
**New York State Department of
Environmental Conservation**

**Phase II
Remedial Investigation
Report**

**Highland Plaza Off-Site Area
Tonawanda, Erie County, New York
Site Number C915293A**

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**New York State Department of Environmental Conservation
Division of Environmental Remediation
Region 9
270 Michigan Avenue
Buffalo, New York 14203**

Phase II Remedial Investigation Report

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Site Number C915293A



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1.0 EXECUTIVE SUMMARY

A 2015 Remedial Investigation (RI) of the Highland Plaza Brownfield Cleanup Program (BCP) Site (Site C915293) documented significant concentrations of chlorinated volatile organic compounds (VOCs) in shallow fill, subsurface soil and groundwater in the service alleyway behind the site. As a result, the New York State Department of Environmental Conservation (NYSDEC) determined that the site posed a significant threat to human health and the environment, and that additional investigation was required. The NYSDEC has assigned this off-site area site number C915293A and called it the Highland Plaza Off-Site Area. Following a failed search for viable responsible parties that would undertake a remedial program at the site, the NYSDEC began a Remedial Investigation of the off-site area in March 2017 to further evaluate the nature and extent of contamination in surface soil, shallow fill, subsurface soil, surface water, groundwater, sump water, and soil vapor associated with the site.

The results of the NYSDEC Remedial Investigation are described in the September 2023 Remedial Investigation Report. Based upon the results of that investigation, it was recommended that a Phase II Remedial Investigation be completed at the Highland Plaza Off-Site Area to evaluate more fully the nature and extent of contamination in shallow fill (<2.0' depth), shallow subsurface soil (<8.0' depth), and groundwater at the site.

This Phase II Remedial Investigation Report details the findings of the NYSDEC Phase II Remedial Investigation of the Highland Plaza Off-Site Area (C915293A) that was completed between October 2023 and September 2024.

The Highland Plaza Off-Site Area (Site C915293A) consists of approximately 0.25 acres of a single parcel located behind the Highland Plaza BCP Site (Site C915293) in the Town of Tonawanda, Erie County, New York. The property is not zoned. The site is bordered by the Highland Plaza BCP Site to the north, commercial and residential properties to the east, residential properties and Grimsby Road to the south, and commercial properties and Colvin Boulevard to the west.

The C915293A site is vacant, although a gravel service road runs through the center of the site. Historically, the Town of Tonawanda maintained this service road but no longer does

so. Neither the Erie County Interactive Mapping Viewer nor DECinfo Locator show any property owner information for this parcel. Overhead and underground utilities are also present in the alleyway. Narrow strips of vegetation are located between the plaza building and the service road, and between the service road and fences that separate the alleyway from the adjacent residential properties to the south. The topography of the site is relatively flat.

Historic information concerning the Highland Plaza BCP Site and Off-Site Area is extremely limited and has largely been elucidated through a review of historic aerial photographs, Sanborn maps, and city directories. A 1928 Sanborn map indicates that neither site was developed, although the C915293 property was subdivided into parcels for future residential development. By 1950 the C915293 site was fully developed into a strip plaza, and all of the homes on Grimsby Road had been constructed. Existing information suggests that the service alleyway (Site C915293A) was always vacant. Use of the Highland Plaza BCP Site (C915293) and Off-Site Area (C915293A) have remained unchanged to the present time.

One of the former tenants in the plaza was High Park Cleaners, which closed in March 2010. It is unknown when dry cleaning operations at the plaza began, but a Polk directory from 1963 indicates that High Park Cleaners was in operation at that time. Poor housekeeping practices at this facility is the likely cause of the contamination at the Highland Plaza Off-Site Area.

A Limited Phase II Site Investigation and Vapor Intrusion Study was completed in 2014 to evaluate the strip plaza prior to its purchase by the current owner. Based upon the results of this investigation, the current owner of the Highland Plaza property applied to the NYSDEC's Brownfield Cleanup Program and was accepted into the program in April 2015.

During the Remedial Investigation completed at the Highland Plaza BCP Site in the fall and winter of 2015, soil outside the strip plaza building and on adjacent properties to the east and south were evaluated. In addition, monitoring wells were installed both on-site and off-site to evaluate groundwater quality. This investigation documented significant concentrations of chlorinated volatile organic compounds in shallow fill, subsurface soil, and groundwater in the off-site area.

The main elements of the NYSDEC Remedial Investigation were completed between March 15 and June 22, 2017; groundwater samples were also collected in 2019 and 2021 and evaluated in the NYSDEC Remedial Investigation Report. As stated above, based upon the results of that investigation, it was recommended that a Phase II Remedial Investigation be completed at the Highland Plaza Off-Site Area to evaluate more fully the nature and extent of contamination in shallow fill (<2.0' depth), shallow subsurface soil (<8.0' depth), and groundwater at the site.

The NYSDEC Phase II Remedial Investigation of the Highland Plaza Off-Site Area began on October 2, 2023 with the completion of soil borings and the installation of monitoring wells. During these field activities, one (1) shallow fill sample (<2.0' depth), seventy-two (72) shallow subsurface soil samples (<8.0' depth), and four (4) deeper subsurface soil samples (>8.0' depth) were collected for analysis. All monitoring wells were gauged weekly until December 29, 2023.

The NYSDEC Phase II Remedial Investigation resumed on May 21, 2024 with the development of all on-site and off-site wells. All monitoring wells were then gauged weekly until July 1, 2024. All monitoring wells were sampled in early August 2024, then gauged weekly until September 19, 2024.

The geology of the Highland Plaza BCP Site and Off-Site Area was evaluated in detail in the NYSDEC Remedial Investigation Report by examining the stratigraphic logs from soil borings completed at the sites. These logs reveal the presence of asphalt, concrete and/or crushed stone fill (thicknesses ranging from 0.25 to 1.0 feet), industrial fill consisting of reworked native silty clay soil mixed with sand, gravel, slag, brick fragments and/or concrete fragments (thicknesses ranging from 0.25 to 1.5 feet) and native silty clay soils at the sites.

The water level information obtained during the BCP Remedial Investigation was utilized to construct a groundwater contour map (Figure 4 of the BCP Remedial Investigation Report). Two additional groundwater contour maps were constructed from the water level data obtained during the NYSDEC Phase II Remedial Investigation. These contours show that groundwater flows radially from well MW-5/MW-5R toward the northwest, north, and northeast, and under Highland Plaza. The dominant direction of groundwater flow is toward the northeast. The low permeability of the native silty clay soils, however, likely precludes any significant groundwater flow.

The primary Contaminants of Concern (COCs) identified at the Highland Plaza Off-Site Area are chlorinated volatile organic compounds that are associated with the former dry cleaning operations of High Park Cleaners. The primary contaminant of concerns at the site are tetrachloroethene, and to a lesser extent, its breakdown products trichloroethene and dichloroethene.

Forty-seven (47) fill and subsurface soil samples from 0.0' to 2.0' depth have been collected from the Highland Plaza Off-Site Area to evaluate the nature and extent of contamination of this depth interval. Primary contaminants of concern that exceeded the NYSDEC Part 375 unrestricted soil cleanup objectives included cis-1,2-dichloroethene (5 samples), tetrachloroethene (14 samples) and trichloroethene (4 samples). Tetrachloroethene (14 samples) and trichloroethene (1 sample) also exceeded the NYSDEC Part 375 residential soil cleanup objectives.

Thirty-three (33) subsurface soil samples from 2.0' to 4.0' depth have been collected from the Highland Plaza Off-Site Area to evaluate the nature and extent of contamination of this depth interval. Primary contaminants of concern that exceeded the NYSDEC Part 375 unrestricted soil cleanup objectives included cis-1,2-dichloroethene (2 samples) and tetrachloroethene (3 samples). Tetrachloroethene (2 samples) also exceeded the NYSDEC Part 375 residential soil cleanup objectives.

Thirteen (13) subsurface soil samples from 4.0' to 6.0' depth have been collected from the Highland Plaza Off-Site Area to evaluate the nature and extent of contamination of this depth interval. Primary contaminants of concern that exceeded the NYSDEC Part 375 unrestricted soil cleanup objectives only included cis-1,2-dichloroethene (1 sample). No exceedances of the NYSDEC Part 375 residential soil cleanup objectives were documented.

