DRAFT
REMEDIAL INVESTIGATION
ALTERNATIVES ANALYSIS REPORT
129 HOLDEN STREET
BUFFALO, NEW YORK
BROWNFIELD CLEANUP PROGRAM
SITE NO. C915261

Prepared For:
New York State Department of Environmental Conservation
Region 9
Buffalo, New York

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Buffalo, New York

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CERTIFICATION

I, Bart A. Klettke, P.E., certify that I am currently a NYS registered professional engineer and that this Revised Remedial Investigation & Alternative Analysis Report was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10) and that all activities were performed in full accordance with the DER-approved work plan and any DER-approved modifications.

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ACRONYMS

AA	Alternative Analysis
ACM	Asbestos Contained Material
BCA	Brownfield Cleanup Agreement
BCP	Brownfield Cleanup Program
bgs	below ground surface
BN	Base Neutral
CAMP	Community Air Monitoring Program
CCR	Construction Completion Report
Class GA	Groundwater criteria
CSCO	Commercial Soil Cleanup Objectives
cy	cubic yards
DEC	New York State Department of Environmental Conservation
DER	Division of Environmental Remediation
DUSR	Data Usability Summary Report
DVS	Data Validation Services
EC	Engineering Controls
EJ	Environmental Justice
EPA	Environmental Protection Agency
ESA	Environmental Site Assessment
eV	Electron Volt
FER	Final Engineering Report
ft MSL	Feet Below Mean Sea Level
FWRIA	Fish & Wildlife Resource Impact Analysis
GZA	GZA GeoEnvironmental of New York
HSA	Hollow Stem Auger
HASP	Health and Safety Plan
HPV	Highland Park Village, LLC
IC	Institutional Controls
ID	Inner Diameter
Koc	Organic Carbon Partitioning Coefficient
MS	Matrix Spike
MSD	Matrix Spike Duplicate
MW	Monitoring Well
NAD	North American Datum
NGVD	National Geodic Vertical Datum
NYCRR	New York State Codes of Rules and Regulations
NYS	New York State
NYSDEC	New York State Department of Environmental Conservation

ACRONYMS

O&M	Operation and Maintenance
OVM	Organic Vapor Meter
PCB	Polychlorinated Biphenyl
ppb	Parts Per Billion
ppm	Parts Per Million
PVC	Polyvinyl Chloride
QC	Quality Control
RAO	Remedial Action Objectives
RAP	Remedial Action Plan
RAR	Remedial Action Report
RI	Remedial Investigation
RQD	Rock Quality Designation
RRSCO	Restricted Residential Soil Cleanup Objective
RSCO	Residential Soil Cleanup Objective
SCGs	Standards, Criteria & Guidance
SDG	Strickler Development Group
SMP	Site Management Plan
STARS	Spills Technology and Remediation Series
SVOC	Semi-volatile Organic Compound
SWPPP	Storm Water Pollution Prevention Plan
TAL	Target Analyte List
TCL	Target Compound List
TOGS	Technical and Operational Guidance Series
TP	Test Pit
USCO	Unrestricted Soil Cleanup Objective
VOC	Volatile Organic Compound

1.0 INTRODUCTION

This Remedial Investigation/Alternatives Analysis Report (RI/AAR) has been prepared on behalf of Highland Park Village, LLC (HPV), formerly Strickler Development Group, LLC, for RI activities performed at the 129 Holden Street Brownfield Cleanup Program (BCP) Site No. C915261 located in the City of Buffalo, Erie County, New York (Site, see Figure 1). The Site property is approximately 27.09 acres in size under tax identification number 90.29-2-43.1. A Site Plan is included as Figure 2.

The RI/AA work was completed under the New York State Department of Environmental Conservation (NYSDEC) BCP and executed Brownfield Cleanup Agreement (BCA, Index # C915261-01-12) dated February 9, 2012. The BCA was amended on October 31, 2013, when NYSDEC approved a BCA amendment application, dated August 26, 2013, to change the ownership name for the Site from Strickler Development Group, LLC to Highland Village Park, LLC. The corporation name has changed while the ownership of the membership interests, the officers and directors has not changed.

The RI activities discussed in this report were completed under approved NYSDEC work plans and GZA GeoEnvironmental of New York (GZA) provided engineering oversight. The RI Work Plan[1] was approved on June 26, 2012 and RI Work Plan Addendum[2] was approved on October 1, 2012. The RI activities were completed between July 2012 and March 2013.

Interpretations presented within this report are based on previous investigations (see Section 1. 4) completed by GZA prior to entering into the BCP and subsequent RI activities. Data generated by GZA are included within this report and compared to the current applicable cleanup regulations (i.e., NYCRR 6 Part 375 Soil Cleanup Objectives and Division of Water, Technical and Operational Guidance Series (TOGS 1.1.1), June 1998, amended April 2000).

1.1 PURPOSE

This RI/AAR has been prepared on behalf of HPV to describe and present the findings of:

1. investigation activities completed prior to entering the BCP;
2. on-site RI activities;
3. evaluation of the remedial alternatives; and
4. recommendation of a remedial strategy selected to address the contamination remaining at the Site.

[1] "Remedial Investigation Work Plan, 129 Holden Street, Buffalo, New York, Brownfield Cleanup Program, Site No. C915261". Prepared for NYSDEC, Region 9, Buffalo New York by GZA, dated June 2012.

[2] Remedial Investigation Work Plan Addendum, 129 Holden Street, Buffalo, New York, Brownfield Cleanup Program, Site No. C915261". Prepared for NYSDEC, Region 9, Buffalo New York by GZA, dated September 25, 2012.

The SI/AAR contains the following sections.

Section 1.0 Introduction: This section states the purpose of the SI/AAR, the Site background including Site description, Site history and previous relevant studies, scope of work and report organization.

Section 2.0 Remedial Investigation: This section summarizes the fieldwork completed as part of the Remedial Investigation (RI) completed between January 2012 and March 2013 by GZA under the BCP.

Section 3.0 Physical Characteristics of the Study Area: This section presents and interprets the various data collected and evaluates Site conditions (e.g., hydrogeology, geology, hydrology, etc.).

Section 4.0 Nature and Extent of Contamination: The types and concentrations of detected chemical compounds in the different environmental media are discussed. The section is divided into the various types of samples collected that include subsurface soil and groundwater.

Section 5.0 Contaminant Fate and Transport: An evaluation of potential migration pathways and contaminant persistence is presented.

Section 6.0 Qualitative Exposure Assessment: This section presents the results of a general qualitative exposure assessment for the Site. The assessment includes an estimation of exposure point concentrations and a comparison of this data with published New York State standards, criteria and guidance values (SCGs).

Section 7.0 Identification of Standards, Criteria & Guidelines and Remedial Action Objectives: This section identifies the standards, criteria and guidelines for the Signore BCP Site and discusses the remedial action objectives.

Section 8.0 Development of Remedial Alternatives: This section presents the list of developed remedial alternatives for detailed screening that were evaluated on the basis of: short-term impacts and effectiveness; long-term effectiveness and permanence; reduction of toxicity, mobility and volume; implementability; compliance with applicable or relevant and appropriate SCGs and Site remediation goals; overall protection of human health and the environment; and cost.

Section 9.0 Detailed Analysis of Remedial Alternatives: Presents a detailed analysis of remedial action alternatives established in Section 9.0. The alternatives are compared on the basis of environmental benefits and costs using the eight criteria established in DER-10. Each alternative is assessed and an appropriate remedy is selected that satisfies the remedial action objectives.

Section 10.0 Comparative Analysis of Remedial Alternatives: Provides a comparative analysis of the alternatives on the basis of the seven criteria, based on the detailed analysis provided in Section 10.0.

Section 11.0 Remedial Action Plan: Provides the work plan for the selected remedial action to be completed at the Signore BCP Site based on the evaluation of the remedial alternatives discussed in Section 11.0.

1.2 SITE AND SURROUNDING AREA DESCRIPTION

The Site is situated in a commercially-zoned area of the City of Buffalo. Surrounding adjacent areas are zoned for residential and public service use. The Site consists of approximately 27.09-acres of land and previously contained five (5) vacant buildings (see Figure 2). Four of the five Site buildings were demolished in 2012 as part of Site redevelopment activities.

1.3 SITE HISTORY

The Site was originally developed for industrial use as early as 1874 for the mining industry and the production of limestone and natural rock cement. The property was owned and operated by the Buffalo Cement Co. Ltd. from 1877 to 1948. During that time, mining operations occurred at the Site. Historical aerial photographs (see Appendix A) show that these operations were performed within the Site boundaries and extended beyond to the north and east. It is documented that 5 to 6 feet of Bertie Limestone was quarried by the Buffalo Cement Co. Ltd. for the production of natural cement at their Buffalo facility.

In 1958, the Site was developed by Central Park Shopping Center, Inc. with the construction of three (3) Site buildings for commercial purposes. Two (2) additional commercial buildings were constructed in 1967 and 1989. Various businesses have occupied the Site throughout its history as a shopping center. The Site has been vacant since July 2011.

1.4 PREVIOUS INVESTIGATIONS

PHASE I ENVIRONMENTAL SITE ASSESSMENT – AUGUST 2011

In August 2011, GZA performed a Phase I Environmental Site Assessment [3] (Phase I ESA) at the Site. Pertinent findings of this report regarding the subject property are as follows:

- The Site was first utilized in at least the early 1900s by Buffalo Cement as a quarry, until the mid-1950s. The Site was first developed by the Central Park Plaza in 1958 with the construction of three Site buildings (Building 1 through Building 3).

[3] "Phase I Environmental Site Assessment, Central Park Plaza, 129 Holden Street, Buffalo, New York" – prepared by GZA GeoEnvironmental of New York for LP Ciminelli Construction, dated August 2011.

An additional building was constructed on the southern portion of the Site in 1967 (Building 4) and the fifth building on the western portion of the Site in 1989 (Building 5). The Site operated as a shopping plaza from 1958 until the last of the tenants vacated the Site in July 2011.

- Historic Site tenants of concern within Building 1 include a photo mart, laundromats, an automatic car wash, a dry cleaner and a chop shop. Several oil containers with missing covers and areas of staining were observed within the chop shop. No floor drains were apparent in the immediate vicinity of the chemical storage areas; however, observations were limited due to the amount of debris within the Site building. GZA observed several cracks in the foundation within the chop shop.

- Historic Site tenants of concern within Building 2 include an auto service shop.

- The Site was listed twice on the NY Spills database. The potential exists for soil and/or groundwater contamination to have resulted from the historic Site usage.

- A maintenance person with Site responsibilities informed GZA that the current owner had been dumping fill materials in the area east of Building 2 at the Site, and was unaware of the origin of the fill materials brought on-Site.

- GZA observed suspect ACM materials during our site reconnaissance including floor tiles, ceiling tiles and pipe wrap throughout the site buildings. The interior portions of the Site buildings were littered with debris piles including garbage, drywall, ceiling tiles, floor tiles, glass, wood, pipe wrap etc. Additionally, due to the age of the buildings (1958-1989) it is possible that ACM materials are present in areas that were not readily accessible.

- GZA observed painted surfaces in the interior portions of the Site building to be in poor condition. Due to the age of the buildings (1958-1989) it is possible that painted surfaces contain detectable quantities of lead.

- GZA observed extensive areas of mold growth on floors, ceilings and walls throughout Site buildings.

Based on the information obtained as part of the assessment, it was GZAs opinion that historic Site usage (i.e., mining operations, photo processing, dry cleaning, chop shop), spill history, and surrounding area usage represented recognized environmental concerns.

PHASE II ENVIRONMENTAL SITE ASSESSMENT – OCTOBER 2011

In October 2011, GZA performed a Phase II Environmental Site Assessment[4] (Phase II ESA) at the Site. The analytical results table and Site Figure are included in Appendix B. Pertinent findings of this report regarding the subject property are as follows:

- The exterior surface cover generally consisted of asphalt or exposed sub-base. The subsurface conditions consisted of granular fill soils to depths of about 2 feet bgs. The granular soil extended deeper at SP-14 (4 feet bgs), SP-17 (8 feet bgs) and SP-18 (8 feet bgs). Underlying the granular soil generally was a cohesive fill soil (silts and clays) with lesser and various amounts of sand, gravel, brick, wood and glass at depths ranging from 4 to 10 feet bgs. At probe locations SP-5 through SP-8 and SP-19, granular fill soil was encountered at depths of 4 to 8 feet extending to the bottom of the soil probes.

- The interior surface cover inside the former chop shop was concrete. Cohesive fill soils (clayey silt) with lesser and various amounts of sand, gravel and brick, were encountered to a depth of 8 feet below grade in the two northern soil probes, SP-9 and SP-10. A sand and gravel fill layer was encountered at SP-9 from about 2 to 4 feet below grade. Subsurface soils at SP-11 in the southern portion of the former chop shop were granular fill soils (gravel and sand) with lesser and various amounts of silt and clay, to a depth of 1.5 feet below grade, overlying a cohesive soil (silty clay) to about 5 feet below grade and then back to a granular fill soil (sand) with lesser and varying amounts of gravel, clay, silt and brick.

- Groundwater was not encountered at soil probe locations completed during the Phase II ESA.

- Thirteen (13) volatile organic compounds (VOCs) were detected at concentrations above method detection limits in one soil fill sample, SP-9, from 0 to 4 feet bgs. This sample was collected from inside Building 1 in the former chop shop area. Of the 13 compounds detected, the total xylene concentration exceeded its respective NYSDEC Part 375[5] Unrestricted Soil Cleanup Objectives (USCOs). No VOCs were detected above method detection limits in the other five samples submitted for analytical testing.

- Semi-volatile organic compounds (SVOCs) were detected above method detection limits in five of the six fill soil samples submitted for analysis. Six (6) of the detected compound concentrations exceeded their respective USCOs, and five (5) exceeded their respective NYSDEC Part 375 Residential Soil Cleanup Objectives

[4] "Phase II Environmental Site Assessment, Central Park Plaza 129 Holden Street Buffalo, New York" – prepared by GZA GeoEnvironmental of New York for Harter Secrest & Emery LLP, dated November 2011.

