

KNOXVILLE UTILITIES BOARD

**Addendum No. 2**

Project: **Kuwahee WWTP Combined Heat and Power Facility**

Control No: **952**

Issued: **To all listed Plan holders**

Date: **November 13, 2017**

This addendum forms a part of the Contract described above. The original Contract Documents and any prior addenda remain in full force and effect except as modified by the following which shall take precedence over any contrary provisions in prior documents.

See attached sheet for specifics of this addendum.

Each Bidder shall acknowledge receipt of this addendum by affixing his signature below, by noting this addendum on his Bid Form, and by attaching this addendum to his Bid. **Failure to acknowledge this addendum could be cause for bid rejection.**

**ACKNOWLEDGMENT**

The undersigned acknowledges receipt of this addendum and the Bid submitted is in accordance with information, instructions and stipulations set forth herein.

BIDDER \_\_\_\_\_

AUTHORIZED SIGNATURE \_\_\_\_\_

DATE \_\_\_\_\_

## **ADDENDUM 1 – Kuwahee WWTP Combined Heat and Power Facility**

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### **Clarifications to Questions:**

**Question 1:** Is it KUB's intent to have a separate D/B contract and O&M contract? If so, please clarify the interface obligations of the D/B and O&M contractors.

**Answer 1:** Please refer to Answer 12 of Addendum 1.

**Question 2:** If D/B and O&M contracts are separate, please clarify when the D/B contractor's performance warranty obligations end.

**Answer 2:** The performance warranty will be upheld by the O&M contractor.

**Question 3:** Please clarify how KUB's performance obligations under the Agreement with TVA flow down to or impact D/B and O&M Contractors.

- a) How would penalties for non-performance be calculated?
- b) How would any fines from EPA be calculated in the event of non-performance?
- c) If O&M provider contract is not renewed, who is responsible for penalties after 12 years of CHP operations (assuming there are penalties)?

**Answer 3:** For question a, please refer to Answer 6 and Answer 21 of Addendum 1 and the amended O&M contract found in Addendum 1. For question b, any fines from the EPA will be passed onto the DBO team. The proposing team will need to determine how to pay for any fines. For question c, if the contract is not renewed, penalties will fall on KUB or the new O&M contractor.

**Question 4:** Can KUB guarantee the quality and quantity of biogas produced or alternatively define the performance guarantee around the design assumptions contained in the RFP?

**Answer 4:** KUB cannot guarantee the quality and quantity of biogas produced. The performance guarantee is an annual power production as stated in Addendum 1 and included in the amended O&M agreement. The quantity of biogas does not affect this performance guarantee as KUB will provide supplemental natural gas free of charge when there isn't sufficient biogas to fuel CHP operations. Biogas sampling was conducted, and the results shared via Addendum 1. It is the responsibility of the proposing team to use the available data to design the system to balance capital costs and O&M costs.

**Question 5:** Is any geotechnical data available for the proposed site?

**Answer 5:** KUB can provide previous borings for informational purposes only. Please see the attached geotechnical information. Please reference Section 00031, paragraph 2.4.

**Question 6:** Please clarify the relative weighting of the selection criteria listed on page 32 of the RFP.

**Answer 6:** Please refer to Answer 3 of Addendum 1.

**Question 7:** Section 3.2.1 of the RFP requires a minimum power production of 11,250 MWh/year. In this table, and elsewhere, a 90% uptime or availability at a load of 90-100% is specified, which results in a significantly higher annual power production. A 90% uptime requirement is aggressive

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when considering the potential for longer-lead time parts failure, failures of auxiliary systems, and minor and major overhaul periods. Would KUB consider a single performance goal for the system that allows more flexibility in how the engines are operated and maintained, but would still meet the TVA requirements?

**Answer 7:** Please refer to the amended O&M agreement in Addendum 1.

**Question 8:** Our understanding is that biogas storage is not present at the site. Without a “wide spot in the road” to regulate fuel supplies there can be large variations in the required biogas/natural gas mixture as well as difficulties in regulating pressure in the digester system to prevent flaring due to the tight pressure control band. We recognize that a compressor is to be added upstream of the biogas cleaning skid as part of a separate project but have concerns about biogas supply rate variations. What controls philosophies have been considered for the proposed upstream configuration?

**Answer 8:** Please refer to Answer 7 of Addendum 1.

**Question 9:** The D/B Agreement and the General Conditions appear to be a standard construction agreement forms. These documents do not address the unique nature of a Design-Build project. Would KUB consider using the DBIA Standard form of Agreement?

**Answer 9:** No. Please refer to Answer 8 of Addendum 1.

**Question 10:** Is there any requirement for prevailing or Davis Bacon wage rates?

**Answer 10:** No.

**Question 11:** It appears the clearing of trees will be required along the northern and southern boundaries of the site. Specifically, what are the restoration requirements and is any reforestation required?

**Answer 11:** Please refer to Clarifications to Specifications for Sections 01030 and 01046.

**Question 12:** Please clarify the small business requirements referenced on page 11 of the RFP and on page 19 paragraph 10.1 of the TVA Agreement with KUB. Given the highly specialized nature of the work there appears to be limited opportunities to engage small businesses. Can KUB clarify what is “required” and what is “encouraged”. Also, are recommended percentages based on the project value or TVA’s contribution?

**Answer 12:** CONTRACTOR is encouraged to assist TVA in meeting the Small Business Subcontracting goals as indicated on page 19, paragraph 10.1 of the TVA Agreement with KUB. The recommended percentages are based on the project value. KUB will require that Section 00487, Verification of Business Status Minority and Women Owned Business Certification, be submitted with every invoice. This section will be the tracking tool used by KUB’s accounting department for reporting purposes.

**Question 13:** For calculating O&M cost it is clear that KUB will provide water and gas service free of cost. Please confirm that power consumed for the CHP system including the chillers will be provided free of charge by KUB.

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**Answer 13:** Yes. KUB will provide the power for the CHP system free of charge.

**Question 14:** Please provide information on the gas meters to be provided by KUB. Will the gas meters include pressure regulators?

**Answer 14:** The gas meters will include pressure regulators. Please refer to the attached drawing sheet for additional information on the gas meter.

**Question 15:** Will KUB maintain the equipment they supply or will the O&M contractor provide maintenance for KUB-supplied equipment?

**Answer 15:** KUB will maintain all meters and step up transformers.

**Question 16:** Please explain why dual natural gas supplies are necessary.

**Answer 16:** A dual supply is not necessary. The second natural gas supply is for the sludge heater project, and is not applicable to the CHP project.

**Question 17:** Regarding Section 00140, Paragraph 2.3.4 “SCADA” Confirm the existing PLC-3/DCCP-1 in the Digester Building will be upgraded and refurbished by KUB.

**Answer 17:** Under the Digester Sludge Heating and Biogas project, a new PLC (PLC-Digester) will be furnished in the boiler room that will replace PLC-3/DCCP. KUB will move the I/O and programming over, and demolish the old PLC separately. Provided the new PLC is installed when construction begins on the CHP system, PLC-Digester will replace PLC-3/CCP on drawing I-2.

**Question 18:** Regarding Section 00140, Paragraph 4.3, there is a discrepancy between this section and electrical drawings pertaining to electric meters. Are kW meters at the utility sources and at step-up transformers furnished by KUB/Owner or will these be supplied by the Contractor?

**Answer 18:** The utility metering at the step-up transformers are to be provided by KUB. The ones inside the existing 15 kV switchgear are to be supplied per the contractor and vendors. Please see the clarification to drawing E-3 below for more information.

**Question 19:** There is a conflict between Section 01500, Paragraph 3.2 and Section 00140, Paragraph 3.2.4. Who is responsible for the cost of temporary/construction power usage?

**Answer 19:** Section 01500 is incorrect. KUB will be providing temporary power. Please see Clarifications to Specifications for Section 01500.

**Question 20:** Is there an instrument list available as part of the 30% conceptual design?

**Answer 20:** No.

**Question 21:** Is the project considered tax exempt?

**Answer 21:** No.

**Question 22:** Will KUB allow for use of the plant fiber backbone for communication?

**Answer 22:** KUB will allow for plant fiber backbone connection for communication within the plant if available.

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**Question 23:** Article I, Section 2.3 of the O&M Agreement indicates KUB can end the agreement for convenience with 180 days' notice. Why would KUB wish to do this and if they do, can the Operator be compensated for lost profits and other related costs?

**Answer 23:** KUB does not anticipate terminating the contract without cause, and this is standard language in all KUB contracts. However, if KUB did opt to utilize this clause, the Contractor would only be compensated for work performed during the 180-day notification period, and would not be compensated for lost profits and other related costs.

**Question 24:** Article I, Section 9 of the O&M Agreement indicates that only payment for services to the Operator can be taken from the KUB wastewater fund. What happens if the wastewater fund is not sufficient for payment?

**Answer 24:** This project will be funded by KUB's wastewater division.

**Question 25:** Article I, Section 11 indicates that the annual CPI adjustment "may" be used to increase payments to the Operator. Would KUB consider making annual CPI adjustments automatic?

**Answer 25:** Yes. KUB would consider making the annual adjustments automatic.

**Question 26:** Will KUB be obligated to choose parties from the same proposing team? Or will KUB choose parties from various proposals (e.g. an operator from one team, and design/builder from another team)?

**Answer 26:** KUB will only choose parties from the same proposing team.

**Question 27:** Per Section 13239, 1.04.C, the minimum accepted nominal output is 840 kW, yet the Caterpillar option is listed as 800 kW in Section 00140. Is 800 kW acceptable?

**Answer 27:** No

**Question 28:** Section 13239, 1.01.G states "The engine shall have a dual fuel blending system, and will be able to adjust the fuel ratio from 100% biogas to 100% natural gas, without shutting down the engine, and without a de-rate of the electrical output of the system". Will KUB accept an exception to the engines' ability to operate from 0 to 100% NG/Biogas without shutting down? Our engine can typically handle as little as 20% biogas without shutting down to reset engine settings to handle 100% natural gas.

**Answer 28:** No. This has been discussed with Caterpillar. Their 1200 kW unit is capable of the 0-100% turndown.

**Question 29:** Are biogas flares required within the design-build scope in cases of excess biogas as a result of emergency conditions, unplanned shut downs, etc.? Does Kuwahee WWTP currently have flaring capability?

**Answer 29:** The plant currently has installed flaring capacity. Biogas flares are not within the scope of this project.

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**Question 30:** Section 13239, 1.04 states “Two (2) expansion tanks with level sensors, sight glasses, and drain valves for the two-closed-circuit engine water jacket and intercooler cooling loops.” Are these tanks identified on any drawings or P&ID’s?

