FONF EXPANSION/SABRE PARK BCP

TOWN OF NIAGARA, NEW YORK

Interim Remedial Measures Work Plan

NYSDEC BCP Number: C932162

Prepared for:
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OCTOBER 2013

CERTIFICATION

I Joel Landes certify that I am currently a NYS registered professional engineer as defined in 6 NYCRR Part 375 and that this Interim Remedial Measures Work Plan 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).

I certify that all information and statements in this certification are true. I understand that a false statement made herein is punishable as Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

NYS Professional Engineer #	Date	Signature
	10/9/13	

It is a violation of Article 130 of New York State Education Law for any person to alter this document in any way without the express written verification of adoption by any New York State licensed engineer in accordance with Section 7209(2), Article 130, New York State Education Law.

INTERIM REMEDIAL MEASURES WORK PLAN

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LIST OF ACRONYMS

Acronym	Definition
AAR	Alternatives Analysis Report
AOC	Area of Concern
ASTM	American Society for Testing and Materials
AWQS	Ambient Water Quality Standards
BCA	Brownfield Cleanup Agreement
BCP	Brownfield Cleanup Program
BMP	Best Management Practice
CAMP	Community Air Monitoring Plan
C&D	Construction & Demolition
CFR	Code of Federal Regulations
CLP	Contract Laboratory Program
COC	Contaminant of Concern
CQAP	Construction Quality Assurance Plan
DER	Division of Environmental Remediation
DRO	Diesel Range Organics
DSHM	Division of Solid & Hazardous Materials
DUSR	Data Usability Summary Report
EC/IC	Engineering Control and Institutional Control
EDD	Electronic Data Deliverable
EDR	Environmental Data Resources
ELAP	Environmental Laboratory Approval Program
EM	Electromagnetics
EPA	Environmental Protection Agency
ESA	Environmental Site Assessment
FER	Final Engineering Report
FSP	Field Sampling Plan
GC	Gas Chromatography
GPR	Ground Penetrating Radar
GPS	Global Positioning System
GRO	Gasoline Range Organics
HASP	Health & Safety Program
HAZWOPER	Hazardous Waste Operations Emergency Response
HDPE	High-density Polyethylene
IHWDS	Inactive Hazardous Waste Disposal Site
IRM	Interim Remedial Measure
IRMWP	Interim Remedial Measures Work Plan
MMP	Material Management Plan
MS/MSD	Matrix Spike / Matrix Spike Duplicate

Acronym	Definition
NAVD	North American Vertical Datum
NWI	National Wetland Inventory
NYCRR	New York Codes Rules and Regulations
NYSDEC	New York State Department of Environmental Conservation
NYS DEC DER	New York State Department of Environmental Conservation Division of Environmental Remediation
NYS DEC PBS	New York State Department of Environmental Conservation Petroleum Bulk Storage
NYSDOH	New York State Department of Health
NYS DOT	New York State Department of Transportation
O&M	Operations & Maintenance
PAHs	Polycyclic Aromatic Hydrocarbons
PCBs	Polychlorinated Biphenyls
PE	Professional Engineer
PID	Photoionization Detector
PM	Particulate Matter
PPE	Personal Protective Equipment
PVC	Polyvinyl Chloride
QA/QC	Quality Assurance / Quality Control
QAPP	Quality Assurance Project Plan
QEP	Qualified Environmental Professional
RAOs	Remedial Action Objectives
RCRA	Resource Conservation and Recovery Act
RE	Remedial Engineer
RI	Remedial Investigation
RIR	Remedial Investigation Report
RIWP	Remedial Investigation Work Plan
SCOs	Soil Cleanup Objectives
SCGs	Standards, Criteria and Guidance
SEQR EAF	State Environmental Quality Review Environmental Assessment Form
SMP	Site Management Plan
SOP	Site Operations Plan
SPDES	State Pollutant Discharge Elimination System
SSDS	Sub-Slab Depressurization System
SSURGO	Soil Survey Geographic
SVOCs	Semi-Volatile Organic Compound
SWPPP	Stormwater Pollution Prevention Plan
TAL	Target Analyte List
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure

Acronym	Definition
TOGS	Technical and Operation Guidance Series
TPH	Total Petroleum Hydrocarbons
USEPA	United State Environmental Protection Agency
UST	Underground Storage Tank
VOCs	Volatile Organic Compound
XRF	X-Ray Fluorescence

EXECUTIVE SUMMARY

Introduction

This Interim Remedial Measures (IRM) Work Plan was prepared by Langan Engineering, Environmental, Surveying, and Landscape Architecture, D.P.C. (Langan) on behalf of Fashion Outlets II, LLC (FO II, LLC) and Macerich-Niagara, LLC (collectively "Macerich" for the purpose of this report). Macerich has entered into the Brownfield Cleanup Program (BCP No. C932162) with the New York State Department of Environmental Conservation (NYSDEC) as a "Volunteer", to investigate and, where necessary, remediate contaminated soil, groundwater, and soil gas encountered during development of the approximate 47.8-acre Site. Macerich is proposing a 225,000 square foot expansion that includes 175,000 square foot of new enclosed gross leasable area to the existing Fashion Outlets of Niagara Falls mall to include 50 new stores and dedicated public common space, and additional asphalt paved parking areas, stormwater detention ponds, and landscaped areas.

A Brownfield Cleanup Program Application was submitted to the NYSDEC on 19 April 2013. A Remedial Investigation (RI) was performed at the Site from June 23, 2013 and July 3, 2013. A Remedial Investigation Report (RIR) was submitted to the NYSDEC on 16 August 2013, simultaneously to preparation of this this IRM Work Plan.

The objective of the IRM Work Plan is to provide the means and methods to remediate areas of concern identified during historical assessments and the RI, to be protective of human health and the environment, mitigate the potential further migration of contaminants in soil, groundwater, and/or soil gas and to facilitate redevelopment of this property.

The procedures and reporting requirements contained in this IRM Work Plan are in accordance with NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation (May 2010). Consistent with Sections 1.11 and 5.3 of the DER-10 document, this IRM Work Plan includes the following items:

- A summary of environmental investigation findings and a description of the Remedial Areas of Concern identified by these investigations;
- A description of the proposed interim remedial measures, remedial technologies and associated sampling and monitoring;
- A listing of applicable soil cleanup objectives (SCOs) and groundwater standards relating to the work;

- Health and Safety and Community Air Monitoring Plans that describe monitoring procedures and vapor, odor and dust control to be implemented during remedial activities;
- Plans for soil waste characterization and off-site disposal;
- A schedule for implementation and reporting; and,
- A Professional Engineer's certification.

Site Description/Physical Setting

The Site subject to the Brownfield Cleanup Agreement (BCA), encompasses approximately 47.8-acres within the Town of Niagara and includes the +34-acres former Sabre Park Mobile Home Community located at 1705 Factory Outlet Boulevard (a/k/a Fashion Outlet Boulevard, a/k/a Third Avenue Extension, a/k/a Connection Boulevard - Assessor's Parcel Numbers 160.08-1-2, 160.08-1-6 and 160.08-1-7), an approximate 10.35-acre parcel located on the southern portion of the larger approximately ±41.3-acre Fashion Outlets of Niagara Falls (Fashion Outlets) property located at 1900 Military Road, (specifically, a portion of Assessor's Parcel Numbers 145.20-1-15), and a smaller parcel encompassing approximately 3.45-acres on the western side of the Site located at 1755 Factory Outlet Boulevard (a/k/a Fashion Outlet Boulevard, a/k/a Third Avenue Extension, a/k/a Connection Boulevard - Assessor's Parcel Number 160.08-1-1). A Site Location Map is provided as Figure 1.

The Sabre Park parcel was previously occupied by 278 mobile home lots from approximately 1972 to 2013. Demolition of the trailers commenced in March 2013 and is expected to be completed by September 2013. The majority of the Site currently consists of asphalt/gravel parking areas, asphalt driveways, and vegetated areas. The Fashion Outlets parcel consists of an asphalt parking lot and some internal parking related roadways. The parcel located at 1755 Factory Outlet Boulevard is currently improved with a Secure Storage facility and associated asphalt parking.

