DRAFT

RCRA FACILITY INVESTIGATION WORKPLAN
VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY
BLACKSBURG, VIRGINIA
EPA ID NO. VAD074747908
ADMINISTRATIVE ORDER ON CONSENT
DOCKET NO. RCRA-03-2010-0396CA

September 14, 2012

PREPARED FOR
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III, MAIL CODE 3LC30
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APPENDICES

EXECUTIVE SUMMARY

Virginia Polytechnic Institute and State University (Virginia Tech) entered into an Administrative Order on Consent (Consent Order; Docket Number RCRA-03-2010-0396CA; Consent Order) with the United States Environmental Protection Agency, Region III (EPA) agreeing to the terms of the Consent Order including applicable modifications and revisions approved by both parties. The Consent Order was executed by EPA on September 29, 2010.

During a teleconference between EPA and Virginia Tech on June 21, 2012, the EPA requested Virginia Tech prepare a RCRA Facility Investigation (RFI) Workplan in accordance with Section VI.B of the Consent Order. As directed by the EPA, the purpose of the RFI Workplan is to address the removal of the two concrete underground storage tanks (USTs) located at the Virginia Tech Power Plant (Area of Concern (AOC) 5), as well as subsequent investigation of soils and potentially groundwater in the vicinity of AOC 5 to evaluate the presence, magnitude, extent, direction, and rate of movement of any hazardous wastes or hazardous constituents (in this case petroleum constituents) that may be present. Virginia Tech is required to provide EPA with a draft RFI Workplan by September 14, 2012.

This RFI Workplan was prepared by Virginia Tech with assistance from Draper Aden Associates in general accordance with the requirements of Section VI.B of the Consent Order (RCRA Facility Investigation), adjusted in scope and magnitude to reflect Virginia Tech's understanding of the EPA Project Coordinator's expectations for this RFI Workplan and consistent with discussions between EPA and Virginia Tech (June 2012 – present).

1.0 INTRODUCTION

1.1 PURPOSE

Virginia Polytechnic Institute and State University (Virginia Tech) entered into an Administrative Order on Consent (Consent Order; Docket Number RCRA-03-2010-0396CA; Consent Order) with the United States Environmental Protection Agency, Region III (EPA) agreeing to the terms of the Consent Order including applicable modifications and revisions approved by both parties. The Consent Order was executed by EPA on September 29, 2010. During a teleconference between EPA and Virginia Tech on June 21, 2012, the EPA requested Virginia Tech prepare a RCRA Facility Investigation (RFI) Workplan in accordance with Section VI.B of the Consent Order.

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1.2 PROJECT BACKGROUND

In the early 2000s EPA requested Virginia Tech to participate in EPA's Vision 2020 program (EPA's Facility Lead Program). Virginia Tech did not formally commit to the Facility Lead program but informally agreed to participate in the process.

Virginia Tech through representatives of Environmental, Health and Safety (EHS), met with representatives of the EPA, the VDEQ, as well as representatives from Tetra Tech EC, Inc. (Tetra Tech), an environmental consulting firm hired by the EPA. Tetra Tech conducted a review of both EPA and VDEQ files for pertinent information concerning 21 solid waste management units (SWMUs) and eight (8) areas of concern (AOCs) prior to conducting a site visit of the Virginia Tech Campus. The EPA, VDEQ and Tetra Tech visited Virginia Tech on November 8, 2006 and were given a tour of the campus by representatives of Virginia Tech's EHS department during which all the AOCs and SWMUs were visited. Subsequent to the site visit, Tetra Tech prepared a report of their findings in a Draft RCRA Site Visit Report dated April 2007.

On September 23, 2010, EPA again visited Virginia Tech and visited all of the AOCs and SWMUs identified in the Tetra Tech report. As a result of the September 23, 2010 site visit, an updated corrective action status table describing EPA's updated understanding of the status of each SWMU and AOC was prepared.

On September 29, 2010, EPA executed the consent order to enforce Virginia Tech's participation in the corrective action process as EPA deemed the voluntary process was insufficient to meet the program goals. Virginia Tech entered into an Administrative Order on Consent with the EPA

agreeing to the terms of the Consent Order including applicable modifications and revisions approved by both parties. Section VI.B.1 of the Consent Order required Virginia Tech to prepare and submit to EPA a Description of Current Conditions at the Facility (Current Conditions Report), which was prepared and submitted to EPA on December 20, 2010.

During a teleconference between EPA and Virginia Tech on April 28, 2011, EPA expressed concern with the potential for ongoing release from existing cast-in-place concrete underground storage tanks (USTs) associated with Area of Concern 5 (AOC-5; 2002 Virginia Tech Power Plant Fuel Release), and questioned the feasibility of replacing these tanks. Subsequently, Virginia Tech held several meetings to discuss the scope of engineering conceptual design for abatement of the current fuel oil tanks, the evaluation of potential alternative supplemental fuel sources at the power plant, and incorporation of the potential cost for removal and remediation, over $1 million, into the budget planning processes.

In correspondence dated November 7, 2011, EPA determined that there are no known potential threats to human health or the environment and that no further action is required at Virginia Tech's 21 solid waste management units (SWMUs 1-21) and at seven of Virginia Tech's areas of concern (AOCs 1-4 and 6-8). This determination will be part of the proposed remedy decision for Virginia Tech presented in EPA's Statement of Basis for the facility. The Statement of Basis will document the remedy selection(s) for Virginia Tech's SWMUs and AOCs; such remedies may include no remedy as well as land use controls. On September 10, 2012, the Virginia Tech Board of Visitors approved a resolution to limit development in those areas where groundwater has been impacted by releases of hazardous waste and/or hazardous constituents (SWMU1 and AOC 6), and to restrict the use of groundwater in those areas. The Statement of Basis will be released for public comment prior to finalization by EPA. Following issuance of EPA's Statement of Basis, Virginia Tech will begin discussions with EPA to address AOC-5 under the Interim Measures process described in the Consent Order.

Virginia Tech has performed a preliminary engineering evaluation for the removal of the existing oil storage structures associated with AOC 5 and replacement with new aboveground storage tanks. Following the removal and closure of the existing oil storage structures an environmental evaluation will be performed to assess for spills or leaks from these structures and possible soil and or groundwater impacts. Impacts, if any, will be addressed in accordance with Virginia Administrative Code 9 VAC 25-580 – *Underground Storage Tanks: Technical Standards and Corrective Action Requirements* (UST Technical Regulation) in coordination with the VDEQ and EPA.