**Answer 30:** No.

**Question 31:** Regarding the FERC form 556 this appears to be a certification of a qualifying facility for the Owner or Generator rather than the contractor. Please clarify who is to make this certification, Design Builder, Owner, or Operator.

**Answer 31:** As stated in RFP Section 3.2.4, the contractor shall be responsible for submitting Form 556 from the Federal Energy Regulatory Commission on behalf of KUB. KUB will be the holder of the certification.

**Question 32:** Section 13239, 1.04.C states “The engine generator shall be manufactured by Caterpillar Inc., Mannheim, Germany distributed by Carolina Cat or GE Jenbacher, Jenbach, Austria, distributed by Nixon Power. No equals will be considered for this equipment. The minimum acceptable nominal output shall be 840 kW, the maximum acceptable output shall be 1,200 kW. Units offered at ratings in excess of their published ratings are not acceptable and will not be approved.” Will KUB accept engine generator manufactured by Caterpillar, Inc., Mannheim, Germany (exact same engine supplied by Caterpillar except without “Cat” brand and without yellow paint) distributed by White Harvest Energy (a TVA rate payer, “Valley” Small Business, and Service Disabled Veteran Owned Business based out of Chattanooga, TN)? Please note White Harvest Energy is currently installing four similar natural gas CHP units in Chattanooga, TN at Erlanger Hospital for the same TVA incentive.

**Answer 32:** KUB will not consider White Harvest Energy as the engine distributor. Please see Clarifications to Specifications for a correction in Section 13239, 1.04.C.

### **Clarifications to Drawings:**

1. E-3 One Line Power Diagram Modifications; At the TVA Meters shown at SUT-1 and SUT-2, DELETE “(SEE NOTE 8)” and REPLACE with the following: “KUB FURNISHED)”.

### **Clarifications to Specifications:**

1. Section 01030; ADD “Any trees damaged or cleared during construction shall be replaced at CONTRACTOR’s expense with trees of equivalent size and species” to end of 1.05.F
2. Section 01046; ADD “Any trees damaged or cleared during construction shall be replaced at CONTRACTOR’s expense with trees of equivalent size and species” to end of 1.08.A
3. Section 01500; DELETE “local electric company” and REPLACE with “OWNER” and DELETE “pay all expenses in connection therewith” in 3.02.A. DELETE “CONTRACTOR” and REPLACE with “OWNER” in 3.02.B.
4. Section 13239; DELETE “642” and REPLACE with “842” in 1.12.A.
5. Section 13239, in paragraph 1.04.C., DELETE “The engine generator manufactured by Caterpillar, Inc. Mannheim, Germany, distributed by Carolina Cat...” and REPLACE with

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“The engine generator manufactured by Caterpillar, Inc. Manheim, Germany, distributed by Stowers...”

6. Appendix I, Proposal Contractor Cover Sheet; DELETE Appendix I, Proposal Contractor Cover Sheet and REPLACE with revised Appendix I, attached. The Proposal DUE DATE has been CHANGED to December 4, 2017, at 2:00 PM, EST.
7. Section 00031; DELETE page 7, section 00031 of the RFP and REPLACE with revised page 7, attached. The RFP schedule has been changed as follows:
  - Cut off for questions at 5:00 PM, on November 20, 2017.
  - Issue addendum, if required by 3:30 PM, on November 27, 2017
  - **Proposals due at 2:00 PM, EST on December 4, 2017**, and information will be read aloud on the Proposal Contractor Cover Sheet.
  - Evaluations will take place 12/5/17 – 12/15/17. KUB reserves the right to conduct interviews with proposers during the evaluation process.
  - Make Award(s) on or about December 18, 2017.
  - Notice to Proceed on or about January 8, 2017.
  - Final Commissioning and begin generating operations October 20, 2019.
8. Section 00031, Paragraph 3.2.4., ADD “The Operator and Operations staff must possess and maintain all applicable state and local permits for operations” to Permitting.

**END OF ADDENDUM 11/17**



**SECTION 00031  
ADVERTISEMENT: REQUEST FOR PROPOSAL**

Notice to all Qualified PROPOSERS:

**RE: REQUEST FOR PROPOSAL FROM CONTRACTORS FOR DESIGN,  
CONSTRUCTION, OPERATION, AND MAINTENANCE OF  
KUWAHEE WWTP COMBINED HEAT AND POWER (CHP)  
FACILITY**

**KUB CONTROL NUMBER: 952**

The Knoxville Utilities Board will be receiving proposals for the referenced project until **2:00 P.M. local time on December 4, 2017. See RFP documents for all requirements.**

The proposed schedule for this Project is as follows:

- A. Proposal documents available on September 27, 2017.
- B. **A mandatory on-site Pre-Poposal meeting will be held at 10:00 AM, EST, on October 17, 2017, at the Kuwahee Wastewater Treatment Plant (Admin. Bldg. – Large Conference Room), 2015 Neyland Dr., Knoxville, TN 37916. On-site meeting attendees must bring HARD HATS, SAFETY GLASSES WITH SIDE SHIELDS AND BOOTS WITH TOE PROTECTION to participate in the on-site walk through.**
- C. Cut off for questions at 5:00 PM on November 20, 2017.
- D. Issue addendum if required by 3:30PM on November 27, 2017.
- E. **Proposals due at 2:00PM, EST, on December 4, 2017**, and information will be read aloud on Proposal Contractor Cover Sheet.
- F. Evaluations will take place 12/5/17 – 12/15/17. KUB reserves the right to conduct interviews with proposers during the evaluation process.
- G. Make Award(s) on or about December 18, 2017.
- H. Notice to Proceed on or about January 8, 2017.
- I. Final Commissioning and begin fueling operations October 20, 2019.

All communications concerning this project shall be addressed to the proper individuals identified in the RFP.

RFP Documents may be picked up at the following location Mon-Fri from 8:00AM – 4:00PM.  
Procurement Department  
Knoxville Utilities Board, Edwin C. Hoskins Operations Center  
4505 Middlebrook Pike  
Knoxville, TN 37921

Addendum 2



## **APPENDIX I - PROPOSAL CONTRACTOR COVER SHEET**

This form shall be firmly attached to the outside of the envelope containing the Proposal, with all State of Tennessee TCA Title 62, Chapter 6 required information for Part 1 and Part 2 included, otherwise the Proposal will not be opened, and if opened by mistake will not be considered.

**Knoxville Utilities Board, Knoxville, Tennessee**

**PROJECT: KUB KUWAHEE WASTEWATER TREATMENT PLANT COMBINED  
HEAT AND POWER (CHP) FACILITY**

**CONTROL NUMBER: 00952**

**OPENS: 2:00 PM (local time) on December 4, 2017**

**PART 1 – PROPOSER will subcontract the GENERAL CONTRACTOR (GC) portion of  
the work**

**PROPOSER COMPANY NAME:** \_\_\_\_\_

**COMPANY CONTACT:** \_\_\_\_\_

**EMAIL ADDRESS:** \_\_\_\_\_

**ADDRESS: Street** \_\_\_\_\_

**City, State, Zip** \_\_\_\_\_

**PHONE NUMBER:** \_\_\_\_\_

### **GENERAL SUBCONTRACTOR INFORMATION:**

**GC SUBCONTRACTOR COMPANY NAME:** \_\_\_\_\_

**GC COMPANY CONTACT:** \_\_\_\_\_

**GC EMAIL ADDRESS:** \_\_\_\_\_

**GC ADDRESS: Street** \_\_\_\_\_

**City, State, Zip** \_\_\_\_\_

**GC PHONE NUMBER:** \_\_\_\_\_

**TENNESSEE GC LICENSE NO:** \_\_\_\_\_

**GC CLASSIFICATION(S):** \_\_\_\_\_

**GC LICENSE EXPIRATION DATE:** \_\_\_\_\_

**\*\*\* OR (SEE NEXT PAGE) \*\*\***

**PART 2 – PROPOSER self performs the GENERAL CONTRACTOR (GC) portion of the work :** Proposer shall complete this part in accordance with the State of Tennessee TCA Title 62, Chapter 6. (Include all classifications and sub-classifications for Proposer’s License Number listed)

**PROPOSER COMPANY NAME:** \_\_\_\_\_

**COMPANY CONTACT:** \_\_\_\_\_

**EMAIL ADDRESS:** \_\_\_\_\_

**ADDRESS: Street** \_\_\_\_\_

**City, State, Zip** \_\_\_\_\_

**PHONE NUMBER:** \_\_\_\_\_

**TENNESSEE GC LICENSE NO:** \_\_\_\_\_

**CLASSIFICATION(S):** \_\_\_\_\_

**LICENSE EXPIRATION DATE:** \_\_\_\_\_

**PART 2A – BIDDER’S ELECTRICAL, PLUMBING, HVAC, or MASONRY SUBCONTRACTORS.**

Bidder shall complete this part in accordance with the State of Tennessee TCA Title 62, Chapter 6 requirement for listing Electrical, Plumbing, HVAC or Masonry Subcontractors on Bid Cover Sheets.

