131 Sunnyside, LLC

Soil Vapor Extraction Interim Remedial Measure Work Plan

Former United Stellar Industries
131 Sunnyside Boulevard
Plainview, New York
NYSDEC Site Number 1-30-115

October 7, 2021

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Acronyms and Abbreviations

CSM	conceptual site model
ft bls	feet below land surface
HSA	hollow-stem auger
IRM	interim remedial measure
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
PVC	polyvinyl chloride
ROI	radius of influence
SVE	soil vapor extraction
SVI	Soil Vapor Investigation
VOC	volatile organic compound

1 Introduction

On behalf of 131 Sunnyside, LLC, Arcadis has prepared this Soil Vapor Extraction Interim Remedial Measure Work Plan (Work Plan) to describe the soil vapor extraction (SVE) interim remedial measure (IRM) and additional soil vapor quality evaluation activities that will be implemented at 131 Sunnyside Boulevard, Plainview, New York (Site), in Nassau County, New York. The scope of work presented in this Work Plan has been developed in response to requests from the New York State Department of Environmental Conservation (NYSDEC) in emails dated May 4, 2021 and September 7, 2021. In an email dated July 28, 2021, Arcadis presented a scope of work to further evaluate soil vapor quality and proposed an interim remedial measure (i.e., a temporary SVE system) at the Site. The NYSDEC indicated in the September 7, 2021 email that the New York State Department of Health (NYSDOH) requested a work plan instead of the July 28, 2021 email transmittal.

2 Environmental Setting

The following subsections of this Work Plan describe the Site geology and recent environmental conditions as they relate to groundwater flow conditions and groundwater quality.

2.1 Geology

In general, the geology at the Site, from land surface down to the bottom of the Magothy Formation, consists primarily of sand with interbedded layers of silt, clay and gravel. The uppermost sequence of these sediments is a part of the Upper Pleistocene outwash and/or morainal deposits, while the lower sequence comprises the Magothy Formation, which is a part of the Atlantic Coastal Plain deposits. In the vicinity of the Site, the Upper Pleistocene deposits are approximately 100 feet thick. Of the numerous clay lenses penetrated during previous drilling efforts, two areally extensive perched zones were encountered at approximately 80 and 100 feet below land surface (ft bls). The clay units, referred to as the shallow and deep clays, respectively, were the only clays found to support perched water (Arcadis 2007).

2.2 Groundwater Flow Conditions

Water level measurements were collected on April 29, 2019 from wells screened immediately above the shallow clay and deep clay upper surfaces that support perched water, and from downgradient wells that are screened in the regional groundwater system. The shallow perched water zone, based on water level measurements, is unconfined and relatively thin (approximately six feet thick). The depth to water in the shallow perched zone at the Site ranges from approximately 66 to 76 ft bls. Based on the equipotential lines generated from water level observations, the shallow perched water flow direction is to the north-northeast.

The hydraulic head elevation in the deep perched water zone is above the bottom of the shallow clay, indicating that the deep perched water zone is confined. The direction of groundwater flow in the deep perched water zone is toward the south-southwest.

2.3 Shallow Perched Zone Water Quality

Based on the conceptual site model (CSM) that transfer of volatile organic compound (VOC) mass from perched water to soil vapor could only occur from the shallow perched zone, only shallow perched water quality is discussed below.

Based on sampling events between August 2006 and July 2013, concentrations of VOCs in the shallow perched zone were either not detected above the laboratory reporting limit or below groundwater quality standards. Therefore, concentrations of VOCs in the shallow soil vapor observed during the July 2010 Soil Vapor Investigation (SVI) and December 2020 Soil Vapor Screening Evaluation do not appear to be associated with the mechanism of VOC mass transfer from the liquid phase to the gas phase.

3 Additional Soil Vapor Quality Evaluation Activities

Based on data that were collected in July 2010 and December 2020, an elevated concentration of TCE is still present in soil vapor at the SV-11 location and an elevated concentration of cis-1,2-DCE is still present in soil vapor at the SV-1 location (Figure 1). As described in the Soil Vapor Screening Evaluation Summary Report (Arcadis 2021), these elevated VOC concentrations in soil vapor appear to be relatively localized based on data from nearby soil vapor sample locations such as SV-12 (near SV-11) and SV-9 (near SV-1). To further evaluate soil vapor quality in the vicinity of temporary soil vapor point SV-11, two (2) permanent soil vapor probes (SV-13 and SV-14) will be installed along the eastern property boundary. The proposed soil vapor probe locations are shown on Figure 1 and are positioned along the edge of the parking lot pavement, which is the furthest east that the drill rig can safely access before the topography slopes downward to the adjacent property to the east. The soil vapor probes will be installed to a depth of approximately 8 ft bls for the collection of soil vapor samples and will be constructed as follows.