[5] 6 New York Code Rules and Regulation (6 NYCRR) Part 375 Environmental Remediation Programs, effective December 14, 2006 (Part 375).

(RSCOs) at two (2) samples locations: SP-4, 2 to 6 feet bgs and SP-15, 0 to 4 feet bgs. Location SP-4 was located south of Building 1 in the area of the former photo mart and SP-15 was in an area of fill material brought to the Site.

- Polychlorinated biphenyls (PCBs) were detected above method detection limits in one (1) sample, SP-9, 0 to 4 feet bgs. The detected concentration exceeds the USCO. This sample was collected from inside Building 1 in the former chop shop area. No PCBs were detected above method detection limits in the other five (5) samples submitted for analytical testing.

- Six (6) metals were detected above method detection limits in the six (6) fill soil samples sent for analysis. Cadmium, chromium and lead exceeded their respective USCOs and the concentrations of cadmium and chromium also exceed their respective RSCOs in the sample, SP-9, 0 to 4 feet bgs. Lead was detected at a concentration above its USCO in the sample SP-10, 0 to 4 feet bgs. Both probes SP-9 and SP-10 were completed inside the former chop shop area.

The results of the Phase II ESA identified VOC, SVOC, PCBs and metals contamination in the fill soil at the Site exceeding Part 375 USCOs and RSCOs. The petroleum related VOCs detected underneath the building in the former chop shop are characteristic of a petroleum release and total xylene was detected above its USCO. A petroleum release was reported to NYSDEC on October 28, 2011 and Spill No. 1109473 was assigned based on the analytical results.

2.0 REMEDIAL INVESTIGATION

The RI field explorations were performed in general accordance with the NYSDEC-approved Work Plans to obtain and evaluate site-specific data, nature and extent of contamination and the degree to which potential contamination pose a threat to human health and the environment.

The following tasks, as described in this report, were completed.

- Assess Site geology and hydrogeologic conditions;
- Evaluate aerial and vertical nature and extent of on-Site contamination;
- Evaluate transport mechanisms;
- Assess potential source(s) of contamination and assess impact to soil and groundwater;
- Identify potential pathways for human exposure; and
- Develop a remedial alternatives evaluation based on Site conditions.

The RI/AAR was completed in general accordance with the following.

- "Remedial Investigation/Alternative Analysis Report Work Plan, 129 Holden Street, Buffalo, New York, Brownfield Cleanup Program Site No. C915261" dated June 2012;
- "Remedial Investigation Work Plan Addendum, 129 Holden Street, Buffalo, New York, Brownfield Cleanup Program Site No. C915261" dated September 2012;
- "Quality Assurance Project Plan, 129 Holden Street, Buffalo, New York, Brownfield Cleanup Program Site No. C915261" dated April 2012;
- "Site Health and Safety Plan, 129 Holden Street, Buffalo, New York, Brownfield Cleanup Program Site No. C915261" dated March 2012;
- "Brownfield Cleanup Program, Citizen Participation Plan, 129 Holden Street, Buffalo, New York, Brownfield Cleanup Program Site No. C915261" dated March 2012;
- NYSDEC Division of Environmental Remediation DER-10, "Technical Guidance for Site Investigation and Remediation", dated May 2010.

A description of the field explorations conducted during this RI is presented in the following subsections. The scope of work of the RI was intended to supplement the investigation activities previously completed by GZA.

2.1 TEST PIT EXPLORATIONS

GZA subcontracted with Nature's Way Environmental Consultants and Contractors, Inc. (Nature's Way) to complete eighty-one (81) test pit explorations at the Site to evaluate the subsurface conditions and to collect analytical samples to assess the nature and extent of contamination present within the subsurface soil. The test pits were completed between July and December 2012. The test pits are identified as TP-1 through TP-81 and are shown on Figure 3. The test pit logs are included in Appendix C.

The test pits were excavated using a track mounted excavator equipped with an approximate 1 cubic yard (cy) bucket. The test pits completed were typically 10 feet in length and 3 feet in width. The depths of the test pits ranged from approximately 6 feet below ground surface (bgs) to approximately 19 feet bgs. Soils removed from the test pits were placed on the ground, adjacent to the test pits. Soils were screened in the field using an organic vapor meter (OVM) and collected in 2-foot intervals to the bottom of the test pits. Upon completion, soils were placed back into the test pits in 2 to 3 foot lifts, generally in the order in which they were removed and compacted with the excavator bucket.

GZA was present during the excavation of test pits to make observations on the subsurface conditions encountered, field screen soils removed from the test pits, document findings, take photographic documentation and collect subsurface soil samples.

Analytical subsurface soil samples were collected from the test pits and submitted for chemical analysis. A summary of the samples collected, the sample interval and the analysis performed is shown on Table 1. Analytical test results from the test pit soil samples are summarized on Table 2 and the results are further discussed in Section 5.4.

2.2 SURFACE SOIL SAMPLING

No surface soil samples were collected from the Site. The proposed redevelopment activities will cover and/or disturb the existing surface soils present at the Site.

2.3 TEST BORINGS AND MONITORING WELL INSTALLATION

GZA subcontracted with Nature's Way to complete six (6) test borings to install six (6) groundwater monitoring wells. The monitoring wells were used to collect groundwater samples for laboratory analysis, conduct field hydraulic conductivity testing and determine groundwater flow direction at the Site. Monitoring wells are identified as MW-1 through MW-6 and are shown on Figure 3. Test boring and monitoring well installation logs are included in Appendix C.

Boreholes were advanced through the overburden and fill material to the top of bedrock using a truck-mounted rotary drill rig and 4 ¼ inch inside diameter hollow stem augers (HSAs). Overburden soil samples were collected continuously ahead of the HSAs by driving a 1-3/8 inch inner diameter by 24 inch long split spoon sampler 24 inches with an automated 140-pound hammer falling approximately 30 inches, in general accordance with ASTM D1586 (Standard Penetration Test). Test borings were advanced with the HSAs until auger refusal (suspected top of bedrock).

Soil samples collected from the test borings were classified in the field by visual examination in accordance with the modified Burmister Classification System. Boring logs that identify appropriate stratification lines, blow counts (if applicable), sample identification, sample depth interval and recovery, and date are included in logs in Appendix C.

Analytical soil samples were collected from the six (6) test borings. A summary of the samples collected and the analysis performed is shown on Table 1. Analytical test results from the test boring soil samples are summarized on Table 2 and the results are further discussed in Section 5.4.

Upon reaching the apparent top of bedrock at five (5) of the six (6) test boring locations, (MW-2 through MW-6), indicated by auger refusal, a 3-7/8 inch diameter rock core barrel was used to core into bedrock. Bedrock cores recovered ranged from 4.8 feet (MW-2, MW-3) to 14.5 feet (MW-4) in length. The rock core samples were logged including run number, sample interval, length of sample recovered, rock quality designation (RQD), and

a description of the rock sampled and individual discontinuities (bedding planes, joints, voids, etc.). This information is included on the boring logs (see Appendix C).

At one test boring location, MW-1, the bedrock was drilled using a 4-inch diameter tri-cone roller bit and air compressor, rather than a core barrel, to remove the cuttings. The HSAs alignment became off-center due to the subsurface conditions and the core barrel could not be advanced through the HSAs to core the bedrock. The tri-cone roller bit was drilled into the bedrock and established the borehole that the monitoring well was installed. No bedrock sample was recovered from this location.

The monitoring wells installed within the six (6) test borings were constructed of 2-inch I.D. flush-coupled Schedule 40 PVC riser and screen. Following placement of the screen and riser within the borehole, the annular space around the screen, approximately 10 feet in length, was backfilled with sand (#0) to at least 1 foot above the top of the screen. An approximate 3 to 6 foot thick layer of bentonite chips was placed above the sand filter and hydrated from ground surface. A mixture of cement/bentonite grout was used to fill the remaining annulus space of the borehole to approximately 1 foot bgs. Protective steel flush-mount road boxes were placed over the top of each monitoring well.

Following installation, the wells were developed utilizing a pump to evacuate the wells and remove cuttings and check that the wells were functioning properly. The monitoring wells were pumped to "dry-like" conditions (MW-1 and MW-3) or purged of at least 10 well volumes (see well development logs in Appendix D). Wells that went dry were allowed to recharge for approximately 1 hour and then pumped to "dry-like" conditions again. Water generated during the well development of purging was placed into 55-gallon drums at the Site.

2.4 FIELD SCREENING

The soil samples retrieved from the test pit and test borings were field screened for total volatile organics using an organic vapor meter (OVM) equipped with a photoionization detector and 10.6 eV bulb. The OVM was calibrated daily during its use, in accordance with manufacturer's requirements, using a gas standard (Isobutylene). The soils removed from the test pits or the split-spoon samplers were screened immediately by running the OVM over the top of the retrieved samples. The peak response, per 2 foot screening interval, was recorded on the test pit and test boring logs in Appendix C.

2.5 GROUNDWATER SAMPLING

Groundwater samples were collected from the six (6) newly installed monitoring wells. The well sampling was conducted utilizing low-flow sampling techniques using a water quality meter, disposable polyethylene tubing and a variable speed pump. A summary of the analysis performed is shown on Table 1. Analytical test results from the groundwater samples collected are summarized on Table 3 and discussed in Section 5.5. Groundwater generated during the well purging prior to sampling was containerized in 55-gallon drums at the Site.

Based on the analytical results of the groundwater sampling the groundwater from monitoring wells MW-1, -3, -4, -5, and -6 were disposed to an on-site sanitary sewer catch basin on May 14, 2013 via a temporary discharge permit issued by the Buffalo Sewer Authority (see Appendix F). The groundwater from MW-2 taken to American Recyclers Inc., in Tonawanda, New York by Environmental Service Group, Inc. on May 14, 2012 for proper disposal (see disposal documentation in Appendix F).

2.6 ENVIRONMENTAL SAMPLING

The soil and groundwater environmental samples collected as part of the RI were submitted to the Paradigm Environmental Services Inc., laboratory located in Rochester, New York.

The analytical data packages were submitted to Data Validation Services (DVS) for review and development of data usability summary reports (DUSRs), provided in Appendix E. The DUSRs are further discussed in Section 5.0.

2.6.1 Subsurface Soil Samples

One hundred-seven (107) subsurface soil samples (excluding QC duplicate and a matrix spike/matrix spike duplicate (MS/MSD) samples) were collected from the 81 test pits and six (6) test borings completed as part of the RI. Seven (7) duplicate soil samples were collected from TP-17, 2 to 4 feet; TP-23, 8 to 10 feet; TP-65, 6 to 8 feet; TP-67, 0 to 2 feet; TP-71, 8 to 10 feet; TP-76, 13 to 15 feet; and TP-80, 2 to 4 feet. Seven (7) MS/MSD soil samples were collected from TP-21, 2 to 4 feet; TP-24, 2 to 4 feet; TP-64, 4 to 6 feet; TP-66, 12 to 14 feet; TP-72, 10 to 12; TP-77, 4 to 6 feet; and TP-81, 2 to 4 feet. A summary of samples collected for analytical testing and the parameters is presented in Table 1 and the results are presented in Table 2.

2.6.2 Groundwater Samples

Six (6) groundwater samples (excluding duplicate and MS/MSD samples) were collected from the six (6) monitoring wells installed as part of the RI. A duplicate groundwater sample was collected from MW-2 and a MS/MSD was collected from MW-5. A summary of samples collected for analytical testing and the parameters is presented in Table 1 and the results are presented in Table 3.

2.7 SURVEY

A boundary survey was completed for the Site and the locations of the 81 test pits and six (6) monitoring wells locations completed as part of the RI, by a licensed land surveyor (McIntosh & McIntosh, PC). The ground surface, road box and monitoring point elevations of the monitoring wells were measured and referenced to the National Geodetic Vertical Datum (NGVD). The test pits were also located and referenced to the NAD83/96, New York State Plane Coordinates, West Zone.

3.0 PHYSICAL CHARACTERISTICS OF THE STUDY AREA

The following sections discuss surface features, meteorology, surface water hydrology, regional and Site geology, regional and Site hydrogeology, and land use and demography.

3.1 SURFACE FEATURES

The Site is approximately 27 acres, located within the City of Buffalo, Erie County, New York. Four (4) of the five (5) former buildings on the Site have been removed along with their respective concrete slabs and foundations. The small one-story building located along Holden Street is the only remaining building at the time of the report.

The Site elevation ranges from approximately 675 feet above mean sea level (ftMSL) to 656 (ftMSL). The ground surface slopes downward towards the northern end of the site, dropping approximately 19 feet. Hill Street formerly transected the Site in a north-south direction (see Figure 2), but has been closed at the north and south ends of the Site, as chain-link fencing has been installed around the perimeter of the property. The surrounding properties consist primarily of residential and commercial facilities.

3.2 METEOROLOGY

Buffalo, New York is typified by moderately warm summers and cold winters with about 94 inches of snowfall per year. The proximity to Lake Erie has an effect on the temperature and amount of snowfall. The average yearly precipitation is about 41 inches with an average yearly temperature of 48 degrees Fahrenheit.

3.3 SURFACE WATER HYDROLOGY

3.3.1 Regional Surface Water Hydrology

The topographic gradient of the area around the Site appears to be relatively flat with a gradual downward slope to the northwest towards the Niagara River, located approximately 3.3 miles northwest of the Site. Scajaquada Creek is also located approximately 1.5 miles west of the Site and Lake Erie is located approximately 4.4 miles southwest of the Site. Regional surface water hydrology is likely consistent with the topographical gradient in the area.

3.3.2 Site Surface Water Hydrology

Site surface water drains via sheet flow to storm water catch basins or ponds at low points where infiltration and/or evaporation occur. Surface water reaching on-site catch basins discharges to the City of Buffalo combined storm-sanitary sewer system.

3.4 REGIONAL GEOLOGY

The Site is situated within the Erie-Ontario Lowlands province of western New York. In general, areas within this province exhibit typically low, generally flat topography.

Based on the Surficial Geologic Map of New York, Niagara Sheet, Caldwell (1988), overburden soils in the vicinity of the Site are reported to be lacustrine silts and clays. These soils were deposited as bottom sediments in pro-glacial lakes and generally have a low permeability. Bedrock in areas proximate to the site property is within 1 to 3 meters of the surface and may sporadically crop out in areas.