**ELECTRICAL SUBCONTRACTOR:**

NAME: \_\_\_\_\_

LICENSE NO: \_\_\_\_\_ EXPIRATION DATE: \_\_\_\_\_

CLASSIFICATION(S): \_\_\_\_\_

**PLUMBING SUBCONTRACTOR:**

NAME: \_\_\_\_\_

LICENSE NO: \_\_\_\_\_ EXPIRATION DATE: \_\_\_\_\_

CLASSIFICATION(S): \_\_\_\_\_

**HVAC OR GEOTHERMAL HEATING AND COOLING SUBCONTRACTOR:**

NAME: \_\_\_\_\_

LICENSE NO: \_\_\_\_\_ EXPIRATION DATE: \_\_\_\_\_

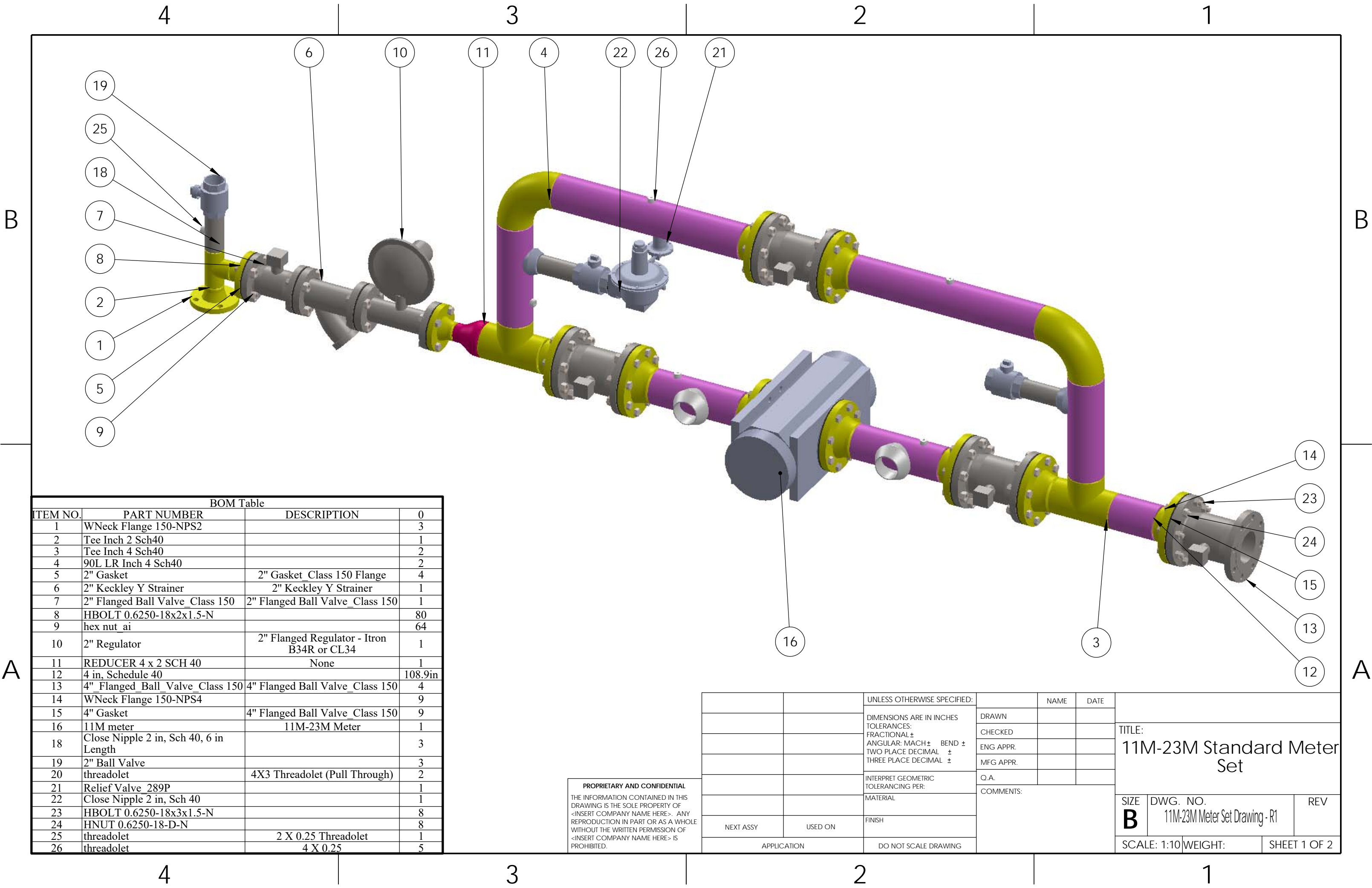
CLASSIFICATION(S): \_\_\_\_\_

**MASONRY SUBCONTRACTOR:**

NAME: \_\_\_\_\_

LICENSE NO: \_\_\_\_\_ EXPIRATION DATE: \_\_\_\_\_

CLASSIFICATION(S): \_\_\_\_\_



BOM Table			
ITEM NO.	PART NUMBER	DESCRIPTION	
1	WNeck Flange 150-NPS2		0
2	Tee Inch 2 Sch40		3
3	Tee Inch 4 Sch40		1
4	90L LR Inch 4 Sch40		2
5	2" Gasket	2" Gasket Class 150 Flange	2
6	2" Keckley Y Strainer	2" Keckley Y Strainer	4
7	2" Flanged Ball Valve_Class 150	2" Flanged Ball Valve_Class 150	1
8	HBOLT 0.6250-18x2x1.5-N		80
9	hex nut ai		64
10	2" Regulator	2" Flanged Regulator - Itron B34R or CL34	1
11	REDUCER 4 x 2 SCH 40	None	1
12	4 in, Schedule 40		108.9in
13	4" Flanged Ball Valve_Class 150	4" Flanged Ball Valve_Class 150	4
14	WNeck Flange 150-NPS4		9
15	4" Gasket	4" Flanged Ball Valve_Class 150	9
16	11M meter	11M-23M Meter	1
18	Close Nipple 2 in, Sch 40, 6 in Length		3
19	2" Ball Valve		3
20	threadolet	4X3 Threadolet (Pull Through)	2
21	Relief Valve 289P		1
22	Close Nipple 2 in, Sch 40		1
23	HBOLT 0.6250-18x3x1.5-N		8
24	HNUT 0.6250-18-D-N		8
25	threadolet	2 X 0.25 Threadolet	1
26	threadolet	4 X 0.25	5

PROPRIETARY AND CONFIDENTIAL  
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF <INSERT COMPANY NAME HERE>. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF <INSERT COMPANY NAME HERE> IS PROHIBITED.

		UNLESS OTHERWISE SPECIFIED:		NAME	DATE	TITLE: 11M-23M Standard Meter Set		
		DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ± ANGULAR: MACH ±    BEND ± TWO PLACE DECIMAL ± THREE PLACE DECIMAL ±	DRAWN					
			CHECKED					
			ENG APPR.					
			MFG APPR.					
		INTERPRET GEOMETRIC TOLERANCING PER:	Q.A.			COMMENTS:		
		MATERIAL						
NEXT ASSY	USED ON	FINISH				SIZE <b>B</b>	DWG. NO. 11M-23M Meter Set Drawing - R1	REV
APPLICATION		DO NOT SCALE DRAWING				SCALE: 1:10	WEIGHT:	SHEET 1 OF 2





**Bhate Geosciences Corporation**  
Geotechnical, Materials, Environmental Engineers

333 Troy Circle, Suite N  
Knoxville, Tennessee 37919  
Phone: (865) 584-3243  
Fax: (205) 584-4296  
Web: <http://www.bhate-geo.com>

June 24, 2008

Gresham, Smith and Partners  
625 Market Street, Suite 800  
Knoxville, Tennessee 37902

Attention: Mr. Craig Parker, P. E.

Subject: Limited Phase II Environmental Site Assessment  
Proposed Lower Third Creek Storage Tank  
Knoxville, Tennessee  
BHATE Project Number: 708113

Dear Mr. Parker:

Bhate Geosciences Corporation (BHATE) has completed a Limited Phase II Environmental Site Assessment (ESA) of the above-referenced site and we are pleased to submit the following letter report of our findings. Our services were provided in general accordance with our proposal number 4702-08R1, dated May 16, 2008.

The purpose of this Limited Phase II ESA was to determine if soil and/or groundwater underneath the subject site had been affected by unknown past activities. To our knowledge, a Phase I ESA has not been conducted at the site in the past. During drilling operations at the site, BHATE informed Mr. Chris Brown, with Gresham, Smith and Partners (GSP), that the water table depth, where encountered, exceeded 45 feet below ground surface (BGS). GSP informed BHATE, at that time, not to install a groundwater monitoring well, and therefore; a groundwater sample was not collected.

### **INTRODUCTION**

BHATE has completed environmental subsurface soil testing of the proposed Lower Third Creek Storage Tank site in Knoxville, Tennessee. The site is located at the existing Knoxville Utilities Board (KUB) Kuhawee Wastewater Treatment Plant off of Neyland Drive (see attached Figure 1). The purpose of the testing is to evaluate soil conditions at the site to determine if contamination from past unknown activities at the site could affect future development plans. Due to the depth of groundwater encountered at the site and soil conditions observed during drilling operations, GSP decided not to install a groundwater monitoring well, and therefore; only subsurface soil samples were collected for analysis. BHATE understands that proposed excavation depths are not anticipated to exceed the groundwater table depths.



The environmental subsurface soil sampling was conducted in conjunction with a preliminary geotechnical evaluation of the site. A total of five borings were advanced during the course of the evaluation, of these, three of the boring locations (B-1, B-2, and B-3) were evaluated for the potential presence of environmental contaminants (see attached Figure 2 for boring locations).

Currently, the site contains two metal warehouse buildings utilized for storage of equipment used in the operations of the wastewater treatment plant. The building is surrounded to the east, south, and west by asphalt paved parking and driveway areas. A grass/gravel area and then a railroad track were observed to the north of the buildings. According to KUB personnel, the buildings were present prior to construction of the wastewater treatment plant and their past usage is unknown.

Since the past usage of the site is unknown, a broad spectrum of soil analysis was utilized and was intended to test for a variety of contaminants. The subsurface soil samples collected during the drilling operations were tested for volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), extractable petroleum hydrocarbons (EPH), metals, and pesticides/PCBs.

### **SOIL INVESTIGATION**

To assess the site for potential impacts, a total of three locations were evaluated on June 4, 2008 by BHATE. Boring B-1 was located north of the warehouse buildings in a grass/gravel covered area. Boring B-2 was located inside the eastern warehouse and advanced through the concrete floor. Boring B-3 was located just south of the eastern warehouse and was advanced through asphalt. The soil samples were collected using a Geoprobe® 7720DT and split-spoon samplers. See attached Figure 2 for boring locations.

Boring B-1 was advanced to a depth of 25.5 feet before auger refusal. Boring B-2 was terminated at 55 feet. Boring B-3 was advanced to a depth of 42.5 feet before auger refusal. Groundwater was encountered in boring B-2 at a depth of approximately 46 feet BGS. A possible void (tool drop) was encountered in boring B-2 from approximately 39 to 46 feet BGS.

### **SOIL DESCRIPTION**

Generally, stiff to medium-stiff, tan to orange, silty, sandy clay was observed in the top 15 to 20 feet BGS at all of the boring locations. After 15 or 20 feet BGS, softer sandier clay was encountered. Rock fragments, including cobbles, were observed at boring location B-2, starting at a depth of approximately 28 feet BGS, and at boring location B-3, starting at a depth of approximately 40 feet BGS. Some exceptions were noted. The boring logs are attached and included with this report.

### **SOIL SAMPLING**

On June 4, 2008, a BHATE Environmental Professional was onsite to conduct the soil sampling and document the drilling operations. Soil samples were collected using a Geoprobe® 7720DT to advance a split spoon sampler. The soil samples were collected continuously at each location. Visible or olfactory indications of contaminated soil were not observed during the drilling operations.