2.0 DESCRIPTION OF VIRGINIA TECH POWER PLANT USTS (AOC 5)

2.1 SITE LOCATION

The Virginia Tech campus is located in the Town of Blacksburg, Montgomery County, Virginia, 42 miles southwest of Roanoke, Virginia. Virginia Tech operates a Title V-permitted Power Plant (central heating facility) that generates steam for heating the majority of the buildings on campus. The Power Plant was constructed in the 1920's, and consists of two coal fired boilers and three natural gas boilers, with a backup fuel source (No. 2 fuel oil) stored in two cast-in-place concrete USTs (designated in the September 29, 2010 consent order as AOC 5). The Power Plant USTs are located at the western corner of Turner Street and Barger Street in Blacksburg. A Site Location Map based on the USGS 7.5-minute Blacksburg, Virginia Topographic Quadrangle is presented as **Figure 1**, and an Oblique Aerial Photograph of the Site is presented as **Figure 2**. A Topographic Survey of the site is included as **Figure 3**. The Virginia Tech Power Plant and AOC 5 are located in a mixed residential, commercial, and industrial area within the corporate limits of the Town of Blacksburg. The site topography slopes northwest toward Stroubles Creek, which is located approximately 900 feet northwest of AOC-5.

2.2 UST DESCRIPTION AND BACKGROUND

The Virginia Tech Power Plant USTs consist of two 137,000-gallon cast-in-place concrete vaults. The USTs were constructed in 1973, and each measures 50 feet long by 40 feet wide by 13 feet high. The tanks share a common center wall. The long axis of the tank system is parallel to Turner Street. The USTs stored No. 6 fuel oil, which was used to fire the boilers in the Power Plant, until the boilers were shifted to use No. 2 fuel oil. The USTs were retrofitted to store No. 2 fuel oil in July 2002.

In July 2002, Clean Harbors Environmental Services, Inc. cleaned the USTs and synthetic liners were installed. Prior to cleaning, any remaining No. 6 fuel oil was emptied from the tank. In order to remove the final six inches of product in the USTs, the No. 6 fuel oil had to be "cut" with No. 2 fuel oil; the resulting mixture was then evacuated from the USTs. Upon removal of the product mixture, Virginia Tech personnel observed No. 6 fuel oil seeping back into the USTs from small holes in the concrete. Following the removal of all liquids, the interior of the USTs were pressure washed and lined with a synthetic sealant. Virginia Tech began to use the USTs for storage of No. 2 fuel oil in August 2002.

On December 6, 2002, the VDEQ received notification of a subsurface petroleum release at the Power Plant. The release was detected following the installation of early release detection vent wells (VW-1 and VW-2) for the two USTs. Upon receipt of the release notification, the VDEQ generated Pollution Complaint Number 2003-2053N (PC No. 2003-2053N) for the site. In correspondence dated December 13, 2002, VDEQ requested Virginia Tech conduct a site risk and remediation assessment for the release and submit a Site Check/Limited Site Characterization Report (SC/LSCR).

In May 2003, Draper Aden Associates collected samples from six borings for TPH-DRO analysis. Soil sample analytical results and observations made by Draper Aden Associates personnel during vent well installation in December 2002 and site characterization activities in May 2003 indicated that the petroleum impact at the Virginia Tech Power Plant UST site appeared to be limited to the soil depth interval of 12-18 feet below ground surface in the vicinity of vent well VW-1 and soil borings B-1, B-2, and B-4 (**Figure 4**). Based on these observations, the petroleum impact was estimated to cover an area of approximately 670 square feet. As the petroleum impact appeared to be limited to soils at a depth of 12-18 feet below ground surface, the volume of petroleum-impacted soil was estimated to be approximately 108 cubic yards, overlain by approximately 298 cubic yards of non-impacted soil.

In March 2004, approximately 143 tons of impacted soil adjacent to the eastern wall of the UST was removed and transported to an off-site treatment facility for disposal. During the excavation of the petroleum impacted soils, free product was observed. The free product had the appearance of #6 fuel oil but had the consistency of #2 fuel oil. All free product was collected in drums for proper disposal. As the excavation progressed along the edge of the tank, the flow of free product increased and appeared more like #2 fuel oil. The excavation continued, and a small hole in the UST was found. The hole is located approximately one foot below the normal full tank level. The fuel oil level in the tank was lowered to below the hole elevation and has remained there since. Further excavation toward the northeast corner of the tank wall was prohibited due to the close proximity to a power pole carrying power to the adjacent electrical substation. A 16-inch diameter monitoring and recovery sump was placed in the excavation and backfilled to facilitate further product recovery. The SC/LSCR presenting this work was submitted to VDEQ in June 2004.

Further remedial activities and environmental monitoring are ongoing at the site in accordance with VDEQ regulations and guidance. Current product levels in the UST remain below the point of release. Virginia Tech estimates that less than 100 gallons of petroleum was released. Vent well VW-1 has exhibited a maximum of approximately one inch of free product on the water table (depth to perched groundwater is approximately 10 to 15 feet below ground surface at this location; true groundwater aquifer is in the bedrock and is not believed to be impacted based on the results of site characterization). Petroleum was never observed in vent well VW-2; however, vent well VW-2 was paved over and destroyed. Only a sheen of petroleum has been observed in the sump.

2.3 CURRENT REMEDIAL ACTION

Activities to remediate this fuel release are ongoing and actively overseen by the VDEQ in accordance with the UST Technical Regulation. As directed by the VDEQ in a letter dated February 17, 2010, and subsequent correspondence dated March 18, 2010, Virginia Tech is required to gauge both the sump and vent well VW-1 monthly; sample both VW-1 and VT Drain No. 1 (the downgradient recipient of the UST footer drain) quarterly; and submit a quarterly report of these activities. The latest quarterly report was submitted to the VDEQ in July 2012; a copy of which is included in **Appendix A**.

Liquid levels are gauged in the sump and in vent well VW-1 on a monthly basis. Product recovery methods include the use of hydrophobic absorbent skimmers to remediate product in the sump. Since employing the use of the sump skimmers as the product recovery method, product level variability has been reduced and product layer thickness measured in the sump has been consistently maintained at an average thickness of 0.01 feet. The Virginia Tech Power Plant USTs are currently still in use storing No. 2 fuel oil; however**,** the level in the tanks are maintained below the hole identified in March 2004. No product resembling No. 2 fuel oil has been encountered in VT Drain No.1 or VW-1 during the monthly gauging efforts. Analytical results from the samples collected in the second quarter 2012 indicated no detections of total petroleum hydrocarbons – diesel range organics (TPH-DRO) or polynuclear aromatic hydrocarbons (PAHs) in VT Drain No. 1 or in vent well VW-1. It is likely that the remaining product encountered in the sump is remnant product leaching from the limited volume of impacted soil left in place due to utility line site limitations and is an indication that the sump is performing as designed.