The Geologic Map of New York, Niagara Sheet (1970), shows bedrock in the site vicinity as belonging to the Middle Devonian Onondaga Limestone or Upper Silurian Akron Dolostone and Bertie Formation.

3.5 SITE GEOLOGY

3.5.1 Overburden

The overburden soils encountered at the Site consists primarily of various fill materials used to backfill the former quarry operations at the Site. However, native soils were encountered in nine (9) test pits completed along the southern boundary of the Site (see Figure 4a) and consisted of brown silty clay with varying amounts of sand and gravel.

The thickness of the overburden soils (native and fill materials) ranged from approximately 5 feet (MW-4) to greater than 19 feet bgs (TP-22). Bedrock was encountered beneath the overburden soils at some of the investigation locations.

The fill materials encountered ranged in characteristics, but have been generally grouped into seven (7) fill layer units, as further described below. These were the main fill stratigraphic units generally encountered during the RI investigation activities.

Fractured Limestone- This fill layer appears to consist of limestone pieces, ranging in size from 4 inches to 4 feet, mixed with lesser and varying amounts of sand, silt and clay. The unit may represent limestone that was excavated from the quarry, but was not processed for reuse. This fill layer was encountered throughout the Site and ranged in thickness from 1 foot to 14 feet. Figure 4a depicts the locations where the unit was encountered during the RI.

Slag – This fill layer mainly consists of material that is a byproduct of the steel production process mixed with lesser and varying amounts of silt, sand, and gravel. It was generally encountered in the eastern and central portion of the Site and the layer ranged in thickness from around 6 inches to 3 feet. Figure 4b depicts the locations where the unit was encountered during the RI.

Black Sands – This fill unit consists of various types of black sand or black stained soils encountered throughout the Site. This unit was encountered in the northeastern, north-central and western portions of the Site. The thickness of the layers encountered ranged from around 6 inches to 7 feet. Figure 4b depicts the locations where the unit was encountered during the RI.

Potential Ash – This fill unit consists of various types of light weight fine sands and silts of various mixed colors (black, orange, white, brown or black). This material may be the result of some sort of process or incineration. This unit was primarily encountered in the central and southeastern portions of the Site. The thickness of the layers encountered ranged from around 6 inches to greater than 14 feet. Figure 4b depicts the locations where the unit was encountered during the RI.

Non-Native Silty Clay – This fill layer is a non-native brown silty clay unit with varying amounts of sand, gravel and other materials (brick, metals, wood, etc.). It was encountered over a significant portion of the investigation site as depicted on Figure 4c. At some locations it was encountered multiple times in the stratigraphic horizon. It ranged in thickness from 1 foot to 12 feet.

Gravels & Sands – This fill layer consists mainly of brown and dark brown gravels with lesser and varying amounts of sands, silts, clays and other debris. This unit was encountered throughout the site, but was most commonly encountered in the central and eastern portions of the Site. The thickness of the layers encountered ranged from around 1 foot to 13 feet. Figure 4d depicts the locations where the unit was encountered during the RI.

Sands & Gravels - This fill layer consists mainly of brown and dark brown sands with lesser and varying amounts of gravels, silts, clays and other debris. This unit was encountered in the central and eastern portions of the Site. The thickness of the layers encountered ranged from around 1 foot to 8 feet. Figure 4d depicts the locations where the unit was encountered during the RI.

3.5.2 Bedrock

Bedrock underlying the Site is the Bertie Limestone Formation of the Salina Group. This group is from the Silurian Period (438 to 408 million years ago). Depth to bedrock at the Site varied due to historic quarry operations. The Bertie Limestone is a gray, aphanitic limestone, which is fine-grained, thinly bedded with close spaced horizontal to sub-horizontal fractures.

Twenty-six (26) of the 81 test pits completed encountered the top of bedrock, in addition to the six (6) monitoring wells that were extended into the bedrock at the Site. The upper bedrock encountered at the Site can generally be classified as fair (rock quality designation (RQD) values of 51 to 75 percent) to good (RQD values of 76 to 90 percent) quality based on the RQDs obtained from the bedrock coring done and recorded on the test boring logs in Appendix C.

Figure 5 depicts the top of bedrock contour map based on the RI investigation locations.

3.5.3 Site Hydrogeology

Groundwater levels from the six (6) monitoring wells installed were measured during the RI. Groundwater levels in these six (6) wells range from about 13.2 feet bgs (MW-4) to 25.9 feet bgs (MW-6). Groundwater flow direction was determined to be in a northerly direction, as shown on Figure 6.

3.6 LAND USE AND DEMOGRAPHY

The site is located in a Commercial Zone of the City of Buffalo. Adjoining land uses are listed below.

- East – Community Service, Residential and Commercial
- North – Residential
- West – Commercial and Community Service
- South – Residential

According to the Potential Environmental Justice Areas In and Around the Northern Half of Buffalo, New York, the Site is located within a potential Environmental Justice (EJ) Area. EJ Areas are designated based on 2000 U.S. Census population data that meet or exceed at least one of the following statistical thresholds: at least 51.1% of the population in an urban area reported themselves to be members of minority groups; at least 33.8% of the population in a rural area reported themselves to be members of minority groups; at least 23.59% of the population in an urban or rural area had household incomes below the federal poverty level.

3.7 FISH & WILDLIFE RESOURCES IMPACT ANALYSIS

No fish and wildlife resource impact analysis (FWRIA) will be required as part of the RI. The FWRIA Decision Key in Appendix 3C of NYSDEC DER-10 was used to come to this conclusion, as follows.

Step 1: Is the site or area of concern a discharge or spill event? No *(Go to Step 2)*

Step 2: Is the site or area of concern a point source of contamination to the groundwater which will be prevented from discharging to surface water? Soil contamination is not widespread, or if widespread, is it confined under buildings or paved areas. No *(Go to Step 3)*

Step 3: Is the site and all adjacent property a developed area with buildings, paved surfaces and little or no vegetation? No *(Go to Step 9)*

Step 9: Does the site or any adjacent or downgradient properties contain any of the following resources?

- Any endangered, threatened or special concern species or rare plants or their habitat; - No
- Any DEC designated significant habitats or rare NYS Ecological Communities; No
- Tidal or Freshwater wetlands; No
- Stream, creek or river; No
- Pond, lake, lagoon; No
- Drainage ditch or channel; No
- Other surface water feature; No
- Other marine or freshwater habitat; No
- Forest; No
- Grassland or grassy field; No
- Parkland or woodland; No
- Shrubby area; No
- Urban wildlife habitat; No
- Other terrestrial habitat. No *(Go to Step 10)*

Step 10: Is the lack of resources due to the contamination? No *(Go to Step 14)*
Step 14: No FWRIA needed.

4.0 NATURE AND EXTENT OF CONTAMINATION

This section discusses the nature and extent of contamination at the Site and its vicinity. This discussion will include data generated as part of the previous investigation (discussed in Section 1.4) and the data collected as part of the RI. Figure 3 identifies the locations of the various test pits and monitoring well locations that were completed and will be used for the discussion of the nature and extent of contamination.

Paradigm Environmental Services Inc. (Paradigm) provided analytical laboratory services for the soil and groundwater samples for this project (see Appendix E for Paradigm's ELAP certifications). Data Validation Services provided the data usability summary reports (DUSRs) for the data generated. Validated analytical data along with data qualifiers, their definitions, as defined by Data Validation Services, are also included in Appendix E. Our presentation of analytical test results within the text does not include data qualifiers.

We note conclusions of the DUSR rejected the following data.

- One (1) VOC (1,4-dioxine) in the soil samples analyzed;
- One (1) herbicide (2,4,5-T) in three samples;
- Silver in 18 soil samples; and
- Mercury in two (2) soil samples.

The data for the above mentioned analytes and samples is noted with an "R" qualifier identifying it as rejected in Table 2. The reported data for 1,4-dioxine, 2,4,5-T and silver for the samples that were rejected were below detection limits. 1,4-dioxine was rejected because the RRFs were below 0.01. 2,4,5-T was rejected because the herbicide matrix spikes of TP-21-2-4 did not show recovery for 2,4,5-T. Silver was rejected in 18 samples because the metals matrix spike of TP-62-9-10 for those samples did not show recovery for silver. Silver results were non-detect in the samples rejected. Mercury was rejected in two (2) soil samples (MW-3-2-4 and MW-3-12-14) because the associated metals matrix spike/matric spike duplicate for those samples collected from MW-3-12-13, did not show recovery for mercury.

1,4-dioxine and 2,4,5-T were not detected above method detection limits in the samples rejected. Silver was not detected above the Part 375 Unrestricted SCOs in the samples analyzed from the Site and the mercury results were non-detected in the two samples rejected. The rejected data does not affect the analytical data for the Site.

The comparative criteria used for assessment of the various media samples, to determine if a potential threat to human health or the environment exists, were as follows.

Subsurface Soil

- Restricted Residential Soil Cleanup Objectives (RRSCOs) per 6 New York Code Rules and Regulation (6 NYCRR) Part 375 Environmental Remediation Programs, Subparts 375-12 to 375-4 & 375-6, effective December 14, 2006.

Groundwater

- Glass GA criteria per NYSDEC's Division of Water, Technical and Operational Guidance Series (TOGS 1.1.1), June 1998, amended April 2000.

4.1 CONTAMINANT TYPES

Discussions of laboratory analytical results are presented below by chemical classes. The various environmental media sampled as part of the RI included subsurface soil and groundwater.

The soil samples collected as part of the initial test pit (TP-1 through TP-27) were analyzed for TCL VOCs, SVOCs Base-Neutral (BN), PCBs, pesticides, herbicides and TAL metals. Based on the analytical results for the initial 27 test pits the analytical sampling program for the remaining soil samples and groundwater samples was reduced to include VOCs, SVOC STARS[6] and TAL metals.

6 Spill Technology and Remediation Series (STARS) Memo #1, Petroleum-Contaminated Soil Guidance Policy, New York State Department of Environmental Conservation, August 1992.

4.2 SURFACE SOIL ANALYTICAL RESULTS

No surface soil samples were collected during the RI. The proposed redevelopment activities will cover and/or disturb the existing surface soils present at the Site.

4.3 SUBSURFACE SOIL ANALYTICAL RESULTS

One-hundred eight (108) subsurface soil samples were analyzed from the eighty-one (81) test pits and six (6) monitoring wells completed as part of the RI. Of the 108 subsurface soil samples collected:

- Forty-eight (48) were analyzed for VOCs Target Compound List (TCL) via Method 8260B.
- Ninety-seven (97) were analyzed for SVOCs. Of the 97 samples tested for SVOCs, 34 were analyzed for base-neutral and acid extractable compounds and 63 were analyzed for STARS compound list.
- One-hundred (100) were analyzed for Target Analyte List (TAL) metals.
- Thirty-four (34) samples were analyzed for PCBs.
- Thirty-four (34) samples were analyzed for pesticides.
- Thirty-four (34) samples were analyzed for herbicides.
- Thirty-five (35) samples were analyzed for total cyanide.

Table 1 provides a summary of the samples collected and the analytical parameters utilized on the various samples collected. Table 2 is a summary of the analytical results and identifies the compounds which exceed the RRSCOs. Figure 7 identifies the locations of soil contamination in exceedance of the RRSCOs at depths of 2 feet bgs or less, as a Track 4 cleanup (as defined in 6 NYCRR Part 357) is being considered for the Site.

4.3.1 Volatile Organic Compounds

From these 48 subsurface soil samples analyzed, a total of 15 different VOCs were detected at concentrations greater than method detection limits. None of the VOCs detected were at concentrations exceeding their respective RRSCOs. See Table 2 and for a summary of the soil analytical results.

4.3.2 Semi-Volatile Organic Compounds

From the 97 subsurface soil samples analyzed for SVOCs, a total of 21 different SVOCs were detected at concentrations greater than the method detection limits. Ten (10) of the 21 SVOCs were detected at concentrations greater than respective

Part 375 RRSCOs. At least one (1) SVOC was detected above its respective RSCO in 36 of the 97 samples analyzed for SVOCs. See Table 2 for a summary of the soil analytical results.

We note that SVOCs were also detected above the Commercial SCOs in 25 sample locations and above the Industrial SCOs in 24 sample locations.

4.3.3 Polychlorinated biphenyls

From the 34 subsurface soil samples analyzed for PCBs, two aroclors (1254 and 1260) were detected at concentrations greater than method detection limits. None of the aroclors detected were at concentrations exceeding their respective RRSCOs. See Table 2 for a summary of the soil analytical results.

4.3.4 Pesticides

From the 34 subsurface soil samples analyzed for pesticides, 17 compounds were detected at concentrations greater than method detection limits. None of the detected pesticides detected were at concentrations exceeding their respective RRSCOs. See Table 2 for a summary of the soil analytical results.

4.3.5 Herbicides

From the 34 subsurface soil samples analyzed for herbicides, none were detected at concentrations greater than method detection limits. See Table 2 for a summary of the soil analytical results.

4.3.6 Total Cyanide

From the 35 subsurface soil samples analyzed for cyanide, it was detected six (6) times at concentrations greater than method detection limits. None of the detected concentrations exceeded their respective RRSCOs. See Table 2 for a summary of the soil analytical results.

4.3.7 Metals

From the 100 subsurface soil samples analyzed for metals, 23 different metals were detected at concentrations greater than the method detection limits, of which 13 metals have Part 375 SCOs. Of the 13 metals detected with SCOs, ten (10) were detected at concentrations greater than their respective RRSCOs. At least one (1) metal was detected above its respective RRSCO in 27 of the 100 samples analyzed for metals. The metals and the number of times the respective metal exceeded its RSCO is as follows.

Arsenic – 10 exceedances
Barium – 9 exceedances
Cadmium – 4 exceedances
Chromium – 2 exceedances
Copper – 8 exceedances
Lead – 11 exceedances
Manganese – 7 exceedances
Mercury – 3 exceedances
Nickel – 1 exceedances
Zinc – 3 exceedances

See Table 2 for a summary of the soil analytical results.