Fifty-six (56) subsurface soil samples from 6.0' to 8.0' depth have been collected from the Highland Plaza Off-Site Area to evaluate the nature and extent of contamination of this depth interval. Primary contaminants of concern that exceeded the NYSDEC Part 375 unrestricted soil cleanup objectives included cis-1,2-dichloroethene (4 samples), tetrachloroethene (12 samples) and trichloroethene (3 samples). Tetrachloroethene (7 samples) also exceeded the NYSDEC Part 375 residential soil cleanup objectives.

Twenty-seven (27) groundwater samples have been collected from the Highland Plaza BCP Site (Site C915293) and Highland Plaza Off-Site Area (C915293A) to evaluate the nature and extent of groundwater contamination at these sites. Primary contaminants of concern that exceeded the NYSDEC groundwater standards or guidance values included 1,1-dichloroethene (2 samples), cis-1,2-dichloroethene (12 samples), trans-1,2-dichloroethene (3 samples), tetrachloroethene (10 samples), and trichloroethene (8 samples).

The NYSDEC Phase II Remedial Investigation completed at the site was designed to delineate the nature and extent of shallow contamination (<8.0' depth) more fully for purposes of evaluating and selecting a remedial alternative. A Data Gap Analysis, however, revealed that additional delineation is required before a remedial action can be implemented.

It is recommended, therefore, that additional investigation be completed at the Highland Plaza Off-Site Area as described in the Data Gap Analysis (see Section 8.1). In addition, groundwater sampling and analysis should be completed periodically to document groundwater conditions at the site, to document any trends in groundwater contamination, and to identify changes, if any, that occur.

2.0 INTRODUCTION

A Remedial Investigation completed at the Highland Plaza BCP Site (Site C915293; Figures 2-1 and 2-2) between October and December 2015 documented significant concentrations of chlorinated volatile organic compounds (VOCs) in shallow fill, subsurface soil, and groundwater in the service alleyway behind the site. Based upon this contamination, the NYSDEC determined that the site posed a significant threat to human health and the environment, and that additional investigation was required to fully evaluate the nature and extent of this contamination. The NYSDEC assigned this off-site area site number C915293A and called it the Highland Plaza Off-Site Area. The NYSDEC immediately began a search to identify potential responsible parties that would be willing to implement a remedial program at the off-site area. A viable responsible party was not identified.

In March 2017, the NYSDEC began a Remedial Investigation at the Highland Plaza Off-Site Area (Site C915293A; Figure 2-2) to determine the full nature and extent of fill, soil, surface water, groundwater, sump water, and soil vapor contamination associated with the site. The results of that investigation are described in the September 2023 NYSDEC Remedial Investigation Report. Based upon the results of that investigation, it was recommended that a Phase II Remedial Investigation be completed at the Highland Plaza Off-Site Area to evaluate more fully the nature and extent of contamination in shallow fill (<2.0' depth), shallow subsurface soil (<8.0' depth), and groundwater at the site.

This Phase II Remedial Investigation Report details the findings of the NYSDEC Phase II Remedial Investigation of the Highland Plaza Off-Site Area (C915293A) that was completed between October 2, 2023 and September 19, 2024. The remaining sections of this report are organized as follows:

- **Section 3.0, Site History and Background:** This section describes the site and its history, and discusses previous investigations completed at the site;
- **Section 4.0, Study Objectives and Investigation Activities:** This section describes the objectives of the NYSDEC Phase II Remedial Investigation and the activities that were completed during the investigation;

- **Section 5.0, Geology and Hydrogeology:** This section briefly describes site geology and hydrogeology, and discusses the hydrographs and groundwater contour maps constructed from water level data obtained from the on-site and off-site wells;
- **Section 6.0, Investigation Results:** This section describes the findings of the NYSDEC Phase II Remedial Investigation, including general observations and a summary of the analytical results obtained from shallow fill (<2.0' depth), shallow subsurface soil (<8.0' depth), and groundwater at the site;
- **Section 7.0, Nature and Extent of Contamination:** This section evaluates all analytical results from the Highland Plaza Off-Site Area to determine the nature and extent of contamination in shallow fill (<2.0' depth), shallow subsurface soil (<8.0' depth), and groundwater at the site;
- **Section 8.0, Data Gap Analysis and Recommendations:** This section presents a data gap analysis of the existing analytical results from the Highland Plaza Off-Site Area to determine if additional data is needed before evaluating remedial alternatives. Recommendations for future activities at the site are also discussed; and
- **Section 9.0, References:** This section contains a list of references utilized or cited in this report.

Figures, tables, and appendices follow Section 9.0.

3.0 SITE HISTORY AND BACKGROUND

3.1 *Site Description*

The Highland Plaza BCP Site (Site C915293) is located at 215 Highland Parkway in the Town of Tonawanda, Erie County, New York (Figures 2-1 and 2-2). The site is bordered by Highland Parkway and commercial properties to the north, commercial properties to the east, a service alleyway and residential properties to the south, and a CITGO gas station and Colvin Boulevard to the west (Figure 2-2). The site is approximately 250 feet long by 100 feet wide, and covers an area of approximately 0.7 acres.

The Highland Plaza Off-Site Area (Site C915293A) is located behind the Highland Plaza BCP Site (Figure 2-2). The site is bordered by the Highland Plaza BCP Site to the north, commercial and residential properties to the east, residential properties and Grimsby Road to the south, and commercial properties and Colvin Boulevard to the west. The service alleyway is approximately 320 feet long by 25 feet wide, and covers an area of approximately 0.25 acres. The exact area of the C915293A site is unknown, however, as the extent of contamination has not been fully delineated.

3.2 *Site Features*

Approximately 50% of the C915293 site is occupied by a one-story strip plaza, with most of the remaining space covered by concrete sidewalks and an asphalt parking lot. A soil cover exists over a 2.5-foot strip behind the plaza building, adjacent to the alleyway (Figure 3-1). The strip plaza consists of three separate but connected slab on grade cinder block buildings that are subdivided into eight commercial tenant spaces. The C915293A site is vacant, although a gravel service road runs through the center of the site (Figure 3-1). Overhead and underground utilities are also present in the alleyway. Narrow strips of vegetation are located between the plaza building and the service road (grass and weeds), and between the service road and fences that separate the alleyway from the adjacent residential properties to the south (grass, weeds, brush, and trees). The topography of both sites is relatively flat.

3.3 Current Zoning and Land Use

The C915293 site is occupied by a strip plaza, and is zoned for commercial use. The C915293A site is not zoned. Historically, the Town of Tonawanda maintained this service road but no longer does so.

3.4 Site History & Ownership

Historic information concerning the Highland Plaza BCP Site and Off-Site Area is extremely limited, and has largely been elucidated through a review of historic aerial photographs, Sanborn maps, and city directories ([Appendix A](#)). A 1928 Sanborn map indicates that neither site was developed, although the C915293 property was subdivided into parcels for future residential development. By 1950 the C915293 site was fully developed into a strip plaza, and all of the homes on Grimsby Road had been constructed. Existing information suggests that the service alleyway (Site C915293A) was always vacant. Use of the Highland Plaza BCP Site (C915293) and Off-Site Area (C915293A) have remained unchanged to the present time.

One of the former tenants in the plaza was High Park Cleaners, which closed in March 2010. It is unknown when dry cleaning operations at the plaza began, but a Polk directory from 1963 indicates that High Park Cleaners was in operation at 231 Highland Parkway within the plaza. The Polk directory from 1973, however, indicates that the dry cleaner now occupied 235 Highland Parkway within the plaza, with the Rags to Riches fabric shop now located at 231 Highland Parkway. High Park Cleaners occupied 235 Highland Parkway until it closed.

Neither the Erie County Interactive Mapping Viewer nor DECinfo Locator show property owner information for the C915293A parcel.

3.5 Previous Investigations

In 2014, a Limited Phase II Site Investigation and Vapor Intrusion Study (Limited Phase II Investigation) was completed to evaluate the strip plaza prior to its purchase by the current owner. During the Limited Phase II Investigation twelve (12) soil borings were completed throughout the property, with four (4) shallow fill samples collected from the alleyway ([Figure 3-2](#)). In addition, a soil vapor intrusion (SVI) study following NYSDOH SVI Guidance was

completed in the former dry cleaner tenant space. Soil samples collected from the site and off-site area contained trichloroethene and tetrachloroethene, while soil vapor contained elevated concentrations of dichloroethene, tetrachloroethene, and trichloroethene. This report can be found online at <https://www.dec.ny.gov/data/DecDocs/C915293/>.

