SUB-SLAB DEPRESSURIZATION SYSTEM EVALUATION WORK PLAN
CENTRAL HUDSON GAS AND ELECTRIC CUSTOMER SERVICE CENTER

610 LITTLE BRITAIN ROAD
NEW WINDSOR, NEW YORK
NYSDEC BCA# C336031

MAY 2019

CENTRAL HUDSON GAS & ELECTRIC CORPORATION
284 SOUTH ROAD
POUGHKEEPSIE, NEW YORK 12601

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610 LITTLE BRITAIN ROAD
NEW WINDSOR, NEW YORK

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1 INTRODUCTION

Kleinfelder has prepared this Sub-slab Depressurization System (SSDS) Evaluation Work Plan (Work Plan) for the Central Hudson Gas and Electric Customer Service Center (Site) located at 610 Little Britain Road in New Windsor, New York (**Figure 1**). Based on the 2009 Sub-slab Depressurization System Report, the SSDS system was installed in 2008 as a proactive measure to mitigate any potential vapor intrusion issues at the facility due to known onsite soil and groundwater impacts of chlorinated volatile organic compounds (VOCs). This Work Plan was prepared to assess whether the continued operation of the SSDS is necessary and, if so, the effectiveness of the SSDS as it operates currently.

The scope of work proposed in this Work Plan is a phased approach to assess site conditions to evaluate if the SSDS can be shut down or still needs to operate as a mitigation measure for vapor intrusion. This phased approach involves baseline sampling of sub-slab soil vapor, indoor air, and outdoor air. If the analytical results show no levels of concern based on New York State Department of Health (NYSDOH) Vapor Intrusion Guidance Decision Matrices, the SSDS will be shut down for a Rebound Evaluation. The Rebound Evaluation would be conducted over a year's time with sub-slab soil vapor sampling at 1, 3, 6, and 12 months post-shutdown. If baseline soil vapor concentrations show exceedances of NYSDOH limits, the SSDS system will be restarted and the system will be evaluated for effectiveness. During the Rebound Evaluation, if sub-slab soil vapor data show levels of concern, the SSDS system will be restarted and evaluated. **Figure 2** represents the decision matrix that will be followed during this evaluation of vapor intrusion conditions and SSDS operation. Key tasks included in this Work Plan are:

- Perform pre-sampling site visit to assess building structural characteristics and inventory chemicals used by the facility.
- Install sub-slab soil vapor probes.
- Conduct Baseline Sampling of sub-slab soil vapor, indoor air, and outdoor air during temporary SSDS shutdown.
- If baseline analytical results show no levels of concern:
  - Conduct a Rebound Evaluation with sub-slab soil vapor sampling at 1 month, 3 months, 6 months, and 1 year post-shutdown.

- Restart and evaluate effectiveness of SSDS system at any point during Rebound Evaluation if sub-slab soil vapor concentrations show levels of concern. This will include indoor and outdoor air sampling.
- If sub-slab soil vapor and indoor air concentrations continue to be within NYSDOH limits after the Rebound Evaluation is completed, permanent SSDS shutdown may be considered.

- If baseline analytical results show levels of concern:
  - Assess the effectiveness of the SSDS system.
  - Adjust/Modify the SSDS based on results of the system evaluation.
  - Develop an Operations, Maintenance, and Monitoring (OM&M) Plan for continued operation of the SSDS system.
- Prepare a Summary Report following completion of sampling and analysis activities. The Summary Report will document the field activities performed, provide a summary of baseline and rebound testing, and will include a human health screening evaluation (HHSE) with recommendations about the operation of the SSDS.

2 SITE BACKGROUND

The Site is located at 610 Little Britain Road in New Windsor, New York. The Site is located on the north side of Little Britain Road and east of the Lake Washington Stilling Basin (**Figure 1**).

Central Hudson Gas & Electric Corporation (CHGE) purchased the majority of the facility in 1977 and the eastern employee parking lot in 1978. The previous owner/occupant of the property purchased in 1977 was J&H Smith Manufacturing Company, which reportedly stored chemicals for manufacturing in the vicinity of the MW18-8E/F well location (**Figure 4**). CHGE has and continues to use the property as a customer service center.

Soil and groundwater at the Site were found to be contaminated with VOCs in the mid-1990s, most notably trichloroethene (TCE), cis-1,2-dichloroethene (cis-1,2-DCE), and vinyl chloride. Impacted soils from the previously identified source area (vicinity of MW18-8 well cluster location, see **Figure 4**) were excavated in the Spring of 2001. Several supplemental groundwater investigations, including the installation of monitoring wells and groundwater sampling/analysis, have been conducted since then. Based on October 2018 analytical data, groundwater at the site continues to be impacted with VOCs.

In 2008, The Chazen Companies (2009) on behalf of CHGE installed an SSDS to mitigate the potential for vapor intrusion of VOCs into the building through the floor slab. Historical data had indicated sub-slab concentrations of various chlorinated VOCs, most commonly 1,1,1-trichlorethane (1,1,1-TCA), and trichloroethene (TCE). The highest overall sub-slab VOC concentration was 176,000 ug/m^3 of 1,1,1-TCA in the sample collected in welding shop garage area; concentrations of 1,1,1-TCA in each of the remaining sub-slab samples were below 200 ug/m^3. The sub-slab soil vapor sample from the welding shop garage also reported 1,1-dichloroethane at a concentration of 40,300 ug/m^3. Highest sub-slab TCE concentrations were reported in samples collected from the welding shop garage (14,200 ug/m^3), the vehicle repair shop (9,570 ug/m^3), and the side bay areas (5,060 ug/m^3). The 2009 Report stated that indoor air quality samples did not detect TCE or other chlorinated solvents and indicated that the floor slab was providing sufficient protections from soil vapor intrusion. The 2009 Report stated that it was understood that the installation of the SSDS was not required by the NYSDOH and/or

the NYSDEC regional offices; the SSDS system was installed as a proactive measure by CHGE to protect facility personnel.

The SSDS functions by maintaining a negative pressure beneath the building slab and by diverting the VOC vapors to the atmosphere above the building roof. The SSDS consists of eight shallow vertical vapor extraction wells (EWs) connected to three 3-HP Rotron Regenerative Blowers. The wells and extraction lines are configured in three zones as follows:

- Zone 1: EW-3 and EW-4
- Zone 2: EW-2 and EW-6
- Zone 3: EW-1, EW-5, EW-7, and EW-8

The layout of the SSDS is shown on **Figure 3**.

