	0.8	0.1	ug/L		ND				20
Vinyl chloride	0.3 U	1.6	0.3	ug/L		ND				20
Xylene-m,p	0.2 U	1.6	0.2	ug/L		ND				20
Xylene-o	0.2 U	0.8	0.2	ug/L		ND				20
Xylenes- Total	0.1 U	0.8	0.1	ug/L		ND				20
Total Trihalomethanes	0.1 U	0.8	0.1	ug/L		ND				200
1,4-Dioxane	0.00			ug/L		0.00				200
Surrogate: 4-Bromofluorobenzene	*20.6*			*ug/L*	*20*		*103*	*65-135*		
Surrogate: 1,2-Dichloroethane-d4	*20.9*			*ug/L*	*20*		*104*	*65-135*		
Surrogate: Toluene-d8	*19.2*			*ug/L*	*20*		*96*	*65-135*		
Surrogate: Dibromofluoromethane	*20.8*			*ug/L*	*20*		*104*	*65-135*		
Matrix Spike (BG40123-MS1)		**Source: 1406708-02**			Prepared & Analyzed: 07/01/14 20:23					
Acetone	137	4.0	2.0	ug/L	100	ND	137	65-135		
Acrylonitrile	124	4.0	1.3	ug/L	100	ND	124	65-135		
Benzene	21.1	0.8	0.1	ug/L	20	ND	105	65-135		
Bromobenzene	20.4	0.8	0.2	ug/L	20	ND	102	65-135		
Bromochloromethane	23.4	0.8	0.1	ug/L	20	ND	117	65-135		
Bromodichloromethane	36.2	0.8	0.2	ug/L	20	13.2	115	65-135		
Bromoform	31.0	0.8	0.2	ug/L	20	7.47	118	65-135		
Bromomethane	7.96	0.8	0.4	ug/L	40	ND	20	65-135		
2-Butanone	136	4.0	2.0	ug/L	100	ND	136	65-135		
n-Butylbenzene	19.6	0.8	0.2	ug/L	20	ND	98	65-135		
sec-Butylbenzene	19.4	0.8	0.2	ug/L	20	ND	97	65-135		
t-Butylbenzene	19.1	0.8	0.1	ug/L	20	ND	95	65-135		
Carbon disulfide	22.2	0.8	0.2	ug/L	20	ND	111	65-135		
Carbon tetrachloride	23.2	0.8	0.2	ug/L	20	ND	116	65-135		
Chlorobenzene	21.1	0.8	0.1	ug/L	20	ND	105	65-135		
Chloroethane	42.8	1.6	0.4	ug/L	40	ND	107	65-135		
Chloroform	28.2	0.8	0.2	ug/L	20	6.48	109	65-135		
Chloromethane	37.4	1.6	0.4	ug/L	40	ND	94	65-135		
2-Chlorotoluene	20.5	0.8	0.1	ug/L	20	ND	103	65-135		
4-Chlorotoluene	20.8	0.8	0.1	ug/L	20	ND	104	65-135		
Dibromochloromethane	44.5	0.8	0.1	ug/L	20	21.2	117	65-135		
Dibromomethane	23.7	0.8	0.2	ug/L	20	ND	118	65-135		
1,2-Dichlorobenzene	20.3	0.8	0.1	ug/L	20	ND	102	65-135		
1,3-Dichlorobenzene	20.0	0.8	0.07	ug/L	20	ND	100	65-135		
1,4-Dichlorobenzene	20.0	0.8	0.2	ug/L	20	ND	100	65-135		
trans-1,4-Dichloro-2-butene	10.9	0.8	0.3	ug/L	20	ND	54	65-135		
Dichlorodifluoromethane	42.2	1.6	0.5	ug/L	40	ND	105	65-135		
1,1-Dichloroethane	22.6	0.8	0.2	ug/L	20	ND	113	65-135		
1,2-Dichloroethane	23.8	0.8	0.1	ug/L	20	ND	119	65-135		

Hazen and Sawyer
10002 Princess Palm Ave, Suite 200
Tampa, FL 33619

July 22, 2014
Work Order: 1406489

Volatile Organic Compounds - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BG40123 - VOC - Prep										
Matrix Spike (BG40123-MS1)		**Source: 1406708-02**			Prepared & Analyzed: 07/01/14 20:23					
1,1-Dichloroethene	22.8	0.8	0.2	ug/L	20	ND	114	65-135		
cis-1,2-Dichloroethene	22.7	0.8	0.09	ug/L	20	ND	113	65-135		
trans-1,2-Dichloroethene	22.4	0.8	0.2	ug/L	20	ND	112	65-135		
1,2-Dichloropropane	22.2	0.8	0.2	ug/L	20	ND	111	65-135		
2,2-Dichloropropane	23.0	0.8	0.3	ug/L	20	ND	115	65-135		
1,1-Dichloropropene	23.2	0.8	0.2	ug/L	20	ND	116	65-135		
cis-1,3-Dichloropropene	7.66	0.8	0.2	ug/L	20	ND	38	65-135		
trans-1,3-Dichloropropene	15.8	0.8	0.1	ug/L	20	ND	79	65-135		
Ethylbenzene	20.8	0.8	0.08	ug/L	20	ND	104	65-135		
Hexachlorobutadiene	18.4	0.8	0.4	ug/L	20	ND	92	65-135		
2-Hexanone	128	4.0	2.1	ug/L	100	ND	128	65-135		
Iodomethane	5.70	0.8	0.2	ug/L	20	ND	28	65-135		
Isopropylbenzene	20.8	0.8	0.1	ug/L	20	ND	104	65-135		
4-Isopropyltoluene	19.4	0.8	0.2	ug/L	20	ND	97	65-135		
Methyl-t-butyl ether	23.6	1.6	0.2	ug/L	20	ND	118	65-135		
Methylene Chloride	22.4	0.8	0.2	ug/L	20	ND	112	65-135		
4-Methyl-2-pentanone	119	4.0	2.6	ug/L	100	ND	119	65-135		
Naphthalene	20.3	0.8	0.2	ug/L	20	ND	101	65-135		
n-Propylbenzene	19.6	0.8	0.1	ug/L	20	ND	98	65-135		
Styrene	21.4	0.8	0.05	ug/L	20	ND	107	65-135		
1,1,1,2-Tetrachloroethane	21.0	0.8	0.2	ug/L	20	ND	105	65-135		
1,1,2,2-Tetrachloroethane	20.3	0.8	0.2	ug/L	20	ND	102	65-135		
Tetrachloroethene	20.4	0.8	0.1	ug/L	20	ND	102	65-135		
Toluene	20.5	0.8	0.09	ug/L	20	ND	102	65-135		
1,2,3-Trichlorobenzene	19.0	0.8	0.2	ug/L	20	ND	95	65-135		
1,2,4-Trichlorobenzene	18.9	0.8	0.3	ug/L	20	ND	95	65-135		
1,1,1-Trichloroethane	23.0	0.8	0.2	ug/L	20	ND	115	65-135		
1,1,2-Trichloroethane	21.6	0.8	0.2	ug/L	20	ND	108	65-135		
Trichloroethene	22.3	0.8	0.2	ug/L	20	ND	111	65-135		
Trichlorofluoromethane	21.5	0.8	0.2	ug/L	20	ND	107	65-135		
1,1,2-Trichloro-1,2,2-trifluoroethane	23.0	1.6	0.6	ug/L	20	ND	115	65-135		
1,2,3-Trichloropropane	21.6	0.8	0.4	ug/L	20	ND	108	65-135		
1,2,4-Trimethylbenzene	20.1	0.8	0.1	ug/L	20	ND	101	65-135		
1,3,5-Trimethylbenzene	20.0	0.8	0.1	ug/L	20	ND	100	65-135		
Vinyl chloride	42.0	1.6	0.3	ug/L	40	ND	105	65-135		
Xylene-m,p	42.9	1.6	0.2	ug/L	40	ND	107	65-135		
Xylene-o	20.5	0.8	0.2	ug/L	20	ND	103	65-135		
Surrogate: 4-Bromofluorobenzene	*20.1*			*ug/L*	*20*		*100*	*65-135*		
Surrogate: 1,2-Dichloroethane-d4	*20.5*			*ug/L*	*20*		*102*	*65-135*		
Surrogate: Toluene-d8	*19.1*			*ug/L*	*20*		*96*	*65-135*		
Surrogate: Dibromofluoromethane	*20.7*			*ug/L*	*20*		*104*	*65-135*		