Based upon the results of the Limited Phase II Investigation, the current owner of the Highland Plaza property applied to the NYSDEC's Brownfield Cleanup Program (BCP) in February 2015. The property was accepted into the BCP in April 2015 as site number C915293.

During the Remedial Investigation completed at the Highland Plaza BCP Site in the fall and winter of 2015, soil outside the strip plaza building and on adjacent properties to the east and south were evaluated. In addition, monitoring wells were installed both on-site and off-site to evaluate groundwater quality and flow direction. The locations of the shallow fill samples, soil borings and monitoring wells collected/completed during the BCP Remedial Investigation are shown on **Figure 3-3**. This investigation documented significant concentrations of chlorinated volatile organic compounds in shallow fill, subsurface soil, and groundwater in the off-site area. This report can be found online at <https://www.dec.ny.gov/data/DecDocs/C915293/>.

Following remediation, the Certificate of Completion for the Highland Plaza BCP Site (C915293) was issued on December 29, 2017.

In March 2017, the NYSDEC began a Remedial Investigation at the Highland Plaza Off-Site Area (Site C915293A; **Figure 2-2**) to determine the full nature and extent of fill, soil, surface water, groundwater, sump water, and soil vapor contamination associated with the site. During this investigation, twenty-four (24) soil borings were completed throughout the C915293A site at the locations shown on **Figure 3-4**. The BCP Remedial Investigation soil borings are also shown on this figure. All NYSDEC surface soil sampling (**Figure 3-5**), shallow fill sampling (**Figure 3-6**), and subsurface soil sampling (**Figure 3-7**) was completed by June 2017. All samples collected from the Highland Plaza Off-Site Area during the BCP Remedial Investigation are also shown on these figures. Groundwater samples (**Figure 3-8**) were collected by the NYSDEC's Standby Spill Contractor in December 2017, June 2019, and May 2021, with the results incorporated into the September 2023 NYSDEC Remedial Investigation Report. This report can be found online at <https://www.dec.ny.gov/data/DecDocs/C915293A/>.

3.6 Neighboring Properties

Properties surrounding the Highland Plaza BCP Site and Off-Site Area are zoned for residential and commercial use. Adjoining properties to the west include a CITGO gas station and an office building. Further west, across Colvin Boulevard, is a Dash's Market. Across Highland Parkway to the north is a plaza, a building occupied by a clothing boutique and a tax preparation service, a United States Post Office, a barber shop, and a restaurant. The adjoining property to the east is the Tonawanda Community Federal Credit Union. Residential properties on Grimsby Road are adjacent to the C915293A site to the south.

4.0 STUDY OBJECTIVES AND INVESTIGATION ACTIVITIES

4.1 Objectives

The overall objective of the NYSDEC Phase II Remedial Investigation at the Highland Plaza Off-Site Area (C915293A) is to delineate more fully the nature and extent of contamination for purposes of evaluating and selecting a remedial alternative. The specific objectives of the NYSDEC Phase II Remedial Investigation were to:

- Further evaluate the nature and extent of shallow fill (<2.0' depth) contamination documented during the BCP and NYSDEC Remedial Investigations;
- Further evaluate the nature and extent of shallow subsurface soil (<8.0' depth) contamination documented during the BCP and NYSDEC Remedial Investigations; and
- Further evaluate the nature and extent of groundwater contamination documented during the BCP and NYSDEC Remedial Investigations.

4.2 Remedial Investigation Activities

The NYSDEC Phase II Remedial Investigation of the Highland Plaza Off-Site Area included the following activities: (1) the completion of an initial survey to stake the locations of the proposed soil borings; (2) the completion of shallow soil borings for geologic logging and to facilitate sample collection; (3) the collection of shallow fill (<2.0' depth) and shallow subsurface soil (<8.0' depth) samples for chemical analysis; (4) the replacement of monitoring well MW-5 that was damaged during snow plowing operations; (5) the installation of a new monitoring well east of Highland Plaza to further evaluate groundwater contamination at the site; (6) the installation of a flush mount on well MW-6 that was installed in soil boring SB-43 during the NYSDEC Remedial Investigation but was never completed; (7) the gauging of all on-site and off-site monitoring wells on a weekly basis following well installation, following well development, and following well sampling to evaluate the recovery of these wells; (8) the collection of groundwater samples from all on-site and off-site monitoring wells for chemical analysis; (9) the

completion of a final site survey; (10) the completion of Data Usability Summary Reports (DUSRs); and (11) the preparation of a Phase II Remedial Investigation Report. These activities are described in detail in the following sections. The main field activities of the NYSDEC Phase II Remedial Investigation were completed between October 2 and December 29, 2023, and between May 21 and September 19, 2024.

4.2.1 Initial Survey

A detailed survey map of the Highland Plaza BCP Site and Off-Site Area was completed in 2017 during the NYSDEC Remedial Investigation (Figure 4-1). On September 29, 2023, KHEOPS Architecture, Engineering and Survey, DPC, a surveyor licensed in the State of New York, completed an initial survey to stake the locations of the proposed NYSDEC Phase II Remedial Investigation soil borings. Coordinates for these borings (NY State Plane Coordinate System, Zone NY W-3103) were pre-determined and are provided in Table 4-1. This task was required because the 2017 soil borings were located close together (Figure 3-4) and the locations could no longer be found in the field.

4.2.2 Soil Boring Program

One of the objectives of the NYSDEC Phase II Remedial Investigation was to further evaluate the extent of shallow fill (<2.0' depth) and shallow subsurface soil (<8.0' depth) contamination from chlorinated VOCs at the Highland Plaza Off-Site Area. To accomplish this objective, ten (10) soil borings were completed at the locations shown on Figure 4-2 using the direct-push drilling technique. These borings are designated SB-55 thru SB-64 and were completed to 10 feet depth. The stratigraphic logs for these soil borings, along with the logs for other soil borings completed in the Off-Site Area, are given in Appendix B.

Fill or subsurface soil samples were collected from the following depth intervals in each boring, which were predetermined prior to the start of the investigation:

- 1.0' – 1.5' depth;
- 2.0' – 2.5' depth;
- 3.5' – 4.0' depth;

- 5.0' – 5.5' depth;
- 6.0' – 6.5' depth; and
- 7.5' – 8.0' depth.

Two (2) additional borings were completed to 24' depth using a rotary drill rig to facilitate monitoring well installation. These borings are also shown on [Figure 4-2](#) and are designated MW-5R and MW-7. Samples were collected from these borings at the following depth intervals, which were predetermined prior to the start of the investigation:

- Same intervals as the shallow soil borings plus;
- 14.5' – 15.0' depth; and
- 23.5 – 24.0' depth.

Continuous soil cores were collected at the ten (10) shallow soil borings (SB-55 thru SB-64) with dedicated acetate liners using the Geoprobe MacroCore closed sampling system. This method was highly effective in preventing soil and fill from falling into the borings and potentially cross-contaminating deeper subsurface soil samples. The Drilling Contractor was responsible for opening these liners. The monitoring well borings (MW-5R and MW-7) were completed with a rotary drill rig by advancing 4¼-inch inside diameter hollow stem augers with continuous split spoon sampling. All soil cores were screened for organic vapors using a MiniRAE PID with an 11.7 eV probe supplied by the Standby Spill Contractor.

Shallow fill (<2.0' depth) was only observed in the auger hole completed to install a pipe bollard in front of monitoring well MW-4. The location of this sample is shown on [Figure 4-3](#). The shallow fill sample was submitted to Pace Analytical Services, LLC in East Longmeadow, Massachusetts for chemical analysis of TCL volatile organic compounds only. Information concerning the collection and analysis of the shallow fill sample is given in [Table 4-2A](#), while the laboratory report is included in [Appendix D](#). The shallow fill samples collected from the Highland Plaza Off-Site Area during the BCP and NYSDEC Remedial Investigations are also included in [Table 4-2A](#) as these results are evaluated in the NYSDEC Phase II Remedial Investigation Report.