- A borehole will be advanced to 8 ft bls and a 6-inch long screen and Teflon®-lined tubing will be placed into the open borehole.
- Once the soil vapor probe has been placed in the borehole, clean silica sand will be installed around the screen and tubing to create an appropriate sand pack. The sand pack will be installed 3 inches above and 3 inches below the 6-inch screen, creating a 12-inch sampling interval (7-8 ft bls).
- 6 inches of dry granulated bentonite will be installed above the sand pack.
- Hydrated bentonite will then be installed to a depth 1 foot below land surface.
- The remaining annulus will be filled with non-shrink grout cement to approximately 6 inches below land surface. A small amount of sand will be placed on top of the cement to ensure that the tubing does not contact the grout cement during curing.
- A flush-mount protective casing will be installed.

Tracer gas testing and soil vapor sampling will be performed consistent with the procedures described in the NYSDEC-approved November 25, 2020 Soil Vapor Screening Evaluation Work Plan. The soil vapor samples will be collected in batch certified, pre-cleaned 6-liter SUMMA® canisters provided by Alpha Analytical, a NYSDOH approved laboratory, located in Westborough, Massachusetts. All samples will be analyzed for the compound list provided in Table 1 of the Soil Vapor Screening Evaluation Work Plan by USEPA Method TO-15.

4 Soil Vapor Extraction Interim Remedial Measure

The SVE IRM will involve the installation of a temporary SVE system in the vicinity of temporary soil vapor points SV-1 and SV-11 to remove, as reasonably practical, the VOCs that have accumulated in soil vapor beneath the asphalt parking lot surface. Two (2) SVE wells (SVE-1 and SVE-2) will be installed, one in the vicinity of SV-11 (SVE-1) and one in the vicinity of SV-1 (SVE-2), to extract VOC-impacted soil vapor. Hollow-stem auger (HSA) drilling will be used for the drilling and installation of the SVE wells. The SVE wells will be constructed with 4-inch diameter Schedule 40 polyvinyl chloride (PVC) casing and 5 feet of 4-inch diameter Schedule 40 PVC screen. The SVE wells will be screened from 5 to 10 ft bls to target the interval where elevated concentrations of VOCs were detected in shallow soil vapor in December 2020. Four (4) induced vacuum monitoring points will be installed around each SVE well (total of eight (8) monitoring points [VMP-1 through VMP-8]) at distances of approximately 20, 40, 60, and 80 feet and in various directions from the SVE wells to determine the radius of influence (ROI). The ROI will be determined based on a minimum vacuum level (relative to ambient pressure) of 0.1 inches of water column. Direct push drilling will be used for the drilling and installation of the induced vacuum monitoring points. The induced vacuum monitoring points will be constructed with 1-inch diameter Schedule 40 PVC casing and 5 feet of 1-inch diameter Schedule 40 PVC screen. The induced vacuum monitoring points will be screened from 5 to 10 ft bls (i.e., screened in the same interval as the SVE wells). The locations of the SVE wells and induced vacuum monitoring points are shown on Figure 1.

The SVE IRM will be operated for a period of 4 weeks and performance monitoring data (e.g., influent air samples) will be collected to evaluate system effectiveness and to assess whether there is a decline in VOC mass removal (i.e., asymptotic behavior). Influent samples will be collected on a weekly basis during the 4-week period of system operation. Monitoring data will be collected from the induced vacuum monitoring points during startup and during the first week of system operation to determine the ROI. The need for treatment (i.e., vapor-phase granular activated carbon) of the extracted soil vapor will be evaluated and confirmed with the NYSDEC prior to system construction. The SVE IRM will be constructed with some temporary components (e.g., rented blower skids and temporary enclosures) to implement a two-month temporary IRM.

Based on data collected during the 4-week system operation period, estimates of mass removal rates will be calculated. Rebound monitoring will be performed to evaluate whether accumulated VOCs have been removed or if longer term operation of the SVE system may be warranted. The rebound monitoring will be performed 1 week following the initial system shut down (i.e., after 4 weeks of continuous operation), and again, 1 month following the initial system shut down. Following each shut down period, the SVE system will be restarted, and an influent sample will be collected 1 hour following resumed operation. The SVE system will then be shut down again following the collection of each rebound influent sample. Therefore, two influent samples will be collected during the rebound monitoring phase.

5 Data Evaluation and Reporting

Following this two-month operating and testing period, the data generated during the IRM will be evaluated and recommendations will be made that can range from permanent shutdown of the IRM to system modifications to accommodate longer-term operation. The SVE IRM operational and rebound monitoring data and our recommendations will be provided to the NYSDEC and NYSDOH for their input and approval of an acceptable path forward. The results of the activities described above will also be summarized in an SVE IRM Summary Report (Report) and submitted to the NYSDEC. Prior to the submittal of the Report, the soil vapor quality data

