Integral Engineering, P.C.
61 Broadway
Suite 1601
New York, NY 10006

telephone: 212.962.4303
facsimile: 212.962.4302
www.integral-corp.com

November 19, 2014 Project No. PE075

Ruth E. Curley, P.E.
Environmental Engineer II
New York State Department of Environmental Conservation

Subject: **Remedial Investigation Proposal**
Former Bridge Cleaners Site – 39-26 30th Street, Long Island City, NY
Brownfield Cleanup Program Site No. C241127

Dear Ms. Curley:

Integral Engineering, P.C. (Integral) has prepared this Remedial Investigation Proposal (Proposal) on behalf of Zhong Chuang Properties LLC (Zhong Chuang or Volunteer) for the property located at 39-26 30th Street, Long Island City, NY (Site). The Site is currently enrolled in the New York State Brownfield Cleanup Program (BCP) and listed as Site No. C241127.

This Proposal includes a summary of Site history; a discussion of the Conceptual Site Model (CSM); a plan to investigate soil and soil vapor at the Site and surrounding properties; and a plan to implement an active sub-slab depressurization system (SSDS) at the property.

SITE BACKGROUND

The approximately 7,500 square foot (SF) Site is formerly known as Bridge Cleaners and is designated as Block 399, Lot 31. A Site location map is provided as Figure 1. A map showing the Site property boundaries is included as Figure 2.

The Site is currently improved with a one-story building (without a basement) that covers the entire lot. The building is currently used as for the storage and cutting of fabrics. The Site is currently zoned as M1-3/R7X, which is a Special Long Island City Mixed Use District for mixed residential and commercial use.

Site Environmental History

According to the June 2014 Remedial Investigation Report (RIR) prepared by TechSolutions Engineering, P.C. (TechSolutions), the Site was used as a dry cleaner from 1997 until about 2011. Other historical uses included warehousing and distribution.

The RIR summarized soil, groundwater, and soil vapor results from investigations performed at the Site between September 2011 and February 2014. In general, elevated tetrachloroethylene (PCE) and trichloroethylene (TCE) concentrations were found in groundwater and soil vapor samples collected within and nearby the Site. PCE and TCE were identified in soil samples at the Site, but did not exceed NYSDEC Unrestricted Soil Cleanup Objectives (SCOs).

CONCEPTUAL SITE MODEL

Based on the information provided to Integral, our working CSM is that there appear to be residual chlorinated hydrocarbons in the unsaturated subsurface near the northern corner of the building, which is potentially causing secondary impacts to groundwater. This residual material may have discharged from a boiler drain in the northern corner of the building, and while there is a small concrete patch in this area, there is no evidence that a drain existed in the building. The CSM also must consider the possibility that a release occurred off-Site. The magnitude of the release, whether on-Site or off-Site (or both), is unknown.

Below is additional supporting information to the CSM:

- The groundwater at the Site, based on previous reports, generally flows from north to south. PCE concentrations in groundwater ranged from 176 to 340 µg/L, and were within the same order of magnitude across the Site, although slightly higher to the south.
- Soil vapor concentrations of PCE ranged from 21,400 to 668,000 µg/m^3 across the Site. The larger concentrations were found in the northern portion of the building, indicating potential residual source material nearby (in unsaturated soil).
- A boiler room was historically present in the northern corner of the building. It was not uncommon for buildings to construct a drain (dry well) for boiler condensate blow-down. No evidence of a drain or dry well has been observed or provided, although there appears to be a small concrete patch in this area.

SUPPLEMENTAL REMEDIAL INVESTIGATION SCOPE OF WORK

Additional soil, soil vapor, and indoor air samples will be collected. The work described herein will be conducted in accordance with 6 NYCRR part 375, and in general conformance with the NYSDEC DER-10. The supplemental investigation will include the installation of two soil borings and five soil vapor / indoor air points, within and surrounding the Site. The supplemental investigation will also include the collection of a soil vapor sample from a previously-installed permanent point within the building (to have contemporaneous data). Exploration and testing locations may be modified during the field program based on observations made in the field, access restrictions, or subsurface obstructions. Following the collection of these data, we will evaluate whether additional data are needed.

