SCOPE OF WORK
INSTALLATION OF ACTIVE SUBSLAB DEPRESSURIZATION SYSTEM
NORTH FRANKLIN STREET SITE – SITE ID #8-89-002
VILLAGE OF WATKINS GLEN, NEW YORK
WORK ASSIGNMENT D003825-09.5

Introduction

This scope of work describes the requirements for the installation of a sub-slab depressurization (SSD) system in the 1-story portion of the Seneca Market Building, which is located at 2 North Franklin Street in Watkins Glen, New York. The Seneca Market Building is located above an area impacted by groundwater contaminated with tetrachloroethene (PCE). PCE vapors have been detected beneath the building slab of the 1-story portion of the Seneca Market Building.

Site Description

The North Franklin Street Class 2 inactive hazardous waste site is an approximately 0.3-acre parcel of land situated in the Village of Watkins Glen, Schuyler County, New York. The site is located in an urban area approximately 400 feet south of Seneca Lake, as shown on Figure 1. Two structures currently exist on site (shown on Figure 1). The building referred to as the "Former Auto Museum" is a single-story metal building on a concrete slab. The second structure is referred to as the "Former Dry Cleaning Building." This is a two-story brick building that also includes two unoccupied single-story brick sheds to the east. Both of these buildings have housed a variety of businesses in the past, including a machine shop and dry cleaning operations. A real estate company currently occupies the site. A SSD system is currently in operation at the site.

The Seneca Market Building (2 North Franklin Street) is located approximately 100 feet north of the North Franklin Street site (Figure 1). Two tenants, Seneca Wine Harbor Center and Watkins Glen International, currently occupy the first floor of the Seneca Market Building. An indoor air investigation conducted during the spring of 2005 detected elevated concentrations of PCE in the soil vapor beneath the building slab of the 1-story eastern portion of the Seneca Market Building, which is currently used by the Seneca Harbor Wine Center as a storage room (Figure 2).

System Description

The purpose of the SSD system is to create and maintain a negative pressure below the full extent of the building slab compared to the pressure above the slab. The system shall be of the type typically used in radon mitigation, shall be designed and constructed in accordance with the requirements outlined below, and shall be similar to Figure 3 (not all features specified are shown on the figure). The actual configuration of the suction holes and pipe runs will be determined by the Contractor in the field and as approved by URS. For costing purposes, the following requirements are to be assumed:

- Installation of two to four suction points through the building slab of the 1-story portion of the building.
- Installation of piping runs to carry soil vapor from below the slab through the buildings wall or roof, and to an externally mounted exhaust fan.
- Extension of the exhaust pipe after the fan to above the roof of the 1-story portion of the building.

The Contractor shall initially install two suction points and associated piping in the most effective and convenient locations in the building, in accordance with the on-site representative of URS. Upon completion of installation, the Contractor shall operate the systems for up to one hour. After this period, the Contractor shall drill two small (less than 0.5 inch) pilot holes away from the suction points, at a location in agreement with the on-site representative of URS. The Contractor shall test the vacuum achieved at each test hole using tubing sealed airtight, at the slab and a vacuum meter. A minimum of 1 Pascal (0.004 inches of water column) shall be measured at the two monitoring points. If insufficient vacuum is observed, URS may exercise its option to require the Contractor to install a third suction point and to plumb it into the exhaust system. The pilot hole vacuum testing shall then be re-conducted. At the direction of the onsite URS representative, one additional suction point (for a total of four points) may be required based on the vacuum testing results.

Contractor Requirements:

A site visit to meet with a URS engineer and the building owners representative is mandatory prior to the acceptance to any bids from the Contractor.

A crew shall comprise a foreman, with at least one year's experience in the installation of SSD systems, with laborers as needed to perform the work in a timely manner. The foreman's experience shall be as foreman for SSD system installations. Crews comprised entirely of newly-hired employees, or of workers experienced only as laborers, will not be accepted. The Contractor shall provide documentation of the foreman's experience upon request.

Based on available information, no asbestos is expected to be encountered during the SSD system installation.

The Contractor shall begin system installation no later than two (2) weeks after notification by URS.

General Installation Requirements:

1.0 <u>System Design</u>

1.1 The sub-slab depressurization system shall be designed and installed as a permanent, integral addition to the building.