2.4 HYDROGEOLOGIC FRAMEWORK

Virginia Tech is located in the folded and faulted Valley and Ridge geologic and physiographic province of Virginia. The Valley and Ridge consists of folded and thrust-faulted Paleozoic sedimentary rocks ranging in age from Cambrian to Mississippian. Post-deformation weathering of these faulted and overturned Paleozoic rocks have resulted in the formation of resistant sandstone and dolomite ridges separated by valleys underlain by more easily eroded shale and limestone.

According to the *Soil Survey of Montgomery County, Virginia* (USDA, 1985), the soil covering the site is classified as Udorthents and Urban Land. Udorthents soils consist of shallow to deep, well drained to somewhat poorly drained soils. The surface layer ranges from about 5 to 15 inches in thickness and is variable in color and texture. The underlying material generally extends to a depth of several feet, and is generally mottled in shades of red, brown, and yellow. The parent material for Udorthents soils are limestone, shale, sandstone, and granite. Urban Land is land covered by streets, parking lots, buildings, and other structures; the original soil has been so altered or obscured that classification is not practical.

Based on mapping presented in the *Geology of the Blacksburg Quadrangle*, *Virginia* (Bartholomew and Lowry, 1979), AOC 5 is underlain by the Cambrian-age Elbrook Formation. The Elbrook Formation consists of light gray to medium gray massive dolomite with interbedded laminated limestone. The Elbrook Formation typically is overlain by an orange-brown clay and silt soil and saprolite of variable thickness.

During the 2003-2004 site characterization activities, bedrock was encountered at depths ranging from 6 feet below ground surface to 18 feet below ground surface in the vicinity of the USTs. Groundwater was not encountered in the vicinity of the USTs during site characterization activities.

Based on subsurface investigations conducted at other SWMUs and AOCs at Virginia Tech, depth to groundwater in the uppermost aquifer in these areas varies from less than 10 feet below

ground surface to more than 65 feet below ground surface. The uppermost aquifer resides in secondary porosity features including fractures, joints, and bedding planes in the underlying dolomite and shale bedrock. Typically, groundwater monitoring wells completed within the uppermost aquifer were advanced through overburden and into bedrock. Once bedrock was encountered, cuttings of dolomite and shale were dry and dusty until groundwater production was encountered. Typically, after the first indication of groundwater was observed, a minimal amount of standby time was required to allow the borehole to recharge with groundwater.

3.0 UST REMOVAL

Based on discussions between Virginia Tech and the VDEQ, removal of the Virginia Tech Power Plant USTs and the associated pump house in their entirety is highly recommended by the VDEQ. Removal and closure of USTs is regulated under the UST Technical Regulation, and will be conducted in accordance with VDEQ Guidance Document #01-2024D - *Storage Tank Program Technical Manual*, a copy of which is included (on CD-ROM) in **Appendix B**.

Due to the nature of the site's physical constraints, the USTs and pump house will be removed by a qualified, licensed contractor with experience in the removal and disposal of cast-in-place concrete USTs. Prior to removal of the USTs, Virginia Tech will obtain a building permit from the appropriate building authority; the building permit will be on-site during the removal of the UST system. During the removal process, the USTs and associated pipes will be drained, cleaned, and completely emptied prior to removal. Upon removal, the concrete and other associated debris will be sampled for waste characterization purposes prior to transportation off-site for disposal or treatment. The debris will be transported to an appropriate disposal or recycling facility based on the results of the waste characterization analyses.

4.0 SITE CHARACTERIZATION

Following removal of the USTs, the underlying soil will be assessed for petroleum impact. The VDEQ and EPA will be notified within 24 hours if evidence of a petroleum release is discovered. If a petroleum release is observed, the UST Technical Regulation requires characterization of the site and the nature of the release. Site characterization consists of activities performed to assess site and contamination conditions, risks posed by the release, and remedial options for cleaning up the release. The objective of site characterization is to obtain information needed to make an appropriate and informed decision regarding the actions necessary to protect human health and the environment from the released materials.

In the event that petroleum impacted soil is identified during UST removal activities, additional assessment and remediation will be required by the VDEQ. The VDEQ may also require evaluation of groundwater conditions beneath the site. Assessment and remediation will be conducted in accordance with the VDEQ *Storage Tank Program Technical Manual* (**Appendix B**). In accordance with the VDEQ *Storage Tank Program Technical Manual*, assessment and remediation activities must be authorized in advance by the VDEQ prior to the work being performed. The purposes of authorizing activities before they are undertaken are to: 1) ensure that all work undertaken for release response and corrective action is eligible for consideration for reimbursement from the Virginia Petroleum Storage Tank Fund (VPSTF); and 2) reduce the number of iterations of site characterization reports (SCRs) and other reports by allowing VDEQ and Virginia Tech to agree on release response and corrective action activities before work is performed at the site. However, the potential extent of petroleum contamination and the requirements for remediation cannot be estimated until the USTs are removed.

Activities performed for characterizing and remediating releases from VPSTF eligible tanks are reimbursable as long as those activities are authorized by the regional staff. Prior to initiating site characterization activities, Virginia Tech must fill out an Activity Authorization Form (AAF) and send the form to the VDEQ Blue Ridge Regional Office (VDEQ-BRRO). VDEQ-BRRO staff will review the form and approve, disapprove, or modify the proposed activities and units. Virginia Tech may commence with site characterization activities upon receipt of the approved AAF from VDEQ-BRRO.

4.1 ASSESSMENT OF PETROLEUM IMPACT

The assessment portion of the site characterization consists of evaluating site conditions and the petroleum impact. This includes evaluating the nature, extent and quantity of the release, characterizing the geologic and hydrologic conditions at the site, and determining current and future land and water uses at and near the site. The data collected during the assessment will be used to support risk and remediation assessments.