Soil Sampling

In order to further evaluate the potential presence of residual source material in soil, the following scope of work will be implemented:

- Advance two soil borings at the Site. The borings are intended to evaluate the presence of chlorinated hydrocarbons (if any) in the unsaturated zone, and to assist in the preparation of remedy recommendations and alternatives;
- Evaluate physical characteristics of the soil column and identify appropriate intervals from which samples will be collected;
- Collect soil samples (EPA Method 5035/5035A); and
- Analyze soil samples (TCL VOCs via EPA Method 8260C).

Proposed soil boring locations are shown on Figure 4. One boring will be advanced through the patched concrete area in the northern corner of the building. The other will be advanced adjacent to the soil vapor point that historically had the highest PCE concentration within the building. Based on field measurements or observations, boring locations may be moved or added.

Continuous soil logging will be conducted for the soil borings. It is anticipated that two soil samples will be analyzed per boring. We estimate that one soil sample will be collected directly above the groundwater interface (approximately 20 ft below ground surface [bgs]) and one sample will be collected from the interval exhibiting the highest PID reading or visual/olfactory impact. Shallow (0-2 ft bgs) soil samples will only be selected for analysis if no obvious signs of impacts are observed within the remainder of the soil column. If

additional impacted or questionable zones are identified, samples will be collected from those areas for analysis. Soil samples are expected to be collected from six-inch intervals.

Soil will be evaluated in the field by a person under the supervision of a Qualified Environmental Professional (QEP).

Soil borings will be installed using direct push technology to the groundwater interface depth, approximately 20 ft bgs. Continuous soil samples will be collected using four or five foot macrocore samplers fitted with dedicated acetate liners. The soil retrieved from each sampler will be field screened with an 11.7 eV PID for VOCs and described by Integral field personnel on boring logs. Evidence of contamination (e.g., Non-Aqueous Phase Liquid [NAPL], sheens, odors, staining, elevated PID readings) will be documented by Integral field personnel.

Soil samples selected for laboratory analysis will be placed in laboratory-supplied containers, sealed and labeled, and placed in a cooler and chilled to 4°C for transport under chain-of-custody procedures. Soil samples will be submitted to a NYSDOH ELAP-certified laboratory via courier service under standard chain-of-custody protocol. The laboratory will provide Analytical Services Protocols (ASP) Category B deliverables.

Soil Vapor Intrusion Sampling

We will collect soil vapor and indoor air samples to evaluate the potential for soil vapor intrusion in off-Site buildings and the potential for off-Site residual source material to exist.

The following scope of work is proposed to further characterize conditions at or near the Site (locations shown on Figure 4):

- Collect five indoor air samples (all off-Site locations, pending access);
- Collect one ambient air sample during the indoor air sample collection (for background conditions);
- Install five off-Site soil vapor points collocated with the indoor air sample locations;
- Purge and collect soil vapor samples from the five newly-installed points and from one previously-installed point within the building; and
- Analyze all soil vapor, indoor air, and ambient air samples for TO-15 VOCs.

Soil vapor and indoor air samples will be collected simultaneously. The soil vapor points will be installed no less than one week prior to sample collection to allow for the indoor air conditions to return to pre-installation conditions.

Indoor and Ambient Air Samples

In accordance with the NYSDOH *Guidance for Evaluating Soil Vapor Intrusion*, five indoor air samples and one ambient air sample (per sampling day) will be collected simultaneous to the collection of sub-slab soil vapor samples.

Indoor air samples will be collected in the breathing zone (approximately four to six feet above the floor). One background ambient air sample will also be collected per day. Indoor and background air samples will be collected in batch-certified clean 6L Summa™ canisters attached to 8-hour or 24-hour flow controllers. Samples will be collected at flow rates no greater than 200 ml/min.