Soil samples collected at boring locations B-1, B-2, and B-3 were split into two portions; one portion was immediately placed in sterile containers and placed on ice for possible submittal for laboratory analysis. The second portion was placed in a resalable plastic bag and

left to volatilize for a minimum of 20 minutes prior to field screening with a photo-ionization detector (PID). Headspace analysis was performed by collecting readings from the volatilized sample portions using a PID.

Significant indications of volatile organic vapors were not observed at any of the boring locations. Best judgment was used in determining which samples to submit to the laboratory for analysis.

## **SOIL ANALYSIS**

Soil samples collected at boring locations B-1, B-2, and B-3 were submitted under a chain of custody to the Environmental Science Corporation (ESC) laboratory in Mt. Juliet, Tennessee. The soil samples were analyzed for VOCs by Environmental Protection Agency (EPA) Method 8260B, RCRA 8 metals (mercury, arsenic, barium, cadmium, chromium, lead, selenium, and silver) by EPA Method 6010B, with the exception of mercury which was analyzed by EPA Method 7471, PAHs by EPA Method 8270C, EPH by the TN-EPH Method, and pesticides/PCBs by EPA Methods 8081 and 8082 respectively. All samples were handled in general compliance with EPA's quality assurance/control protocols to ensure sample integrity and prevent cross-contamination.

## **SOIL ANALYSIS**

Laboratory reported analytical results for soil samples collected at soil boring locations B-1, B-2, and B-3 are summarized in Table 1 below. Only parameters with concentrations above their respective detection limits are represented in the table. The laboratory report and chain of custody are attached and included with this report.

**Table 1**  
Summary of Soil Analytical Data

Lab Sample ID			L349028-01	L349028-02	L349028-03	2008 Region 9 PRGs*
Client Sample ID			B-1 16-18 FT	B-2 9-11 FT	B-3 3-7 FT	
Collect Date			6/4/2008	6/4/2008	6/4/2008	
Method	Parameter	Units	Value	Value	Value	Value
7471	Mercury	mg/kg	<0.020	0.024	0.02	28
6010B	Arsenic	mg/kg	<b>1.9**</b>	<1.0	<b>2.6**</b>	1.6
6010B	Barium	mg/kg	60	15	82	19,000
6010B	Cadmium	mg/kg	0.89	<0.25	0.77	810
6010B	Chromium	mg/kg	12	2.8	15	1,400
6010B	Lead	mg/kg	11	2.1	16	400***
8260B	1,1,2-Trichloro-1,2,2-trifluoroethane	mg/kg	0.013	<0.0050	<0.0050	180,000

### **Notes**

Shaded values indicate detections above laboratory detection limits

Bold values indicate an exceedance of established regulatory criteria

\* 2008 EPA Region 9 PRGs for industrial soil

\*\* Does not exceed the documented background concentration of 10 mg/kg

\*\*\* 2008 EPA Region 9 PRG for residential soil - no industrial soil value available

The laboratory reported detections of the parameters listed in Table 1 were compared to the 2008 EPA Region 9 Preliminary Remediation Goals (PRGs) for industrial soil, with the exception of lead, which was compared to the PRG for residential soil since a PRG for industrial soil is unavailable. Detections of EPH, pesticides/PCBs, or PAHs, above laboratory detection limits, were not observed in any of the soil sampled analyzed.

The soil samples collected boring locations B-1 and B-3 had laboratory reported arsenic concentrations of 1.9 milligrams per kilogram (mg/kg) and 2.6 mg/kg respectively, which exceeds the regulatory level of 1.6 mg/kg. However, according to *Hazardous Trace Elements in Tennessee Soils and Other Regolith* (Tennessee Department of Environment and Conservation, Division of Geology, Report of Investigation No. 49, 2001), the average background of arsenic in Tennessee soils is 10 mg/kg. Based on this study, the laboratory reported concentrations of arsenic in soils collected at these locations are below documented background levels. No other exceedances of regulatory criteria were observed.

### **CONCLUSIONS AND RECOMMENDATIONS**

***Exceedances of regulatory criteria and/or documented background levels were not observed in the soil samples collected at the proposed storage tank site. BHATE does not recommended any further sampling of subsurface soils at this time.***

### **QUALIFICATIONS OF REPORT**

This report is an instrument of service of BHATE. The report was prepared for the exclusive use of Gresham, Smith and Partners. The report's contents may not be relied upon by any party other than Gresham, Smith and Partners without the express written permission of BHATE.

The findings of this report are based on the conditions encountered at the locations and on the dates of BHATE's investigation. Conditions might change at the location(s) investigated subsequent to the date of the field work; therefore, the findings of this report should not be relied upon to accurately represent conditions at any other time. The analytical results obtained from sampling of media may not be representative of conditions between sampled locations. Field conditions may change as a result of natural changes, fluctuations, or other types of disturbances. Conclusions presented in this report, under any circumstance, do not comprise a guarantee that all areas onsite are similar to the locations sampled.

The scope of services performed in this report is designed to identify contamination onsite at locations suspected to be contaminated. The scope of services does not include delineation (vertical and horizontal extents) of potentially impacted material, nor does the scope of services include estimations of materials to be remediated. If impacted material is discovered, BHATE can provide additional services under a separate scope of services.

Regulatory criteria presented in this report may change at any time, either during the issuance of this report or after the report is issued. BHATE can not be held responsible for any regulatory changes that occur that may effect the conclusions and recommendations contained herein. BHATE is not responsible for reporting the findings of this report to appropriate regulatory agencies, unless agreed upon first by the client and BHATE.

### **CLOSING**

We appreciate the opportunity to work with you on this project and look forward to continuing our relationship. If you have any questions or we may be of further service to you, please call us.

Respectfully submitted,  
**BHATE GEOSCIENCES CORPORATION**

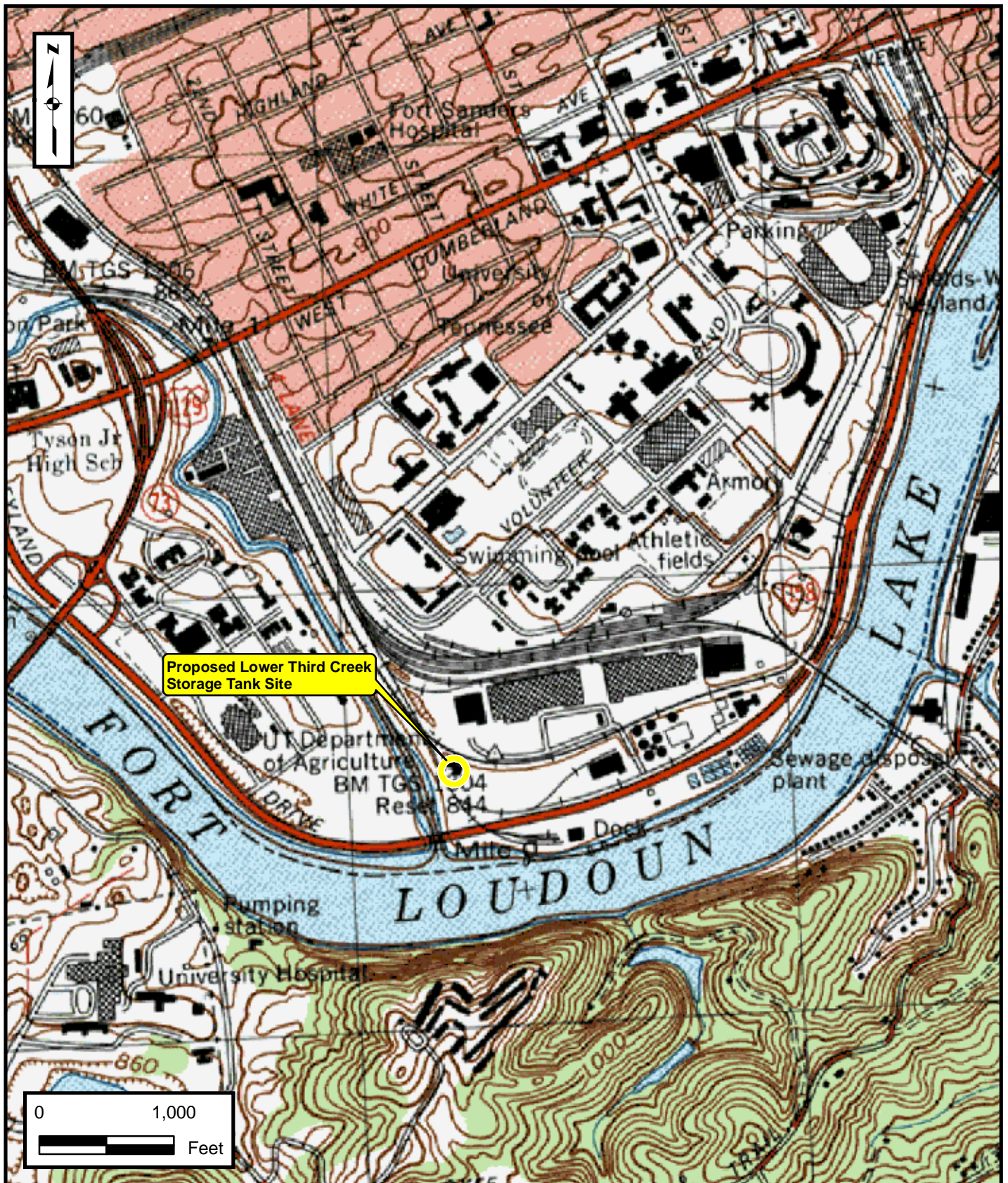


L. Leroy Leonard  
Environmental Division Manager



Marc L. Langlois  
Senior Reviewer

Attachments:      Figure 1 –Site Vicinity Map  
                             Figure 2 – Boring Location Map  
                             Boring Logs  
                             Laboratory Report  
                             Chain of Custody



**BHATE**  
GEOSCIENCES

#### SITE VICINITY MAP

USGS Topographic Map Reference: Knoxville, Tennessee Quadrangle  
1978 - 20' Contours  
(<http://seamless.usgs.gov/website/seamless/viewer.htm>)

PROJECT  
NO.

