Sub-Slab Depressurization System (SSDS) Pilot Test Report

Site:

161-01 – 161-11 29th Avenue
Flushing, NY

Prepared for:

John Procida
C/O Dominick A DeRiso
Dorsey & DeRiso
19-02 Whitestone Expressway, Suite 105
Whitestone, NY 11357

Prepared by:

EnviroTrac Ltd
5 Old Dock Road
Yaphank, NY 11980

June 2020

A Full Service Environmental Consulting and Contracting Firm

Sub-Slab Depressurization System (SSDS) Pilot Study Report
161-01 – 161-11 29th Avenue, Flushing, New York.

PURPOSE

This report is intended to summarize the results of the SSDS pilot study that was conducted by EnviroTrac on May 15, 2020. The purpose of the test was to determine the feasibility of implementing a full scale SSD system as a viable means of mitigation throughout the existing building structure. The results of this study were used to determine the feasibility of each technology, as well as determining the required operating parameters and layout for the selected system. The site consists of six (6) existing two-story buildings, each with a single-story basement.

TECHNICAL SCOPE OF WORK PERFORMED

1. Pilot Test Equipment

For the purpose of the pilot test, EnviroTrac mobilized its mobile SSD system equipment to conduct the study at representative locations. The mobile system consists a regenerative vacuum blower mounted to a mobile steel skid. The test skid also includes a vacuum gauge, inline filter, vacuum relief valve, flow port, sample port, recirculation/fresh air valve, and associated piping and discharge stack. Major system components of the existing SVE system are described below.

Soil Vapor Extraction Equipment:

- Extraction Blower(s)– RadonAway Model #GP-501, Vacuum Blower
  - o Max Flow: 70 SCFM
  - o Max Vac: 4 “H_2O
  - RadonAway Model #HS-5000, Vacuum Blower
  - o Max Flow: 44 SCFM
  - o Max Vac: 35 “H_2O

Additional Test Equipment

- TSI Handheld Air Velocity/Vacuum Meter – Model 8386A
- UEI Digital Manometer – EM201B (0.000 – 20.000 “H2O)

2. Test Zones

To facilitate the test, EnviroTrac installed two (2) 4-inch diameter temporary extraction wells. A 5-inch diameter core drill was used to install a 4-inch diameter schedule 40 PVC pipe that was sealed to the floor slab penetration. The soil immediately below the slab was manually hand cleared in order to install the temporary extraction points. Each temporary extraction well was constructed using 4-inch diameter schedule 40 PVC well screen (20-slot) that extended down into the subgrade soil (~12” bgs) and was fitted with a PVC end cap. Well sand was installed around the well screen up to the elevation of the existing vapor barrier and then sealed with a self-leveling sealant. The well screen was transitioned to solid schedule 40 PVC pipe at the bottom of the existing concrete floor slab with the annulus between the outside of the PVC pipe and the concrete edge sealed with quick setting hydraulic cement. Adequate time was given to allow for the sealant to setup prior to the commencement of the pilot test. The layout of the temporary extraction wells and monitoring points can be seen in Figure 1. Once the temporary points were setup, the mobile test blower was connected to the top of the tested extraction well. For the purpose of the pilot study two (2) temporary extraction points were installed. One within the basement of the building at 161-01 29th Avenue and one within the basement of the building at 161-09 29th Avenue. However, it should be noted that due

to time constraints and soil conditions encountered, only the temporary extraction point installed within the vacant building, located at 161-01 29th Avenue, was utilized for the pilot study.

SSDS TESTING METHODOLOGY

Throughout the pilot study the extraction well was tested at varying operational conditions. Prior to starting the test, a flexible pipe connector was used to mount each of the test blowers to the top of the temporary extraction well riser pipe. In order to monitor the sub-slab vacuum response of the test, several vacuum monitoring points (VPs) were installed through the concrete floor slab, at select locations. The location of each VP was installed radially outward from the text point in 5-foot increments from 5 feet to 20 feet. During the test, the vacuum blower was configured to operate at several different steps of increasing or decreasing flow and vacuum. Throttling of the blower was carried out by adjusting the mobile system piping manifold control valve. During each step, operating parameters such as applied flow, vacuum, and sub-slab vacuum responses were recorded. The applied extraction well flow and vacuum were measured from a monitoring point located in the extraction piping several feet above where the piping penetrates the floor slab.

During each step vacuum influence was recorded from all applicable monitoring points utilizing a handheld digital manometer. For each step the operating conditions were allowed to sufficiently stabilize at a steady state condition prior to the recording of any readings.

PILOT TESTING RESULTS

In order to determine the performance requirements at each of the SSD extraction zones, the pilot test data is used to estimate the effective Radius of Influence (ROI) of each of the test steps of the pilot study. This is typically indicated by a VP measurement of ≥ 0.03 ”H_2O (~7 pascals) vacuum response. During the test it was determined that only a low radius of influence was achievable. This is most likely due to the presence of fine-grained soils that were encountered during the installation of the two (2) test points, which typically do not allow for the unrestricted passage of induced air flow. To compensate for the low permeability of air flow through the underlying soils, a vacuum blower with a higher vacuum rating is usually utilized. In order to achieve complete vacuum coverage of the building footprint, the selected ROI would be used to assist in the layout of the full scale SSD System.