1.2 The sub-slab depressurization unit shall be designed to avoid the creation of other health, safety, or environmental hazards to building occupants, such as back drafting of natural draft combustion appliances.

1.3 The sub-slab depressurization unit shall be designed to maximize vapor reduction above the slab and in consideration of the need to minimize excess energy usage, to avoid compromising moisture and temperature controls and other comfort features, and to minimize noise.

1.4 The sub-slab depressurization unit and its components shall be designed to comply with the laws, ordinances, codes, and regulations of relevant jurisdictional authorities, including applicable mechanical, electrical, building, plumbing, energy, and fire prevention codes.

2.0 System Installation

2.1 General Requirements

2.1.1 All components of the sub-slab depressurization unit shall be installed in compliance with the applicable mechanical, electrical, building, plumbing, energy and fire prevention codes, standards, and regulations of the local jurisdiction.

2.1.2 The Contractor shall obtain all required local licenses and permits, and display them in the work areas as required by local ordinances.

2.1.3 Where portions of structural framing material must be removed to accommodate vent pipes, material removed shall be no greater than that permitted for plumbing installations by applicable building or plumbing codes.

2.1.4 Where installation of the sub-slab depressurization unit requires pipes or ducts to penetrate a firewall or other fire resistance rated wall or floor, penetrations shall be protected in accordance with applicable building, mechanical, fire, and electrical codes.

2.2 Vent Pipe Installation Requirements

2.2.1 All joints and connections in the sub-slab depressurization system using plastic vent pipes shall be permanently sealed with adhesives as specified by the manufacturer of the pipe material used. Joints or connections in other vent pipe materials shall be made airtight.

2.2.2 Vent pipes shall be fastened to the structure of the building with hangers, strapping, or other supports that will adequately secure the piping. Existing plumbing pipes, ducts, or mechanical equipment shall not be used to support or secure a vent pipe.

2.2.3 Supports for vent pipes shall be installed at least every 6 feet on horizontal runs. Vertical runs shall be secured either above or below the points of penetration through floors, ceilings, and roofs, or at least every 8 feet on runs that do not penetrate floors, ceilings, or roofs.

2.2.4 To prevent blockage of air flow into the bottom of vent pipes, these pipes shall be supported or secured in a permanent manner that prevents their downward movement.

2.2.5 Vent pipes shall be installed in a configuration that ensures that any rainwater or condensation within the pipes drains downward through the vent pipe and into the ground beneath the slab.

2.2.6 Vent pipes shall not block access to any areas requiring maintenance or inspection. Vents shall not be installed in front of or interfere with any light, opening, door, window or equipment access area required by code.

2.2.7 To prevent re-entrainment of vapors, the point of discharge from vents of fan-powered soil depressurization system shall meet all of the following requirements: (1) be above the eave of the roof, (2) be ten feet or more above ground level, (3) be ten feet or more from any window, door, or other opening into conditioned spaces of the structure that is less than two feet below the exhaust point, and (4) be ten feet or more from any opening into an adjacent building. The total required distance (ten feet) from the point of discharge to openings in the structure may be measured either directly between the two points or be the sum of measurements made around intervening obstacles. Whenever possible, the exhaust point should be positioned above the highest eave of the building and as close to the roof ridgeline as possible.

2.2.8 A gate valve shall be installed in the vent pipes at each suction point so that the relative percentage of flow from each suction point can be adjusted.

2.2.9 A manometer shall be installed at each suction point that displays the pressure differential between the inside of the vent pipe and the ambient basement pressure.

2.2.10 Vent pipes shall be labeled to indicate that they are components of a sub-slab depression system.

2.3 Vent Fan Installation Requirements

2.3.1 The vent fan used in the sub-slab depressurization unit shall be designed or otherwise sealed to reduce the potential for leakage of soil gas from the fan housing.

2.3.2 The vent fan system shall be equipped with a warning light that comes on whenever the fan stops running for any reason. The warning light shall be mounted in an easily visible location.

2.3.3 The vent fan shall be sized to provide the pressure difference and airflow characteristics necessary to achieve a net flux of air from above the building slab to beneath the building slab.

2.3.4 The vent fan shall be installed on the exterior of the building.

2.3.5 The vent fan shall be installed in a configuration that avoids condensation buildup in the fan housing. Fans should be installed in vertical runs of the vent pipe.

2.3.6 The vent fan shall be mounted on the exterior of buildings andshall be rated for outdoor use and installed in a watertight protective housing.

