BENCHMARK
ENVIRONMENTAL
ENGINEERING &
SCIENCE, PLLC

May 18, 2018

Mr. David P. Locey
Project Manager
New York State Department of Environmental Conservation
Division of Environmental Remediation, Region 9
270 Michigan Avenue
Buffalo, New York 14203-2999

Re: Work Plan for Active Subslab Depressurization System (ASD) Installation
Hurondel Site
73-79 W. Huron Street, Buffalo, NY 14202
BCP Site No. C915282

Dear Mr. Locey:

Per our recent discussions, we are herein submitting this Work Plan to convey plans for installation of an Active Subslab Depressurization (ASD) system within the existing building located on the above-referenced Brownfield Cleanup Program (BCP) Site. This work is being undertaken pursuant to the NYSDEC-approved (November 2017) Site Management Plan (SMP), which requires that measures to address subslab vapor concerns be undertaken if a vadose zone develops beneath the basement floor slab. As further discussed below, redevelopment plans will raise the current basement floor elevation. This is expected to result in an unsaturated zone within the aggregate beneath the new slab.

General

An ASD system creates a negative pressure zone beneath a building slab using a powered fan connected to a vapor extraction system beneath the building floor. The extraction system is typically comprised of perforated piping or aggregate-filled suction pits. When in operation the extraction system causes vapor present in the sub-slab to migrate toward the extraction network, where it is conveyed and emitted to location above the roof of the building. The negative pressure field prevents contaminated soil gas from entering the building. Generally, essential components of an ASD include:

- The sub-base aggregate beneath the slab.
- Extraction points installed beneath the slab at strategic locations across the building structure.
- A vent stack pipe from the extraction point(s) under the slab to above the roof away from HVAC intakes.

- A continuous operation fan equipped with a pressure gauge indicating the system is under negative pressure.
- Sealing of all major slab and foundation penetrations, including joints, cracks and utility and pipe penetrations.

The ASD system employed for this project will be designed in general accordance with the EPA design document entitled "Radon Prevention in the Design and Construction of Schools and Other Large Buildings" Third Printing with Addendum, June 1994 and the NYSDOH "Guidance for Evaluating Soil Vapor Intrusion in the State of New York" dated October 2006. The design incorporates multiple extraction legs, each of which will be tied to a vertical piping vent stack and manifolded to one of two exhaust fans. A warning device will be installed on both manifolds to facilitate vacuum loss detection. Additional detail concerning the system design and installation is presented below.

Please be advised that the subject work is expected to generate some excess soil/fill from beneath the building floor to accommodate new stairwell foundations and new sump pits and will involve import of aggregate materials. Benchmark will provide professional oversight during these activities and will assist our client in maintaining SMP compliance, including proper management of excavation spoils, treatment and discharge of excavation water under an industrial discharge permit issued by the Buffalo Sewer Authority, and issuance of approval requests to the Department for imported of aggregate materials per NYSDEC DER-10 requirements.

Floor Slab Modifications

The existing basement floor slab and sump will be abandoned, and a new slab will be poured for structural and architectural purposes. In general, the existing slab will be broken up in place to assure any settlement pockets that may exist beneath the slab are identified and addressed. A new layer of washed stone aggregate will then be placed over the former floor along with an underdrain piping network leading to new sealed sump pits. Sub-slab sanitary piping servicing basement lavatories will also be directed to sealed sewage ejector sumps. Separate ASD extraction piping will be placed at the approximate locations shown on drawing P-100, attached. The piping will be comprised of 4" diameter perforated PVC with solid risers strategically located within planned interior partition walls for connection to the above-grade extraction system.

A new floor slab comprised of alternating sections of 18" and 12" reinforced concrete will be poured. The floor will be underlain by a 2" sand or insulation layer and a minimum 6-mil poly vapor barrier. After curing, all floor slab gaps will be sealed with polyurethane sealant. Temporary vacuum measurement points (6 total) will be installed at the approximate locations shown on drawing P-100 (see note 11).