Hazen and Sawyer
10002 Princess Palm Ave, Suite 200
Tampa, FL 33619

July 22, 2014
Work Order: 1406489

Volatile Organic Compounds - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BG40123 - VOC - Prep										
Matrix Spike (BG40123-MS2)		**Source: 1406489-01**			Prepared & Analyzed: 07/01/14 20:56					
Acetone	184 J2	4.0	2.0	ug/L	100	40.5	143	65-135		
Acrylonitrile	119	4.0	1.3	ug/L	100	ND	119	65-135		
Benzene	22.3	0.8	0.1	ug/L	20	ND	111	65-135		
Bromobenzene	20.4	0.8	0.2	ug/L	20	ND	102	65-135		
Bromochloromethane	25.4	0.8	0.1	ug/L	20	ND	127	65-135		
Bromodichloromethane	22.0	0.8	0.2	ug/L	20	ND	110	65-135		
Bromoform	17.5	0.8	0.2	ug/L	20	ND	87	65-135		
Bromomethane	2.09 J2	0.8	0.4	ug/L	40	ND	5	65-135		
2-Butanone	139	4.0	2.0	ug/L	100	6.76	132	65-135		
n-Butylbenzene	20.2	0.8	0.2	ug/L	20	ND	101	65-135		
sec-Butylbenzene	19.5	0.8	0.2	ug/L	20	ND	97	65-135		
t-Butylbenzene	19.4	0.8	0.1	ug/L	20	ND	97	65-135		
Carbon disulfide	22.5	0.8	0.2	ug/L	20	ND	112	65-135		
Carbon tetrachloride	21.5	0.8	0.2	ug/L	20	ND	107	65-135		
Chlorobenzene	21.3	0.8	0.1	ug/L	20	ND	107	65-135		
Chloroethane	56.3 J2	1.6	0.4	ug/L	40	ND	141	65-135		
Chloroform	23.6	0.8	0.2	ug/L	20	ND	118	65-135		
Chloromethane	39.3	1.6	0.4	ug/L	40	ND	98	65-135		
2-Chlorotoluene	20.4	0.8	0.1	ug/L	20	ND	102	65-135		
4-Chlorotoluene	20.8	0.8	0.1	ug/L	20	ND	104	65-135		
Dibromochloromethane	19.4	0.8	0.1	ug/L	20	ND	97	65-135		
Dibromomethane	25.6	0.8	0.2	ug/L	20	ND	128	65-135		
1,2-Dichlorobenzene	20.5	0.8	0.1	ug/L	20	ND	102	65-135		
1,3-Dichlorobenzene	20.1	0.8	0.07	ug/L	20	ND	101	65-135		
1,4-Dichlorobenzene	20.5	0.8	0.2	ug/L	20	ND	102	65-135		
trans-1,4-Dichloro-2-butene	4.72 J2	0.8	0.3	ug/L	20	ND	24	65-135		
Dichlorodifluoromethane	47.9	1.6	0.5	ug/L	40	ND	120	65-135		
1,1-Dichloroethane	23.0	0.8	0.2	ug/L	20	ND	115	65-135		
1,2-Dichloroethane	23.8	0.8	0.1	ug/L	20	ND	119	65-135		
1,1-Dichloroethene	22.1	0.8	0.2	ug/L	20	ND	111	65-135		
cis-1,2-Dichloroethene	23.4	0.8	0.09	ug/L	20	ND	117	65-135		
trans-1,2-Dichloroethene	23.0	0.8	0.2	ug/L	20	ND	115	65-135		
1,2-Dichloropropane	23.1	0.8	0.2	ug/L	20	ND	115	65-135		
2,2-Dichloropropane	22.1	0.8	0.3	ug/L	20	ND	111	65-135		
1,1-Dichloropropene	23.8	0.8	0.2	ug/L	20	ND	119	65-135		
cis-1,3-Dichloropropene	2.15 J2	0.8	0.2	ug/L	20	ND	11	65-135		
trans-1,3-Dichloropropene	10.2 J2	0.8	0.1	ug/L	20	ND	51	65-135		
Ethylbenzene	20.9	0.8	0.08	ug/L	20	ND	105	65-135		
Hexachlorobutadiene	20.6	0.8	0.4	ug/L	20	ND	103	65-135		
2-Hexanone	122	4.0	2.1	ug/L	100	ND	122	65-135		
Iodomethane	3.17 J2	0.8	0.2	ug/L	20	ND	16	65-135		
Isopropylbenzene	21.0	0.8	0.1	ug/L	20	ND	105	65-135		
4-Isopropyltoluene	19.4	0.8	0.2	ug/L	20	ND	97	65-135		
Methyl-t-butyl ether	23.6	1.6	0.2	ug/L	20	ND	118	65-135		
Methylene Chloride	23.7	0.8	0.2	ug/L	20	ND	119	65-135		