2.3.7 The vent fan shall be mounted and secured in a manner that minimizes transfer of vibration to the structural framing of the building.

2.3.8 To facilitate maintenance and future replacement, the vent fan shall be installed in the vent pipe using removable couplings or flexible connections that can be tightly secured to both the fan and the vent pipe.

2.3.9 A moisture bypass fitting designed to allow water condensate in vent pipes above the fan to drain away rather than enter the fan shall be installed on the exhaust vent pipe.

2.4 Suction Pit Requirement for Sub-slab Depressurization Systems

2.4.1 To provide optimum pressure field extension of the sub-slab communication zone, adequate material shall be excavated from the area immediately below the slab penetration point of system vent pipes.

2.5 Sealing Requirement

2.5.1 Openings around vent pipe penetrations of the slab shall be cleaned, prepared, and sealed in a permanent, airtight manner using compatible caulks or other sealant materials. (See paragraph 3.5.) Openings around other utility penetrations of the slab shall also be sealed.

2.5.2 Openings, perimeter channel drains, or cracks that exist where the slab meets the foundation wall (floor-wall joint), shall be sealed with urethane caulk or equivalent material. When the opening or channel is greater than 1/2 inch in width, a foam backer rod or other comparable filler material shall be inserted in the channel before application of the sealant. This sealing technique shall be done in a manner that retains the channel feature as a water control system. Other openings or cracks in slabs or at expansion or control joints should also be sealed. Openings or cracks that are determined to be inaccessible or beyond the ability of the contractor to seal shall be disclosed to the client and included in the documentation.

2.5.3 Openings around vent pipe penetrations of the building wall or roof shall be sealed in a permanent, watertight manner using a waterproof boot and other compatible sealant materials.

2.6 Electrical Requirements

2.6.1 Wiring for the sub-slab depressurization unit shall conform to provisions of the National Electric Code and any additional local regulations.

2.6.2 Wiring may not be located in or chased through the mitigation installation ducting or any other heating or cooling ductwork.

2.6.3 Mitigation fans installed on the exterior of buildings shall be hard-wired into an electrical circuit. Plugged fans shall not be used outdoors.

2.6.4 If the rated electricity requirements of a sub-slab depressurization unit fan exceeds 50 percent of the circuit capacity into which it will be connected, or if the total connected load on the circuit (including the vent fan) exceeds 80 percent of the circuit's rated capacity, a separate, dedicated circuit shall be installed to power the fan.

2.6.5 An electrical disconnect switch or circuit breaker shall be installed in sub-slab depressurization unit fan circuits to permit deactivation of the fan for maintenance or repair by the building owner or servicing contractor.

3.0 Materials

3.1 All mitigation system electrical components shall be U.L. listed or of equivalent specifications.

3.2 The mitigation fan shall be Model HP220 as manufactured by Fantech, or approved equal. The fan shall be capable of providing 193 cfm at 1 inch of water column vacuum.

3.3 As a minimum, all plastic vent pipes in mitigation systems shall be made of Schedule 40 PVC, ABS or equivalent piping material.

3.3 Vent pipefittings in a mitigation system shall be of the same material as the vent pipes. (See paragraph 2.3.7 for exception when installing vent fans).

3.4 Cleaning solvents and adhesives used to join plastic pipes and fittings shall be as recommended by manufacturers for use with the type of pipe material used in the mitigation system.

3.5 When sealing cracks in slabs and other small openings around penetrations of the slab and foundation walls, caulks and sealants designed for such application shall be used. Urethane sealants are recommended because of their durability.

3.6 When sealing holes for plumbing rough-in or other large openings in slabs and foundation walls that are below the ground surface, non-shrink mortar, grouts, expanding foam, or similar materials designed for such application shall be used.

4.0 Post-Mitigation Testing

4.1 After installation, the Contractor shall re-examine and verify the integrity of the fan mounting seals and all joints in the interior vent piping.

