SUBSURFACE INVESTIGATION REPORT

130 MIDLAND AVENUE
PORT CHESTER, NEW YORK

PREPARED FOR:

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INTRODUCTION

HydroEnvironmental Solutions, Inc. (HES), on behalf Mr. Kevin Leahey, of The Renatus Group, has completed a Subsurface Investigation (SI) at the property located at 130 Midland Avenue in Port Chester, New York. The SI included the installation of twelve (12) soil borings, six (6) monitoring wells and eight (8) soil vapor points throughout the property. The SI field work was completed from January 27, 2020 through February 19, 2020. The site location is shown on **Figure 1** and photographs taken during field activities are included on **Figure 2**.

The site activities completed by HES included test boring installation, monitoring well installation, soil vapor point installation, field screening soil samples for the presence of petroleum vapors with a photoionization detector (PID), and collection of representative soil, groundwater and soil vapor samples for laboratory analysis. The field activities and results are presented below.

SITE BACKGROUND

In May 2019, PM Environmental, Incorporated (PM) completed a Phase II Environmental Site Assessment (ESA) at the subject property. The Phase II investigation consisted of a total of twelve (12) soil borings, nine (9) temporary monitor wells and two (2) soil gas sampling points.

The results of the Phase II indicated that the soil, groundwater and soil gas at the subject property were impacted. Soils exceed New York State Department of Environmental Conservation (NYSDEC) Restricted Use Soil Clean-Up Objectives – Commercial (RU(C)-SCOs) in boring locations SB/TMW-4, SB-6, SB-11, SB/TMW-12. Groundwater samples exceeded NYSDEC Ambient Water Quality Standards (AWQS) in accordance with the Technical and Operational Guidance Series (TOGS) 1.1.1. in monitor well locations SB/TMW-2, SB/TMW-4, SB/TMW-5, SB/TMW-8 and SB/TMW-12. Soil vapor samples collected from below the building slab exceeded United States Environmental Protection Agency (EPA) Vapor Intrusion Screening Levels (VISLs) at both of the soil gas point locations; SSGS-1 and SSGS-2.

Based on the findings presented in the Phase II completed by PM, an additional environmental investigation has been recommended. HES completed the following work to further assess the extent of soil, groundwater and soil vapor impacts at the property.

HYDROGEOLOGIC SETTING

The subject site consists of a relatively flat parcel. The site and surrounding area slopes to the east, gently away from the property towards Captain Harbor, which is located

approximately 2,900 feet to the east of the site. The groundwater flow direction was not calculated as part of this SI, although groundwater flow likely mimics topography and flows to the east towards the Captain Harbor.

The unconsolidated material beneath the site is composed of fill which consists of silt, gravel and sand, with varying amounts of slag, coal, brick and concrete. A layer of silt, sand and clay with varying amounts of peat was encountered below the unconsolidated fill at approximately 8 to 10 feet below grade (ftbg). According to the Surficial Geologic Map of New York, the native material beneath the site consists of a glacial till, variable in texture, usually poorly sorted diamict of variable clasts (Cadwell, 1986). According to the Geologic Map of New York, the bedrock beneath the site is the Harrison Gneiss, consisting of biotite-hornblende-quartz-plagioclase gneiss with accessory garnet and sphene; plagioclase commonly occurs as augen (Fisher, 1970).

FIELD ACTIVITIES

Test Boring Installation and Soil Sampling

Between January 28th and January 31st, 2020, HES installed twelve (12) test borings across the site. The test borings were designated GB-1 through GB-12 and installed using a Geoprobe® 54DT and the direct push drilling method and Manual Geoprobe® equipment. The approximate test boring and soil sampling locations are identified on **Figure 3** and their respective Geologic Logs are included in **Appendix 1**.