For each indoor air (and soil vapor and ambient air) sample, the start time, end time, maximum and minimum temperature, and beginning and final ambient temperature will be recorded. Indoor and ambient air samples will be analyzed for VOCs via USEPA Method TO-15 at a NYSDOH ELAP-certified analytical laboratory. The laboratory will provide ASP Category B deliverables.

For commercial properties, indoor air samples will be collected over an eight-hour period. For residential properties, samples will be collected over a twenty-four-hour period.

Soil Vapor Samples

Each soil vapor probe will be installed approximately 2" below the building slab using dedicated 1/8" Teflon tubing. The tubing will be implanted into the hole and the annular space sealed with bentonite to prevent ambient air from entering the area around the probe. Once the seal is secure, a "T" fitting and valve will be connected on the above-surface end of the tubing. A syringe will be used to purge the vapors in the probe and tubing of three volumes. As required by the NYSDOH, a helium (He) tracer will be used as part of the sampling process and all testing will follow the NYSDOH Soil Vapor Guidance[1]. Prior to sample collection, the helium concentration will be measured using a field meter and the measurement recorded for each soil vapor sampling location. Prior to sample collection, a multi-gas meter will be used to measure the concentration of O_2, CO_2, and CH_4 in each probe, to assess the subsurface chemistry (e.g. redox state). Following this procedure, the soil vapor samples will be collected in clean, batch certified 6L Summa™ canisters at flow rates no greater than 200 ml/min. Soil vapor samples will be analyzed for VOCs via USEPA Method TO-15 at a NYSDOH ELAP-certified analytical laboratory.

[1] *Guidance for Evaluating Soil Vapor Intrusion in the State of New York, Final*. October 2006.

For commercial properties, soil vapor samples will be collected over an eight-hour period. For residential properties, samples will be collected over a twenty-four-hour period.

The property located at 35-27 29th Street (Lot 9) has recently undergone investigation and is currently under construction. Therefore, no soil vapor samples are proposed at this property.

Integral, on behalf of the Volunteer, will attempt to obtain access agreements for the off-Site locations. We will attempt to contact each property owner/manager by letter, primarily. If we cannot obtain the necessary access agreements within the timeframe described in the *Schedule* section of this Proposal (below), we will proceed with collecting only those samples from properties where we have written access agreements.

SUB-SLAB DEPRESSURIZATION SYSTEM (SSDS)

The purpose of this section is to present the design process for the anticipated on-Site mitigation measures to reduce soil vapor intrusion. An active Sub-Slab Depressurization System (SSDS) is proposed.

Pilot Test Procedure

A pilot test will be performed to evaluate the conditions of the subsurface as they would inform the design parameters of the SSDS. The pilot test will consist of applying pressure to the subsurface through a drilled hole in the slab, and then measuring the resulting pressure at various distances and directions from the point of applied pressure. The resulting data will be used to evaluate the intrinsic permeability under the slab, the radius of influence of the pilot test fan, and other factors that will inform the design.

Design Criterion

A design criterion of 0.010 inches of water column (inWC) will be utilized for the SSDS design; meaning, the SSDS will be designed to provide a minimum of 0.010 inWC of differential pressure across the slab (vacuum, defined as a lower pressure beneath the slab than above the slab). United States Environmental Protection Agency (USEPA) Radon Mitigation Standards recommend at least 0.004 inWC of pressure differential across the building slab. We will design to a higher pressure differential to add a factor of safety to the

design and to take into account that a radon-type fan operates at lower pressures; however, differential pressure of 0.004 inWC across the slab is acceptable, according to USEPA.

SSDS Layout

The fan models, along with the locations of the fans, will be selected after the evaluation of the pilot test data. The fans will be placed on the roof or on the side of the existing building. The fans will run continuously. No treatment of the exhaust is contemplated at this time.

