BUNNELL-LAMMONS ENGINEERING, INC.

GEOTECHNICAL, ENVIRONMENTAL AND CONSTRUCTION MATERIALS CONSULTANTS

EXCAVATION CORRECTIVE ACTION PLAN

Burton's BP (Former)
439 West Washington Street
Greenville, Greenville County, South Carolina
UST Permit # 12299; C.A. # 55262

Prepared For

Mr. Robert A. Dunn
South Carolina Department of Health and Environmental Control
Underground Storage Tank Management Division
2600 Bull Street
Columbia, South Carolina 29201-1708

Prepared By

Bunnell-Lammons Engineering, Inc.
6004 Ponders Court
Greenville, South Carolina 29615
SCDHEC Certified Contractor No. UCC-0010

August 30, 2017

BLE Project Number J17-11664-01

BUNNELL-LAMMONS ENGINEERING, INC.
GEOTECHNICAL, ENVIRONMENTAL AND CONSTRUCTION MATERIALS CONSULTANTS

August 30, 2017

South Carolina Department of Health and Environmental Control
Bureau of Land and Waste Management
Underground Storage Tank Management Division
2600 Bull Street
Columbia, South Carolina 29201-1708

Attention: Mr. Robert Dunn, Hydrogeologist

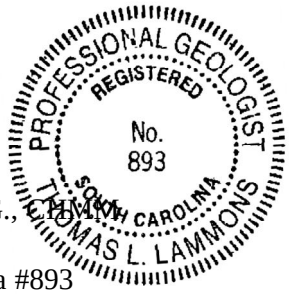
Subject: **Excavation Corrective Action Plan**
Burton's BP (Former)
439 West Washington Street
Greenville, Greenville County, South Carolina
UST Permit #12299; C.A. #55262
BLE Project No. J17-11664-01

Dear Mr. Dunn:

Bunnell-Lammons Engineering, Inc. (BLE) is pleased to submit this Excavation Corrective Action Plan (ECAP) for removal and disposal of petroleum impacted soils from the subject site. The purpose of this ECAP is to provide specific details of the excavation activities and site restoration process upon completion. Additionally, a Site Specific Work Plan (SSWP) for the installation of up to two shallow groundwater monitoring wells is include as an attachment. Provided herein is our understanding of the project information, proposed scope of services, and appropriate schedule.
Please do not hesitate to contact us if you have any questions concerning this ECAP.

Sincerely,

BUNNELL-LAMMONS ENGINEERING, INC.



Trevor J. Benton, P.G.
Senior Hydrogeologist
Registered, South Carolina #2395

Thomas L. Lammons, P.G., CHMM
Principal Hydrogeologist
Registered, South Carolina #893

6004 PONDERS COURT
GREENVILLE, SOUTH CAROLINA 29615

PHONE (864) 288-1265
FAX (864) 288-4430

1.0 PROJECT INFORMATION

The subject site is located at 439 West Washington Street in Greenville, South Carolina (**Figure 1**). Eleven underground storage tanks (USTs) were historically located on the property which were closed by removal in September 1989 and November 1998. In response to the 1989 UST closure assessment, a release of petroleum contaminants to the subsurface was reported to the SCDHEC on December 29, 1989 and confirmed on December 31, 1989. The site is bordered by West Washington Street to the north, the Downtown Presbyterian Church property to the east and south, and office complexes to the east and south, and West Broad Street to the west. Commercial and office properties are located further west, south, and east of the site, and St. Mary's Catholic Church/School is located further north/northeast of the site.

Various environmental assessments have been conducted at the site since 1989 which have resulted in the installation of 27 groundwater monitoring to assess the extent of dissolved-phase and free-phase contamination associated with the release.

As required by SCDHEC, active corrective action (excavation) activities are necessary to remove existing petroleum impacted soil and to reduce dissolved-phase petroleum chemicals of concern (COC) in the source area. A site plan of the proposed excavation area is provided as **Figure 2**.

2.0 SCOPE OF SERVICES

2.1 Site Conditions Prior to Excavation

On August 29, 2017, BLE personnel mobilized to the site to document the condition of the property prior to implementation of excavation activities. Please note, the perimeter of excavation area was previously marked by SCDHEC personnel on August 4, 2017.