During the installation of GB-1 through GB-11, soil samples were collected continuously in 4-foot increments at each test boring location using a 2.25-inch carbon steel macro-core sampler and logged in the field by the on-site hydrogeologist. At each boring location, the HES hydrogeologist recorded and documented subsurface conditions. Volatile organic vapor analysis was performed on soil samples collected in the field using a calibrated MiniRAE® 3000 PID and the headspace method. The results of soil field screening are summarized on the Geologic Logs in **Appendix 1**. Bedrock was not encountered at any of the boring locations at depths ranging from approximately 5 ftbg to 15 ftbg. Groundwater was observed at all boring locations at approximately 6 ftbg.

Soil samples were collected from the test boring locations and placed in appropriately labeled sample jars and transported on ice to York Analytical Laboratories, Inc. (York); a New York State Certified Laboratory located in Stratford, Connecticut, where they were analyzed for the presence of volatile organic compounds (VOCs) via EPA Method 8260, semi-volatile organic compounds (SVOCs) via EPA Method 8270, Polychlorinated biphenyls (PCBs), Herbicides, Pesticides, TAL Metals, 1,4-Dioxane and

Per- and Polyfluoroalkyl substances (PFAS). The test boring locations are shown on **Figure 3**, a site plan of the subject site and soil sampling laboratory analytical results from the test borings are summarized on **Table 1** and the laboratory analytical report is included in **Appendix 2**.

Monitor Well Installation and Groundwater Sampling

On January 28th and 29th, 2020, SoilTesting, Inc. of Oxford, Connecticut, under direct supervision of HES, installed six (6) groundwater monitoring wells using a truck-mounted Diedrich D-120 drill rig and the hollow stem auger (HAS) drilling method. The installed monitor wells were designated MW-1 through MW-6 and their approximate locations are identified on **Figure 4**. The wells were constructed of 2-inch schedule 40 PVC with 20-slot well screen and solid casing. Filter sand and a bentonite seal were placed in the annular space surrounding the wells. The wells were allowed time to equilibrate prior to purging and sampling activities.

Additionally, undisturbed sediment samples were collected continuously in 2-foot increments using a 2.25-inch carbon steel split-spoon sampler. Completion depths ranged from 12 ftbg to 29 ftbg. The soil samples were collected and screened using a calibrated MiniRae® 3000 PID and the headspace method. PID field screening results are included on the Geologic Logs for the MW-1 through MW-6 which are attached as **Appendix 1**.

Soil samples were collected from MW-1, MW-3, MW-4, MW-5 and MW-6 locations. Each of the samples collected were placed in appropriately labeled glassware and transported on ice to York where they were analyzed for the presence of VOCs via EPA Method 8260, SVOCs via EPA Method 8270, PCBs, Herbicides, Pesticides, TAL Metals, 1,4-Dioxane and PFAS. Soil sampling laboratory analytical results from the monitor well installations are summarized on **Table 1** and the laboratory analytical report is included in **Appendix 2**.

On February 13th, 14th and 19th, 2020, groundwater samples were collected from the monitoring wells. Prior to sample collection, depth to water (DTW) measurements were collected using an electronic interface probe. Following DTW measurements, groundwater was evacuated using a bladder pump. The pump was decontaminated between sampling well locations using an Alconox® solution. The groundwater samples, designated MW-1 through MW-6, were collected in appropriately labeled glassware in accordance with industry accepted protocols. The samples were transported on ice to York and were analyzed for VOCs via EPA method 8260 and SVOCs via EPA method 8270, 1,4-Dioxane and PFAS. The groundwater sampling laboratory analytical results from the test borings are summarized on **Table 2** and the laboratory analytical report is included in **Appendix 3**.