4.1.1 Constituents of Potential Concern

The constituents of potential concern (COPCs) associated with a potential release of petroleum from the Virginia Tech Power Plant USTs as stipulated by the VDEQ during previous site characterization activities and ongoing remediation activities are TPH-DRO (C10-C34 carbon

range) and total PAHs. The proposed chemical analyses for the COPCs, analytical methods, and quantitation limits are included in **Table 1.**

4.1.2 Subsurface Soil Assessment

In accordance with the VDEQ *Storage Tank Program Technical Manual*, following removal of the USTs subsurface soil samples will be collected from locations where a release would most likely be detected if one occurred, including: the bottom of the UST basin, the sidewalls of the UST basin, beneath pipelines and other associated ancillary equipment, and any other area where impact would be suspected. Soil samples will be collected using the procedures specified in the Quality Assurance Project Plan (**Appendix C**) and analyzed for the COPCs using the analytical methods listed in **Table 1**. The number and depths of subsurface soil samples to be collected will be determined based on field conditions observed following removal of the USTs and discussion with the VDEQ.

4.1.3 Groundwater Assessment

Groundwater was not encountered in the vicinity of the USTs during previous site characterization activities. Based on conditions observed following removal of the USTs and the analytical results of subsurface soil samples, the VDEQ may require sampling of groundwater beneath the site. Collection of groundwater samples may require the drilling and installation of temporary and/or permanent monitoring wells in bedrock. Monitoring well boring and installation (if required) will be conducted in accordance with the procedures specified in the Quality Assurance Project Plan (**Appendix C**). Groundwater samples will be collected using the procedures specified in the Quality Assurance Project Plan (**Appendix C**) and analyzed for the COPCs using the analytical methods listed in **Table 1**. The number of groundwater samples to be collected will be determined based on field conditions observed following removal of the USTs and discussion with the VDEQ.

4.2 RISK ASSESSMENT

The risk assessment portion of the site characterization will evaluate risks to human and environmental receptors posed by the release. The risk assessment will identify potential and impacted receptors (including sensitive receptors), estimates migration rates for the COPCs, and evaluates risks to individual receptors. Potential pathways of exposure including ingestion, inhalation, and dermal contact will be evaluated in the risk assessment. The risk assessment will also present proposed remediation endpoints based upon site-specific risks. The overall goal of the risk assessment is to evaluate risks to receptors so that endpoints for corrective action may be defined on a scientific and defensible basis.

Following the removal of free product and saturated soils (if present) to the extent that contaminant migration from these sources is minimized, a risk-based decision making process will be utilized to identify the future course of action at the site. The risk assessment will be conducted in accordance with the guidelines presented in the VDEQ *Storage Tank Program Technical Manual* (**Appendix B**).

4.3 REMEDIATION ASSESSMENT

The remediation assessment portion of the site characterization will evaluate the potential for remediation at the site and the applicability of potentially appropriate remedial technologies. Along with considering the merits and feasibility of active remedial technologies, the remediation assessment will evaluate the potential for natural attenuation at the site as well as case closure with no further action.

A description of and conceptual design for each potential remedial alternative considered will be included in the remediation assessment along with an estimated time frame for implementation and duration of the remedial alternative to achieve the risk based endpoints. The remediation assessment will provide an estimate of the relative costs for the applicable technologies. Finally, the remediation assessment will contain a recommended course of action based upon the information generated during the site characterization process. The remediation assessment will be prepared in accordance with the guidelines presented in the VDEQ *Storage Tank Program Technical Manual* (**Appendix B**).

5.0 REQUIRED PLANS

5.1 HEALTH AND SAFETY PLAN

The Health and Safety Plan (HASP) (**Appendix C**) describes the responsibilities, training requirements, protective equipment, and the site operating procedures to be used and implemented. It provides for protection of on-site personnel, to the extent practicable, from the potential hazards associated with contacting or handling surface water, sediment, soils, and groundwater and associated wastes at the Facility.

5.2 QUALITY ASSURANCE PROJECT PLAN

The Quality Assurance Project Plan (QAPP) (**Appendix D**) sets forth the minimum protocols for field activities to be conducted following removal of the USTs. The QAPP also describes the field sampling protocols, analytical methods, and laboratory protocols to be utilized for sample analysis.

5.3 LABORATORY DATA PACKAGE(S)

Virginia Tech will utilize the analytical services of one or more VDEQ-accredited and, if required, EPA-accredited laboratories to perform the chemical analyses specified in the RFI Work Plan using the methods identified in the QAPP. The Laboratory Data Package will include a quality control summary and a sample data section. Data validation is described in the QAPP (**Appendix D**).

5.4 DATA MANAGEMENT PLAN

A Data Management Plan is included in the QAPP (**Appendix D**).

5.5 PROJECT MANAGEMENT PLAN

A Project Management Plan is included in the QAPP (**Appendix D**).

5.6 COMMUNITY RELATIONS PARTICIPATION PLAN

Virginia Tech submitted a final Community Relations Participation Plan to the EPA on July 20, 2012. A copy of the Community Relations Participation Plan is included in **Appendix E**.

6.0 INVESTIGATION-DERIVED WASTES

During the field activities, a limited amount of waste material may be generated in connection with personnel protection, sample collection, sample handling and equipment decontamination. Such waste may include excess soil, equipment decontamination fluids, personal protection equipment (PPE) and disposable sampling equipment. Disposition of this investigation-derived waste will be in general accordance with the VDEQ Policy for the Handling of Investigation Derived Waste (IDW) dated June 28, 1995, and the corresponding Addendum dated July 24, 1996 (**Appendix F**).