We note that metals were also detected above the Commercial SCOs in 19 sample locations and above the Industrial SCOs in 12 sample locations.

4.4 SOIL SOURCE AREAS

The investigation activities completed did not identify specific sources of the various SVOCs and metals contamination identified. No VOCs, PCBs, herbicides or pesticides were detected in the soil samples analyzed as part of the RI above their respective RRSCOs.

The Site contains significant amounts of fill materials that were placed after closing the quarry operations and prior to construction of Central Park Plaza in the early 1950s. Section 3.5.1 identified the seven (7) main fill units and one (1) native soil unit identified.

The goal of the remediation is to achieve RRSCOs via a Track 4 Cleanup. The investigation did identify various areas of fill material (i.e., black sands, ash, slag) that are impacted and should be addressed as part of the remedial action to achieve a restricted residential Track 4 cleanup. These areas will either be removed or covered to meet the Track 4 Cleanup criteria. The sampling locations of SVOCS and metals above the RRSCO in the upper 2 feet of soil present at the Site are shown on Figure 7. However, HPV is considering utilizing a 3-foot cleanup depth rather than the required 2 foot depth to take a more conservative approach. The 13 areas that exceed the RRSCO to be addressed as part of the remedial action are shown on Figure 8.

Table 4 identifies the potential areas shown on Figure 8 that require remedial action in the upper 3 feet of soil at the Site. Remedial action areas were identified by three criteria, as follows.

- Soil sample results from the RI exceeded the RRSCOs;
- Soil sample results from the Phase II ESA exceeded the RRSCOs; and
- The area contained a fill unit (e.g., ash, black sand, slag) that generally had exceedances of the RSCOs.

The potential ash unit was sampled eight (8) times as part of the RI. The results of the eight (8) samples exceeded the RSCOs in seven (7) of those samples (88%). Therefore, we estimate that the end-disposition of the potential ash layer should be addressed as part of the remedial action at the Site.

Black sands or black stained soils were sampled nine (9) times as part of the RI. The results of the nine (9) samples exceeded the RSCOs in eight (8) of those samples (89%). Therefore, we estimate that the end-disposition of the black sands or black stained soils should be addressed as part of the remedial action at the Site.

The slag layer was sampled two (2) times as part of the RI and exceeded the RSCOs in both samples (100%). Therefore, we estimate that the end-disposition of the slag layer should be addressed as part of the remedial action at the Site.

As discussed in Section 1.4, the Phase II ESA activities in 2010 identified SVOC and metal contamination exceeding their respective RSCOs. These locations (SP-4, SP-9, and SP-15) have been incorporated in the discussion of remedial areas included in Table 4 and shown on Figure 8.

The petroleum-related VOCs detected underneath the former building in the area of the former chop shop (see Figure 8), which resulted in assigning Spill No. 1109473 to the Site, have been incorporated in the discussion of remedial areas included in Table 4 and shown on Figure 7.

4.5 GROUNDWATER ANALYTICAL RESULTS

Six (6) groundwater samples were collected from six (6) newly installed monitoring wells as part of the RI (MW-1 through MW-6). The groundwater samples were analyzed for VOCs, SVOCs (STARS), and metals. The analytical results are summarized on Table 3.

4.5.1 Volatile Organic Compounds

Six (6) groundwater samples collected from six (6) different monitoring points were analyzed for VOCs via EPA Method 8260B. Three (3) different VOCs were detected at concentrations greater than method detection limits, but below their respective NYSDEC Class GA criteria.

4.5.2 Semi-volatile Organic Compounds

Six (6) groundwater samples collected from six (6) different monitoring points were analyzed for SVOCs via EPA Method 8270 STARS. No SVOCs were detected at concentrations greater than method detection limits.

4.5.3 Metals

Six (6) groundwater samples collected from six (6) different monitoring points were analyzed for metals via EPA Method 6010/7471. Fifteen (15) different metals were detected at concentrations greater than method detection limits, of which four (4) analytes were detected above their respective NYSDEC Class GA, as follows.

Iron was detected at one location, MW-2 (5.1 ppm) at a concentration exceeding its respective Class GA criteria (0.3 ppm).

Magnesium was detected at two locations, MW-2 (110 ppm) and MW-6 (54 ppm) at concentrations exceeding its respective Class GA criteria (35 ppm).

Manganese was detected at one location, MW-3 (0.5 ppm) slightly exceeding its Class GA criteria (0.3 ppm)

Sodium was detected at five (5) locations, MW-1 (290 ppm), MW-2 (140 ppm), MW-3 (54 ppm), MW-5 (120 ppm) and MW-6 (160 ppm) at concentrations exceeding its respective Class GA criteria (20 ppm).

4.6 GROUNDWATER SOURCE AREAS

The results of the groundwater sampling did not identify specific contaminants of concern or that a groundwater problem exists at the Site. No VOCs or SVOCs were detected in the groundwater samples analyzed as part of the RI above their respective NYSDEC Class GA criteria, excepting iron, magnesium, manganese and sodium.

The detections of sodium, which occurred in the six (6) wells sampled, is likely attributed to the use of road salt. The Site was the former Central Park Plaza, which was in operation for over 40 years as a commercial plaza, and the surrounding area likely required application of road salt in the winter months.

The detections of iron (one location), magnesium (two locations) and manganese (one location) should not be a concern due to the limited number of detections of these analytes and because the Site/surrounding areas are serviced with public water. Additionally, we note, that the iron, magnesium and sodium do not have SCOs, therefore, these three (3) analytes will not be addressed by remedial actions.

5.0 CONTAMINANT FATE AND TRANSPORT

This section discusses the mechanisms that may affect migration of contaminants present at the Site. The soil/fill and groundwater sample analytical results are included in the discussion of the physical characterization of the Site to evaluate the fate and transport of

potential contaminants in Site media. The mechanisms by which the contaminants can migrate to other areas or media are briefly outlined below.

5.1 FUGITIVE DUST GENERATION

Contaminants present in subsurface soil can be released to ambient air as a result of fugitive dust generation. The Site is primarily characterized as gently sloping, with asphalt or gravel surface cover throughout. Soils that are exposed at the Site are primarily within the footprints of the four (4) former buildings which were demolished having the concrete slabs and footings removed. Suspension of soil particulates due to wind may occur in areas without surface cover or if physical disturbance (i.e., excavation) of subsurface soil/fill is to occur. However, remedial excavation activities would be managed under a soil management plan requiring particulate monitoring and dust suppression action thresholds. These thresholds will require actions to mitigate dust/particulate generation during remedial actions that would minimize the potential for contaminated sediment particles to migrate from the Site.

Under the planned redevelopment of the Site, the majority of the Site will be developed for restricted residential land use and will be covered by structures, asphalt, concrete, and vegetative cover in areas not otherwise covered by manmade materials. Therefore, this migration pathway is not considered relevant under the current and reasonably anticipated future land use.

Fugitive dust generation is not considered significant if a soil management plan, incorporating dust suppression methods, is implemented during remedial action at the Site.

5.2 VOLATILIZATION

Volatile contaminants present in soil/fill and groundwater may be released to ambient or indoor air through volatilization either from or through the soil/fill underlying current or future building structures. Volatile chemicals typically have a low organic-carbon partition coefficient (Koc), low molecular weight, and a high Henry's Law constant. No volatile organic compounds were detected in the soil or groundwater during the RI sampling program above their RSCOs (see Table 2) or Class GA (see Table 3) criteria, respectively.

Therefore, the volatilization pathway is not considered relevant due to the lack of volatile contaminants in the soil or groundwater at this Site.

5.3 SURFACE WATER RUNOFF

Erosion and transport of surface soils and associated sorbed contaminants in surface water runoff is a potential migration pathway. The Site is primarily characterized as gently sloping, with asphalt or gravel surface cover throughout. Soils that are exposed at the Site are primarily contained within the footprints of the four (4) former buildings having been demolished with the concrete slabs and footings removed.

Stormwater generated during remedial excavation activities would be managed under a soil management plan, which would minimize or eliminate the potential of contaminated sediment particles migrating from the Site.

The redevelopment of the Site will incorporate a new stormwater collection, retention and discharge system designed in accordance with New York State stormwater standards to provide a mechanism for controlled surface water transport that will result in minimization of sediment erosion and provide an on-Site capture mechanism within a stormwater retention basin.

Therefore, the surface water runoff pathway is not considered significant if a soil management plan is implemented during remedial action at the Site.

5.4 LEACHING

Leaching refers to contaminants present in soil/fill migrating downward to groundwater as a result of infiltration of precipitation. The primary contaminants at the Site are SVOCs and metals which have relative low mobility and solubility characteristics in soil matrices.

Based on the results of the groundwater samples collected from the Site, sodium was the only analyte detected at five (5) of the six (6) sampling locations at concentrations above its Class GA criteria. These detections are attributed to the use of road salt at the Site and surrounding areas. Other analytes detected above Class GA criteria (lead, magnesium and manganese) were not detected at any frequency that would indicate leaching is occurring. Therefore, leaching is not considered a relevant migration pathway.

We also note that the Site and surrounding areas are serviced by publicly supplied water.

5.5 GROUNDWATER TRANSPORT

Groundwater sampling conducted during the RI indicated that minor metal contaminants (iron, magnesium, manganese and sodium) were detected in the groundwater at a few locations. The fate and transport of a metal in soil and groundwater depends upon the chemical form and speciation of the metal. Typically, metals are relatively immobile in subsurface systems. The distribution of metals across the Site is likely due to the various types and the large quantity of fill material, which are present at the Site.

However, other than sodium, metals were not consistently identified at sampling locations or consistently detected above the Class GA criteria in the Site monitoring wells. Therefore, groundwater transport of contamination is not considered a relevant migration pathway. We note that no VOCs or SVOCs were detected above the Class GA criteria.

The pH of groundwater may alter the mobility of a metal. Metals are likely to be more mobile in an acidic environment than under neutral (pH of 7) or higher pH conditions. Field data from the groundwater samples (see Appendix D) indicated groundwater at the Site has a

pH range from 6 to 8. The metals could migrate northerly, but it is not expected to be a significant concern.

5.6 EXPOSURE PATHWAYS

Based on the analysis of chemical fate and transport provided above, the potential exposure pathways, by which site contaminants may reach off-site receptors, are fugitive dust migration and surface water migration. However, remedial activities completed in accordance with a soil management plan will significantly minimize or eliminate the potential that contaminated sediment particles could migrate from the Site in the form of fugitive dust and/or surface runoff.

During proposed remediation or redevelopment construction activities, a Community Air Monitoring Program (CAMP) and erosion and sediment control strategies required under a NYSDEC Construction Stormwater permit and Stormwater Pollution Prevention Plan (SWPPP), will be implemented to mitigate the potential for off-site exposure.

These potential exposure pathways will be substantially mitigated over the long term by both the completion of remedial action which will involve the removal of contaminated material from the Site. Additionally, Site redevelopment will involve the installation and implementation of a Site stormwater collection and management system designed in accordance with New York State standards to significantly mitigate the potential for soil erosion on-Site and the potential for off-site transport of soil particles in the form of sediment.

6.0 QUALITATIVE HUMAN HEALTH EXPOSURE ASSESSMENT

The purpose of the qualitative human health exposure assessment (exposure assessment) is to evaluate and document how people might be exposed to site-related contaminants, and to identify and characterize the potentially exposed population(s) now and under reasonably anticipated future uses of the site and surrounding area. The exposure assessment was completed based on the information presented in Sections 1.0 through 5.0.

A complete exposure pathway must exist for an individual or population to be impacted by the contamination at the Site. A complete exposure pathway exists when all five (5) of the following components exist.

1. A source or release of contamination;
2. Transport mechanism;
3. Point of potential human exposure with the contaminated medium;
4. Route of exposure at the contact point; and
5. A receptor population.

Section 4.0 discusses potential source areas and other contaminated media at and associated with the Site. Section 5.0 discusses potential routes of migration of chemical substances from source areas and observed contaminant migration at the Site.

6.1 HUMAN HEALTH EVALUATION

This section discusses the qualitative exposure assessment, an evaluation of Site occurrence and a comparison to standards, criteria and guidelines (SCGs) related to potential impacts to human health.

6.1.1 Exposure Assessment

This exposure assessment discusses potential migration routes by which chemicals in the environment may be able to reach human receptors. This discussion is based on current and hypothetical future Site conditions.

Currently, the Site is vacant, four (4) of the five (5) former buildings have been demolished, and the surrounding areas consist of residential and commercial properties. It is assumed, for the purposes of this evaluation, that the surrounding area use will remain unchanged.

In developing hypothetical future Site conditions, GZA based our assumption on the plan to develop the property for restricted residential use. Therefore, the qualitative exposure assessment will utilize Part 375 RSCOs for site soil and the NYSDEC Class GA criteria for groundwater.

Development and/or intrusive Site work in areas near the Site were evaluated. A future Site worker scenario, unaware of potential contamination, was also considered.

This section focuses primarily on identifying potential points of human contact with contaminated media and discusses exposure pathways identified for both on-Site and off-Site scenarios.

6.1.1.1 Surface Soils

Exposure to chemical substances within surface soils may occur via dermal contact or ingestion.

The 27-acre Site is covered extensively by asphalt parking lots and roadway, gravel lots and is currently inactive. An 8-foot security fence surrounds the Site to prevent unauthorized access, however a potential does exist for trespassing to occur.

No surface soil samples were collected during the RI, as the redevelopment activities for the Site will cover and/or disturb the existing surface soils present at the Site.

Under the current conditions, exposure to surface soil contaminants via dermal contact or incidental ingestion is considered minimal as the Site has been fenced to prevent unauthorized access.

6.1.1.2 Subsurface Soils

Exposure to contaminants within the subsurface soils may occur via direct contact, inhalation or incidental ingestion under the hypothetical future scenario where intrusive Site work is performed and the workers are unaware or not properly trained to work with potentially hazardous materials. If these materials are brought to the surface and not adequately secured, there is a potential exposure scenario to adjacent residents that could occur via dust migration or vapor emissions. As such, intrusive work on the Site, including construction or maintenance work should be conducted in accordance with requirements that include health and safety monitoring, under a controlled work environment. The likelihood of this potential exposure is relatively low, if proper health and safety procedures are followed.