Hazen and Sawyer
10002 Princess Palm Ave, Suite 200
Tampa, FL 33619

July 22, 2014
Work Order: 1406489

Volatile Organic Compounds - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BG40123 - VOC - Prep										
Matrix Spike (BG40123-MS2)		**Source: 1406489-01**			Prepared & Analyzed: 07/01/14 20:56					
4-Methyl-2-pentanone	119	4.0	2.6	ug/L	100	ND	119	65-135		
Naphthalene	20.9	0.8	0.2	ug/L	20	ND	105	65-135		
n-Propylbenzene	20.0	0.8	0.1	ug/L	20	ND	100	65-135		
Styrene	22.0	0.8	0.05	ug/L	20	ND	110	65-135		
1,1,1,2-Tetrachloroethane	21.2	0.8	0.2	ug/L	20	ND	106	65-135		
1,1,2,2-Tetrachloroethane	20.5	0.8	0.2	ug/L	20	ND	102	65-135		
Tetrachloroethene	20.5	0.8	0.1	ug/L	20	ND	102	65-135		
Toluene	26.3	0.8	0.09	ug/L	20	5.71	103	65-135		
1,2,3-Trichlorobenzene	18.7	0.8	0.2	ug/L	20	ND	94	65-135		
1,2,4-Trichlorobenzene	18.9	0.8	0.3	ug/L	20	ND	95	65-135		
1,1,1-Trichloroethane	23.4	0.8	0.2	ug/L	20	ND	117	65-135		
1,1,2-Trichloroethane	21.4	0.8	0.2	ug/L	20	ND	107	65-135		
Trichloroethene	22.8	0.8	0.2	ug/L	20	ND	114	65-135		
1,1,2-Trichloro-1,2,2-trifluoroethane	23.1	1.6	0.6	ug/L	20	ND	116	65-135		
Trichlorofluoromethane	21.4	0.8	0.2	ug/L	20	ND	107	65-135		
1,2,3-Trichloropropane	20.9	0.8	0.4	ug/L	20	ND	104	65-135		
1,2,4-Trimethylbenzene	20.4	0.8	0.1	ug/L	20	ND	102	65-135		
1,3,5-Trimethylbenzene	20.0	0.8	0.1	ug/L	20	ND	100	65-135		
Vinyl chloride	46.6	1.6	0.3	ug/L	40	ND	116	65-135		
Xylene-m,p	42.4	1.6	0.2	ug/L	40	ND	106	65-135		
Xylene-o	21.0	0.8	0.2	ug/L	20	ND	105	65-135		
Surrogate: 4-Bromofluorobenzene	*20.1*			*ug/L*	*20*		*101*	*65-135*		
Surrogate: 1,2-Dichloroethane-d4	*20.1*			*ug/L*	*20*		*100*	*65-135*		
Surrogate: Toluene-d8	*19.4*			*ug/L*	*20*		*97*	*65-135*		
Surrogate: Dibromofluoromethane	*20.5*			*ug/L*	*20*		*103*	*65-135*		

Hazen and Sawyer
10002 Princess Palm Ave, Suite 200
Tampa, FL 33619

July 22, 2014
Work Order: 1406489

Pesticide Analyses - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BF43006 - 8011 microextraction for EDB/DBCP										
Blank (BF43006-BLK1)					Prepared & Analyzed: 06/30/14 18:12					
1,2-Dibromo-3-chloropropane	0.0050 U	0.020	0.0050	ug/L						
1,2-Dibromoethane	0.0050 U	0.020	0.0050	ug/L						
Surrogate: 2-Bromo-1-chloropropane	*0.111*			*ug/L*	*0.10*		*111*	*70-130*		
LCS (BF43006-BS1)					Prepared & Analyzed: 06/30/14 18:35					
1,2-Dibromoethane	0.0869	0.020	0.0050	ug/L	0.10		87	70-130		
1,2-Dibromo-3-chloropropane	0.102	0.020	0.0050	ug/L	0.10		102	70-130		
Surrogate: 2-Bromo-1-chloropropane	*0.100*			*ug/L*	*0.10*		*100*	*70-130*		
LCS Dup (BF43006-BSD1)					Prepared & Analyzed: 06/30/14 18:58					
1,2-Dibromoethane	0.0877	0.020	0.0050	ug/L	0.10		88	70-130	0.9	20
1,2-Dibromo-3-chloropropane	0.105	0.020	0.0050	ug/L	0.10		105	70-130	3	20
Surrogate: 2-Bromo-1-chloropropane	*0.101*			*ug/L*	*0.10*		*101*	*70-130*		
Matrix Spike (BF43006-MS1)		**Source: 1406553-03**			Prepared & Analyzed: 06/30/14 19:21					
1,2-Dibromoethane	0.0977	0.022	0.0054	ug/L	0.11	ND	91	65-135		
1,2-Dibromo-3-chloropropane	0.101	0.022	0.0054	ug/L	0.11	ND	94	65-135		
Surrogate: 2-Bromo-1-chloropropane	*0.0926*			*ug/L*	*0.11*		*86*	*70-130*		
Matrix Spike Dup (BF43006-MSD1)		**Source: 1406553-03**			Prepared & Analyzed: 06/30/14 19:44					
1,2-Dibromo-3-chloropropane	0.119	0.021	0.0052	ug/L	0.10	ND	114	65-135	16	20
1,2-Dibromoethane	0.106	0.021	0.0052	ug/L	0.10	ND	102	65-135	8	20
Surrogate: 2-Bromo-1-chloropropane	*0.112*			*ug/L*	*0.10*		*108*	*70-130*		

