



# Florida Onsite Sewage Nitrogen Reduction Strategies Study

Task B.7

## **B-HS6 Field System Monitoring Report No. 1**

### **Progress Report**

February 2014

442-27-001

**HAZEN AND SAWYER**  
Environmental Engineers & Scientists

In association with:



**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. 1**

#### **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

**February 2014**

#### **Prepared by:**

**HAZEN AND SAWYER**  
Environmental Engineers & Scientists

In Association With:

**AET**  
Applied Environmental Technology





## **B-HS6 Field System Monitoring Report No. 1**

---

### **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 first 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 first B-HS6 monitoring and sampling event conducted on January 22, 2014 (Experimental Day 69). 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 eight points in the treatment system, and sample analyses by a NELAC certified laboratory.

### **3.0 Materials and Methods**

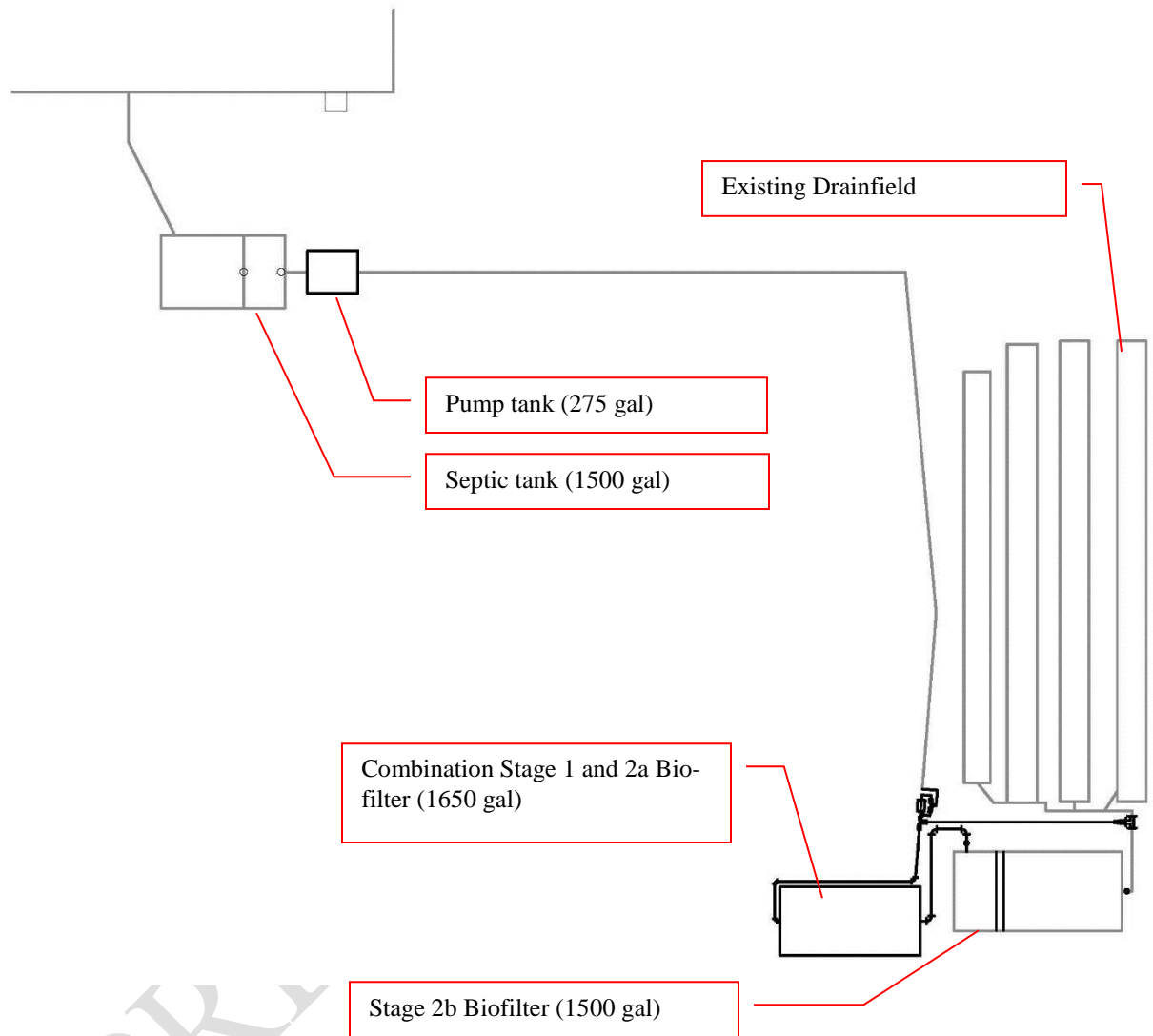
#### **3.1 Project Site**

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.

c:\44237-001R004\Wpdocs\Report\Final

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).

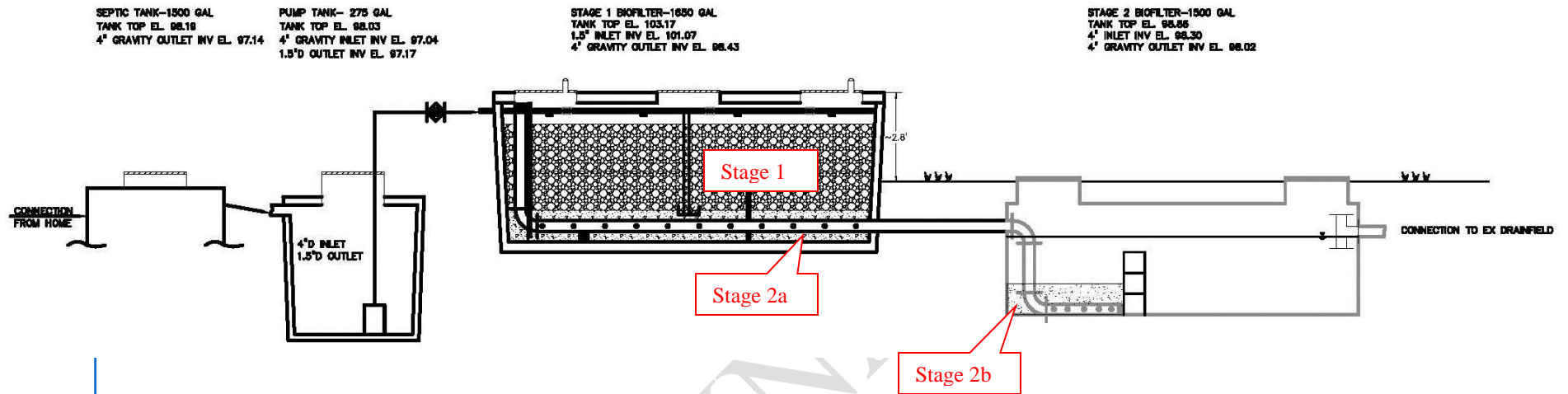




**Figure 1**  
**Plan view of B-HS6 system layout installed in Wakulla county**

o:\44237-001R004\Wpdocs\Report\Final

October 2013

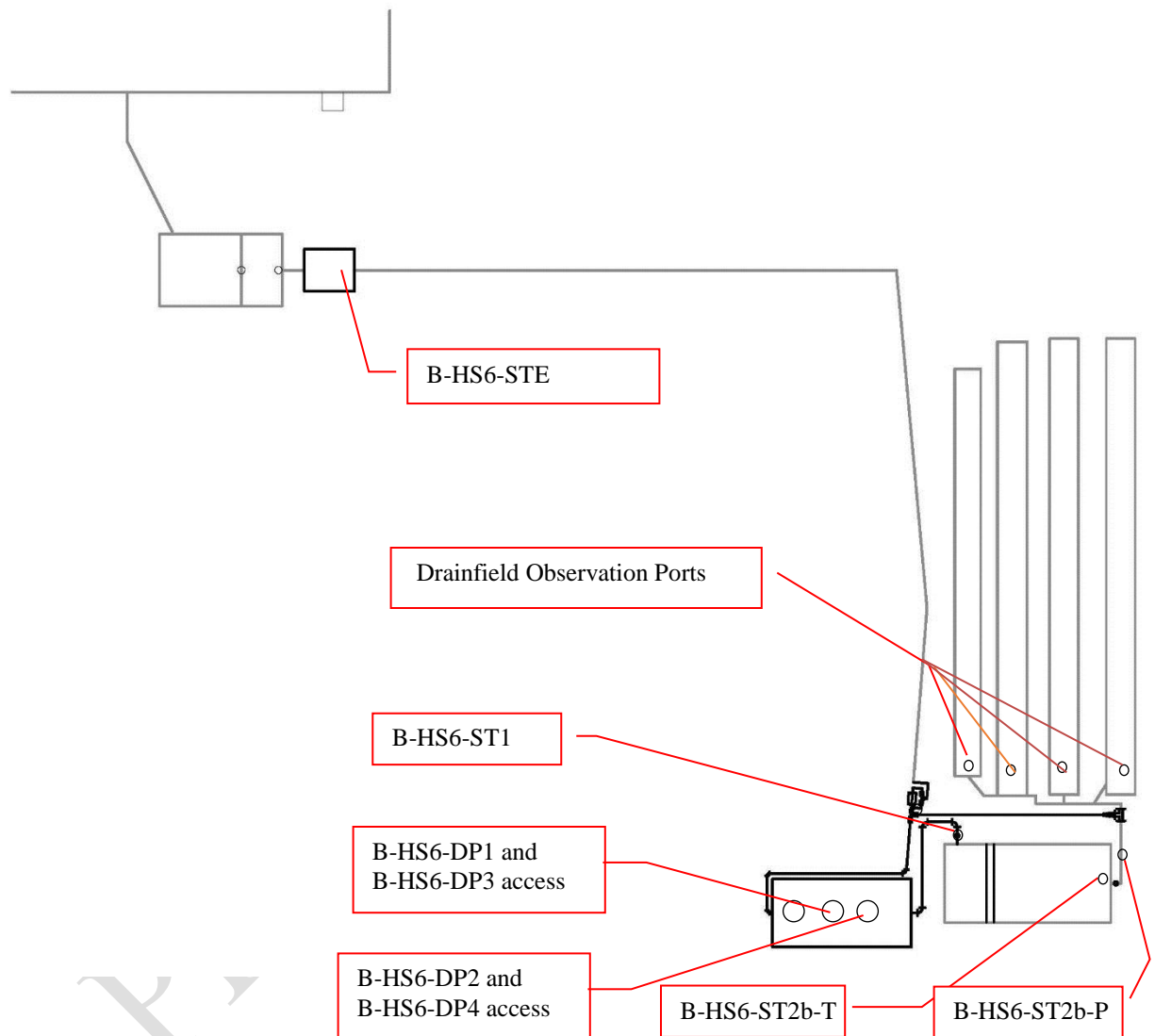


**Figure 2**  
**Flow Schematic of B-HS6 PNRS installed in Wakulla County**

### 3.2 Monitoring and Sample Locations and Identification

The eight primary monitoring points for the B-HS6 system are shown in Figure 3. Household wastewater enters the 1<sup>st</sup> 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 primary 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**  
**BHS-6 Treatment System Sampling and Monitoring Locations**

o:\44237-001R004\Wpdocs\Report\Final



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

The pump tank contents are discharged to the top of the Stage 1 biofilter through 4 spray nozzles. 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 primary sampling points (B-HS6-DP1 and B-HS6-DP2) are sampled by connecting a peristaltic pump to the drivepoint tubing, representing the Stage 1 unsaturated biofilter effluent.



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

Twelve inches of lignocellulosic media was installed underneath the expanded clay media. 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 drivepoints were installed at the bottom of the Stage 2a saturated lignocellulosic media (see Figure 6). The fourth and fifth primary 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.

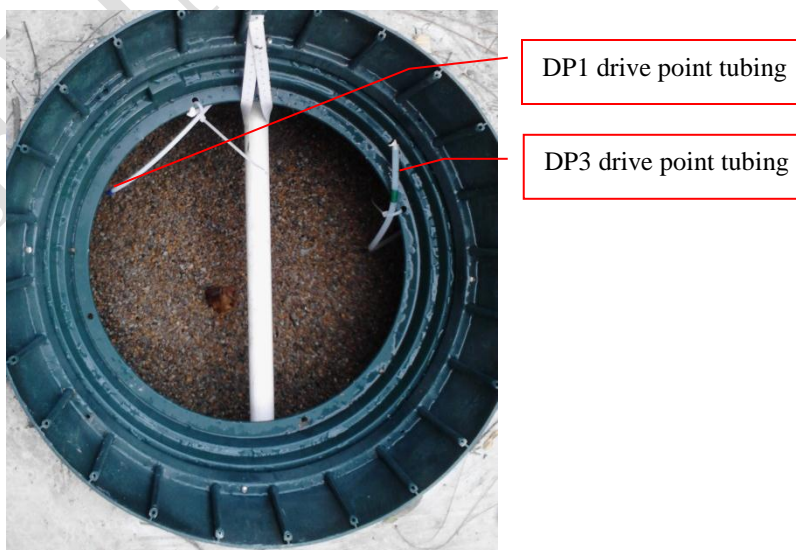




**Figure 6**

**Stage 2a Saturated Biofilter Effluent (B-HS6-DP3 and B-HS6-DP4 sample)**

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

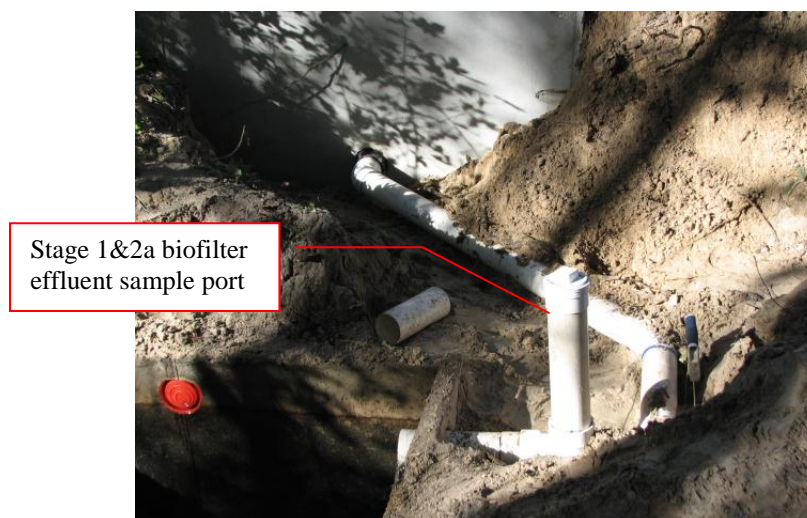


**Figure 7**

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

o:\44237-001R004\Wpdocs\Report\Final

The effluent from the Stage 1&2a biofilter flows into the Stage 2b biofilter by gravity. The sixth primary sampling point (B-HS6-ST1) 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).



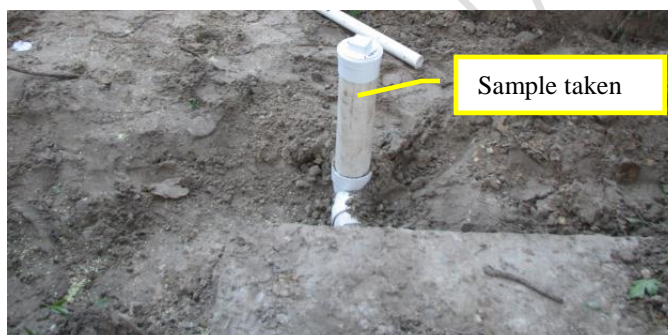
**Figure 8**  
**Stage 1&2a Biofilter Effluent Sample Port (B-HS6-ST1 sample)**

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-ST2-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-ST2-T sample)**

The eighth primary sampling point (B-HS6-ST2-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-ST2-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. Preliminary sampling for several key parameters was conducted November 20, 2013 (Experimental Day 6) and December 4, 2013 (Experimental Day 20) to evaluate start-up performance. The first formal sampling event was conducted January 22, 2014 (Experimental Day 69). For this first formal sampling event, the water meter for the house and treatment system flow meters were read and recorded on January 22, 2014. 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 initially 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**

Preliminary start-up sampling was conducted on November 20, 2013 (Experimental Day 6) and December 4, 2013 (Experimental Day 20) and consisted of monitoring the nitrogen transformation through the system. The first formal sample event (Sample Event No. 1), which is the subject of this report, was conducted on January 22, 2014 (Experimental Day 69). A full suite of influent, intermediate and effluent water quality samples were collected from the system for water quality analysis. Samples were collected at each of the eight 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, B-HS6-ST2-T, B-HS6-ST2-P. Duplicate samples were also taken at B-HS6-ST1 and B-HS6-ST2-P. 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, B-HS6-ST2-T, 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. Sample volumes for samples B-HS6-DP1 and B-HS6-DP2 were too small to measure field parameters.

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<sub>3</sub>-N), nitrate nitrogen (NO<sub>3</sub>-N), nitrite nitrogen (NO<sub>2</sub>-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 ammonia nitrogen (NH<sub>3</sub>-N), nitrate nitrogen (NO<sub>3</sub>-N), and nitrite nitrogen (NO<sub>2</sub>-N). 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 <sub>3</sub>	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 <sub>3</sub> -N)	EPA 350.1	0.005 mg/L
Nitrate Nitrogen (NO <sub>3</sub> -N)	EPA 300.0	0.01 mg/L
Nitrite Nitrogen (NO <sub>2</sub> -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 <sub>5</sub> )	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**

<b>Date and Time Read</b>	<b>Household Water Meter Reading</b>	<b>Average Daily Household Flow between readings</b>	<b>PNRS Flow Meter Reading</b>	<b>Average Daily PNRS Flow between readings</b>
	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
Average since start-up to January 22, 2014		132.3		158.0

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 January 22, 2014, the household water use average was 132.3 gallons per day with periods of higher and lower flows (Table 2). The average pumped flow to the PNRS was 158.0 gallons per day from start-up through January 22, 2014.