Screens will be installed at each pressure relief point where the vertical riser penetrates the concrete slab so the pressure relief point can be better accessed. To create a pressure relief point, the existing slab will be cored. The underlying soil (as much is practicable) will be removed. A PVC pipe will be inserted into each pressure relief point and the void space will be filled with 2-3" aggregate (or similar material). The penetration in the slab (or wall) will be sealed with a chemically-resistant sealant such as bituthene liquid membrane. The riser pipes will connect to the SSDS fans mounted on the roof or exterior of the building. The final location of all vertical riser piping and roof mounts will be determined by a Professional Engineer in consultation with the building owner.

SSDS Performance Monitoring

Sub-slab vacuum monitoring points (VMPs) will be used to measure sub-slab differential pressure. The VMPs will be located throughout the building in locations that do not interfere with the usage of the building. Each VMP will consist of a small penetration through the slab. Each VMP will be sealed with chemically-resistant sealant.

Vacuum influence of the SSDS will be measured after installation and system startup. Manual differential pressure measurements will be collected by connecting a digital micromanometer to the VMPs installed throughout the building. Readings above 0.004 inWC are considered acceptable, per USEPA Radon Mitigation Standards.

As an additional measure, U-tube manometers will be installed on each of the riser pipes. The purpose of the manometers is to provide verification that each SSDS fan is operating and to help evaluate performance by comparing screen pressures to VMP pressures.

SCHEDULE

Below is a schedule for the above scope of work. We anticipate completing the field work (excluding SSDS construction) by December 31, 2014. Due to this tight schedule, Integral is assuming that we can proceed immediately upon NYSDEC approval and that no public comment is necessary.

Five days notice will be provided to NYSDEC in advance of field sampling. Based upon current knowledge of the Site, the following schedule, subject to change, is proposed:

Task	Task Duration	Total Duration	Anticipated Completion Date
Submit Proposal to NYSDEC	0 Weeks	0 Weeks	10/24/14 (Complete)
Discussions with NYSDEC; approval of Proposal	4 Weeks	4 Weeks	11/21/14 (In progress)
Supplemental Remedial Investigation			
Mobilization/coordination with Site owner and tenant, as well as adjacent property owners and tenants	3 Weeks	7 Weeks	12/12/14
Perform supplemental remedial investigation (best case, assuming access)	2 Weeks	9 Weeks	12/26/14
Prepare Data Evaluation Report	6 Weeks	25 Weeks	2/6/15
Mitigation Measure			
Perform pilot test (concurrent with mobilization)	1 Week	1 Week	12/12/14
Design SSDS	4 Weeks	5 Weeks	1/16/15
Contract for & Install SSDS	6 Weeks	11 Weeks	2/27/15

