DRAFT

Remedial Design Basis Report – Soil Vapor Extraction and Vapor Intrusion Mitigation

Prepared for

General Electric Company

Bay Shore, New York

May 12, 2015

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This is a draft and is not intended to be a final representation
of the work done or recommendations made by Brown and Caldwell Associates.
It should not be relied upon; consult the final report.

Brown and Caldwell Associates

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CERTIFICATION STATEMENT

I, Marek Ostrowski, certify that I am currently a NYS registered professional engineer and that this Remedial Design Basis Report was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the Division of Environmental Remediation (DER) Technical Guidance for Site Investigation and Remediation (aka DER-10) and that all activities were performed in full accordance with the DER-approved work plan and any DER-approved modifications.

_____ _____

Marek Ostrowski, P.E.
N.Y.P.E. License Number 073661

Date

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List of Abbreviations

cfm	cubic feet per minute
GE	General Electric
IWC	inches water column
NYSDEC	New York Department of Environmental Conservation
PDI	Pre-Design Investigation
PVC	Polyvinyl chloride
RWP	Remedial Work Plan
SSDS	Sub-Slab depressurization
SVE	Soil Vapor Extraction
VI	Vapor Intrusion
VOC	Volatile Organic Compound
VPGAC	Vapor-Phase Granular activated carbon

Section 1

Introduction

The approved Remedial Work Plan (RWP, BC, January 2015) denotes the selected site remedy for the Former Baron Blakeslee Property (Site) in Bayshore, New York. The approved remedy consists primarily of a soil vapor extraction (SVE) system focused on the known areas if Volatile Organic Compound (VOC) impacts in the unsaturated soils beneath the existing building at the facility. The primary objective of the SVE system is to remediate VOC concentrations in soil to levels that meet the 6 NYCRR Part 375-6 Soil Cleanup Objectives for Restricted Residential use. It is also the intention of the SVE system to mitigate potential soil vapor intrusion (VI) by achieving adequate sub-slab vacuum beneath the entire building footprint.

This remedial design report describes the VI remedy and the procedures for verifying that the SVE system is adequately mitigating VI under the entire building. If needed as a contingency, a supplemental sub-slab depressurization system (SSDS) will be installed to achieve adequate sub-slab vacuum under the remaining portions of the building footprint to mitigate potential soil VI. This remedial design report also includes the SSDS design to supplement the SVE system, if warranted.

This report is presented to New York State Department of Environmental Conservation (NYSDEC) for its approval of the selected remedy at the site. Construction of the remedial system is anticipated to begin in July 2015.

Section 2

Remedial Design - Soil Vapor Extraction System

SVE technology will be implemented to remove contaminants from the impacted, unsaturated soils beneath the building sub-slab while also providing an influence on sub-slab vapors in order to meet the VI mitigation goals. The SVE system will be designed to achieve a vacuum in the sub-slab zone that is measured as 0.004 inches water column (IWC) differential pressure between the sub-slab unsaturated zone and the building interior to ensure mitigation of VI pathways to the building.

2.1 Soil Vapor Extraction System Components

The elements of the SVE system will be designed based upon the results of SVE testing activities performed on March 6, 2014 and described in the RWP. Additional diagnostics testing may also contribute to both the design of the SVE system and the design of a supplemental SSDS. The diagnostics testing will extend to areas of the building footprint not previously examined.

Based on the pre-design evaluation, the SVE system is expected to consist of five extraction wells. It is anticipated that the flow from each SVE well will be up to 50 cubic feet per minute (cfm) at an applied vacuum of up to 5 IWC.

The SVE wells are anticipated to be 4-inch diameter Schedule 40 polyvinyl chloride (PVC). The screens will be approximately 5 feet long, 0.010-inch slot size, installed with the top of the screen at 2 feet below the bottom of the floor slab. Each SVE well will be equipped with a vacuum gauge to monitor vacuum, a valve for flow (throttling) control and isolation, and a sampling port. Laterals from each well will be equipped for flow measurement. Refer to Figure 1 for a preliminary design of the SVE system layout.