Soil Vapor Point Installation and Soil Vapor Sampling

Eight (8) soil vapor monitoring points were installed using a hammer drill in accordance with New York State Department of Health (NYSDOH) Soil Vapor Sampling Procedures. The monitoring points were constructed of 6-inch and 12-inch stainless-steel screen and polyethylene tubing. Each screen was set to a depth of 6 to 18-inches below the surface and No. 2 filter sand was used to fill the annular space surrounding the screen. A bentonite seal was then placed above the filter sand layer and concrete was used to complete the seal flush with the surface. Sub-slab soil vapor sampling for the site involved collecting soil vapor samples from below the buildings slab using 6-inch stainless steel screen vapor monitoring implants. The interior vapor monitoring points were designated VP-1 through VP-5. In order to determine if vapor migration was occurring from below the slab, exterior perimeter vapor monitoring points were installed surrounding the exterior of the building's foundation using 12-inch stainless steel vapor monitoring implants. The exterior monitoring points were designated VP-6 through VP-8.

HES performed a tracer gas test according to NYSDOH Guidelines, to confirm the vapor monitoring points were adequately sealed and would collect a sample of the soil vapor from the surrounding formation properly.

On February 4th and 19th, 2020, HES collected soil vapor samples from the soil vapor monitoring points at the Site. Samples were collected in appropriately labeled 6-liter regulated stainless-steel summa canisters over an 8-hour period and transported to York, where they were analyzed for VOCs using US EPA Method TO-15 + Freon analysis. Additionally, indoor and outdoor ambient air samples were collected during the February 4th, 2020 sampling event.

Approximate vapor monitoring points and sampling locations are shown on **Figure 5**. The soil vapor laboratory analytical results are summarized on **Table 3** and the laboratory analytical data is included in **Appendix 4**.

RESULTS

Test Boring and Soil Sampling Results

Significant VOC vapors were detected at a majority of the boring locations during PID field screening activities. The highest PID readings at each test boring ranged from 0.8 parts per million (ppm) to 201 ppm. The results of PID field screening are summarized on the Geologic Logs included in **Appendix 1**.

Soil laboratory analytical results indicate that concentrations of either SVOCs and/or TAL Metals were detected above NYSDEC RU(C)-SCOs; in accordance with Subpart 375-6: Remedial Program Soil Cleanup Objectives for commercial properties in six of the sixteen soil samples as detailed below.

Soil collected from the ground boring location designated GB-1 (4-8) contained concentrations of SVOCs which exceed NYSDEC RU(C)-SCOs and include Benzo(a)anthracene (12.9 mg/kg), Benzo(a)pyrene (10.1 mg/kg), Benzo(b)fluoranthene (8.17 mg/kg) and Dibenzo(a,h)anthracene (2.22 mg/kg).

Soil collected from the ground boring location designated GB-2 (4-8) contained concentrations of the SVOC Benzo(a)pyrene (1.18 ug/kg) which exceeded NYSDEC RU(C)-SCOs.

Soil collected from the ground boring location designated GB-5 (0-4) contained concentrations of the SVOC Benzo(a)pyrene (1.24 ug/kg) which exceeded NYSDEC RU(C)-SCOs.

Soil collected from the ground boring location designated GB-8 (8-12) contained concentrations of the SVOC Benzo(a)pyrene (1.44 ug/kg) which exceeded NYSDEC RU(C)-SCOs.

Soil collected from the ground boring location designated GB-12 (1-4) contained concentrations of the SVOC Benzo(a)pyrene (1.61 ug/kg) as well as Copper (411 ug/kg) which exceeded their respective NYSDEC RU(C)-SCOs.

Soil collected from the ground boring location designated MW-4 (2-7) contained concentrations of SVOCs which exceed NYSDEC RU(C)-SCOs and include Benzo(a)pyrene (2.74 mg/kg), and Dibenzo(a,h)anthracene (0.571 mg/kg).

Furthermore, PFAS compounds were detected in the soil sample locations designated GB-5 and MW-4.

Soil sampling results collected during the SI conducted by HES as well as soil sampling results obtained by PM during the Phase II investigation which exceed NYSDEC RU(C)-SCOs are shown on **Figure 3**. The laboratory analytical results are summarized on **Table 1** and the analytical report is included in **Appendix 2**.