3 PROPOSED SCOPE OF WORK

The scope of work proposed in this Work Plan is a phased approach to evaluate whether the SSDS system is still needed for vapor mitigation, and, if it is needed, to assess its effectiveness in protecting facility personnel. Baseline conditions of sub-slab soil vapor, indoor air, and outdoor air will be analyzed. If baseline conditions indicate concentrations are below NYSDOH thresholds, a Rebound Evaluation will be conducted to monitor the potential rebound of VOC concentrations in sub-slab soil vapor after system shutdown. The Rebound Evaluation will be conducted over a year's time with soil vapor sampling at 1, 3, 6, and 12 months post-shutdown. If soil vapor concentrations show exceedances of NYSDOH limits at any of these sampling events, the SSDS system will be restarted and evaluated. A decision matrix (**Figure 2**) illustrates the workflow for the evaluation of vapor intrusion conditions and SSDS operation. Key tasks included in this Work Plan are:

- Perform pre-sampling site visit to assess building structural characteristics and inventory chemicals used by the facility.
- Install sub-slab soil vapor sample probes
- Conduct Baseline Condition sampling during temporary SSDS shutdown.
- If warranted, conduct a Rebound Evaluation with sub slab soil vapor sampling at 1 month, 3 months, 6 months, and 1 year post-shutdown.
- If soil vapor concentrations continue to be within NYSDOH limits after the Rebound Evaluation is completed, permanent shutdown may be considered.
- Restart and evaluate effectiveness of SSDS system at any point during Rebound Evaluation if soil vapor concentrations show levels of concern. Indoor and outdoor air sampling will also be conducted at this time.
- Adjust/Modify the SSDS based on results of the system evaluation.
- Develop an Operations, Maintenance, and Monitoring (OM&M) Plan for continued operation of the SSDS system.
- Prepare a summary report.

The field investigation will be performed in general accordance with the following guidance documents:

- Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York, New York State Department of Health (NYSDOH), Center for Environmental Health Bureau of Environmental Exposure Investigation (NYSDOH, 2006).
- Soil Vapor / Indoor Air Decision Matrices (NYSDOH May 2017).
- Standard Operating Procedures #1704: Summa Canister Sampling, prepared by the United States Environmental Protection Agency (USEPA) Environmental Response Team (USEPA Environmental Response Team, 1995).
- Standard Operating Procedures #2008: General Air Sampling Guidelines, prepared by the USEPA Environmental Response Team (USEPA Environmental Response Team, 1994).

The proposed scope of work is described in further detail in the following sections.

3.1 TASK 1 PRE-SAMPLING ACTIVITIES

A site-specific Health and Safety Plan (HASP) will be prepared prior to implementing field activities, to address the health and safety of field staff and provide contingency plans for emergencies that may arise during the work. The HASP will provide guidelines for personal protection equipment and safety procedures to be used by staff during field operations.

A Site visit will be performed and will include walking through the structures of concern to perform a visual inspection and to assess and mark proposed sub-slab probe locations in areas judged as suitable for obtaining representative results. Proposed sampling locations shown on **Figure 3** are approximate and may be adjusted based on field conditions. The visual inspection will include:

- Basic structure type (e.g., slab-on-grade) and building floor plan.
- Building construction materials.
- Physical condition of building and floor slab.
- Presence and locations of utility ports or penetrations, floor drains, and sumps (if any).
- Number, type, frequency, and locations of window and door openings.
- Water supply and sewage management.
- Heating, ventilation, and air conditioning (HVAC) system operating condition.
- Potential indoor sources of air pollution (e.g., chemicals used in the normal course of business).

A pre-sampling inspection form/questionnaire (see **Appendix A**) will also be completed during the building walk-through and prior to sampling indoor/outdoor air and sub-slab soil vapor.

A One-Call notification will be made after the proposed sub-slab probe locations are marked, but a minimum of 48 hours (two business days) prior to initiating subsurface-intrusive activities, to obtain clearance for public underground utilities. Additionally, CHGE will locate and mark onsite gas and electric utilities.

A geophysical services provider shall be contracted to locate and mark detectable subsurface utility lines and other identifiable subsurface features at and immediately adjacent to the proposed sub-slab soil vapor probe locations.

The SSDS system will be shut down a minimum of 2 weeks prior to sampling. Building occupants will be requested to suspend activities that may affect indoor air quality, including smoking and use of sprays, solvents, paints, or other products potentially containing VOCs, for a minimum of 24 hours before sample collection, to extents feasible. Weekend sampling should be considered. Employees will be requested to remove items suspected to be contributors of VOCs to indoor air before the sampling is performed, if feasible. Employees will also be requested to:

- Keep windows and exterior doors closed during sample collection.
- Turn off mechanical fans used for air circulation (other than fans that are routine parts of HVAC systems) at least 24 hours prior to sample collection.
- Operate heating and cooling systems as normal for the time of year.

The purposes of these steps are to reduce potential dilution of VOCs that may be present and to enhance the stack effect created when warm air from inside a structure rises and leaks out of cracks in the upper part of a structure, thus creating a vacuum that draws air through foundation cracks and other cracks in the lower portion of a structure.

3.2 TASK 2 – BASELINE SAMPLING AND TESTING

Baseline sampling shall be performed during the winter heating season while the heating systems maintain normal indoor air temperature in the range between 65-75º Fahrenheit. The heating season for New York is considered to be November 15th to March 31st. Baseline sampling tasks

described below include the installation of sub-slab soil vapor probes, and collecting and analyzing sub-slab soil vapor samples, indoor air samples, and outdoor air samples:

3.2.1 Task 2.1 Sub-Slab Probe Installation

A re-usable sub-slab (SS) sampling probe will be installed near each extraction well plus two additional locations to fill data gaps for a total of ten sampling probes (**Figure 3**). Probes should be located a minimum of 10 feet away from each extraction well and shall be constructed in accordance with NYSDOH guidelines and as follows:

- After removal of the floor covering (if a covering such as tile or carpet is present) from the immediate probe installation area, a small-diameter hole (i.e., no larger than approximately 1.25 inches in diameter) will be drilled through the concrete foundation slab and into the sub-slab material. Either an electric hand drill or concrete coring device will be used to drill the hole, which will be advanced approximately 4 inches into the sub-slab material (typically consisting of crushed miscellaneous base [CMB] or sand). After completion of each hole, the drill bit and other re-useable equipment will be cleaned to prevent potential cross contamination. Investigation-derived waste, including but not limited to concrete cores, CMB, sand, and equipment wash water, will be managed as described in **Section 3.8**.
- The sub-slab soil vapor probe will be constructed using a Vapor Pin™ (or equivalent) and consist of a 0.12-inch to 0.25-inch diameter brass or stainless-steel tube with an air-permeable tip that will be placed within the sub-slab material so that the maximum depth of the probe screen is no more than 2 inches below the base of the slab. If needed, the vapor probe tip will be covered with clean sand. An optional Teflon™ separator may be placed above the probe tip around the blank tube.
- Bentonite powder or granules will be used to fill the annular space in the bore from above the Teflon™ separator to above the bottom of the concrete foundation. Prior to introducing the bentonite, the borehole will be cleaned with a damp towel to increase the potential for a good seal and to remove concrete dust from the hole. Deionized or distilled water will be added to hydrate the bentonite and seal the annulus. Care will be used in placement of the bentonite to prevent post-emplacement expansion that may compromise the probe integrity and/or cement seal.
- The probe tubing will be tightly sealed to the foundation slab using a quick-setting Portland cement-concrete mixture.