Hazen and Sawyer
10002 Princess Palm Ave, Suite 200
Tampa, FL 33619

July 22, 2014
Work Order: 1406489

Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BF42425 - Ion Chromatography 300.0 Prep										
Blank (BF42425-BLK1)					Prepared & Analyzed: 06/24/14 18:42					
Nitrite (as N)	0.01 U	0.04	0.01	mg/L						
Nitrate (as N)	0.01 U	0.04	0.01	mg/L						
Sulfate	0.20 U	0.60	0.20	mg/L						
Orthophosphate as P	0.010 U	0.040	0.010	mg/L						
Surrogate: Dichloroacetate	*0.826*			*mg/L*	*1.0*		*83*	*78-120*		
Surrogate: Dichloroacetate	*0.826*			*mg/L*	*1.0*		*83*	*78-120*		
Surrogate: Dichloroacetate	*0.826*			*mg/L*	*1.0*		*83*	*78-120*		
Surrogate: Dichloroacetate	*0.826*			*mg/L*	*1.0*		*83*	*78-120*		
LCS (BF42425-BS1)					Prepared & Analyzed: 06/24/14 18:54					
Sulfate	8.44	0.60	0.20	mg/L	9.0		94	85-115		
Nitrite (as N)	1.31	0.04	0.01	mg/L	1.4		94	85-115		
Orthophosphate as P	0.896	0.040	0.010	mg/L	0.90		100	85-115		
Nitrate (as N)	1.50	0.04	0.01	mg/L	1.7		88	85-115		
Surrogate: Dichloroacetate	*0.917*			*mg/L*	*1.0*		*92*	*78-120*		
Surrogate: Dichloroacetate	*0.917*			*mg/L*	*1.0*		*92*	*78-120*		
Surrogate: Dichloroacetate	*0.917*			*mg/L*	*1.0*		*92*	*78-120*		
Surrogate: Dichloroacetate	*0.917*			*mg/L*	*1.0*		*92*	*78-120*		
LCS Dup (BF42425-BSD1)					Prepared & Analyzed: 06/24/14 19:05					
Nitrite (as N)	1.28	0.04	0.01	mg/L	1.4		92	85-115	2	200
Sulfate	8.36	0.60	0.20	mg/L	9.0		93	85-115	1	200
Orthophosphate as P	0.810	0.040	0.010	mg/L	0.90		90	85-115	10	200
Nitrate (as N)	1.52	0.04	0.01	mg/L	1.7		89	85-115	0.9	200
Surrogate: Dichloroacetate	*0.961*			*mg/L*	*1.0*		*96*	*78-120*		
Surrogate: Dichloroacetate	*0.961*			*mg/L*	*1.0*		*96*	*78-120*		
Surrogate: Dichloroacetate	*0.961*			*mg/L*	*1.0*		*96*	*78-120*		
Surrogate: Dichloroacetate	*0.961*			*mg/L*	*1.0*		*96*	*78-120*		

Hazen and Sawyer
10002 Princess Palm Ave, Suite 200
Tampa, FL 33619

July 22, 2014
Work Order: 1406489

Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BF42425 - Ion Chromatography 300.0 Prep										
Matrix Spike (BF42425-MS1)		**Source: 1406502-01**			Prepared & Analyzed: 06/25/14 09:44					
Orthophosphate as P	0.801	0.040	0.010	mg/L	0.90	ND	89	85-115		
Sulfate	8.29 J2,J6	0.60	0.20	mg/L	9.0	1.31	78	85-115		
Nitrite (as N)	0.666 J2,J6	0.04	0.01	mg/L	1.4	ND	48	85-115		
Nitrate (as N)	1.38 J2	0.04	0.01	mg/L	1.7	ND	81	85-115		
Surrogate: Dichloroacetate	*0.809*			*mg/L*	*1.0*		*81*	*78-120*		
Surrogate: Dichloroacetate	*0.809*			*mg/L*	*1.0*		*81*	*78-120*		
Surrogate: Dichloroacetate	*0.809*			*mg/L*	*1.0*		*81*	*78-120*		
Surrogate: Dichloroacetate	*0.809*			*mg/L*	*1.0*		*81*	*78-120*		
Matrix Spike (BF42425-MS2)		**Source: 1405693-03**			Prepared & Analyzed: 06/25/14 12:55					
Nitrate (as N)	1.34 J2	0.04	0.01	mg/L	1.7	ND	79	85-115		
Nitrite (as N)	1.52	0.04	0.01	mg/L	1.4	ND	108	85-115		
Orthophosphate as P	0.834	0.040	0.010	mg/L	0.90	ND	93	85-115		
Sulfate	9.09	0.60	0.20	mg/L	9.0	1.16	88	85-115		
Surrogate: Dichloroacetate	*0.834*			*mg/L*	*1.0*		*83*	*78-120*		
Surrogate: Dichloroacetate	*0.834*			*mg/L*	*1.0*		*83*	*78-120*		
Surrogate: Dichloroacetate	*0.834*			*mg/L*	*1.0*		*83*	*78-120*		
Surrogate: Dichloroacetate	*0.834*			*mg/L*	*1.0*		*83*	*78-120*		
Batch BF42532 - BOD										
Blank (BF42532-BLK1)					Prepared: 06/25/14 Analyzed: 06/30/14 15:55					
Carbonaceous BOD	2 U	2	2	mg/L						
LCS (BF42532-BS1)					Prepared: 06/25/14 Analyzed: 06/30/14 15:55					
Carbonaceous BOD	182	2	2	mg/L	200		91	85-115		

Hazen and Sawyer
10002 Princess Palm Ave, Suite 200
Tampa, FL 33619

July 22, 2014
Work Order: 1406489

Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BF42532 - BOD										
LCS Dup (BF42532-BSD1)					Prepared: 06/25/14 Analyzed: 06/30/14 15:55					
Carbonaceous BOD	182	2	2	mg/L	200		91	85-115	0	200
Duplicate (BF42532-DUP1)		**Source: 1406489-01**			Prepared: 06/25/14 Analyzed: 06/30/14 15:55					
Carbonaceous BOD	55	2	2	mg/L		61			9	25
Batch BF42629 - alkalinity										
Blank (BF42629-BLK1)					Prepared & Analyzed: 06/27/14 09:37					
Total Alkalinity	2.0 U	8.0	2.0	mg/L						
LCS (BF42629-BS1)					Prepared & Analyzed: 06/27/14 09:44					
Total Alkalinity	120	8.0	2.0	mg/L	120		95	90-110		
Matrix Spike (BF42629-MS1)		**Source: 1406210-05**			Prepared & Analyzed: 06/27/14 10:19					
Total Alkalinity	130	8.0	2.0	mg/L	120	9.8	92	80-120		
Matrix Spike Dup (BF42629-MSD1)		**Source: 1406210-05**			Prepared & Analyzed: 06/27/14 10:25					
Total Alkalinity	130	8.0	2.0	mg/L	120	9.8	92	80-120	0	26
Batch BF42707 - TSS prep										
Blank (BF42707-BLK1)					Prepared: 06/27/14 Analyzed: 06/30/14 15:58					
Total Suspended Solids	1 U	1	1	mg/L						
Volatile Suspended Solids	1 U	1		mg/L						
Blank (BF42707-BLK2)					Prepared: 06/27/14 Analyzed: 06/30/14 15:58					
Total Suspended Solids	1 U	1	1	mg/L						
Volatile Suspended Solids	1 U	1		mg/L						