## 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 3.

**Table 3**  
**Summary of System Electrical Use**

Date and Time Read	Electrical Meter Reading	Average Daily Electrical Use	Average Electrical Use per Gallon Treated
	Cumulative (kWh)	(kWh/day)	(kWh/gal)
11/6/2013 12:22	2749	0.00	
11/14/2013 12:32	2749	0.00	
11/20/2013 8:08	2751	0.34	0.0021
12/4/2013 7:54	2757	0.43	0.0026
12/20/2013 12:48	2764	0.43	0.0026
1/9/2014 11:53	2772	0.40	0.0027
1/22/2014 8:57	2777	0.39	0.0026
Total average start-up to 1/22/14		0.40	0.0025

The total average electrical use through January 22, 2014 was 0.40 kWh per day. The average electrical use per gallon treated was 0.0025 kWh per gallon treated, and this parameter has been fairly stable since start-up.

### 4.3 Water Quality

Water quality analytical results and raw analytical data for the preliminary start-up sampling conducted on November 20, 2013 (Experimental Day 6) and December 4, 2013 (Experimental Day 20) are included in Appendix A. The preliminary sampling results indicated that ammonia reduction was limited through the Stage 1 biofilter. 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.

Water quality results for the first full sampling event (Sample Event No.1) are listed in Table 4. Nitrogen results are graphically displayed in Figure 12. 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. 1. The performance of the various system components was compared by considering the changes through treatment of nitrogen species (TKN,  $\text{NH}_3\text{-N}$ , and  $\text{NO}_x\text{-N}$ ), as well as supporting water quality parameters.



**Figure 12**  
**Graphical Representation of Nitrogen Results**  
**Sample Event 1, January 22, 2014 (Experimental Day 69)**

**Septic Tank Effluent (STE) Quality:** The water quality characteristics of STE collected in Sample Event 1 were in the low end of the typical range generally expected for domestic STE. The measured TKN concentration for this sample event was 33 mg-N/L, which is significantly lower than preliminary STE samples taken November 20, 2013 (77 mg-N/L) and December 4, 2013 (50 mg-N/L). These values may reflect a change in household water usage since measurements were taken during the BHS-1 study period between June 2011 and January 2013. In the previous B-HS1 study, the average daily water use was 108.7 gallons/day in contrast to the 132.3 gallons per day reported in Table 2. The lower TKN values of  $53.3 \pm 22.2$  mg-N/L,  $n=3$  for the B-HS6 study period as compared to  $82.6 \pm 11$  mg-N/L,  $n=8$  from the BHS-1 study period, may be due to dilution of the waste stream.

**Stage 1 Unsaturated Effluent (DP1 and DP2):** Stage 1 unsaturated effluent (DP1 and DP2) NH<sub>3</sub>-N concentrations were 1.9 and 2.0 mg/L and the NO<sub>x</sub>-N concentrations were 39.6 and 42.5 mg/L for samples DP01 and DP02, respectively. These results indicate significant nitrification of the effluent by the Stage 1 media biofilter.

**Stage 2a Saturated Effluent (DP3 and DP4):** Stage 2b 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 and NH<sub>3</sub>-N concentrations, which were equivalent from both drivepoints, were 16 mg/L and 14 mg/L, respectively. DP3 and DP4

NO<sub>x</sub>-N concentrations were 4.4 mg/L and 2.3 mg/L, respectively, and were accompanied by a measured 0.79 and 0.86 mg/L DO and -93 and -92 mV ORP, respectively.

**Stage 1&2a Tank Effluent (ST1):** 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 7 mg/L, with 4.1 mg/L of NH<sub>3</sub>-N. The relatively high NO<sub>x</sub>-N concentration of 23.5 mg/L was accompanied by a measured 1.71 mg/L DO and -25 mV ORP. The Stage 1&2a biofilter showed incomplete nitrification and partial denitrification. The Stage 1&2a effluent TSS concentration was 4 mg/L and CBOD<sub>5</sub> was 10 mg/L.

As discussed above, the samples from inside the Stage 1&2a tank (DP3 and DP4) had different water quality characteristics than those from the outlet sample port (ST1). The tank sample TKN and NH<sub>3</sub>-N concentrations were higher, and the NO<sub>x</sub>-N concentrations were lower. 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. This is most likely due to issues with the sprayers which were providing insufficient coverage of the Stage 1 media surface prior to December 21, 2013, which is when the sprayer positions were adjusted.

**Stage 2b Tank Effluent (ST2):** Both monitoring points, B-HS6-ST2-T and B-HS6-ST2-P, had nearly identical nitrogen concentrations. Effluent NO<sub>x</sub>-N from the Stage 2b biofilter was less than 0.04 mg/L. The low NO<sub>x</sub>-N was accompanied by a measured DO of less than 0.34 mg/L DO and -71 mV ORP. The Stage 2b biofilter produced a highly reducing environment and achieved essentially complete NO<sub>x</sub>-N reduction. However, the only partially successful NH<sub>3</sub>-N reduction through the Stage 1 biofilter, was evidenced in the Stage 2 effluent NH<sub>3</sub>-N concentration of 9.5 mg/L and TKN of 11 mg/L. Final total nitrogen (TN) in the treatment system effluent was 11 mg/L. The Stage 2b effluent sulfate concentration was 130 mg/L.

Table 4  
Water Quality Analytical Results

Sample ID	Sample Date/Time	Sample Type	Temp (°C)	pH	Total Alkalinity (mg/L)	DO (mg/L)	ORP (mV)	Specific Conductance (µS)	TSS (mg/L)	VSS (mg/L)	CBOD <sub>5</sub> (mg/L)	COD	TN (mg/L N) <sup>1</sup>	TKN (mg/L N)	Organic N (mg/L N) <sup>2</sup>	NH <sub>3</sub> -N (mg/L N)	NO <sub>3</sub> -N (mg/L N)	NO <sub>2</sub> -N (mg/L N)	NO <sub>x</sub> (mg/L N)	TIN (mg/L N) <sup>3</sup>	TP (mg/L)	Ortho P (mg/L P)	Sulfate (mg/L)	H <sub>2</sub> S (mg/L)	Sulfide (mg/L)	Fecal (Ct/100 mL)	E-coli (Ct/100 mL)
BHS6-STE	1/22/14 11:34	G	16.1	7.18	500	0.08	-165.00	1091.00	24	19	75	200	33.0	33	10.0	23	0.01	0.01	0.01	23.01	7	4.9	2.5	2	4.7	340,000	300,000
BHS6-DP01	1/22/14 12:18	G														1.9	38	1.6	39.6	41.5							
BHS6-DP02	1/22/14 12:24	G														2	42	0.52	42.52	44.52							
BHS6-DP03	1/22/14 12:01	G	14.4	6.45		0.79	-93	1015			33		20.4	16	2.0	14	2.3	2.1	4.4	18.4							
BHS6-DP04	1/22/14 11:49	G	14.2	6.46		0.86	-92	1015			24		18.3	16	2.0	14	1.2	1.1	2.3	16.3							
BHS6-ST1	1/22/14 10:45	G	13.8	6.31	310	1.71	-28	926	4	4	10	37	30.5	7	2.9	4.1	23	0.51	23.51	27.61	2.8	1.8	20	0.69	0.81	6900	5700
BHS6-ST1 Dup	1/22/14 10:46	G	13.8	6.31		1.92	-28	925								4.3	24	0.52	24.52	28.82						5200	4700
BHS6-ST2-Tee	1/22/14 11:15	G	13.7	6.62	430	0.13	-71	1134	23	21	15	50	11.0	11	1.5	9.5	0.01	0.01	0.01	9.51	3	2	130	1	1.4	5600	4800
BHS6-ST2-Port	1/22/14 11:00	G	13.6	6.61	430	0.34	-71	1133	4	4	4	50	11.0	11	1.5	9.5	0.04	0.01	0.04	9.54	3	2	130	0.74	1	4600	4500
BHS6-ST2-Port Dup	1/22/14 11:01	G	13.6	6.61		0.34	-71	1133								10	0.01	0.01	0.01	10.01						3600	3100
BHS6-EB	1/22/14 12:08	G			2.8				1	1	2	10	0.06	0.05	0.04	0.009	0.01	0.01	0.01	0.019	0.01	0.01	0.2		0.1	10	6

Notes:

<sup>1</sup>Total Nitrogen (TN) is a calculated value equal to the sum of TKN and NO<sub>x</sub>.

<sup>2</sup>Organic Nitrogen (ON) is a calculated value equal to the difference of TKN and NH<sub>3</sub>.

<sup>3</sup>Total Inorganic Nitrogen (TIN) is a calculated value equal to the sum of NH<sub>3</sub> and NO<sub>x</sub>.

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.



## 5.0 B-HS5 Sample Event No. 1: Summary and Recommendations

### 5.1 Summary

The Sample Event No. 1 results indicate that:

- Septic tank effluent (STE) quality is characteristic of typical household STE quality. The total nitrogen concentration of 33 mg/L is in the lower range of values typically reported for Florida single family residence STE.
- The Stage 1 biofilter (DP1 and DP2) showed 90% nitrification; effluent contained less than 2 mg/L ammonia-N and a  $\text{NO}_x\text{-N}$  concentration of approximately 40 mg/L.
- The Stage 2a biofilter lignocellulosic media produced partial denitrification with effluent  $\text{NO}_x\text{-N}$  concentrations less than 5 mg/L.
- TKN and  $\text{NH}_3\text{-N}$  concentrations in Stage 2a biofilter effluent were 16 mg/L and 14 mg/L, respectively, and were higher than in biofilter influent.
- The Stage 1&2a effluent sample port (ST1) between the Stage 1&2a combination tank outlet and the Stage 2b sulfur tank inlet, also indicated incomplete nitrification with TKN and  $\text{NH}_3\text{-N}$  concentrations of 7 mg/L and 4.1 mg/L, respectively. The effluent indicated partial denitrification evidenced by a  $\text{NO}_x\text{-N}$  concentration of 23.5 mg/L.
- The Stage 2b sulfur biofilter (ST2) produced a reducing environment and effluent  $\text{NO}_x\text{-N}$  was less than 0.04 mg N/L.
- The total nitrogen concentration in the final effluent from the total treatment system was 11 mg/L, of which 9.5 mg/L was  $\text{NH}_3\text{-N}$ , an approximately 67% reduction from STE.

### 5.2 Recommendations

In Sample Event 1, the unsaturated Stage 1 biofilter exhibited better nitrification performance as compared to the preliminary sampling events. As discussed in Section 4.3, it was observed during preliminary sampling 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. Continued observation of the sprayer performance will determine if another type of effluent distribution system needs to be implemented.

o:\44237-001R004\Wpdocs\Report\Final

PRELIMINARY



## **Appendix A: Laboratory Report**

PRELIMINARY

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

**Table A.1**  
**Preliminary Start-up Sample Event No. 1 Results**

Sample ID	Sample Date/Time	Sample Type	Temp (°C)	pH	Total Alkalinity (mg/L)	DO (mg/L)	ORP (mV)	Specific Conductance (µS)	TSS (mg/L)	VSS (mg/L)	CBOD <sub>5</sub> (mg/L)	COD (mg/L)	TN (mg/L N) <sup>1</sup>	TKN (mg/L N)	Organic N (mg/L N) <sup>2</sup>	NH <sub>3</sub> -N (mg/L N)	NH <sub>4</sub> -N (mg/L N)	NO <sub>3</sub> -N (mg/L N)	NO <sub>2</sub> -N (mg/L N)	NO <sub>x</sub> (mg/L N)	TIN (mg/L N) <sup>3</sup>	TP (mg/L)	Ortho P (mg/L P)
BHS6-STE	11/20/13 9:10	G	20.6	7.08	510	0.12	-224	1093	32	30	61	140	50.0	50	3.0	47		0.01	0.01	0.02	47.02	13	4.4
BHS6-ST1	11/20/13 9:20	G	20.9	7.00	420	0.15	-224	1088	25	24	31	740	31.6	31	9.0	22		0.01	0.57	0.57	22.57	34	9.5

Notes:

<sup>1</sup>Total Nitrogen (TN) is a calculated value equal to the sum of TKN and NO<sub>x</sub>.

<sup>2</sup>Organic Nitrogen (ON) is a calculated value equal to the difference of TKN and NH<sub>3</sub>.

<sup>3</sup>Total Inorganic Nitrogen (TIN) is a calculated value equal to the sum of NH<sub>3</sub> and NO<sub>x</sub>.

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.

**Table A.2**  
**Preliminary Start-up Sample Event No. 2 Results**

Sample ID	Sample Date/Time	Sample Type	Temp (°C)	pH	Total Alkalinity (mg/L)	DO (mg/L)	ORP (mV)	Specific Conductance (µS)	TSS (mg/L)	VSS (mg/L)	CBOD <sub>5</sub> (mg/L)	COD (mg/L)	TN (mg/L N) <sup>1</sup>	TKN (mg/L N)	Organic N (mg/L N) <sup>2</sup>	NH <sub>3</sub> -N (mg/L N)	NO <sub>3</sub> -N (mg/L N)	NO <sub>2</sub> -N (mg/L N)	NO <sub>x</sub> (mg/L N)	TIN (mg/L N) <sup>3</sup>	TP (mg/L)	Ortho P (mg/L P)	Sulfate	H <sub>2</sub> S	Sulfide	Fecal (Ct/100 mL)	E-coli (Ct/100 mL)
BHS6-STE	12/4/13 10:59	G	19.1	7.17	560	0.22	-207	1177	25	23	60	160	77.0	77	20.0	57	0.01	0.01	0.01	57.01	17	4.9	0.45	0.79	1.8	120,000	100,000
BHS6-DP01	12/4/13 10:30	G													58	0.05	0.37	0.42	58.42								
BHS6-DP02	12/4/13 10:23	G													50	0.3	2.1	2.4	52.4								
BHS6-DP03	12/4/13 10:11	G	18.7	5.50		0.21	-126	1101			340		16.0	16	11.9	4.1	0.01	0.01	0.01	4.11						16,000	2,600
BHS6-DP04	12/4/13 9:55	G	18.2	5.30		0.42	-80.00	1166.00			450		16.0	16	14.8	1.2	0.01	0.01	0.01	1.21						90,000	790
BHS6-ST1	12/4/13 9:17	G	18.5	6.5	500	0.69	-129	1091	11	9	72	230	49.7	48	9.0	39	0.33	1.4	1.73	40.73	15	3.7				63,000	51,000
BHS6-ST2-Tee	12/4/13 9:43	G	17.2	6.24	470	0.14	-237	1217	38	34	56	340	38.0	38	14.0	24	0.04	0.01	0.04	24.04	14	4.5	92	17	20	1,800	1,800
BHS6-ST2-Port	12/4/13 9:31	G	17.2	6.2	480	0.2	-239	1216	38	26	78	380	31.0	31	6.0	25	0.01	0.01	0.01	25.01	15	4.7	93	26	30	3,000	2,700
BHS6-EB	12/4/13 11:12	G			160				1	1	2	10	0.1	0.05	0.0	0.009	0.06	0.01	0.06	0.069	0.01	0.01	16	0.01	0.1	2	2

Notes:

<sup>1</sup>Total Nitrogen (TN) is a calculated value equal to the sum of TKN and NO<sub>x</sub>.

<sup>2</sup>Organic Nitrogen (ON) is a calculated value equal to the difference of TKN and NH<sub>3</sub>.

<sup>3</sup>Total Inorganic Nitrogen (TIN) is a calculated value equal to the sum of NH<sub>3</sub> and NO<sub>x</sub>.

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.