4.2 After installation of two suction points, the Contractor shall measure suctions or flows in system piping or ducting to assure that the system is operating as designed. A test of the pressure reduction field extension shall be performed. Upon completion of installation, the Contractor shall operate the system for up to one hour. After this period, the Contractor shall drill two small (less than 0.5 inch) pilot holes away from the suction points, at a location in agreement with the on-site representative of URS. The Contractor shall test the vacuum achieved at each test hole by using tubing sealed airtight at the slab and a vacuum meter. A minimum of 1 Pascal (0.004 inches of water column) shall be measured at this monitoring point. If insufficient vacuum is observed, URS may exercise its option to require the Contractor to install a third suction point and to plumb it into the exhaust system. The pilot hole flow testing shall then be re-conducted. At the direction of the onsite URS representative, one additional suction point (for a total of four points) may be required based on the flow testing results.

4.3 Immediately after installation in buildings containing natural draft combustion appliances, the building shall be tested for back drafting of those appliances. Any back drafting condition that results from installation of the sub-slab depressurization unit shall be corrected before the system is placed in operation.

5.0 Warrantee

5.1 The fan used to power the SSD system shall have a warrantee of at least three (3) years. That warrantee shall be transferred to the owner of the SSD system at the completion of its installation.

5.2 The Contractor shall warrantee its work and materials for a period of one year as specified in Article VIII of the Subcontract Agreement.

6.0 Worker Health and Safety

6.1 The Contractor shall comply with all OSHA, state and local standards or regulations relating to worker safety and occupational vapor exposure.

6.2 In addition to the OSHA and NIOSH standards, the following requirements that are specifically or uniquely applicable for the safety and protection of vapor mitigation workers shall be met:

6.2.1 The Contractor shall advise workers of the hazards of exposure to PCE and the need to apply protective measures when working in areas of elevated vapor concentrations.

6.2.2 The Contractor shall have a worker protection plan on file that is available to all employees and is approved by any state or local regulating agencies that require such a plan. Exception: A worker protection plan is not required for a contractor who is a sole proprietor unless required by state or local regulations.

6.2.3 The Contractor shall ensure that appropriate safety equipment such as hard hats, face shields, ear plugs, respiratory protection, steel-toe boots and protective gloves are available on the job site during cutting, drilling, grinding, polishing, demolishing or other activity associated with vapor mitigation projects.

6.2.4 All electrical equipment used during mitigation projects shall be properly grounded. Circuits used as a power source should be protected by Ground-fault Circuit Interrupters (GFCI).

6.2.5 When work is required at elevations above the ground or floor, the contractor shall ensure that ladders or scaffolding are safely installed and operated.

6.2.6 The Contractor shall ensure that respiratory protection conforms with the requirements in the NIOSH Guide to Industrial Respiratory Protection.

6.2.7 Where combustible materials exist in the specific area of the building where vapor mitigation work is to be conducted, and the contractor is creating temperatures high enough to induce a flame, the contractor shall ensure that fire extinguishers suitable for type A, B, and C fires are available in the immediate work area.

6.2.8 When mitigation work requires the use of sealants, adhesives, paints, or other substances that may be hazardous to health, contractors shall provide employees with the applicable Material Safety Data Sheets (MSDS) and explain the required safety procedures.

7.0 Documentation

7.1 At the completion of the project installation, the Contractor shall provide the URS inspector a brief letter report documenting the installation and including, at a minimum, the following:

7.1.1 The address of the installation and the name of the property owner.

7.1.2 Date and time of the installation.

7.1.3 The crew that performed the installation, including the name of the foreman.

7.1.4 All problems or issues, that may have risen, and their resolution as discussed with URS's representative.

7.1.5 Any problems or issues that will prevent the SSD system from performing adequately.

7.1.6 The results of all system testing.

7.1.7 The number or other identification of the circuit through which the fan is powered.

7.1.8 A drawing on 8½ x 11-inch or larger paper showing the installation with respect to the footprint of the 1-story portion of the Seneca Market Building. The drawing need not be to scale, but shall call out dimensions to major features so as to clearly and accurately describe the system. The drawing shall show the point at which the suction piping penetrates the wall, fan, suction points, electrical wiring, warning/alarm lights, etc. The drawing shall also show monitoring points, cracks sealed, sump pits covered, and all major gas-powered appliances (water heaters, furnaces, driers, etc.).

7.1.9 Provide a copy of the fan warrantee assumable by the building owner.

7.2 URS's inspector will review the submitted letter report, and, if necessary, return it to the contractor for revision. The Contractor shall revise the report as indicated at no additional cost.