Hazen and Sawyer
10002 Princess Palm Ave, Suite 200
Tampa, FL 33619

July 22, 2014
Work Order: 1406489

Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BF42707 - TSS prep										
LCS (BF42707-BS1)					Prepared: 06/27/14 Analyzed: 06/30/14 15:58					
Total Suspended Solids	45.5	1	1	mg/L	50		91	85-115		
LCS (BF42707-BS2)					Prepared: 06/27/14 Analyzed: 06/30/14 15:58					
Total Suspended Solids	50.0	1	1	mg/L	50		100	85-115		
Duplicate (BF42707-DUP1)		**Source: 1406550-07**			Prepared: 06/27/14 Analyzed: 06/30/14 15:58					
Total Suspended Solids	8.00	1	1	mg/L		18.2			78	30
Volatile Suspended Solids	8.00	1		mg/L		4.00			67	20
Batch BF43015 - COD prep										
Blank (BF43015-BLK1)					Prepared: 06/30/14 Analyzed: 07/01/14 14:58					
Chemical Oxygen Demand	10 U	25	10	mg/L						
LCS (BF43015-BS1)					Prepared: 06/30/14 Analyzed: 07/01/14 14:58					
Chemical Oxygen Demand	45	25	10	mg/L	50		90	90-110		
Matrix Spike (BF43015-MS1)		**Source: 1406427-01**			Prepared: 06/30/14 Analyzed: 07/01/14 14:58					
Chemical Oxygen Demand	530	25	10	mg/L	250	310	88	85-115		
Matrix Spike Dup (BF43015-MSD1)		**Source: 1406427-01**			Prepared: 06/30/14 Analyzed: 07/01/14 14:58					
Chemical Oxygen Demand	530	25	10	mg/L	250	310	88	85-115	0	32
Batch BF43037 - Sulfide prep										
Blank (BF43037-BLK1)					Prepared & Analyzed: 06/30/14 09:29					
Sulfide	0.10 U	0.40	0.10	mg/L						

Hazen and Sawyer
10002 Princess Palm Ave, Suite 200
Tampa, FL 33619

July 22, 2014
Work Order: 1406489

Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BF43037 - Sulfide prep										
LCS (BF43037-BS1)					Prepared & Analyzed: 06/30/14 09:29					
Sulfide	9.33	0.40	0.10	mg/L	10		93	85-115		
Matrix Spike (BF43037-MS1)		**Source: 1406553-01**			Prepared & Analyzed: 06/30/14 09:29					
Sulfide	15.6	0.40	0.10	mg/L	10	ND	156	85-115		
Matrix Spike Dup (BF43037-MSD1)		**Source: 1406553-01**			Prepared & Analyzed: 06/30/14 09:29					
Sulfide	15.6	0.40	0.10	mg/L	10	ND	156	85-115	0	14
Batch BG40502 - alkalinity										
Blank (BG40502-BLK1)					Prepared & Analyzed: 07/05/14 15:24					
Total Alkalinity	2.0 U	8.0	2.0	mg/L						
LCS (BG40502-BS1)					Prepared & Analyzed: 07/05/14 15:30					
Total Alkalinity	120	8.0	2.0	mg/L	120		95	90-110		
Matrix Spike (BG40502-MS1)		**Source: 1406654-06**			Prepared & Analyzed: 07/05/14 17:48					
Total Alkalinity	220	8.0	2.0	mg/L	120	110	93	80-120		
Matrix Spike Dup (BG40502-MSD1)		**Source: 1406654-06**			Prepared & Analyzed: 07/05/14 17:56					
Total Alkalinity	220	8.0	2.0	mg/L	120	110	92	80-120	0.4	26
Batch BG40907 - Ion Chromatography 300.0 Prep										
Blank (BG40907-BLK1)					Prepared & Analyzed: 07/09/14 17:23					
Sulfate	0.20 U	0.60	0.20	mg/L						
Surrogate: Dichloroacetate	*0.892*			*mg/L*	*1.0*		*89*	*78-120*		

Hazen and Sawyer
10002 Princess Palm Ave, Suite 200
Tampa, FL 33619

July 22, 2014
Work Order: 1406489

Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BG40907 - Ion Chromatography 300.0 Prep										
LCS (BG40907-BS1)					Prepared & Analyzed: 07/09/14 17:34					
Sulfate	9.33	0.60	0.20	mg/L	9.0		104	85-115		
Surrogate: Dichloroacetate	*0.998*			*mg/L*	*1.0*		*100*	*78-120*		
LCS Dup (BG40907-BSD1)					Prepared & Analyzed: 07/09/14 17:45					
Sulfate	9.15	0.60	0.20	mg/L	9.0		102	85-115	2	200
Surrogate: Dichloroacetate	*1.02*			*mg/L*	*1.0*		*102*	*78-120*		
Matrix Spike (BG40907-MS1)		**Source: 1407014-06**			Prepared & Analyzed: 07/09/14 18:30					
Sulfate	113 L	0.60	0.20	mg/L	9.0	104	95	85-115		
Surrogate: Dichloroacetate	*0.877*			*mg/L*	*1.0*		*88*	*78-120*		
Matrix Spike (BG40907-MS2)		**Source: 1406866-02**			Prepared & Analyzed: 07/09/14 19:48					
Sulfate	18.0	0.60	0.20	mg/L	9.0	8.44	107	85-115		
Surrogate: Dichloroacetate	*1.00*			*mg/L*	*1.0*		*100*	*78-120*		