7.0 SCHEDULE OF IMPLEMENTATION/REPORTING

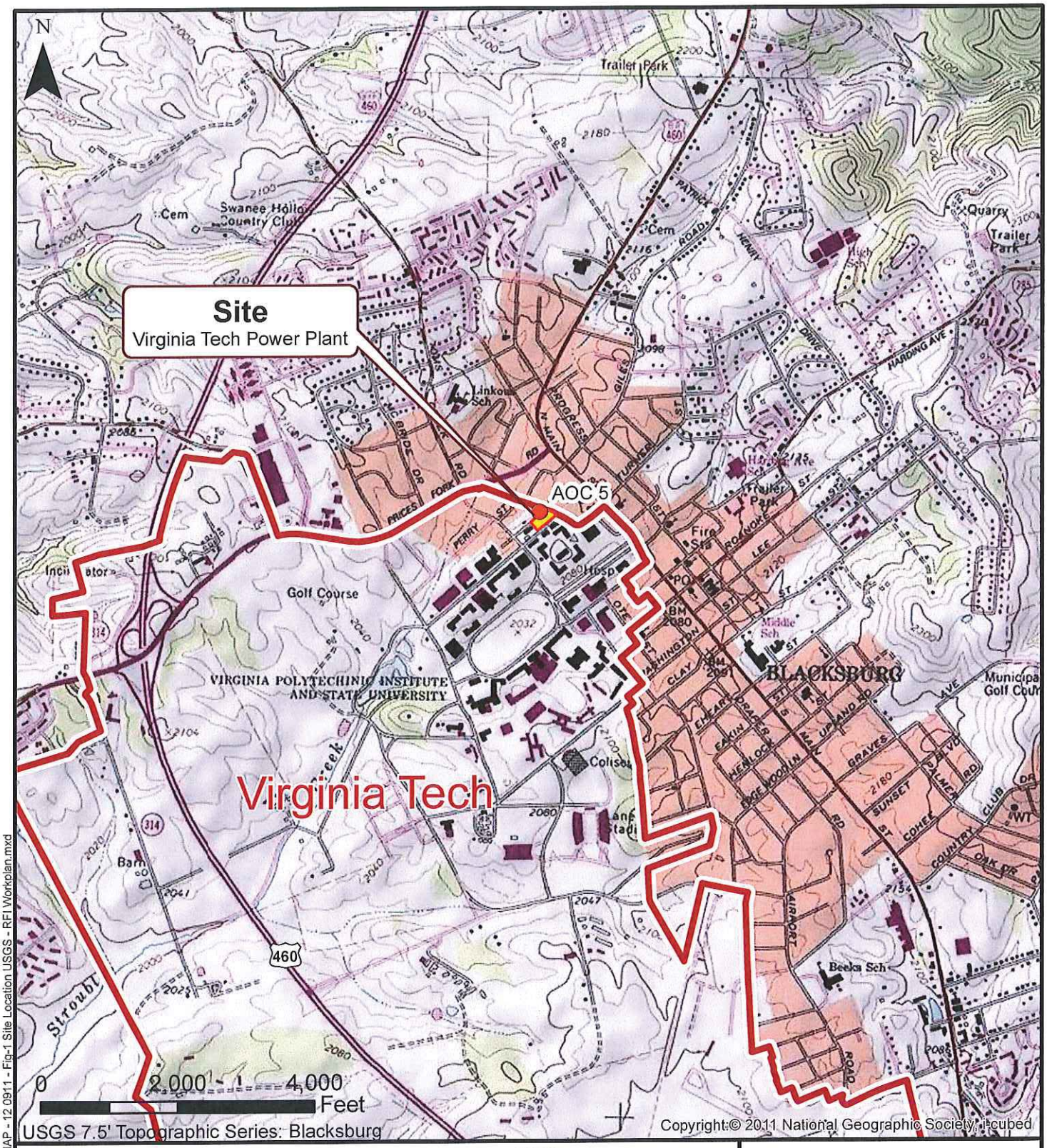
A proposed schedule for implementation of the RFI Work Plan is included as **Table 2**. The schedule will be revised, as necessary, based on final approval of the RFI Work Plan as well as on Virginia Tech's schedule.

8.0 REFERENCES

Bartholomew, M.J., and Lowry, W.D., 1979, *Geology of the Blacksburg Quadrangle, Virginia*, Virginia Division of Mineral Resources Publication 14 (GM81B), text and 1:24,000 scale map.

United States Department of Agriculture, 1985, *Soil Survey of Montgomery County, Virginia*.

FIGURES



Site Location Map

RFI Workplan
Virginia Polytechnic Institute and State University
Blacksburg, Virginia
EPA Administrative Order on Consent
Docket No. RCRA-03-2010-0396CA

SCALE 1" = 2000'

PLAN NO. B10131B-05

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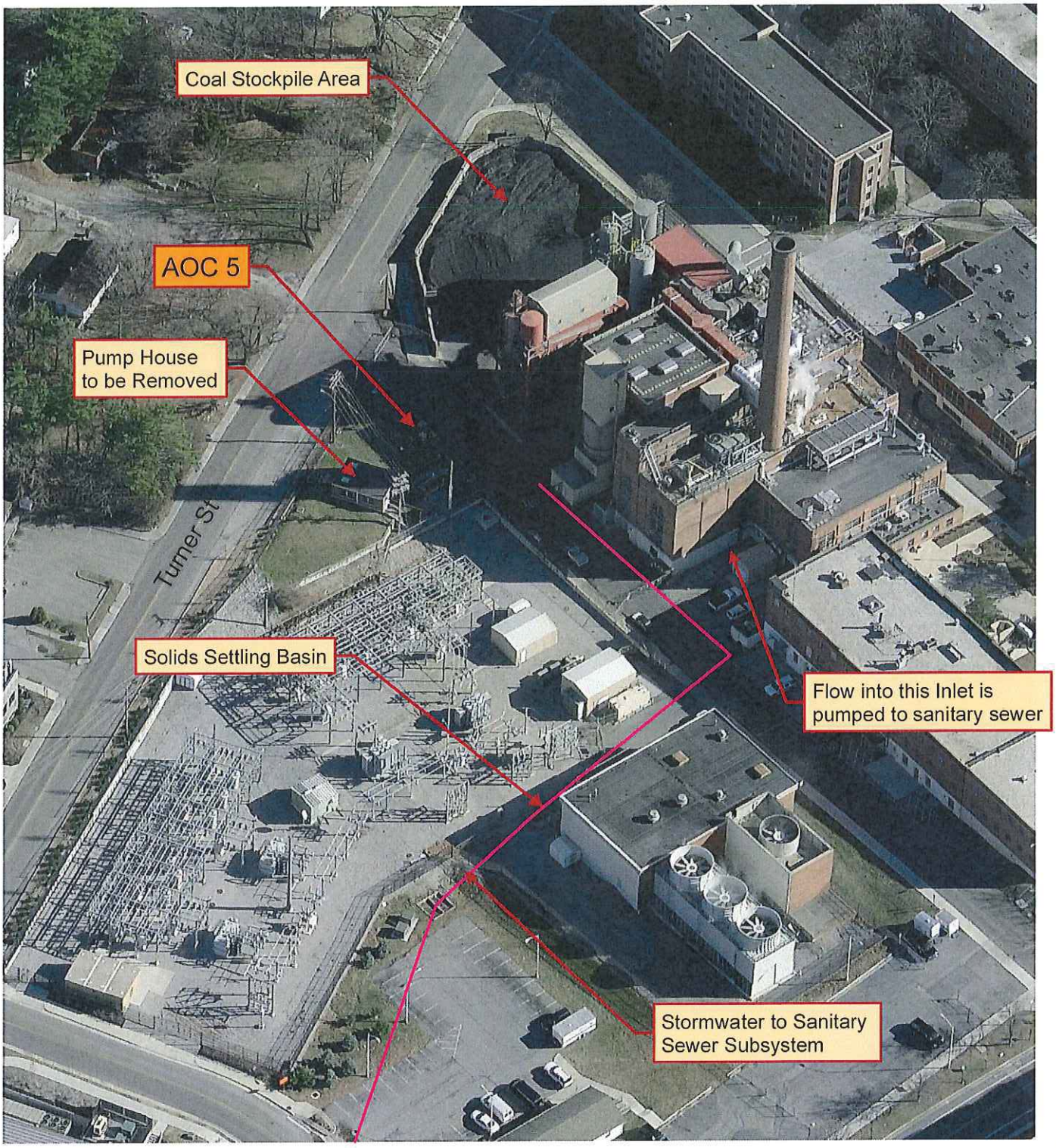
DESIGNED TEJ
DRAWN SMF
CHECKED SN
DATE 09-11-12

