NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Environmental Remediation, Remedial Bureau C
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November 22, 2016

Ms. Katherine Vater
Project Manager
National Grid – Site Investigation and Remediation
287 Maspeth Ave
Brooklyn, NY 11211-1703

Dear Ms. Vater:

Re: K – Dangman Park MGP
Kings County, site no. 224047
IRM Premobilization Investigation Work Plan (ARCADIS, November 04, 2016)

The New York State Department of Environmental Conservation (the Department) and the New York State Department of Health (NYSDOH) have reviewed the referenced work plan. The work plan is hereby approved.

Please place copies of the work plan in the document repositories.

Please contact me with any questions via email at william.wu@dec.ny.gov, or via phone at (518) 402-9662.

Sincerely,

William Wu
Environmental Engineer 1
Remedial Bureau C
Division of Environmental Remediation

ec: G. Cross, NYSDEC
D. Hettrick, NYSDOH
J. Deming, NYSDOH
M. Cathy Geraci, Arcadis of New York, Inc.
M. Miller, Arcadis of New York, Inc.

Katherine Vater
Project Manager
Site Investigation and Remediation

November 4, 2016

Mr. William Wu
Environmental Engineer
New York State Department of Environmental Conservation
Division of Environmental Remediation
Remedial Bureau C, 11th Floor
625 Broadway
Albany, NY 12233

Re: Former Dangman Park Manufactured Gas Plant Site - Property Redevelopment
IRM Premobilization Investigation Work Plan
Brooklyn, New York
NYSDEC Site No. 224047
Index # A2-0552-0606

Dear Mr. Wu:

This letter transmits the Interim Remedial Measure (IRM) Premobilization Investigation Work Plan, which details the proposed scope for test pits to be excavated, soil borings to be drilled, and soil samples to be analyzed to support the excavation IRM to be implemented on Block 7273, Lot 1R that traverses the former Dangman Park Manufactured Gas Plant (MGP) Site (the Site).

We anticipate conducting field work in December 2016, after receiving the New York State Department of Environmental Conservation's (NYSDEC's) approval of the work plan and agreement from the Owner to access the property. The field work is expected to take approximately three to four weeks to complete. I will notify you at least 7 days in advance of the scheduled date for commencement of the field activities.

The planned activities in the IRM Premobilization Investigation Work Plan do not impact the In-Situ Treatment IRM Work Plan (Arcadis, September 2, 2016), which is also anticipated to begin in December 2016 pending the NYSDEC's approval of the work plan and agreement from the Owner to access the property.

If you have any questions or require any additional information, please contact me at (608) 826-3663 or at katherine.vater@nationalgrid.com.

Sincerely,

Katherine Vater
Project Manager

Enclosure - IRM Premobilization Investigation Work Plan

cc: Dawn Hettrick, NYSDOH
Linda Sullivan, Esq., National Grid
Bonnie Barnett, Esq., Drinker Biddle and Reath LLP
Megan Miller, P.E., Arcadis
M. Cathy Geraci, Arcadis

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ARCADIS Design & Consultancy for natural and built assets

Ms. Katherine Vater
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Subject:
Former Dangman Park Manufactured Gas Plant Site – Property Redevelopment
IRM Premobilization Investigation Work Plan
Brooklyn, New York
NYSDEC Site No. 224047
Index # A2-0552-0606

ENVIRONMENT

Date:
November 4, 2016

Contact:
Megan A. Miller, P.E.

Phone:
(315) 671-9422

Email:
Megan.Miller@arcadis.com

Our ref:
B0036704.0001

Dear Ms. Vater:

This letter presents the proposed scope for test pits to be excavated, soil borings to be drilled, and soil samples to be analyzed to support the excavation Interim Remedial Measure (IRM) to be implemented on Block 7273, Lot 1R that traverses the former Dangman Park Manufactured Gas Plant (MGP) Site (the Site). Arcadis is conducting this work on behalf of National Grid.

The activities will be conducted in advance of IRM implementation and will provide additional data within the three (3) excavation areas (IRM Excavation Areas 1 through 3) identified in the draft Interim Remedial Measure Design Work Plan (dated September 2, 2016). In the draft work plan (Section 5.3), a "Test Pit Work Plan" is identified to be submitted to the New York State Department of Environmental Conservation (NYSDEC) and implemented prior to mobilization of the excavation IRM. Because the scope of the IRM premobilization activities has been expanded to include more than test pits (e.g., waste characterization), the title has been changed, as identified above, to IRM Premobilization Investigation Work Plan.

The IRM premobilization investigation activities will be conducted to accomplish the following objectives:

- Pre-characterize soil for handling requirements and off-site treatment/disposal purposes.