708113

SCALE

AS SHOWN

DATE

6/10/2008

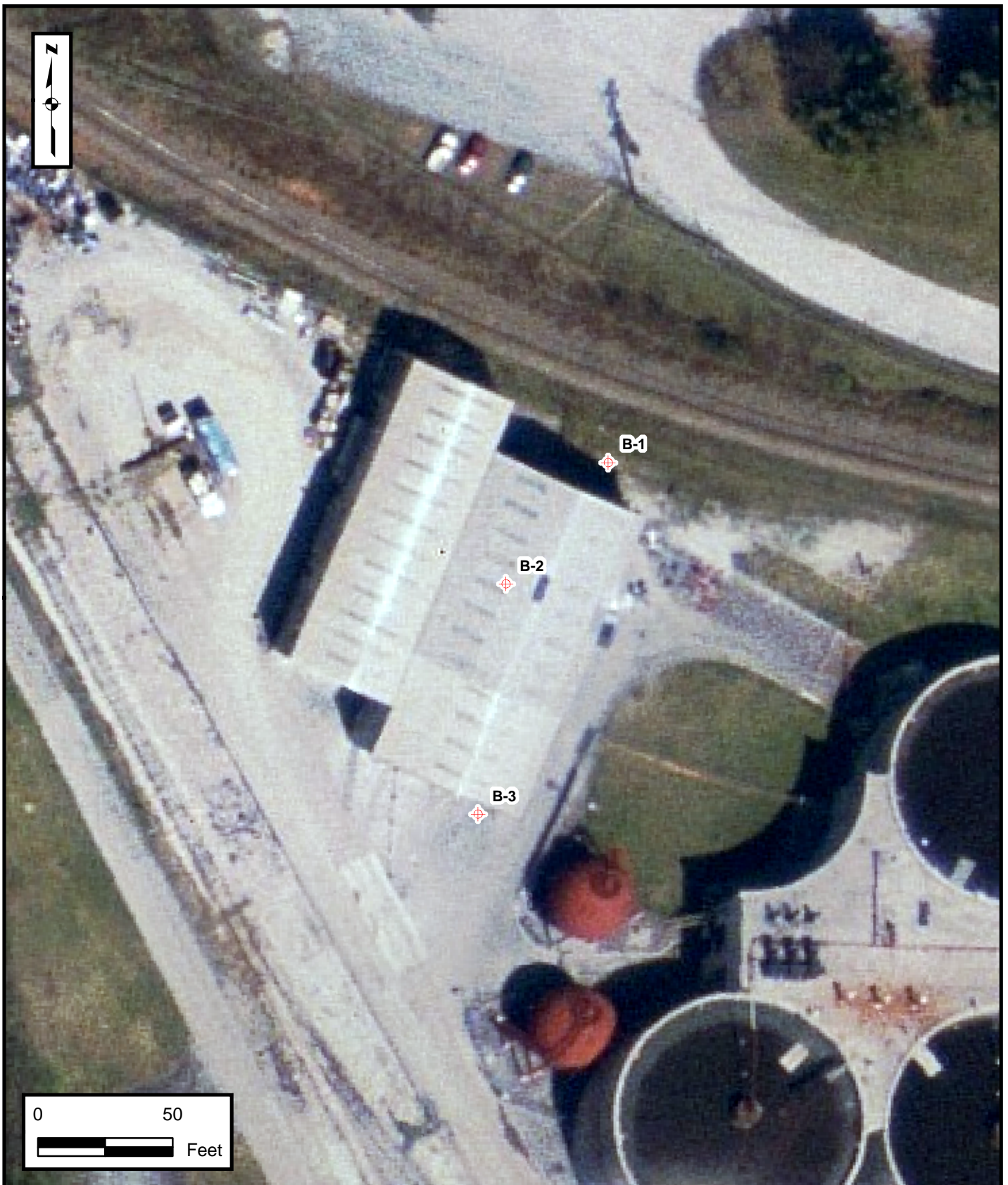
DRAWN BY:  
L. Leonard

FILE NAME:

#### PROPOSED LOWER THIRD CREEK STORAGE TANK

KUB KUHAWE  
WASTEWATER  
TREATMENT PLANT  
KNOXVILLE, TN

FIGURE 1



**BHATE**  
GEOSCIENCES

### BORING LOCATION MAP

2002 AERIAL PHOTOGRAPH - 1 FOOT RESOLUTION  
USGS NATIONAL MAP SERVER  
(<http://seamless.usgs.gov/website/seamless/viewer.htm>)

PROJECT NO.	SCALE	DATE	DRAWN BY:
708113	AS SHOWN	6/10/2008	L. Leonard
			FILE NAME:

### PROPOSED LOWER THIRD CREEK STORAGE TANK

**KUB KUHAWE  
WASTEWATER  
TREATMENT PLANT  
KNOXVILLE, TN**

**FIGURE 2**

# LOG OF BORING

CONTRACTED WITH: Gresham, Smith and Partners

PROJECT NAME: Lower Third Creek Storage Tank

PROJECT LOCATION: Knoxville, Tennessee

BORING NO.: B-1

JOB NO.: 708113

SHEET 1 OF 1

DATE: 6/4/08

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE DATA										
			NUMBER	TYPE	BLOWS/6"	N-VALUE	MOISTURE (%)	LL (%)	PL (%)	PI (%)	PPqu (tsf)	WATER LEVEL	REMARKS
0		2" GRAVEL Stiff, tan to orange, silty, sandy CLAY											
			1		3-4-6	10							
5		...medium-stiff	2		1-2-3	5							
		...same	3		1-3-4	7							
10		...same	4		5-7-8	15							
15		...with trace manganese dioxide staining	5		4-6-6	12							
20			6		4-4-6	10							
		Medium-dense to dense, tan SAND, with trace manganese dioxide staining											
25		...same	7		4-4-50/5"	>50							
		Auger refusal at 25.5 feet										GNE	
30													
35													
40													
45													
50													
55													

KNOXVILLE BORING LOG 708113 LOWER THIRD CREEK GPJ BHATE OCT05.GDT 6/10/08

KNOXVILLE BORING LOG 708113 LOWER THIRD CREEK.GPJ BHATE OCT05.GDT 6/10/08



GNE = Ground Water Not Encountered

▽ = Water Table Encountered

@ Time of Boring

▼ = Delayed Water Table Level

⊗ = Hole Cave In Depth

333 Troy Circle, Suite N  
Knoxville, TN 37919  
865-584-3243 (Phone)  
865-584-4297 (Fax)

# LOG OF BORING

CONTRACTED WITH: Gresham, Smith and Partners

PROJECT NAME: Lower Third Creek Storage Tank

PROJECT LOCATION: Knoxville, Tennessee

BORING NO.: B-2

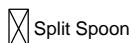
JOB NO.: 708113

SHEET 1 OF 1

DATE: 6/4/08

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE DATA									
			NUMBER	TYPE	BLOWS/6"	N-VALUE	MOISTURE (%)	LL (%)	PL (%)	PI (%)	PPqu (tsf)	WATER LEVEL
0		2" CONCRETE 4" GRAVEL										
		Stiff, tan to orange, silty, sandy CLAY	1	⊗	5-5-10	15						
		...with trace manganese dioxide staining	2	⊗	3-5-6	11						
		...very stiff, mottled, trace manganese dioxide staining	3	⊗	5-9-12	21						
		...same	4	⊗	7-9-10	19						
			5	⊗	3-5-8	13						
		Medium-dense, tan to orange SAND, with trace manganese dioxide staining										
		...same	6	⊗	2-4-5	9						
		...same	7	⊗	3-5-6	11						
			8	⊗	5-3-3	6*						
		Soft, tan to brown, loose SAND, moist, with fine gravel size rock fragments										
		Very soft, tan to brown, sandy CLAY, moist, with fine gravel size rock fragments	9	⊗	W-O-H							
		Possible VOID from 39' to 46'	10	⊗	W-O-H							
			11	⊗	W-O-H							
		Boring terminated at 55 feet										

KNOXVILLE BORING LOG 708113 LOWER THIRD CREEK.GPJ BHATE OCT05.GDT 6/10/08



GNE = Ground Water Not Encountered

▽ = Water Table Encountered

@ Time of Boring

▼ = Delayed Water Table Level

⊗ = Hole Cave In Depth

333 Troy Circle, Suite N  
Knoxville, TN 37919  
865-584-3243 (Phone)  
865-584-4297 (Fax)

# LOG OF BORING

CONTRACTED WITH: Gresham, Smith and Partners

PROJECT NAME: Lower Third Creek Storage Tank

PROJECT LOCATION: Knoxville, Tennessee

BORING NO.: B-3

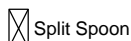
JOB NO.: 708113

SHEET 1 OF 1

DATE: 6/4/08

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE DATA								
			NUMBER	TYPE	BLOWS/6"	N-VALUE	MOISTURE (%)	LL (%)	PL (%)	PI (%)	PPqu (tsf)
0		3" ASPHALT 2' BASE									
		Soft, brown, silty CLAY	1	×	1-1-1	2					
5		Medium-stiff, tan to orange, silty, sandy CLAY, with trace manganese dioxide staining	2	×	1-1-3	4					
		...stiff, mottled	3	×	1-3-4	7					
10											
15		...stiff	4	×	4-6-8	14					
20		...same	5	×	4-5-7	12					
25		Medium-dense, tan SAND, moist, with manganese dioxide staining	6	×	3-3-4	7					
30		...same	7	×	2-2-3	5					
35		Medium-stiff, tan o brown, sandy CLAY, with trace manganese dioxide staining	8	×	3-3-4	7					
40		...with fine to coarse gravel size rock fragments	9	×	2-3-3	6					
42.5		Auger refusal at 42.5 feet									
45											
50											
55											

KNOXVILLE BORING LOG 708113 LOWER THIRD CREEK.GPJ BHATE OCT05.GDT 6/10/08



GNE = Ground Water Not Encountered

▽ = Water Table Encountered

@ Time of Boring

▼ = Delayed Water Table Level

⊠ = Hole Cave In Depth

333 Troy Circle, Suite N  
Knoxville, TN 37919  
865-584-3243 (Phone)  
865-584-4297 (Fax)

Environmental Services Report  
Proposed Lower Third Creek Storage Tank  
Pump Station Site  
Knoxville, Tennessee  
BHATE Project Number: 708113

**Prepared For:**

Mr. Craig Parker, P.E.  
Gresham, Smith and Partners  
625 Market Street, Suite 800  
Knoxville, Tennessee 37902





**Bhate Geosciences Corporation**  
Geotechnical, Materials, Environmental Engineers

5217 5<sup>th</sup> Avenue South  
Birmingham, Alabama 35212  
Phone: (205) 591-7062  
Fax: (205) 591-7184  
Web: <http://www.bhate-eng.com>

October 17, 2008

Mr. Craig Parker, P.E.  
Gresham, Smith and Partners  
625 Market Street, Suite 800  
Knoxville, Tennessee 37902

Subject: Environmental Services Report  
Proposed Lower Third Creek Storage Tank  
Pump Station Site  
Knoxville, Tennessee  
BHATE Project Number: 708113

Dear Mr. Parker:

Bhate Geosciences Corporation (BHATE) has completed subsurface soil and groundwater sampling at the above-referenced site and we are pleased to submit the following letter report of our findings. Our services were provided in general accordance with our proposal number 4821-08, dated July 15, 2008.