An existing SVE trailer is scheduled for utilization at the site; to be powered by the facility's existing electrical infrastructure. SVE wells will be piped to the trailer's enclosed SVE blowers and related accessories. The trailer will discharge via a PVC stack provided with temporary vapor-phase granular activated carbon (VPGAC) treatment prior to discharge. The discharge piping will terminate above the facility roof with a tee fitting for horizontal discharge.

2.2 Performance Monitoring

Two types of subsurface monitoring points will be installed to assess the performance of the SVE system and VI mitigation: 1) soil vapor monitoring wells; and 2) sub-slab vacuum monitoring points. Soil vapor monitoring points will be installed to assess vacuum within the impacted unsaturated soil areas. Sub-slab monitoring points will allow for assessment of the areal extents of the VI mitigation effort.

2.2.1 Soil Vapor Monitoring Wells

Soil vapor monitoring wells will be installed within the impacted areas to provide the following SVE data:

- measure vacuum in the unsaturated zone; and

- provide information on the VOC concentrations in the soil vapor.

Together with the system flow and mass removal information, the data will be used to adjust the SVE system operation and to monitor the progress of the remediation of the unsaturated zone soils.

The soil vapor monitoring wells will be installed with flush-mounted road boxes and equipped with a barbed bass fitting connection to measure vacuum with a manometer and/or collect soil vapor samples, as shown on Figure 2. The proposed SVE wells and the existing wells installed during the Pre-Design Investigation (PDI) for the purpose of the SVE test may be used as soil vapor monitoring points.

2.2.2 Sub-Slab Vacuum Monitoring Point

Sub-slab vacuum monitoring points will be placed on a grid throughout the building as shown on Figure 1 to indicate the extent of the sub-slab depressurization zone by providing the data on the differential pressure between the sub-slab space and the interior of the building.

The sub-slab vacuum monitoring points will also be flush-mounted to the existing floor slab and equipped with a port to measure differential pressure with a gauge as illustrated on Figure 2.

2.3 Vapor Intrusion Mitigation

The preliminary evaluation of the SVE equipment and PDI data indicates that SVE may achieve the goal of sub-slab depressurization under a substantial portion of the building footprint. The influence of the SVE system will be evaluated during the additional diagnostics testing, as well as following construction and during subsequent operation as described in Section 2.2. The data will be evaluated to determine the need (if any) for a supplemental SSDS. A contingency for the implementation of additional SSDS in the areas outside the influence of the SVE system is presented in Section 3.

Section 3

Remedial Design Contingency for Additional VI Mitigation – Sub-Slab Depressurization System

This section describes the SSDS, a supplemental method to establish adequate sub-slab vacuum under the entire building until soil vapor conditions no longer create a potential for VI. If areas of sub-slab differential pressure measured at less than 0.004 IWC are identified with the implementation of the SVE system, a SSDS system will be installed in these areas to meet the VI mitigation goals.

3.1 Sub-Slab Depressurization System

The SSDS will be designed and implemented to achieve adequate sub-slab vacuum throughout portions of the building footprint outside of the influence of the SVE system through the use of additional sub-slab extraction points. The additional extraction points will be located as necessary within the building footprint.

The SSDS extraction points will be core drilled through the building slab for depressurization of the spaces immediately beneath building slab. Small pits will be provided beneath the slab penetrations by removing quantities of soil or gravel to create an approximate 12-inch diameter extraction zone. Screened PVC risers will be installed at the extraction points with the slab penetrations sealed at the soil / slab interface to prevent air leakage. The PVC extraction piping will manifold to a blower fan mounted on the exterior of the building to extract soil vapors. The SSDS will discharge directly to the atmosphere.

Detailed design of the SSDS will be developed during the pre-construction work phase with data collected during the diagnostic testing. SSDS system development will include identification and sealing of all existing sub-slab vapor leakage points.

The SSDS may also include accommodations for future enhancements to maintain the sub-slab vacuum conditions required for VI mitigation beyond the SVE's functional period, if needed.

Section 4

NYSDEC Approval

This report is presented to NYSDEC for review and approval under General Electric's (GE's) Brownfield Cleanup Agreement. This Design Basis Report acknowledges that the SVE system, or a combination of the SVE system and an SSDS, will mitigate potential soil VI by achieving adequate sub-slab vacuum under the entire building footprint. The methods and materials for the construction of the SVE system, measuring sub-slab vacuum, and the construction of an SSDS are presented.