Groundwater Sampling Results

Groundwater collected from the monitoring well at the MW-2 location contained concentrations of VOCs which include Isopropylbenzene (9.43 micrograms per liter (ug/L)), n-Propylbenzene (12.4 ug/L), p- & m- Xylenes (6.06 ug/L) and Total Xylenes (8.4 ug/L) which exceeded their respective NYSDEC AWQS in accordance with the TOGS 1.1.1.

Groundwater collected from the monitoring well at the MW-4 location contained concentrations of SVOCs which include Benzo(a)anthracene (0.0778 ug/L), Benzo(a)pyrene (0.0556 ug/L), Benzo(b)fluoranthene (0.0556 ug/L) and Chrysene (0.0556 ug/L) which exceeded their respective NYSDEC AWQS in accordance with the TOGS 1.1.1.

Groundwater collected from the monitoring well at the MW-4 location contained concentrations of SVOCs which include Benzo(a)anthracene (0.108 ug/L), Benzo(a)pyrene (0.0973 ug/L), Benzo(b)fluoranthene (0.0757 ug/L), Benzo(k)fluoranthene (0.0757 ug/L), Chrysene (0.0856 ug/L) and Indeno(1,2,3-cd)pyrene (0.0541 ug/L) which exceeded their respective NYSDEC AWQS in accordance with the TOGS 1.1.1.

Furthermore, PFAS compounds were detected in each of the six monitor well locations.

Groundwater sampling results collected during the SI conducted by HES which exceed NYSDEC AWQS TOGS 1.1.1 are shown on **Figure 4**. The laboratory analytical results are summarized on **Table 2** and the analytical report is included in **Appendix 3**.

Soil Vapor Sampling Results

Soil vapor collected from below the foundation slab at the VP-1 location contained concentrations of multiple VOCs which were detected above their respective NYSDOH – Indoor Air – Upper Fence levels. VOCs detected which exceed upper fence levels include cis-1,2-Dichloroethylene (199 ug/m3 (microgram per meter cubed), Dichlorodifluoromethane (62.2 ug/m3), Tetrachloroethylene (7,970.0 ug/m3) and Trichloroethylene (98.9 ug/m3).

Soil vapor collected from below the foundation slab at the location of VP-2 contained concentrations of multiple VOCs which were detected above their respective NYSDOH – Indoor Air – Upper Fence levels. VOCs detected which exceed upper fence levels include cis-1,2-Dichloroethylene (1.7 ug/m3), Dichlorodifluoromethane (76.9 ug/m3), Tetrachloroethylene (1,190.0 ug/m3) and Trichloroethylene (41.8 ug/m3).

Soil vapor collected from below the foundation slab at the VP-3 location contained concentrations of multiple VOCs which were detected above their respective NYSDOH – Indoor Air – Upper Fence levels. VOCs detected which exceed upper fence levels include 1,1,1-Trichloroethane (191 ug/m3), Benzene (20 ug/m3), Dichlorodifluoromethane (2,080.0 ug/m3), Tetrachloroethylene (19.0 ug/m3) and Trichlorofluoromethane (Freon 11) (21.3 ug/m3).

Soil vapor collected from below the foundation slab at the location of VP-4 contained concentrations of multiple VOCs which were detected above their respective NYSDOH – Indoor Air – Upper Fence levels. VOCs detected which exceed upper fence levels include 1,1,1-Trichloroethane (17.0 ug/m3), Chloroform (14.3 ug/m3), Dichlorodifluoromethane (790.0 ug/m3), Tetrachloroethylene (11.9 ug/m3) and Trichlorofluoromethane (Freon 11) (167.0 ug/m3).

Soil vapor collected from below the foundation slab at the VP-5 location contained concentrations of multiple VOCs which were detected above their respective NYSDOH – Indoor Air – Upper Fence levels. VOCs detected which exceed upper fence levels include 1,1,1-Trichloroethane (33.7 ug/m3), 4-Methyl-2-pentanone (2.3 ug/m3), Benzene (70.6 ug/m3), Chloroethane (1.49 ug/m3), Chloroform (1.79 ug/m3), Dichlorodifluoromethane (54.5 ug/m3), Methyl Methacrylate (2.18 ug/m3), Tetrachloroethylene (5.76 ug/m3) and Trichlorofluoromethane (Freon 11) (74.9 ug/m3).