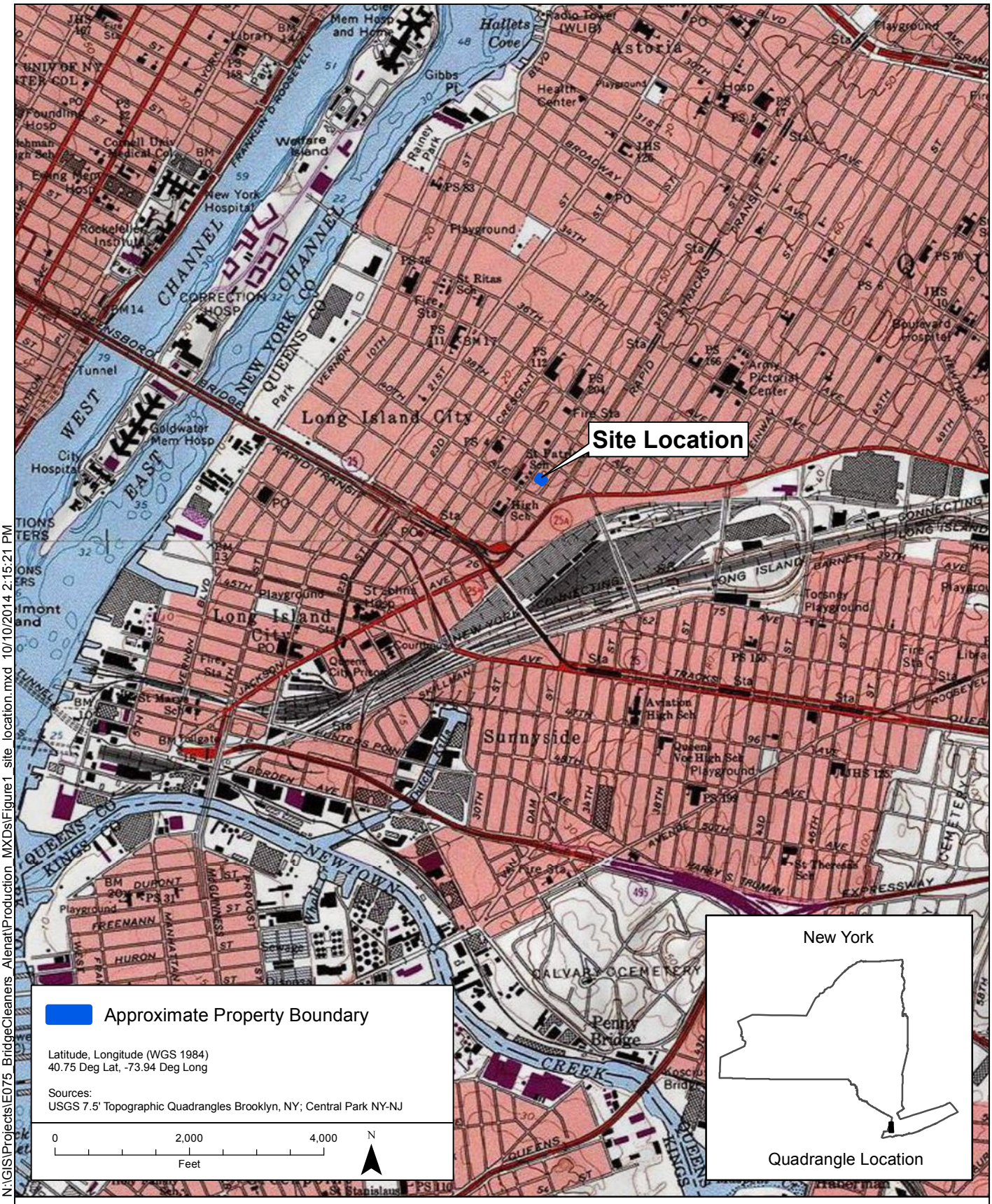
We look forward to discussing this Proposal with you, and to continuing to work with you to bring this Site through the Brownfield Cleanup Program. Please do not hesitate to contact us at (212) 440-6702 if you have questions.