NYSDEC approval of this design report is requested.

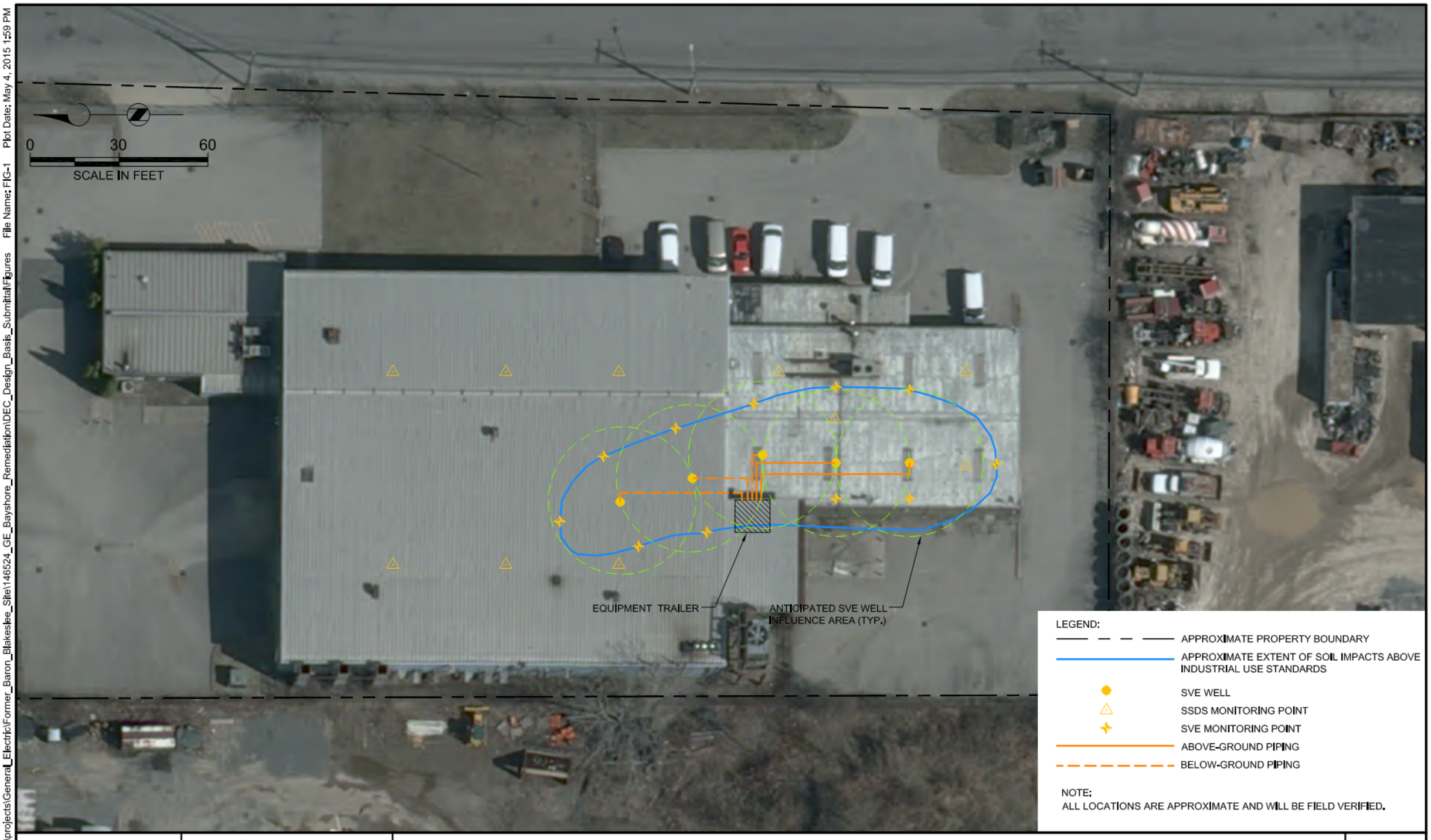
Section 5

References

Brown and Caldwell Associates. January 2015. Alternatives Analysis and Remedial Work Plan, Former Baron Blakeslee Property, Site #C152204, Bay Shore, Suffolk County, New York