The Project Site is bounded by Factory Outlet Boulevard/Route 190 to the west/northwest, the existing Fashion Outlets of Niagara Falls to the east, and National Grid power lines to the south. A Site plan depicting the existing conditions is included as Figure 2.

Site History and Areas of Concern

Numerous previous environmental reports have been completed (by Langan and others) for the Sabre Park and Fashion Outlets of Niagara Falls parcels. Historic remedial actions have also been performed at the parcels. Previous reports and historic remedial actions are discussed in

detail in the 5 July 2011 Phase I Environmental Site Assessments (ESAs) prepared by Langan and will not be discussed in detail in this report; however, a brief summary is presented below.

Sabre Park Property

According to a review of title records for the Site, Sabre Park was owned by Union Carbide Corporation from 1949 until 1969. According to the Environmental Data Resources (EDR) Report, during expansion of the mobile home community to the south in 1978, fill with elevated level of organic chemicals was discovered; however, information regarding the source or quantity of this fill material was not provided. During a 1985/1986 soil sampling event conducted by the United States Environmental Protection Agency (USEPA), organic chemicals were not detected; however, the samples contained mercury. Mercury impacted soil was remediated via excavation and offsite disposal; however, elevated concentrations of mercury remain in on-site soils (maximum concentration = 766 mg/kg).

A follow-up field investigation of the extent of mercury contamination at Sabre Park Trailer Park was conducted by NUS Corporation (NUS) in May 1988. A total of 424 soil samples were screened for total mercury using the Region 2 Fit X-Ray Fluorescence (XRF) system. In addition 125 split samples were sent to an EPA Contract Laboratory Program (CLP) for confirmation. Mercury was detected by XRF at concentrations greater than 40 mg/kg (up to 84 mg/kg) in 14 soil samples collected from the southwestern portion of the Site. Mercury was detected in 41 of 125 CLP samples at concentrations ranging from 0.14 to 54.4 mg/kg. Approximately 1,200 cubic–yards mercury impacted soil was remediated in 1989 by excavation and off-site disposal as a D-listed (D009-mercury) hazardous waste at an off-site soil disposal facility.

During an August 1995 subsurface investigation conducted by Paragon Environmental Services (Paragon), total petroleum hydrocarbons (TPH) were detected in the soil and groundwater at concentrations ranging from 7 to 120 mg/kg in soil, and 0.4 to 0.72 mg/L in groundwater. As the NYSDEC has no criteria for TPH in subsurface media, Paragon was directed to use professional judgment to determine if the TPH concentrations posed a risk to human health or the environment. It was Paragon's opinion that the TPH concentrations in the soil and groundwater at the Site did not pose a risk to human health and no further action was recommended on the Site.

Seven petroleum spills (heating oil, motor oil, non-PCB transformer oil, waste oil) were reported at the Sabre Park property from 1985 to 2010. These spills have all been closed according to the NYSDEC Spills Database.

Based on the historic dumping that occurred at the Sabre Park property, the NYSDEC identified the Site as an Inactive Hazardous Waste Disposal Site. Subsequent to several phases of remediation, the NYSDEC concluded that the Sabre Park property had been properly remediated

and that "no further action" was required. In a letter dated March 21, 1995, the NYSDEC delisted Sabre Park from the Registry of Inactive Hazardous Waste Disposal Sites in New York State.

Fashion Outlets of Niagara Falls Property

According to the 5 July 2011 Phase I ESA conducted by Langan for the Fashion Outlets property, the 1970 and 1980 city directory listings indicate historic uses of the Fashion Outlets property may have included a dry cleaner. The exact location of the former dry cleaner has not been confirmed.