- Assess/confirm the subsurface presence of former MGP structures and other subsurface structures/obstructions.

A description of the test pit, soil boring, and soil sampling and analysis activities is presented below, noting that additional soil borings, test pits or soil samples may be installed/collected based on field observations. Prior to implementing intrusive activities, available Site utility plans will be reviewed, a detailed visual Site inspection will be performed, and New York 811 will be contacted to identify and mark the location of underground utilities. Also prior to implementing the intrusive activities, a Construction Noise Mitigation Plan for compliance with Chapter 28 of 15 Rules of the City of New York (RCNY) will be prepared (noise mitigation measures during intrusive work will be limited to moveable barriers), and a temporary fence will be placed around the work area.

TEST PITS

Nine (9) test pits will be completed (locations TP-1 through TP-9 as shown on Figure 1) in an attempt to: 1) locate/identify in IRM Excavation Areas 1 and 2 shallow foundations and obstructions (including materials of construction, thickness, depth, etc.) that may potentially impact implementation of the IRM (e.g., installation of excavation support systems and soil excavation); and 2) identify the precise location of the former northwestern gas holder and determine absence/presence of the cistern (IRM Excavation Area 1). The test pits will be completed prior to soil boring drilling and will be used to determine actual soil boring locations. Test pits will be excavated at the following locations (as shown on Figure 1):

- Four locations (TP-1 through TP-4) within IRM Excavation Area 1, coinciding with the adjusted mapped location of the former northwestern gas holder based on 1895 and/or 1906 Sanborn Fire Insurance Maps and subsurface drilling observations at the SRI-1 soil boring location on October 8, 2015. Based on those observations, it appears that the gas holder wall (constructed of brick) may be present from approximately 4 feet below land surface (ft bls) to a depth of approximately 21 ft bls. Test pits TP-1 through TP-4 will be oriented to traverse the suspected location of the gas holder wall. TP-1 also coincides with the adjusted mapped location of the former cistern.
- Five locations within IRM Excavation Area 2 (locations TP-5 through TP-9) coinciding (in part) with potential shallow foundations and other obstructions observed during Supplemental Remedial Investigation (SRI) activities conducted in the back alley.

These nine test pit locations will be adjusted or expanded, as needed, based on the locations of subsurface utilities/structures and subsurface conditions encountered in the field.

As noted above, additional test pits may also be completed based on subsurface conditions encountered in the field. The locations of the additional test pits will be determined in the field.

The test pits will be completed following the procedures described in the standard operating procedure provided in Attachment A. The work will be conducted in accordance with the current Arcadis project-specific Health and Safety Plan (HASP) that will be amended as necessary. Community air monitoring procedures to be followed during the field investigation activities described herein are presented in the Community Air Monitoring Plan (CAMP) that is included in the NYSDEC-approved Remedial Investigation Work Plan (Arcadis, 2011; RI Work Plan).

Work-zone air monitoring and dust, vapor, and odor control measures, including foaming as needed, will be performed during the field activities. Based on air monitoring and visual assessment during intrusive and material handling activities, nuisance odors (if any) will be controlled and particle and volatile organic vapor levels will be maintained below the action levels identified in the HASP and CAMP. Odor control methods to be employed during the field activities include those identified in the CAMP, as well as foaming (as needed).

Each test pit will be excavated using a rubber-tired backhoe or small excavator to the top of the groundwater table, the depth of refusal, or the limit of the backhoe/excavator, whichever is encountered first. Prior to excavating the test pit locations shown on Figure 1, the excavation area (e.g., sidewalk, building slab) will be saw cut. The test pit excavation depths are anticipated to be up to 5 to 8 feet deep. Excavated material will be visually examined and logged by the field geologist or geotechnical engineer, field-screened using a photoionization detector (PID), and temporarily staged on polyethylene sheeting adjacent to the test pits. The observations and PID readings will be documented in a field notebook. The excavations will be sketched and photographed, as appropriate, to record significant subsurface features.

After each test pit is completed, excavated materials will be placed back into the test pit. Excavated materials will be placed into the test pits with visually clean soils used to cover impacted materials (if present). Additionally, the portion of the concrete sidewalk or building slab removed to facilitate the test pit excavations will be replaced as a “cover” and surface pavement will be restored in kind as necessary. The test pits will be staked for subsequent surveying by a New York State licensed Land Surveyor.

SOIL BORINGS

Based on the results of the investigation activities previously conducted at the Site, twelve (12) soil borings will be drilled (IRM-1 through IRM-12 as shown on Figure 1) during the IRM premobilization investigation activities to achieve the previously described objectives. The soil boring locations will be adjusted, as needed, based on the locations of subsurface utilities and observations made while excavating the test pits (e.g., locations of surface structures and subsurface conditions encountered). Additional soil borings may also be drilled based on subsurface conditions encountered; their locations will be determined in the field.