Figures

Path: \\bcusrfp01\projects\General_Electric\Former_Baron_Blakeslee_Site\146524_GE_Bayshore_Remediation\DEC_Design_Basis_Submittal\Figures File Name: FIG-1 Plot Date: May 4, 2015 1:59 PM Ca



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SCALE: 1" = 30'

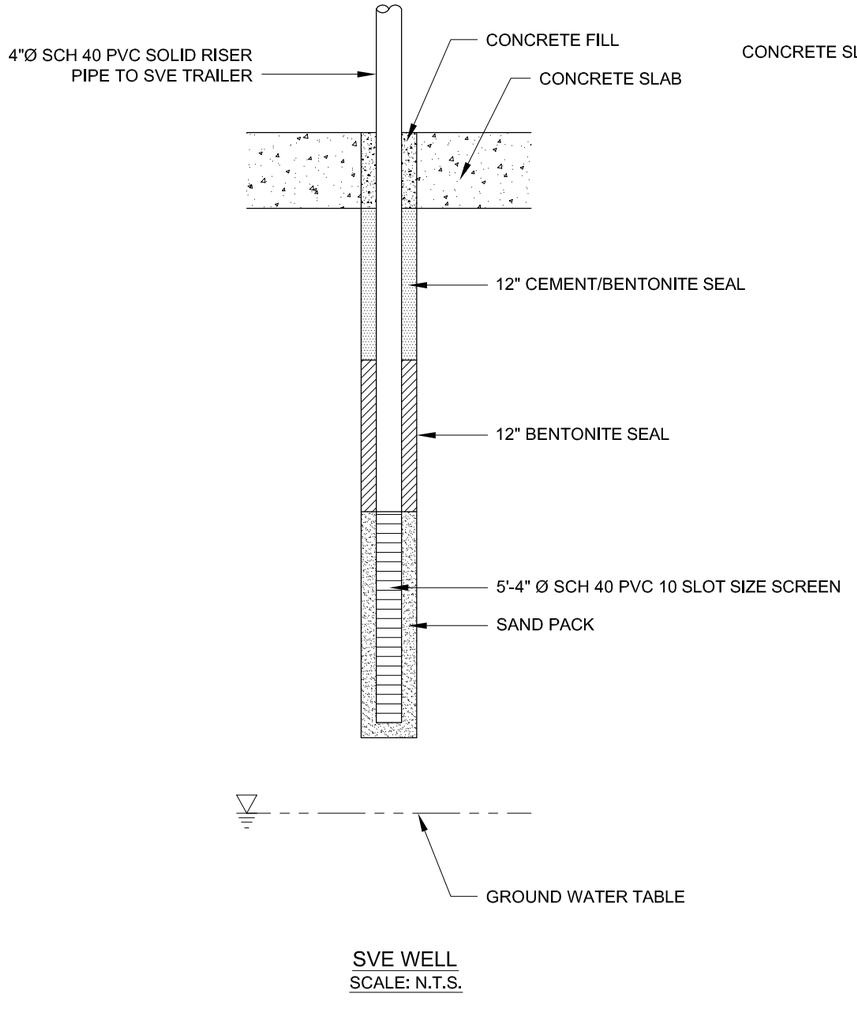
145361.100

DATE: May 4, 2015

SYSTEM LAYOUT
FORMER BARON BLAKESLEE SITE
BAY SHORE, NEW YORK

FIGURE

1



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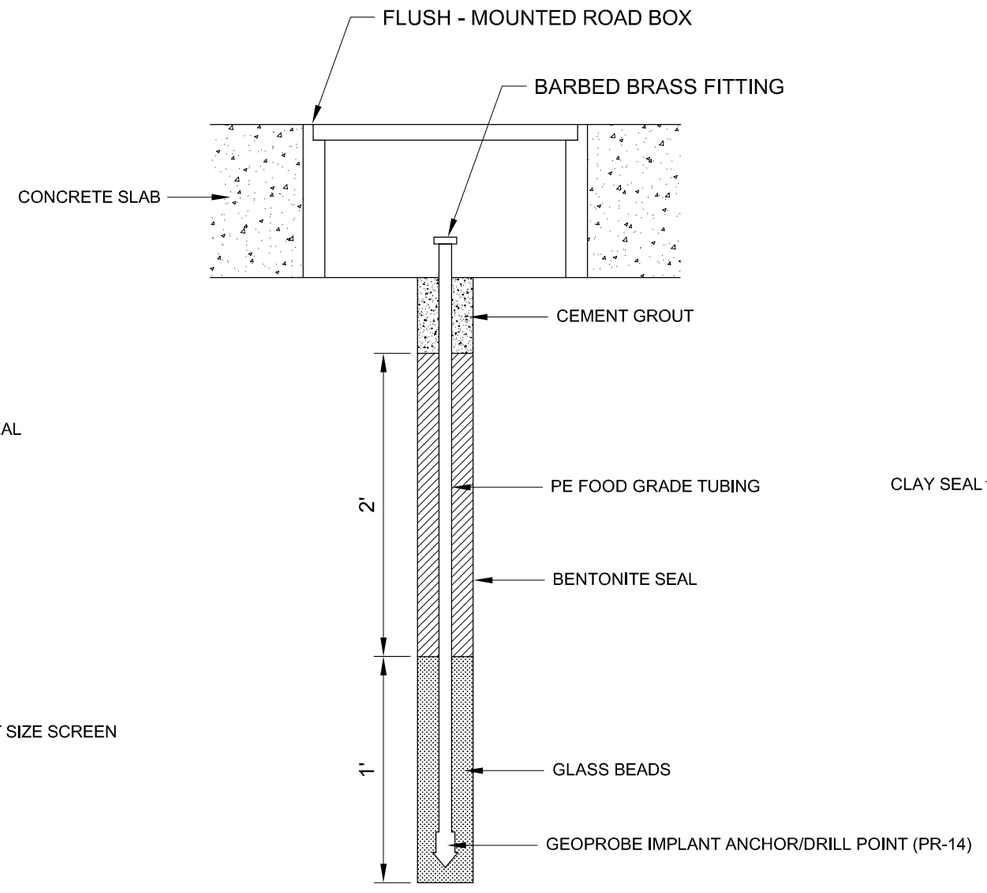