FIGURE 1

Path: P:\B10\100\B10131B\B10131B-05\GIS\MAP - 12 0911 - Fig-1 Site Location USGS - RFI Workplan.mxd



Aerial image Dec.25, 2008, View from West. Copyright Pictometry; Licensed via Pictometry Online.

Oblique Aerial

Power Plant

RFI Workplan
Virginia Polytechnic Institute and State University
Blacksburg, Virginia
EPA Administrative Order on Consent
Docket No. RCRA-03-2010-0396CA

SCALE n/a

PLAN NO. B10131B-05

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Charlottesville, VA
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DESIGNED TEJ
DRAWN SMF
CHECKED SN
DATE 09-11-12

FIGURE 2

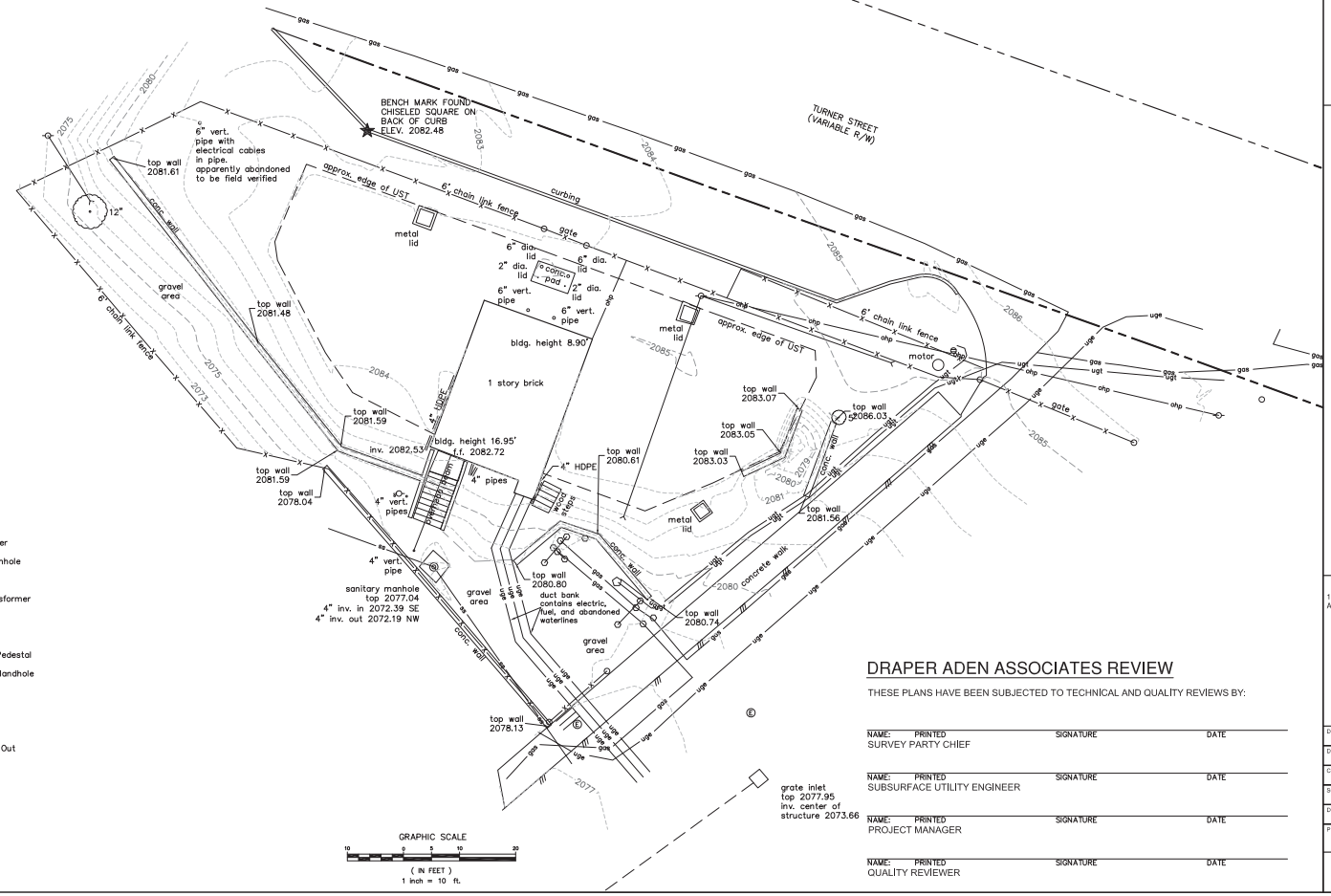
Path: P:\B10\100\B10131B\B10131B-05\GIS\MAP - 12 0911 - Fig-2 PowerPlant Oblq - RFI Workplan.mxd

NOTES:

1.) Source of meridian for bearings is based upon: Virginia State Plane, South zone, (NAD 83).
2.) Elevations are based upon a vertical datum established by existing on site control, (NAVD 88.)
3.) This survey was prepared without the benefit of a title commitment or title report and all easements and encumbrances that might be disclosed in a title search may not be shown.
4.) Utilities shown are based upon:
SUE Quality Level B, ASCE 38-02 – field designation of underground utilities performed by DAA; and visible evidence in conjunction with compiled records.
5.) This topographic survey of Virginia Tech Power Plant–Pump House was completed under the direct and responsible charge of, Loren W. Knighting from an actual Ground survey made under my supervision; that the imagery and/or original data was obtained on November 07, 2011 and that this plat and/or map meets minimum accuracy standards unless otherwise noted.
6.) Contour interval: 1'.
7.) This survey was prepared for Virginia Tech. Draper Aden Associates assumes no liability for reuse or modification of this document.
8.) Property lines shown hereon are compiled from record information.
9.) Draper Aden Associates provides benchmarks for the construction of the improvements shown on these plans. All other existing elevations are for reference to existing conditions only. Do not use spot elevations, finish floor elevations, elevations on manholes, elevations on survey nails, survey hubs, control points (horizontal points provided) or any other points for construction other than the provided benchmarks. Failure to utilize and verify the provided benchmarks could result in damages and additional cost that are the contractor's responsibility.