Hazen and Sawyer
10002 Princess Palm Ave, Suite 200
Tampa, FL 33619

July 22, 2014
Work Order: 1406489

Nitrogen, Ammonia - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Matrix Spike Dup (339110-10)		**Source: 680-339110-8**			Prepared & Analyzed: 07/15/14 08:50					
Ammonia (as N)	1.63 J3	0.050	0.026	mg/L	1.00		129	90-110	6	30
Duplicate (339110-25)		**Source: 680-339110-24**			Prepared & Analyzed: 07/15/14 09:22					
Ammonia (as N)	30.8	1.0	0.52	mg/L				-	7	30
LCS (339110-35)					Prepared & Analyzed: 07/15/14 09:45					
Ammonia (as N)	1.00	0.050	0.026	mg/L	1.00		100	90-110		
Blank (339110-46)					Prepared & Analyzed: 07/15/14 10:43					
Ammonia (as N)	0.026 U,U	0.050	0.026	mg/L				-		
Matrix Spike (339110-9)		**Source: 680-339110-8**			Prepared & Analyzed: 07/15/14 08:50					
Ammonia (as N)	1.53 J3	0.050	0.026	mg/L	1.00		119	90-110		
Matrix Spike (339111-23)		**Source: 680-339111-22**			Prepared & Analyzed: 07/15/14 09:45					
Ammonia (as N)	3.18 J3	0.10	0.052	mg/L	1.00		123	90-110		
LCS (339111-24)					Prepared & Analyzed: 07/15/14 09:45					
Ammonia (as N)	1.00	0.050	0.026	mg/L	1.00		100	90-110		
Matrix Spike Dup (339111-26)		**Source: 680-339111-22**			Prepared & Analyzed: 07/15/14 09:45					
Ammonia (as N)	3.15 J3	0.10	0.052	mg/L	1.00		121	90-110	1	30
Blank (339111-44)					Prepared & Analyzed: 07/15/14 10:43					
Ammonia (as N)	0.026 U,U	0.050	0.026	mg/L				-		

Hazen and Sawyer
10002 Princess Palm Ave, Suite 200
Tampa, FL 33619

July 22, 2014
Work Order: 1406489

Nitrogen, Ammonia - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Duplicate (616182X)		**Source: 1406489-02**			Prepared & Analyzed: 07/15/14 09:56					
Ammonia (as N)	3.22	0.10	0.052	mg/L		3.1		-	3	30

Hazen and Sawyer
10002 Princess Palm Ave, Suite 200
Tampa, FL 33619

July 22, 2014
Work Order: 1406489

Nitrogen, Total Kjeldahl - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
LCS (339754-28)					Prepared: 07/14/14 Analyzed: 07/17/14 19:19					
Nitrogen, Kjeldahl	2.29	0.20	0.15	mg/L	2.00		114	75-125		
Blank (339754-29)					Prepared: 07/14/14 Analyzed: 07/17/14 19:20					
Nitrogen, Kjeldahl	0.15 U,U	0.20	0.15	mg/L				-		
Matrix Spike (339754-31)		**Source: 680-339754-30**			Prepared: 07/14/14 Analyzed: 07/17/14 19:22					
Nitrogen, Kjeldahl	3.40	0.20	0.15	mg/L	2.00		88	75-125		
Matrix Spike Dup (339754-32)		**Source: 680-339754-30**			Prepared: 07/14/14 Analyzed: 07/17/14 19:23					
Nitrogen, Kjeldahl	3.71	0.20	0.15	mg/L	2.00		104	75-125	9	40
Duplicate (339754-34)		**Source: 680-339754-33**			Prepared: 07/14/14 Analyzed: 07/17/14 19:27					
Nitrogen, Kjeldahl	1.13	0.20	0.15	mg/L				-	3	40

Hazen and Sawyer
10002 Princess Palm Ave, Suite 200
Tampa, FL 33619

July 22, 2014
Work Order: 1406489

Phosphorus, Total - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Matrix Spike (339753-107)		**Source: 680-339753-106**			Prepared: 07/14/14 Analyzed: 07/18/14 09:42					
Phosphorus	6.73	1.0	0.41	mg/L	2.00		69	60-140		
Matrix Spike Dup (339753-108)		**Source: 680-339753-106**			Prepared: 07/14/14 Analyzed: 07/18/14 09:43					
Phosphorus	6.87	1.0	0.41	mg/L	2.00		76	60-140	2	40
LCS (339753-28)					Prepared: 07/14/14 Analyzed: 07/17/14 19:19					
Phosphorus	2.21	0.10	0.041	mg/L	2.00		110	60-140		
Duplicate (339753-34)		**Source: 680-339753-33**			Prepared: 07/14/14 Analyzed: 07/17/14 19:27					
Phosphorus	0.237	0.10	0.041	mg/L				-	18	40
Blank (339930-95)					Prepared: 07/14/14 Analyzed: 07/19/14 17:03					
Phosphorus	0.041 U,U	0.10	0.041	mg/L				-		

Hazen and Sawyer
10002 Princess Palm Ave, Suite 200
Tampa, FL 33619

July 22, 2014
Work Order: 1406489

* Qualifiers, Notes and Definitions

Results followed by a "U" indicate that the sample was analyzed but the compound was not detected. Results followed by "I" indicate that the reported value is between the laboratory method detection limts and the laboratory practical quantitation limit.

A statement of estimated uncertainty of test results is available upon request.

For methods marked with **, all QC criteria have been met for this method which is equivalent to a SAL certified method.

Test results in this report meet all the requirements of the NELAC standards. Any applicable qualifiers are shown below.

U	Indicates that the compound was analyzed for but not detected.
Q	Sample held beyond the accepted holding time.
L	Off-scale high. Result exceeded highest calibration standard.
J6	The sample matrix interfered with the ability to make any accurate determination.
J5	Matrix spike of this sample was outside typical range. All other QC criteria were acceptable.
J3	Estimated value; value may not be accurate. Spike recovery or RPD outside of criteria.
J2	Quality control value for accuracy was outside control limits.
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.

Questions regarding this report should be directed to :

Kathryn Nordmark
Telephone (813) 855-1844 FAX (813) 855-2218
Kathryn@southernanalyticallabs.com

SOUTHERN ANALYTICAL LABORATORIES, INC.
110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677 813-855-1844 fax 813-855-2218

SAL Project No. 146489

Client Name	Contact / Phone:
Hazen and Sawyer	
Project Name / Location: BHS6 SE#5	
Samplers: (Signature)	

Matrix Codes: DW-Drinking Water WW-Wastewater SW-SurfaceWater SL-Sludge SO-Soil GW-Groundwater SA-Saline Water O-Other R-Reagent Water