In addition to the shallow fill sample, seventy-two (72) shallow subsurface soil samples

(<8.0' depth) were collected during the NYSDEC Phase II Remedial Investigation to determine the nature and extent of contamination in shallow subsurface soil. The locations of these samples are shown on [Figure 4-4](#). Shallow subsurface soil samples were collected at the fixed intervals stated above. Deeper subsurface soil samples (>8.0' depth) were collected at the two (2) well borings at the fixed intervals stated above.

All subsurface soil samples collected during the NYSDEC Phase II Remedial Investigation were submitted to Pace Analytical Services, LLC in East Longmeadow, Massachusetts for chemical analysis of TCL volatile organic compounds only. Information concerning the collection and analysis of the subsurface soil samples is given in [Table 4-2B](#) (samples <8.0' depth) and [Table 4-2C](#) (samples >8.0' depth), while the laboratory reports are included in [Appendix D](#). The shallow subsurface soil samples (<8.0' depth) collected from the Highland Plaza Off-Site Area during the BCP and NYSDEC Remedial Investigations are also included in [Table 4-2B](#) as these results are evaluated in the NYSDEC Phase II Remedial Investigation Report.

Upon completion of the soil boring program, the Drilling Contractor backfilled the borings with excess soil from the samples and filled the remaining opening to ground surface with bentonite pellets.

4.2.3 Overburden Monitoring Well Installation

One of the objectives of the NYSDEC Phase II Remedial Investigation was to further evaluate the nature and extent of groundwater contamination documented during the BCP and NYSDEC Remedial Investigations.

Five (5) overburden monitoring wells were installed at the Highland Plaza BCP Site and Off-Site Area during the BCP Remedial Investigation ([Figure 3-8](#)). These wells monitor the reddish-brown silty clay deposit that underlies the sites ([Table 4-3](#)). During the NYSDEC Remedial Investigation a 1-inch micro-well (MW-6) was installed in soil boring SB-43 but was never completed. During the NYSDEC Phase II Remedial Investigation this well was completed with a flush mount surrounded by a concrete pad. The location of this well is shown on [Figure 4-5](#).

During a site visit with the Standby Spill Contractor on August 21, 2023, monitoring well

MW-5 was found to be damaged, presumably hit during snow plowing operations. In addition, monitoring well MW-4 could not be found. It was suspected that the well was buried by gravel from snow plowing activities in the alleyway. On September 7, 2023 the Standby Spill Contractor, using a metal detector, was able to find this well and determine that it was still useable.

During the NYSDEC Phase II Remedial Investigation, monitoring well MW-5 was replaced (MW-5R), while a new monitoring well (MW-7) was installed east of Highland Plaza as shown on (Figure 4-5). These wells were installed by advancing 4¼-inch inside diameter hollow stem augers with continuous split spoon sampling using a rotary drill rig. The depth of each well was 24 feet to be consistent with the existing wells.

Each monitoring well was constructed with 2-inch diameter threaded/flush joint Schedule 40 PVC screen (10 slot), threaded bottom plugs, and flush-threaded PVC riser pipe. The wells were constructed with 10-foot long screens. An appropriately graded silica sand filter pack was placed around the well screen and extended to approximately 2 feet above the screen. Bentonite was placed above the filter pack to approximately 2 feet below ground surface. Each well was completed with a flush mount surrounded by a concrete pad. Monitoring well construction details are given in Table 4-3, while the well construction diagrams for all wells are given in Appendix C.

Following well installation, pipe bollards were installed in front of monitoring wells MW-4, MW-5R and MW-6 to prevent the wells from getting hit during future snow plowing operations.

The Standby Spill Contractor began to develop all on-site and off-site wells on October 4, 2023 using either a bailer (well MW-6) or a peristaltic pump (wells MW-1 thru MW-4). Newly installed monitoring wells MW-5R and MW-7 were dry and could not be developed. Field parameters (i.e., pH, temperature, conductivity, oxidation-reduction potential, dissolved oxygen, and turbidity) were monitored during the development of wells MW-1, MW-2, and MW-3, but not wells MW-4 and MW-6. Well Development Logs are included in Appendix F.

Development/redevelopment of all on-site and off-site wells was completed by the Standby Spill Contractor on May 21 and 22, 2024 using a peristaltic pump. Field parameters (i.e.,

pH, temperature, conductivity, oxidation-reduction potential, dissolved oxygen, and turbidity) were not monitored during the development of the wells. Well Development Logs are included in [Appendix F](#).

4.2.4 Water Level Measurements

To evaluate the hydrogeology of the Highland Plaza BCP Site and Off-Site Area, water levels in all on-site and off-site wells were measured weekly between October 4 and December 29, 2023, between May 21 and July 1, 2024, and between August 7 and September 19, 2024. These water levels are summarized in [Table 4-4](#), along with historic water levels obtained from the on-site and off-site wells. The water level data obtained during the NYSDEC Phase II Remedial Investigation were utilized to construct hydrographs and groundwater contour maps (see Section 5.0 for details).

4.2.5 Groundwater Sampling

All existing and newly installed monitoring wells (7 total) were sampled by the Standby Spill Contractor on August 6 and 7, 2024 using the low-flow sampling technique, with the samples placed into laboratory supplied, pre-cleaned sample jars. All groundwater samples were submitted to Eurofins Buffalo in Amherst, New York for chemical analysis of TCL volatile organic compounds and TAL metals. Information concerning sample collection and analysis is given in [Table 4-2D](#), while the laboratory report is included in [Appendix D](#). The groundwater samples collected during the BCP and NYSDEC Remedial Investigations are also included in [Table 4-2D](#) as these results are evaluated in the NYSDEC Phase II Remedial Investigation Report.

Prior to sampling, the wells were purged, with the purged water monitored for pH, temperature, conductivity, oxidation-reduction potential, dissolved oxygen, and turbidity. These data were recorded on Well Purge and Sampling Logs ([Appendix F](#)).

4.2.6 Data Validation

Analytical results obtained during the NYSDEC Phase II Remedial Investigation of the Highland Plaza Off-Site Area (Site C915293A) were validated to determine if the data met the criteria for data quality and use. The analytical results for shallow fill, subsurface soil, and groundwater were validated by Environmental Data Quality, Inc. The validated analytical results

are discussed in Sections 6.0 and 7.0. The laboratory reports for the shallow fill, subsurface soil, and groundwater samples are included in **Appendix D**, while the Data Usability Summary Reports are included in **Appendix E**. All data were found to be acceptable for use.

4.2.7 Final Site Survey and Mapping

Following the completion of the NYSDEC Phase II Remedial Investigation field activities, KHEOPS Architecture, Engineering and Survey, DPC, was retained to complete a final survey of the site. The final survey activities included the following:

- Horizontal locations and ground surface elevations of all soil borings (SB-55 thru SB-64, MW-5R, and MW-7) completed during the NYSDEC Phase II Remedial Investigation; and
- Horizontal locations and vertical elevations of all existing monitoring wells and those installed during the NYSDEC Phase II Remedial Investigation. Elevations included ground surface and the inner PVC riser of each well.

Vertical control was established to the nearest ± 0.01 foot for all ground surface and PVC riser elevations. Elevations were determined relative to the North American Vertical Datum of 1988 (NAVD 88 or newer), with reference made to an existing monument in the vicinity of the site. Horizontal coordinates were surveyed to the NY State Plane Coordinate System, Zone NY W-3103 (in feet), North American Datum (NAD) of 1983 (or newer) to an accuracy of ± 0.5 feet or better.

4.2.8 NYSDEC Phase II Remedial Investigation Report Preparation

The NYSDEC Phase II Remedial Investigation Report was prepared to: (1) describe site history to the extent that it is known; (2) describe the field activities completed during the NYSDEC Phase II Remedial Investigation; (3) present the analytical results of the shallow fill, subsurface soil, and groundwater samples collected during the investigation; (4) describe the nature and extent of shallow fill (<2.0' depth), shallow subsurface soil (<8.0' depth), and groundwater contamination at the site; (5) present a data gap analysis of the existing analytical results from the Highland Plaza Off-Site Area to determine if additional data is needed before evaluating remedial alternatives; and (6) present recommendations for future activities at the

Highland Plaza Off-Site Area (Site C915293A).