This topographic survey of Virginia Tech Power Plant Pump House was completed under the direct and responsible charge of, Loren W. Knighting from an actual [X] Ground or [ ] Airborne survey made under my supervision; that the imagery and/or original data was obtained on November 07, 2011; and that this plat, map, or digital geospatial data including metadata meets minimum accuracy standards unless otherwise noted.

VIRGINIA STATE PLANE, SOUTH ZONE



GRAPHIC SCALE
10 0 5 10 20
(IN FEET)
1 inch = 10 ft.

LEGEND

Property Line	Rod Found	Electric Box
Contour	Monument Found	Guy Pole
Gas Line	Telephone Pedestal	Electric Marker
Overhead Power	Telephone Manhole	Electrical Manhole
Sanitary Sewer and Manhole	Telephone Box	Utility Pole
Storm Line and Manhole	Fire Hydrant	Electric Transformer
Storm Line and Inlet	Water Valve	Ground Light
Underground Cable TV	Water Meter	Light Pole
Underground Electric	Well	Fiber Optic Pedestal
Underground Telephone	Benchmark	Fiber Optic Handhole
Underground Fiber Optic	Bollard	Gas Vent
Unknown Utility	Sign (1-post)	Gas Valve
Waterline	Sign (2-post)	Gas Meter
Asphalt	Spot Elevation	Sewer Clean Out
Building	Deciduous Tree	Wood Post
Fence (as noted)	Evergreen Tree	Metal Post
Stream	Shrub	Gravel
Treeline	Concrete	
Guy Wire		

DRAPER ADEN ASSOCIATES REVIEW

THESE PLANS HAVE BEEN SUBJECTED TO TECHNICAL AND QUALITY REVIEWS BY:

NAME: PRINTED	SIGNATURE	DATE
SURVEY PARTY CHIEF		
SUBSURFACE UTILITY ENGINEER		
PROJECT MANAGER		
QUALITY REVIEWER		

COMMONWEALTH OF VIRGINIA
L. W. KNIGHTING
Lic. No. 1440
LAND SURVEYOR

Draper Aden Associates
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2206 South Main Street
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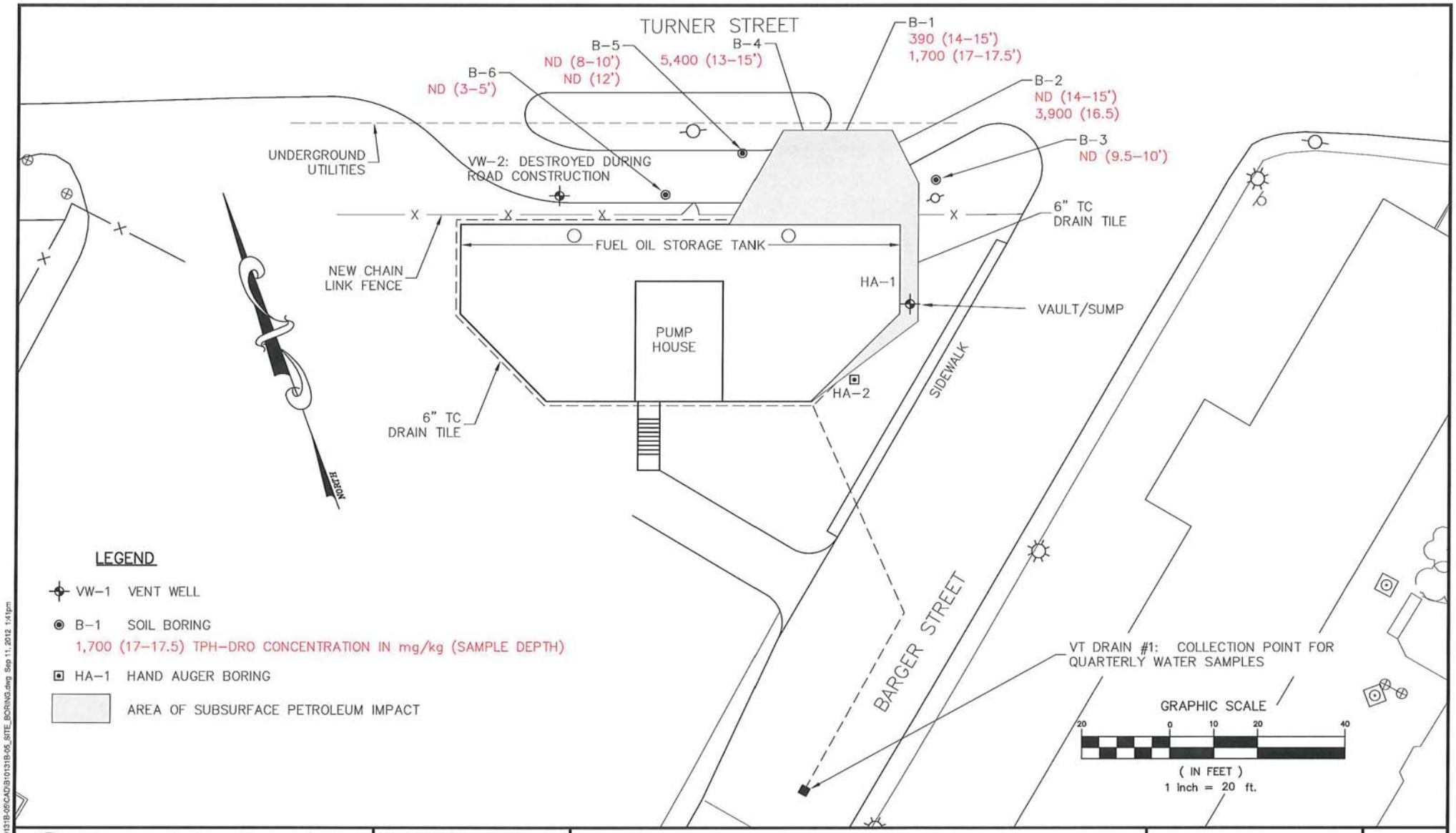
Richmond, VA
Charlottesville, VA
Hampton Roads, VA