Sincerely,

James L. Esperance
Engineer

Keith P. Brodock, P.E.
Managing Engineer

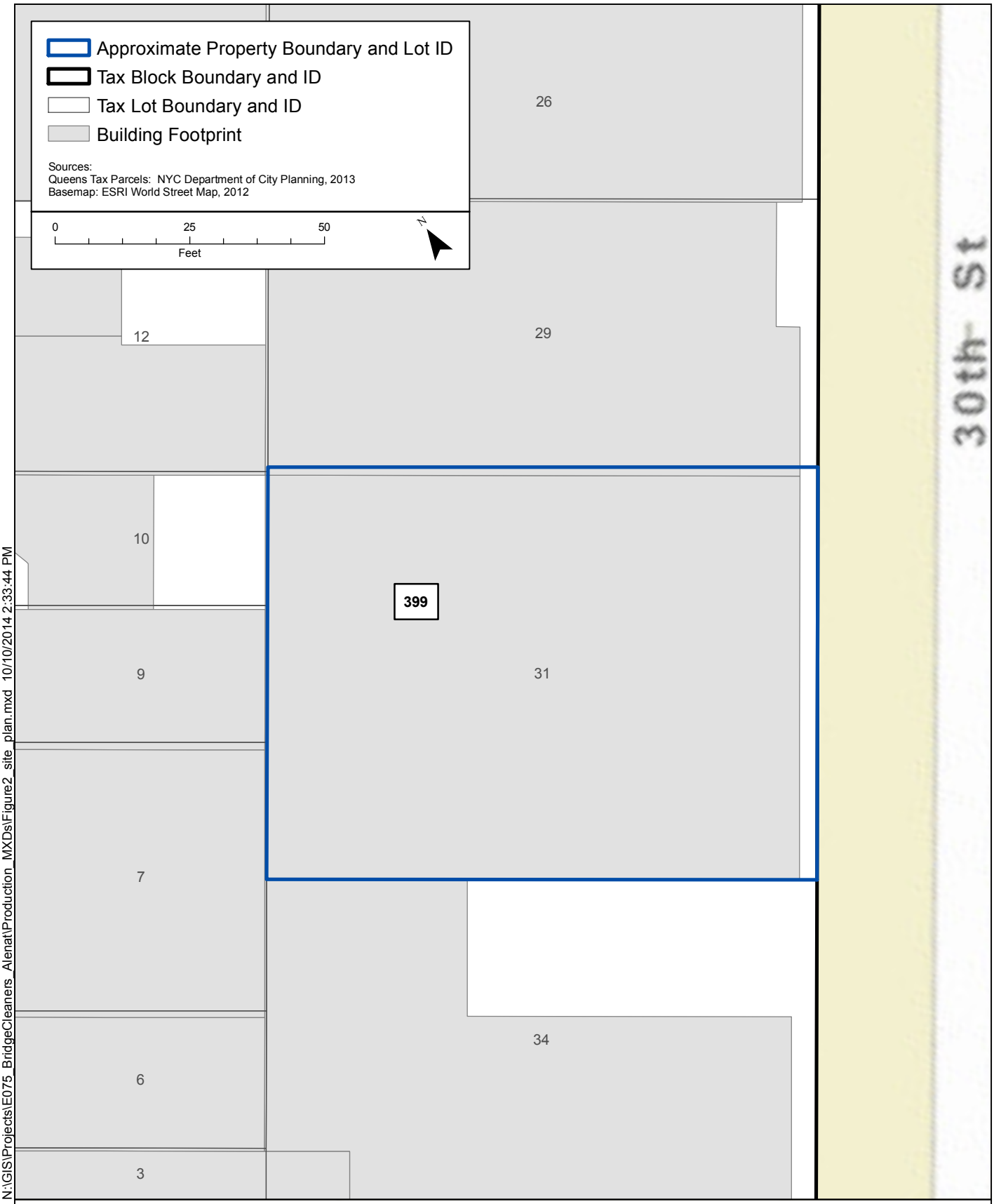
Enclosures



N:\GIS\Projects\E075_BridgeCleaners_Alenat\Production_MXDs\Figure1_site_location.mxd 10/10/2014 2:15:21 PM