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

**November 29, 2013**  
**Work Order: 1312519**

## Laboratory Report

Project Name		B-HS6 Preliminary						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description		BHS6-STE						
Matrix		Wastewater						
SAL Sample Number		1312519-01						
Date/Time Collected		11/20/13 09:10						
Collected by		Harmon Harden						
Date/Time Received		11/21/13 08:00						
<b><u>Inorganics</u></b>								
Ammonia as N	mg/L	47	EPA 350.1	2.0	0.47		11/25/13 11:39	50
Carbonaceous BOD	mg/L	61	SM 5210B	2	2	11/21/13 10:18	11/26/13 10:30	1
Chemical Oxygen Demand	mg/L	140	EPA 410.4	25	10	11/27/13 08:43	11/27/13 13:00	1
Nitrate (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		11/22/13 09:00	1
Nitrite (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		11/22/13 09:00	1
Orthophosphate as P	mg/L	4.4	EPA 300.0	0.040	0.010		11/22/13 09:00	1
Phosphorous - Total as P	mg/L	13	SM 4500P-E	0.40	0.10	11/22/13 15:32	11/26/13 14:14	10
Total Alkalinity	mg/L	510	SM 2320B	8.0	2.0		11/22/13 11:08	1
Total Kjeldahl Nitrogen	mg/L	50	EPA 351.2	0.20	0.05	11/25/13 08:49	11/27/13 12:50	20.83
Total Suspended Solids	mg/L	32	SM 2540D	1	1	11/21/13 08:56	11/21/13 15:01	1
Volatile Suspended Solids	mg/L	30	EPA 160.4	1	1	11/22/13 10:48	11/26/13 10:29	1
Nitrate+Nitrite (N)	mg/L	0.02 U	EPA 300.0	0.08	0.02		11/22/13 09:00	1
Sample Description		BHS6-ST1						
Matrix		Wastewater						
SAL Sample Number		1312519-02						
Date/Time Collected		11/20/13 09:20						
Collected by		Harmon Harden						
Date/Time Received		11/21/13 08:00						
<b><u>Inorganics</u></b>								
Ammonia as N	mg/L	22	EPA 350.1	0.80	0.19		11/25/13 10:49	20
Carbonaceous BOD	mg/L	31	SM 5210B	2	2	11/21/13 10:18	11/26/13 10:30	1
Chemical Oxygen Demand	mg/L	740	EPA 410.4	25	10	11/27/13 08:43	11/27/13 13:00	1
Nitrate (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		11/22/13 09:00	1
Nitrite (as N)	mg/L	0.57	EPA 300.0	0.04	0.01		11/22/13 09:00	1
Orthophosphate as P	mg/L	9.5	EPA 300.0	0.040	0.010		11/22/13 09:00	1
Phosphorous - Total as P	mg/L	34	SM 4500P-E	0.80	0.20	11/22/13 15:32	11/26/13 14:31	20
Total Alkalinity	mg/L	420	SM 2320B	8.0	2.0		11/22/13 11:26	1
Total Kjeldahl Nitrogen	mg/L	31	EPA 351.2	0.20	0.05	11/25/13 08:49	11/27/13 13:48	9.62
Total Suspended Solids	mg/L	25	SM 2540D	1	1	11/21/13 08:56	11/21/13 15:01	1
Volatile Suspended Solids	mg/L	24	EPA 160.4	1	1	11/22/13 10:48	11/26/13 10:29	1
Nitrate+Nitrite (N)	mg/L	0.57	EPA 300.0	0.08	0.02		11/22/13 09:00	1



# 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

November 29, 2013  
Work Order: 1312519

## Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b>Batch BK32104 - TSS prep</b>										
<b>Blank (BK32104-BLK1)</b>					Prepared & Analyzed: 11/21/13					
Total Suspended Solids	1 U	1	1	mg/L						
<b>LCS (BK32104-BS1)</b>					Prepared & Analyzed: 11/21/13					
Total Suspended Solids	50.8	1	1	mg/L	50		102	85-115		
<b>Duplicate (BK32104-DUP1)</b>					<b>Source: 1312447-03</b>		Prepared & Analyzed: 11/21/13			
Total Suspended Solids	1 U	1	1	mg/L		ND				30
<b>Batch BK32109 - BOD</b>										
<b>Blank (BK32109-BLK1)</b>					Prepared: 11/21/13 Analyzed: 11/26/13					
Carbonaceous BOD	2 U	2	2	mg/L						
<b>LCS (BK32109-BS1)</b>					Prepared: 11/21/13 Analyzed: 11/26/13					
Carbonaceous BOD	210	2	2	mg/L	200		105	85-115		
<b>LCS Dup (BK32109-BSD1)</b>					Prepared: 11/21/13 Analyzed: 11/26/13					
Carbonaceous BOD	199	2	2	mg/L	200		99	85-115	5	200
<b>Duplicate (BK32109-DUP1)</b>					<b>Source: 1312519-01</b>		Prepared: 11/21/13 Analyzed: 11/26/13			
Carbonaceous BOD	64	2	2	mg/L		61			5	25
<b>Batch BK32114 - Ammonia by SEAL</b>										
<b>Blank (BK32114-BLK1)</b>					Prepared & Analyzed: 11/25/13					
Ammonia as N	0.009 U	0.040	0.009	mg/L						

# 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

November 29, 2013  
Work Order: 1312519

## Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b>Batch BK32114 - Ammonia by SEAL</b>										
<b>LCS (BK32114-BS1)</b>					Prepared & Analyzed: 11/25/13					
Ammonia as N	0.48	0.040	0.009	mg/L	0.50		96	90-110		
<b>Matrix Spike (BK32114-MS1)</b>					Source: 1312445-07 Prepared & Analyzed: 11/25/13					
Ammonia as N	0.49	0.040	0.009	mg/L	0.50	0.013	95	90-110		
<b>Matrix Spike (BK32114-MS2)</b>					Source: 1312582-07 Prepared & Analyzed: 11/25/13					
Ammonia as N	0.49	0.040	0.009	mg/L	0.50	0.014	95	90-110		
<b>Matrix Spike Dup (BK32114-MSD1)</b>					Source: 1312445-07 Prepared & Analyzed: 11/25/13					
Ammonia as N	0.47	0.040	0.009	mg/L	0.50	0.013	92	90-110	3	10
<b>Matrix Spike Dup (BK32114-MSD2)</b>					Source: 1312582-07 Prepared & Analyzed: 11/25/13					
Ammonia as N	0.51	0.040	0.009	mg/L	0.50	0.014	99	90-110	4	10
<b>Batch BK32201 - Ion Chromatography 300.0 Prep</b>										
<b>Blank (BK32201-BLK1)</b>					Prepared & Analyzed: 11/22/13					
Nitrate (as N)	0.01 U	0.04	0.01	mg/L						
Nitrite (as N)	0.01 U	0.04	0.01	mg/L						
Orthophosphate as P	0.010 U	0.040	0.010	mg/L						
Surrogate: Dichloroacetate	0.999			mg/L	1.0		100	90-115		
Surrogate: Dichloroacetate	0.999			mg/L	1.0		100	90-115		
Surrogate: Dichloroacetate	0.999			mg/L	1.0		100	90-115		
<b>LCS (BK32201-BS1)</b>					Prepared & Analyzed: 11/22/13					
Orthophosphate as P	0.892	0.040	0.010	mg/L	0.90		99	85-115		
Nitrite (as N)	1.48	0.04	0.01	mg/L	1.4		106	85-115		
Nitrate (as N)	1.70	0.04	0.01	mg/L	1.7		100	85-115		
Surrogate: Dichloroacetate	1.00			mg/L	1.0		100	90-115		
Surrogate: Dichloroacetate	1.00			mg/L	1.0		100	90-115		
Surrogate: Dichloroacetate	1.00			mg/L	1.0		100	90-115		

# 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

November 29, 2013  
Work Order: 1312519

## Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b>Batch BK32201 - Ion Chromatography 300.0 Prep</b>										
<b>LCS Dup (BK32201-BSD1)</b>					Prepared & Analyzed: 11/22/13					
Nitrite (as N)	1.48	0.04	0.01	mg/L	1.4		106	85-115	0.2	200
Orthophosphate as P	0.906	0.040	0.010	mg/L	0.90		101	85-115	2	200
Nitrate (as N)	1.71	0.04	0.01	mg/L	1.7		100	85-115	0.5	200
Surrogate: Dichloroacetate	1.00			mg/L	1.0		100	90-115		
Surrogate: Dichloroacetate	1.00			mg/L	1.0		100	90-115		
Surrogate: Dichloroacetate	1.00			mg/L	1.0		100	90-115		
<b>Matrix Spike (BK32201-MS1)</b>					<b>Source: 1312569-01</b>		Prepared & Analyzed: 11/22/13			
Nitrite (as N)	1.42	0.04	0.01	mg/L	1.4	ND	101	85-115		
Orthophosphate as P	0.865	0.040	0.010	mg/L	0.90	ND	96	85-115		
Nitrate (as N)	1.87	0.04	0.01	mg/L	1.7	0.167	100	85-115		
Surrogate: Dichloroacetate	0.987			mg/L	1.0		99	90-115		
Surrogate: Dichloroacetate	0.987			mg/L	1.0		99	90-115		
Surrogate: Dichloroacetate	0.987			mg/L	1.0		99	90-115		
<b>Matrix Spike (BK32201-MS2)</b>					<b>Source: 1312577-01</b>		Prepared & Analyzed: 11/22/13			
Nitrate (as N)	1.76	0.04	0.01	mg/L	1.7	0.0220	102	85-115		
Orthophosphate as P	0.811	0.040	0.010	mg/L	0.90	ND	90	85-115		
Nitrite (as N)	1.41	0.04	0.01	mg/L	1.4	ND	101	85-115		
Surrogate: Dichloroacetate	0.960			mg/L	1.0		96	90-115		
Surrogate: Dichloroacetate	0.960			mg/L	1.0		96	90-115		
Surrogate: Dichloroacetate	0.960			mg/L	1.0		96	90-115		
<b>Batch BK32206 - alkalinity</b>										
<b>Blank (BK32206-BLK1)</b>					Prepared & Analyzed: 11/22/13					
Total Alkalinity	2.0 U	8.0	2.0	mg/L						

# 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

November 29, 2013  
Work Order: 1312519

## Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b>Batch BK32206 - alkalinity</b>										
<b>LCS (BK32206-BS1)</b>					Prepared & Analyzed: 11/22/13					
Total Alkalinity	140	8.0	2.0	mg/L	120		109	90-110		
<b>Matrix Spike (BK32206-MS1)</b>					Source: 1312533-01 Prepared & Analyzed: 11/22/13					
Total Alkalinity	280	8.0	2.0	mg/L	120	150	98	80-120		
<b>Matrix Spike Dup (BK32206-MSD1)</b>					Source: 1312533-01 Prepared & Analyzed: 11/22/13					
Total Alkalinity	280	8.0	2.0	mg/L	120	150	101	80-120	1	26
<b>Batch BK32223 - VSS Prep</b>										
<b>Blank (BK32223-BLK1)</b>					Prepared: 11/22/13 Analyzed: 11/26/13					
Volatile Suspended Solids	1 U	1		mg/L						
<b>Duplicate (BK32223-DUP1)</b>					Source: 1312519-01 Prepared: 11/22/13 Analyzed: 11/26/13					
Volatile Suspended Solids	32.0	1		mg/L		30.0			6	20
<b>Batch BK32238 - Digestion for TP by EPA 365.2/SM4500PE</b>										
<b>Blank (BK32238-BLK1)</b>					Prepared: 11/22/13 Analyzed: 11/26/13					
Phosphorous - Total as P	0.010 U	0.040	0.010	mg/L						
<b>LCS (BK32238-BS1)</b>					Prepared: 11/22/13 Analyzed: 11/26/13					
Phosphorous - Total as P	0.800	0.040	0.010	mg/L	0.80		100	90-110		
<b>Matrix Spike (BK32238-MS1)</b>					Source: 1312522-02 Prepared: 11/22/13 Analyzed: 11/26/13					
Phosphorous - Total as P	0.994	0.040	0.010	mg/L	1.0	0.0270	97	90-110		

# 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

November 29, 2013  
Work Order: 1312519

## Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b>Batch BK32238 - Digestion for TP by EPA 365.2/SM4500PE</b>										
<b>Matrix Spike (BK32238-MS2)</b>		<b>Source: 1312582-07</b>			Prepared: 11/22/13 Analyzed: 11/26/13					
Phosphorous - Total as P	1.02	0.040	0.010	mg/L	1.0	0.0488	97	90-110		
<b>Matrix Spike Dup (BK32238-MSD1)</b>		<b>Source: 1312522-02</b>			Prepared: 11/22/13 Analyzed: 11/26/13					
Phosphorous - Total as P	1.00	0.040	0.010	mg/L	1.0	0.0270	98	90-110	1	25
<b>Matrix Spike Dup (BK32238-MSD2)</b>		<b>Source: 1312582-07</b>			Prepared: 11/22/13 Analyzed: 11/26/13					
Phosphorous - Total as P	1.03	0.040	0.010	mg/L	1.0	0.0488	98	90-110	0.7	25
<b>Batch BK32506 - Digestion for TKN by EPA 351.2</b>										
<b>Blank (BK32506-BLK1)</b>					Prepared: 11/25/13 Analyzed: 11/27/13					
Total Kjeldahl Nitrogen	0.05 U	0.20	0.05	mg/L						
<b>LCS (BK32506-BS1)</b>					Prepared: 11/25/13 Analyzed: 11/27/13					
Total Kjeldahl Nitrogen	2.48	0.20	0.05	mg/L	2.5		98	90-110		
<b>Matrix Spike (BK32506-MS1)</b>		<b>Source: 1312661-02</b>			Prepared: 11/25/13 Analyzed: 11/27/13					
Total Kjeldahl Nitrogen	3.38	0.20	0.05	mg/L	2.5	0.700	106	90-110		
<b>Matrix Spike (BK32506-MS2)</b>		<b>Source: 1312522-02</b>			Prepared: 11/25/13 Analyzed: 11/27/13					
Total Kjeldahl Nitrogen	3.64	0.20	0.05	mg/L	2.5	0.961	106	90-110		
<b>Matrix Spike Dup (BK32506-MSD1)</b>		<b>Source: 1312661-02</b>			Prepared: 11/25/13 Analyzed: 11/27/13					
Total Kjeldahl Nitrogen	3.33	0.20	0.05	mg/L	2.5	0.700	104	90-110	2	20
<b>Matrix Spike Dup (BK32506-MSD2)</b>		<b>Source: 1312522-02</b>			Prepared: 11/25/13 Analyzed: 11/27/13					
Total Kjeldahl Nitrogen	3.67	0.20	0.05	mg/L	2.5	0.961	107	90-110	0.7	20



# 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

November 29, 2013  
Work Order: 1312519

## Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b>Batch BK32705 - COD prep</b>										
<b>Blank (BK32705-BLK1)</b>					Prepared & Analyzed: 11/27/13					
Chemical Oxygen Demand	10 U	25	10	mg/L						
<b>LCS (BK32705-BS1)</b>					Prepared & Analyzed: 11/27/13					
Chemical Oxygen Demand	45	25	10	mg/L	50		90	90-110		
<b>Matrix Spike (BK32705-MS1)</b>					Source: 1312689-01 Prepared & Analyzed: 11/27/13					
Chemical Oxygen Demand	50	25	10	mg/L	50	ND	100	85-115		
<b>Matrix Spike Dup (BK32705-MSD1)</b>					Source: 1312689-01 Prepared & Analyzed: 11/27/13					
Chemical Oxygen Demand	48	25	10	mg/L	50	ND	96	85-115	4	32

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

**November 29, 2013**  
**Work Order: 1312519**

---

**\* 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 limits 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.

Questions regarding this report should be directed to :

Kathryn Nordmark

Telephone (813) 855-1844 FAX (813) 855-2218

Kathryn@southernanalyticalabs.com



## 110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677 813-855-1844 fax 813-855-2218

1312519

[illegible]

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

**December 20, 2013**  
**Work Order: 1312994**

## Laboratory Report

Project Name		B-HS6 SE#1						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution

Sample Description **BHS6-STE**  
 Matrix **Wastewater**  
 SAL Sample Number **1312994-01**  
 Date/Time Collected **12/04/13 10:59**  
 Collected by **Harmon Harden**  
 Date/Time Received **12/05/13 09:55**

### Inorganics

Hydrogen Sulfide (Unionized)	mg/L	0.79	SM 4550SF	0.04	0.01		12/10/13 11:00	1
Ammonia as N	mg/L	57	EPA 350.1	2.0	0.47		12/09/13 12:05	50
Carbonaceous BOD	mg/L	60	SM 5210B	2	2	12/06/13 09:00	12/11/13 08:44	1
Chemical Oxygen Demand	mg/L	160	EPA 410.4	25	10	12/09/13 08:30	12/09/13 13:15	1
Nitrate (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		12/06/13 04:52	1
Nitrite (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		12/06/13 04:52	1
Orthophosphate as P	mg/L	4.9	EPA 300.0	0.040	0.010		12/06/13 04:52	1
Phosphorous - Total as P	mg/L	17	SM 4500P-E	0.40	0.10	12/06/13 10:06	12/12/13 10:12	10
Sulfate	mg/L	0.45 I	EPA 300.0	0.60	0.20		12/06/13 04:52	1
Sulfide	mg/L	1.8	SM 4500SF	0.40	0.10		12/10/13 11:00	1
Total Alkalinity	mg/L	560	SM 2320B	8.0	2.0		12/11/13 11:50	1
Total Kjeldahl Nitrogen	mg/L	77	EPA 351.2	0.20	0.05	12/05/13 16:46	12/09/13 10:47	20.83
Total Suspended Solids	mg/L	25	SM 2540D	1	1	12/05/13 14:39	12/10/13 10:53	1
Volatile Suspended Solids	mg/L	23	EPA 160.4	1	1	12/05/13 14:39	12/10/13 10:53	1
Nitrate+Nitrite (N)	mg/L	0.02 U	EPA 300.0	0.08	0.02		12/06/13 04:52	1

Sample Description **BHS6-DP01**  
 Matrix **Wastewater**  
 SAL Sample Number **1312994-02**  
 Date/Time Collected **12/04/13 10:30**  
 Collected by **Harmon Harden**  
 Date/Time Received **12/05/13 09:55**

### Inorganics

Ammonia as N	mg/L	58	EPA 350.1	2.0	0.47		12/09/13 13:40	50
Nitrate (as N)	mg/L	0.05	EPA 300.0	0.04	0.01		12/06/13 05:02	1
Nitrite (as N)	mg/L	0.37	EPA 300.0	0.04	0.01		12/06/13 05:02	1
Nitrate+Nitrite (N)	mg/L	0.42	EPA 300.0	0.08	0.02		12/06/13 05:02	1

Sample Description **BHS6-DP02**  
 Matrix **Wastewater**  
 SAL Sample Number **1312994-04**  
 Date/Time Collected **12/04/13 10:23**  
 Collected by **Harmon Harden**  
 Date/Time Received **12/05/13 09:55**