CONCLUSIONS AND RECOMENDATIONS

Based on the results of the pilot study, the pilot testing performed demonstrates that a full scale SSD system can serve as an effective means of mitigation for the existing site building. If a target ROI of 15 feet is selected for each proposed extraction well, and we assume the more stringent result as a more conservative solution, it was determined that a minimum vacuum of 35.0 “H_2O and an air flow rate of ~5 CFM would need to be applied at each extraction wellhead. Appropriate consideration shall be addressed concerning the number and spacing of the extraction laterals. It should be noted that the results of the pilot study data could be extrapolated further to determine required system operational parameters at other selected ROIs, but it is unlikely that more than a 15-foot ROI could be achieved using typical industry standard equipment.

Recommended Design Parameters (each extraction well):

- Target Radius of Influence (ROI): 15 feet
- Applied Vacuum: 35 “H_2O
- Applied Flow Rate: 5 CFM

ATTACHMENTS

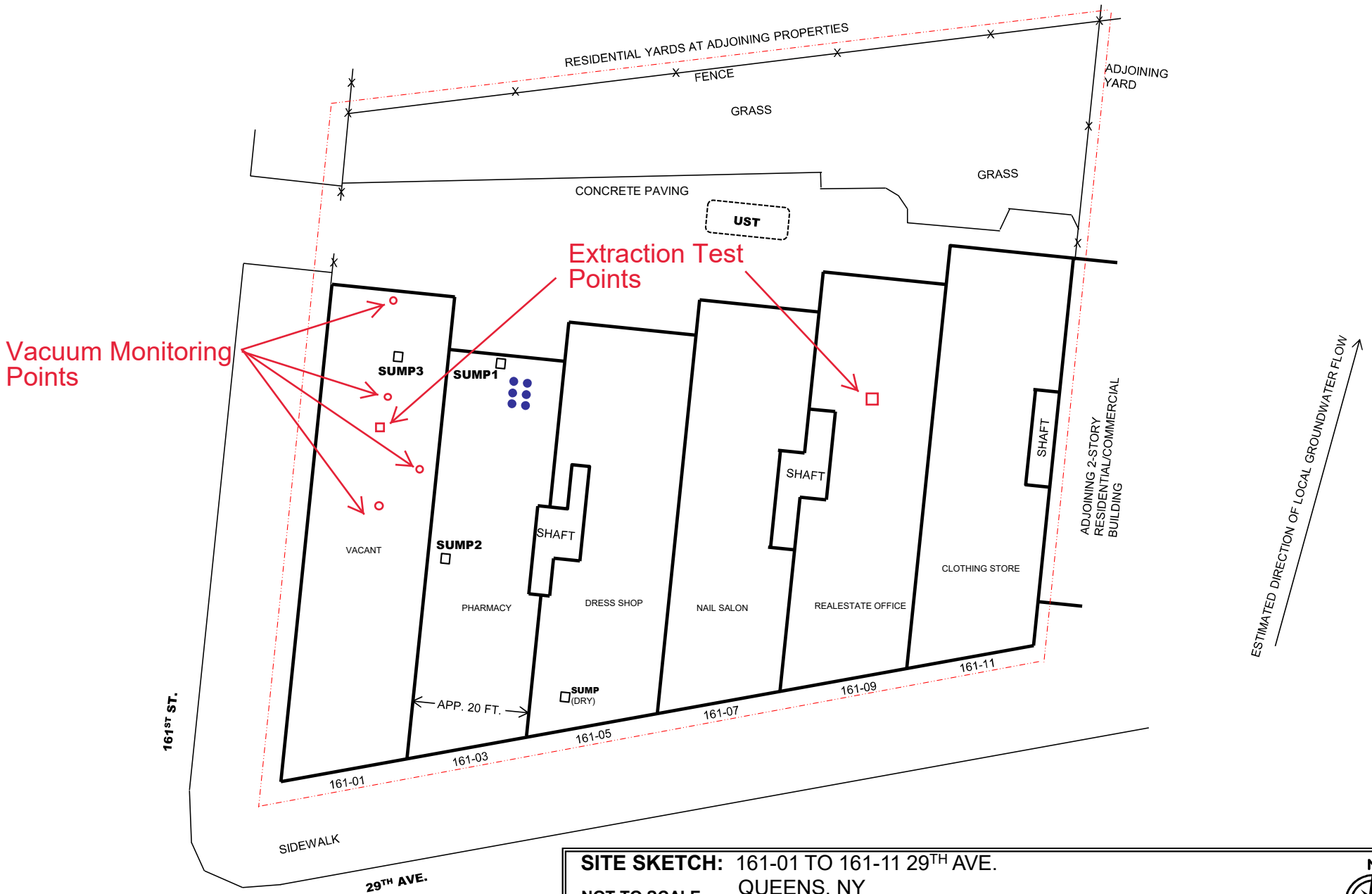
1. Figure 1 – Site Plan with SSDS Test Point Locations

REFERENCES

1. ASTM E1465-08a “Standard Practice for Radon Control Options for the Design and Construction

of New Low-Rise Residential Buildings”
2. New York State Department of Environmental Conservation, (NYSDEC), DER-10 “Technical Guidance for Site Investigation and Remediation”

ATTACHMENTS



SITE SKETCH: 161-01 TO 161-11 29TH AVE.
QUEENS, NY

NOT TO SCALE

PATTERNED LINES ENCLOSE THE SITE

INTERIOR DETAILS ARE APPROXIMATE AND BASED ON OBSERVATIONS ONLY

N

FIGURE 1