5.0 GEOLOGY AND HYDROGEOLOGY

5.1 *Site Geology*

The geology of the Highland Plaza BCP Site and Off-Site Area was evaluated in detail in the NYSDEC Remedial Investigation Report by examining the stratigraphic logs from soil borings completed at both sites. These logs reveal the presence of asphalt, concrete and/or crushed stone fill (thicknesses ranging from 0.25 to 1.0 feet), industrial fill consisting of reworked native silty clay soil mixed with sand, gravel, slag, brick fragments and/or concrete fragments (thicknesses ranging from 0.25 to 1.5 feet) and native silty clay soils at the sites.

Bedrock was not encountered at either the Highland Plaza BCP Site or Off-Site Area. However, a boring completed at 175 Willowbreeze Road approximately 1,340 feet northwest of the Highland Plaza BCP Site (Figure 5-8) encountered bedrock (split spoon refusal) at a depth of 48.2 feet. The stratigraphic log for this soil boring is given in [Appendix B](#).

For more detail concerning regional and site geology, the reader is referred to the NYSDEC Remedial Investigation Report, which can be found online at <https://www.dec.ny.gov/data/DecDocs/C915293A/>.

5.2 *Site Hydrogeology*

During the Remedial Investigation completed at the Highland Plaza BCP Site (Site C915293), five (5) overburden groundwater monitoring wells (MW-1 thru MW-5) were installed both on-site and off-site to evaluate groundwater quality and flow direction. During the NYSDEC Phase II Remedial Investigation, micro-well MW-6, installed during the NYSDEC Remedial Investigation, was completed with a flush mount and concrete pad, damaged monitoring well MW-5 was replaced with well MW-5R, and a new monitoring well (MW-7) was installed east of Highland Plaza. The locations of these wells are shown on [Figure 4-5](#). Monitoring well construction details are given in [Table 4-3](#), while the well construction diagrams are given in [Appendix C](#).

Depth to groundwater during natural flow conditions (i.e., not immediately following

well development or purging activities) is somewhat variable. During the BCP Remedial Investigation, depth to groundwater ranged from 2.8 to 5.4 feet (Table 4-4), while during the NYSDEC Remedial Investigation, depth to groundwater ranged from 2.1 to 7.7 feet (Table 4-4). During the NYSDEC Phase II Remedial Investigation, under natural flow conditions, depth to groundwater ranged from 1.26 to 7.62 feet (Table 4-4). There were occasions, however, when groundwater levels in well MW-5 (and its replacement well MW-5R) were close to the ground surface (Figure 5-1, Figure 5-2; Table 4-4). It is suspected that surface water from the nearby shallow ditch (Figure 5-1; Figure 6-9) recharges these wells. During the drier and hotter summer months, this ditch is dry (Figure 6-10), and depth to groundwater in well MW-5R ranged from 3.23 to 3.81 feet (Table 4-4).

The water level data in Table 4-4 shows that recharge of these wells is extremely slow. For example, on December 18, 2015, each of the BCP wells was purged dry during development. Water level data obtained on December 22, 2015 indicates that these wells had not yet recharged to their pre-development levels.

The slow recharge of the Highland Plaza wells was further evaluated during the NYSDEC Phase II Remedial Investigation. Following the installation of monitoring wells MW-5R and MW-7 in early October, 2023, both wells were still dry 24 hrs. after completion. As a result, water levels were measured weekly in all on-site and off-site wells until the end of December 2023 when the Standby Spill Contract expired. These water levels, summarized in Table 4-4, were utilized to construct the hydrographs shown in Figure 5-3. These hydrographs show that it took almost three (3) months for wells MW-5R and MW-7 to fully fill with groundwater following installation (Figure 5-3). Monitoring wells MW-1, MW-2, MW-3, and MW-6, however, fully recharged by November 3, 2023, one (1) month following well development on October 3 and 4, 2023 (Figure 5-3). Curiously, water levels in well MW-4 continued to rise throughout the gauging period (Figure 5-3; Table 4-4).

All on-site and off-site wells were developed/redeveloped on May 21 and 22, 2024. The water levels before and after development are summarized in Table 4-4. To further evaluate the rate of recharge, water levels were again measured weekly until July 1, 2024. The hydrographs constructed from these water levels are shown in Figure 5-4. Monitoring wells MW-1, MW-2, MW-4, MW-5R, and MW-6 fully recharged by June 11, 2024. Wells MW-3 and MW-7, however,

did not fully recharge until June 25, 2024 (Figure 5-4).

All on-site and off-site wells, except well MW-1, were sampled on August 7, 2024; well MW-1 was sampled on August 6, 2024. The water levels before and after well sampling are summarized in Table 4-4. Following sampling, water levels were measured weekly until September 19, 2024. The hydrographs constructed from these water levels are also shown on Figure 5-4, which shows that the wells had recharged by September 5, 2024.

The slow recharge of these wells supports the extremely low hydraulic conductivities (10^{-6} to 10^{-8} cm/s) of the reddish-brown silty clay deposit that is found throughout the Tonawanda area (May, 2007; May, 2012). These low hydraulic conductivities suggest that significant groundwater flow is not occurring.

The water level information collected on December 4, 2015 (Table 4-4) during the BCP Remedial Investigation was utilized to construct a groundwater contour map (Figure 4 of the BCP Remedial Investigation Report). These water levels were recontoured during the NYSDEC Phase II Remedial Investigation using the Golden Software application Surfer. This contour is provided as Figure 5-5 and shows that groundwater flows radially from well MW-5 toward the north and northeast, and under the Highland Plaza and Tonawanda Community Federal Credit Union properties.

Groundwater contour maps were also constructed from the water level data obtained during the NYSDEC Phase II Remedial Investigation. Figure 5-6 is a groundwater contour map generated from the water level data collected on December 15, 2023. This contour shows that groundwater is mounded around off-site monitoring well MW-5R and that the dominant direction of groundwater flow is toward the northeast. There is also a less defined flow component from well MW-5R to the north (Figure 5-6). By December 29, 2023, the groundwater mound around well MW-5R was more defined, with groundwater flow toward the northwest, north, and northeast (Figure 5-7).

6.0 INVESTIGATION RESULTS

A brief description of the activities completed during the NYSDEC Phase II Remedial Investigation of the Highland Plaza Off-Site Area (Site C915293A) was presented in Section 4.0. In this section, a detailed evaluation of the observations made during the investigation and the analytical results obtained from the samples are presented. Analytical results are summarized by environmental media (e.g., shallow fill (<2.0' depth), shallow subsurface soil (<8.0' depth), deeper subsurface soil (>8.0' depth), and groundwater).

For this report, analytical results for shallow fill and subsurface soil were evaluated against the unrestricted and residential soil cleanup objectives of Tables 375-6.8(a) and 375-6.8(b) contained in the December 2006 NYSDEC publication entitled “6NYCRR Part 375: Environmental Remediation Programs”. For contaminants not included in 6 NYCRR Part 375, the soil cleanup objectives identified in the October 2010 NYSDEC Commissioner’s Policy CP-51 entitled “Soil Cleanup Guidance” were utilized. The residential soil cleanup objectives were used due to the close proximity of the site to residential properties on Grimsby Road.

Analytical results for groundwater were evaluated against the water quality standards and guidance values contained in the NYSDEC publication entitled “Technical and Operational Guidance Series (TOGS) 1.1.1: Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations”, Division of Water, June 1998, with addenda. The groundwater standards and guidance values for individual contaminants were taken directly from Table 1 of that document.

6.1 General Observations

The Highland Plaza Off-Site Area is vacant, although a gravel service road runs through the center of the site (Figures 6-1 thru 6-6, 6-12, and 6-13). Overhead (Figures 4-1, 6-1 thru 6-7, and 6-11 thru 6-14) and underground (natural gas) (Figure 4-1) utilities are also present in the alleyway and will need to be considered during the remedy selection process. In addition to the utility poles and overhead lines immediately behind Highland Plaza, utility lines cross the alleyway and connect to each residence on Grimsby Road adjacent to the site (Figures 6-2, 6-7, 6-11, and 6-13). Fences separate the alleyway from the residences on Grimsby Road (Figures 6-

1, 6-6, 6-8 thru 6-10, and 6-12) and will be an obstacle to remediation. Narrow strips of vegetation are located between the plaza building and the service road (grass and weeds), and between the service road and fences that separate the alleyway from the adjacent residential properties to the south (grass, weeds, brush, and trees; Figures 6-1, 6-3, 6-4 thru 6-6, and 6-8 thru 6-14).