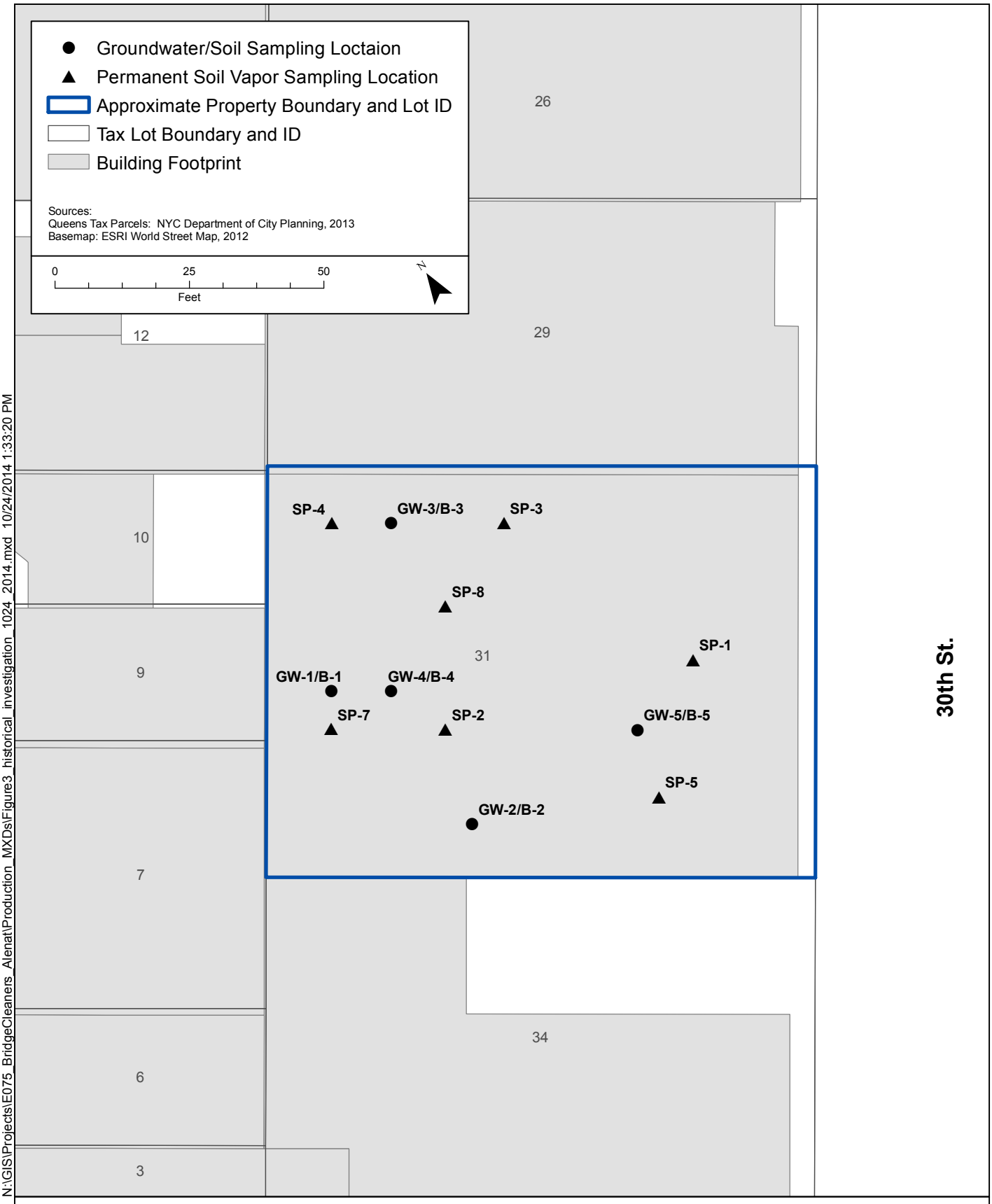
integral engineering p.c.
61 Broadway, Suite 1601
New York, New York 10006
www.integral-corp.com

Figure 1.
Site Location Map
39-26 30th St.
Long Island City, NY



integral engineering p.c.
61 Broadway, Suite 1601
New York, New York 10006
www.integral-corp.com