ASD Extraction Piping

Each of the extraction piping risers will be connected to solid Schedule 40 PVC piping that will transition to one of two 6" PVC manifolds. Both manifolds will run through the interior of the building and will daylight above the roof line a minimum of 25 feet from any air intake or window (see Detail 6 on sheet P-501, attached). An appropriately sized continuous duty in-line fan (Radonaway GP-51 or equivalent) will be installed on each manifold to produce a negative pressure in the sub-slab aggregate. A magnehelic gauge having a differential pressure rating equivalent or greater than the fan vacuum rating will be installed on each manifold riser in the basement. The magnehelic gauges will measure the instantaneous negative pressure produced by the in-line fans and will indicate that the system is operational. All extraction system components will be installed by a professional mechanical/plumbing contractor and visually inspected by Benchmark personnel during installation.

Post-Installation Confirmation Testing

The ASD System will be tested to determine the system's effectiveness and proper installation. The following steps will be performed and documented.

- The ASD system fans will be energized, and magnehelic gauge readings will be recorded approximately 4 hours after initial system start-up. Another reading will be taken and recorded after approximately 1 week of operation to check if significant change in pressure readings is observed relative to the initial operating vacuum. If there is a significant vacuum difference from the initial readings, additional inspections and/or troubleshooting will be necessary.

- A field test will be conducted to confirm the negative pressure created beneath the slab. With the ASD system operating, the vacuum measurement port bolts will be removed and a threaded barbed fitting will be installed. Vacuum will be measured at each of the six locations using a handheld digital micro-manometer or comparable instrument. If adequate depressurization is not measured at each point (-0.001 inches of H2O or less), troubleshooting will be performed as described below.

Troubleshooting

Troubleshooting of the ASD system, if needed, will involve:

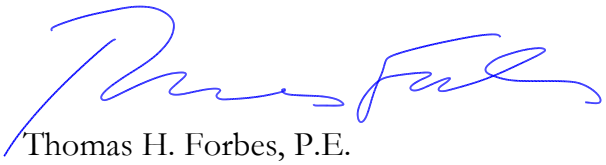
- Confirmation of fan operation
- Verification that extraction points are not plugged/fouled or flooded
- Inspection and repair of loose fittings or separated extraction pipe joints
- Re-sealing of all major entry routes and penetrations (if necessary)
- Replacement/upsizing of fans with higher vacuum ratings

Reporting

A report documenting the installation work and the results of the startup testing detailed above will be prepared and submitted to the NYSDEC along with an SMP addendum. The SMP addendum will describe the ASD system and will include procedures for routine monitoring of the ASD manometers by school maintenance staff, who will perform the monitoring in concert with routine HVAC system checks. Following acceptance the report the vacuum measurement points will be permanently sealed.

Please contact us if you have any questions or require additional information.

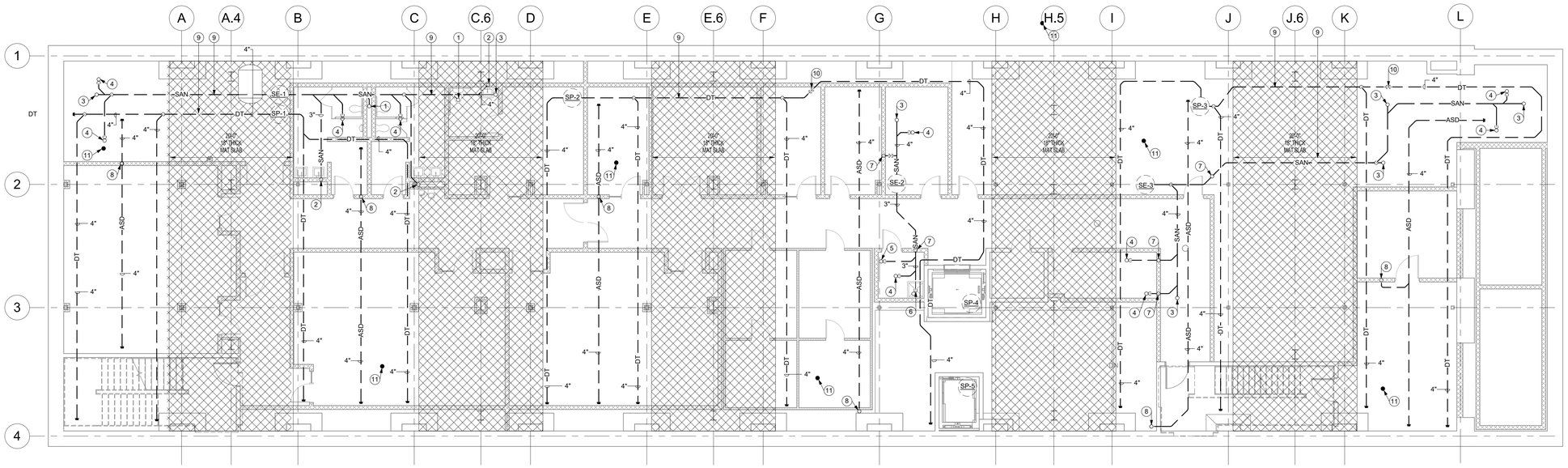
Sincerely,
Benchmark Environmental Engineering & Science, PLLC