- The sub-slab soil vapor probe will be constructed with a recessed threaded cap having a brass or stainless-steel threaded fitting or compression fitting, so that the probe completion will be flush with the foundation slab. This configuration is intended to avoid a tripping hazard and protect the vapor probes until they are no longer needed and are decommissioned. The proposed sub-slab probe construction is detailed on **Figure 5**.

3.2.2 Task 2.2 Baseline Sub-Slab Soil Vapor Sampling and Analysis

Sub-slab soil vapor sampling will be performed a minimum of two weeks after the SSDS blowers are shut down. Sub-slab soil vapor samples will be collected following NYSDOH guidance and as follows:

- Samples shall be collected following a short-circuit test using a helium leak test and shroud method.
- Each sub-slab soil vapor probe will be purged of one to three probe volumes prior to sample collection, at a flow rate that does not exceed 0.2 liters per minute (L/min), to remove air in the sampling train that may otherwise dilute the vapor samples.
- The probe volume (i.e., the combined probe tubing volume and estimated pore volume of the annular pack around the probe tip) will be calculated based on the following equation:
- $Volume = [(\pi r_1^2 h_1 - \pi r_2^2 h_2) \times f_1] + [(\pi r_1^2 h_3 - \pi r_3^2 h_3) \times f_2] + \pi r_2^2 h_2 + \pi r_3^2 h_4 + \pi r_4^2 h_5$

  Where:

  - π = 3.14159 (unitless)
  - r_1 = radius of borehole
  - h_1 = length of sand pack
  - r_2 = inner radius of probe tip
  - h_2 = length of probe tip
  - f_1 = porosity of sand (i.e., use 0.40 for sand)
  - h_3 = length of dry bentonite
  - f_2 = porosity of dry bentonite (i.e., use 0.50 for dry bentonite)
  - h_4 = length of probe
  - r_3 = inner radius of probe
  - r_4 = inner radius of aboveground tubing
  - h_5 = length of aboveground tubing

- Prior to sample collection, helium gas contained within a shroud will be placed over the sub-slab vapor probe's surface connection and the sample train for a short-circuit test of helium. If helium is detected in the sample train by a helium detector, then the point will be re-patched, and tubing examined to ensure there are no leaks in which ambient air can infiltrate. Once the sample point passes the short-circuit test, the shroud will be removed, and the point will be sampled.
- The sub-slab vapor sample collection train will be purged of three volumes of air. After purging, a sub-slab vapor sample will be collected by withdrawing soil vapor from the probe into a batched-certified clean, evacuated, 6-liter Summa™ canister fitted with a flow restrictor calibrated to collect the sample over an 8-hour period. The sample will be logged onto a chain of custody (COC) form and submitted to a NYSDOH Environmental Laboratory Accreditation Program (ELAP) laboratory for VOC (including cis-1,2-DCE, TCE, and vinyl chloride) analysis by USEPA Method TO-15. Samples will be analyzed on standard laboratory turnaround time (approximately 10 business days).
- One field duplicate sample will be collected and analyzed for each 20 sub-slab probe sample batch or one per day, whichever is more often, for data quality validation and evaluation purposes. Duplicate samples will be collected using a "T" fitting.

3.2.3 Task 2.3 Baseline Indoor Air and Outdoor Air Sampling and Analysis

Proposed indoor air (IA) and outdoor air (OA) sample locations are shown on **Figure 3 and 4**. Provided below are procedures for the collection of the samples:

- Collect IA and OA samples simultaneously the day after the collection of the sub-slab soil vapor samples for baseline analysis as follows:
    - Summa™ canisters of 6-liter capacity will be used to collect indoor and outdoor air samples. Each Summa™ canister will be fitted with a flow restrictor, and initial vacuums of less than 25 inches of mercury (inHg) will not be used for sampling. The Summa™ canisters along with flow regulators to be utilized will be 100-percent certified clean and selective ion monitoring (SIM) certified clean by the supplying laboratory. Air sampling shall be collected over an 8-hour period.

- Each Summa™ canister will be set at a height of approximately 3 feet to 5 feet above the floor level (to the extent practicable) to collect indoor air samples representative of the breathing zone. One duplicate indoor air sample will be collected for data quality validation and evaluation purposes.
- Weather data will be obtained by the Consultant on the day of air sampling from the closest meteorological station with available published data and reviewed to assess meteorological conditions that may affect sample collection and analytical results.
- Outdoor air sampling locations indicated on **Figure 4** may be adjusted based on wind direction as applicable. The outdoor air samples will be collected in a manner similar to the indoor air samples.
- The IA and OA samples will be submitted to the ELAP laboratory for analysis of VOCs using USEPA Method TO-15 SIM on standard laboratory turnaround time of 10 business days.

Following the completion of baseline sampling, the SSDS will be restarted.

Once analytical results are received from the laboratory, they will be evaluated against the May 2017 NYSDOH Soil Vapor/Indoor Air Decision Matrices for pertinent VOCs to assess the need for action. Baseline results will be tabulated and submitted with a brief summary of results to CHGE for discussion purposes.

3.3 TASK 3 – REBOUND EVALUATION

Should the analytical results of the baseline sampling be favorable and show no levels of concern according to the 2017 NYSDOH Soil Vapor/Indoor Air Decision Matrices, an SSDS Rebound Evaluation consisting of multiple sampling events is proposed as described below. The Rebound Evaluation is designed to monitor the sub-slab conditions for potential buildup of soil vapor concentrations that might occur without the SSDS operating.

- Shut down the SSDS.
- Collect a round of sub-slab soil vapor samples for VOC analysis approximately 1 month after the SSDS was shutdown. Analytical results will be tabulated and submitted to the client.

- If results are still below risk-based levels from first rebound sampling event, the SSDS will remain off. Collect another round of sub-slab soil vapor samples for VOC analysis at end of first quarter (3 months). Analytical results will be tabulated and submitted to the client.
- If results continue to be below risk-based levels from the first quarter event, collect a second quarter (6 months) round of sub-slab soil vapor samples for VOC analysis. Analytical results will be tabulated and submitted to the client.
- If results are still below risk-based levels from the second quarter event, collect another round of sub-slab soil vapor samples for VOC analysis at the 1-year anniversary of the SSDS shutdown. A set of IA/OA samples will also be collected at this time to assess indoor air quality for worker health and safety.

The time gap between each sampling event and/or number of events may need to be adjusted depending on rebound trend. The Rebound Evaluation is anticipated to be complete after 1 year of testing.

After each sampling event, the SSDS may need to be restarted if results of the event indicated that action was required based on the NYSDOH Soil Vapor/Indoor Air Decision Matrices or trends in concentrations indicated that action levels may be reached before the next sampling event. If that is the case, the rebound testing will be terminated and the SSDS will be restarted. Further assessment of subsurface conditions may be considered to get a better understanding on the source and extent of chlorinated solvents in the subsurface. In addition, optimization of the system operation may be considered (e.g., operate a sub-set of the zone blowers instead of all three blowers).