Bid Sheet

1. Lump sum cost for the installation of two suction points, a fan and exhaust system, all associated piping and wiring, all additional work, materials and equipment as described in the scope of work, and as required to provide one complete and workable system, including installation and flow testing of two pilot holes, mobilization, demobilization, cleanup, per diem, reporting, and all incidental costs:

   $_____ ; _____dollars and _____ cents
   (numbers) (words) (words)

2. Lump sum cost for the installation of a third suction point, including all associated piping, all additional work, materials and equipment as described in the scope of work, and as required to provide one complete and workable system, including the re-testing of the pilot holes, and all incidental costs:

   $_____ ; _____dollars and _____ cents
   (numbers) (words) (words)

3. Lump sum cost for the installation of a fourth suction point, including all associated piping, all additional work, materials and equipment as described in the scope of work, and as required to provide one complete and workable system, including the re-testing of the pilot holes, and all incidental costs:

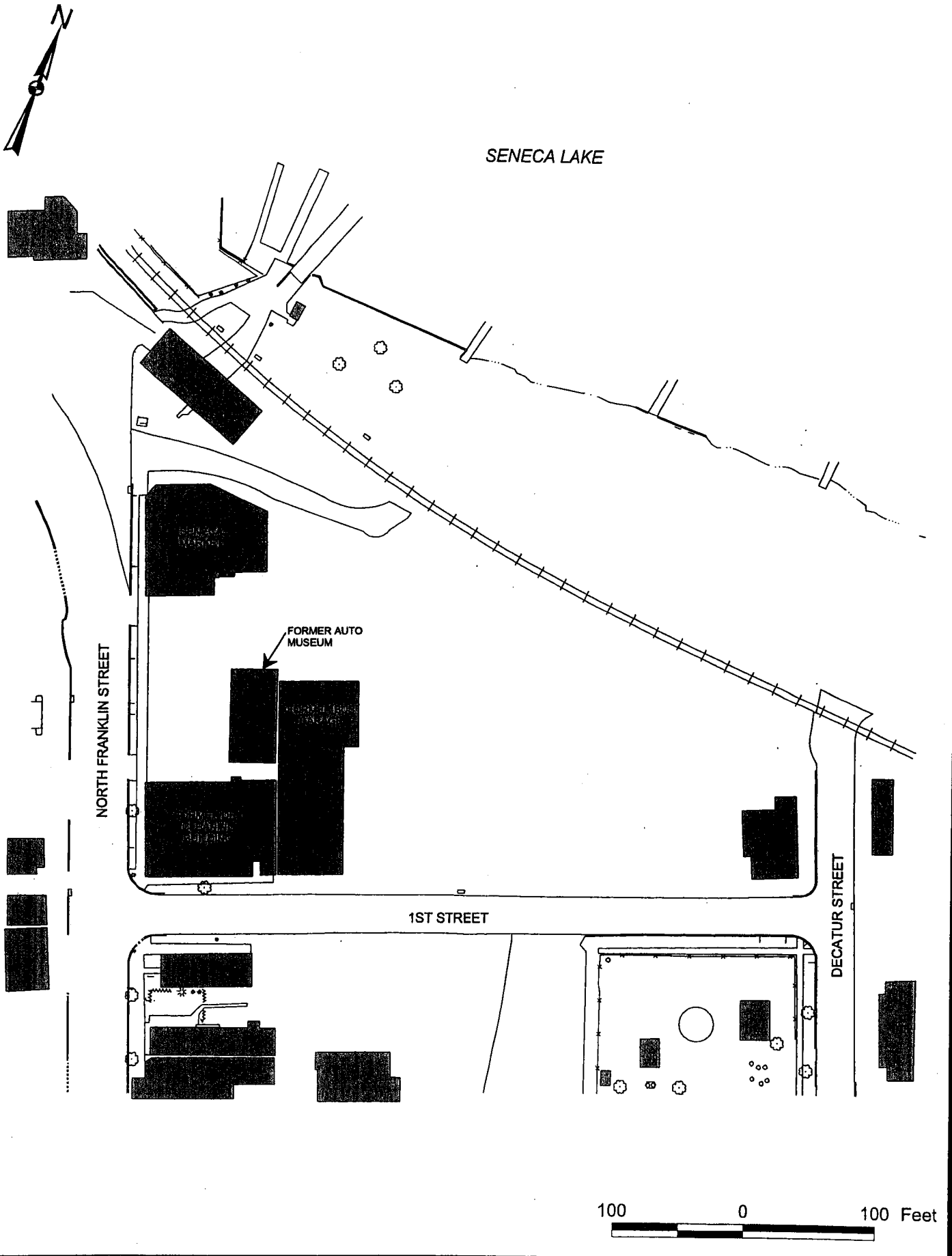
   $_____ ; _____dollars and _____ cents
   (numbers) (words) (words)