### Inorganics

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

**December 20, 2013**  
**Work Order: 1312994**

## Laboratory Report

Project Name		B-HS6 SE#1						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description		<b>BHS6-DP02</b>						
Matrix		<b>Wastewater</b>						
SAL Sample Number		<b>1312994-04</b>						
Date/Time Collected		<b>12/04/13 10:23</b>						
Collected by		<b>Harmon Harden</b>						
Date/Time Received		<b>12/05/13 09:55</b>						
Ammonia as N	mg/L	50	EPA 350.1	2.0	0.47		12/09/13 13:42	50
Nitrate (as N)	mg/L	0.30	EPA 300.0	0.04	0.01		12/06/13 05:11	1
Nitrite (as N)	mg/L	2.1	EPA 300.0	0.04	0.01		12/06/13 05:11	1
Nitrate+Nitrite (N)	mg/L	2.4	EPA 300.0	0.08	0.02		12/06/13 05:11	1
Sample Description		<b>BHS6-DP03</b>						
Matrix		<b>Wastewater</b>						
SAL Sample Number		<b>1312994-06</b>						
Date/Time Collected		<b>12/04/13 10:11</b>						
Collected by		<b>Harmon Harden</b>						
Date/Time Received		<b>12/05/13 09:55</b>						
<b><u>Inorganics</u></b>								
Ammonia as N	mg/L	4.1	EPA 350.1	0.20	0.047		12/09/13 13:44	5
Carbonaceous BOD	mg/L	340	SM 5210B	2	2	12/06/13 09:00	12/11/13 08:44	1
Nitrate (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		12/06/13 05:21	1
Nitrite (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		12/06/13 05:21	1
Total Kjeldahl Nitrogen	mg/L	16	EPA 351.2	0.20	0.05	12/05/13 16:46	12/09/13 12:43	5
Nitrate+Nitrite (N)	mg/L	0.02 U	EPA 300.0	0.08	0.02		12/06/13 05:21	1
Sample Description		<b>BHS6-DP04</b>						
Matrix		<b>Wastewater</b>						
SAL Sample Number		<b>1312994-07</b>						
Date/Time Collected		<b>12/04/13 09:55</b>						
Collected by		<b>Harmon Harden</b>						
Date/Time Received		<b>12/05/13 09:55</b>						
<b><u>Inorganics</u></b>								
Ammonia as N	mg/L	1.2	EPA 350.1	0.080	0.019		12/09/13 13:46	2
Carbonaceous BOD	mg/L	450	SM 5210B	2	2	12/06/13 09:00	12/11/13 08:44	1
Nitrate (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		12/06/13 05:30	1
Nitrite (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		12/06/13 05:30	1
Total Kjeldahl Nitrogen	mg/L	16	EPA 351.2	0.20	0.05	12/05/13 16:46	12/09/13 12:44	5
Nitrate+Nitrite (N)	mg/L	0.02 U	EPA 300.0	0.08	0.02		12/06/13 05:30	1



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

**December 20, 2013**  
**Work Order: 1312994**

## Laboratory Report

Project Name		B-HS6 SE#1						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description		BHS6-ST1						
Matrix		Wastewater						
SAL Sample Number		1312994-08						
Date/Time Collected		12/04/13 09:17						
Collected by		Harmon Harden						
Date/Time Received		12/05/13 09:55						
<b><u>Inorganics</u></b>								
Ammonia as N	mg/L	39	EPA 350.1	0.80	0.19		12/09/13 12:15	20
Carbonaceous BOD	mg/L	72	SM 5210B	2	2	12/06/13 09:00	12/11/13 08:44	1
Chemical Oxygen Demand	mg/L	230	EPA 410.4	25	10	12/09/13 13:30	12/09/13 17:00	1
Nitrate (as N)	mg/L	0.33	EPA 300.0	0.04	0.01		12/06/13 05:39	1
Nitrite (as N)	mg/L	1.4	EPA 300.0	0.04	0.01		12/06/13 05:39	1
Orthophosphate as P	mg/L	3.7	EPA 300.0	0.040	0.010		12/06/13 05:39	1
Phosphorous - Total as P	mg/L	15	SM 4500P-E	0.40	0.10	12/06/13 10:06	12/12/13 10:14	10
Total Alkalinity	mg/L	500	SM 2320B	8.0	2.0		12/11/13 12:06	1
Total Kjeldahl Nitrogen	mg/L	48	EPA 351.2	0.20	0.05	12/05/13 16:46	12/09/13 11:53	20.83
Total Suspended Solids	mg/L	11	SM 2540D	1	1	12/05/13 14:39	12/10/13 10:53	1
Volatile Suspended Solids	mg/L	9	EPA 160.4	1	1	12/05/13 14:39	12/10/13 10:53	1
Nitrate+Nitrite (N)	mg/L	1.8	EPA 300.0	0.08	0.02		12/06/13 05:39	1
Sample Description		BHS6-ST2-tee						
Matrix		Wastewater						
SAL Sample Number		1312994-09						
Date/Time Collected		12/04/13 09:43						
Collected by		Harmon Harden						
Date/Time Received		12/05/13 09:55						
<b><u>Inorganics</u></b>								
Hydrogen Sulfide (Unionized)	mg/L	17	SM 4550SF	0.04	0.01		12/10/13 11:00	1
Ammonia as N	mg/L	24	EPA 350.1	0.80	0.19		12/09/13 12:17	20
Carbonaceous BOD	mg/L	56	SM 5210B	2	2	12/06/13 09:00	12/11/13 08:44	1
Chemical Oxygen Demand	mg/L	340	EPA 410.4	25	10	12/09/13 13:30	12/09/13 17:00	1
Nitrate (as N)	mg/L	0.04	EPA 300.0	0.04	0.01		12/06/13 05:49	1
Nitrite (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		12/06/13 05:49	1
Orthophosphate as P	mg/L	4.5	EPA 300.0	0.040	0.010		12/06/13 05:49	1
Phosphorous - Total as P	mg/L	14	SM 4500P-E	0.40	0.10	12/06/13 10:06	12/12/13 10:15	10
Sulfate	mg/L	92	EPA 300.0	0.60	0.20		12/06/13 05:49	1
Sulfide	mg/L	20	SM 4500SF	0.40	0.10		12/10/13 11:00	1
Total Alkalinity	mg/L	470	SM 2320B	8.0	2.0		12/11/13 12:20	1
Total Kjeldahl Nitrogen	mg/L	38	EPA 351.2	0.20	0.05	12/05/13 16:46	12/09/13 12:48	9.62
Total Suspended Solids	mg/L	38	SM 2540D	1	1	12/05/13 14:39	12/10/13 10:53	1
Volatile Suspended Solids	mg/L	34	EPA 160.4	1	1	12/05/13 14:39	12/10/13 10:53	1
Nitrate+Nitrite (N)	mg/L	0.04 I	EPA 300.0	0.08	0.02		12/06/13 05:49	1

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

**December 20, 2013**  
**Work Order: 1312994**

## Laboratory Report

Project Name		B-HS6 SE#1						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description		BHS6-ST2-port						
Matrix		Wastewater						
SAL Sample Number		1312994-10						
Date/Time Collected		12/04/13 09:31						
Collected by		Harmon Harden						
Date/Time Received		12/05/13 09:55						
<b><u>Inorganics</u></b>								
Hydrogen Sulfide (Unionized)	mg/L	26	SM 4550SF	0.04	0.01		12/10/13 11:00	1
Ammonia as N	mg/L	25	EPA 350.1	0.80	0.19		12/09/13 12:19	20
Carbonaceous BOD	mg/L	78	SM 5210B	2	2	12/06/13 09:00	12/11/13 08:44	1
Chemical Oxygen Demand	mg/L	380	EPA 410.4	25	10	12/09/13 13:30	12/09/13 17:00	1
Nitrate (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		12/06/13 05:58	1
Nitrite (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		12/06/13 05:58	1
Orthophosphate as P	mg/L	4.7	EPA 300.0	0.040	0.010		12/06/13 05:58	1
Phosphorous - Total as P	mg/L	15	SM 4500P-E	0.40	0.10	12/06/13 10:06	12/12/13 11:10	10
Sulfate	mg/L	93	EPA 300.0	0.60	0.20		12/06/13 05:58	1
Sulfide	mg/L	30	SM 4500SF	0.40	0.10		12/10/13 11:00	1
Total Alkalinity	mg/L	480	SM 2320B	8.0	2.0		12/11/13 13:28	1
Total Kjeldahl Nitrogen	mg/L	31	EPA 351.2	0.20	0.05	12/05/13 16:46	12/09/13 11:56	20.83
Total Suspended Solids	mg/L	38	SM 2540D	1	1	12/05/13 14:39	12/10/13 10:53	1
Volatile Suspended Solids	mg/L	26	EPA 160.4	1	1	12/05/13 14:39	12/10/13 10:53	1
Nitrate+Nitrite (N)	mg/L	0.02 U	EPA 300.0	0.08	0.02		12/06/13 05:58	1
Sample Description		BHS6-EB						
Matrix		Reagent Water						
SAL Sample Number		1312994-11						
Date/Time Collected		12/04/13 11:12						
Collected by		Harmon Harden						
Date/Time Received		12/05/13 09:55						
<b><u>Inorganics</u></b>								
Hydrogen Sulfide (Unionized)	mg/L	0.01 U	SM 4550SF	0.04	0.01		12/10/13 11:00	1
Ammonia as N	mg/L	0.009 U	EPA 350.1	0.040	0.009		12/09/13 12:30	1
Carbonaceous BOD	mg/L	2 U	SM 5210B	2	2	12/06/13 09:00	12/11/13 08:44	1
Chemical Oxygen Demand	mg/L	10 U	EPA 410.4	25	10	12/09/13 13:30	12/09/13 17:00	1
Nitrate (as N)	mg/L	0.06	EPA 300.0	0.04	0.01		12/06/13 06:07	1
Nitrite (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		12/06/13 06:07	1
Orthophosphate as P	mg/L	0.010 U	EPA 300.0	0.040	0.010		12/06/13 06:07	1
Phosphorous - Total as P	mg/L	0.010 U	SM 4500P-E	0.040	0.010	12/06/13 10:06	12/12/13 11:36	1
Sulfate	mg/L	16	EPA 300.0	0.60	0.20		12/06/13 06:07	1
Sulfide	mg/L	0.10 U	SM 4500SF	0.40	0.10		12/10/13 11:00	1
Total Alkalinity	mg/L	160	SM 2320B	8.0	2.0		12/11/13 13:33	1
Total Kjeldahl Nitrogen	mg/L	0.05 U	EPA 351.2	0.20	0.05	12/05/13 16:46	12/09/13 12:49	1
Total Suspended Solids	mg/L	1 U	SM 2540D	1	1	12/05/13 14:39	12/10/13 10:53	1

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

December 20, 2013  
Work Order: 1312994

**Laboratory Report**

Project Name		B-HS6 SE#1						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description		BHS6-EB						
Matrix		Reagent Water						
SAL Sample Number		1312994-11						
Date/Time Collected		12/04/13 11:12						
Collected by		Harmon Harden						
Date/Time Received		12/05/13 09:55						
Volatile Suspended Solids	mg/L	1 U	EPA 160.4	1	1	12/05/13 14:39	12/10/13 10:53	1
Nitrate+Nitrite (N)	mg/L	0.06 I	EPA 300.0	0.08	0.02		12/06/13 06:07	1

# 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

December 20, 2013  
Work Order: 1312994

## Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b>Batch BL30527 - VSS Prep</b>										
<b>Blank (BL30527-BLK1)</b>					Prepared: 12/05/13 Analyzed: 12/10/13					
Total Suspended Solids	1 U	1	1	mg/L						
Volatile Suspended Solids	1 U	1		mg/L						
<b>LCS (BL30527-BS1)</b>					Prepared: 12/05/13 Analyzed: 12/10/13					
Total Suspended Solids	51.0	1	1	mg/L	50		102	85-115		
<b>Duplicate (BL30527-DUP1)</b>					Source: 1312963-01 Prepared: 12/05/13 Analyzed: 12/10/13					
Total Suspended Solids	57.0	1	1	mg/L		61.0			7	30
Volatile Suspended Solids	51.0	1		mg/L		55.0			8	20
<b>Batch BL30533 - Ion Chromatography 300.0 Prep</b>										
<b>Blank (BL30533-BLK1)</b>					Prepared & Analyzed: 12/06/13					
Sulfate	0.20 U	0.60	0.20	mg/L						
Orthophosphate as P	0.010 U	0.040	0.010	mg/L						
Nitrite (as N)	0.01 U	0.04	0.01	mg/L						
Nitrate (as N)	0.01 U	0.04	0.01	mg/L						
Surrogate: Dichloroacetate	1.15			mg/L	1.0		115	90-115		
Surrogate: Dichloroacetate	1.15			mg/L	1.0		115	90-115		
Surrogate: Dichloroacetate	1.15			mg/L	1.0		115	90-115		
Surrogate: Dichloroacetate	1.15			mg/L	1.0		115	90-115		
<b>LCS (BL30533-BS1)</b>					Prepared & Analyzed: 12/06/13					
Sulfate	8.58	0.60	0.20	mg/L	9.0		95	85-115		
Orthophosphate as P	0.815	0.040	0.010	mg/L	0.90		91	85-115		
Nitrite (as N)	1.43	0.04	0.01	mg/L	1.4		102	85-115		
Nitrate (as N)	1.74	0.04	0.01	mg/L	1.7		102	85-115		
Surrogate: Dichloroacetate	1.08			mg/L	1.0		108	90-115		
Surrogate: Dichloroacetate	1.08			mg/L	1.0		108	90-115		
Surrogate: Dichloroacetate	1.08			mg/L	1.0		108	90-115		
Surrogate: Dichloroacetate	1.08			mg/L	1.0		108	90-115		

# 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

December 20, 2013  
Work Order: 1312994

## Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
---------	--------	-----	-----	-------	-------------	---------------	------	-------------	-----	-----------

### Batch BL30533 - Ion Chromatography 300.0 Prep

#### LCS Dup (BL30533-BSD1)

Prepared & Analyzed: 12/06/13

Sulfate	8.48	0.60	0.20	mg/L	9.0		94	85-115	1	200
Nitrate (as N)	1.75	0.04	0.01	mg/L	1.7		103	85-115	1	200
Nitrite (as N)	1.49	0.04	0.01	mg/L	1.4		106	85-115	4	200
Orthophosphate as P	0.858	0.040	0.010	mg/L	0.90		95	85-115	5	200
Surrogate: Dichloroacetate	1.14			mg/L	1.0		114	90-115		
Surrogate: Dichloroacetate	1.14			mg/L	1.0		114	90-115		
Surrogate: Dichloroacetate	1.14			mg/L	1.0		114	90-115		
Surrogate: Dichloroacetate	1.14			mg/L	1.0		114	90-115		

#### Matrix Spike (BL30533-MS1)

Source: 1313004-01

Prepared & Analyzed: 12/06/13

Sulfate	57.8	0.60	0.20	mg/L	9.0	49.1	97	85-115		
Orthophosphate as P	2.99	0.040	0.010	mg/L	0.90	2.10	99	85-115		
Nitrate (as N)	1.65	0.04	0.01	mg/L	1.7	0.0350	95	85-115		
Nitrite (as N)	1.50	0.04	0.01	mg/L	1.4	ND	108	85-115		
Surrogate: Dichloroacetate	1.05			mg/L	1.0		105	90-115		
Surrogate: Dichloroacetate	1.05			mg/L	1.0		105	90-115		
Surrogate: Dichloroacetate	1.05			mg/L	1.0		105	90-115		
Surrogate: Dichloroacetate	1.05			mg/L	1.0		105	90-115		

### Batch BL30538 - Digestion for TKN by EPA 351.2

#### Blank (BL30538-BLK1)

Prepared: 12/05/13 Analyzed: 12/09/13

Total Kjeldahl Nitrogen	0.05 U	0.20	0.05	mg/L						
-------------------------	--------	------	------	------	--	--	--	--	--	--

#### LCS (BL30538-BS1)

Prepared: 12/05/13 Analyzed: 12/09/13

Total Kjeldahl Nitrogen	2.41	0.20	0.05	mg/L	2.5		95	90-110		
-------------------------	------	------	------	------	-----	--	----	--------	--	--

# 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

December 20, 2013  
Work Order: 1312994

## Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b>Batch BL30538 - Digestion for TKN by EPA 351.2</b>										
<b>Matrix Spike (BL30538-MS1)</b>		<b>Source: 1313019-07</b>			Prepared: 12/05/13 Analyzed: 12/09/13					
Total Kjeldahl Nitrogen	2.88	0.20	0.05	mg/L	2.5	0.582	91	90-110		
<b>Matrix Spike (BL30538-MS2)</b>		<b>Source: 1312989-02</b>			Prepared: 12/05/13 Analyzed: 12/09/13					
Total Kjeldahl Nitrogen	3.13	0.20	0.05	mg/L	2.5	0.630	98	90-110		
<b>Matrix Spike Dup (BL30538-MSD1)</b>		<b>Source: 1313019-07</b>			Prepared: 12/05/13 Analyzed: 12/09/13					
Total Kjeldahl Nitrogen	3.11	0.20	0.05	mg/L	2.5	0.582	100	90-110	7	20
<b>Matrix Spike Dup (BL30538-MSD2)</b>		<b>Source: 1312989-02</b>			Prepared: 12/05/13 Analyzed: 12/09/13					
Total Kjeldahl Nitrogen	3.11	0.20	0.05	mg/L	2.5	0.630	98	90-110	0.5	20
<b>Batch BL30623 - Digestion for TP by EPA 365.2/SM4500PE</b>										
<b>Blank (BL30623-BLK1)</b>		Prepared: 12/06/13 Analyzed: 12/12/13								
Phosphorous - Total as P	0.010 U	0.040	0.010	mg/L						
<b>LCS (BL30623-BS1)</b>		Prepared: 12/06/13 Analyzed: 12/12/13								
Phosphorous - Total as P	0.860	0.040	0.010	mg/L	0.80		108	90-110		
<b>Matrix Spike (BL30623-MS1)</b>		<b>Source: 1313019-07</b>			Prepared: 12/06/13 Analyzed: 12/12/13					
Phosphorous - Total as P	1.09	0.040	0.010	mg/L	1.0	0.0431	105	90-110		
<b>Matrix Spike (BL30623-MS2)</b>		<b>Source: 1313035-02</b>			Prepared: 12/06/13 Analyzed: 12/12/13					
Phosphorous - Total as P	1.10	0.040	0.010	mg/L	1.0	0.0298	107	90-110		
<b>Matrix Spike Dup (BL30623-MSD1)</b>		<b>Source: 1313019-07</b>			Prepared: 12/06/13 Analyzed: 12/12/13					
Phosphorous - Total as P	1.13	0.040	0.010	mg/L	1.0	0.0431	108	90-110	3	25