3.4 TASK 4 – SSDS RESTART

As stated previously, if sub-slab soil vapor concentrations show levels of concern (based on 2017 NYSDOH Soil Vapor/Indoor Air Decision Matrices) at any point in the Rebound Evaluation, the SSDS will be restarted. As part of the restarting process, IA and OA samples will be collected and submitted to the laboratory for VOC analysis following the baseline sampling protocol (**Section 3.2.3**).

Analytical results will be evaluated and compared to NYSDOH Decision Matrices. The tabulated data and interpretation and recommendation(s) will be submitted to CHGE for discussion. If IA

sample concentrations show levels of concern, the effectiveness of the SSDS will be evaluated (**Task 5**) and an Operation, Maintenance, and Monitoring (OM&M) Plan will be developed (**Task 7**). If IA sample concentrations show no levels of concern, an OM&M Plan will be developed (**Task 7**) and the SSDS system will continue to operate.

3.5 TASK 5 – SSDS EFFECTIVENESS EVALUATION

The condition of the existing SSDS components will be assessed for operational parameters and functionality. The assessment will include an evaluation of the condition of the well heads, well covers, conveyance lines and conveyance continuity, blower function, blower amperage draw, blower noise, and above ground piping condition. Findings of the SSDS component condition assessment with recommendations for corrective action, if any, shall be reported with the findings in **Task 6** below.

While the SSDS is operating, various samples will be collected and analyzed to assess the effectiveness of the system. Extracted soil vapor from the SSDS shall be sampled while the system is operating to evaluate concentration and mass removal rate from the SSDS system. Each zone of the SSDS will be sampled while blower is running (blower inlet). Measurements of vacuum in each extraction well and flow from each blower for Zones 1, 2 and 3 will be collected. Soil vapor samples from each extraction well and from each Zone (blower) will also be collected using 1-Liter Summa Canisters. The samples shall be analyzed for VOCs using USEPA TO-15 Method. Results will be used to evaluate concentrations being extracted from each well and to evaluate what is being discharged to the atmosphere from each Zone (blower).

3.6 TASK 6 – SUMMARY REPORT PREPARATION

An SSDS Evaluation Summary Report will be prepared at the end of field activities to summarize investigation tasks and findings. The report shall include a Human Health Screening Evaluation (HHSE) and discuss the evaluation of the potential for subsurface VOC vapors to impact indoor air quality based on the Site-specific information available, including the chemicals of potential concern, affected media (i.e., soil vapor and indoor and outdoor air), characteristics of the occupied structures. The report will include a discussion of methodology, findings, conclusions, and recommendations. Data tables and figures will be provided to illustrate the findings. The

Summary Report will be prepared under the supervision of and signed by a professional engineer or environmental professional.

3.7 TASK 7 – SSDS OPERATION, MAINTENANCE, AND MONITORING PLAN

If the investigation findings indicate that the SSDS needs to remain in operation, an Operation, Maintenance & Monitoring (OM&M) Plan will be developed for the SSDS in accordance with the 2006 NYSDOH VI Guidance. The OM&M Plan will address visual inspections, identification and repair of leaks, inspection of exhaust points, preventative maintenance, system performance, air monitoring, and recordkeeping. Routine maintenance and inspection should occur every 12 to 18 months. Non-routine or emergency maintenance topics will also be addressed.

3.8 INVESTIGATION-DERIVED WASTE DISPOSAL

Small amounts of construction debris (e.g. pulverized concrete) and soil will be generated during the installation of the sub-slab soil vapor probes. Waste debris will be collected in five-gallon buckets and staged for later offsite disposal. Additionally, it is estimated that approximately five gallons of wash water will be generated as a result of cleaning the concrete drill bit, tools, and sampling equipment between sub-slab soil vapor probe installations. The bucket(s) of wastewater will also be staged for later offsite disposal. CHGE will be responsible for the offsite disposal of IDW. It is assumed that previous waste characterization data for soil and water can be used to represent the wastes generated during the SSDS evaluation. CHGE will arrange for the IDW to be transported from the Site for disposal at an appropriate CHGE-approved facility.

4 SCHEDULE

Upon authorization from CHGE, the scheduling and preparation for the baseline sampling will begin. Baseline sampling will be coordinated to occur within the heating season (generally November 15th to March 31st in New York State).

- System Shutdown (temporary) (week 1)
- Conduct Building Pre-sampling Inspection and Inventory (week 1-2)
- Baseline Sampling (week 3)
- Turn SSDS system back on (week 3)
- Evaluate Results (week 5-6)
- If results show no levels of concern (using NYSDOH Decision Matrices), begin Rebound Evaluation (with sampling at 1, 3, 6, and 12 months after Baseline Sampling).
- If results show soil vapor concerns, but no indoor air concerns, continue SSDS operation and develop an OM&M Plan (week 6-12)
- If results indicate soil vapor and indoor air concerns, conduct SSDS Effectiveness Evaluation and develop an OM&M Plan (week 6-18)
- Draft Summary Report will be submitted approximately 5 weeks after final analytical data is received.
- Final Draft Summary Report will be submitted approximately two weeks following receipt of comments from CHGE. CHGE will be responsible for any submissions to the NYSDEC.

5 LIMITATIONS

This Work Plan was prepared in a manner consistent with that level of care and skill ordinarily exercised by other members of Kleinfelder's profession practicing in the same locality, under similar conditions and at the date the services are provided. Kleinfelder's conclusions, opinions, and recommendations are based on a limited number of observations and data. It is possible that conditions could vary between or beyond the data evaluated. Kleinfelder makes no other representation, guarantee, or warranty, express or implied, regarding the services, communication (oral or written), report, opinion, or instrument of service provided.

This Work Plan may be used only by the Client and the registered design professional in responsible charge and only for the purposes stated for this specific engagement within a reasonable time from its issuance, but in no event later than two years from the date of the Work Plan.

6 REFERENCES

New York Department of Health Center for Environmental Health Bureau of Environmental Exposure Investigation (NYSDOH), 2006. FINAL Guidance for Evaluating Soil Vapor Intrusion in the State of New York. October.

New York State Department of Health, 2017. Soil Vapor / Indoor Air Matrices. May

The Chazen Companies, 2009. Sub-slab Depressurization System Report, Central Hudson Gas & Electric, 610 Little Britain Road, Town of Newburgh, Orange County, New York. January.

USEPA, 2018. Regional Screening Level (RSL) Summary Table (TR=1E-6, HQ=1). November.

USEPA Environmental Response Team, 1994. Standard Operating Procedures #2008: General Air Sampling Guidelines. May.

USEPA Environmental Response Team, 1995. Standard Operating Procedures #1704: Summa Canister Sampling. July 27.