PARAMETER / CONTAINER DESCRIPTION

SAL Use Only Sample No.	Sample Description	Date	Time	Matrix	Composite	Grab	40mLV, $Na_2S_2O_3$ 504.1, 8260	500mLP, Cool Total Alkalinity, TSS, VSS, CBOD, NOx, OP, SO_4	125mLP, H_2SO_4 COD, TKN, NH_3, TP	500mLP, NaOH, Zn Acetate H_2S	125mLP, Cool Total Alkalinity, TSS, VSS, CBOD, NOx	125mLP, H_2SO_4 TKN, NH_3	500mLP, Cool Total Alkalinity, TSS, VSS, CBOD, NOx	500mLP, Cool Total Alkalinity, TSS, VSS, CBOD, NOx, SO_4	125mLP, H_2SO_4 COD, TKN, NH_3	Field pH	Field Temperature	Field Conductivity	Field DO			No. of Containers (Total per each location)
01	BHS6-STE	6/23/14	10:48	WW		X	5	2	1	1						7.13	24.2	1278	.23			
02	BHS6-DP01		11:56	WW		X					1	1										
03	BHS6-DP02		12:12	WW		X					1	1				↙	↘					
04	BHS6-DP03		11:26	WW		X						1	2			25.3	6.36	898	30	.30		
05	BHS6-DP04		11:36	WW		X								2	1	6.39	25.4	930	.16			
06	BHS6-ST1&2a		11:06	WW		X		2	1	1						6.28	25.9	946	.29			
07	BHS6-ST1&2a-DUP		11:08	WW		X		2	1	1						6.28	25.9	945	.30			
08	BHS6-ST2b-T		10:30	WW		X	5	2	1	1						6.60	24.1	108	.34			
09	BHS6-EB	↓	11:48	R		X		2	1	1						5.26	25.9	2.1	.61			
10	Trip Blank	6/23/14		R		X	1															

Containers Prepared/ Relinquished:	Date/Time: 6/23/14	Received: 6/24/14 15:00	Date/Time:
Relinquished:	Date/Time: 6/23/14 1430	Received:	Date/Time: 6-23-14 6-24-14 925
Relinquished:	Date/Time:	Received:	Date/Time:
Relinquished:	Date/Time:	Received:	Date/Time:
Relinquished:	Date/Time:	Received:	Date/Time:

Seal intact?	Ø N N/A
Samples intact upon arrival?	Ø N N/A
Received on ice? Temp. 1.9	Ø N N/A
Proper preservatives indicated?	Ø N N/A
Rec'd within holding time?	Ø N N/A
Volatiles rec'd w/out headspace?	Ø N N/A
Proper containers used?	Ø N N/A

Instructions / Remarks:
Ship to:
Harmon Harden
1825 Cottage Grove Rd.
Talahassee, FL 32303 850-212-4378

Chain of Custody xls
Rev.Date 11/19/01

Chain of Custody

Appendix B: Operation & Maintenance Log

Table B.1
Operation and Maintenance Log

Date	Description
9/12/2013	Checked system. Met with contractor regarding second system construction.
11/5/2013	Started installation of second passive treatment system.
11/6/2013	Finished installation
11/14/2013	High water alarm in pump tank. Pump was not working.
	Contractor repaired loose wiring. Pump had not run from time of installation.
	Cleaned two Stage 1 sprayers clogged with construction debris.
11/20/2013	Preliminary Sample Event No. 1 (STE and ST1).
	No ponding in drainfield observation ports.
	Cleaned all four Stage 1 sprayers - not clogged but were not spraying properly.
12/4/2013	Preliminary Sample Event No. 2
	Ponding of 1.5 inches in drainfield obs. port #2, other three ports were dry.
12/20/2013	Preliminary sampling indicated nitrification was insufficient
	Checked and cleaned Stage 1 sprayers.
	Even after cleaning, majority of spray going straight down.
12/21/2013	Rotated Stage 1 sprayers so they are spraying straight up on the tank lid.
	Observed better coverage of Stage 1 media
1/9/2014	Site visit. System ok. Observed that vents on Stage 1 tank were pushed down.
	Vents were pulled back up and resealed with existing mastic.
1/22/2014	Sample Event No. 1
3/7/2014	Site visit. System ok. Observed one of the sprayers had a broken tip.
	Ponding of ¼ inch in observation port #2, all others dry.
3/20/2014	Removed existing sprayers. Installed 3 Orenco sprayers.
3/24/2014	Site visit. System ok. Ponding of 1/4 inch in observation port #2, all others dry.
	Sprayers working well.
4/10/2014	Sample Event No. 2
	Water level within Stage 1&2a tank elevated approximately 14-inches.
4/10/2014	Installed piezometer in the Stage 1&2a tank.
4/14/2014	Attempt to clear clog in the inlet pipe to Stage 2b tank with plumbing snake.
4/16/2014	Cleared clog in inlet pipe to Stage 2b tank with compressed air and rubber bladder.
	Water level in piezometer in Stage 1&2a tank dropped by approximately 12 inches.
4/28/2014	System Check. Ponding of 1/4 inch in observation port #2, all others dry.
	Sprayers working well. Water level in ST1 sample port elevated by less than 2 inches.
5/7/2014	Sample Event No. 3.
	Water level in ST1 sample port elevated by approximately 4 inches.

Table B.1 (con't)
Operation and Maintenance Log

Date	Description
5/27/14	System Check
	Water level in ST1 sample port elevated by approximately 8 inches
5/30/14	Started repair of sulfur tank inlet pipe. Drained tank, removed a portion of sulfur.
5/31/14	Finished removing sulfur.
	Repaired inlet pipe to sulfur tank and replace sulfur in tank.
6/23/14	Sample Event No. 4
	Water level in Stage 1 tank at normal operational level.