# 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

December 20, 2013  
Work Order: 1312994

## Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BL30623 - Digestion for TP by EPA 365.2/SM4500PE										
Matrix Spike Dup (BL30623-MSD2)		Source: 1313035-02			Prepared: 12/06/13 Analyzed: 12/12/13					
Phosphorous - Total as P	1.12	0.040	0.010	mg/L	1.0	0.0298	109	90-110	2	25
Batch BL30633 - BOD										
Blank (BL30633-BLK1)					Prepared: 12/06/13 Analyzed: 12/11/13					
Carbonaceous BOD	2 U	2	2	mg/L						
Blank (BL30633-BLK2)					Prepared: 12/06/13 Analyzed: 12/11/13					
Carbonaceous BOD	2 U	2	2	mg/L						
LCS (BL30633-BS1)					Prepared: 12/06/13 Analyzed: 12/11/13					
Carbonaceous BOD	184	2	2	mg/L	200	92	85-115			
LCS (BL30633-BS2)					Prepared: 12/06/13 Analyzed: 12/11/13					
Carbonaceous BOD	188	2	2	mg/L	200	94	85-115			
LCS Dup (BL30633-BSD1)					Prepared: 12/06/13 Analyzed: 12/11/13					
Carbonaceous BOD	187	2	2	mg/L	200	93	85-115	1	200	
LCS Dup (BL30633-BSD2)					Prepared: 12/06/13 Analyzed: 12/11/13					
Carbonaceous BOD	190	2	2	mg/L	200	95	85-115	1	200	
Duplicate (BL30633-DUP1)		Source: 1312938-01			Prepared: 12/06/13 Analyzed: 12/11/13					
Carbonaceous BOD	25	2	2	mg/L	26				3	25
Duplicate (BL30633-DUP2)		Source: 1312989-01			Prepared: 12/06/13 Analyzed: 12/11/13					
Carbonaceous BOD	110	2	2	mg/L	110				6	25



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

**December 20, 2013**  
**Work Order: 1312994**

**Inorganics - Quality Control**

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b>Batch BL30654 - COD prep</b>										
<b>Blank (BL30654-BLK1)</b>					Prepared & Analyzed: 12/09/13					
Chemical Oxygen Demand	10 U	25	10	mg/L						
<b>LCS (BL30654-BS1)</b>					Prepared & Analyzed: 12/09/13					
Chemical Oxygen Demand	45	25	10	mg/L	50		90	90-110		
<b>Matrix Spike (BL30654-MS1)</b>					Source: 1312964-15 Prepared & Analyzed: 12/09/13					
Chemical Oxygen Demand	45	25	10	mg/L	50	ND	90	85-115		
<b>Matrix Spike Dup (BL30654-MSD1)</b>					Source: 1312964-15 Prepared & Analyzed: 12/09/13					
Chemical Oxygen Demand	52	25	10	mg/L	50	ND	104	85-115	14	32
<b>Batch BL30910 - Ammonia by SEAL</b>										
<b>Blank (BL30910-BLK1)</b>					Prepared & Analyzed: 12/09/13					
Ammonia as N	0.009 U	0.040	0.009	mg/L						
<b>LCS (BL30910-BS1)</b>					Prepared & Analyzed: 12/09/13					
Ammonia as N	0.50	0.040	0.009	mg/L	0.50		100	90-110		
<b>Matrix Spike (BL30910-MS1)</b>					Source: 1312994-11 Prepared & Analyzed: 12/09/13					
Ammonia as N	0.53	0.040	0.009	mg/L	0.50	ND	105	90-110		
<b>Matrix Spike (BL30910-MS2)</b>					Source: 1313037-07 Prepared & Analyzed: 12/09/13					
Ammonia as N	0.52	0.040	0.009	mg/L	0.50	0.010	101	90-110		
<b>Matrix Spike Dup (BL30910-MSD1)</b>					Source: 1312994-11 Prepared & Analyzed: 12/09/13					
Ammonia as N	0.52	0.040	0.009	mg/L	0.50	ND	104	90-110	2	10

# 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

December 20, 2013  
Work Order: 1312994

## Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BL30910 - Ammonia by SEAL										
Matrix Spike Dup (BL30910-MSD2)		Source: 1313037-07			Prepared & Analyzed: 12/09/13					
Ammonia as N	0.51	0.040	0.009	mg/L	0.50	0.010	100	90-110	0.7	10
Batch BL30914 - COD prep										
Blank (BL30914-BLK1)					Prepared & Analyzed: 12/09/13					
Chemical Oxygen Demand	10 U	25	10	mg/L						
LCS (BL30914-BS1)					Prepared & Analyzed: 12/09/13					
Chemical Oxygen Demand	45	25	10	mg/L	50		90	90-110		
Matrix Spike (BL30914-MS1)		Source: 1312994-11			Prepared & Analyzed: 12/09/13					
Chemical Oxygen Demand	45	25	10	mg/L	50	ND	90	85-115		
Matrix Spike Dup (BL30914-MSD1)		Source: 1312994-11			Prepared & Analyzed: 12/09/13					
Chemical Oxygen Demand	48	25	10	mg/L	50	ND	96	85-115	6	32
Batch BL31028 - Sulfide prep										
Blank (BL31028-BLK1)					Prepared & Analyzed: 12/10/13					
Sulfide	0.10 U	0.40	0.10	mg/L						
Blank (BL31028-BLK2)					Prepared & Analyzed: 12/10/13					
Sulfide	0.10 U	0.40	0.10	mg/L						
LCS (BL31028-BS1)					Prepared & Analyzed: 12/10/13					
Sulfide	4.92	0.40	0.10	mg/L	5.0		98	85-115		

# 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

December 20, 2013  
Work Order: 1312994

## Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b>Batch BL31028 - Sulfide prep</b>										
<b>LCS (BL31028-BS2)</b>					Prepared & Analyzed: 12/10/13					
Sulfide	4.71	0.40	0.10	mg/L	5.0		94	85-115		
<b>Matrix Spike (BL31028-MS1)</b>					Source: 1313000-01 Prepared & Analyzed: 12/10/13					
Sulfide	4.51	0.40	0.10	mg/L	5.0	ND	90	85-115		
<b>Matrix Spike (BL31028-MS2)</b>					Source: 1313004-20 Prepared & Analyzed: 12/10/13					
Sulfide	4.92	0.40	0.10	mg/L	5.0	ND	98	85-115		
<b>Matrix Spike Dup (BL31028-MSD1)</b>					Source: 1313000-01 Prepared & Analyzed: 12/10/13					
Sulfide	4.71	0.40	0.10	mg/L	5.0	ND	94	85-115	4	14
<b>Matrix Spike Dup (BL31028-MSD2)</b>					Source: 1313004-20 Prepared & Analyzed: 12/10/13					
Sulfide	4.71	0.40	0.10	mg/L	5.0	ND	94	85-115	4	14
<b>Batch BL31101 - alkalinity</b>										
<b>Blank (BL31101-BLK1)</b>					Prepared & Analyzed: 12/11/13					
Total Alkalinity	2.0 U	8.0	2.0	mg/L						
<b>LCS (BL31101-BS1)</b>					Prepared & Analyzed: 12/11/13					
Total Alkalinity	140	8.0	2.0	mg/L	120		109	90-110		
<b>Matrix Spike (BL31101-MS1)</b>					Source: 1313054-01 Prepared & Analyzed: 12/11/13					
Total Alkalinity	280	8.0	2.0	mg/L	120	160	99	80-120		
<b>Matrix Spike Dup (BL31101-MSD1)</b>					Source: 1313054-01 Prepared & Analyzed: 12/11/13					
Total Alkalinity	290	8.0	2.0	mg/L	120	160	102	80-120	1	26

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

**December 20, 2013**  
**Work Order: 1312994**

---

**\* 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 limits 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.

Questions regarding this report should be directed to :

Kathryn Nordmark

Telephone (813) 855-1844 FAX (813) 855-2218

Kathryn@southernanalyticalabs.com



# SOUTHERN ANALYTICAL LABORATORIES, INC.

110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677 813-855-1844 fax 813-855-2218

SAL Project No. 1312994

Client Name Hazen and Sawyer										Contact / Phone:										
Project Name / Location B-HS6 SE#1																				
Samplers: (Signature) <i>[Signature]</i>										PARAMETER / CONTAINER DESCRIPTION										
<p>Matrix Codes:            DW-Drinking Water WW-Wastewater            SW-Surface Water SL-Sludge SO-Soil            GW-Groundwater SA-Saline Water O-Other            R-Reagent Water</p>																				
SAL Use Only	Sample No.	Sample Description	Date	Time	Matrix	Composite	Grab	1LP, Cool Total Alkalinity, TSS, VSS, CBOD, NOx, OP, SO <sub>4</sub>	125mLP, H <sub>2</sub> SO <sub>4</sub> COD, TKN, TP, NH <sub>3</sub>	500mLP, NaOH & Zn Acetate H <sub>2</sub> S	125mLP, H <sub>2</sub> SO <sub>4</sub> NH <sub>3</sub>	125mLP, Cool NOx	500mLP, Cool CBOD, NOx	125mLP, H <sub>2</sub> SO <sub>4</sub> TKN, NH <sub>3</sub>	1LP, Cool Total Alkalinity, TSS, VSS, CBOD, NOx, OP	Field Temperature	Field pH	Field Conductivity	Field DO	No. of Containers (Total per each location)
	01	BHS6-STE	12/4/13	10:59	WW		X	1	1	1						19.1	7.16	1177	0.22	
	02	BHS6-DP01	12/4/13	10:36	WW		X				1	1								
	03	BHS6-SL01	X	X	WW		X				1	1								
	04	BHS6-DP02	12/4/13	10:23	WW		X				1	1								
	05	BHS6-SL02	X	X	WW		X				1	1				18.6	5.50	1107	.21	
	06	BHS6-DP03	12/4/13	10:11	WW		X						1	1						
	07	BHS6-DP04		9:55	WW		X						1	1		18.2	5.27	1143	.38	
	08	BHS6-ST1		9:17	WW		X		1						1	18.5	6.45	1091	.58	
	09	BHS6-ST2-tee		9:43	WW		X	1	1	1						17.2	6.22	1217	.41	
	10	BHS6-ST2-port		9:31	WW		X	1	1	1						17.2	6.21	1215	.16	
	11	BHS6-EB	12/4/13	11:12	R		X	1	1	1										
Containers Prepared/Relinquished:		Date/Time:	Received:		Date/Time:															
<i>[Signature]</i>		11:50 AM 11/11	<i>[Signature]</i>		11/15 14:05															
<i>[Signature]</i>		Date/Time: 13-20 12/4	<i>[Signature]</i>		12-5-13 9:55															
Relinquished:		Date/Time:	Received:		Date/Time:															
Relinquished:		Date/Time:	Received:		Date/Time:															
Relinquished:		Date/Time:	Received:		Date/Time:															
Relinquished:		Date/Time:	Received:		Date/Time:															
Seal intact? <input checked="" type="radio"/> N <input type="radio"/> NA Samples intact upon arrival? <input checked="" type="radio"/> N <input type="radio"/> NA Received on ice? Temp <u>1.8</u> <input checked="" type="radio"/> N <input type="radio"/> NA Proper preservatives indicated? <input checked="" type="radio"/> N <input type="radio"/> NA Rec'd w/in holding time? <input checked="" type="radio"/> N <input type="radio"/> NA Volatiles rec'd w/out headspace? <input type="radio"/> Y <input checked="" type="radio"/> N <input type="radio"/> NA Proper containers used? <input checked="" type="radio"/> N <input type="radio"/> NA							Instructions / Remarks:													

Chain of Custody.xls  
Rev Date 11/18/01

Chain of Custody

**REPORT OF MICROBIOLOGICAL ANALYSIS**

Hazen and Sawyer, P.C.  
 Attn: Josefin Edeback-Hirst, PE  
 10002 Princess Palm Avenue  
 Suite 200  
 Tampa, FL 33619

Report #: 23834  
 Report Date: December 9, 2013  
 NELAC#: E81350  
 FDEPQA#: 920087G  
 Project#: 211296  
 Sampled By: Mark Busby  
 Sample Site: [REDACTED] Drive Septic System  
 Sample Date: 12-04-13

Table 1. Samples received 12-04-13.

Units:	Fecal Coliform # colonies/100 mL	Dilution Factor	<i>E. coli</i> # colonies/100 mL	Dilution Factor
Methodology:	SM 9222D		EPA 1603	
Detection Limit:	2.0		2.0	
Analysis Date:	12-04-13		12-04-13	
Analysis Time:	14:00		14:00	
Analyst:	AL		AL	
Sample Location/Time:				
Lab Number:				
ST1, 09:17				
#119875	63,000 B	1,000	51,000	1,000
ST2, 09:31				
#119876	3,000	100	2,700	1,000
ST2T, 09:43				
#119877	1,800	100	1,800	1,000
DP4, 09:57				
#119878	90,000 B	1,000	790	10
DPO3, 10:11				
#119879	16,000	1,000	2,600	100
STE, 10:59				
#119880	120,000	10,000	100,000	10,000
Rinse Blank, 11:12				
#119881	2.0 U	2	2.0 U	2

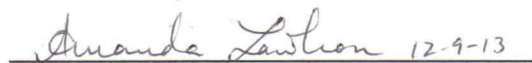
## Data Qualifiers that may apply:

U = Analyte was not detected and the indicated value is the detection limit.

B = Colony count exceeded the ideal of 20-60 (fecal coliform) or 20-80 (*E. coli*) colonies per plate.

## Data Release Authorization:

Sample integrity and reliability certified by lab personnel prior to analysis. All quality assurance samples met quality control limits unless otherwise specified. The reported analytical results relate only to the sample submitted. This report shall not be reproduced, except in full, without the written approval of Ackuritlabs. Please contact the undersigned at the above phone number with any questions regarding this report.

  
 Amanda Lawhon, QA Officer



## CHAIN OF CUSTODY RECORD

Page \_\_\_\_ of \_\_\_\_

[illegible]



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

**February 11, 2014**  
**Work Order: 1400162**

## Laboratory Report

Project Name		B-HS6 SE#2						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution

Sample Description **BHS6-STE**  
 Matrix **Wastewater**  
 SAL Sample Number **1400162-01**  
 Date/Time Collected **01/22/14 11:34**  
 Collected by **Harmon Harden**  
 Date/Time Received **01/23/14 09:20**

### Inorganics

Hydrogen Sulfide (Unionized)	mg/L	2.0	SM 4550SF	0.04	0.01		01/28/14 09:00	1
Ammonia as N	mg/L	23	EPA 350.1	0.80	0.19		02/05/14 14:33	20
Carbonaceous BOD	mg/L	75	SM 5210B	2	2	01/23/14 11:34	01/28/14 11:23	1
Chemical Oxygen Demand	mg/L	200	EPA 410.4	25	10	01/27/14 09:02	01/27/14 11:30	1
Nitrate (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		01/24/14 02:42	1
Nitrite (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		01/24/14 02:42	1
Orthophosphate as P	mg/L	4.9	EPA 300.0	0.040	0.010		01/24/14 02:42	1
Phosphorous - Total as P	mg/L	7.0	SM 4500P-E	0.20	0.050	02/04/14 09:47	02/05/14 12:21	5
Sulfate	mg/L	2.5	EPA 300.0	0.60	0.20		01/24/14 02:42	1
Sulfide	mg/L	4.7	SM 4500SF	0.40	0.10		01/28/14 09:00	1
Total Alkalinity	mg/L	500	SM 2320B	8.0	2.0		01/31/14 14:06	1
Total Kjeldahl Nitrogen	mg/L	33	EPA 351.2	8.3	2.1	01/31/14 10:20	02/04/14 12:05	41.67
Total Suspended Solids	mg/L	24	SM 2540D	1	1	01/23/14 09:05	01/28/14 12:26	1
Volatile Suspended Solids	mg/L	19	EPA 160.4	1	1	01/24/14 09:54	01/28/14 12:26	1
Nitrate+Nitrite (N)	mg/L	0.02 U	EPA 300.0	0.08	0.02		01/24/14 02:42	1

Sample Description **BHS6-DP01**  
 Matrix **Wastewater**  
 SAL Sample Number **1400162-02**  
 Date/Time Collected **01/22/14 12:18**  
 Collected by **Harmon Harden**  
 Date/Time Received **01/23/14 09:20**

### Inorganics

Ammonia as N	mg/L	1.9	EPA 350.1	0.040	0.009		02/05/14 12:26	1
Nitrate (as N)	mg/L	38	EPA 300.0	0.40	0.10		01/24/14 02:51	10
Nitrite (as N)	mg/L	1.6	EPA 300.0	0.04	0.01		01/24/14 02:51	1
Nitrate+Nitrite (N)	mg/L	39	EPA 300.0	0.44	0.11		01/24/14 02:51	10

Sample Description **BHS6-ST1 Dup**  
 Matrix **Wastewater**  
 SAL Sample Number **1400162-03**  
 Date/Time Collected **01/22/14 10:46**  
 Collected by **Harmon Harden**  
 Date/Time Received **01/23/14 09:20**

### Inorganics

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

**February 11, 2014**  
**Work Order: 1400162**

## Laboratory Report

Project Name		B-HS6 SE#2						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description		BHS6-ST1 Dup						
Matrix		Wastewater						
SAL Sample Number		1400162-03						
Date/Time Collected		01/22/14 10:46						
Collected by		Harmon Harden						
Date/Time Received		01/23/14 09:20						
Ammonia as N	mg/L	4.3	EPA 350.1	0.20	0.047		02/05/14 13:50	5
Nitrate (as N)	mg/L	24	EPA 300.0	0.40	0.10		01/24/14 03:00	10
Nitrite (as N)	mg/L	0.52	EPA 300.0	0.04	0.01		01/24/14 03:00	1
Nitrate+Nitrite (N)	mg/L	25	EPA 300.0	0.44	0.11		01/24/14 03:00	10
Sample Description		BHS6-DP02						
Matrix		Wastewater						
SAL Sample Number		1400162-04						
Date/Time Collected		01/22/14 12:24						
Collected by		Harmon Harden						
Date/Time Received		01/23/14 09:20						
<u>Inorganics</u>								
Ammonia as N	mg/L	2.0	EPA 350.1	0.040	0.009		01/31/14 09:38	1
Nitrate (as N)	mg/L	42	EPA 300.0	0.40	0.10		01/24/14 03:10	10
Nitrite (as N)	mg/L	0.52	EPA 300.0	0.04	0.01		01/24/14 03:10	1
Nitrate+Nitrite (N)	mg/L	43	EPA 300.0	0.44	0.11		01/24/14 03:10	10
Sample Description		BHS6-ST2-Port Dup						
Matrix		Wastewater						
SAL Sample Number		1400162-05						
Date/Time Collected		01/22/14 11:01						
Collected by		Harmon Harden						
Date/Time Received		01/23/14 09:20						
<u>Inorganics</u>								
Ammonia as N	mg/L	10	EPA 350.1	0.40	0.095		01/31/14 11:08	10
Nitrate (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		01/24/14 03:19	1
Nitrite (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		01/24/14 03:19	1
Nitrate+Nitrite (N)	mg/L	0.02 U	EPA 300.0	0.08	0.02		01/24/14 03:19	1
Sample Description		BHS6-DP03						
Matrix		Wastewater						
SAL Sample Number		1400162-06						
Date/Time Collected		01/22/14 12:01						
Collected by		Harmon Harden						
Date/Time Received		01/23/14 09:20						
<u>Inorganics</u>								