View to the South

View to the North

2.2 Pre-Excavation Activities

Prior to initiating excavation activities, the following will be performed at the site:

- Secure site access with the current property owner, Downtown Presbyterian Church.
- Perform a utility survey utilizing ground penetrating radar and magnetic methods to identify all surface and subsurface utilities in the area of the excavation.
- Abandon existing deep monitoring well MW-7D in accordance with South Carolina Well Standards. The well will be tremi-grouted to the ground surface with a neat cement grout.

2.3 Excavation Plan

The excavation activities consist of removing and disposing of a predetermined volume of petroleum-contaminated soil from a specified location on-site. As determined by the SCDHEC, the excavation is comprised of a 68ft x 20ft x 20ft area and will breach the water table by four to five feet. In general the excavation activities will consist of the following:

- Mobilize a Komatsu PC200 excavator, New Holland L180 skid steer, Caterpillar 935 bulldozer, Ford LD75 tractor, and a Caterpillar CS434C vibratory roller to the subject site to complete the required scope of work.
- The existing concrete in the predetermined excavation area will be cut prior to commencing excavation activities using a concrete floor saw. The concrete will be removed from the site and retained for repurposing or disposed of at a permitted facility.
- Using a Komatsu PC200 excavator, excavate petroleum contaminated soils from the ground surface to the designated termination depth of 20 feet below ground surface and load the

soils in tri-axle dump trucks for hauling to a permitted landfill for proper disposal. Approximately 13-15 cubic yards of soil will be loaded on each truck for hauling and we estimate that up to 85 trucks will be required to complete this scope of work. The trucking company to be utilized during this scope of work is NW White of Greer, South Carolina. The petroleum contaminated soils will be transported to the Twin Chimney Class 3 Landfill in Honea Path, South Carolina for disposal.

- Two existing shallow groundwater monitoring wells located within the excavation area will be abandoned by removal during this scope of work.

- As necessary, excavation dewatering will be performed by creating multiple sump points in the excavation and installing standpipes to extract groundwater. Pump sizes will be determined in the field based on the recharge rates of the groundwater in the excavation. The water will be pumped to a 20,000-gallon frac tank located on the property. The frac tank will be emptied as needed and the waste water will be transported to VLS Recovery Services in Mauldin, South Carolina for proper disposal.

2.4 Excavation Safety

- A designated safety officer from BLE will be on-site during all applicable activities. The safety officer will have successfully completed their OSHA HAZWOPER 40-Hour training and 8- Hour annual refresher course.

- The excavation activities shall be conducted in general accordance with OSHA standards (29 CFR 1926). The excavation will be secured (i.e. flagging, cones, fencing, etc.) in order to prevent persons or traffic from entering the area. The safety officer will be responsible for access to the excavation area and will ensure that only individuals/equipment involved with the

- Only personnel associated with the project are permitted on the site. At the end of each day, the excavation area will be adequately marked and secured overnight.

- It is anticipated that this scope of work will be performed in Level D personal protective equipment (PPE). Upgrades to the PPE assumption will be made in the field if conditions present themselves.

2.5 Excavation Backfilling

- The excavation will be backfilled in compacted lifts to the ground surface with imported structural fill soils. Bulk samples of the backfill soils will be collected for Standard Proctor testing to determine the maximum dry density of the soil. The results of the Standard Proctor tests will be utilized during compaction of the backfill to ensure the material was compacted to 95% of the Standard Proctor Maximum Dry Density as determined by ASTM D698. The soils will be compacted with a remote-control vibrating sheepsfoot compactor and/or the tracks on a Komatsu PC200 excavator.

- BLE will provide construction materials testing (CMT) services during the placement of the backfill. These services include field density testing (ASTM D-2937) of compacted fill soils (uncontaminated overburden soils and imported backfill soils); with a minimum of one set of density tests for every vertical foot lift. However, as required, the bottom three feet of the excavation will be backfilled with coarse gravel (#57 stone or equivalent), therefore field density tests will not be completed on these lifts.

- During the backfilling process, a minimum of 2,000 pounds of Oxygen Releasing Compound (ORC®) Advanced and a minimum of 8,000 pounds of an activated carbon slurry (remedial compounds) will be mixed with the coarse gravel from approximately 20 feet below ground surface (bgs) to 17 feet bgs. An additional 22,000 pounds of an activated carbon slurry will be blended with the structural fill soils from 17 feet bgs to 14 feet bgs. No further amendments will be added to the backfill soils shallower than 14 feet bgs. The remedial compounds will be blended into the fill material in accordance with the manufactures specifications with the use of the Komatsu PC200 bucket/mixing attachment and/or Ford LD75 tractor. Other mixing options will be evaluated on-site to ensure the most efficient process is utilized. The ORC® Advanced compound will be shipped in approximate 55 pound pails from Regenesis of San Clemente, California. The activated carbon will be shipped in 1,000 pound bulk bags from Encotech of Chapin, South Carolina.