Thomas H. Forbes, P.E.
Principal Engineer

ec: J. Jerge
M. Croce
T. Mekus (McGuire)
R. Knoer (The Knoer Group)

FIGURES/DRAWINGS



FOUNDATION FLOOR PLAN - PLUMBING

SCALE: 1/8" = 1'-0"

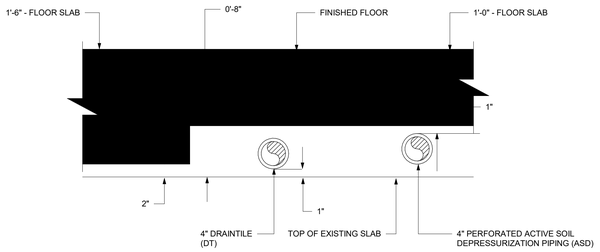
1 P100

N

0' 8' 16' 32'

P100 DRAWING NOTES

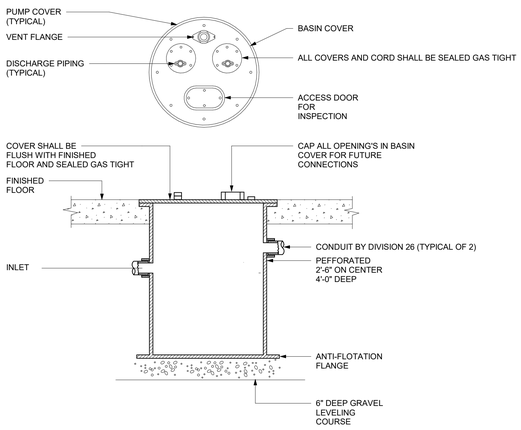
1 4" SANITARY UP TO 1'-0" AFF.
2 3" SANITARY UP TO 1'-0" AFF.
3 4" SANITARY UP TO DPCO.
4 3" SANITARY UP TO FD.
5 4" SANIITARY UP TO SAFE WASTE.
6 3" SANITARY UP TO MB.
7 2" VENT UP TO 1'-0" AFF.
8 4" ACTIVE SOIL DEPRESSURIZATION BRANCH UP TO 1'-0" AFF.
9 INSTALL PIPING BENEATH MAT SLAB.
10 OFFSET PIPING TO RUN BENEATH MAT SLAB.
11 VACUUM PORT LOCATIONS, REFER TO DETAIL 7/P100, THIS SHEET, FOR INSTALLATION DETAIL.



FOUNDATION PIPING DETAIL

SCALE:NOT TO SCALE

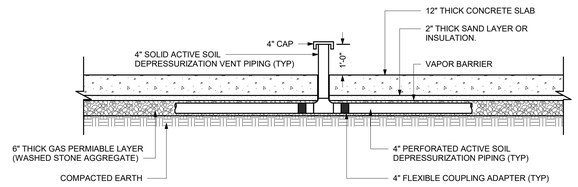
2 P100



SUMP PUMP/SEWAGE EJECTOR BASIN

SCALE:NOT TO SCALE

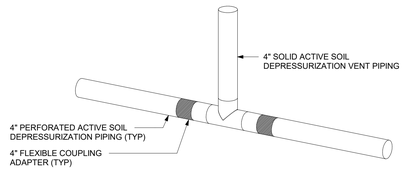
3 P100



UNDER SLAB PIPING DETAIL

SCALE: 1/8" = 1'-0"

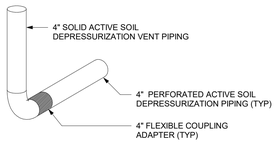
4 P100



VERTICAL SUCTION PIPE ASSEMBLY DETAIL

SCALE: 1/8" = 1'-0"