A shallow ditch, approximately 3 inches deep, is present in the service alleyway between the gravel service road and fences that separate the site from the residential properties on Grimsby Road. This ditch was not surveyed during the NYSDEC Remedial Investigation but photographs showing its location are provided as Figures 5-1, 6-9, and 6-10. This ditch receives precipitation and snowmelt runoff and is dry at other times of the year (Figure 6-10). The ditch has no outlet, so it has not been observed to flow. During the NYSDEC Phase II Remedial Investigation field activities in October 2023 this ditch was dry (Figure 6-10; compare to Figures 5-1 and 6-9). In addition, part of this ditch near well MW-5R is now filled in with crushed stone (Figure 6-12).

In early summer 2023 the owner of Highland Plaza installed a storm water management system along the service alleyway. Precipitation from the roof of the plaza is diverted through piping (Figure 6-13) to four large poly tanks (Figures 6-13 thru 6-15). Water is then conveyed from the tanks to the storm sewer system along Colvin Boulevard.

6.2 Shallow Fill (<2.0' Depth)

One (1) shallow fill sample and its duplicate were collected during the NYSDEC Phase II Remedial Investigation and analyzed for TCL volatile organic compounds via EPA method 8260D. The location of this sample is shown on Figure 4-3. The analytical results for this sample and its duplicate are summarized in Table 6-1, while information concerning sample collection and analysis is given in Table 4-2A. The laboratory report is included in Appendix D.

Eleven (11) volatile organic compounds were detected in the shallow fill samples (Table 6-1). Chlorinated VOCs detected included cis-1,2-dichloroethene, trans-1,2-dichloroethene, tetrachloroethene, and trichloroethene. Petroleum VOCs were also detected in the shallow fill samples including benzene, ethylbenzene, toluene, and xylenes (Table 6-1). Acetone, methylene chloride, and methyl cyclohexane were also detected (Table 6-1), although acetone and

methylene chloride are common laboratory contaminants. Of these contaminants, only cis-1,2-dichloroethene (both samples) and tetrachloroethene (both samples) were detected at concentrations that exceeded the NYSDEC Part 375 unrestricted soil cleanup objectives (Table 6-1). The concentrations of tetrachloroethene (both samples) also exceeded the NYSDEC Part 375 residential soil cleanup objectives (Table 6-1).

6.3 Shallow Subsurface Soil (<8.0' Depth)

Seventy-two (72) shallow subsurface soil samples (<8.0' depth) were collected during the NYSDEC Phase II Remedial Investigation and analyzed for TCL volatile organic compounds via EPA method 8260D. The locations of the borings from which these samples were collected are shown on Figure 4-4. The analytical results for these samples are summarized in Tables 6-2A thru 6-2L, while information concerning sample collection and analysis is given in Table 4-2B. The laboratory reports are included in Appendix D.

Fourteen (14) volatile organic compounds were detected in the shallow subsurface soil samples with chlorinated VOCs being detected most frequently (Tables 6-2A thru 6-2L). Chlorinated VOCs detected included 1,1-dichloroethene (2 samples), 1,1,2-trichloroethane (1 sample), cis-1,2-dichloroethene (26 samples), trans-1,2-dichloroethene (3 samples), chloromethane (1 sample), tetrachloroethene (27 samples), and trichloroethene (19 samples). Carbon disulfide (1 sample), methyl cyclohexane (2 samples), methyl ethyl ketone (2 samples), tert-butyl ethyl ether (1 sample), and toluene (2 samples) were also detected in the shallow subsurface soil samples (Tables 6-2A thru 6-2L). Acetone (14 samples) and methylene chloride (3 samples), common laboratory contaminants, were also detected (Tables 6-2A thru 6-2L). Of these contaminants, only acetone (3 samples), cis-1,2-dichloroethene (5 samples), tetrachloroethene (2 samples) and trichloroethene (1 sample) were detected at concentrations that exceeded the NYSDEC Part 375 unrestricted soil cleanup objectives (Tables 6-2A thru 6-2L). The concentration of tetrachloroethene in one (1) sample also exceeded the NYSDEC Part 375 residential soil cleanup objectives (Tables 6-2A thru 6-2L).

6.4 Deeper Subsurface Soil (>8.0' Depth)

Four (4) deeper subsurface soil samples (>8.0' depth) were collected during the NYSDEC

Phase II Remedial Investigation and analyzed for TCL volatile organic compounds via EPA method 8260D. The locations of the borings from which these samples were collected are shown on [Figure 4-4](#) (locations MW-5R and MW-7). The analytical results for these samples are summarized in [Tables 6-2K and 6-2L](#), while information concerning sample collection and analysis is given in [Table 4-2C](#). The laboratory reports are included in [Appendix D](#).

No volatile organic compounds were detected in these samples ([Tables 6-2K and 6-2L](#)).

6.5 Groundwater

Seven (7) groundwater samples were collected during the NYSDEC Phase II Remedial Investigation and analyzed for TCL volatile organic compounds via EPA method 8260C and TAL metals via EPA methods 200.7 and 245.1. The locations of the wells from which these samples were collected are shown on [Figure 4-5](#). The analytical results for these samples are summarized in [Table 6-3](#), while information concerning sample collection and analysis is given in [Table 4-2D](#). The laboratory reports are included in [Appendix D](#).

Four (4) volatile organic compounds were detected in the groundwater samples with three (3) of these compounds being chlorinated VOCs ([Table 6-3](#)). Chlorinated VOCs detected included cis-1,2-dichloroethene (2 samples), tetrachloroethene (1 sample), and trichloroethene (2 samples). Chloroform was detected in well MW-5R. Of these contaminants, cis-1,2-dichloroethene (2 samples), tetrachloroethene (1 sample), and trichloroethene (1 sample) were detected at concentrations that exceeded the NYSDEC groundwater standards or guidance values ([Table 6-3](#)).

Nineteen (19) metals were detected in the groundwater samples collected from the Highland Plaza BCP Site and Off-Site Area ([Table 6-3](#)). Of these compounds, ten (10) were detected at concentrations that exceeded the NYSDEC groundwater standards or guidance values, with five (5) of these metals being EPA priority pollutant metals ([Table 6-3](#)). USEPA priority pollutant metals are toxic metals for which technology based effluent limitations and guidelines are required by Federal law. The priority pollutant metals that exceeded the groundwater standards or guidance values included arsenic (1 sample), beryllium (1 sample), chromium (2 samples), copper (1 sample), and lead (2 samples) ([Table 6-3](#)). These exceedances were associated with wells MW-2 (on-site) and MW-6 (off-site) ([Table 6-3](#)). Other metals that

exceeded the NYSDEC groundwater standards or guidance values included iron (6 samples), magnesium (7 samples), manganese (4 samples), nickel (1 sample), and sodium (7 samples) (Table 6-3). Aluminum and calcium were also detected at significant concentrations (Table 6-3), but there are no NYSDEC groundwater standards or guidance values for these contaminants.

7.0 NATURE AND EXTENT OF CONTAMINATION

The overall objective of the NYSDEC Phase II Remedial Investigation at the Highland Plaza Off-Site Area (C915293A) was to delineate more fully the nature and extent of contamination for purposes of evaluating and selecting a remedial alternative. The results of the NYSDEC Phase II Remedial Investigation were discussed in Section 6.0. In this section, those results, along with historic results from the Off-Site Area, are evaluated to determine the nature and extent of contamination of shallow fill (<2.0' depth), shallow subsurface soil (<8.0' depth), and groundwater at the Highland Plaza Off-Site Area.

7.1 *Primary Contaminants of Concern*

The Primary Contaminants of Concern (COCs) identified for the Highland Plaza Off-Site Area are those compounds detected at concentrations that most frequently exceeded their respective comparison criteria. For shallow fill (<2.0' depth) and shallow subsurface soil (<8.0' depth), these criteria are the NYSDEC Part 375 soil cleanup objectives. For groundwater, these criteria are the NYSDEC TOGS 1.1.1 groundwater quality standards and guidance values. The principal COCs in shallow fill (<2.0' depth), shallow subsurface soil (<8.0' depth) and groundwater at the site are chlorinated VOCs, which are associated with the former dry cleaning operations of High Park Cleaners. The primary contaminant of concern at the site is tetrachloroethene, and to a lesser extent, its breakdown products trichloroethene and dichloroethene. The primary contaminants of concern were the focus of the NYSDEC Phase II Remedial Investigation.