2.6 Site Restoration

Upon completion of the excavation and backfilling activities, the site will be returned to its original condition. All waste generated from the Corrective Action activities will be removed from the site, rutted areas will be filled to the current ground surface, and exposed soil areas will be covered with grass sod to limit erosion. Photographs of the post-excavation site condition will be included in the final report.

2.7 Post-Excavation Monitoring Well Installations

Pursuant to the Corrective Action Specifications (Part III, Section 3.5, B.10.E), up to two groundwater monitoring wells will be installed upon completion of the Corrective Action activities. The wells will be installed in locations determined by the SCDHEC project manager and in accordance with BLE's Site Specific Work Plan provided in Attachment A. The wells will be installed as Type II groundwater monitoring wells with a CME-750 ATV (or equivalent) drill rig employing 4 1/4-inch inside diameter (ID) hollow stem augers (8 1/2-inch outer diameter (OD)). The monitoring wells will be constructed of 2-inch ID, Schedule 40 PVC casing with flush-threaded joints installed to the termination depth of the boring. The bottom 10-foot section of each well will consist of a manufactured well screen with 0.010-inch wide machined slots and will bracket the water table. A standard sand filter pack, bentonite seal, and grout will be installed to the ground surface and the wells will be completed with steel, bolted, flush-mount covers in a 2'x2' concrete pad. Upon installation, the wells will be properly developed in accordance with SCDHEC's Quality Assurance Program Plan 3.1 dated December 2016.

3.0 SCHEDULE

A conservative estimate of our completion schedule is provided below. Since many of the tasks can be conducted concurrently, it is likely that actual times may vary.

1)	Excavation Corrective Action Plan Approval and Public Notice[1]	3 weeks
2)	Utility survey and monitoring well abandonments	1 day
3)	Equipment mobilization and cutting/removal of concrete.....	1 day*
4)	Excavation and disposal of petroleum contaminated soils.....	1 week
5)	Excavation backfilling and remedial compound mixing.....	1 week
6)	Site Restoration	1 week
7)	Install up to two groundwater monitoring wells.....	2 days
8)	Report preparation and submittal	4 weeks

PROJECT TOTAL: Approximately 11 weeks

* - task performed in conjunction with other task(s)

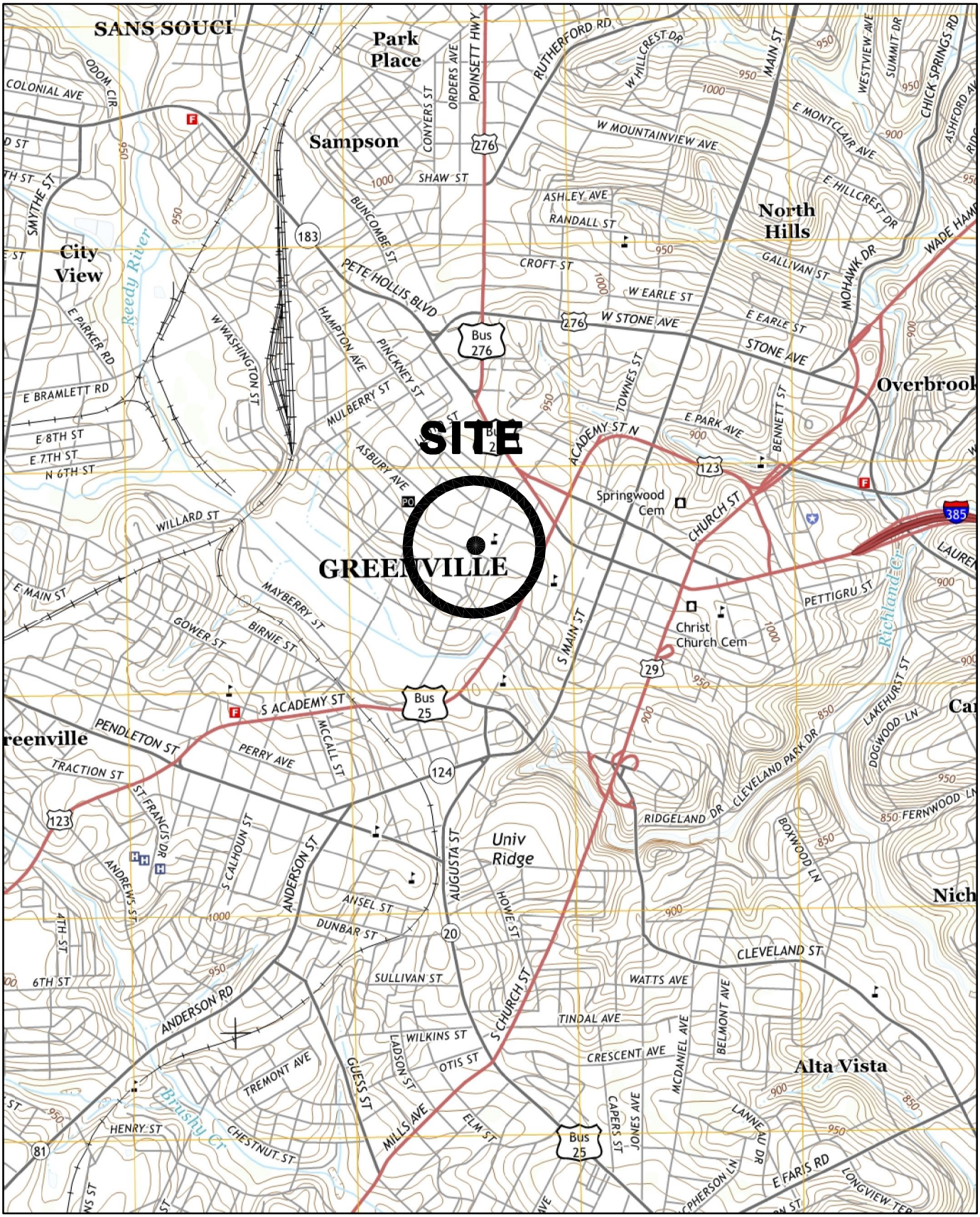
Notes:

[1] SCDHEC response and approvals are required for several tasks which will have an impact on initiating work efforts and ultimate completion timeframes.

4.0 CERTIFICATION BY A SOUTH CAROLINA ENGINEER OR GEOLOGIST

Pursuant to SCDHEC regulations, the final excavation report will be sealed by a Professional Engineer or Geologist registered in the State of South Carolina.

FIGURES



2000 1000 0 2000 4000

APPROXIMATE SCALE IN FEET

REFERENCE:
USGS TOPOGRAPHIC MAP, 7.5 MINUTE SERIES, GREENVILLE, S.C. QUADRANGLE, 2014.

DRAWN: ACE	DATE: 08-29-17	BLE INC. BUNNELL-LAMMONS ENGINEERING, INC. 6004 PONDERS COURT GREENVILLE, SOUTH CAROLINA 29615 PHONE: (864)288-1265 FAX: (864)288-4430	SITE LOCATION MAP BURTON'S BP UST PERMIT #12299 439 W. WASHINGTON STREET GREENVILLE, SOUTH CAROLINA
CHECKED: TJB	CAD: BURTONSBP-SLM		FIGURE 1
APPROVED:	JOB NO: J17-11664-01		

30 15 0 30 60

APPROXIMATE SCALE IN FEET

REFERENCE:
GOOGLE EARTH IMAGE DATED 6-17-2016.

DRAWN: ACE	DATE: 08-29-17	BUNNELL-LAMMONS ENGINEERING, INC. 6004 PONDERS COURT GREENVILLE, SOUTH CAROLINA 29615 PHONE: (864)288-1265 FAX: (864)288-4430	EXCAVATION PLAN BURTON'S BP UST PERMIT #12299 439 WEST WASHINGTON STREET GREENVILLE, SOUTH CAROLINA
CHECKED: TJB	CAD: BURTONSBP-EXPL		
APPROVED:	JOB NO: J17-11664-01		FIGURE 2

ATTACHMENT A

SITE SPECIFIC WORK PLAN –
MONITORING WELL INSTALLATIONS

D H E C
PROMOTE PROTECT PROSPER

Site-Specific Work Plan for Approved ACQAP
Underground Storage Tank Management Division

To: Mr. Robert Dunn (SCDHEC Project Manager)
From: Trevor J. Benton, P.G. (Contractor Project Manager)
Contractor: Bunnell-Lammons Engineering, Inc, UST Contractor Certification Number: UCC-0010