TOPOGRAPHIC SURVEY
VIRGINIA TECH - POWER PLANT PUMP HOUSE
TOWN OF BLACKSBURG, MONTGOMERY COUNTY, VIRGINIA

REVISIONS
12-12-11
Added strom structures

DESIGNED BY: N/A
DRAWN BY: JFF
CHECKED BY: LWK
SCALE: 1" = 10'
DATE: 11-09-11
PROJECT NUMBER: B10131B-09S

SHEET
1 OF 1



P:\B10\100B10131\B10131B-05\CAD\B10131B-05_SITE_BORING.dwg Sep 11, 2012 1:41pm

Draper Aden Associates
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Blacksburg, VA 24060
540-552-0444 Fax: 540-552-0291
Richmond, VA
Charlottesville, VA
Hampton Roads, VA
Raleigh-Durham, NC

DESIGNED	RGM
DRAWN	DLD
CHECKED	SN
DATE	09/11/2012

2003-2004 SCR SITE MAP / BORING LOCATION MAP
VIRGINIA TECH POWERPLANT UST-RFI WORKPLAN
VIRGINIA POLYTECHNIC INSTITUTE & STATE UNIVERSITY, BLACKSBURG, VIRGINIA

SCALE: 1" = 20'

PLAN NO. B10131B-05

FIGURE 4

TABLES

TABLE 1

CONSTITUENTS OF POTENTIAL CONCERN

RFI WORK PLAN
VIRGINIA TECH POWER PLANT UST REMOVAL
BLACKSBURG, VIRGINIA

CONSENT ORDER – RCRA-03-2010-0396CA

Media	COPC	USEPA SW 846 Method Number	Quantitation Limit (QL)	Units	Screening Level	Units
SOIL	**Semi-Volatile Organic Compunds (SVOCs) - Polynuclear Aromatic Hydrocarbons (PAHs)**					
	Acenaphthene	8270D	0.0017	mg/kg	33,000	mg/kg
	Acenaphthylene	8270D	0.0017	mg/kg	n/a	mg/kg
	Anthracene	8270D	0.0017	mg/kg	170,000	mg/kg
	Benzo(a)anthracene	8270D	0.0017	mg/kg	2.1	mg/kg
	Benzo(a)pyrene	8270D	0.0017	mg/kg	0.21	mg/kg
	Benzo(b)fluoranthene	8270D	0.0017	mg/kg	2.1	mg/kg
	Benzo(ghi)perylene	8270D	0.0017	mg/kg	n/a	mg/kg
	Benzo(k)fluoranthene	8270D	0.0017	mg/kg	21	mg/kg
	Chrysene	8270D	0.0017	mg/kg	210	mg/kg
	Dibenz(a,h)anthracene	8270D	0.0017	mg/kg	0.21	mg/kg
	Fluoranthene	8270D	0.0017	mg/kg	22,000	mg/kg
	Fluorene	8270D	0.0017	mg/kg	22,000	mg/kg
	Indeno(1,2,3-cd)pyrene	8270D	0.0017	mg/kg	2.1	mg/kg
	Naphthalene	8270D	0.0017	mg/kg	18	mg/kg
	Phenanthrene	8270D	0.0017	mg/kg	n/a	mg/kg
	Pyrene	8270D	0.0017	mg/kg	17	mg/kg
	Total Petroleum Hydrocarbons - Diesel Range Organics (TPH-DRO)					
	TPH-DRO (C10-C34)	8015C modified	12	mg/kg	100	mg/kg

Screening Level for PAHs: USEPA Region III Regional Screening Level (RSL) for Industrial Soil, April 2012.
Screening Level for TPH-DRO: VDEQ Storage Tank Program Technical Manual, May 2011.

TABLE 1

CONSTITUENTS OF POTENTIAL CONCERN

RFI WORK PLAN
VIRGINIA TECH POWER PLANT UST REMOVAL
BLACKSBURG, VIRGINIA

CONSENT ORDER – RCRA-03-2010-0396CA

Media	COPC	USEPA SW 846 Method Number	Quantitation Limit (QL)	Units	Screening Level	Units
WATER	**Semi-Volatile Organic Compounds (SVOCs) - Polynuclear Aromatic Hydrocarbons (PAHs)**					
	Acenaphthene	8270D	0.05	ug/l	400	ug/l
	Acenaphthylene	8270D	0.05	ug/l	n/a	ug/l
	Anthracene	8270D	0.05	ug/l	1,300	ug/l
	Benzo(a)anthracene	8270D	0.05	ug/l	0.029	ug/l
	Benzo(a)pyrene	8270D	0.05	ug/l	0.2*	ug/l
	Benzo(b)fluoranthene	8270D	0.05	ug/l	0.029	ug/l
	Benzo(ghi)perylene	8270D	0.05	ug/l	n/a	ug/l
	Benzo(k)fluoranthene	8270D	0.05	ug/l	0.29	ug/l
	Chrysene	8270D	0.05	ug/l	2.9	ug/l
	Dibenz(a,h)anthracene	8270D	0.05	ug/l	0.0029	ug/l
	Fluoranthene	8270D	0.05	ug/l	630	ug/l
	Fluorene	8270D	0.05	ug/l	220	ug/l
	Indeno(1,2,3-cd)pyrene	8270D	0.05	ug/l	0.029	ug/l
	Naphthalene	8270D	0.05	ug/l	0.14	ug/l
	Phenanthrene	8270D	0.05	ug/l	n/a	ug/l
	Pyrene	8270D	0.05	ug/l	87	ug/l
	Total Petroleum Hydrocarbons - Diesel Range Organics (TPH-DRO)					
	TPH-DRO (C10-C34)	8015C modified	0.1	mg/l	1	mg/l

Screening Level for PAHs: USEPA Region III Regional Screening Level (RSL) for Tap Water, April 2012, OR USEPA Maximum Contaminant Level (MCL) for Drinking Water if marked with *.
Screening Level for TPH-DRO: VDEQ Storage Tank Program Technical Manual, May 2011.

DRAFT
Table 2
Proposed Implementation Schedule
Virginia Tech Power Plant - UST Removal and AST Installation

TASKS	WEEKS																																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
Geotechnical Investigation and Report Preparation:																																	
Prepare Structural Construction Designs (Option 2):																																	
Installation of Structural Engineering Controls:																																	
Pump House/UST Structure Demolition & Removal:																																	
Preparation and Submittal of Tank Closure Report:																																	
Assessment/Remediation of Environmental Impact:																																	
Preparation and Submittal of SCR/Remediation Reports to VDEQ/EPA:																																	
AST Fabrication:																																	
Preparation and Submittal of AST Registration/ODCP Application:																																	
Construction of AST Footers:																																	
Delivery & Installation of ASTs:																																	
Landscaping:																																	