7.2 *Fill and Subsurface Soil: 0.0'-2.0' Depth*

Forty-seven (47) fill and subsurface soil samples from 0.0' to 2.0' depth have been collected from the Highland Plaza Off-Site Area to evaluate the nature and extent of contamination of this depth interval. Twenty (20) of these samples were collected during the Remedial Investigation of the Highland Plaza BCP Site (Site C915293), thirteen (13) samples were collected during the NYSDEC Remedial Investigation of the Highland Plaza Off-Site Area (C915293A), and fourteen (14) samples were collected during the NYSDEC Phase II Remedial Investigation. The locations of these samples are shown on **Figure 7-1**.

All forty-seven (47) samples were analyzed for TCL volatile organic compounds. The analytical results for these samples are summarized in **Tables 7-1A thru 7-1F**, while information concerning sample collection and analysis is given in **Tables 4-2A and 4-2B**. The laboratory reports from the NYSDEC Phase II Remedial Investigation are included in **Appendix D**, while the laboratory reports from previous investigations are included in various reports, which can be found online at: <https://www.dec.ny.gov/data/DecDocs/C915293/> and <https://www.dec.ny.gov/data/DecDocs/C915293A/>.

Fifteen (15) volatile organic compounds were detected in these samples with chlorinated VOCs being detected most frequently (**Tables 7-1A thru 7-1F**). Chlorinated VOCs that exceeded the NYSDEC Part 375 unrestricted soil cleanup objectives from 0.0' to 2.0' depth include cis-1,2-dichloroethene (5 samples), tetrachloroethene (14 samples) and trichloroethene (4 samples). Tetrachloroethene (14 samples) and trichloroethene (1 sample) also exceeded the NYSDEC Part 375 residential soil cleanup objectives. These exceedances are summarized in **Tables 7-1A thru 7-1F**. The locations of the samples from 0.0' to 2.0' depth that exceeded the residential soil cleanup objectives for the primary contaminants of concern are shown on **Figure 7-1**. This figure shows that primary contaminant exceedances were generally confined to the narrow strip of land between the gravel service road and fence line directly behind the former High Park Cleaners tenant space. The spatial distribution of the exceedances suggests that the spent dry-cleaning fluid was likely poured or dumped onto the ground surface in this area.

Figure 7-1 also shows two (2) exceedances farther east in the narrow strip of land between the gravel service road and fence line. A shallow swale is present in this area, and it is likely that the spent dry-cleaning fluid flowed down this swale to the SB-23 and SB-33 locations.

Figure 7-1 further shows exceedances by the primary contaminants of concern in the sample collected from soil boring SB-60. The original location of this boring was approximately 3 feet closer to the plaza building; however, the National Fuel Gas representative could not locate the underground natural gas line in the field and made us move this boring to the south.

7.3 Subsurface Soil: 2.0'-4.0' Depth

Thirty-three (33) subsurface soil samples from 2.0' to 4.0' depth have been collected from

the Highland Plaza Off-Site Area to evaluate the nature and extent of contamination of this depth interval. Nine (9) of these samples were collected during the NYSDEC Remedial Investigation of the Highland Plaza Off-Site Area (C915293A) with twenty-four (24) samples collected during the NYSDEC Phase II Remedial Investigation. The locations of these samples are shown on **Figure 7-2**.

All thirty-three (33) samples were analyzed for TCL volatile organic compounds. The analytical results for these samples are summarized in **Tables 7-2A thru 7-2D**, while information concerning sample collection and analysis is given in **Table 4-2B**. The laboratory reports from the NYSDEC Phase II Remedial Investigation are included in **Appendix D**, while the laboratory reports from the NYSDEC Remedial Investigation are included in **Appendix D** of the NYSDEC Remedial Investigation Report, which can be found online at:

<https://www.dec.ny.gov/data/DecDocs/C915293A/>.

Thirteen (13) volatile organic compounds were detected in these samples with chlorinated VOCs being detected most frequently (**Tables 7-2A thru 7-2D**). Chlorinated VOCs that exceeded the NYSDEC Part 375 unrestricted soil cleanup objectives from 2.0' to 4.0' depth include cis-1,2-dichloroethene (2 samples) and tetrachloroethene (3 samples). Tetrachloroethene (2 samples) also exceeded the NYSDEC Part 375 residential soil cleanup objectives. These exceedances are summarized in **Tables 7-2A thru 7-2D**. The locations of the samples from 2.0' to 4.0' depth that exceeded the residential soil cleanup objectives for the primary contaminants of concern are shown on **Figure 7-2**. This figure shows that one (1) exceedance was documented in the principal disposal area shown in **Figure 7-1**, while a second exceedance (SB-33) was documented farther east in the narrow strip of land between the gravel service road and fence line. As previously stated, a shallow swale is present in this area, and it is possible that the spent dry-cleaning fluid flowed down this swale to the SB-33 location.

7.4 Subsurface Soil: 4.0'-6.0' Depth

Thirteen (13) subsurface soil samples from 4.0' to 6.0' depth have been collected from the Highland Plaza Off-Site Area to evaluate the nature and extent of contamination of this depth interval. One (1) of these samples was collected during the NYSDEC Remedial Investigation of the Highland Plaza Off-Site Area (C915293A) with another twelve (12) samples collected during

the NYSDEC Phase II Remedial Investigation. The locations of these samples are shown on **Figure 7-3**.

All thirteen (13) samples were analyzed for TCL volatile organic compounds. The analytical results for these samples are summarized in **Tables 7-3A and 7-3B**, while information concerning sample collection and analysis is given in **Table 4-2B**. The laboratory reports from the NYSDEC Phase II Remedial Investigation are included in **Appendix D**, while the laboratory report from the NYSDEC Remedial Investigation are included in **Appendix D** of the NYSDEC Remedial Investigation Report, which can be found online at:

<https://www.dec.ny.gov/data/DecDocs/C915293A/>.

Seven (7) volatile organic compounds were detected in these samples with chlorinated VOCs being detected most frequently (**Tables 7-3A and 7-3B**). Cis-1,2-dichloroethene (1 sample) was the only chlorinated VOC that exceeded the NYSDEC Part 375 unrestricted soil cleanup objectives from 4.0' to 6.0' depth. No exceedances of the NYSDEC Part 375 residential soil cleanup objectives were documented (**Tables 7-3A and 7-3B**).

7.5 Subsurface Soil: 6.0'-8.0' Depth

Fifty-six (56) subsurface soil samples from 6.0' to 8.0' depth have been collected from the Highland Plaza Off-Site Area to evaluate the nature and extent of contamination of this depth interval. Eight (8) of these samples were collected during the Remedial Investigation of the Highland Plaza BCP Site (Site C915293), twenty-four (24) samples were collected during the NYSDEC Remedial Investigation of the Highland Plaza Off-Site Area (C915293A), and twenty-four (24) samples were collected during the NYSDEC Phase II Remedial Investigation. The locations of these samples are shown on **Figure 7-4**.

All fifty-six (56) samples were analyzed for TCL volatile organic compounds. The analytical results for these samples are summarized in **Tables 7-4A thru 7-4G**, while information concerning sample collection and analysis is given in **Table 4-2B**. The laboratory reports from the NYSDEC Phase II Remedial Investigation are included in **Appendix D**, while the laboratory reports from previous investigations are included in various reports, which can be found online at: <https://www.dec.ny.gov/data/DecDocs/C915293/> and <https://www.dec.ny.gov/data/DecDocs/C915293A/>.

Seventeen (17) volatile organic compounds were detected in these samples with chlorinated VOCs being detected most frequently (Tables 7-4A thru 7-4G). Chlorinated VOCs that exceeded the NYSDEC Part 375 unrestricted soil cleanup objectives from 6.0' to 8.0' depth include cis-1,2-dichloroethene (4 samples), tetrachloroethene (12 samples) and trichloroethene (3 samples). Tetrachloroethene (7 samples) also exceeded the NYSDEC Part 375 residential soil cleanup objectives. These exceedances are summarized in Tables 7-4A thru 7-4G. The locations of the samples from 6.0' to 8.0' depth that exceeded the residential soil cleanup objectives for the primary contaminants of concern are shown on Figure 7-4. This figure shows that primary contaminant exceedances were generally confined to the principal disposal area shown in Figure 7-1, while one (1) exceedance was documented east of that area in boring SB-29. An underground natural gas line is located in this area of the site (Figure 7-4), so it is possible that spent dry-cleaning fluid migrated along the bedding of the gas line to the SB-29 location.