Soil vapor collected from outside of the foundation slab at the location of VP-6 contained concentrations of multiple VOCs which were detected above their respective NYSDOH – Indoor Air – Upper Fence levels. VOCs detected which exceed upper fence levels include 4-Methyl-2-pentanone (3.47 ug/m3), Acetone (160 ug/m3), Methyl Methacrylate (14.4 ug/m3) and Tetrahydrofuran (1.12 ug/m3).

Soil vapor collected from outside of the foundation slab at the location of VP-7 contained concentrations of multiple VOCs which were detected above their respective NYSDOH – Indoor Air – Upper Fence levels. VOCs detected which exceed upper fence levels include 1,1,1-Trichloroethane (9.94 ug/m3), Acetone (1,430 ug/m3), Cyclohexane (17.6 ug/m3), n-Hexane (18.6 ug/m3), Tetrachloroethylene (17.3 ug/m3) and Trichloroethylene (3.92 ug/m3).

Soil vapor collected from outside of the foundation slab at the VP-8 location contained concentrations of multiple VOCs which were detected above their respective NYSDOH – Indoor Air – Upper Fence levels. VOCs detected which exceed upper fence levels include Acetone (193 ug/m3), Methyl Methacrylate (2.56 ug/m3) and Tetrahydrofuran (2.67 ug/m3).

An indoor ambient air sample was collected inside of the dry cleaner facility. Results from the indoor ambient air sampling show that multiple VOCs were detected above their respective NYSDOH – Indoor Air – Upper Fence levels which include Methyl Methacrylate (3.72 ug/m3), Tetrachloroethylene (295 ug/m3) and Trichloroethylene (0.995 ug/m3).

Soil vapor sampling results collected during the SI conducted by HES as well as soil vapor sampling results obtained by PM during the Phase II investigation which exceed NYSDOH Upper Fence Levels are shown on **Figure 5**. The laboratory analytical results are summarized on **Table 3** and the analytical report is included in **Appendix 4**.

CONCLUSIONS

Soil screening and the laboratory analyses of soil, groundwater and soil vapor completed during SI activities at the subject site indicate that impacts to the soil, groundwater and soil vapor beneath the site are present. It is likely that these impacts relate to historic activities at the property, including the operation at the site of a historical dry-cleaning facility and historic importation of fill. These findings support the conclusions and recommendations of the Phase II ESA Report provided by PM. A copy of the Phase II ESA report is attached in **Appendix 5**.

- Based on PID field screening and laboratory analytical results from the SI and collected data from the Phase II Report, widespread impacts to the site remain in the unconsolidated fill material due to historic site use. Several SVOCs which exceed NYSDEC RU(C)-SCOs were detected across the site and include Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene and Dibenzo(a,h)anthracene. Additionally, copper was also detected above NYSDEC RU(C)-SCOs. No VOCs, PCBs, Herbicides, Pesticides, or 1,4-Dioxane were detected above NYSDEC- RU(C)-SCOs in any of the soil samples collected for laboratory analysis.

- Multiple VOCs and SVOCs were detected above NYSDEC-AWQS in several of the groundwater samples collected for laboratory analysis.

- Soil vapor data indicates widespread impacts to the soil vapor beneath the building's foundation slab and outside the building's footprint exist beneath the site. Historic operations at the site consisted of a grocery store and dry-cleaning facility. Freon 11 and Freon 12 exist in soil vapor beneath the former grocery store slab.

Additionally, concentrations of Tetrachloroethylene (PCE) and Trichloroethylene (TCE) exist in soil vapor beneath the entire building slab as well as outside of the building footprint.