6.1.1.3 Groundwater

Exposure to groundwater includes ingestion, direct contact and inhalation of vapors. The Site and surrounding area are serviced by publicly supplied water; therefore, the use of groundwater for drinking water supply is unlikely.

Other than sodium, metals were not consistently identified at sampling locations or consistently detected above the Class GA criteria in the Site monitoring wells. Therefore, groundwater contamination is not considered an exposure pathway. We note that no VOCs or SVOCs were detected above the Class GA criteria.

The depth of groundwater at the Site is, on average from the monitoring well water level data, around 20 feet bgs. Groundwater should not be encountered during future redevelopment or utility repairs at the Site where excavations are not expected to go to 20 feet bgs.

6.1.1.4 Potential Volatile Vapors

There does not appear to be an inhalation exposure potential due to the lack of volatile organic compound detections in the soil and groundwater samples collected at the Site.

6.1.1.5 Dust Migration

Potential dust migration from unpaved or unvegetated areas of the Site is expected to be minimal, as about 75% of the Site is covered with asphalt, gravel or vegetation. If contaminated subsurface soils are brought to the surface, dust migration is a possible scenario. However, dust mitigation measures, documented by real-time air monitoring for particulate levels, will be conducted during remedial activities.

As such, intrusive work at the Site should be conducted in accordance with requirements that include health and safety monitoring under a controlled work environment. The likelihood of this potential exposure is low, if proper health and safety procedures are followed.

6.2 QUALITATIVE EXPOSURE ASSESSMENT SUMMARY

The qualitative exposure assessment identified contamination associated with on- and off-Site environmental media. The media and primary issues are summarized below.

Surface Soils: Exposure to on-site or off-site surface soils via dermal contact or incidental ingestion is considered low as the Site is secured with fencing.

Subsurface Soils: SVOCs and metals contamination were detected at concentrations greater than their respective Standards, Criteria and Guidelines (SGC as defined in Section 7) in the subsurface soil. Exposure to the subsurface soils may occur via dermal contact, inhalation or ingestion under a hypothetical future scenario where on-Site intrusive work is performed and workers are unaware or not properly trained to work with contaminated materials. It is unlikely that exposure to local residents may occur since the Site is secured with fencing. If construction activities were to occur, intrusive work should be conducted in accordance with requirements that include a soil management plan and health and safety monitoring. Therefore, the likelihood of this potential exposure is low, if proper health and safety procedures are followed.

We do not suspect off-site subsurface soil contamination associated with the Site to be present or a concern. Therefore, exposure to subsurface soils via dermal contact or incidental ingestion is unlikely.

Groundwater: Other than sodium, metals were not consistently identified at sampling locations or consistently detected above the Class GA criteria in the Site monitoring wells. Groundwater contamination is not considered a relevant exposure pathway. We note that no VOCs or SVOCs were detected above the Class GA criteria.

Due to the average depth of groundwater (about 20 feet bgs), future development or utility repairs at the Site will likely not encounter groundwater during excavation activities.

Vapor Migration: Based on the soil and groundwater samples, there does not appear to be a potential for an inhalation exposure at the Site as no VOCs were detected at concentrations above the soil and/or groundwater criteria.

Dust Migration: Potential dust migration from unpaved or unvegetated areas of the Site could occur, but is limited as the majority of the Site is covered with asphalt, gravel or vegetation. Therefore, the likelihood of exposure is unlikely.

If contaminated subsurface soils are brought to the surface, dust migration is a possible scenario. Intrusive on-site work should be conducted in accordance with requirements that include health and safety monitoring under a controlled work environment. The likelihood of this potential exposure is low, if proper health and safety procedures are followed.

7.0 IDENTIFICATION OF STANDARDS, CRITERIA AND GUIDELINES AND REMEDIAL ACTION OBJECTIVES

7.1 INTRODUCTION

Standards, Criteria and Guidelines (SCGs) are used to establish the locations where remedial actions are warranted and to establish remedial action objectives (RAO). The SCGs established for the Site consist of the following.

Surface and Subsurface Soil

- Residential Soil Cleanup Objectives (RSCOs) per 6 New York Code Rules and Regulation (6 NYCRR) Part 375 Environmental Remediation Programs, Subparts 375-12 to 375-4 & 375-6, effective December 14, 2006.

Groundwater

- Glass GA criteria per NYSDEC's Division of Water, Technical and Operational Guidance Series (TOGS 1.1.1), June 1998, amended April 2000.

7.2 REMEDIAL ACTION OBJECTIVES

The final remedial measures for the Site must satisfy Remedial Action Objectives (RAO). RAOs are site-specific statements that convey the goals for minimizing or eliminating substantial risk to human health and the environment. The RAOs for the Site are as follows.

- Address soils with contaminants above the RRSCOs in the upper 2 feet, as required by a restricted residential Track 4 cleanup, to protect public health and the environment.
- Prevent ingestion or direct contact with soil contaminants exceeding the RRSCOs.
- Implement and maintain engineering and institutional controls to assure the Site is not used in a manner inconsistent with the future anticipated use (restricted residential).

The contaminants identified to be addressed as part of the remedial action, have not been identified in the groundwater, do not migrate under typical subsurface conditions and do not pose a vapor inhalation concern.

In addition to achieving RAOs, NYSDECs BCP requires remedy evaluation in accordance with DER-10. The guidance states that an appropriate remedy should identify and develop a remedial action that is based on the following criteria.

Overall Protection of Public Health and the Environment. This criterion is an evaluation of the remedy's ability to protect public health and the environment assessing how each alterative would eliminate, reduce or control (through removal, treatment, containment, engineering controls, or institutional controls) the existing or potential human exposures or environmental impacts.

Compliance with Standards, Criteria, and Guidance (SCGs). Compliance with SCGs addresses whether a remedy will meet applicable environmental laws, regulations, standards, and guidance.

Long-Term Effectiveness and Permanence. This criterion evaluates the long-term effectiveness permanence of the remedy after implementation. If contamination will remain on- or off-site after the selected remedy has been implemented, the following items are evaluated: (i) human exposures, (ii) ecological receptors or (iii) impacts to the environment. Evaluation of institutional and/or engineering controls is also required.

Reduction of Toxicity, Mobility or Volume with Treatment. This criterion evaluates the remedy's ability to reduce the toxicity, mobility, or volume of Site contamination. Preference is given to remedies that permanently and significantly reduce the toxicity, mobility, or volume of the wastes at the Site.

Short-Term Effectiveness. This criterion is an evaluation of the potential short-term adverse environmental impacts and human exposures during construction and/or implementation of the remedy. This criterion also includes a discussion of engineering controls that will be used to mitigate short term impacts (i.e., dust control measures), and an estimate of the length of time needed to achieve the remedial objectives.

Implementability. This criterion is an evaluation of the technical and administrative feasibility of implementing the remedy. Technical feasibility includes the difficulties associated with the construction and the ability to monitor the effectiveness of the remedy. For administrative feasibility, the availability of the necessary personnel and material is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, etc.

Cost Effectiveness. This criterion is an evaluation of the overall cost effectiveness of a remedy. Capital costs and costs associated with site management are estimated for the remedy and presented on a Present Worth basis.

Land Use. This criterion is an evaluation of the current, intended and reasonably anticipated future use of the site and its surroundings, as it relates to a remedy, when unrestricted levels would not be achieved.

Community Acceptance. This criterion is evaluated after public review of the remedy selection process as part of the final NYSDEC selection/approval of a remedy for site use.

7.3 REMEDIAL ACTION AREAS AND VOLUMES

This subsection identifies and presents the estimated areas and volumes of contaminated soil to assist in evaluating remedial alternatives later in this report. The estimates are based on the information gathered as part of the previous Phase II ESA and RI. We note that based on the results of the groundwater sampling, no action is required to address the minor groundwater contamination identified. The follow discussion focuses on soil.

As shown on Figure 8 and summarized in Table 4, thirteen (13) remedial areas have been identified. The total estimated volume of soil to be addressed within these 13 areas is approximately 23,000 cubic yards to achieve a BCP Track 4 cleanup.

At NYSDECs request, HPV was asked to evaluate a remedial action involving the removal and off-site disposal of significantly impacted materials. The purpose of removing and disposing of the significantly impacted material off-site would be to:

- address "hot spots" of contaminant material that contains elevated levels of SVOCs and metals; and
- further reduce the potential for worker exposure to these soils during Site redevelopment.

To determine what constitutes significantly impacted material or a hotspot, a statistical analysis of the data was completed. The statistical analysis was performed on five (5) metal analytes (arsenic, chromium, copper, nickel and zinc) and five (5) semi-volatile organic compounds (Benzo (a) anthracene, Benzo (a) pyrene, Benzo (b) fluoranthene, Dibenz (a,h) anthracene, Indeno (1,2,3-cd) pyrene) that had at least one exceedance of the Part 375 ISCO. These 10 analytes/compounds are considered the Significant Compounds of Concern (SCOC). The statistical analysis was completed using the entire data set from the subsurface investigation at the Site pertaining to these SCOC.

U.S. EPA statistical software ProUCL Version 4.1.01 was used to complete the statistical analysis. ProUCL is a statistical software package developed by U.S. EPA[7] ProUCL is equipped with statistical methods and graphical tools to assess environmental sampling and statistical issues, such as establishing 95% upper confidence levels (95%UCL).

The statistical analysis outputs from the ProUCL software for the ten SCOC are included in Appendix G. The outputs identified statistical outliers and statistical means for each of the

7 EPA. 2010a. ProUCL Version 4.1.01, Statistical Software for Environmental Applications for Data Sets with and without Non-detect Observations. Download from: http://www.epa.gov/osp/hstl/tsc/software.htm.

SCOC based on the 95%UCL. To determine what would be considered significantly impacted material for off-site disposal, a Proposed Excavation Limit Threshold was determined. It was determined by using the higher of the concentrations of the statistical mean plus 2 standard deviations or Part 375 ISCO for each of the SCOC (see Table 5).

If the analytical result from one (1) of the ten (10) SCOC is present above the Proposed Excavation Limit Threshold (see last column of Table 5) it was considered for excavation and off-site disposal. If the analytical results of one (1) of the ten (10) SCOC were above its Proposed Excavation Limit Threshold concentration and present within a soil unit that is present in upper 4 feet of soil at the Site, it was identified for removal.

Table 5 identifies the locations and sample depths of analytical results that exceeded the Proposed Excavation Limit Threshold concentration for each SCOC. The analytical sample depths in conjunction with the test pit and monitoring well logs were reviewed to determine if the exceedance occurred within the upper 4 feet or was within material that is present at that location within the upper 4 feet. [Example: arsenic was detected in sample TP-77, 4 to 6 feet bgs which is above the Proposed Excavation Limit Threshold. Although the depth of the sample is below 4 feet, the material from which the samples was collected at that location was present from 3 feet bgs to 6 feet bgs (see TP-77 test pit log in Appendix C). Therefore, the 1 foot of material present in the vicinity of TP-77 from 3 to 4 feet would be removed for disposal off-site.]

Table 5 identifies the Proposed Excavation Limit Threshold developed and summarizes the soil locations identified as exceeding those limits. Figure 9 identifies the five (5) locations of the significantly impacted material proposed to be excavated for off-site disposal. Table 4 identifies the estimated volume associated with the soil to be excavated for off-site disposal and the estimated volume of soil to be relocated/and or capped with a clean soil cover system on-site. Though the significantly impacted material proposed to be removed represents a hotspot, they are not a source, as there is no groundwater contamination associated with the Site, the SCOC are not mobile under typical subsurface conditions at out Site, and they do not create a vapor inhalation concern.

We note that the Proposed Excavation Limit Threshold is also the concentration proposed to be used, per analyte/compound, to assess the extent and/or limit of contamination to be excavated. The Proposed Excavation Limit Thresholds will be the concentrations that the confirmatory soil samples results from the excavations will be compared to for the SCOC.

7.4 REMEDIAL RESPONSE ACTIONS

To satisfy the remedial action objectives for the Site, remedial action will be required to address the SVOC and metal impacted soil contamination at the Site to achieve a BCP Track 4 restricted residential-use soil cleanup.

In addition to the evaluation of alternatives to remediate to the required criteria for likely end use of the Site, NYSDEC regulations require an evaluation of more restrictive end-use scenarios. These include an unrestricted use scenario (considered under 6NYCRR Part

375-2.8 to be representative of cleanup to pre-disposal conditions), and a scenario less restrictive than the reasonably anticipated future use. Per DER-10, evaluation of a "no-action" alternative is also required to provide a baseline for comparison against other alternatives.

Therefore, the alternatives to be discussed in greater detail in Section 8.0 will include:

- One (1) soil alternative to satisfy Track 4 Restricted Residential cleanup criteria;
- An alternative to satisfy Track 1 Unrestricted-use cleanup criteria (as required by DER-10); and
- No action.

8.0 DEVELOPMENT OF REMEDIAL ALTERNATIVES

8.1 INTRODUCTION

This section presents a description of the remedial alternatives for soil that have been developed for the Site to achieve a Track 4 Restricted Residential cleanup; a Track 1 Unrestricted-use cleanup (as required by DER-10); and the NYSDEC-requested soil excavation and off-site disposal of SCOC.

8.2 SOIL ALTERNATIVES

Three (3) soil remedial alternatives have been selected based on NYSDEC requirements (no action and cleanup to pre-disposal conditions) and presumed future use of the Site for restricted residential use. An expanded description of each of the soil alternatives is provided below. In addition to the description, each alternative is compared to the source removal or control measure hierarchy identified in Part 375-1.8(c), which consists of the following ranked from most preferable to least preferable:

1) removal and/or treatment;
2) containment;
3) elimination of exposure; and
4) treatment of source at point of exposure.

8.2.1 Soil Alternative No. 1 – No Action

The No Action alternative involves taking no further action to remedy the condition of contaminated Site soils. NYSDEC guidance requires that the No Action alternative be evaluated to provide a baseline for comparison against other alternatives in the detailed analysis of soil alternatives (Section 9.0). We note that this alternative does not meet any of the four (4) source removal or control measure criteria identified in Part 375-1.8(c).