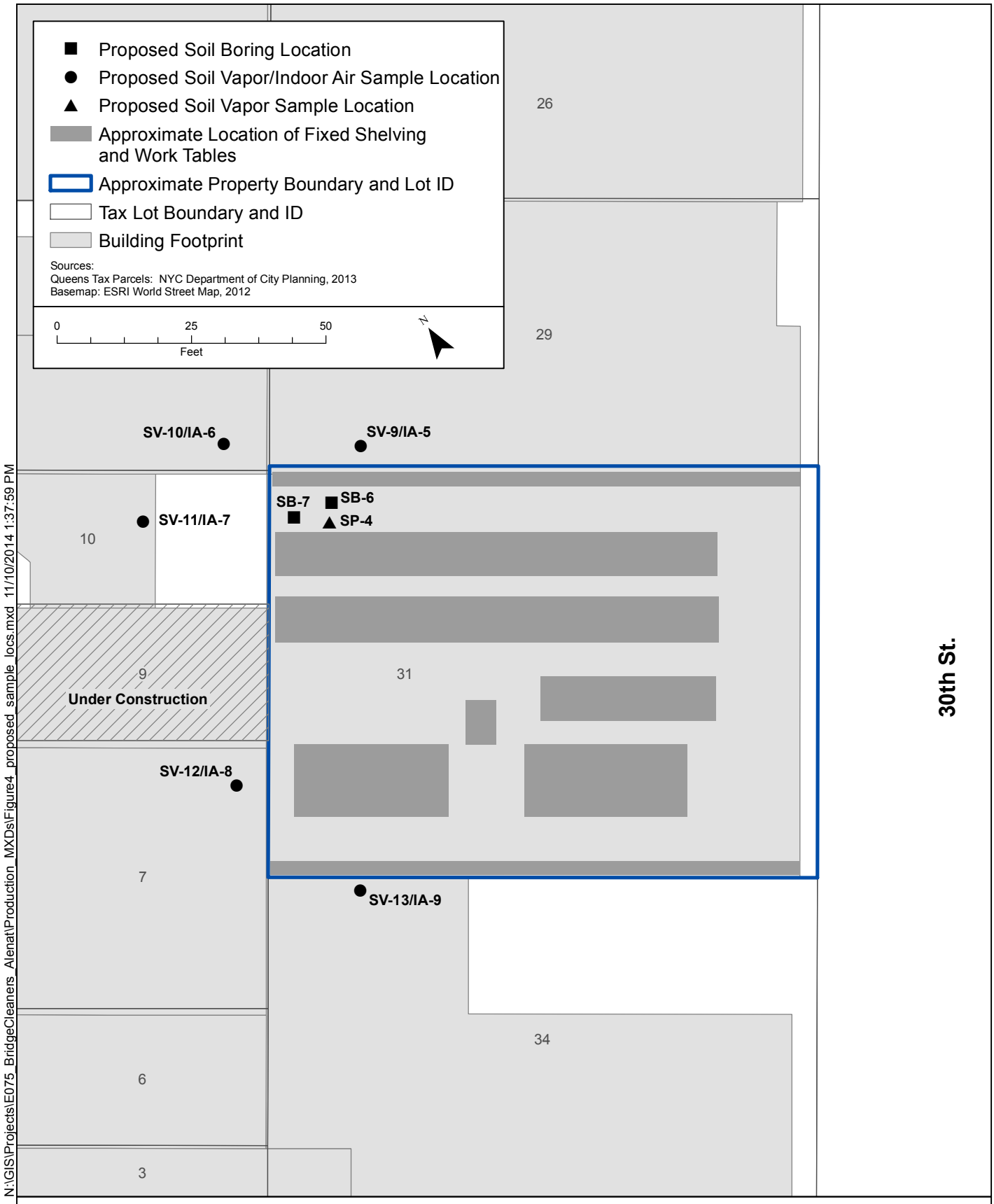
Figure 2.
Site Plan
39-26 30th St
Long Island City, NY



N:\GIS\Projects\E075_BridgeCleaners_Alenat\Production_MXDs\Figure3_historical_investigation_1024_2014.mxd 10/24/2014 1:33:20 PM

integral engineering p.c.
61 Broadway, Suite 1601
New York, New York 10006
www.integral-corp.com

Figure 3.
Historical Investigation Locations
39-26 30th St
Long Island City, NY



integral engineering p.c.
61 Broadway, Suite 1601
New York, New York 10006
www.integral-corp.com

Figure 4.
Proposed Sample Locations
39-26 30th St
Long Island City, NY