Methodologies and protocols to be followed during implementation of the soil boring drilling and sampling activities are presented in the Field Sampling Plan (FSP) that is included in the RI Work Plan (Arcadis, 2011). Analytical procedures and requirements to be followed for the laboratory analysis of samples collected during the field activities are presented in the Quality Assurance Project Plan (QAPP) (Arcadis, 2011). As identified above, the field work described herein will be conducted in accordance with the current Arcadis project-specific HASP; and the community air monitoring procedures to be followed and the mitigative measures to be implemented (as necessary) are presented in the CAMP included in the RI Work Plan.

The soil borings will be drilled to a maximum depth of 15 ft bls (IRM Excavation Areas 2 and 3) and a maximum depth of 21 ft bls (IRM Excavation Area 1). Some of the soil borings within IRM Excavation Area 1 are shown within the footprint of the former northwestern gas holder; the foundation of the gas holder will not be penetrated during soil boring drilling activities. Field data will be used to determine the actual depth of each soil boring.

All drilling locations will be hand augered/hand dug, and/or air knifed to a depth of 5 ft bls. The soil borings will be drilled using sonic drilling methods and continuous soil sampling will be performed using a 5-foot long, 4-inch diameter core barrel. Soil recovered from each sample interval will be visually characterized for color, texture, and moisture content as described in the National Grid Field Descriptions of Samples for Former Manufactured Gas Plant (MGP) Sites (Appendix B [FSP] of the RI Work Plan). The presence of visible staining, non-aqueous phase liquid (NAPL), and obvious odors will be noted and the soil will be field screened with a PID.

Upon completion, the soil borings will be backfilled with the drill/soil cuttings and clean sand used if necessary to fill the borehole to the surface. The surface pavement will be restored in kind, as necessary.

Field survey activities will be performed by a New York State licensed Land Surveyor to document final soil boring locations.

SOIL SAMPLING AND ANALYSIS

Soil samples will be collected from soil boring locations IRM-1 through IRM-12 and analyzed as described below to characterize the soil for off-site treatment/disposal and to facilitate direct-loading of the excavated materials into trucks for off-site transportation.

Based on previous experience, it is assumed that the potential treatment/disposal facilities will require the collection and analysis of waste characterization samples at a frequency of 1 sample per 750 tons of soil. Therefore, it is anticipated that seventeen (17) waste characterization samples will be collected for laboratory analysis. It is further anticipated that seventeen (17) discrete (grab) samples and seventeen (17) composite samples (5-point grab composite) will be analyzed. The composite sample will consist of 5 grab samples collected from the soil cores, and will be formed by placing equal portions of soil from each grab sample into a precleaned, stainless steel bowl. The grab samples will be thoroughly homogenized using a stainless steel scoop or trowel before being transferred into the sample containers provided by the laboratory.

The discrete (grab) samples will be analyzed for volatile organic compounds (VOCs) in accordance with United States Environmental Protection Agency (USEPA) SW-846 Method 8260 and toxicity characteristic leaching procedure (TCLP) VOCs in accordance with USEPA SW-846 Methods 1311/8260. The composite samples will be analyzed for the following parameters based on requirements of potential treatment/disposal facilities that may be used during the IRM:

- Semi-volatile organic compounds (SVOCs) in accordance with USEPA SW-846 Method 8270;
- Pesticides in accordance with USEPA SW-846 Method 8081;
- Polychlorinated biphenyls (PCBs) in accordance with USEPA SW-846 Method 8082;
- Metals in accordance with USEPA SW-846 Methods 6010/7471;
- Hexavalent chromium in accordance with USEPA SW-846 Method 7196;
- Total cyanide in accordance with USEPA SW-846 Method 9010;
- Percent sulfur in accordance with ASTM D129;

- Total petroleum hydrocarbons (TPH) (diesel-range organics and gasoline-range organics) in accordance with USEPA SW-846 Method 8015;
- Extractable petroleum hydrocarbons (EPH) in accordance with New Jersey Department of Environmental Protection (NJDEP) EPH Method;
- Total extractable organic halides in accordance with USEPA SW-846 Method 9023;
- Heat of combustion in accordance with ASTM D240;
- TCLP SVOCs in accordance with USEPA SW-846 Methods 1311/8270;
- TCLP metals in accordance with USEPA SW-846 Methods 1311/6010/7470;
- TCLP pesticides in accordance with USEPA SW-846 Methods 1311/8081;
- TCLP herbicides in accordance with USEPA SW-846 Methods 1311/8151;
- Ignitability in accordance with USEPA SW-846 Method 1030;
- Corrosivity (as pH) in accordance with USEPA SW-846 Method 9045; and
- Reactive cyanide and sulfide in accordance with USEPA SW-846 Sections 7.3.2/7.3.3.