8.2.2 Soil Alternative No. 2 Excavation and Proper Off-Site Disposal to Achieve Unrestricted Site Use

Soil Alternative No. 2 would involve excavation and proper off-site disposal of contaminated soil to meet the Unrestricted SCOs. This evaluation is required to fulfill the NYSDEC requirement to assess one alternative that will achieve unrestricted use relative to soil contamination without the use of institutional controls. This alternative would be the most preferable action in accordance with the criteria identified in Part 375-1.8(c).

In some areas, soils that meet the Unrestricted SCOs will be required to be excavated in an effort to remove deeper contaminated soils up to a depth of 15 feet bgs or bedrock refusal. These clean soils may be able to be reused on-site and placed back in the excavation once the contaminated soils have been removed. The soil excavation would be backfilled with clean soil after the limits of the remediation have been reached.

It has been estimated that an approximate 179,000 cubic yards of soil will need to be excavated of which, approximately 90,000 cubic yards will require off-site disposal to achieve the Part 375 Unrestricted SCOs. This estimate was based on the data collected as part of the previous Phase II ESA and RI. Appendix G contains the estimated volume calculations.

8.2.3 Soil Alternative No. 3 Excavation and Off-Site Disposal of SCOC Material and Impacted Soil Relocation/Clean Soil Cover System Installation with Site Management Plan Implementation

In order to prepare the Site for redevelopment, the asphalt surface cover needs to be removed and the existing grades need to be adjusted. HPV would like to achieve a final remedial soil cover system grade approximately 1 foot below the existing grade in the southern portion of the Site and increase Site grades on the northern portion of the Site. Figure 10 identifies the following areas associated with the Soil Alternative No. 3 remedial strategy.

- Areas to be Excavated for Off-site Disposal
- Excavated Soil Temporary Staging Area
- North Remedial Area
- South Remedial Area
- MOB Soil Stockpile Area
- Proposed UB Medical Soil Stockpile Area

Soil Alternative No. 3 would involve excavation of SCOC soil contamination in combination with the installation of a 2 foot clean soil cover system across the entire Site. The excavation and proper off-site disposal would involve the removal of areas containing significantly impacted material that contain SCOC (identified in Table 5, discussed in Section 7.3 and shown in red on Figure 10) that are present within the

upper 4 feet, and in some cases greater than 4 feet, of the Site at current grade. These areas will be excavated, staged, characterized, and properly disposed of off-site.

The remaining areas (shown in blue and green on Figure 10) will either be:

1) relocated within the Site limits and covered with a minimum of a 2 foot clean soil cover system that meets the RRSCOs and would be acceptable for residential use; or

2) covered in place with a minimum of a 2 foot clean soil cover system.

This alternative would remove significantly impacted materials and prevent exposure to other impacted soils. This alternative would be a preferable action in accordance with the hierarchy criteria identified in Part 375-1.8(c) for five areas containing soils exceeding the Proposed Excavation Limit Threshold concentrations for the respective SCOC.

In April 2014, 10 additional test pits were completed around the five areas (two at each location) containing soils exceeding the Proposed Excavation Limit Threshold concentrations for the respective SCOC. The purpose of these activities was to assess the potential depth of excavation that would be required to remove the SCOC contaminated soils in association with these five areas. The test pits are as follows.

- TP-10A and TP-10B were completed 15 feet west and 15 feet south, respectively, of TP-10.
- TP-70A and TP-70B were completed 15 feet southeast and 15 north, respectively, of TP-70.
- TP-74A and TP-74B were completed 15 feet west and 15 feet northeast, respectively, of TP-74.
- TP-75A and TP-75B were completed 15 feet south and 15 feet northeast, respectively, of TP-75.
- TP-77A and TP-77B were completed 15 feet south and 15 feet west, respectively, of TP-77.

These test pits were completed to assess the potential quantity of soils at 4 feet bgs, or deeper, in the vicinity of the five locations that exceed the Proposed Excavation Limit Threshold.

Based on the results of this additional test pit sampling most of these five locations will not require excavation below the four foot depth however some excavation activities below 4 feet bgs will be necessary for to address soil contamination exceeding the Proposed Excavation Limit Threshold concentrations.

The findings and planned excavation depths are as follows. The analytical results are tabularized on Table 6.

TP-10 (Area 3): Five SVOCs (benzo (a) anthracene, benzo (a) pyrene, benzo (b) fluoranthene, dibenz (a,h) anthracene, indeno (1,2,3-cd) pyrene) as shown in Table 5, were detected above the derived Proposed Excavation Limit Threshold concentrations in a dark brown sand soil matrix at TP-10.

The two additional test pits (TP-10A and TP-10B, see test pits logs in Appendix C) completed around TP-10 identified the dark brown soil matrix. At TP-10A, the dark brown soil matrix was encountered from 4 feet to 15 feet bgs (bottom of excavation). The analytical results from the 4 feet bgs sample at TP-10A were below the Proposed Excavation Limit Threshold for the SCOCs and the ISCOs for the other compounds/analytes detected.

At TP-10B, the dark brown soil matrix was encountered from 7 feet to 10 feet bgs; however, a silty clay was present above from 2 to 5 feet bgs. A sample was collected from 4 feet bgs, taken of the silty clay material. The results were below method detection limits for SVOCs and below Unrestricted SCOs for metals. It appears that at this location there is at least three feet of soil meeting the RRSCOs above the dark brown sand soil matrix that was encountered. Therefore, it does not appear that significant excavation below 4 feet bgs will be necessary for this location.

TP-70 (Area 4): Two (2) SVOCs (dibenz (a,h) anthracene and indeno (1,2,3-cd) pyrene), as shown in Table 5, were detected above the derived Proposed Excavation Limit Threshold concentrations in a black sand soil matrix at TP-70.

In the two additional test pits (TP-70A and TP-70B, see test pits logs in Appendix C) completed around TP-70, evidence of black sand was only observed in TP-70B from ground surface to about 7 feet bgs. No black sand was observed at TP-70A.

The analytical results from the 4 feet bgs sample at TP-70A were below the USCOs for SVOCs and below the RRSCOs for the metal analytes. The analytical results from the 4 feet bgs sample at TP-70B were below the USCOs for SVOCs with the exception of indeno (1,2,3-cd) pyrene, a SCOC, which exceeded the RRSCO but was below its respective Commercial SCO and Proposed Excavation Limit Threshold. Therefore, it does not appear that significant excavation below 4 feet bgs will be necessary for this location.

TP-74 (Area 11): Arsenic, as shown in Table 5, was detected above the derived Proposed Excavation Limit Threshold concentrations in a mixed soil matrix (dark brown/orange/white/black sand with other constituents) at TP-74.

In the two additional test pits (TP-74A and TP-74B, see test pits logs in Appendix C) completed around TP-74 identified the mixed soil matrix at both TP-74A and TP-74 at 3 and 4 feet bgs, respectively and extending to the bottom of the test pits at 15 feet bgs.

The analytical results from the 4 feet bgs sample at TP-74A were below the USCOs for metal analytes, including arsenic. SVOCs were generally below the RRSCOs with the exception of the SCOCs (benzo (a) anthracene, benzo (a) pyrene, benzo (b) fluoranthene, dibenz (a,h) anthracene, indeno (1,2,3-cd) pyrene). The results for these compounds were below their respective ISCO with the exception of benzo (a) pyrene which was detected at a concentration above its respective ISCO but below the Proposed Excavation Limit Threshold. The analytical results from the 4 feet bgs sample at TP-74B were non-detect for SVOCs and metals with the exception of lead which was below its Commercial SCO. Therefore, it does not appear that significant excavation below 4 feet bgs will be necessary for this location.

TP-75 (Area 5): Chromium, as shown in Table 5, was detected above the derived Proposed Excavation Limit Threshold concentrations in a black sand soil matrix at TP-75.

In the two additional test pits (TP-75A and TP-75B, see test pits logs in Appendix C) completed around TP-75, evidence of black sand was observed in both TP-75A and TP-75B. The black sand was observed at TP-75A from 4 to 7 feet bgs and 10 to 13 feet bgs. The black sand was observed at TP-75B from 3 to 6 feet bgs and 13 to 15 feet bgs (the bottom of the excavation).

The SVOC analytical results from the 4 feet bgs samples at TP-75A and TP-75B were generally below the RRSCOs with the exception of the SCOCs (benzo (a) anthracene, benzo (a) pyrene, benzo (b) fluoranthene, dibenz (a,h) anthracene, indeno (1,2,3-cd) pyrene). The results for these compounds were below their ISCOs with the exception of benzo (a) pyrene in both samples, but they were below their respective Proposed Excavation Limit Threshold.

The metal analytical results from the 4 feet bgs sample at TP-75A were below the RRSCOs. The metal analytical results from the 4 feet bgs sample at TP-75B were generally below the RRSCOs, with the exception of arsenic and lead. Arsenic concentrations were above the ISCO but below the Proposed Excavation Limit Threshold concentration. Lead concentrations were above the RRSCO but below the Commercial SCOs.

Therefore, it does not appear that significant excavation below 4 feet bgs will be necessary for this location.

TP-77 (Area 11): Arsenic and zinc, as shown in Table 5, were detected above the derived Proposed Excavation Limit Threshold concentrations in a mixed soil matrix (dark brown/orange/white/black sand with other constituents) at TP-77.

In the two additional test pits (TP-77A and TP-77B, see test pits logs in Appendix C) completed around TP-77, the mixed soil matrix was not identified at TP-74A until about 10 feet bgs and it was not identified in TP-74B. However, a black sand was identified in TP-77A from 4 to 8 feet bgs.

The analytical results from the 4 feet bgs and 6 feet bgs samples at TP-77A (black sand) contained SCOC SVOCs that exceeded the Proposed Excavation Limit Threshold concentrations. The analytical results from the TP-77A, 8 feet bgs sample, were non-detect for SVOCs and the metal analytes were below the USCOs.

The analytical results from the 4 feet bgs sample at TP-77BA were non-detect for SVOCs and the metal analytes were below the USCOs.

Therefore, it appears that some excavation activities below 4 feet bgs will be necessary for this location to address soil contamination exceeding the Proposed Excavation Limit Threshold concentrations.

Therefore, a conservative estimate of approximately 2,500 cubic yards of soil will be excavated to remove and address the SCOC in exceedance of their Proposed Excavation Limit Threshold concentrations.

The soil excavations to address the SCOC would be backfilled after the excavation limits are reached based on the results of confirmatory side wall and bottom of excavation samples. The remaining soil, approximately 20,500 cubic yards of soil to be addressed, will be either covered in place or relocated within the Site and covered with a cover system. The volume of cover material needed is estimated at 87,500 cubic yards assuming a 2 foot cover over the 27.09 acre Site.

As shown on Figure 10, the Site has been divided into a North Remedial Area and a South Remedial Area. In the North Remedial Area surface grades will need to be increased prior to redevelopment and in the South Remedial Area surface grades will be decreased.

HPV is proposing the following remedial/redevelopment action strategy to address the remaining impacted soil present at the Site after the SCOC soil excavation are completed and address redevelopment needs.

HPV will remove the asphalt and sub-base cover present and stockpile it at the Site. It is estimated that approximately 736,000 square feet of asphalt is to be removed (see Figure 11). After the asphalt and sub-base are removed (approximately 1 foot), a two foot soil cut will be completed in the South Remedial Area to move the soil present in the upper 2 feet (with the exception of those located in MOB Soil stockpile area and proposed UB Medical Site stockpile area, as shown on Figure 10 and to be discussed later in this section) to the North Remedial Area. It is estimated that the two foot cut in the South Remedial Area will generate approximately 29,185 cubic yards of soil. This cut would include relocating impacted soil above the RRSCOs present in the upper 3 feet associated with Area 3, Area 7, and Area 13 (slag material). The entire South Remedial Area would then be covered with a high visibility demarcation layer and a minimum of two feet of clean soil cover which would include soils present within Area 8 and remaining in Areas 3, 7 and 13.

The 29,185 cubic yards of soil generated from the 2 foot cut in the South Remedial Area will be relocated into the North Remedial Area. The soil will be placed in areas of the North Remedial Area that will require current grades to be increase and be used to backfill a former basement located in the northwest portion of the Site (see Figure 10). The basement is approximately 150 feet by 50 feet and 10 feet deep. It will be backfilled with soil that exceeds the RRSCOs to a depth of 3 feet bgs. Acceptable soil would be used to cover the soil from the South Remedial Area and finish raising grades within the basement area to existing ground surface. This would cover the impacted soil with a clean soil cover of at least 3 feet. The basement can accommodate approximately 1,940 cubic yards of soil. The remaining soil from the South Remedial Area will be used to increase the grades in select locations of the North Remedial Area. The entire North Remedial Area will be capped with a demarcation layer and a minimum of a 2 foot clean soil cover system. This clean soil cover system would address Remedial Areas 4, 5, 6, 10, 11, 12 and 13. The cover system will include a high viability demarcation layer to be placed over the soil before being covered with 2 feet of acceptable soil.

As mentioned above, there are two soil stockpile areas, MOB Soil stockpile area and the proposed UB Medical Site stockpile area within the Site limits. The MOB Soil stockpile area consists of approximately 30,000 cubic yards of soil that was brought to the Site between February 2013 and October 2013 from another BCP Site (C#915260, Former Mobil Service Station 99-MST, located at 1001 Main Street in Buffalo, New York). Soil from the MOB site was sampled and characterized in accordance with a NYSDEC approved work plan[8]. Approval to reuse the native sandy soils from the MOB site at the 129 Holden Street Site was granted by NYSDEC in two letters dated February 7, 2013 and March 21, 2013 (see Appendix I).

The placement of the MOB Soil stockpile at the Site, as shown on Figure 10, has presently covered Remedial Area 1 with at least 2 to 3 feet of clean soil. The soil from the MOB Site will be used to create the 2 foot clean soil cover system to be established across the entire Site.