The purpose of the subsurface soil and groundwater sampling was to determine if past activities, either onsite or adjacent to the site, could have impacted the soil and/or groundwater. To our knowledge, a Phase I ESA has not been conducted at the site in the past.

### **INTRODUCTION**

BHATE has completed environmental subsurface soil and groundwater sampling at the proposed Lower Third Creek Pump Station site in Knoxville, Tennessee. The Pump Station site is located approximately 350 feet south of the proposed storage tank site (see attached Figure 1). The site is currently a parking lot with surrounding grass-covered areas and is maintained by the City of Knoxville Parks and Recreation Department. The proposed Storage Tank site is located at the Knoxville Utilities Board (KUB) Kuhawee Wastewater Treatment Plant off of Neyland Drive. BHATE understands that KUB owns this property and has allowed the City of Knoxville to use the land.

GSP requested subsurface soil and groundwater sampling for evaluation of potential contamination that could affect future development plans. Based on the scope of services outlined in the proposal, two boring locations were to be screened and sampled for potential contamination. One of the two boring locations was to be converted to a monitoring well if indications of groundwater were observed prior to refusal. BHATE conducted an initial soils investigation at the site on August 11, 2008. Based on field conditions encountered at that time, a total of four boring location were screened for possible contamination. Groundwater was encountered during the investigation and a groundwater monitoring well was installed.

**QUALITY • SERVICE • EXCELLENCE**

The environmental subsurface soil and groundwater sampling was conducted in conjunction with a geotechnical evaluation of the site. Due to adjustments in the geotechnical borings, the designations of the original boring locations changed during the performance of the field activities. Below, the original boring designations are presented with the revised boring locations. Only the boring locations screened for potential contamination are presented below. Please be aware that the laboratory reports of analysis attached with the document refer to the original boring designations. The revised boring location designations will be referred to in this document (see attached Figure 2 for boring locations).

<b><i>Original Boring Location Designation</i></b>	<b><i>Revised Boring Location Designation</i></b>
B-8	SB-11
B-9	SB-12
B-10	SB-13
B-11	SB-14

### **SOILS INVESTIGATION**

To assess the site for potential subsurface soil contamination, a total of four locations were evaluated on August 11, 2008 by BHATE. Boring SB-11 was located along the southern access driveway for the existing parking lot and corresponds to the east side of the proposed pump station. Boring SB-12 was located in the existing parking lot and corresponds to the southwest corner of the proposed odor control building. Boring SB-13 was located in the existing parking lot and corresponds to an interior location in the proposed odor control building. Boring SB-14 is located in a grass-covered area located south of the existing parking lot and corresponds to the location of the proposed diversion structure for the pump station. See attached Figure 2 for boring locations.

Boring SB-11 was advanced to a depth of 16 feet before auger refusal. Boring SB-12 was advanced to a depth of 8.5 feet before auger refusal. Boring SB-13 was advanced to a depth of 15.5 feet before auger refusal. Boring SB-14 was advanced to a depth of 20 feet before auger refusal. Saturated soil conditions were encountered in boring SB-11 at a depth of approximately 15.5 feet below ground surface (BGS). Moist soil conditions were encountered at boring location SB-14 at a depth of approximately 19 feet BGS. It should be noted that based on subsequent borings in the area the refusal depth is not due to bedrock but from presence of river gravel or other obstructions.

### **SOIL DESCRIPTION**

Apparent fill material at boring location SB-11 was encountered from ground surface until approximately four feet BGS. Apparent fill material was encountered from the ground surface until approximately eight feet BGS at boring locations SB-12, SB-13, and SB-14. Generally, the fill material at the boring locations consisted of medium stiff to stiff, tan to dark brown, silty clay. Organics, organic odor, and some gravel were observed in the apparent fill material. For a complete description of the soils encountered, please see the attached Log of Borings.

### **SOIL SAMPLING**

On August 11, 2008, a BHATE Environmental Professional was onsite to conduct the soil sampling and document the drilling operations. Subsurface soil samples were collected using a CME 550X ATV drill rig to advance previously decontaminated, two-foot long, split spoon samplers. The soil samples were collected continuously at each location.

Soil samples collected at boring locations SB-11, SB-12, SB-13, and SB-14 were split into two portions; one portion was immediately placed in sterile containers and placed on ice for possible submittal for laboratory analysis. The second portion was placed in a resalable plastic bag and left to volatilize for a minimum of 20 minutes prior to field screening with a photo-ionization detector (PID). Headspace analysis was performed by collecting readings from the volatilized sample portions using a PID. The PID is useful for screening soils for volatile organic compounds (VOCs); however, the PID can not detect petroleum constituents unless the constituents contain VOCs.

*Potential contamination (dark soil staining) was observed in subsurface soils at the first boring location (SB-11). The staining at boring location SB-11 was observed from 0.5 feet to 6 feet BGS. What appeared to be coal was observed toward the bottom of this depth range. Odors were detected throughout this depth range. PID readings at this boring location ranged from 10.8 parts per million (ppm) to 44.7 ppm. The highest PID reading was observed in the soil sample collected from the two feet to four feet BGS depth range and this sample was sent to the laboratory for analysis. Apparent residual soil was observed from 6 feet BGS until refusal at 16 feet BGS. Saturated soil conditions were encountered at approximately 15.5 feet BGS.*

*Dark-stained soil was observed just above refusal (8.5 feet BGS) at boring location SB-12. This layer of stained soil was approximately two inches thick and petroleum-like odors were observed. The soil from the ground surface until refusal is assumed to be a fill material at this location. PID readings at this boring location ranged from 13.6 ppm to 42.9 ppm. A soil sample from this boring location was not submitted to the laboratory for analysis.*

Based on dark-staining and odors observed in the soil at the first two boring locations, BHATE screened two additional boring locations (SB-13 and SB-14) for potential contamination. Boring location SB-13, located north of boring locations SB-11 and SB-12, was observed to have a two inch layer of dark-stained soils with possible petroleum odors around eight feet BGS. Some rock was encountered at approximately 8.5 feet; however, auger refusal was not encountered at this hole until 15.5 feet BGS<sup>1</sup>. The soil from the ground surface until approximately eight feet BGS is assumed to be a fill material at this location. PID readings at this boring location ranged from 21.4 ppm to 72.6 ppm. The highest PID reading was observed in the soil sample collected from the six to eight feet BGS depth range and this sample was sent to the laboratory for analysis.

Boring location SB-14, located south of the previous three borings, included soil that appeared to be free of contaminants. Apparent fill material at this location was encountered from the ground surface until approximately eight feet BGS. Refusal was encountered at 20 feet BGS. PID readings at this boring location ranged from 7.2 ppm to 12.1 ppm. According to Mr. Anthony Crist, with GSP, KUB requested the analysis of soil from this boring location in an attempt to delineate the extent of any potential contamination observed in the previous three borings. Based on observations made at boring location SB-13 and SB-14, soil from the six to eight feet BGS depth range was sent to the laboratory for analysis.

---

<sup>1</sup> *Shallow auger refusal encountered in the borings is apparently due to presence of gravel or obstructions and not due to limestone bedrock as was confirmed by subsequent deeper borings.*

## **SOIL ANALYSIS**

Soil samples collected at boring locations SB-11, SB-13, and SB-14 were submitted under a chain of custody to the Environmental Science Corporation (ESC) laboratory in Mt. Juliet, Tennessee. The soil samples were analyzed for VOCs by Environmental Protection Agency (EPA) Method 8260B, RCRA 8 metals (mercury, arsenic, barium, cadmium, chromium, lead, selenium, and silver) by EPA Method 6010B, with the exception of mercury which was analyzed by EPA Method 7471, PAHs by EPA Method 8270C, Extractable Petroleum Hydrocarbons (EPH) by the TN-EPH Method, Total Petroleum Hydrocarbons (TPH) by EPA Method 8015D/GRO, and pesticides/PCBs by EPA Methods 8081 and 8082 respectively. All samples were handled in general compliance with EPA's quality assurance/control protocols to ensure sample integrity and prevent cross-contamination.

## **SOIL ANALYTICAL RESULTS**

Laboratory reported analytical results for soil samples collected at soil boring locations SB-11, SB-13, and SB-14 are summarized in Table 1 below. Only laboratory detections above detection limits are represented in the table. The laboratory report and chain of custody are attached and included with this report.

**Table 1**  
Summary of Soil Analytical Data

Lab Sample ID			L359624-01	L359624-02	L359624-03	2008 EPA
Client Sample ID			SB-11 2-4 FT	SB-13 6-8 FT	SB-14 6-8 FT	Region 9
Collect Date			8/11/2008	8/11/2008	8/11/2008	SSLs*
Method	Parameter	Units	Value	Value	Value	Value
7471	Mercury	mg/kg	0.1	0.057	0.021	28
6010B	Arsenic	mg/kg	<b>1.7**</b>	<b>7.2**</b>	<b>3.7**</b>	1.6
6010B	Barium	mg/kg	120	82	80	19,000
6010B	Cadmium	mg/kg	0.77	2.8	0.92	810
6010B	Chromium	mg/kg	20	15	18	450***
6010B	Lead	mg/kg	12	250	18	400****
6010B	Selenium	mg/kg	7.4	<2.0	6.9	5,100
EPH	Extractable Petroleum Hydrocarbon	mg/kg	<4.0	7*****	<4.0	NA

### **Notes**

Shaded values indicate detections above laboratory detection limits

Bold values indicate an exceedance of established regulatory criteria

NA - Not applicable / 2008 Region 9 SSL is not available

\* 2008 EPA Region 9 Soil Screening Levels (SSLs) for industrial soil

\*\* Does not exceed the documented background concentration of 10 mg/kg

\*\*\* 2008 EPA Region 9 SSL is not available for total chromium - this value is a 2004 EPA Region 9

Preliminary Remediation Goal (PRG) for total chromium

\*\*\*\* 2008 EPA Region 9 SSL for residential soil - no industrial soil value available

\*\*\*\*\* EPH was compared to TDEC, DSWM most stringent cleanup criteria value of 100 mg/kg

The laboratory reported detections of the parameters listed in Table 1 were compared to the 2008 EPA Region 9 Soil Screening Levels (SSLs) for industrial soil, with the exception of lead and EPH. Lead was compared to the 2008 EPA Region 9 SSL for residential soil since a SSL for industrial soil is unavailable. EPH was compared to the Tennessee Department of Environment and Conservation (TDEC), Division of Solid Waste Management (DSWM) most stringent cleanup criteria value of 100 milligrams per kilogram (mg/kg). Detections of TPH, VOCs, pesticides/PCBs, or PAHs, above laboratory detection limits, were not observed in any of the soil samples analyzed.