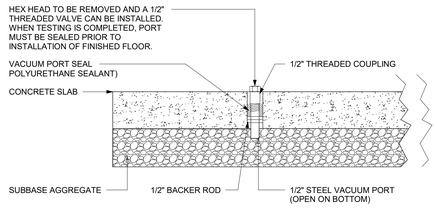
5 P100



OFFSET VERTICAL SUCTION POINT PIPE ASSEMBLY DETAIL

SCALE: 1/8" = 1'-0"

6 P100



VACUUM PORT DETAIL

SCALE: 1/8" = 1'-0"

7 P100

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BID PACKAGE 4: CORE & SHELL

FOUNDATION FLOOR PLAN - PLUMBING

AS NOTED (SCALE:)	
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ESC (CHECKED BY:)	NO. / DATE / REVISIONS:
2017066.00 (PROJECT NO.)	05/16/2018 (DATE:)

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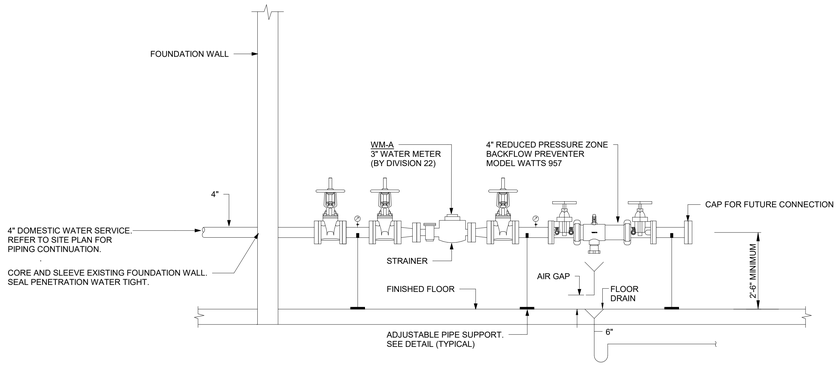


DETAIL NOTES:

A. PROVIDE PROPER SUPPORTS FOR BACKFLOW PREVENTERS, WATER METER AND PIPING.

B. PROVIDE CALIBRATED WATER METER. REFER TO SPECIFICATIONS FOR FURTHER INFORMATION.

C. PROVIDE 8" CLEARANCE BEHIND BACKFLOW PREVENTERS, 1'-0" ABOVE AND 2'-6" CLEARANCE IN FRONT OF DEVICES.

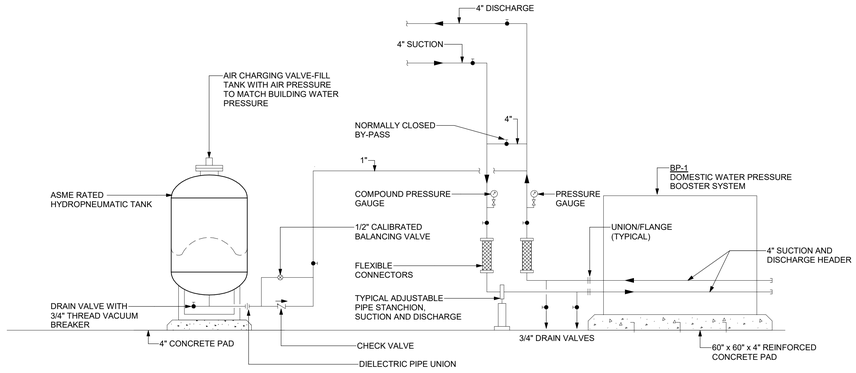
D. PAINT SUPPORTS WITH ONE (1) PRIMER AND TWO (2) FINISH COATS OF COLOR AS SPECIFIED.

E. PROVIDE LENGTHS OF STRAIGHT PIPE UPSTREAM AND DOWNSTREAM OF METER AS RECOMMENDED BY MANUFACTURER.

DOMESTIC WATER SERVICE DETAIL

SCALE: 1/8" = 1'-0"

1 P501



DETAIL NOTES:

A. MOUNT BOOSTER SYSTEM ON NEOPRENE AND CORK VIBRATION PADS.

B. INTERLOCK BOOSTER SYSTEM CUT-OFF PROBE WITH BOOSTER SYSTEM SAFETIES.

C. PIPE 1/2" THERMAL RELIEF VALVE TO FLOOR DRAIN.

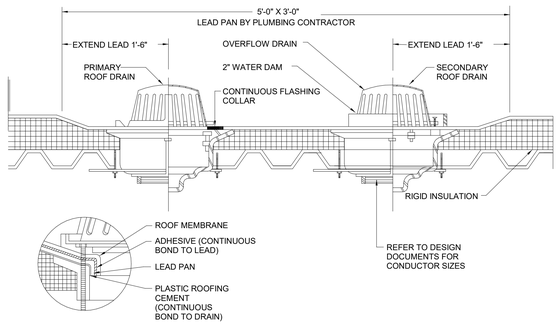
D. INSULATE SUCTION AND DISCHARGE HEADER.