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

**February 11, 2014**  
**Work Order: 1400162**

## Laboratory Report

Project Name		B-HS6 SE#2						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description		BHS6-DP03						
Matrix		Wastewater						
SAL Sample Number		1400162-06						
Date/Time Collected		01/22/14 12:01						
Collected by		Harmon Harden						
Date/Time Received		01/23/14 09:20						
Ammonia as N	mg/L	14	EPA 350.1	0.80	0.19		01/27/14 14:07	20
Carbonaceous BOD	mg/L	33	SM 5210B	2	2	01/23/14 11:34	01/28/14 11:23	1
Nitrate (as N)	mg/L	2.3	EPA 300.0	0.04	0.01		01/24/14 03:28	1
Nitrite (as N)	mg/L	2.1	EPA 300.0	0.04	0.01		01/24/14 03:28	1
Total Kjeldahl Nitrogen	mg/L	16	EPA 351.2	1.9	0.48	01/31/14 10:20	02/04/14 12:06	9.62
Nitrate+Nitrite (N)	mg/L	4.4	EPA 300.0	0.08	0.02		01/24/14 03:28	1
Sample Description		BHS6-DP04						
Matrix		Wastewater						
SAL Sample Number		1400162-07						
Date/Time Collected		01/22/14 11:49						
Collected by		Harmon Harden						
Date/Time Received		01/23/14 09:20						
<u>Inorganics</u>								
Ammonia as N	mg/L	14	EPA 350.1	0.80	0.19		01/27/14 14:09	20
Carbonaceous BOD	mg/L	24	SM 5210B	2	2	01/23/14 11:34	01/28/14 11:23	1
Nitrate (as N)	mg/L	1.2	EPA 300.0	0.04	0.01		01/24/14 03:38	1
Nitrite (as N)	mg/L	1.1	EPA 300.0	0.04	0.01		01/24/14 03:38	1
Total Kjeldahl Nitrogen	mg/L	16	EPA 351.2	1.9	0.48	01/31/14 10:20	02/04/14 12:08	9.62
Nitrate+Nitrite (N)	mg/L	2.2	EPA 300.0	0.08	0.02		01/24/14 03:38	1
Sample Description		BHS6-ST1						
Matrix		Wastewater						
SAL Sample Number		1400162-08						
Date/Time Collected		01/22/14 10:45						
Collected by		Harmon Harden						
Date/Time Received		01/23/14 09:20						
<u>Inorganics</u>								
Hydrogen Sulfide (Unionized)	mg/L	0.69	SM 4550SF	0.04	0.01		01/28/14 09:00	1
Ammonia as N	mg/L	4.1	EPA 350.1	0.40	0.095		01/27/14 12:44	10
Carbonaceous BOD	mg/L	10	SM 5210B	2	2	01/23/14 11:34	01/28/14 11:23	1
Chemical Oxygen Demand	mg/L	37	EPA 410.4	25	10	01/27/14 14:00	01/27/14 16:45	1
Nitrate (as N)	mg/L	23	EPA 300.0	0.40	0.10		01/24/14 03:47	10
Nitrite (as N)	mg/L	0.51	EPA 300.0	0.04	0.01		01/24/14 03:47	1
Orthophosphate as P	mg/L	1.8	EPA 300.0	0.040	0.010		01/24/14 03:47	1
Phosphorous - Total as P	mg/L	2.8	SM 4500P-E	0.080	0.020	02/04/14 09:47	02/05/14 12:21	2

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

**February 11, 2014**  
**Work Order: 1400162**

## Laboratory Report

Project Name		B-HS6 SE#2						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description		BHS6-ST1						
Matrix		Wastewater						
SAL Sample Number		1400162-08						
Date/Time Collected		01/22/14 10:45						
Collected by		Harmon Harden						
Date/Time Received		01/23/14 09:20						
Sulfate	mg/L	20	EPA 300.0	0.60	0.20		01/24/14 03:47	1
Sulfide	mg/L	0.81	SM 4500SF	0.40	0.10		01/28/14 09:00	1
Total Alkalinity	mg/L	310	SM 2320B	8.0	2.0		01/31/14 14:16	1
Total Kjeldahl Nitrogen	mg/L	7.0	EPA 351.2	0.40	0.10	01/31/14 10:20	02/04/14 12:10	1.98
Total Suspended Solids	mg/L	4	SM 2540D	1	1	01/24/14 09:54	01/28/14 12:26	1
Volatile Suspended Solids	mg/L	4	EPA 160.4	1	1	01/24/14 09:54	01/28/14 12:26	1
Nitrate+Nitrite (N)	mg/L	24	EPA 300.0	0.44	0.11		01/24/14 03:47	10
Sample Description		BHS6-ST2-tee						
Matrix		Wastewater						
SAL Sample Number		1400162-09						
Date/Time Collected		01/22/14 11:15						
Collected by		Harmon Harden						
Date/Time Received		01/23/14 09:20						
<b><u>Inorganics</u></b>								
Hydrogen Sulfide (Unionized)	mg/L	1.0	SM 4550SF	0.04	0.01		01/28/14 09:00	1
Ammonia as N	mg/L	9.5	EPA 350.1	0.20	0.047		01/27/14 12:46	5
Carbonaceous BOD	mg/L	15	SM 5210B	2	2	01/23/14 11:34	01/28/14 11:23	1
Chemical Oxygen Demand	mg/L	50	EPA 410.4	25	10	01/27/14 14:00	01/27/14 16:45	1
Nitrate (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		01/24/14 04:53	1
Nitrite (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		01/24/14 04:53	1
Orthophosphate as P	mg/L	2.0	EPA 300.0	0.040	0.010		01/24/14 04:53	1
Phosphorous - Total as P	mg/L	3.0	SM 4500P-E	0.080	0.020	02/04/14 09:47	02/05/14 12:22	2
Sulfate	mg/L	130	EPA 300.0	6.0	2.0		01/28/14 13:36	10
Sulfide	mg/L	1.4	SM 4500SF	0.40	0.10		01/28/14 09:00	1
Total Alkalinity	mg/L	430	SM 2320B	8.0	2.0		01/31/14 14:28	1
Total Kjeldahl Nitrogen	mg/L	11	EPA 351.2	1.9	0.48	01/31/14 10:20	02/04/14 13:14	9.62
Total Suspended Solids	mg/L	23	SM 2540D	1	1	01/24/14 09:54	01/28/14 12:26	1
Volatile Suspended Solids	mg/L	21	EPA 160.4	1	1	01/24/14 09:54	01/28/14 12:26	1
Nitrate+Nitrite (N)	mg/L	0.02 U	EPA 300.0	0.08	0.02		01/24/14 04:53	1
Sample Description		BHS6-ST2-port						
Matrix		Wastewater						
SAL Sample Number		1400162-10						
Date/Time Collected		01/22/14 11:00						
Collected by		Harmon Harden						
Date/Time Received		01/23/14 09:20						

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

February 11, 2014  
 Work Order: 1400162

### Laboratory Report

Project Name		B-HS6 SE#2						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description		BHS6-ST2-port						
Matrix		Wastewater						
SAL Sample Number		1400162-10						
Date/Time Collected		01/22/14 11:00						
Collected by		Harmon Harden						
Date/Time Received		01/23/14 09:20						
<b><u>Inorganics</u></b>								
Hydrogen Sulfide (Unionized)	mg/L	0.74	SM 4550SF	0.04	0.01		01/28/14 09:00	1
Ammonia as N	mg/L	9.5	EPA 350.1	0.20	0.047		01/27/14 12:48	5
Carbonaceous BOD	mg/L	4	SM 5210B	2	2	01/23/14 11:34	01/28/14 11:23	1
Chemical Oxygen Demand	mg/L	50	EPA 410.4	25	10	01/27/14 14:00	01/27/14 16:45	1
Nitrate (as N)	mg/L	0.04	EPA 300.0	0.04	0.01		01/24/14 05:02	1
Nitrite (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		01/24/14 05:02	1
Orthophosphate as P	mg/L	2.0	EPA 300.0	0.040	0.010		01/24/14 05:02	1
Phosphorous - Total as P	mg/L	3.0	SM 4500P-E	0.080	0.020	02/01/14 07:15	02/03/14 14:48	2
Sulfate	mg/L	130	EPA 300.0	6.0	2.0		01/28/14 17:18	10
Sulfide	mg/L	1.0	SM 4500SF	0.40	0.10		01/28/14 09:00	1
Total Alkalinity	mg/L	430	SM 2320B	8.0	2.0		01/31/14 14:39	1
Total Kjeldahl Nitrogen	mg/L	11	EPA 351.2	1.9	0.48	01/31/14 10:20	02/04/14 13:15	9.62
Total Suspended Solids	mg/L	4	SM 2540D	1	1	01/24/14 09:54	01/28/14 12:26	1
Volatile Suspended Solids	mg/L	4	EPA 160.4	1	1	01/24/14 09:54	01/28/14 12:26	1
Nitrate+Nitrite (N)	mg/L	0.04 I	EPA 300.0	0.08	0.02		01/24/14 05:02	1

Sample Description  
 Matrix  
 SAL Sample Number  
 Date/Time Collected  
 Collected by  
 Date/Time Received

BHS6-EB  
 Reagent Water  
 1400162-11  
 01/22/14 12:08  
 Harmon Harden  
 01/23/14 09:20

<b>Inorganics</b>								
Ammonia as N	mg/L	0.009 U	EPA 350.1	0.040	0.009		01/27/14 12:50	1
Carbonaceous BOD	mg/L	2 U	SM 5210B	2	2	01/23/14 11:34	01/28/14 11:23	1
Chemical Oxygen Demand	mg/L	10 U	EPA 410.4	25	10	01/27/14 14:00	01/27/14 16:45	1
Nitrate (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		01/24/14 05:21	1
Nitrite (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		01/24/14 05:21	1
Orthophosphate as P	mg/L	0.010 U	EPA 300.0	0.040	0.010		01/24/14 05:21	1
Phosphorous - Total as P	mg/L	0.010 U	SM 4500P-E	0.040	0.010	02/01/14 07:15	02/03/14 13:56	1
Sulfate	mg/L	0.20 U	EPA 300.0	0.60	0.20		01/24/14 05:21	1
Sulfide	mg/L	0.10 U	SM 4500SF	0.40	0.10		01/28/14 09:00	1
Total Alkalinity	mg/L	2.8 I	SM 2320B	8.0	2.0		01/31/14 14:42	1
Total Kjeldahl Nitrogen	mg/L	0.05 U	EPA 351.2	0.20	0.05	01/31/14 10:20	02/04/14 12:15	1
Total Suspended Solids	mg/L	1 U	SM 2540D	1	1	01/24/14 09:54	01/28/14 12:26	1
Volatile Suspended Solids	mg/L	1 U	EPA 160.4	1	1	01/24/14 09:54	01/28/14 12:26	1

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

February 11, 2014  
Work Order: 1400162

**Laboratory Report**

Project Name		B-HS6 SE#2						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description		BHS6-EB						
Matrix		Reagent Water						
SAL Sample Number		1400162-11						
Date/Time Collected		01/22/14 12:08						
Collected by		Harmon Harden						
Date/Time Received		01/23/14 09:20						
Nitrate+Nitrite (N)	mg/L	0.02 U	EPA 300.0	0.08	0.02		01/24/14 05:21	1

# 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

February 11, 2014  
Work Order: 1400162

## Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b>Batch BA42306 - TSS prep</b>										
<b>Blank (BA42306-BLK1)</b>					Prepared & Analyzed: 01/23/14					
Total Suspended Solids	1 U	1	1	mg/L						
<b>LCS (BA42306-BS1)</b>					Prepared & Analyzed: 01/23/14					
Total Suspended Solids	48.8	1	1	mg/L	50		98	85-115		
<b>Duplicate (BA42306-DUP1)</b>					Source: 1400162-01 Prepared & Analyzed: 01/23/14					
Total Suspended Solids	25.0	1	1	mg/L		24.0			4	30
<b>Batch BA42310 - Ion Chromatography 300.0 Prep</b>										
<b>Blank (BA42310-BLK1)</b>					Prepared & Analyzed: 01/23/14					
Orthophosphate as P	0.010 U	0.040	0.010	mg/L						
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						
Surrogate: Dichloroacetate	1.00			mg/L	1.0		100	90-115		
Surrogate: Dichloroacetate	1.00			mg/L	1.0		100	90-115		
Surrogate: Dichloroacetate	1.00			mg/L	1.0		100	90-115		
Surrogate: Dichloroacetate	1.00			mg/L	1.0		100	90-115		
<b>LCS (BA42310-BS1)</b>					Prepared & Analyzed: 01/24/14					
Nitrate (as N)	1.79	0.04	0.01	mg/L	1.7		105	85-115		
Orthophosphate as P	0.948	0.040	0.010	mg/L	0.90		105	85-115		
Nitrite (as N)	1.53	0.04	0.01	mg/L	1.4		109	85-115		
Sulfate	9.43	0.60	0.20	mg/L	9.0		105	85-115		
Surrogate: Dichloroacetate	1.06			mg/L	1.0		106	90-115		
Surrogate: Dichloroacetate	1.06			mg/L	1.0		106	90-115		
Surrogate: Dichloroacetate	1.06			mg/L	1.0		106	90-115		
Surrogate: Dichloroacetate	1.06			mg/L	1.0		106	90-115		



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

**February 11, 2014**  
**Work Order: 1400162**

**Inorganics - Quality Control**

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b>Batch BA42310 - Ion Chromatography 300.0 Prep</b>										
<b>LCS Dup (BA42310-BSD1)</b>					Prepared & Analyzed: 01/24/14					
Sulfate	9.38	0.60	0.20	mg/L	9.0		104	85-115	0.5	200
Orthophosphate as P	0.931	0.040	0.010	mg/L	0.90		103	85-115	2	200
Nitrite (as N)	1.52	0.04	0.01	mg/L	1.4		108	85-115	1	200
Nitrate (as N)	1.76	0.04	0.01	mg/L	1.7		104	85-115	1	200
Surrogate: Dichloroacetate	1.06			mg/L	1.0		106	90-115		
Surrogate: Dichloroacetate	1.06			mg/L	1.0		106	90-115		
Surrogate: Dichloroacetate	1.06			mg/L	1.0		106	90-115		
Surrogate: Dichloroacetate	1.06			mg/L	1.0		106	90-115		
<b>Matrix Spike (BA42310-MS1)</b>					<b>Source: 1400879-01</b>		Prepared & Analyzed: 01/24/14			
Orthophosphate as P	1.07	0.040	0.010	mg/L	0.90	0.0970	108	85-115		
Sulfate	17.3	0.60	0.20	mg/L	9.0	7.47	109	85-115		
Nitrite (as N)	1.40	0.04	0.01	mg/L	1.4	ND	100	85-115		
Nitrate (as N)	1.83	0.04	0.01	mg/L	1.7	0.0380	105	85-115		
Surrogate: Dichloroacetate	1.09			mg/L	1.0		109	90-115		
Surrogate: Dichloroacetate	1.09			mg/L	1.0		109	90-115		
Surrogate: Dichloroacetate	1.09			mg/L	1.0		109	90-115		
Surrogate: Dichloroacetate	1.09			mg/L	1.0		109	90-115		
<b>Matrix Spike (BA42310-MS2)</b>					<b>Source: 1400162-08</b>		Prepared & Analyzed: 01/24/14			
Orthophosphate as P	2.67	0.040	0.010	mg/L	0.90	1.84	92	85-115		
Nitrite (as N)	1.92	0.04	0.01	mg/L	1.4	0.513	100	85-115		
Nitrate (as N)	17.0 L	0.04	0.01	mg/L	1.7	23.4	NR	85-115		
Sulfate	30.3	0.60	0.20	mg/L	9.0	20.5	110	85-115		
Surrogate: Dichloroacetate	1.08			mg/L	1.0		108	90-115		
Surrogate: Dichloroacetate	1.08			mg/L	1.0		108	90-115		
Surrogate: Dichloroacetate	1.08			mg/L	1.0		108	90-115		
Surrogate: Dichloroacetate	1.08			mg/L	1.0		108	90-115		