The proposed UB Medical Site stockpile area is an area to stage and stockpile native soils to be excavated as part of site development from the University of Buffalo Medicine & Biomedical Sciences Building located at the corners of Main Street, High Street and Washington Street, in Buffalo, New York. A preliminary data report[9] and secondary report[10] for the UB Medical Site was submitted to NYSDEC.

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8 "REVISION #2, Imported Soil Source for 129 Holden Street Site (C915261), Sampling Plan for Kaleida Health Medical Office Building Site (C915260), 1001 Main Street, Buffalo, NY 14094" dated November 12, 2014. Prepared by GZA GeoEnvironmental of New York for NYSDEC.

9 "Preliminary Soil Reuse Sampling Report, Imported Soil Source for 129 Holden Street Site (C915261), Sampling Plan for University of Buffalo School of Medicine and Biomedical Sciences Building Site, Corners of Main Street, High Street & Washington Street, Buffalo, New York 14094" dated April 16, 2014. Prepared by GZA GeoEnvironmental of New York for NYSDEC.

A response from NYSDEC dated June 6, 2014 (see Appendix I) indicated that native soil up to 20 feet in depth from ground surface could be reused at 129 Holden Street Site. Therefore, it is being anticipated that the deeper (greater than 20 feet bgs) native soils will also be formally approved by NYSDEC for reuse at the 129 Holden Street Site. It is estimated that approximately 50,000 cubic yards of soil will be brought from the UB Medical Site and stockpiled for reuse at the Site.

The proposed placement of the UB Medical Site stockpile at the Site, as shown on Figure 10, will covered Remedial Areas 2, 9 and 13 with clean soil. Prior to placement of the soil within the proposed soil stockpile area, a demarcation layer will be placed on the existing soil at current grade. The soil will be stockpiled to a proposed height of about 7 feet above current grade. When the UB Medical Site soil is to be used to create the cover system at other portions of the Site, the soil stockpile will be cut leaving behind at least 2 feet of soil above current grade, creating the clean soil cover system in this 4.9 acre portion of the Site.

Additional source(s) of cover system soils will need to be identified for the Site which will need to meet the requirements of Part 375-6.8(b) for reuse at a restricted residential site. Prior to soil being brought to the Site for use in the cover system, HPV will seek NYSDEC approval for the use of the material(s).

This alternative is a restricted use alternative (cleanup to RRSCOs and Track 4 criteria) and both institutional and engineering controls will be utilized (i.e., NYSDEC environmental easement and cover system). This alternative will require that an environmental easement be filed with Erie County and would likely include the following requirements:

- The Site will be used for restricted residential use;
- The cover system will remain in place;
- A site management plan (SMP) will be implemented during subsurface activities including redevelopment and post-development activities; and
- Annual certification report will be prepared to assess that the institutional and engineering controls established for the Site are in place and effective.

10 "2nd Soil Reuse Sampling Report, Imported Soil Source for 129 Holden Street Site (C915261), Corners of Main Street, High Street & Washington Street, Buffalo, New York 14203" dated June 3, 2014. Prepared by GZA GeoEnvironmental of New York for NYSDEC.

9.0 DETAILED ANALYSIS OF ALTERNATIVES

9.1 INTRODUCTION

The purpose of the detailed analysis of alternatives is to present the relevant information to select a remedy. During the detailed analysis, the alternatives established in Section 8.0 are compared on the basis of environmental benefits and costs using criteria discussed in Section 7.2. This approach is intended to provide needed information to compare the merits of each alternative and select an appropriate remedy that satisfies the remedial action objectives for the Site.

9.2 DETAILED ANALYSIS OF SOIL ALTERNATIVES

The three (3) Soil Alternatives are evaluated individually in terms of the environmental and cost criteria described in Section 7.2. Descriptions of the alternatives are provided in Section 8.2.

9.2.1 Soil Alternative No. 1 – No Action

1. Overall Protection of Human Health and the Environment: This alternative does not reduce the risk or exposure for human health and the environment, since the Site would remain in its present condition. Uncontrolled access to the Site could lead to potential exposure to impacted soil or if intrusive work were performed at the Site and workers are unaware or untrained regarding the contaminants.

2. Compliance with Standards, Criteria and Guidance (SCGs): This alternative will not comply with the chemical-specific SCGs for the Site. The SVOCs and metal contaminant levels in the soil are not expected to decrease appreciably over time, as natural attenuation is not expected to reduce the levels of contamination.

3. Long-Term Effectiveness and Permanence: This alternative does not involve removal or treatment of contaminated soil. The risks involved with the erosion, migration and direct contact with soil contaminants would remain the same or similar to current conditions. Given the mass of soil contamination, reduction in risk associated with natural attenuation is not expected. Therefore, this alternative is not expected to provide long-term effectiveness to reduce the potential risk to human health and the environment assumed for this alternative.

4. Reduction of Toxicity, Mobility, and Volume: This alternative does not involve the removal or treatment of the soil contamination present at the Site. Therefore, neither the toxicity, mobility nor volume of contamination is

expected to be reduced significantly. Natural attenuation is not likely to reduce the concentrations in soil over time.

5. Short-Term Impact and Effectiveness: No potential short-term adverse environmental impacts and human exposures are anticipated during the implementation of this alternative since there are no remedial activities involved.

6. Implementability: This alternative is readily implementable on a technical basis, in that it involves no action. There may be administrative difficulties associated with implementing this alternative as a result of community resistance to No Action. Also, institutional controls (e.g., deed or environmental easement) would likely be required for the Site property to preclude contact with contaminated media.

7. Cost: No capital costs are anticipated for this alternative, as there would be no action.

8. Land Use: This alternative would not meet the land use criteria, as the Site is located in a mixed residential and commercial area in the City of Buffalo and the anticipated future uses would likely be restricted residential. Additional remedial action will be needed to meet these anticipated future uses.

9.2.2 Soil Alternative No. 2 - Excavation and Proper Off-Site Disposal to Achieve Unrestricted SCOs

1. Overall Protection of Human Health and the Environment: This alternative is considered to be protective of human health and the environment with respect to soil. Implementation of this alternative would result in removal of impacted soil to maximum depth of 15 feet bgs or bedrock refusal.

2. Compliance with Standards, Criteria and Guidance (SCGs): This alternative is expected to meet the soil chemical-specific SCGs.

3. Long-Term Effectiveness and Permanence: This alternative is considered an adequate, reliable and permanent remedy for soil and, as such, the risks involved with the migration and/or direct contact with soil contaminants would be reduced or eliminated. This alternative will allow for unrestricted use of the Site.

4. Reduction of Toxicity, Mobility, and Volume: This alternative involves the removal and off-site disposal of contaminated soil. The toxicity, mobility and volume of this contamination will be reduced by excavation of impacted soils.

5. Short-Term Impacts and Effectiveness: There are several potential short-term impacts associated with this alternative.

- There is potential for impacts to human health (workers and construction personnel) due to direct contact, and particulate releases. This alternative would require the preparation of a health and safety plan (HASP) to identify proper personal protective equipment required as well as the proper site and community air monitoring, as outlined in the NYSDOH Generic Community Air Monitoring Plan (CAMP), in order to mitigate potential adverse conditions.

- Contamination of equipment used for excavation purposes could carry contamination off-site. Therefore, equipment will be decontaminated prior to leaving the Site, as necessary, in order to avoid the transport of contaminants.

- Field personnel would wear appropriate personal protective equipment during excavation in order to limit health risks due to exposure to contaminants and physical hazards.

  Human health and the environment would be protected under this alternative if the HASP and CAMP are properly implemented. This alternative is expected to meet the soil remedial action objectives at completion of the excavations, because the impacted soil will be removed from the Site. Confirmatory soil sampling would be performed to verify the alternatives effectiveness.

- This alternative would have short term effectiveness. Removal of the impacted soil would remove the potential exposure.

6. Implementability: This alternative is readily implementable on a technical basis with standard construction methods and equipment. Materials and services necessary for construction are readily available.

   There are no anticipated, specific problems associated with obtaining permits or approvals from agencies to implement this alternative.

7. Cost: Total capital costs for this alternative are estimated to total approximately $7,562,000 for remediation to Unrestricted SCOs. The quantities, unit costs, and subtotal costs and associated assumptions, estimated for comparative purposes, are presented in Appendix H.

8. Land Use: This alternative would meet the land use criteria, as the Site is located in a mixed residential and commercial area in the City of Buffalo, the anticipated future use is restricted residential and this alternative would meet these anticipated future uses.

9.2.3 Soil Alternative No. 3 – Excavation and Off-Site Disposal of SCOC Material and Impacted Soil Relocation/Clean Soil Cover System Installation with Site Management Plan Implementation

1. Overall Protection of Human Health and the Environment: This alternative is considered to be protective of human health and the environment with respect as implementation of this alternative would result in removal of significantly impacted material with the SCOC exceeding the Potential Excavation Limit Threshold from five (5) areas of the Site. It would also require additional soil to be either relocated and placed under as 2 foot soil cover system or covered in place at the Site to achieve a Track 4 cleanup.

2. Compliance with Standards, Criteria and Guidance (SCGs): This alternative will remove the significantly impacted material with the SCOC exceeding the Potential Excavation Limit Threshold from five (5) areas of the Site and additional soil meeting the RRSCOs will be used create a 2 foot cover system over the remaining contaminants to achieve a Track 4 cleanup.

3. Long-Term Effectiveness and Permanence: This alternative is considered an adequate, reliable and permanent remedy for the soil to be removed. The relocated and capped soil will reduce the risks involved with migration and/or direct contact with soil contaminants. This alternative will require a Site Management Plan that with implementation will allow for long-term effectiveness and permanence of this alterative as Track 4 cleanup.

4. Reduction of Toxicity, Mobility, and Volume: This alternative involves the removal and off-site disposal of significantly impacted material containing SCOC above the Potential Excavation Limit Threshold concentration that are present at the Site. The toxicity, mobility and volume of this contamination at the Site will be reduced by excavation and off-site disposal of these soils in the five (5) areas identified.

5. Short-Term Impacts and Effectiveness: There are several potential short-term impacts associated with this alternative.

   - There is potential for impacts to human health (workers and construction personnel) due to direct contact, and particulate releases during excavation. This alternative would require the preparation of a health and safety plan (HASP) to identify proper personal protective equipment required as well as the proper site and community air monitoring, as outlined in the NYSDOH Generic Community Air Monitoring Plan (CAMP), in order to mitigate potential adverse conditions.

   - Contamination of equipment used for excavation purposes could carry contamination off-site. Therefore, equipment will be decontaminated

prior to leaving the Site, as necessary, in order to avoid the transport of contaminants.

- Field personnel would wear appropriate personal protective equipment during excavation in order to limit health risks due to exposure to contaminants and physical hazards.

  Human health and the environment would be protected under this alternative if the HASP and CAMP are properly implemented. This alternative is expected to meet the soil remedial action objectives at completion of the excavations, because the impacted soil will be removed from the Site. Confirmatory soil sampling would be performed to verify the alternatives effectiveness.

- This alternative would have short term effectiveness. Removal of the impacted soil would remove the potential exposure to the black sands and potential ash material.

6. Implementability: This alternative is readily implementable on a technical basis with standard construction methods and equipment. Materials and services necessary for construction are readily available.

   There are no anticipated, specific problems associated with obtaining permits or approvals from agencies to implement this alternative.

7. Cost: Total capital costs for this alternative are estimated at approximately $2,333,000 for soil excavation and disposal, soil relocation, cover system installation, and SMP preparation. If the excavations are required to exceed 4 feet bgs and remove SCOC to greater depths, the total capital costs for this alternative will increase. It has been estimated that the volume of soil to be excavated and disposed is about 2,500 cubic yards.

   The quantities, unit costs, and subtotal costs and associated assumptions, estimated for comparative purposes, are presented in Appendix H. Annual costs associated with the SMP which include inspection and verification of institutional and engineering controls; and submittal of an annual Periodic Review Report is approximately $6,000 which has a 30 year Net Present Value of $67,000.

8. Land Use: This alternative would meet the land use criteria for a Track 4 BCP cleanup. The Site is located in a mixed residential and commercial area in the City of Buffalo and the anticipated future use is restricted residential and this alternative would meet these anticipated future uses.

10.0 COMPARATIVE ANALYSIS OF SOIL REMEDIAL ALTERNATIVES

The Soil Alternatives are compared on the basis of the seven (7) environmental and one (1) cost criteria, based on the detailed analysis in Section 9.0.

10.1 SOIL ALTERNATIVES

10.1.1 Overall Protection of Public Health and the Environment

Soil Alternative No. 1 involves taking no action and will not be protective of human health and the environment. Soil Alternative No. 2 will remove the soil contamination and will be protective of human health and the environment. Soil Alternative No. 3 will involve the removal from the Site and off-site disposal of significantly impacted material containing the SCOC., Additionally, relocating and or capping the remaining impacted materials with a 2 foot cover system is required to be protective of human health and the environment to achieve a Track 4 cleanup.

The SCOC excavation activities associated with Soil Alternative No. 3 are proposed to be completed to about 4 feet bgs, pending results of confirmation analytical results. At this depth, this alternative will be protective of human health and the environment and achieve the requirements of a Track 4 cleanup. The benefits of removing additional soil below 4 feet bgs, double what is required by law for a Track 4 cleanup, does not justify their removal, as the 4 foot removal scenario will be protective of human health and the environmental and achieve the RAOs.

10.1.2 Compliance with Standards, Criteria and Guidance (SCGs)

Soil Alternative No. 1 will not achieve compliance with the SCGs for soil as no action would be taken to address the soil contamination at the Site. Soil Alternative No. 2 would achieve compliance with SCGs (i.e., USCOs) for the soil. Soil Alternative No. 3 ~~and 4~~ would achieve compliance with SCGs (i.e., RRSCOs) for the soil as a Track 4 cleanup.

The SCOC excavation activities associated with Soil Alternative No. 3 are proposed to be completed to about 4 feet bgs, pending results of confirmation analytical results. At this depth, this alternative will be compliant with SCGs and achieve the requirements of a Track 4 cleanup. The benefits of removing additional soil below 4 feet bgs, double what is required by law for a Track 4 cleanup, does not justify their removal, as the 4 foot removal scenario will achieve compliance with SCGs (i.e., RRSCOs) for the soil and achieve the RAOs.