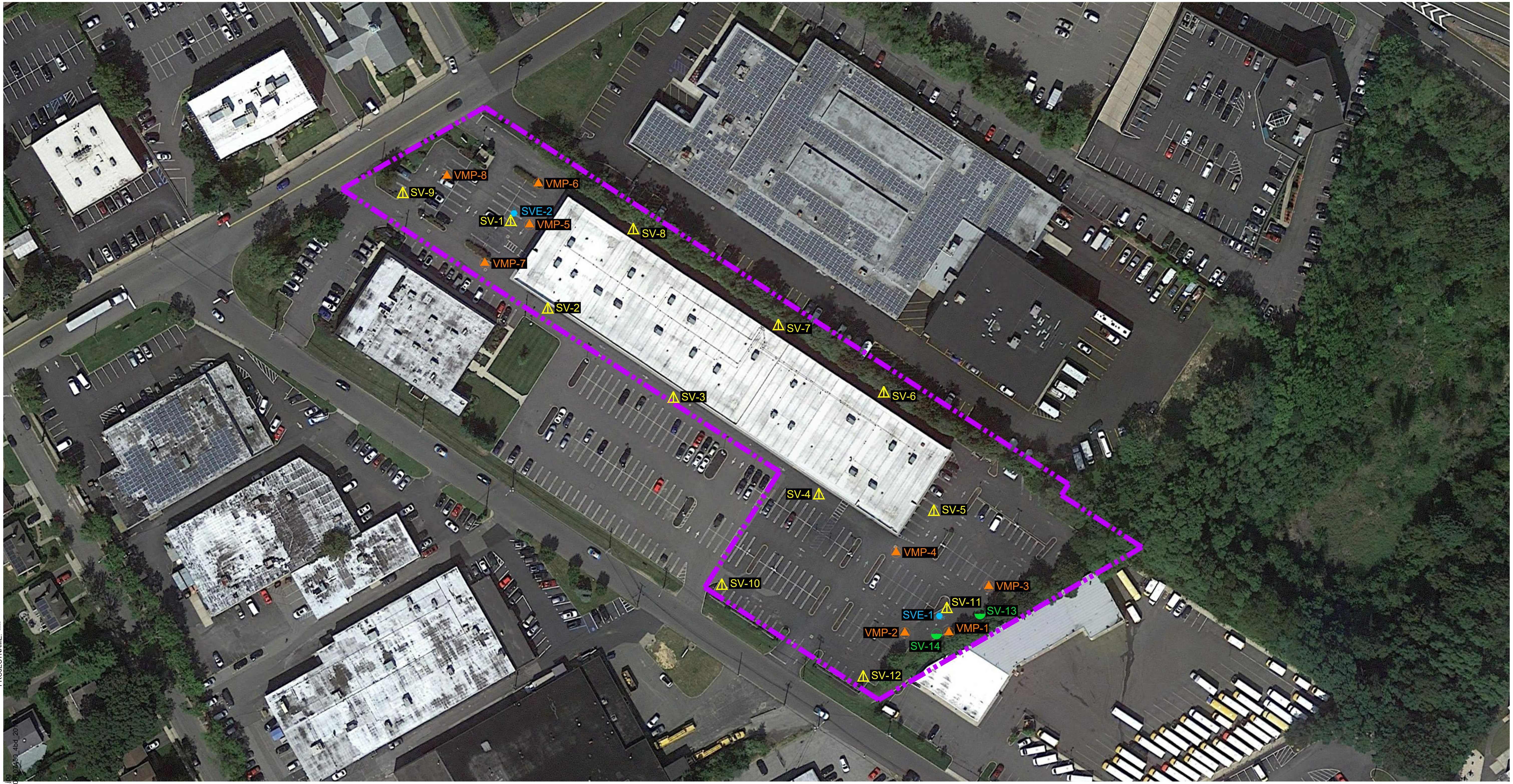
collected from SV-13 and SV-14 will be discussed with the NYSDEC to determine whether off-site soil vapor intrusion investigation activities are warranted at the property located directly east of the Site during the 2021/2022 heating season. If it is determined that off-site soil vapor intrusion investigation activities are necessary, good faith efforts will be made during the heating season to secure an access agreement with the off-site property owner.

6 References

Arcadis 2021. *Soil Vapor Screening Evaluation Summary Report.* Former United Stellar Industries, 131 Sunnyside Boulevard, Plainview, New York. February 2021.

Arcadis. 2007. *Site Characterization Report*. United Stellar Industries Property. 131 Sunnyside Boulevard, Plainview, New York. June 2007.

Figures



LEGEND:

- APPROXIMATE PROPERTY LINE
- SV-1 SOIL VAPOR SAMPLE LOCATION
- SVE-1 SOIL VAPOR EXTRACTION WELL
- SV-12 SOIL VAPOR PROBE
- VMP-1 VACUUM MONITORING POINT

0 100' 200'

APPROXIMATE SCALE IN FEET

NOTES:

1. SITE AERIAL PHOTOGRAPH FROM GOOGLE EARTH PRO, DATED 09.19.2019.
2. ALL CONCENTRATIONS ARE IN MICROGRAMS PER CUBIC METER (μg/m^3).
3. ALL LOCATIONS ARE APPROXIMATE.

FORMER UNITED STELLAR INDUSTRIES SITE
131 SUNNYSIDE BOULEVARD
PLAINVIEW, NEW YORK

SVE IRM WELL LOCATIONS

ARCADIS Design & Consultancy for natural and built assets

FIGURE
1

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