SVE MONITORING POINT
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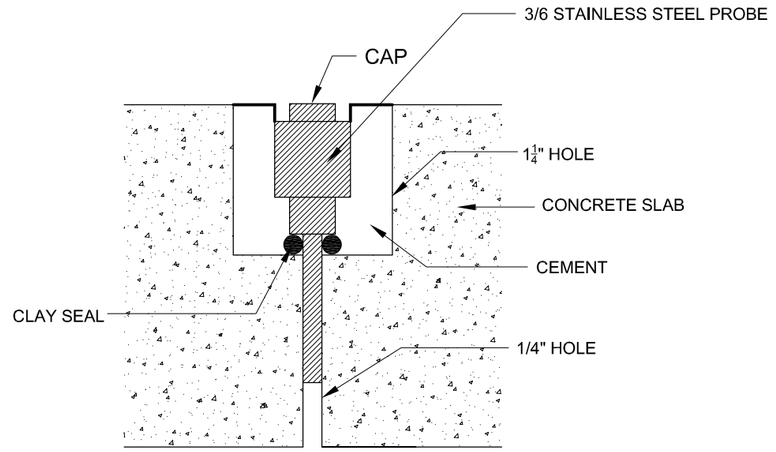
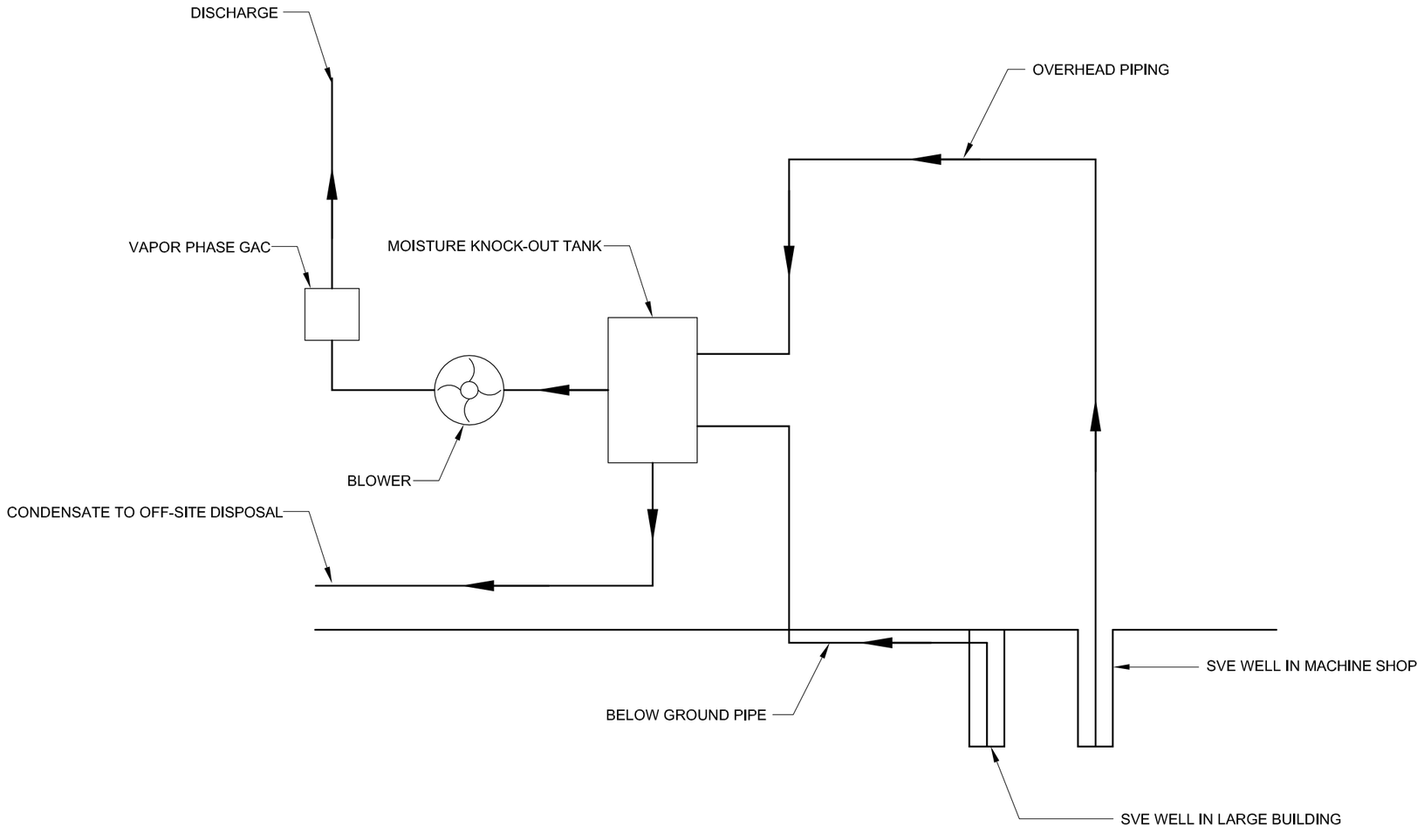


SUB-SLAB VACUUM
MONITORING POINT
SCALE: N.T.S.

Brown AND Caldwell	SCALE: N.T.S. DATE: May 4, 2015	WELL CONSTRUCTION DETAILS FORMER BARON BLAKESLEE SITE BAY SHORE, NEW YORK	FIGURE 2



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SCALE: N.T.S.

DATE: May 4, 2015

SVE SYSTEM SCHEMATIC
FORMER BARON BLAKESLEE SITE
BAY SHORE, NEW YORK

FIGURE
3

Path: \\bcusrfp01\projects\General_Electric\Former_Baron_Blakeslee_Site\146524_GE_Bayshore_Remediation\DEC_Design_Basis_Submittal\Figures File Name: FIG-3 Plot Date: May 4, 2015 2:03 PM Ca