TABLE

Table 1
Proposed Sampling Schedule
CHGE Little Britain Road Facility
610 Little Britain Road
New Windsor, New York

Sample	Area of Concern	Sample Location Rationale	Proposed Analyses (Indoor Air)	Proposed Analyses (Outdoor Air)	Sub-Slab Soil Vapor Probe Screen Depth (inches below base of floor slab)	Proposed Analyses (Soil Vapor)
			VOCs	VOCs		VOCs
			TO-15	TO-15		TO-15
IA-1	ZONE 3	Indoor air sample in vicinity of EW-1 at location near seams, cracks, utility penetrations, as applicable, to help evaluate potential exposure and route of entry.	X			
IA-2	ZONE 2	Indoor air sample in vicinity of EW-2 at location near seams, cracks, utility penetrations, as applicable, to help evaluate potential exposure and route of entry.	X			
IA-3	ZONE 1	Indoor air sample in vicinity of EW-3 at location near seams, cracks, utility penetrations, as applicable, to help evaluate potential exposure and route of entry.	X			
IA-4	ZONE 1	Indoor air sample in vicinity of EW-4 at location near seams, cracks, utility penetrations, as applicable, to help evaluate potential exposure and route of entry.	X			
IA-5	ZONE 3	Indoor air sample in vicinity of EW-5 at location near seams, cracks, utility penetrations, as applicable, to help evaluate potential exposure and route of entry.	X			
IA-6	ZONE 2	Indoor air sample in vicinity of EW-6 at location near seams, cracks, utility penetrations, as applicable, to help evaluate potential exposure and route of entry.	X			
IA-7	ZONE 3	Indoor air sample in vicinity of EW-7 at location near seams, cracks, utility penetrations, as applicable, to help evaluate potential exposure and route of entry.	X			
IA-8	ZONE 3	Indoor air sample in vicinity of EW-8 at location near seams, cracks, utility penetrations, as applicable, to help evaluate potential exposure and route of entry.	X			
IA-9	ZONE 2	Indoor air sample in the maintenance garage along side of building to address datagap along the southwest portion of the building as requested by NYSDEC. Location near seams, cracks, utility penetrations, as applicable, to help evaluate potential exposure and route of entry.	X			
IA-10	ZONE 3	Indoor air sample in center of building footprint as requested by NYSDEC. Location near seams, cracks, utility penetrations, as applicable, to help evaluate potential exposure and route of entry.	X			
SS-1	ZONE 3	Sub-slab sample in vicinity of EW-1 to help evaluate potential exposure and route of entry.			2	X
SS-2	ZONE 2	Sub-slab sample in vicinity of EW-2 to help evaluate potential exposure and route of entry.			2	X
SS-3	ZONE 1	Sub-slab sample in vicinity of EW-3 to help evaluate potential exposure and route of entry.			2	X
SS-4	ZONE 1	Sub-slab sample in vicinity of EW-4 to help evaluate potential exposure and route of entry.			2	X

Table 1
Proposed Sampling Schedule
CHGE Little Britain Road Facility
610 Little Britain Road
New Windsor, New York

Sample	Area of Concern	Sample Location Rationale	Proposed Analyses (Indoor Air) VOCs TO-15	Proposed Analyses (Outdoor Air) VOCs TO-15	Sub-Slab Soil Vapor Probe Screen Depth (inches below base of floor slab)	Proposed Analyses (Soil Vapor) VOCs TO-15
SS-5	ZONE 3	Sub-slab sample in vicinity of EW-5 to help evaluate potential exposure and route of entry.			2	X
SS-6	ZONE 2	Sub-slab sample in vicinity of EW-6 to help evaluate potential exposure and route of entry.			2	X
SS-7	ZONE 3	Sub-slab sample in vicinity of EW-7 to help evaluate potential exposure and route of entry.			2	X
SS-8	ZONE 3	Sub-slab sample in vicinity of EW-8 to help evaluate potential exposure and route of entry.			2	X
SS-9	ZONE 2	Sub-slab sample in the maintenance garage along side of building to address datagap along the southwest portion of the building as requested by NYSDEC to help evaluate potential exposure and route of entry.			2	X
SS-10	ZONE 3	Sub-slab sample in center of building footprint as as requested by NYSDEC to help evaluate potential exposure and route of entry.			2	X
OA-1		Outdoor air sampling location southeast of building.		X		
OA-2		Outdoor air sampling location northeast of building.		X		
OA-3		Outdoor air sampling location northwest of building.		X		
DUP-1		Duplicate IA indoor air sample, collected at IA-2.	X			
DUP-2		Duplicate OA outdoor air sample, collected at OA-3.		X		
DUP-3		Duplicate soil vapor sample collected at SS-2 or SS-3			2	X

Notes:

IA = Indoor Air
OA = Outdoor Air
EW = Extraction Well
VOCs = Volatile organic compounds
NYSDEC = New York State Department of Environmental Conservation

FIGURES

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PROJECT NO.	-
DRAWN BY:	SMW
CHECKED BY:	JC
FILE NAME:	SiteLocationMap