The soil samples collected boring locations SB-11, SB-13, and SB-14 had laboratory reported arsenic concentrations of 1.7 mg/kg, 7.2 mg/kg, and 3.7 mg/kg respectively. According to *Hazardous Trace Elements in Tennessee Soils and Other Regolith* (Tennessee Department of Environment and Conservation, Division of Geology, Report of Investigation No. 49, 2001), the average background of arsenic in Tennessee soils is 10 mg/kg. Based on this study, the laboratory reported concentrations of arsenic in soils collected at these locations are below documented background levels. No other exceedances of regulatory criteria were observed.

### **GROUNDWATER INVESTIGATION**

BHATE installed one temporary groundwater monitoring well (MW-1) at boring location SB-11 on August 12, 2008. The well was constructed with 10 feet of two-inch, schedule 40 PVC pipe, and 5 feet of two-inch factory slotted 0.010 well screen with a two-inch long PVC point at the end. The well extended past ground surface approximately two inches, so the well was approximately 15 feet BGS. The annulus was filled with sand to two feet above the top of the well screen and was sealed by placing two feet of bentonite hole-plug above the sand.

The static water level on August 12, 2008 was 12.6 feet BGS. The well was developed on August 12, 2008 by bailing the well dry and removing approximately three well volumes of water. After waiting approximately 24 hours, the well was purged by removing approximately three well volumes of water. After purging the well, the water was allowed to equilibrate 20 minutes and a sample was collected on August 13, 2008.

### **GROUNDWATER ANALYSIS**

The groundwater sample was submitted under chain of custody to ESC for analysis of VOCs by EPA Method 8260B, RCRA 8 metals (mercury, arsenic, barium, cadmium, chromium, lead, selenium, and silver) by EPA Method 6010B, with the exception of mercury which was analyzed by EPA Method 7471, PAHs by EPA Method 8270C, EPH by the TN-EPH Method, and TPH by EPA Method 8015D/GRO. All samples were handled in general compliance with EPA's quality assurance/control protocols to ensure sample integrity and prevent cross-contamination.

### **GROUNDWATER ANALYTICAL RESULTS**

Laboratory reported analytical results for the groundwater sample collected at monitoring well MW-1 are summarized in Table 2 below. Only laboratory detections above detection limits are represented in the table. The laboratory report and chain of custody are attached and included with this report.

**Table 2**  
Summary of Groundwater Analytical Data

Lab Sample ID			L359935-01		EPA MCLs*
Client Sample ID			MW-1 12FT		
Collect Date			8/13/2008		
Method	Parameter	Units	Value	Qual	Value
6010B	Barium	mg/l	0.35		2
6010B	Chromium	mg/l	0.054		0.10
6010B	Lead	mg/l	0.039		0.015
EPH	Extractable Petroleum Hydrocarbon	mg/l	0.1**		NA

**Notes**

Shaded values indicate detections above laboratory detection limits

Bold values indicate an exceedance of established regulatory criteria

NA - Not applicable / EPA MCL is not available

\* EPA Maximum Contaminant Levels (MCL) for drinking water

\*\* EPH was compared to TDEC, DUST detection/action level of >0.1 mg/l

The laboratory reported detections of the parameters listed in Table 2 were compared to the EPA Maximum Contaminant Levels (MCLs) for drinking water, with the exception of EPH. EPH was compared to the TDEC, Division of Underground Storage Tanks (DUST) detection/action level of 0.1 milligrams per liter (mg/l). Detections of TPH, VOCs, or PAHs, above laboratory detection limits, were not observed in the groundwater sample submitted.

A concentration of 0.039 mg/l for lead was reported by the laboratory. This reported concentration exceeds the EPA MCL of 0.015 mg/l. The laboratory reported concentration of EPH (0.1 mg/l) is just below the TDEC, DUST detection/action level of >0.1 mg/l.

**CONCLUSIONS AND RECOMMENDATIONS**

Exceedances of regulatory criteria and/or documented background levels were not observed in the soil samples collected at the proposed pump station site. A laboratory reported detection of EPH was observed in a soil sample collected at boring location SB-13. The laboratory reported concentration of lead in the groundwater sampled collected from monitoring well location MW-1 exceeds the EPA MCL for lead in drinking water. A laboratory reported detection of EPH was also observed in the groundwater sample collected at MW-1.

*Based on the laboratory reported detections of EPH and lead in the soil and/or groundwater at the site, the possibility exists that concentrations of these parameters, or other parameters, might be elevated at different, un-sampled locations. If development plans proceed at the site, environmental screening is recommended while excavating subsurface soils or removing any groundwater. BHATE recommends that soil and/or groundwater removed from the site should be tested. Based on the test results, special disposal or reuse requirements might be applicable.*

## **QUALIFICATIONS OF REPORT**

This report is an instrument of service of BHATE. The report was prepared for the exclusive use of Gresham, Smith and Partners and KUB. The report's contents may not be relied upon by any party other than Gresham, Smith and Partners without the express written permission of BHATE.

The findings of this report are based on the conditions encountered at the locations and on the dates of BHATE's investigation. Conditions might change at the location(s) investigated; therefore, the findings of this report should not be relied upon to accurately represent conditions at any other time. The analytical results obtained from sampling of media may not be representative of conditions between sampled locations. Field conditions may change as a result of natural changes, fluctuations, or other types of disturbances. Conclusions presented in this report, under any circumstance, do not comprise a guarantee that all areas onsite are similar to the locations sampled.

The scope of services performed in this report is designed to identify contamination onsite at locations suspected to be contaminated. The scope of services does not include delineation (vertical and horizontal extents) of potentially impacted material, nor does the scope of services include estimations of materials to be remediated. If impacted material is discovered, BHATE can provide additional services under a separate scope of services.

Regulatory criteria presented in this report may change at any time, either during the issuance of this report or after the report is issued. BHATE can not be held responsible for any regulatory changes that occur that may effect the conclusions and recommendations contained herein. BHATE is not responsible for reporting the findings of this report to appropriate regulatory agencies, unless agreed upon first by the client and BHATE.

## **CLOSING**

We appreciate the opportunity to work with you on this project and look forward to continuing our relationship. If you have any questions or we may be of further service to you, please call us.

Respectfully submitted,  
**BHATE GEOSCIENCES CORPORATION**

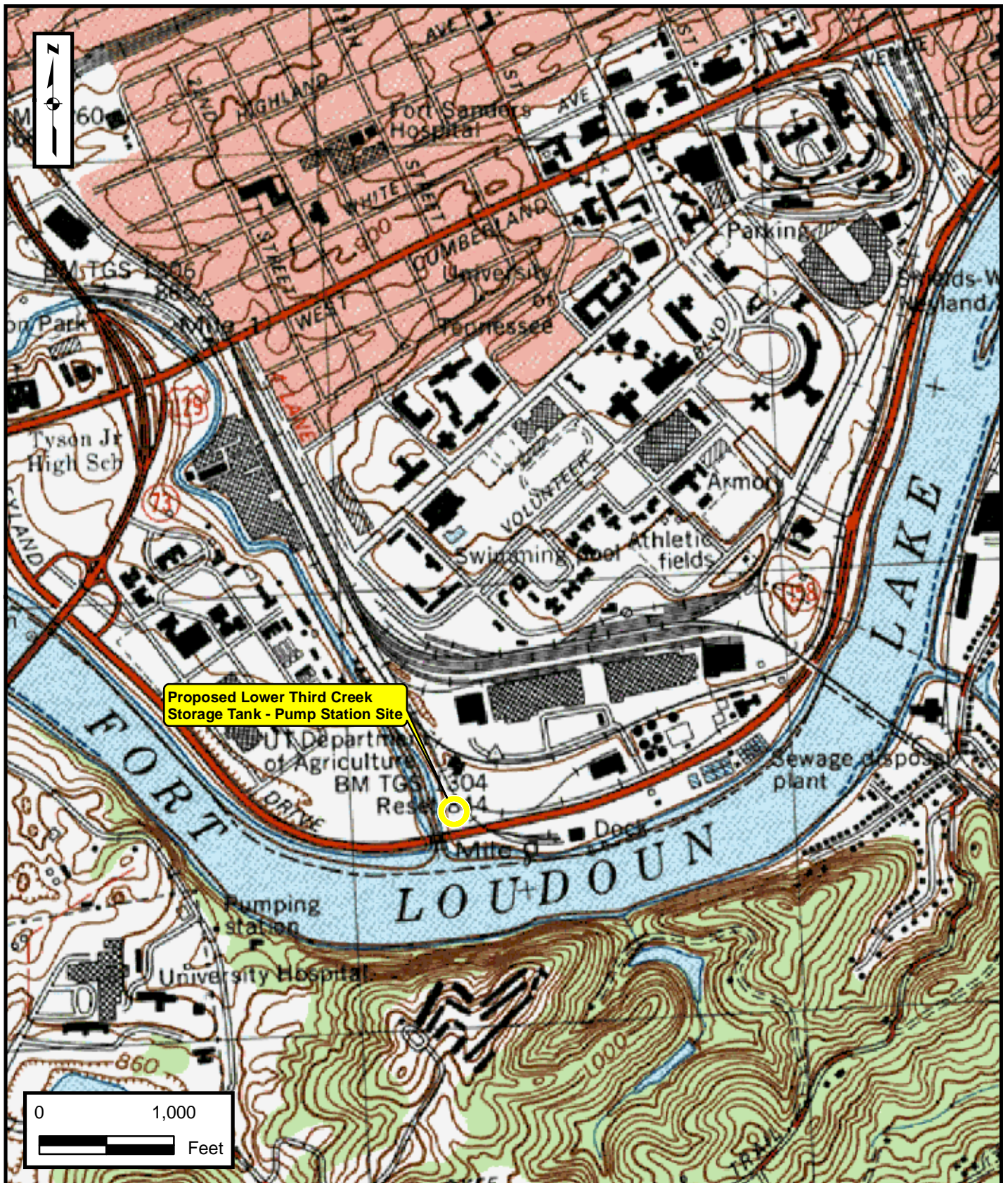


L. Leroy Leonard  
Environmental Division Manager



Uday R. Bhate, P.G., P.E.  
Senior Principal

Attachments:      Figure 1 –Site Vicinity Map  
                            Figure 2 – Boring Location Map  
                            Boring Logs  
                            Laboratory Reports and Chains of Custody



#### SITE VICINITY MAP

USGS Topographic Map Reference: Knoxville, Tennessee Quadrangle  
1978 - 20' Contours  
(<http://seamless.usgs.gov/website/seamless/viewer.htm>)

#### PROPOSED LOWER THIRD CREEK STORAGE TANK

KUB KUHAWE  
WASTEWATER  
TREATMENT PLANT  
KNOXVILLE, TN

**BHATE**  
GEOSCIENCES

PROJECT  
NO.