Additional or slightly modified analytical parameters may be completed as necessary, and as determined by the selected off-site treatment/disposal facility(ies).

Additionally, soil samples will be collected from select boring locations based on field screening/ observations and submitted for forensic analyses to assess if there are different sources of petroleum impacts at the Site. The soil samples will be submitted for laboratory forensic analyses, which may include (but not be limited to) the following:

- Wide-range hydrocarbon fingerprint by gas chromatography/flame ionization detector (GC/FID) using USEPA Method 8015 modified;
- Extended polycyclic aromatic hydrocarbon (PAH) profiles by gas chromatography/mass spectrometry/selected ion monitoring (GC/MS/SIM) using USEPA Method 8270 modified;
- Petroleum biomarker compounds by GC/MS SIM using USEPA Method 8270 modified; and
- Total sulfur using ASTM D5453.

INVESTIGATION-DERIVED WASTES

Soil cuttings and other investigation-derived waste (IDW) (e.g., plastic sheeting from the test pitting activities, decontamination water, etc.) will be segregated by waste type and placed in appropriate waste containers (e.g., Department of Transportation (DOT)-approved 55-gallon steel drums). The drums of wastes generated during the activities will be temporarily stored on-site at a secure location determined in consultation with the Owner, until National Grid arranges for off-site treatment/disposal.

PROPOSED SCHEDULE

We anticipate conducting the IRM premobilization investigation field work in December 2016, after receiving the NYSDEC's approval of this work plan and agreement from the Owner to access the property. The field work is expected to take approximately three to four weeks to complete; conducted 5 days per week (non-weekend) between 7 am and 6 pm (the hours for construction defined in the NYC Noise Code), except work on Fridays will end by 4 pm.

Consistent with the SRI field activities, a summary of the work conducted and the CAMP monitoring data will be emailed to you weekly (at minimum). After completing the field work, a summary of the test pit and soil boring activities, along with the associated findings, will be provided for submittal to the NYSDEC. This information will be used to finalize the Excavation IRM Design.

Please do not hesitate to contact me or Cathy Geraci if you have any questions or require additional information.

Sincerely,

Arcadis of New York, Inc.

Megan A. Miller, P.E.
Vice President

Copies:
Steven Feldman, Arcadis
Cathy Geraci, Arcadis
Christopher Keen, Arcadis
Bonnie Barnett, Esq., Drinker, Biddle and Reath
Leigh Bausinger, Esq., Drinker, Biddle and Reath
Linda Sullivan, Esq., National Grid

Enclosures:

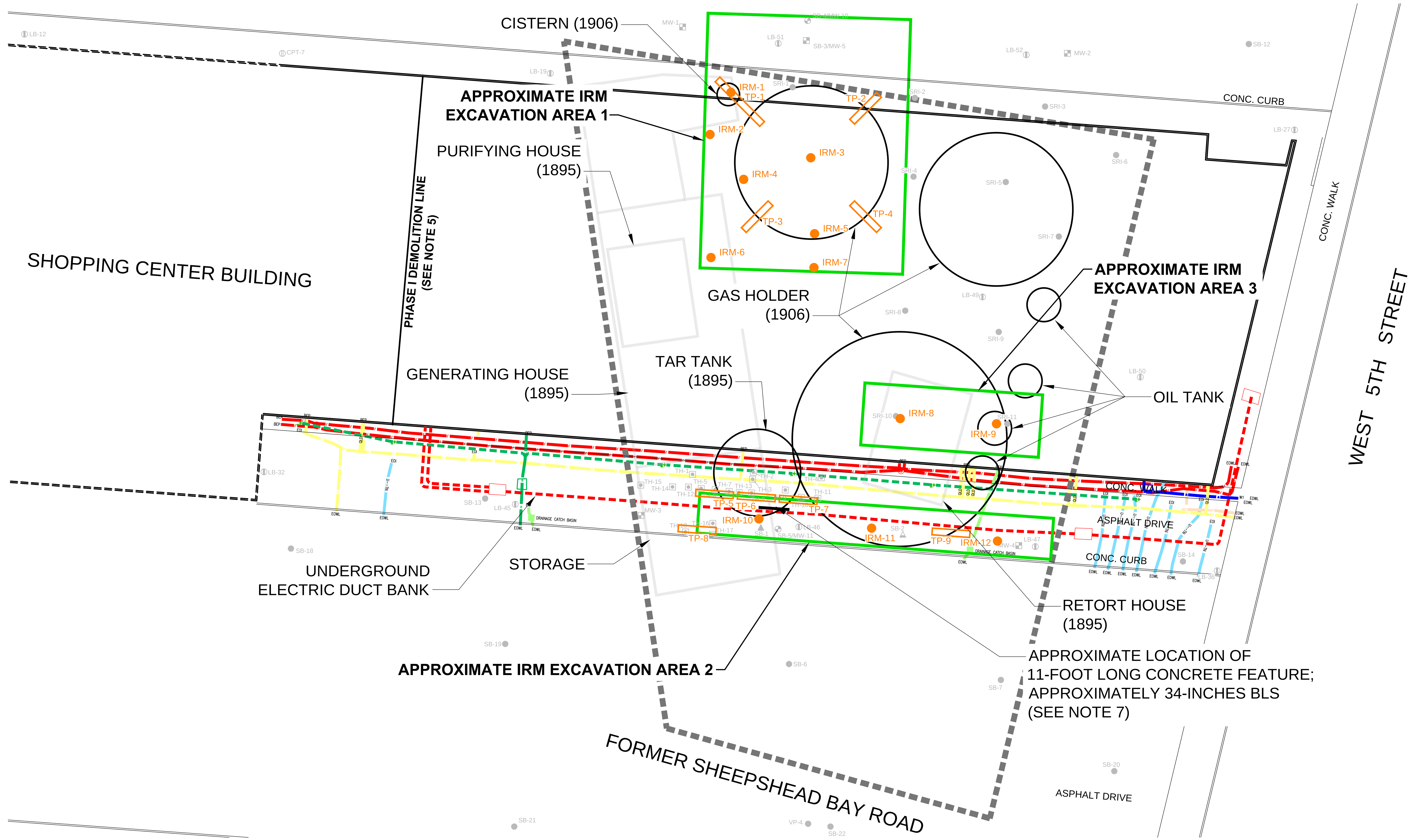
Figure

1 Proposed Test Pit and Soil Boring Locations

Attachment

A Test Pit Excavation Standard Operating Procedure

FIGURE



LEGEND:

- APPROXIMATE FORMER MGP SITE BOUNDARY
- FORMER MGP FEATURE (1895 AND/OR 1906 SANBORN FIRE INSURANCE MAPS)
- FORMER MGP FEATURE (1895 AND/OR 1906 SANBORN FIRE INSURANCE MAPS) ADJUSTED BASED ON FIELD OBSERVATIONS OF POTENTIAL GAS HOLDER WALL AT SOIL BORING LOCATION SRI-1
- COMMUNICATION LINE
- GAS LINE
- SANITARY LINE
- ELECTRIC LINE
- DRAINAGE LINE
- UNKNOWN LINE
- WATER LINE
- QLD GAS LINE
- SANITARY LINE (SUSPECTED ROUTE)
- SB-1 SITE CHARACTERIZATION SOIL BORING LOCATION (ARCADIS, 2009)
- SB-2 SITE CHARACTERIZATION SOIL BORING/GEOPROBE GROUNDWATER SAMPLING LOCATION (ARCADIS, 2009)
- MW-1 SITE CHARACTERIZATION MONITORING WELL LOCATION (ARCADIS, 2009); ABANDONED IN JUNE 2016
- SB-7 REMEDIAL INVESTIGATION NAPL DELINEATION SOIL BORING/ VERTICAL AQUIFER PROFILE TEMPORARY MONITORING WELL LOCATION (ARCADIS, 2011)
- SB-8 REMEDIAL INVESTIGATION NAPL DELINEATION SOIL BORING LOCATION (ARCADIS, 2011 AND 2012)
- MW-10 REMEDIAL INVESTIGATION MONITORING WELL LOCATION (ARCADIS, 2011, 2012, AND 2013); ABANDONED IN JUNE 2016
- VP-1 REMEDIAL INVESTIGATION VERTICAL AQUIFER PROFILE TEMPORARY MONITORING WELL LOCATION (ARCADIS, 2012)
- SRI-10 SUPPLEMENTAL REMEDIAL INVESTIGATION SOIL BORING LOCATION (ARCADIS, 2015)
- LB-10 PROPERTY OWNER DRILLED BORING (LANGAN 2015)
- CPT-5 PROPERTY OWNER CPT BORING (LANGAN 2015)
- SUPPLEMENTAL REMEDIAL INVESTIGATION TEST HOLE (ARCADIS 2016)
- IRM-1 PROPOSED SOIL BORING LOCATION
- TP-1 PROPOSED TEST PIT LOCATION

0 20' 40'

APPROXIMATE SCALE IN FEET

NOTES:

1. MONITORING WELL, TEST HOLE, AND SOIL BORING LOCATIONS SURVEYED RELATIVE TO THE NEW YORK STATE PLANE COORDINATE SYSTEM, LONG ISLAND ZONE, NORTH AMERICAN DATUM OF 1983 (NAD 83).
2. LOCATIONS OF FORMER MGP FEATURES ARE APPROXIMATE.
3. BASE MAP BY DONALD G. DEKENIPP L.S., P.C., PROFESSIONAL LAND SURVEYOR.
4. UTILITY INFORMATION FROM CARDNO FIELD DRAFT DRAWING DATED MARCH 28, 2016; EXCEPT FOR THE APPROXIMATE LOCATION OF THE UNDERGROUND ELECTRIC DUCT BANK, WHICH IS FROM COSENTINI ASSOCIATES DRAWING DATED MARCH 1, 2016 (PROVIDED BY THE PROPERTY OWNER TO NATIONAL GRID).
5. PHASE I DEMOLITION LINE BASED ON INFORMATION PRESENTED IN AN AUGUST 22, 2016 EMAIL FROM CAMMEBY'S MANAGEMENT CO. LLC TO NATIONAL GRID.
6. THE PROPERTY OWNER DRILLED AND CPT BORING LOCATIONS ARE APPROXIMATE BASED ON A LANGAN DRAWING DATED OCTOBER 15, 2015.
7. THE CONCRETE FEATURE (e.g., POTENTIAL FOUNDATION) WAS OBSERVED ON APRIL 11, 2016 WITHIN A DEEPER SEGMENT OF THE TRENCH EXCAVATED BY PROPERTY OWNER DURING INSTALLATION OF THEIR UNDERGROUND ELECTRIC DUCT BANK. THE OBSERVED CONCRETE FEATURE IS LOCATED BELOW THE ELECTRIC DUCT BANK.
8. ALL UTILITY LOCATIONS ARE APPROXIMATE.
9. IRM EXCAVATION LIMITS TO BE DETERMINED DURING THE REMEDIAL DESIGN.
10. ALL PROPOSED TEST PIT AND SOIL BORING LOCATIONS ARE APPROXIMATE AND ACTUAL LOCATIONS WILL BE DETERMINED IN THE FIELD DURING IMPLEMENTATION BASED ON ACCESSIBILITY, UTILITY LOCATIONS, AND OTHER CONSIDERATIONS.
11. ADDITIONAL TEST PITS OR SOIL BORINGS MAY BE COMPLETED BASED ON SUBSURFACE CONDITIONS ENCOUNTERED IN THE FIELD. THE LOCATIONS OF THESE TEST PITS OR SOIL BORINGS WILL BE DETERMINED IN THE FIELD DURING IMPLEMENTATION.
12. THE DIMENSIONS OF THE TEST PITS WILL BE DETERMINED IN THE FIELD DURING IMPLEMENTATION.