10.1.3 Long-Term Effectiveness and Permanence

Soil Alternative No. 1 does not have long-term effectiveness and permanence as no action would be taken, the soil contamination would remain and there would be

chance for exposure to an uncontrolled Site. Soil Alternative No. 2 would have long-term effectiveness and permanence as the soil contamination would be removed from the Site. Soil Alternative No. 3 would achieve compliance with SCGs (i.e., RRSCOs) for the soil as a Track 4 cleanup and 4 will have a SMP to maintain the long-term effectiveness and permanence.

The SCOC excavation activities associated with Soil Alternative No. 3 are proposed to be completed to about 4 feet bgs, pending results of confirmation analytical results. At this depth, along with the implementation of the SMP, this alternative would achieve long-term effectiveness and permanence. The benefits of removing additional soil below 4 feet bgs, double what is required by law for a Track 4 cleanup, does not justify their removal, as the 4 foot removal scenario will achieve long-term effectiveness and permanence for the soil and achieve the RAOs.

10.1.4 Reduction of Toxicity, Mobility or Volume with Treatment

Soil Alternatives No. 1 does not reduce the toxicity, mobility and volume of soil contamination as no action is taken. Soil Alternative No. 2 will reduce the toxicity, mobility and volume of contaminated soils as it will be excavated and properly disposed off-site. Soil Alternative No. 3 will reduce the toxicity, mobility and volume of contaminated soils containing the SCOC above the Potential Excavation Limit Threshold as these materials will be excavated and properly disposed off-site. The remaining contaminants will be capped with a cover system to reduce the potential for exposure.

SCOC removal activities to depths greater than 4 feet bgs would further reduce the toxicity, mobility and volume of SCOC contaminated soil present at the Site. However, benefits of removing additional soil below 4 feet bgs, double what is required by law for a Track 4 cleanup, does not justify their removal and the RAOs are achieved by the 4 foot removal action. Contaminants remaining below the Potential Excavation Threshold Limits and above the RRSCOs will still be located and capped at depths greater than 2 feet bgs.

10.1.5 Short-Term Impact and Effectiveness

Soil Alternative No. 1 requires no action and will have no short-term impact and effectiveness. Soil Alternative Nos. 2 and 3 address soil contamination at the Site which would have both short-term impacts and effectiveness.

Excavation and/or soil relocation work done as part of the remedial action would utilize a work plan, health and safety plan and CAMP to reduce potential exposures and properly manage materials generated, which would minimize the short-term impacts. Removal of the contaminated soil would remove the potential exposure.

10.1.6 Implementability

Both Soil Alternative Nos. 1, 2 and 3 are technically and administratively implementable with readily available methods, equipment, materials and services.

10.1.7 Cost

As Soil Alternative No. 1 requires no action, there are no costs associated with this alternative. Total capital costs for Soil Alternative No. 2 are estimated to total approximately $7,562,000 for remediation to Unrestricted SCOs. Total capital costs for Soil Alternative No. 3 are estimated to total approximately $2,333,000 for the removal of contamination associated with the SCOC above the Potential Excavation Limit Threshold and associated soil relocation and cover system. Soil Alterative No. 3 will also have an annual Periodic Review Report cost of $6,000 which has a 30 year Net Present Value of $67,000.

We note that if the excavations are extended to greater than 4 feet bgs, the total capital costs for this alternative will increase. The benefit of removing additional soil below 4 feet bgs, double what is required by law for a Track 4 cleanup, does not justify their removal, as the RAOs will be achieved removing the soil to 4 feet bgs.

In Section 8.2, we discussed the source removal or control measure hierarchy identified in Part 375-1.8(c). Soil Alternative Nos. 2 and 3 were the most preferable actions in accordance with the criteria. This section identifies significant difference in costs between the two soil alternatives which remove soils from the Site for unrestricted use (Soil Alternative No. 1) versus limited soil removals and the creation of a soil cover system over the remaining contaminated material (Soil Alternative No. 3) which will be a factor in the alternative selection.

10.1.8 Land Use

Soil Alternative No. 1 will not meet the land use criteria, as the soil contamination would remain on-site in portions of the Site to be redeveloped for restricted residential use. Soil Alternative No. 2 would achieve the land use criteria, as the soil contamination would be removed to unrestricted use. Soil Alternative No. 3 would achieve the land use criteria for restricted residential use as a Track 4 cleanup.

11.0 REMEDIAL ACTION PLAN

The Remedial Action Plan (RAP) for the Site is presented below, based on the comparative analysis of remedial alternatives in Section 10.0. This Remedial Action Plan is presented based on the current knowledge of the Site and may be modified if site conditions change.

The sections below present the steps that are anticipated to be performed to address the contaminated soil at the 129 Holden Street Site. This RAP does not constitute a formal work plan, but provided an overview of the remedial strategy that will be implemented. The remedial strategy will consist of Soil Alternative No. 3 (Excavation and Off-Site Disposal of SCOC Material and Impacted Soil Relocation/Clean Soil Cover System Installation with Site Management Plan Implementation

11.1 REMEDIAL WORK PLAN

A remedial work plan will be provided to NYSDEC identifying the remedial actions to include:

1. Excavation and off-site disposal of soil contamination containing SCOC above the Potential Excavation Limit Threshold (see Table 5);
2. Relocation and capping of soil contaminants above the RRSCO but below the Potential Excavation Limit Threshold with a minimum of a 2 foot clean soil cover system.

We note that the remedial action will involve the covering the 27 area Site with the cover system, which will include a high-visibility demarcation layer and a minimum of 2 feet of clean acceptable soil that meets the requirements of Part 375-6.8(b) for reuse at a restricted residential Track 4 BCP site.

11.1.1 Soil Excavation and Off-Site Disposal

Based on the comparative analysis of soil alternatives in Section 10, it appears that SCOC excavations to around 4 feet bgs, will achieve the seven (7) environmental criteria discussed in Section 7.2, achieve the RAOs and meet the remedial goals for a Track 4 Restricted Residential BCP cleanup. Once the 4 foot depth is reach, confirmatory soil samples will be collected from the sidewalls and bottom of the excavations. The results will be compared to the Potential Excavation Limit Thresholds that have been derived for the SCOCs.

We note that in our opinion, it does not provide significant additional benefit to remove additional soil below 4 feet bgs, double what is required by law for a Track 4 cleanup. The RAOs will be achieved by removing the SCOC impacted soil to 4 feet bgs and do not provide greater health and environmental protection in accordance with the seven (7) environmental criteria.

Figures 9 and 10 identify the five (5) areas (TP-10, TP-70, TP-74, TP-75, and TP-77) that contain the SCOC in the upper 4 feet at the Site that exceed the Potential Excavation Limit Threshold. These soils will be excavated, stockpiled, characterized and properly disposed at a permitted landfill facility.

It is estimated that approximately 2,500 cubic yards of soil will be removed from the five (5) locations shown on Table 4.

Confirmatory samples will be collected from the sidewalls and bottom of the excavations. Sidewall post-excavation samples will be collected every 30 to 40 linear feet in consultation with NYSDEC. Bottom post-excavation samples will be collected every 900 square feet of exposed bottom of excavation. If the results of the confirmatory samples are below the Potential Excavation Limit Threshold for the SCOC but above the RRSCOs, the excavation activities for off-site disposal will cease and the remaining soil above the RRSCOs associated with the area will be addressed by either relocation and capping with a minimum of a 2 foot clean soil cover system or capping in-place with a minimum of a 2 foot clean soil cover system, as discussed below. If confirmatory sample results exceed the Potential Excavation Limit Threshold, additional soil will be removed to a depth below 4 feet bgs.

Post-excavation soil samples will be sampled for TCL SVOC and TAL metals. Excavation areas will be barricaded to keep personnel away from the excavation prior to backfilling.

11.1.2 Soil Relocation and Clean Soil Cover System Installation

The asphalt and sub-base cover present will be removed and stockpiled at the Site. It is estimated that approximately 736,000 square feet of asphalt is to be removed (see Figure 11). After the asphalt and sub-base are removed (approximately 1 foot), a two foot soil cut will be completed in the South Remedial Area to move the soil present in the upper 2 feet (with the exception of the those located in MOB Soil stockpile area and proposed UB Medical Site stockpile area, as shown on Figure 10) to the North Remedial Area. It is estimated that the two foot cut in the South Remedial Area will generate approximately 30,000 cubic yards of soil. This cut would include relocating impacted soil above the RRSCOs present in the upper 3 feet associated with Area 3, Area 7, and Area 13 (slag material). The entire South Remedial Area would then be capped with a minimum of a 2 foot clean soil cover system which would include soils present within Area 8 and remaining in Areas 3, 7 and 13. We note that Areas 2 and 9 were covered by the UB Medical Building stockpile area. Prior to placement of soil in this area, a demarcation layer was placed. Once the stockpiled soils are removed for use from this area, a minimum of a 2 foot soil cover will remain in this area, creating the 2 foot clean soil cover system.

The cover system will include a high visibility demarcation layer to be placed over the soil before being covered with a minimum of a 2 foot clean soil cover system.

The 30,000 cubic yards of soil generated from the 2 foot cut in the South Remedial Area will be relocated into the North Remedial Area. The soil will be placed in areas of the North Remedial Area that require current grades be increased and to backfill a former basement located in the northwest portion of the Site (see Figure 10). The basement is approximately 150 feet by 50 feet and 10 feet deep. It will be backfilled with soil that exceeds the RRSCOs to a depth of 3 feet bgs. Clean acceptable soil will

be used to cover the soil from the South Remedial Area and finish raising grades within the basement area to existing ground surface. This would cover the impacted soil with a clean soil cover system of at least 3 feet in the former basement. The basement can accommodate approximately 1,940 cubic yards of soil. The remaining soil from the South Remedial Area will be used to increase the grades in select locations of the North Remedial Area. The entire North Remedial Area will be capped with a minimum of a 2 foot clean soil cover system. This clean soil cover system would address Remedial Areas 4, 5, 6, 10, 11, 12 and 13. The clean soil cover system will include a high visibility demarcation layer to be placed over the soil before being covered with 2 feet of acceptable soil.

Community air monitoring and soil screening with an OVM will be conducted continuously during the soil excavation and relocation activities. The existing HASP would be modified, as necessary, to address the additional activities. The anticipated remedial activities to excavate, relocate, and/or cap the Site with a cover system will be above the groundwater table.

We note that during the soil excavation activities to remove SCOC contaminated materials above the Potential Excavation Threshold Limits or activities to relocate soil:

- if grossly contaminated soils are encountered (oily product), these soils will be stockpiled separately and characterized for off-site disposal; and
- if suspect soils (i.e., black sands) are encountered, NYSDEC will be notified and additional soil samples will be collected prior to covering with the clean soil cover system.

11.2 INSTITUTIONAL CONTROLS

The Site decision document will include institutional controls (IC) such as an environmental easement, in additional to the soil cover system, to restrict activities on the Site to protect future users from the soil contamination at depth, and verify the cover system remains in place. We currently anticipate the IC to be:

- The Site use will be limited to restricted residential, commercial or industrial use;
- The residential structures will be slab-on-grade construction;
- The cover system will remain in place;
- A SMP and Excavation Work Plan will be developed and implemented during subsurface activities including redevelopment and post-development activities; and
- Annual certification report will be prepared to assess that the institutional and engineering controls established for the Site are in place and effective.

11.3 SITE MANAGEMENT PLAN

A SMP will be prepared to manage and monitor contamination associated with the soil and to maintain and certify institutional and engineering controls to be put in place at the Site. The SMP will exist in perpetuity or until extinguishment of the environmental easement to be filed in accordance with ECL Article 71, Title 36. The SMP addresses the means for implementing the Institutional Controls (ICs) and Engineering Controls (ECs) that will be required by the environmental easement (discussed below) for the Site. The SMP will be developed using the latest version of the NYSDEC SMP template (current available version is dated February 2013).

An environmental easement will be granted to NYSDEC, and recorded with the Erie County Clerk, that will provide an enforceable legal instrument to ensure compliance with the SMP, ECs and ICs placed on the Site. The ICs will place restrictions on site use, and mandate reporting measures for the applicable ECs and ICs. The SMP specifies the methods necessary to ensure compliance with the ECs and ICs required by the environmental easement for contamination that remains. Compliance with the SMP is required by the grantor (Strickler Development) of the environmental easement and the grantor's successors and assigns. The SMP may only be revised with the approval of NYSDEC.

The SMP will provide a detailed description of the following plans:

- An Institutional and Engineering Control Plan that identifies use restrictions and engineering controls for the Site and details the steps and media-specific requirements necessary to assure the following institutional and/or engineering controls remain in place and effective:
  - Institutional Controls – Environmental Easement.
  - Engineering Controls – Soil Cover System.
- An Excavation Management Plan which details the provisions for the management of future excavations through the cover system and in areas of remaining contamination below the cover system;
- An Operation and Maintenance Plan to assure continued operation, maintenance, monitoring, inspection and reporting of the physical component of the remedy. The plan includes, but is not limited to:
  - Compliance monitoring of the cover system to assure proper operation and maintenance (O&M) as well as providing the data for any necessary permit or permit equivalent reporting;
  - Maintaining site access controls and NYSDEC notification; and
  - Providing the NYSDEC access to the Site and O&M records.

11.4 REPORTING

Remedial actions to be conducted to relocate the soil contamination and construct the soil cover system will be documented. NYSDEC will be notified of the remedial actions prior to their initiation, in accordance with the BCP notification requirements. We anticipate a remedial action report/construction completion report will be prepared after the soil activities are completed. After evaluation of the information from this work, we anticipate the following reports to follow.

- Remedial Action Report/Construction Completion Report (RAR/CCR)
- Site Management Plan
- Final Engineering Report (FER).

11.5 SCHEDULE

The following schedule is proposed for the implementation of the remedial action and follow up reporting requirements.

Submittal of Remedial Work Plan	August 2014
Remedial Implementation	Fall 2014
Submittal of RAR/CCR	April 2014
Submittal of Site Management Plan:	April 2014
Submittal of Final Engineering Report:	Summer 2015