Facility Name: Burton's BP UST Permit #: 12299
Facility Address: 439 West Washington Street, Greenville, South Carolina
Responsible Party: Orphan Phone:
RP Address:
Property Owner (if different): Downtown Presbyterian Church
Property Owner Address: 435 West Washington Street, Greenville, South Carolina
Current Use of Property: Vacant Lot

Scope of Work (Please check all that apply)

- ☐ IGWA
- ☐ Tier I
- ☐ Tier II
- ☑ Monitoring Well Installation
- ☐ Groundwater Sampling
- ☐ Other
- ☐ GAC

Analyses (Please check all that apply)

Groundwater/Surface Water:

- ☐ BTEXNMDCA (8260B)
- ☐ Oxygenates (8260B)
- ☐ EDB (8011)
- ☐ PAH (8270D)
- ☐ Lead
- ☐ 8 RCRA Metals
- ☐ TPH
- ☐ pH
- ☐ BOD
- ☐ Nitrate
- ☐ Sulfate
- ☐ Other
- ☐ Methane
- ☐ Ethanol
- ☐ Dissolved Iron

Soil:

- ☐ BTEXN
- ☐ PAH
- ☐ 8 RCRA Metals
- ☐ Oil & Grease (9071)
- ☐ TPH-DRO (3550B/8015B)
- ☐ TPH-GRO (5030B/8015B)
- ☐ Grain Size
- ☐ TOC

Air:

- ☐ BTEXN

Sample Collection (Estimate the number of samples of each matrix that are expected to be collected.)

_____ Soil _____ Water Supply Wells _____ Air _____ Field Blank
_____ Monitoring Wells _____ Surface Water _____ Duplicate _____ Trip Blank

Field Screening Methodology

Estimate number and total completed depth for each point, and include their proposed locations on the attached map.

# of shallow points proposed: 0 Estimated Footage: 0 feet per point
# of deep points proposed: 0 Estimated Footage: 0 feet per point
Field Screening Methodology: NA

Permanent Monitoring Wells

Estimate number and total completed depth for each well, and include their proposed locations on the attached map.

# of shallow wells: 2 Estimated Footage: 20 feet per point
# of deep wells: 0 Estimated Footage: 0 feet per point
# of recovery wells: 0 Estimated Footage: 0 feet per point
Monitoring Well development method (consistent with SOP):
Comments, if warranted:
The new wells will be installed as 2-inch diameter monitoring wells screened from 10-20 feet below ground surface. The wells will be developed in accordance with BLE's Annual Contractor Quality Assurance Plan (ACQAP), unless free-product is present in the well.

UST Permit #: 12299 Facility Name: Burton's BP

Implementation Schedule (Number of calendar days from approval)
Field Work Start-Up: 14 Field Work Completion: 45
Report Submittal: 60 # of Copies Provided to Property Owners: 1

Aquifer Characterization
Pump Test: ☐ Slug Test: ☐ (Check one and provide explanation below for choice)
NA

Investigation Derived Waste Disposal
Soil: 2 Tons Purge Water: 20 Gallons
Drilling Fluids: 0 Gallons Free-Phase Product: 0 Gallons

Additional Details For This Scope of Work
For example, list wells to be sampled, wells to be abandoned/repaired, well pads/bolts/caps to replace, details of AFVR event, etc.
Two 2-inch diameter monitoring wells will be installed in locations determined by the SCDHEC project manager. The wells are not required to be sampled as part of this scope of work.

Compliance With Annual Contractor Quality Assurance Plan (ACQAP)
NA Laboratory as indicated in ACQAP? (Yes/No) If no, indicate laboratory information below.
Name of Laboratory:
SCDHEC Certification Number:
Name of Laboratory Director:

Yes Well Driller as indicated in ACQAO? (Yes/No) If no, indicate driller information below.
Name of Well Driller:
SCLLR Certification Number:

No Other variations from ACQAP. Please describe below.

Attachments
1. Attach a copy of the relevant portion of the USGS topographic map showing the site location.
2. Prepare a site base map. This map must be accurately scaled, but does not need to be surveyed. The map must include the following:
   - North Arrow
   - Location of property lines
   - Location of buildings
   - Previous soil sampling locations
   - Previous monitoring well locations
   - Proposed soil boring locations
   - Proposed monitoring well locations
   - Legend with facility name and address, UST permit number, and bar scale
   - Streets or highways (indicate names and numbers)
   - Location of all present and former ASTs and USTs
   - Location of all potential receptors
3. Assessment Component Cost Agreement, SCDHEC Form D-3664