NATIONAL GRID
FORMER DANGMAN PARK MGP SITE
BROOKLYN, NEW YORK

IRM PREMOBILIZATION INVESTIGATION WORK PLAN

PROPOSED TEST PIT AND SOIL BORING LOCATIONS

ARCADIS Design & Consultancy for natural and built assets

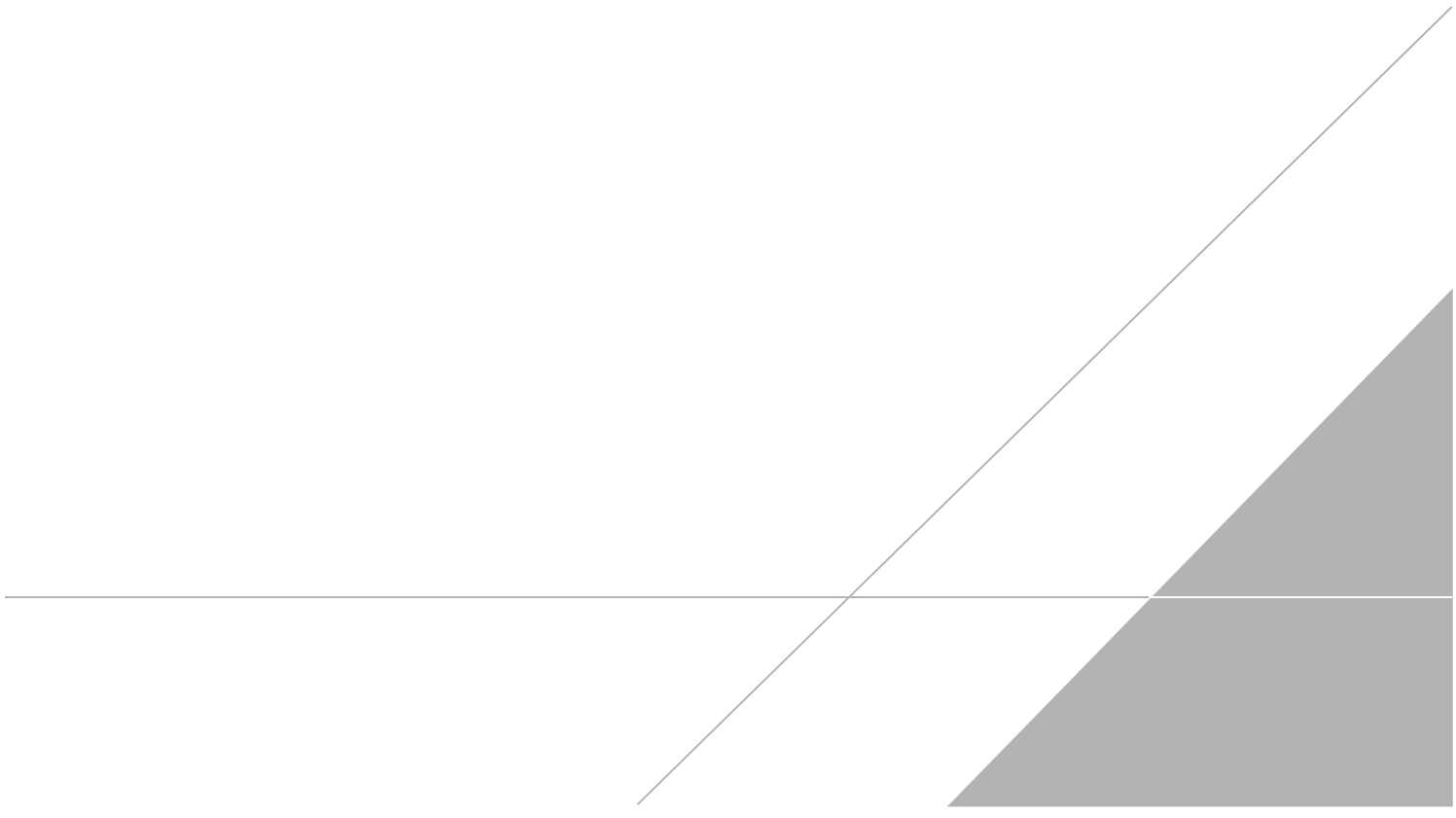
FIGURE

1

CITY:SYRACUSE-NY DIV/GROUP:ENV DB:A.SANCHEZ LD:ALS PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
Z:\ENVCAD\SYRACUSE\ACT\B0036704\0001\01212\36704T01.dwg LAYOUT: 1 SAVED: 11/4/2016 2:02 PM ACADVER: 19.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ---- PLOTTED: 11/4/2016 2:55 PM BY: SANCHEZ, ADRIAN
XREFS: Xref_01 XrUtility IMAGES: image_2012-1105.jpg PROJECTNAME: ----

ATTACHMENT A

Test Pit Excavation Standard Operating Procedure



ARCADIS
Infrastructure, environment, facilities

Imagine the result

Test Pit Excavation (NON-ENTRY)

Rev. #: 2

Rev Date: May 28, 2008

Approval Signatures

Prepared by: Andrew Kamik Date: 5/28/2008

Reviewed by: Michael J Hefell Date: 5/28/2008
(Technical Expert)

I. Scope and Application

This SOP outlines policies and procedures for the advancement of test-pits using rubber-tire or track-mounted backhoes. For all work activities conducted by ARCADIS involving test pits or other excavations, ARCADIS staff will refer to and comply with ARCADIS HS Procedure No. ARC HSCS005, Excavation and Trenching. Test pits will be excavated using a decontaminated, rubber-tired backhoe or track-hoe as appropriate. Test pits may be performed based on the need to identify subsurface structures, facilitate the collection of soil samples and provide larger-scale subsurface characterization than allowed using soil borings. Personnel should stand upwind of the excavation area to the extent possible. Continuous air monitoring may be conducted as indicated in the site Health and Safety Plan (HASP). Excavating will be conducted at the selected locations that have been cleared for utilities until significant source materials, groundwater, or bedrock is encountered, or the purpose of the test pit has been met, or the physical limits of the backhoe have been reached. Test pit materials will be visually observed and described with respect to depth. Samples may be collected for laboratory or geotechnical analyses. Photographs of the test pits and excavated materials should be taken for future reference.

II. Personnel Qualifications

ARCADIS personnel overseeing, directing, or supervising the sampling portion of the test pit activities will have a minimum of 6 months of previous related experience under the supervision of an experienced (2 years) oversight person and at a minimum a 4-year degree (Bachelors) in environmental sciences, engineering, hydrogeology, or geology, and have completed health and safety training as required by OSHA Regulation 29 CFR 1910.120 (HAZWOPER). Personnel will also have completed any client-specific training as may be required. If the test pit is excavated by ARCADIS personnel, a competent person as defined by ARC HSCS005 will be on-site at all times.