_____
Company Name

_____
Signature

_____
Name/Title

_____
Date



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NORTH FRANKLIN STREET
PROJECT SITE

FIGURE 1

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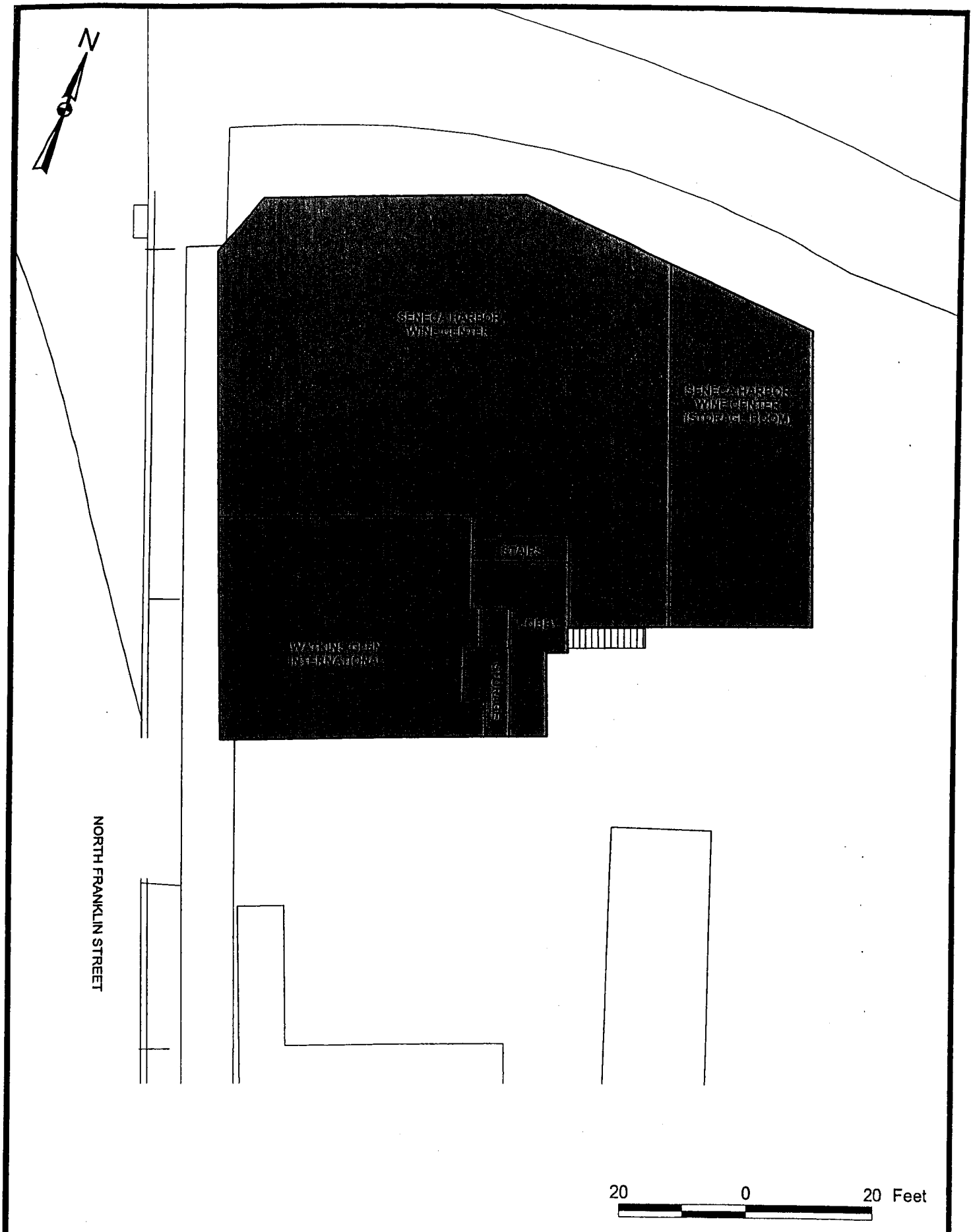
5/6/2005