Appendix C: Vericomm PLC Data

System Status			23-Jun-14	15-Jun-14	1-Jun-14	11-May-14
Point	Description	Status	Value	Value	Value	Value
1	Alarm Status	Automatic	OK	OK	OK	OK
2	Alert Status	Automatic	OK	OK	OK	OK
3	System Mode	Automatic	Normal	Normal	Normal	Normal
5	Timer Mode	Automatic	Off	Normal	Overide	Normal
6	Active Off Time	Automatic	180.0 Minutes	180.0 Minutes	30.0 Minutes	180.0 Minutes
7	Active On Time	Automatic	2.0 Minutes	2.0 Minutes	2.0 Minutes	2.0 Minutes
9	Pump Mode	Automatic	Off	OffCycl	OffCycl	OffCycl
10	Pump Status	Automatic	Off	Off	Off	Off
12	Pump Cycles Today	Automatic	3.0 Cycles	5.0 Cycles	2.0 Cycles	17.0 Cycles
13	Override Cycles Today	Automatic	2.0 Cycles	5.0 Cycles	2.0 Cycles	11.0 Cycles
14	Pump Run Time Today	Automatic	5.3 Minutes	8.2 Minutes	2.2 Minutes	37.4 Minutes
Settings						
Point	Description	Status	Value	Value	Value	Value
17	Off Cycle Time	Constant/Setpoint	180.0 Minutes	180.0 Minutes	180.0 Minutes	180.0 Minutes
18	On Cycle Time	Constant/Setpoint	2.0 Minutes	2.0 Minutes	2.0 Minutes	2.0 Minutes
19	Override Off Cycle Time	Constant/Setpoint	30.0 Minutes	30.0 Minutes	30.0 Minutes	30.0 Minutes
20	Override On Cycle Time	Constant/Setpoint	2.0 Minutes	2.0 Minutes	2.0 Minutes	2.0 Minutes
21	Minimum Override Cycles	Automatic	3.0 Cycles	3.0 Cycles	3.0 Cycles	3.0 Cycles
23	Override Cycle Limit per Day	Constant/Setpoint	21.0 Cycles	21.0 Cycles	21.0 Cycles	21.0 Cycles
24	Time Limit per Day	Constant/Setpoint	200.0 Minutes	200.0 Minutes	200.0 Minutes	200.0 Minutes
25	High Level Pump Test	Automatic	5.0 Minutes	5.0 Minutes	5.0 Minutes	5.0 Minutes
28	Alarm Update Interval	Timing Override	120.0 Minutes	480.0 Minutes	240.0 Minutes	240.0 Minutes
29	Page Delay	Automatic	960.0 Minutes	960.0 Minutes	960.0 Minutes	960.0 Minutes
30	Page Interval	Automatic	30.0 Minutes	30.0 Minutes	30.0 Minutes	30.0 Minutes
31	Local Alarm Delay	Constant/Setpoint	1140.0 Minutes	1140.0 Minutes	1140.0 Minutes	1140.0 Minutes
32	Local Reactivate Delay	Automatic	120.0 Minutes	120.0 Minutes	120.0 Minutes	120.0 Minutes
Troubleshooting						
Point	Description	Status	Value	Value	Value	Value
33	Top Float Status	Automatic	OK	OK	OK	OK
34	Middle Float Status	Automatic	OK	OK	OK	OK
35	Bottom Float Status	Automatic	OK	OK	OK	OK
37	Contactor Status	Automatic	OK	OK	OK	OK
38	Pump Status	Automatic	OK	OK	OK	OK
40	Filter Status	Automatic	OK	OK	OK	OK
41	Tank Status	Automatic	OK	OK	OK	OK
43	Power Status	Automatic	OK	OK	OK	OK
Flow Data						
Point	Description	Status	Value	Value	Value	Value
49	Pump Run Time Today	Automatic	5.3 Minutes	8.2 Minutes	2.2 Minutes	37.4 Minutes
50	Override Cycles Today	Automatic	2	5	2	11
51	Pump Cycles Today	Automatic	3.0 Cycles	5.0 Cycles	2.0 Cycles	17.0 Cycles
52	Average Run Time per Cycle Today	Automatic	1.8 Minutes	1.6 Minutes	1.1 Minutes	2.2 Minutes
54	Brownouts Today	Automatic	0.0	0.0	0.0	0.0

30-Day History Data			23-Jun-14	15-Jun-14	1-Jun-14	11-May-14
Point	Description	Status	Value	Value	Value	Value
65	30 Day Average Run Time per Day	Automatic	13.5 Minutes	14.2 Minutes	17.5 Minutes	17.6 Minutes
66	30 Day Average Override Cycles per Day	Automatic	0.7 Cycles	0.5 Cycles	1.2 Cycles	1.8 Cycles
67	30 Day Average Cycles per Day	Automatic	6.7 Cycles	7.0 Cycles	8.3 Cycles	8.1 Cycles
68	30 Day Average Run Time per Cycle	Automatic	2.0 Minutes	2.0 Minutes	2.1 Minutes	2.2 Minutes
71	30 Day Total Pump Run Time	Automatic	405.0 Minutes	426.8 Minutes	524.2 Minutes	529.4 Minutes
72	30 Day Total Override Cycles	Automatic	20.0 Cycles	14.0 Cycles	35.0 Cycles	55.0 Cycles
73	30 Day Total Cycles	Automatic	201.0 Cycles	211.0 Cycles	250.0 Cycles	242.0 Cycles
76	30 Day Total Brownouts	Automatic	0	0	0	0
Totalized Pump Data						
Point	Description	Status	Value	Value	Value	Value
82	Pump Total Run Time	Automatic	1633.4 Hours	1631.6 Hours	1628.4 Hours	1623.2 Hours
83	Pump Total Cycles	Automatic	49241.0 Cycles	49189.0 Cycles	49094.0 Cycles	48941.0 Cycles
Miscellaneous						
Point	Description	Status	Value	Value	Value	Value
145	Pump On Auto	Automatic	Off	Off	Off	Off
147	Pump Test Today	Automatic	Off	On	On	On
148	Pump Check Enable	Automatic	Off	Off	Off	Off
149	Total Override Cycles	Automatic	0	0	1	0
150	High Level Condition	Automatic	Off	Off	Off	Off
151	Leak Check Enable	Automatic	Off	On	On	On
152	Brownout State	Automatic	Off	Off	Off	Off
153	Test Mode	Automatic	Off	Off	Off	Off
Alarm Points						
Point	Description	Status	Value	Value	Value	Value
161	General Alarm	Automatic	Off	Off	Off	Off
162	New Alarm	Automatic	Off	Off	Off	Off
163	Update Central Enable	Automatic	On	On	On	On
167	Page Alarm Start	Automatic	Off	Off	Off	Off
168	Pager Signal	Override Off	Off	Off	Off	Off
169	Local Alarm Start	Automatic	Off	Off	Off	Off
170	Local Alarm Silence	Automatic	Off	Off	Off	Off
Inputs & Outputs						
Point	Description	Status	Value	Value	Value	Value
177	High Level/Override Timer Float Input	Automatic	Off	Off	Off	Off
178	Timer Float Input	Automatic	Off	On	On	On
179	Redundant Off Float & Low Level Alarm Input	Automatic	On	On	On	On
181	Push To Silence Input	Automatic	Off	Off	Off	Off
182	Auxiliary Contact Input	Automatic	Off	Off	Off	Off
186	Pump Output	Automatic	Off	Off	Off	Off
188	Alarm Light Output	Automatic	Off	Off	Off	Off
189	Audible Alarm Output	Automatic	Off	Off	Off	Off

o:\44237-001\Wpdocs\Report\Draft