If the test pit is excavated by a subcontractor, the subcontractor will provide the competent person per OSHA 1926.32(f). The excavation subcontractor will maintain all appropriate licenses and/or certifications as required by the State and Municipality. The equipment operator and any assistants working on site will, prior to beginning work, have completed all health and safety and other training as may be required by ARCADIS and the client.

III. Equipment List

The following equipment will be available, as required, during test pitting:

- rubber-tired (or track-mounted) backhoe in good working order;
- flame ionization detector (FID) and/or photoionization detector (PID), and/or other colorimetric;
- sample containers and forms;
- daily field log and/or field notebook;
- supplies and equipment to comply with site- and client-specific health and safety procedures;
- stainless steel shovel, scoop, hand auger, or trowel;
- digital camera;
- polyethylene sheeting; and
- ground stakes.

IV. Cautions

Water used for decontamination of excavation equipment will be of a quality acceptable for project objectives. Testing of water supply should be considered.

Work may be conducted on or in proximity to steep terrain. Site-specific health and safety issues will be thoroughly reviewed by all site personnel prior to beginning work.

V. Health and Safety Considerations

A site-specific Health and Safety Plan (HASP) meeting client requirements will be prepared along with Job Safety Analyses (JSAs) that outline the H&S hazards and controls for conducting the test pit activities. Project staff will review and be familiar with these plans and JSAs prior to work. These documents will detail the excavation safety requirements per ARC HSCS005. In addition, underground and above ground utilities will be located and cleared per ARCADIS H&S Procedure ARC HSFS019 – Utility Location.

VI. Procedures

Where necessary to characterize soil conditions, soil samples will be collected from the backhoe bucket, either directly or with a decontaminated stainless steel scoop or trowel.

Samples should be homogenized, if appropriate.

Material removed from the test pits during excavation will be placed on polyethylene sheeting. Visually clean soils will be segregated from soils that may contain source materials. Soils meeting field screening or laboratory analytical criteria may be placed back into the excavation. Soils not meeting screening or laboratory analytical criteria will be managed on site as described in the *Waste Management* section below. For sites that cannot be fully secured, clean fill will be available to backfill excavations immediately upon completion of test pits. To facilitate surveying, the location of the test pits will be marked with stakes after they have been backfilled. Stakes should be placed at the ends of the test pit and at any significant bend or corner, as appropriate.

VII. Waste Management

All water generated during decontamination procedures will be collected and contained onsite in 55-gallon drums or a temporary frac-tank pending laboratory analysis and appropriate disposal.

Personal protective equipment (such as gloves, disposable clothing, and other disposable equipment) resulting from personnel cleaning procedures and soil sampling/handling activities will be placed in plastic bags. These bags will be transferred into appropriately labeled 55-gallon drums for appropriate disposal.

Depending on volume generated, soil materials will be placed in sealed 55-gallon steel drums or stockpiled on site (placed on and covered by plastic sheeting). The material will be analyzed to determine the appropriate disposal method.

VIII. Data Recording and Management

The supervising geologist/engineer/scientist will be responsible for documenting activities using a daily field log to record all relevant information in a clear and concise format. As an alternative, a bound field notebook may be used at the discretion of field personnel to document field activities. Where appropriate, photographs will be taken to supplement written notes. The record of test pitting will include:

- start and finish dates of excavating;

- name and location of project;
- project number, client, and site location;
- sample number and depths;
- depth to water;
- observations of soil type/characteristics and lithology;
- documentation of any elevated organic vapor emissions;
- names of Contractor's personnel, inspectors, or other people onsite; and
- weather conditions.

IX. Quality Assurance

Equipment will be cleaned prior to use onsite. At the discretion of the ARCADIS Project Manager or field geologist/engineer/scientist, equipment may be decontaminated between each test pit location, and prior to leaving the site. All equipment and associated tools that may have come in contact with contaminated soils and/or waste materials will be cleaned with high-pressure steam cleaning equipment using a potable water source. More detailed equipment cleaning procedures are provided in the HASP.

X. References

United States Department of Labor. 1989. Occupational Safety & Health Administration (OSHA), Title 29 Code of Federal Regulations (CFR)Part 1926.651 Subpart P Excavations, .54 Federal Register (FR) 45959, October 31, 1989 and 59 FR 40730, Aug. 9, 1994.

ARCADIS HS Procedure No. ARC HSCS005, Excavation and Trenching, 12 May 2008.

ARCADIS H&S Procedure ARC HSFS019 – Utility Location, 22 February 2008