# 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

February 11, 2014

Work Order: 1400162

## Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b>Batch BA42311 - Ion Chromatography 300.0 Prep</b>										
<b>Blank (BA42311-BLK1)</b>					Prepared & Analyzed: 01/24/14					
Orthophosphate as P	0.010 U	0.040	0.010	mg/L						
Sulfate	0.20 U	0.60	0.20	mg/L						
Nitrite (as N)	0.01 U	0.04	0.01	mg/L						
Nitrate (as N)	0.01 U	0.04	0.01	mg/L						
Surrogate: Dichloroacetate	1.04			mg/L	1.0		104	90-115		
Surrogate: Dichloroacetate	1.04			mg/L	1.0		104	90-115		
Surrogate: Dichloroacetate	1.04			mg/L	1.0		104	90-115		
Surrogate: Dichloroacetate	1.04			mg/L	1.0		104	90-115		
<b>LCS (BA42311-BS1)</b>					Prepared & Analyzed: 01/24/14					
Nitrate (as N)	1.70	0.04	0.01	mg/L	1.7		100	85-115		
Orthophosphate as P	0.880	0.040	0.010	mg/L	0.90		98	85-115		
Sulfate	9.16	0.60	0.20	mg/L	9.0		102	85-115		
Nitrite (as N)	1.49	0.04	0.01	mg/L	1.4		106	85-115		
Surrogate: Dichloroacetate	1.03			mg/L	1.0		103	90-115		
Surrogate: Dichloroacetate	1.03			mg/L	1.0		103	90-115		
Surrogate: Dichloroacetate	1.03			mg/L	1.0		103	90-115		
Surrogate: Dichloroacetate	1.03			mg/L	1.0		103	90-115		
<b>LCS Dup (BA42311-BSD1)</b>					Prepared & Analyzed: 01/24/14					
Orthophosphate as P	0.876	0.040	0.010	mg/L	0.90		97	85-115	0.5	200
Nitrite (as N)	1.49	0.04	0.01	mg/L	1.4		106	85-115	0	200
Sulfate	9.08	0.60	0.20	mg/L	9.0		101	85-115	0.9	200
Nitrate (as N)	1.70	0.04	0.01	mg/L	1.7		100	85-115	0.2	200
Surrogate: Dichloroacetate	1.04			mg/L	1.0		104	90-115		
Surrogate: Dichloroacetate	1.04			mg/L	1.0		104	90-115		
Surrogate: Dichloroacetate	1.04			mg/L	1.0		104	90-115		
Surrogate: Dichloroacetate	1.04			mg/L	1.0		104	90-115		

# 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

February 11, 2014  
Work Order: 1400162

## Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
---------	--------	-----	-----	-------	-------------	---------------	------	-------------	-----	-----------

### Batch BA42311 - Ion Chromatography 300.0 Prep

Matrix Spike (BA42311-MS1)		Source: 1400162-10			Prepared & Analyzed: 01/24/14					
Sulfate	90.0 L	0.60	0.20	mg/L	9.0	133	NR	85-115		
Orthophosphate as P	3.02	0.040	0.010	mg/L	0.90	2.05	108	85-115		
Nitrite (as N)	1.37	0.04	0.01	mg/L	1.4	ND	98	85-115		
Nitrate (as N)	1.79	0.04	0.01	mg/L	1.7	0.0380	103	85-115		
Surrogate: Dichloroacetate	0.982			mg/L	1.0		98	90-115		
Surrogate: Dichloroacetate	0.982			mg/L	1.0		98	90-115		
Surrogate: Dichloroacetate	0.982			mg/L	1.0		98	90-115		
Surrogate: Dichloroacetate	0.982			mg/L	1.0		98	90-115		

### Batch BA42319 - BOD

Blank (BA42319-BLK1)		Prepared: 01/23/14 Analyzed: 01/28/14								
Carbonaceous BOD	2 U	2	2	mg/L						
LCS (BA42319-BS1)		Prepared: 01/23/14 Analyzed: 01/28/14								
Carbonaceous BOD	183	2	2	mg/L	200		91	85-115		
LCS Dup (BA42319-BSD1)		Prepared: 01/23/14 Analyzed: 01/28/14								
Carbonaceous BOD	189	2	2	mg/L	200		95	85-115	4	200
Duplicate (BA42319-DUP1)		Source: 1400901-01			Prepared: 01/23/14 Analyzed: 01/28/14					
Carbonaceous BOD	120	2	2	mg/L		120			2	25

### Batch BA42343 - Ammonia by SEAL

Blank (BA42343-BLK1)		Prepared & Analyzed: 01/27/14								
Ammonia as N	0.009 U	0.040	0.009	mg/L						

# 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

February 11, 2014  
Work Order: 1400162

## Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b>Batch BA42343 - Ammonia by SEAL</b>										
<b>LCS (BA42343-BS1)</b>					Prepared & Analyzed: 01/27/14					
Ammonia as N	0.49	0.040	0.009	mg/L	0.50		98	90-110		
<b>Matrix Spike (BA42343-MS1)</b>					<b>Source: 1400910-02</b> Prepared & Analyzed: 01/27/14					
Ammonia as N	0.51	0.040	0.009	mg/L	0.50	0.033	96	90-110		
<b>Matrix Spike (BA42343-MS2)</b>					<b>Source: 1400914-07</b> Prepared & Analyzed: 01/27/14					
Ammonia as N	0.49	0.040	0.009	mg/L	0.50	0.036	92	90-110		
<b>Matrix Spike Dup (BA42343-MSD1)</b>					<b>Source: 1400910-02</b> Prepared & Analyzed: 01/27/14					
Ammonia as N	0.50	0.040	0.009	mg/L	0.50	0.033	93	90-110	3	10
<b>Matrix Spike Dup (BA42343-MSD2)</b>					<b>Source: 1400914-07</b> Prepared & Analyzed: 01/27/14					
Ammonia as N	0.51	0.040	0.009	mg/L	0.50	0.036	95	90-110	3	10
<b>Batch BA42419 - Ion Chromatography 300.0 Prep</b>										
<b>Blank (BA42419-BLK1)</b>					Prepared & Analyzed: 01/24/14					
Nitrate (as N)	0.01 U	0.04	0.01	mg/L						
Surrogate: Dichloroacetate	1.05			mg/L	1.0		105	90-115		
<b>LCS (BA42419-BS1)</b>					Prepared & Analyzed: 01/24/14					
Nitrate (as N)	1.75	0.04	0.01	mg/L	1.7		103	85-115		
Surrogate: Dichloroacetate	1.07			mg/L	1.0		107	90-115		
<b>LCS Dup (BA42419-BSD1)</b>					Prepared & Analyzed: 01/24/14					
Nitrate (as N)	1.73	0.04	0.01	mg/L	1.7		102	85-115	0.9	200
Surrogate: Dichloroacetate	1.05			mg/L	1.0		105	90-115		

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

February 11, 2014  
 Work Order: 1400162

## Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b>Batch BA42419 - Ion Chromatography 300.0 Prep</b>										
<b>Matrix Spike (BA42419-MS1)</b>		<b>Source: 1400915-01</b>			Prepared & Analyzed: 01/24/14					
Nitrate (as N)	6.45	0.04	0.01	mg/L	1.7	4.65	106	85-115		
Surrogate: Dichloroacetate	1.01			mg/L	1.0		101	90-115		
<b>Matrix Spike (BA42419-MS2)</b>		<b>Source: 1400300-06</b>			Prepared & Analyzed: 01/24/14					
Nitrate (as N)	17.3	0.40	0.10	mg/L	17	0.0400	101	85-115		
Surrogate: Dichloroacetate	1.05			mg/L	1.0		105	90-115		
<b>Batch BA42707 - COD prep</b>										
<b>Blank (BA42707-BLK1)</b>		Prepared & Analyzed: 01/27/14								
Chemical Oxygen Demand	10 U	25	10	mg/L						
<b>LCS (BA42707-BS1)</b>		Prepared & Analyzed: 01/27/14								
Chemical Oxygen Demand	45	25	10	mg/L	50		90	90-110		
<b>Matrix Spike (BA42707-MS1)</b>		<b>Source: 1400970-03</b>			Prepared & Analyzed: 01/27/14					
Chemical Oxygen Demand	67	25	10	mg/L	50	17	100	85-115		
<b>Matrix Spike Dup (BA42707-MSD1)</b>		<b>Source: 1400970-03</b>			Prepared & Analyzed: 01/27/14					
Chemical Oxygen Demand	63	25	10	mg/L	50	17	92	85-115	6	32
<b>Batch BA42713 - Ion Chromatography 300.0 Prep</b>										
<b>Blank (BA42713-BLK1)</b>		Prepared & Analyzed: 01/28/14								
Sulfate	0.20 U	0.60	0.20	mg/L						
Surrogate: Dichloroacetate	1.05			mg/L	1.0		105	90-115		

# 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

February 11, 2014  
Work Order: 1400162

## Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b>Batch BA42713 - Ion Chromatography 300.0 Prep</b>										
<b>LCS (BA42713-BS1)</b>					Prepared & Analyzed: 01/28/14					
Sulfate	9.52	0.60	0.20	mg/L	9.0		106	85-115		
Surrogate: Dichloroacetate	1.05			mg/L	1.0		105	90-115		
<b>LCS Dup (BA42713-BSD1)</b>					Prepared & Analyzed: 01/28/14					
Sulfate	9.26	0.60	0.20	mg/L	9.0		103	85-115	3	200
Surrogate: Dichloroacetate	1.05			mg/L	1.0		105	90-115		
<b>Matrix Spike (BA42713-MS1)</b>					<b>Source: 1400700-02</b>		Prepared & Analyzed: 01/28/14			
Sulfate	11,000	600	200	mg/L	9000	2060	99	85-115		
Surrogate: Dichloroacetate	1.01			mg/L	1.0		101	90-115		
<b>Matrix Spike (BA42713-MS2)</b>					<b>Source: 1400910-01</b>		Prepared & Analyzed: 01/28/14			
Sulfate	184	6.0	2.0	mg/L	90	89.3	106	85-115		
Surrogate: Dichloroacetate	1.06			mg/L	1.0		106	90-115		
<b>Batch BA42725 - COD prep</b>										
<b>Blank (BA42725-BLK1)</b>					Prepared & Analyzed: 01/27/14					
Chemical Oxygen Demand	10 U	25	10	mg/L						
<b>LCS (BA42725-BS1)</b>					Prepared & Analyzed: 01/27/14					
Chemical Oxygen Demand	45	25	10	mg/L	50		90	90-110		
<b>Matrix Spike (BA42725-MS1)</b>					<b>Source: 1400162-08</b>		Prepared & Analyzed: 01/27/14			
Chemical Oxygen Demand	89	25	10	mg/L	50	37	104	85-115		
<b>Matrix Spike Dup (BA42725-MSD1)</b>					<b>Source: 1400162-08</b>		Prepared & Analyzed: 01/27/14			
Chemical Oxygen Demand	89	25	10	mg/L	50	37	104	85-115	0	32

# 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

February 11, 2014  
Work Order: 1400162

## Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b>Batch BA42805 - Sulfide prep</b>										
<b>Blank (BA42805-BLK1)</b>					Prepared & Analyzed: 01/28/14					
Sulfide	0.10 U	0.40	0.10	mg/L						
<b>LCS (BA42805-BS1)</b>					Prepared & Analyzed: 01/28/14					
Sulfide	4.67	0.40	0.10	mg/L	5.0		93	85-115		
<b>Matrix Spike (BA42805-MS1)</b>					<b>Source: 1400162-11</b>		Prepared & Analyzed: 01/28/14			
Sulfide	5.08	0.40	0.10	mg/L	5.0	ND	102	85-115		
<b>Matrix Spike Dup (BA42805-MSD1)</b>					<b>Source: 1400162-11</b>		Prepared & Analyzed: 01/28/14			
Sulfide	5.28	0.40	0.10	mg/L	5.0	ND	106	85-115	4	14
<b>Batch BA42812 - VSS Prep</b>										
<b>Blank (BA42812-BLK1)</b>					Prepared: 01/24/14 Analyzed: 01/28/14					
Total Suspended Solids	1 U	1	1	mg/L						
Volatile Suspended Solids	1 U	1		mg/L						
<b>LCS (BA42812-BS1)</b>					Prepared: 01/24/14 Analyzed: 01/28/14					
Total Suspended Solids	48.2	1	1	mg/L	50		96	85-115		
<b>Duplicate (BA42812-DUP1)</b>					<b>Source: 1400162-01</b>		Prepared: 01/24/14 Analyzed: 01/28/14			
Volatile Suspended Solids	18.5	1		mg/L		19.0			3	20
Total Suspended Solids	24.5	1	1	mg/L		24.0			2	30
<b>Batch BA43035 - Ammonia by SEAL</b>										
<b>Blank (BA43035-BLK1)</b>					Prepared & Analyzed: 01/31/14					
Ammonia as N	0.009 U	0.040	0.009	mg/L						



# 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

February 11, 2014  
Work Order: 1400162

## Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b>Batch BA43035 - Ammonia by SEAL</b>										
<b>LCS (BA43035-BS1)</b>					Prepared & Analyzed: 01/31/14					
Ammonia as N	0.55	0.040	0.009	mg/L	0.50		109	90-110		
<b>Matrix Spike (BA43035-MS1)</b>					<b>Source: 1400959-07</b> Prepared & Analyzed: 01/31/14					
Ammonia as N	0.55	0.040	0.009	mg/L	0.50	0.013	107	90-110		
<b>Matrix Spike (BA43035-MS2)</b>					<b>Source: 1400988-07</b> Prepared & Analyzed: 01/31/14					
Ammonia as N	0.54	0.040	0.009	mg/L	0.50	0.027	102	90-110		
<b>Matrix Spike Dup (BA43035-MSD1)</b>					<b>Source: 1400959-07</b> Prepared & Analyzed: 01/31/14					
Ammonia as N	0.53	0.040	0.009	mg/L	0.50	0.013	104	90-110	3	10
<b>Matrix Spike Dup (BA43035-MSD2)</b>					<b>Source: 1400988-07</b> Prepared & Analyzed: 01/31/14					
Ammonia as N	0.56	0.040	0.009	mg/L	0.50	0.027	107	90-110	4	10
<b>Batch BA43101 - alkalinity</b>										
<b>Blank (BA43101-BLK1)</b>					Prepared & Analyzed: 01/31/14					
Total Alkalinity	2.0 U	8.0	2.0	mg/L						
<b>LCS (BA43101-BS1)</b>					Prepared & Analyzed: 01/31/14					
Total Alkalinity	140	8.0	2.0	mg/L	120		109	90-110		
<b>Matrix Spike (BA43101-MS1)</b>					<b>Source: 1400983-03</b> Prepared & Analyzed: 01/31/14					
Total Alkalinity	260	8.0	2.0	mg/L	120	140	100	80-120		
<b>Matrix Spike Dup (BA43101-MSD1)</b>					<b>Source: 1400983-03</b> Prepared & Analyzed: 01/31/14					
Total Alkalinity	260	8.0	2.0	mg/L	120	140	95	80-120	2	26

# 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

February 11, 2014  
Work Order: 1400162

## Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b>Batch BA43113 - Digestion for TKN by EPA 351.2</b>										
<b>Blank (BA43113-BLK1)</b>					Prepared: 01/31/14 Analyzed: 02/04/14					
Total Kjeldahl Nitrogen	0.05 U	0.20	0.05	mg/L						
<b>LCS (BA43113-BS1)</b>					Prepared: 01/31/14 Analyzed: 02/04/14					
Total Kjeldahl Nitrogen	2.68	0.20	0.05	mg/L	2.5		106	90-110		
<b>Matrix Spike (BA43113-MS1)</b>					Source: 1400162-11 Prepared: 01/31/14 Analyzed: 02/04/14					
Total Kjeldahl Nitrogen	2.72	0.20	0.05	mg/L	2.5	ND	107	90-110		
<b>Matrix Spike (BA43113-MS2)</b>					Source: 1401115-02 Prepared: 01/31/14 Analyzed: 02/04/14					
Total Kjeldahl Nitrogen	3.16	0.20	0.05	mg/L	2.5	0.696	97	90-110		
<b>Matrix Spike Dup (BA43113-MSD1)</b>					Source: 1400162-11 Prepared: 01/31/14 Analyzed: 02/04/14					
Total Kjeldahl Nitrogen	2.57	0.20	0.05	mg/L	2.5	ND	102	90-110	5	20
<b>Matrix Spike Dup (BA43113-MSD2)</b>					Source: 1401115-02 Prepared: 01/31/14 Analyzed: 02/04/14					
Total Kjeldahl Nitrogen	3.44	0.20	0.05	mg/L	2.5	0.696	108	90-110	9	20
<b>Batch BB40101 - Digestion for TP by EPA 365.2/SM4500PE</b>										
<b>Blank (BB40101-BLK1)</b>					Prepared: 02/01/14 Analyzed: 02/03/14					
Phosphorous - Total as P	0.010 U	0.040	0.010	mg/L						
<b>LCS (BB40101-BS1)</b>					Prepared: 02/01/14 Analyzed: 02/03/14					
Phosphorous - Total as P	0.849	0.040	0.010	mg/L	0.80		106	90-110		
<b>Matrix Spike (BB40101-MS1)</b>					Source: 1401069-07 Prepared: 02/01/14 Analyzed: 02/03/14					
Phosphorous - Total as P	1.10	0.040	0.010	mg/L	1.0	0.105	99	90-110		