N
W E
S
0 500 1,000 Ft

Orange County, New York

Aerial Imagery: ESRI

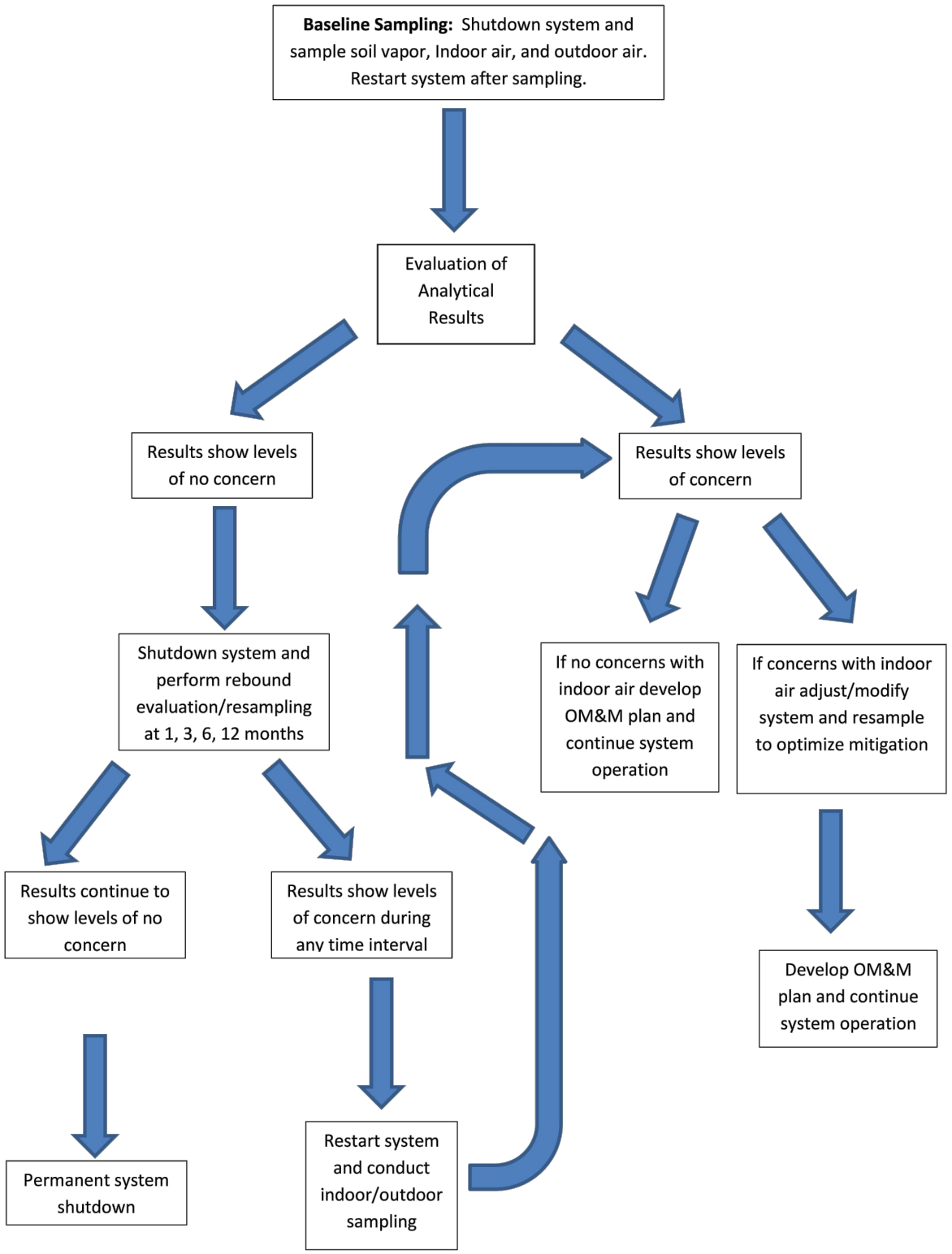
Site Boundary

Central Hudson Gas & Electric Corporation

Figure 1
Site Location Map
610 Little Britain Road, New Windsor, New York

Date: 1/3/2019

Index Map



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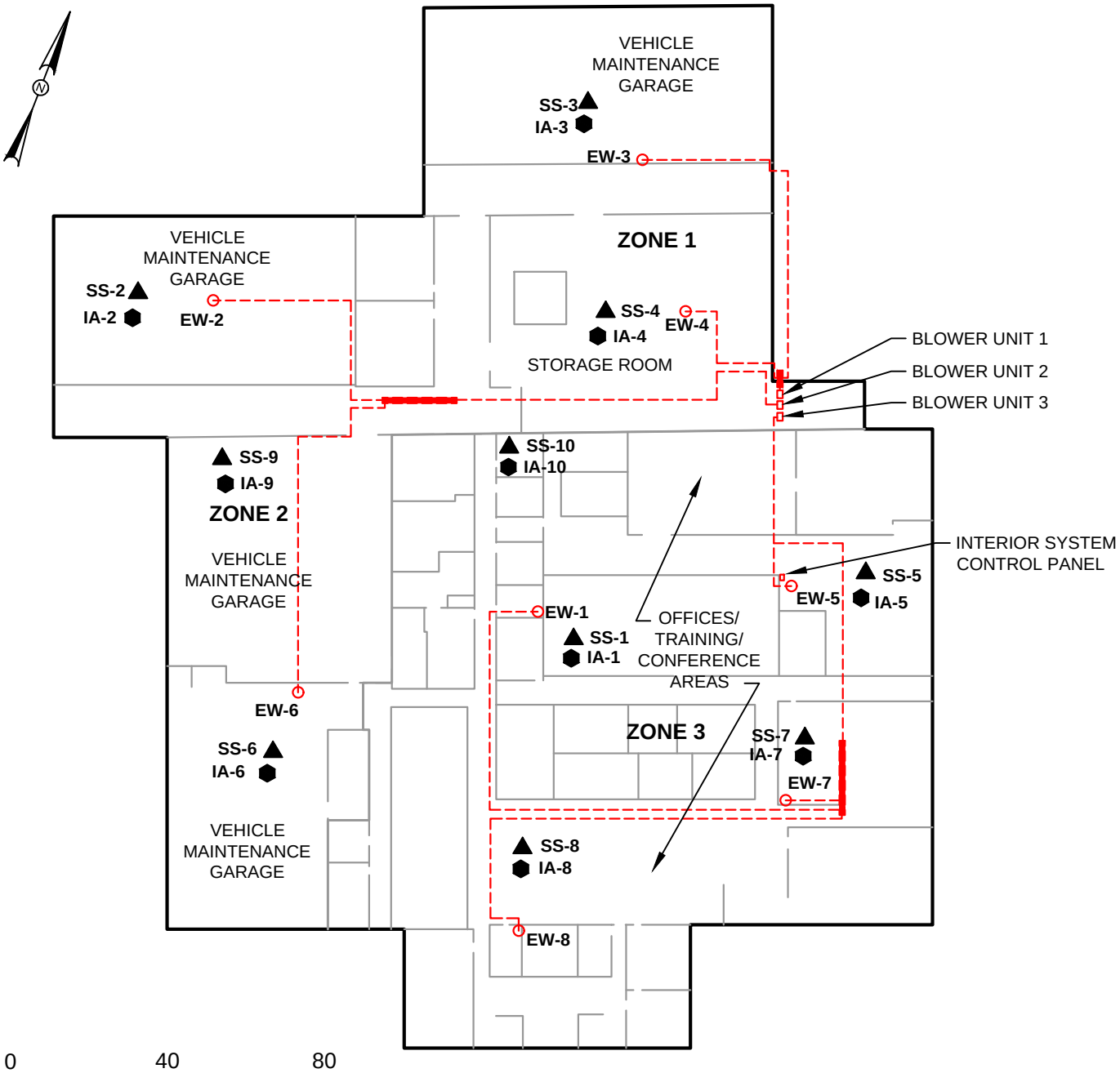
PROJECT NO.	20190147
DRAWN BY:	JDS
CHECKED BY:	JC
DATE:	03/11/2019
REVISED:	

WORKPLAN DECISION MATRIX

CHGE LITTLE BRITAIN ROAD FACILITY
610 LITTLE BRITAIN ROAD
NEW WINDSOR, NEW YORK

FIGURE
2



REFERENCE:
BASE MAPPING CREATED FROM THE FOLLOWING: PLAN TITLED "FIGURE 3 SUBSLAB DEPRESSURIZATION SYSTEM PIPING DIAGRAM & CONTROLS LAYOUT", DATED: JAN. 2009, AND PREPARED BY THE CHAZEN COMPANIES

LEGEND

- SS-10 ▲ PROPOSED SUBSLAB SAMPLE LOCATION
- IA-10 ⬢ PROPOSED INDOOR AIR SAMPLE LOCATION
- EW-8 ○ EXTRACTION WELL
- TWO INCH DIAMETER VACUUM LINE
- FOUR INCH DIAMETER VACUUM LINE