E. BOOSTER PUMP SYSTEM REPRESENTATIVE SHALL FIELD CALIBRATE BALANCING VALVE.

DOMESTIC WATER BOOSTER SYSTEM

SCALE:NOT TO SCALE

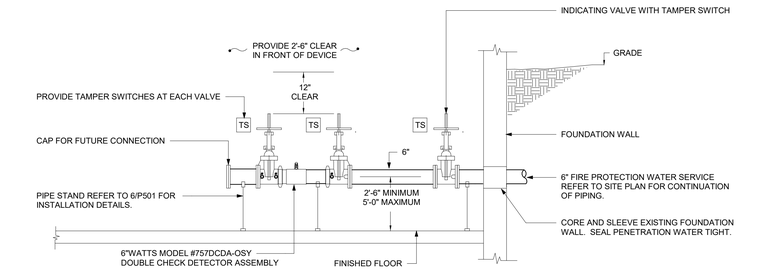
2 P501



PRIMARY AND SECONDARY ROOF DRAIN DETAIL

SCALE:NOT TO SCALE

3 P501



DETAIL NOTES:

A. REFER TO FLOOR PLANS FOR LOCATION OF FIRE PROTECTION SERVICE ENTRANCE.

B. ALL COMPONENTS SHALL BE PROVIDED IN ACCORDANCE WITH NFPA 13, LOCAL AUTHORITIES HAVING JURISDICTION AND COMPONENTS MANUFACTURERS. CONTRACTOR FOR ELECTRICAL WORK WILL WIRE ALARM, TAMPER SWITCHES, PRESSURE AND FLOW SWITCHES. COORDINATE ELECTRICAL CHARACTERISTICS OF DEVICES WITH CONTRACTOR FOR ELECTRICAL WORK.

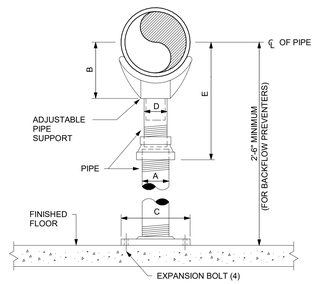
C. PROVIDE PROPER PIPE SUPPORTS. PAINT WITH ONE (1) COAT OF PRIMER AND TWO (2) FINISH COATS OF GLOSS BLACK PAINT. CONTRACTOR SHALL ALSO REPAINT ANY PORTIONS OF PIPING SYSTEM DISTURBED BY CONSTRUCTION - MATCH EXISTING PAINT COLORS AS REQUIRED.

FIRE PROTECTION WATER SERVICE ENTRANCE

SCALE: 1/8" = 1'-0"

5 P501

PIPE SIZE	A	B	C	D	DIMENSION E	
					MINIMUM	MAXIMUM
4"	3"	4 3/16"	9"	2 1/2"	9 1/4"	1'- 2"
6"	3"	5 7/16"	9"	2 1/2"	10 1/2"	1'-3 1/4"



ADJUSTABLE PIPE SUPPORT DETAILS

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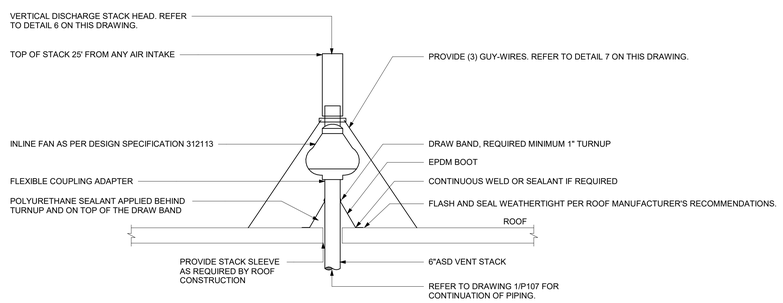
4 P501



ACTIVE SOIL DEPRESSURIZATION FAN DETAIL

SCALE: 1/8" = 1'-0"

6 P501

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