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

**February 11, 2014**  
**Work Order: 1400162**

**Inorganics - Quality Control**

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b>Batch BB40101 - Digestion for TP by EPA 365.2/SM4500PE</b>										
<b>Matrix Spike (BB40101-MS2)</b>		<b>Source: 1401049-02</b>			Prepared: 02/01/14 Analyzed: 02/03/14					
Phosphorous - Total as P	1.01	0.040	0.010	mg/L	1.0	0.0345	97	90-110		
<b>Matrix Spike Dup (BB40101-MSD1)</b>		<b>Source: 1401069-07</b>			Prepared: 02/01/14 Analyzed: 02/03/14					
Phosphorous - Total as P	1.09	0.040	0.010	mg/L	1.0	0.105	99	90-110	0.5	25
<b>Matrix Spike Dup (BB40101-MSD2)</b>		<b>Source: 1401049-02</b>			Prepared: 02/01/14 Analyzed: 02/03/14					
Phosphorous - Total as P	1.09	0.040	0.010	mg/L	1.0	0.0345	106	90-110	8	25
<b>Batch BB40407 - Digestion for TP by EPA 365.2/SM4500PE</b>										
<b>Blank (BB40407-BLK1)</b>		Prepared: 02/04/14 Analyzed: 02/05/14								
Phosphorous - Total as P	0.010 U	0.040	0.010	mg/L						
<b>LCS (BB40407-BS1)</b>		Prepared: 02/04/14 Analyzed: 02/05/14								
Phosphorous - Total as P	0.762	0.040	0.010	mg/L	0.80		95	90-110		
<b>Matrix Spike (BB40407-MS1)</b>		<b>Source: 1401146-07</b>			Prepared: 02/04/14 Analyzed: 02/05/14					
Phosphorous - Total as P	1.20	0.040	0.010	mg/L	1.0	0.0980	110	90-110		
<b>Matrix Spike (BB40407-MS2)</b>		<b>Source: 1401169-02</b>			Prepared: 02/04/14 Analyzed: 02/05/14					
Phosphorous - Total as P	1.06	0.040	0.010	mg/L	1.0	0.0462	101	90-110		
<b>Matrix Spike Dup (BB40407-MSD1)</b>		<b>Source: 1401146-07</b>			Prepared: 02/04/14 Analyzed: 02/05/14					
Phosphorous - Total as P	1.18	0.040	0.010	mg/L	1.0	0.0980	108	90-110	2	25
<b>Matrix Spike Dup (BB40407-MSD2)</b>		<b>Source: 1401169-02</b>			Prepared: 02/04/14 Analyzed: 02/05/14					
Phosphorous - Total as P	1.07	0.040	0.010	mg/L	1.0	0.0462	102	90-110	1	25

# 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

February 11, 2014  
Work Order: 1400162

## Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b>Batch BB40415 - Ammonia by SEAL</b>										
<b>Blank (BB40415-BLK1)</b>					Prepared & Analyzed: 02/05/14					
Ammonia as N	0.009 U	0.040	0.009	mg/L						
<b>LCS (BB40415-BS1)</b>					Prepared & Analyzed: 02/05/14					
Ammonia as N	0.52	0.040	0.009	mg/L	0.50		104	90-110		
<b>Matrix Spike (BB40415-MS1)</b>					Source: 1401146-07 Prepared & Analyzed: 02/05/14					
Ammonia as N	0.51	0.040	0.009	mg/L	0.50	0.024	97	90-110		
<b>Matrix Spike (BB40415-MS2)</b>					Source: 1401171-01 Prepared & Analyzed: 02/05/14					
Ammonia as N	0.49	0.040	0.009	mg/L	0.50	ND	99	90-110		
<b>Matrix Spike Dup (BB40415-MSD1)</b>					Source: 1401146-07 Prepared & Analyzed: 02/05/14					
Ammonia as N	0.52	0.040	0.009	mg/L	0.50	0.024	100	90-110	3	10
<b>Matrix Spike Dup (BB40415-MSD2)</b>					Source: 1401171-01 Prepared & Analyzed: 02/05/14					
Ammonia as N	0.51	0.040	0.009	mg/L	0.50	ND	102	90-110	3	10

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

**February 11, 2014**  
**Work Order: 1400162**

---

**\* 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 limits 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.

L Off-scale high. Result exceeded highest calibration standard.

Questions regarding this report should be directed to :

Kathryn Nordmark

Telephone (813) 855-1844 FAX (813) 855-2218

Kathryn@southernanalyticalabs.com



Client Name Hazen and Sawyer										Contact / Phone:											
Project Name / Location B-HS6 SE#2																					
Samplers: (Signature) <i>[Signature]</i>										PARAMETER / CONTAINER DESCRIPTION											
Matrix Codes: DW-Drinking Water WW-Wastewater SW-Surface Water SL-Sludge SO-Soil GW-Groundwater SA-Saline Water O-Other R-Reagent Water																					
SAL Use Only	Sample No.	Sample Description	Date	Time	Matrix	Composite	Grab	YLP, Cool	Total Alkalinity, TSS, VSS, CBOD, NOx, OP, SO <sub>4</sub>	125mLP, H <sub>2</sub> SO <sub>4</sub> COD, TKN, NH <sub>3</sub> , TP	500mLP, NaOH, Zn Acetate H <sub>2</sub> S	125mLP, H <sub>2</sub> SO <sub>4</sub> NH <sub>3</sub>	125mLP, Cool NOx	500mLP, Cool CBOD, NOx	125mLP, H <sub>2</sub> SO <sub>4</sub> TKN, NH <sub>3</sub>		Field pH	Field Temperature	Field Conductivity	Field DO	No. of Containers (Total per each location)
	01	BHS6-STE	1/22	11:34	WW		X		1	1	1						7.18	16.1	1091	.08	
	02	BHS6-DP01	1/22	12:18	WW		X					1	1								
	03	BHS6-STE ST1 Dup	1/22	10:46	WW		X					1	1				6.31	13.8	925	1.89	
	04	BHS6-DP02	1/22	12:24	WW		X					1	1								
	05	BHS6-STE ST2 -port Dup	1/22	11:01	WW		X					1	1				6.61	13.6	1133	.35	
	06	BHS6-DP03	1/22	12:01	WW		X							1	1		6.44	14.4	1014	.81	
	07	BHS6-DP04	1/22	11:49	WW		X							1	1		6.41	14.3	1015	.08	
	08	BHS6-ST1	1/22	10:45	WW		X		1	1	1						6.31	13.8	925	1.89	
	09	BHS6-ST2-tee	1/22	11:15	WW		X		1	1	1						6.63	13.7	1134	.15	
	10	BHS6-ST2-port	1/22	11:00	WW		X		1	1	1						6.61	13.6	1133	.35	
	11	BHS6-EB	1/22	12:08	R		X		1	1	1										

Containers Prepared: <i>[Signature]</i>	Date/Time: 1500	Received: <i>[Signature]</i>	Date/Time: 13:00	Seal intact? <input checked="" type="radio"/> N <input type="radio"/> NA Samples intact upon arrival? <input checked="" type="radio"/> N <input type="radio"/> NA Received on ice? Temp. <u>0.3</u> <input checked="" type="radio"/> N <input type="radio"/> NA Proper preservatives indicated? <input checked="" type="radio"/> N <input type="radio"/> NA Rec'd within holding time? <input checked="" type="radio"/> N <input type="radio"/> NA Volatiles rec'd w/out headspace? <input checked="" type="radio"/> Y <input type="radio"/> N <input checked="" type="radio"/> NA Proper containers used? <input checked="" type="radio"/> N <input type="radio"/> NA	Instructions / Remarks: Ship to: Harmon Harden 1825 Cottage Grove Rd. Tallahassee, FL 32303  <div style="font-size: 2em; font-weight: bold;">1400162</div>
Relinquished: <i>[Signature]</i>	Date/Time: 1-07-14	Received: <i>[Signature]</i>	Date/Time: 11/13/14		
Relinquished: <i>[Signature]</i>	Date/Time: 1:45	Received: <i>[Signature]</i>	Date/Time:		
Relinquished: <i>[Signature]</i>	Date/Time:	Received: <i>[Signature]</i>	Date/Time: 1-23-14 920		
Relinquished: <i>[Signature]</i>	Date/Time:	Received: <i>[Signature]</i>	Date/Time:		

**REPORT OF MICROBIOLOGICAL ANALYSIS**

Hazen and Sawyer, P.C.  
Attn: Josefin Edeback-Hirst, PE  
10002 Princess Palm Avenue  
Suite 200  
Tampa, FL 33619

Report #: 23928  
Report Date: January 27, 2014  
NELAC#: E81350  
FDEPQA#: 920087G  
Project#: 211296  
Sampled By: Mark Busby  
Sample Site: [REDACTED] Drive Septic System  
Sample Date: 01-22-14

Table 1. Samples received 01-22-14.

Units:	Fecal Coliform # colonies/100 mL	Dilution Factor	<i>E. coli</i> # colonies/100 mL	Dilution Factor
Methodology:	SM 9222D		EPA 1603	
Detection Limit:	2.0		2.0	
Analysis Date:	01-22-14		01-22-14	
Analysis Time:	14:00		14:00	
Analyst:	AL		AL	
Sample Location/Time:				
Lab Number:				
Stage 1, 10:45				
#120623	6,900 B	100	5,700	100
Stage 1 Dup, 10:46				
#120624	5,200	100	4,700	100
ST-2 Port, 11:00				
#120625	4,600	100	4,500	100
ST-2 Port Dup, 11:01				
#120626	3,600	100	3,100	100
ST-2T, 11:15				
#120627	5,600	100	4,800	100
STE, 11:33				
#120628	340,000	10,000	300,000	10,000
Rinse, 12:08				
#120629	10	2	6	2

## Data Qualifiers that may apply:

U = Analyte was not detected and the indicated value is the detection limit.

B = Colony count exceeded the ideal of 20-60 (fecal coliform) or 20-80 (*E. coli*) colonies per plate.

## Data Release Authorization:

Sample integrity and reliability certified by lab personnel prior to analysis. All quality assurance samples met quality control limits unless otherwise specified. The reported analytical results relate only to the sample submitted. This report shall not be reproduced, except in full, without the written approval of Ackuritlabs. Please contact the undersigned at the above phone number with any questions regarding this report.

Amanda Lawhon 1-27-14  
Amanda Lawhon, QA Officer



## CHAIN OF CUSTODY RECORD

Page 1 of 1

[illegible]



## 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 sampling of 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 sampling of system.
	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	System check. Observed that vents on Stage 1 tank were pushed down.
	Vents were pulled back up and resealed with existing mastic.

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



## Appendix C: Vericomm PLC Data

System Status			22-Jan-14	22-Dec-13	4-Dec-13	20-Nov-13	14-Nov-13	6-Nov-13
Point	Description	Status	Value	Value	Value	Value	Value	Value
1	Alarm Status	Automatic	OK	OK	OK	OK	PmpFail	OK
2	Alert Status	Automatic	OK	OK	OK	OK	OK	OK
3	System Mode	Automatic	Normal	Normal	Normal	Normal	Normal	Normal
5	Timer Mode	Automatic	Normal	Normal	Normal	Normal	Override	Off
6	Active Off Time	Automatic	240.0 Minutes	240.0 Minutes	240.0 Minutes	240.0 Minutes	60.0 Minutes	240.0 Minutes
7	Active On Time	Automatic	2.0 Minutes	2.0 Minutes	2.0 Minutes	2.0 Minutes	5.0 Minutes	2.0 Minutes
9	Pump Mode	Automatic	OffCycl	OffCycl	OffCycl	OffCycl	OffCycl	Off
10	Pump Status	Automatic	Off	Off	Off	Off	Off	Off
12	Pump Cycles Today	Automatic	2.0 Cycles	8.0 Cycles	2.0 Cycles	2.0 Cycles	1.0 Cycles	37.0 Cycles
13	Override Cycles Today	Automatic	0.0 Cycles	3.0 Cycles	0.0 Cycles	0.0 Cycles	1.0 Cycles	0.0 Cycles
14	Pump Run Time Today	Automatic	4.1 Minutes	28.2 Minutes	4.0 Minutes	4.0 Minutes	0.1 Minutes	72.0 Minutes
Settings								
Point	Description	Status	Value	Value	Value	Value	Value	Value
17	Off Cycle Time	Constant/Setpoint	240.0 Minutes	240.0 Minutes	240.0 Minutes	240.0 Minutes	240.0 Minutes	240.0 Minutes
18	On Cycle Time	Constant/Setpoint	2.0 Minutes	2.0 Minutes	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	60.0 Minutes	60.0 Minutes
20	Override On Cycle Time	Constant/Setpoint	5.0 Minutes	5.0 Minutes	5.0 Minutes	5.0 Minutes	5.0 Minutes	5.0 Minutes
21	Minimum Override Cycles	Automatic	3.0 Cycles	3.0 Cycles	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	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	200.0 Minutes	200.0 Minutes
25	High Level Pump Test	Automatic	5.0 Minutes	5.0 Minutes	2.0 Minutes	2.0 Minutes	2.0 Minutes	2.0 Minutes
28	Alarm Update Interval	Timing Override	120.0 Minutes	240.0 Minutes	120.0 Minutes	120.0 Minutes	240.0 Minutes	240.0 Minutes
29	Page Delay	Automatic	960.0 Minutes	960.0 Minutes	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	30.0 Minutes	30.0 Minutes
31	Local Alarm Delay	Constant/Setpoint	1140.0 Minutes	1140.0 Minutes	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	120.0 Minutes	120.0 Minutes
Troubleshooting								
Point	Description	Status	Value	Value	Value	Value	Value	Value
33	Top Float Status	Automatic	OK	OK	OK	OK	OK	OK
34	Middle Float Status	Automatic	OK	OK	OK	OK	OK	OK
35	Bottom Float Status	Automatic	OK	OK	OK	OK	OK	OK
37	Contactor Status	Automatic	OK	OK	OK	OK	OK	OK
38	Pump Status	Automatic	OK	OK	OK	OK	PmpFail	OK
40	Filter Status	Automatic	OK	OK	OK	OK	OK	OK
41	Tank Status	Automatic	OK	OK	OK	OK	OK	OK
43	Power Status	Automatic	OK	OK	OK	OK	OK	OK
Flow Data								
Point	Description	Status	Value	Value	Value	Value	Value	Value
49	Pump Run Time Today	Automatic	4.1 Minutes	28.2 Minutes	4.0 Minutes	4.0 Minutes	0.1 Minutes	72.0 Minutes
50	Override Cycles Today	Automatic	0	3	0	0	1	0
51	Pump Cycles Today	Automatic	2.0 Cycles	8.0 Cycles	2.0 Cycles	2.0 Cycles	1.0 Cycles	37.0 Cycles
52	Average Run Time per Cycle Today	Automatic	2.1 Minutes	3.5 Minutes	2.0 Minutes	2.0 Minutes	0.1 Minutes	1.9 Minutes
54	Brownouts Today	Automatic	0	0	0	0	0	1

o:\44237-001\Wpdocs\ReportDraft

System Status			22-Jan-14	22-Dec-13	4-Dec-13	20-Nov-13	14-Nov-13	6-Nov-13
30-Day History Data								
Point	Description	Status	Value	Value	Value	Value	Value	Value
65	30 Day Average Run Time per Day	Automatic	12.7 Minutes	13.6 Minutes	26.4 Minutes	99.6 Minutes	128.8 Minutes	169.0 Minutes
66	30 Day Average Override Cycles per Day	Automatic	0.4 Cycles	0.4 Cycles	0.8 Cycles	0.7 Cycles	0.1 Cycles	0.0 Cycles
67	30 Day Average Cycles per Day	Automatic	5.5 Cycles	6.1 Cycles	12.0 Cycles	48.5 Cycles	63.8 Cycles	83.8 Cycles
68	30 Day Average Run Time per Cycle	Automatic	2.3 Minutes	2.2 Minutes	2.2 Minutes	2.1 Minutes	2.0 Minutes	2.0 Minutes
71	30 Day Total Pump Run Time	Automatic	379.5 Minutes	406.5 Minutes	792.6 Minutes	2986.6 Minutes	3863.6 Minutes	5070.2 Minutes
72	30 Day Total Override Cycles	Automatic	12.0 Cycles	13.0 Cycles	25.0 Cycles	20.0 Cycles	3.0 Cycles	0.0 Cycles
73	30 Day Total Cycles	Automatic	166.0 Cycles	182.0 Cycles	360.0 Cycles	1456.0 Cycles	1913.0 Cycles	2514.0 Cycles
76	30 Day Total Brownouts	Automatic	0	0	2	2	1	0
Totalized Pump Data								
Point	Description	Status	Value	Value	Value	Value	Value	Value
82	Pump Total Run Time	Automatic	1591.5 Hours	1585.1 Hours	1580.8 Hours	1577.5 Hours	1575.1 Hours	1574.5 Hours
83	Pump Total Cycles	Automatic	48167.0 Cycles	47998.0 Cycles	47886.0 Cycles	47798.0 Cycles	47748.0 Cycles	47734.0 Cycles
Miscellaneous								
Point	Description	Status	Value	Value	Value	Value	Value	Value
145	Pump On Auto	Automatic	Off	Off	Off	Off	Off	Off
147	Pump Test Today	Automatic	Off	On	Off	Off	On	On
148	Pump Check Enable	Automatic	Off	Off	Off	Off	Off	Off
149	Total Override Cycles	Automatic	0	0	0	0	3	0
150	High Level Condition	Automatic	Off	Off	Off	Off	Off	Off
151	Leak Check Enable	Automatic	On	On	On	On	On	Off
152	Brownout State	Automatic	Off	Off	Off	Off	Off	Off
153	Test Mode	Automatic	Off	Off	Off	Off	Off	Off
Alarm Points								
Point	Description	Status	Value	Value	Value	Value	Value	Value
161	General Alarm	Automatic	Off	Off	Off	Off	On	Off
162	New Alarm	Automatic	Off	Off	Off	Off	On	Off
163	Update Central Enable	Automatic	On	On	On	On	On	Off
167	Page Alarm Start	Automatic	Off	Off	Off	Off	Off	Off
168	Pager Signal	Override Off	Off	Off	Off	Off	Off	Off
169	Local Alarm Start	Automatic	Off	Off	Off	Off	Off	Off
170	Local Alarm Silence	Automatic	Off	Off	Off	Off	Off	Off
Inputs & Outputs								
Point	Description	Status	Value	Value	Value	Value	Value	Value
177	High Level/Override Timer Float Input	Automatic	Off	Off	Off	Off	On	Off
178	Timer Float Input	Automatic	On	On	On	On	On	Off
179	Redundant Off Float & Low Level Alarm Input	Automatic	On	On	On	On	On	On
181	Push To Silence Input	Automatic	Off	Off	Off	Off	Off	Off
182	Auxiliary Contact Input	Automatic	Off	Off	Off	Off	Off	Off
186	Pump Output	Automatic	Off	Off	Off	Off	Off	Off
188	Alarm Light Output	Automatic	Off	Off	Off	Off	Off	Off
189	Audible Alarm Output	Override Off	Off	Off	Off	Off	Off	Off