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PROJECT NO.	20190147
DRAWN BY:	JDS
CHECKED BY:	JC
DATE:	04/30/2019
REVISED:	

SITE PLAN WITH PROPOSED SUB-SLAB & INDOOR AIR SAMPLE LOCATIONS

CHGE LITTLE BRITAIN ROAD FACILITY
610 LITTLE BRITAIN ROAD
NEW WINDSOR, NEW YORK

FIGURE
3

MW96-6
MW18-14A
MW18-14C
MW18-14B
MW18-10A
MW18-10C
MW18-10B
MW01-8A
MW18-11B
MW18-11C
MW18-11A
MW94-1B
MW18-8D
MW18-8E
MW18-8F
OA-3
MW01-8B
MW18-12A
MW18-12C
MW18-12B
SG-1
MW18-13B
MW18-13C
MW96-7B
OA-2
MW06-9C
MW06-2C
MW94-2B
MW94-2
MW94-3
MW94-5
OA-1
MW94-4B2
(Abandoned)
MW06-4C
(Abandoned)

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PROJECT NO.	-
DRAWN BY:	SMW
CHECKED BY:	JC
FILE NAME:	OutdoorAirSampleLocation

N
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0 50 100 Ft

Orange County, New York

Aerial Imagery: ESRI

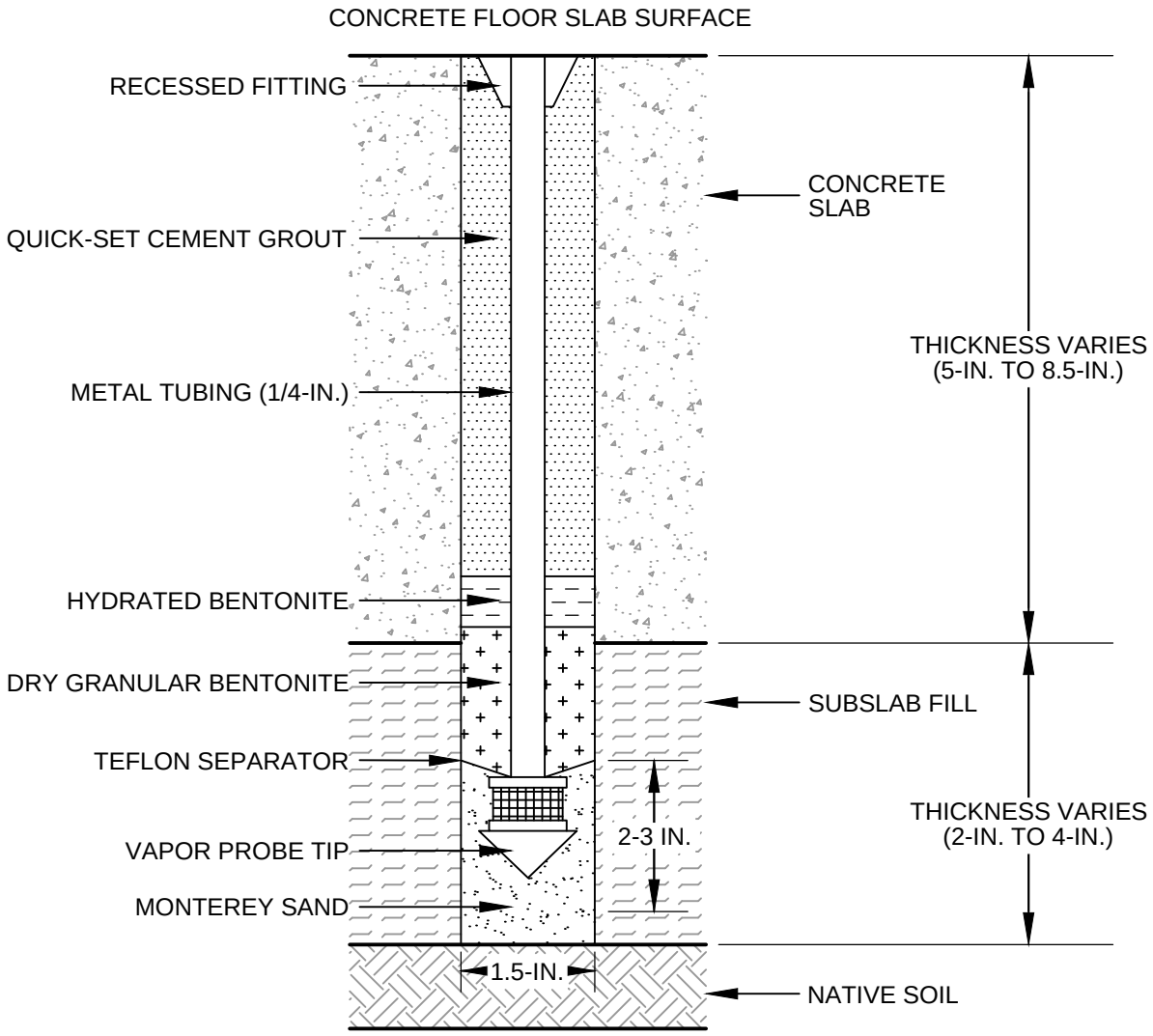
— Site Boundary
Monitoring Well
Staff Guage
OA-3 Proposed Outdoor Air Sample Location

Central Hudson Gas & Electric Corporation

Figure 4
Proposed Outdoor Air Sample Locations
610 Little Britain Road, New Windsor, New York

Date: 3/6/2019

Index Map



NOTE: VAPOR PIN™ IS AN APPROVED ALTERNATIVE.

Central Hudson Gas & Electric Corporation	KLEINFELDER Bright People. Right Solutions. www.kleinfelder.com	PROJECT: 20190147.001A DRAWN: 12/2018 DRAWN BY: DMF CHECKED BY: JC FILE NAME: 20190147_F5.dwg	SUB-SLAB VAPOR PROBE CONSTRUCTION DETAIL SSDS EVALUATION LITTLE BRITAIN RD. FACILITY 610 LITTLE BRITAIN RD. NEW WINDSOR, NEW YORK	FIGURE 5

APPENDIX A

PRE-SAMPLING INSPECTION FORMS

NEW YORK STATE DEPARTMENT OF HEALTH
INDOOR AIR QUALITY QUESTIONNAIRE AND BUILDING INVENTORY
CENTER FOR ENVIRONMENTAL HEALTH

This form must be completed for each residence involved in indoor air testing.