708113

SCALE

AS SHOWN

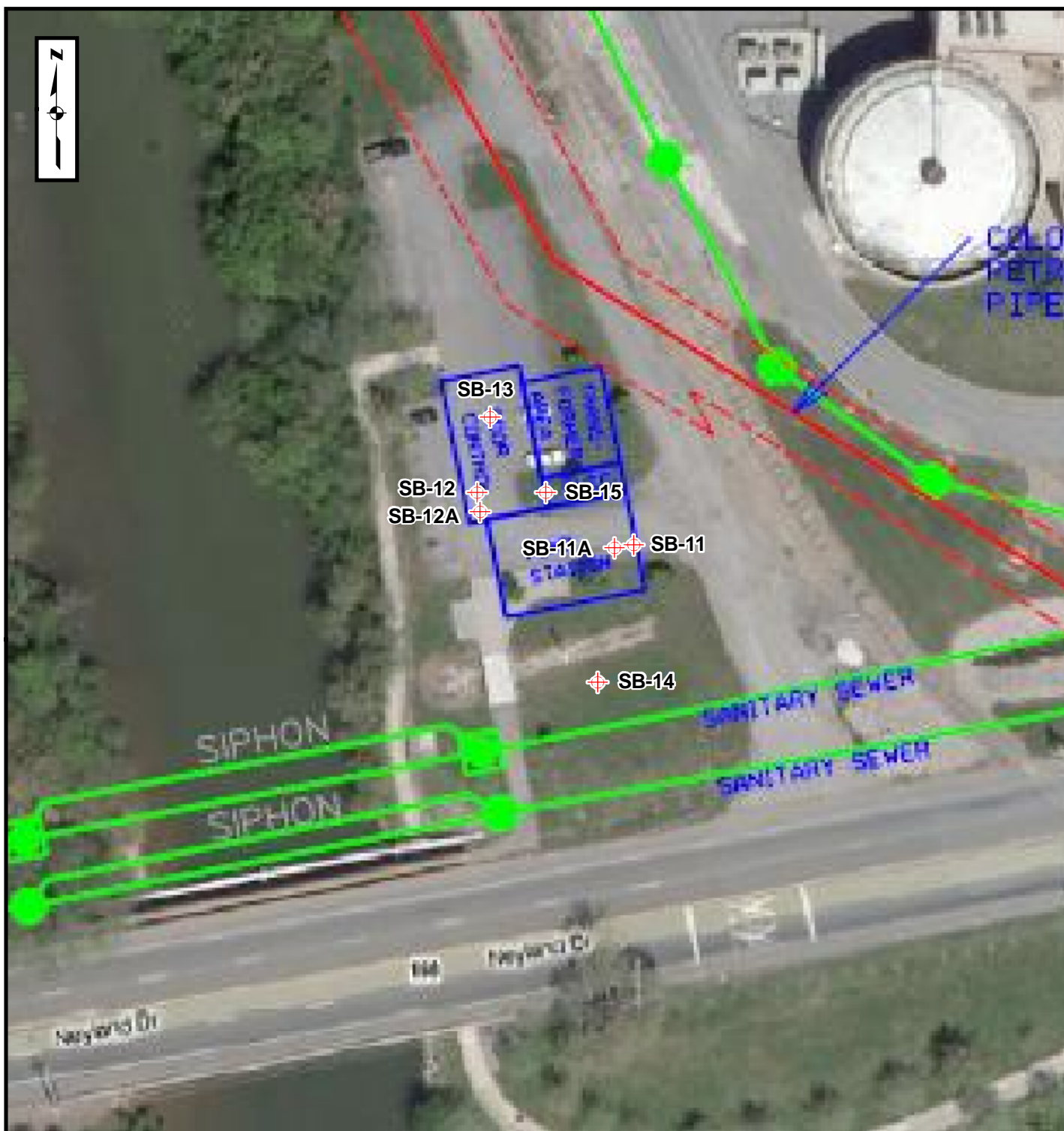
DATE

9/12/2008

DRAWN BY:  
L. Leonard

FILE NAME:

FIGURE 1



Note: All boring locations are depicted on this map.  
 Borings SB-11, SB-12, SB-13, and SB-14 were screened  
 for the environmental evaluation.

**BHATE**  
 GEOSCIENCES

**BORING LOCATION MAP  
 PUMP STATION SITE**

PROJECT  
 NO.

708113

SCALE

N.T.S.

DATE

9/12/2008

DRAWN BY:  
 L. Leonard

FILE NAME:

**PROPOSED LOWER THIRD  
 CREEK STORAGE TANK**

**KUB KUHAWE  
 WASTEWATER  
 TREATMENT PLANT  
 KNOXVILLE, TN**

**FIGURE 2**

# LOG OF BORING

CONTRACTED WITH: Gresham, Smith and Partners

PROJECT NAME: Lower Third Creek Storage Tank


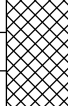





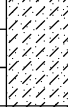



PROJECT LOCATION: Knoxville, Tennessee

BORING NO.: SB-11

JOB NO.: 708113

SHEET 1 OF 1

DATE: 8/11/08

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE DATA									
				NUMBER	TYPE	BLOWS/6"	N-VALUE	MOISTURE (%)	LL (%)	PL (%)	PI (%)	PPqu (tsf)	WATER LEVEL
0	825		4" ASPHALT 2" BASE										
			Medium to very stiff, tan to dark brown, silty, sandy CLAY, with organic odor, trace fine gravel size rock fragments and organics dark staining and some odors	1		3-3-7	10						
			(POSSIBLE FILL)										
5	820		Medium to very stiff, tan, sandy CLAY, with trace manganese dioxide staining dark staining and possible coal fragments dark staining	2		6-7-7	14						
				3		5-7-10	17						
10	815		...medium-stiff	4		3-4-6	10						
			Medium-dense to loose, tan, clayey SAND, with coarse gravel size rock fragments, moist	5		12-3-3	6						
15	810		Auger refusal at 16 feet										
20	805												
25	800												
30	795												

KNOXVILLE BORING LOG 708113 LOWER THIRD CREEK SECOND SET.GPJ BHATE OCT05.GDT 10/17/08




GNE = Ground Water Not Encountered

 = Water Table Encountered

@ Time of Boring

 = Delayed Water Table Level

 = Hole Cave In Depth

333 Troy Circle, Suite N  
Knoxville, TN 37919  
865-584-3243 (Phone)  
865-584-4297 (Fax)

# LOG OF BORING

CONTRACTED WITH: Gresham, Smith and Partners

PROJECT NAME: Lower Third Creek Storage Tank

PROJECT LOCATION: Knoxville, Tennessee

BORING NO.: SB-12

JOB NO.: 708113

SHEET 1 OF 1

DATE: 8/11/08

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE DATA									
				NUMBER	TYPE	BLOWS/6"	N-VALUE	MOISTURE (%)	LL (%)	PL (%)	PI (%)	PPqu (tsf)	WATER LEVEL
0	826		4" ASPHALT 2" BASE										
	825		Medium-stiff to stiff, tan to dark brown, sandy CLAY, with fine to coarse gravel size rock fragments and organic odor	1	⊗	6-5-8	13						
5				2	⊗	2-4-5	9						
	820		dark staining and possible petroleum odors (POSSIBLE FILL)	3	⊗	7-12-50/2	>50*						
			Auger refusal at 8.5 feet										
10													
	815												
15													
	810												
20													
	805												
25													
	800												
30													
	795												

KNOXVILLE BORING LOG 708113 LOWER THIRD CREEK SECOND SET.GPJ BHATE OCT05.GDT 10/17/08



GNE = Ground Water Not Encountered

▽ = Water Table Encountered

@ Time of Boring

▼ = Delayed Water Table Level

⊗ = Hole Cave In Depth

333 Troy Circle, Suite N  
Knoxville, TN 37919  
865-584-3243 (Phone)  
865-584-4297 (Fax)

# LOG OF BORING

CONTRACTED WITH: Gresham, Smith and Partners

PROJECT NAME: Lower Third Creek Storage Tank

PROJECT LOCATION: Knoxville, Tennessee

BORING NO.: SB-13

JOB NO.: 708113

SHEET 1 OF 1

DATE: 8/11/08

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE DATA								
				NUMBER	TYPE	BLOWS/6"	N-VALUE	MOISTURE (%)	LL (%)	PL (%)	PI (%)	PPqu (tsf)
0	828		4" ASPHALT 2" BASE									
			Medium-stiff to stiff, tan to brown, silty CLAY, with fine to coarse gravel size rock fragments, trace organics	1	⊗	4-5-5	10					
5			...moist, soft	2	⊗	2-2-3	5					
			dark staining and possible petroleum odor ...stiff	3	⊗	5-8-21	29*					
	820		(POSSIBLE FILL)									
10			Medium-dense to loose, tan, clayey SAND, with trace manganese dioxide staining	4	⊗	4-5-7	12					
	815											
15			...moist, with trace fine to coarse gravel size rock fragments	5	⊗	4-5-50/5	>50					
			Auger refusal at 15.5 feet									
	810											
20												
	805											
25												
	800											
30												
	795											

KNOXVILLE BORING LOG 708113 LOWER THIRD CREEK SECOND SET.GPJ BHATE OCT05.GDT 10/17/08



GNE = Ground Water Not Encountered

▽ = Water Table Encountered

@ Time of Boring

▼ = Delayed Water Table Level

⊗ = Hole Cave In Depth

333 Troy Circle, Suite N  
Knoxville, TN 37919  
865-584-3243 (Phone)  
865-584-4297 (Fax)

# LOG OF BORING

CONTRACTED WITH: Gresham, Smith and Partners

PROJECT NAME: Lower Third Creek Storage Tank

BORING NO.: SB-14

SHEET 1 OF 1

PROJECT LOCATION: Knoxville, Tennessee

JOB NO.: 708113

DATE: 8/11/08

[illegible]