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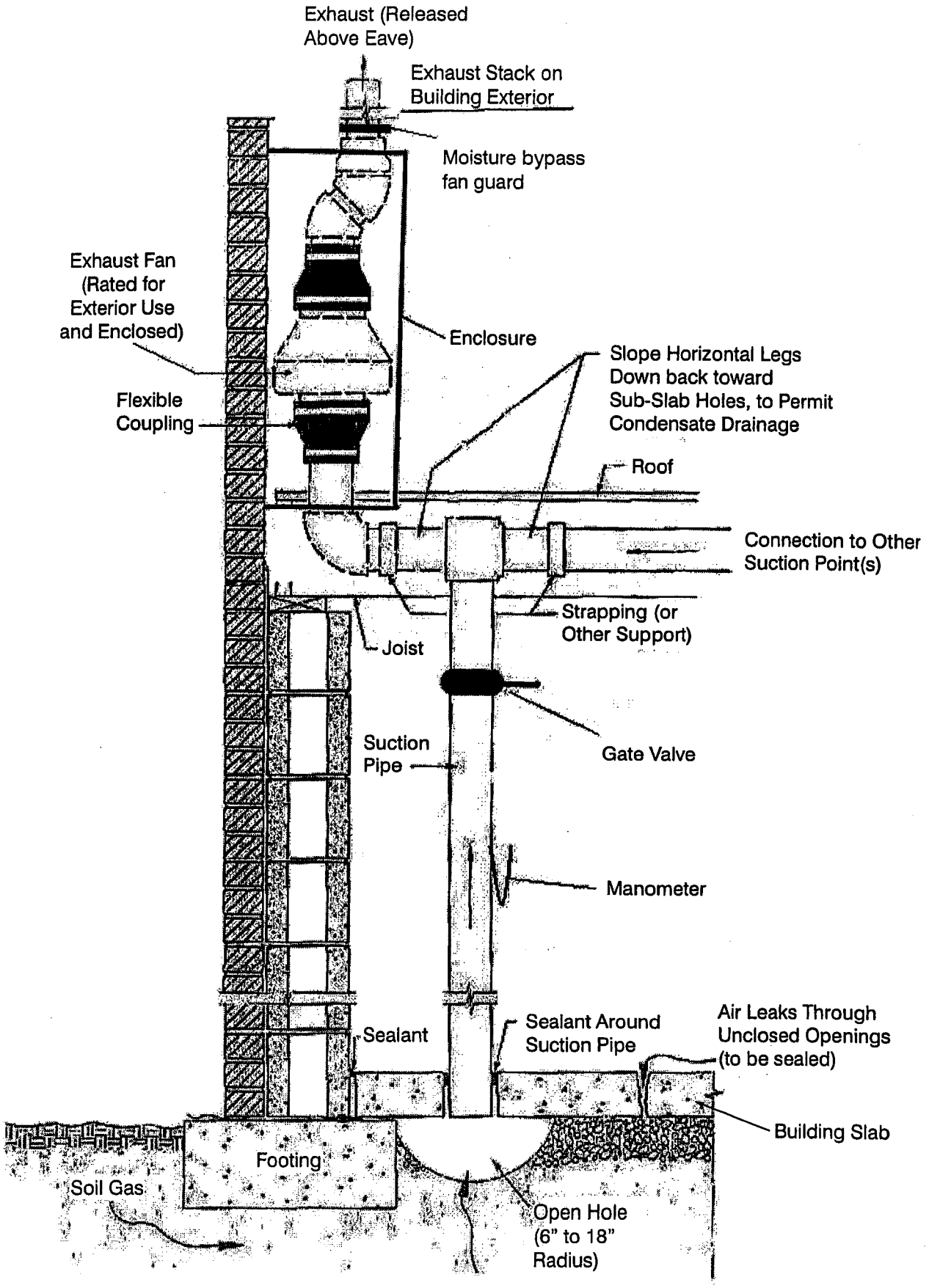
SENECA MARKET BUILDING
2 NORTH FRANKLIN STREET

FIGURE 2

N:\11173258.00000\DB\GIS\DEC2000\n_franklin.apr SENECA MARKET BUILDING
7/26/2005



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TYPICAL DEPRESSURIZATION VENT AND EXHAUST PIPING

FIGURE 3

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