Preparer's Name _____ Date/Time Prepared _____

Preparer's Affiliation _____ Phone No._____

Purpose of Investigation_____

1. OCCUPANT:

Interviewed: Y / N

Last Name: _____ First Name: _____

Address: _____

County: _____

Home Phone: _____ Office Phone: _____

Number of Occupants/persons at this location _____ Age of Occupants _____

2. OWNER OR LANDLORD: (Check if same as occupant ___)

Interviewed: Y / N

Last Name: _____First Name: _____

Address: _____

County: _____

Home Phone: _____ Office Phone: _____

3. BUILDING CHARACTERISTICS

Type of Building: (Circle appropriate response)

Residential	School	Commercial/Multi-use
Industrial	Church	Other: _____

If the property is residential, type? (Circle appropriate response)

Ranch	2-Family	3-Family
Raised Ranch	Split Level	Colonial
Cape Cod	Contemporary	Mobile Home
Duplex	Apartment House	Townhouses/Condos
Modular	Log Home	Other:_____

If multiple units, how many? _____

If the property is commercial, type?

Business Type(s) _____

Does it include residences (i.e., multi-use)? Y / N If yes, how many? _____

Other characteristics:

Number of floors_____ Building age_____

Is the building insulated? Y / N How air tight? Tight / Average / Not Tight

4. AIRFLOW

Use air current tubes or tracer smoke to evaluate airflow patterns and qualitatively describe:

Airflow between floors

_____

_____

_____

Airflow near source

_____

_____

_____

Outdoor air infiltration

_____

_____

_____

Infiltration into air ducts

_____

_____

_____

5. BASEMENT AND CONSTRUCTION CHARACTERISTICS (Circle all that apply)

a. Above grade construction:	wood frame	concrete	stone	brick
b. Basement type:	full	crawlspace	slab	other _____
c. Basement floor:	concrete	dirt	stone	other _____
d. Basement floor:	uncovered	covered	covered with _____	
e. Concrete floor:	unsealed	sealed	sealed with _____	
f. Foundation walls:	poured	block	stone	other _____
g. Foundation walls:	unsealed	sealed	sealed with _____	
h. The basement is:	wet	damp	dry	moldy
i. The basement is:	finished	unfinished	partially finished	
j. Sump present?	Y / N			
k. Water in sump?	Y / N / not applicable			

Basement/Lowest level depth below grade: _____(feet)

Identify potential soil vapor entry points and approximate size (e.g., cracks, utility ports, drains)

_____

_____

6. HEATING, VENTING and AIR CONDITIONING (Circle all that apply)

Type of heating system(s) used in this building: (circle all that apply – note primary)

Hot air circulation	Heat pump	Hot water baseboard	
Space Heaters	Stream radiation	Radiant floor	
Electric baseboard	Wood stove	Outdoor wood boiler	Other _____

The primary type of fuel used is:

Natural Gas	Fuel Oil	Kerosene
Electric	Propane	Solar
Wood	Coal	

Domestic hot water tank fueled by: _____

Boiler/furnace located in:	Basement	Outdoors	Main Floor	Other_____
Air conditioning:	Central Air	Window units	Open Windows	None

Are there air distribution ducts present? Y / N

Describe the supply and cold air return ductwork, and its condition where visible, including whether there is a cold air return and the tightness of duct joints. Indicate the locations on the floor plan diagram.

_____

_____

_____

_____

7. OCCUPANCY

Is basement/lowest level occupied? Full-time Occasionally Seldom Almost Never

Level	**General Use of Each Floor (e.g., familyroom, bedroom, laundry, workshop, storage)**
Basement	_____
1st Floor	_____
2nd Floor	_____
3rd Floor	_____
4th Floor	_____

8. FACTORS THAT MAY INFLUENCE INDOOR AIR QUALITY

a. Is there an attached garage? Y / N

b. Does the garage have a separate heating unit? Y / N / NA

c. Are petroleum-powered machines or vehicles stored in the garage (e.g., lawnmower, atv, car) Y / N / NA Please specify_____

d. Has the building ever had a fire? Y / N When?_____

e. Is a kerosene or unvented gas space heater present? Y / N Where? _____

f. Is there a workshop or hobby/craft area? Y / N Where & Type? _____

g. Is there smoking in the building? Y / N How frequently? _____

h. Have cleaning products been used recently? Y / N When & Type? _____

i. Have cosmetic products been used recently? Y / N When & Type? _____

j. Has painting/staining been done in the last 6 months? Y / N Where & When? _____

k. Is there new carpet, drapes or other textiles? Y / N Where & When? _____

l. Have air fresheners been used recently? Y / N When & Type? _____

m. Is there a kitchen exhaust fan? Y / N If yes, where vented?_____

n. Is there a bathroom exhaust fan? Y / N If yes, where vented?_____

o. Is there a clothes dryer? Y / N If yes, is it vented outside? Y / N

p. Has there been a pesticide application? Y / N When & Type?_____

Are there odors in the building? Y / N
If yes, please describe: _____

Do any of the building occupants use solvents at work? Y / N
(e.g., chemical manufacturing or laboratory, auto mechanic or auto body shop, painting, fuel oil delivery, boiler mechanic, pesticide application, cosmetologist

If yes, what types of solvents are used? _____

If yes, are their clothes washed at work? Y / N

Do any of the building occupants regularly use or work at a dry-cleaning service? (Circle appropriate response)

Yes, use dry-cleaning regularly (weekly) No
Yes, use dry-cleaning infrequently (monthly or less) Unknown
Yes, work at a dry-cleaning service

Is there a radon mitigation system for the building/structure? Y / N Date of Installation: _____
Is the system active or passive? Active/Passive

9. WATER AND SEWAGE

Water Supply:	Public Water	Drilled Well	Driven Well	Dug Well	Other: _____
Sewage Disposal:	Public Sewer	Septic Tank	Leach Field	Dry Well	Other: _____

10. RELOCATION INFORMATION (for oil spill residential emergency)

a. Provide reasons why relocation is recommended: _____

b. Residents choose to: remain in home relocate to friends/family relocate to hotel/motel

c. Responsibility for costs associated with reimbursement explained? Y / N

d. Relocation package provided and explained to residents? Y / N

11. FLOOR PLANS

Draw a plan view sketch of the basement and first floor of the building. Indicate air sampling locations, possible indoor air pollution sources and PID meter readings. If the building does not have a basement, please note.

Basement:

First Floor:

12. OUTDOOR PLOT

Draw a sketch of the area surrounding the building being sampled. If applicable, provide information on spill locations, potential air contamination sources (industries, gas stations, repair shops, landfills, etc.), outdoor air sampling location(s) and PID meter readings.

Also indicate compass direction, wind direction and speed during sampling, the locations of the well and septic system, if applicable, and a qualifying statement to help locate the site on a topographic map.

13. PRODUCT INVENTORY FORM

Make & Model of field instrument used: _____

List specific products found in the residence that have the potential to affect indoor air quality.

Location	Product Description	Size (units)	Condition*	Chemical Ingredients	Field Instrument Reading (units)	Photo** Y / N

* Describe the condition of the product containers as **Unopened (UO), Used (U),** or **Deteriorated (D)**
** Photographs of the **front and back** of product containers can replace the handwritten list of chemical ingredients. However, the photographs must be of good quality and ingredient labels must be legible.