7.6 Groundwater

Twenty-seven (27) groundwater samples have been collected from the Highland Plaza BCP Site (Site C915293) and Highland Plaza Off-Site Area (C915293A) to evaluate the nature and extent of groundwater contamination at these sites. Five (5) of these samples were collected during the Remedial Investigation of the Highland Plaza BCP Site (Site C915293), fifteen (15) samples were collected during the NYSDEC Remedial Investigation of the Highland Plaza Off-Site Area (915293A), and seven (7) samples were collected during the NYSDEC Phase II Remedial Investigation. The locations of the wells from which these samples were collected are shown on Figure 4-5.

All twenty-seven (27) samples were analyzed for TCL volatile organic compounds. The analytical results for these samples are summarized in Tables 7-5A thru 7-5C, while information concerning sample collection and analysis is given in Table 4-2D. The laboratory report from the NYSDEC Phase II Remedial Investigation is included in Appendix D, while the laboratory reports from previous investigations are included in various reports, which can be found online at: <https://www.dec.ny.gov/data/DecDocs/C915293/> and <https://www.dec.ny.gov/data/DecDocs/C915293A/>.

Seven (7) volatile organic compounds were detected in these samples with chlorinated

VOCs being detected most frequently (Tables 7-5A thru 7-5C). Chlorinated VOCs that exceeded the NYSDEC groundwater standards or guidance values include 1,1-dichloroethene (2 samples), cis-1,2-dichloroethene (12 samples), trans-1,2-dichloroethene (3 samples), tetrachloroethene (10 samples), and trichloroethene (8 samples). These exceedances are summarized in Tables 7-5A thru 7-5C.

The most significant impact to groundwater by the primary contaminants of concern was documented in off-site wells MW-4 and MW-5 (Figure 4-5; Tables 7-5A thru 7-5C). Groundwater contamination decreases significantly as groundwater flows to the north and northeast under the Highland Plaza and Tonawanda Community Federal Credit Union properties (Tables 7-5A thru 7-5C).

It is important to note, however, that contamination of groundwater in monitoring well MW-5 (soil boring SB-27) by the primary contaminants of concern (Table 7-5C) is inconsistent with the location of the spent dry-cleaning fluid disposal area as documented by the subsurface soil results (Figures 7-1 thru 7-4). In addition, no exceedances of the NYSDEC groundwater standards or guidance values were documented for the primary contaminants of concern in replacement well MW-5R (Table 7-5C), which was installed approximately 10 feet closer to the spent dry-cleaning fluid disposal area (Figure 4-5) due to the presence of overhead utility lines (Figure 6-11).

8.0 DATA GAPA ANALYSIS AND RECOMMENDATIONS

8.1 Data Gap Analysis

Investigations completed at the Highland Plaza Off-Site Area have documented significant chlorinated VOC contamination in shallow fill (<2.0' depth), shallow subsurface soil (<8.0' depth), and groundwater at the site. **Figure 7-1** shows chlorinated VOC exceedances of the restricted residential soil cleanup objectives from 0.0' to 2.0' depth. The spatial distribution of these exceedances suggests that the spent dry-cleaning fluid was likely poured or dumped onto the ground surface along the narrow strip of land between the gravel service road and fence line directly behind the former High Park Cleaners tenant space. An east-west cross-section showing tetrachloroethene concentrations (**Figure 8-1**; location shown on **Figure 8-2**) suggests that the contamination at boring SB-33 is an extension of the shallow fill contamination documented at boring SB-23 to the west. A shallow swale is present in this area, and it is likely that the spent dry-cleaning fluid flowed down this swale to the SB-23 and SB-33 locations.

Chlorinated VOC contamination in soil boring SB-60 appears to be an outlier (**Figure 7-1**) and should be further evaluated. Because the underground natural gas line can no longer be located in the field, hand augers/borings would likely be needed to further delineation the contamination in this area.

Figure 7-2 shows that analytical results from 2.0' to 4.0' depth are more limited in the principal disposal area behind the former High Park Cleaners tenant space. Exceedances of the primary contaminants of concern were only documented in two (2) samples (SB-33 and SB-53), which are spaced widely apart. A comparison of **Figure 7-2** with **Figure 7-1** suggests that contamination could extend east and west of soil boring SB-53. To address this data gap, additional samples should be collected west of soil boring SB-53, from the shallow swale between soil borings SB-33 and SB-53, and from the gravel service road between soil borings SB-45 and SB-59 (**Figure 7-2**).

Figure 7-3 shows that no analytical results are available from 4.0' to 6.0' depth in the principal disposal area behind the former High Park Cleaners tenant space (compare with **Figure 7-1**). As a result, additional samples are needed from this depth interval to determine the

horizontal extent of contamination by the primary contaminants of concern, unless it is assumed that contamination migrated vertically downward from the shallower zones.

Figure 7-4 shows that contamination of subsurface soil from 6.0' to 8.0' depth by the primary contaminants of concern is generally confined to the area directly behind the former High Park Cleaners tenant space. The presence of contamination in boring SB-29, however, does not appear to be connected directly with the spent dry-cleaning fluid disposal area (Figure 7-4). Since an underground natural gas line is located in this area of the site, it is possible that spent dry-cleaning fluid migrated along the bedding of the gas line to the SB-29 location. As discussed above, this gas line can no longer be located in the field. As a result, further delineation of the contamination along the gas line between soil borings SB-29 and SB-46 would require extensive hand clearing before soil borings could be completed.

As previously stated, the objective of the NYSDEC Phase II Remedial Investigation was to further evaluate the nature and extent of shallow fill (<2.0' depth) and shallow subsurface soil (<8.0' depth) contamination that was documented during the BCP and NYSDEC Remedial Investigations. It is important, however, to make a statement concerning the presence of tetrachloroethene contamination in boring SB-27 (former well MW-5) at 23 to 24 feet depth (Figure 8-1), as this boring is not near the location of the spent dry-cleaning fluid disposal area (Figures 7-1 and 7-4). It is unclear why tetrachloroethene was detected in this boring as there are no known utilities in this portion of the alleyway that would have become migration pathways. In addition, the NYSDEC completed a soil boring (SB-50) approximately 3.5 feet from boring SB-27 and could not reproduce the results from the Highland Plaza BCP Remedial Investigation. In addition, the cross-section of Figure 8-1 suggests that the tetrachloroethene exceedance in boring SB-27 is anomalous as no other exceedances were documented between the spent dry-cleaning fluid disposal area and this boring.

Contamination in the alleyway by the primary contaminants of concern, as best exemplified by Figures 7-1 and 7-4, suggests that spent dry cleaning fluid likely impacts two (2), and possibly three (3), residential properties along Grimsby Road. This is a major data gap. Access from these property owners would be required before any sampling could be completed. In addition, access to the backyards of these properties with a direct push drill rig is limited by the presence of fencing and narrow gates. It is likely that some fencing along the service alleyway

would need to be removed for access, unless hand borings were completed. Furthermore, if a direct push drill rig was utilized, plywood or other ground surface protective measures would be required to limit damage to the yards.

8.2 Recommendations

The NYSDEC Phase II Remedial Investigation completed at the Highland Plaza Off-Site Area was designed to delineate the nature and extent of shallow contamination (<8.0' depth) more fully for purposes of evaluating and selecting a remedial alternative. The Data Gap Analysis, however, revealed that additional delineation is required before a remedial alternative can be selected and implemented.

It is recommended, therefore, that additional investigation be completed at the Highland Plaza Off-Site Area as described in the Data Gap Analysis. In addition, groundwater sampling and analysis should be completed periodically to document groundwater conditions at the site, to document any trends in groundwater contamination, and to identify changes, if any, that occur.

9.0 REFERENCES

- EGMS, 2017, Remedial Investigation Final Report, Highland Plaza BCP Site, Site No. C915293: Environmental & Geologic Management Services, LLC, Orchard Park, New York.
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