The northwestern portion of the Property (grids 1 through 7 of Figure 4, in Appendix A) was formerly occupied by the Walter Kozdranski Construction Company. This facility has a documented release of diesel fuel oil associated with a former leaking underground storage tank removed in July 1988. A spill report was issued for the Property in July 1988. Reportedly, 5,400 gallons of liquid were removed from the Site but is unclear if the liquids were tank related or groundwater. The spill was closed by the NYSDEC on July 12, 1988. According to the 2004 Phase II Environmental Site Investigation conducted by IVI Due Diligence Services, Inc. (IVI), concentrations of petroleum related semi-volatile organic compounds (SVOCs), including benzo(a)anthracene, chrysene, and benzo(a)pyrene in three of six soil borings locations were detected above the applicable NYSDEC numeric criteria. As the results of this investigation were similar to the information the NYSDEC had on the Kozdranski property when they closed the spill in 1988, no further investigation was recommended by IVI.

The Fashion Outlets property received contaminated fill in late 1960's or early 1970's. A waste area approximately 0.5-acres in size was discovered in the parking area immediately west-northwest of the outlets. In October 1985, a yellow-tan waste material was discovered during the installation of stormwater piping in the northwestern property corner and investigation of the on-site waste material was initiated. The results of the investigations revealed the presence of volatile organic compounds (VOCs), SVOCs, inorganic compounds, and pesticide compounds. Elevated concentrations of N-nitrosodiphenylamine and 1,2,4-trichlorobenzene were detected in on-site soils in October 1985. Six different types of fill were identified on-site: including a yellow-tan resinous waste, white powder-like material, construction and demolition debris, ash and slag. Based on the described fill placement location, it does not appear that this contaminated material was placed within the BCP development Site boundary.

Approximately 12,879 tons of contaminated materials and 7,300 gallons of impacted wastewater were removed from the Fashion Outlets property between January and February of 1994. The results of post-remediation soil sampling activities indicate that elevated concentrations of 2-mercaptobenzothiazole were detected in four of the twenty-four soil samples at concentrations that exceed the applicable numeric soil criteria. Several metals and pesticides were also detected

in soil at concentrations that are below the applicable criteria. The NYSDEC-lead remediation was closed with a Record of Decision in December 1994, which required the property owner to file a deed restriction/covenant prohibiting future use of certain area of the Site for residential purposes. In January 1995, the Site was delisted from the New York State Inactive Hazardous Waste Disposal Site (IHWDS) list (No. 932103).

During additional site remediation activities in November 1994, soil impacted with N-nitrosodiphenylamine, 1,2,4-trichlorobenzene and 2-mercaptobenzothiazole was excavated from the Site and reused beneath an on-site parking lot.

Based on Site observations, the development history of the Site and the findings of the previous reports outlined above, the areas of concern (AOCs) investigated during the remedial investigation are as follows:

1. Historic Site Use – The northern portion of Site was historically owned by the Walter Kozdranski Construction Company. As indicated above, this facility has had a documented release of diesel fuel oil associated with a former leaking underground storage tank removed in July 1988. During a 2004 Phase II ESI conducted by IVI, concentrations of petroleum related SVOCs, including benzo(a)anthracene, chrysene, and benzo(a)pyrene were detected in soil above the applicable NYSDEC numeric criteria:
2. Historic Site Use (On-site Dumping) – The northern portion of the Site received contaminated fill in late 1960's or early 1970's. A waste area approximately 0.5-acres in size was discovered in the parking area immediately west-northwest of the current outlet building. The results of the investigations revealed the presence of VOCs, SVOCs, inorganic compounds, and pesticide compounds. Elevated concentrations of N-nitrosodiphenylamine and 1,2,4-trichlorobenzene were detected in on-site soils in October 1985. Six different types of fill were identified on-site: including a yellow-tan resinous waste, white powder-like material, construction and demolition debris, ash and slag; and,
3. Historic Site Use (Former Sabre Park Parcel) – According to a review of title records the former Sabre Park Parcel was owned by Union Carbide Corporation. During expansion of the mobile home community to the south in 1978, fill material with elevated levels of organic chemicals was discovered. This fill material (approx. 1,200 cubic–yards) was subsequently removed from the southern portion of the property and disposed of as a D-listed (D009) hazardous waste at an offsite soil disposal facility in 1989. During a 1985/1986 soil sampling event conducted by the USEPA, organic chemicals were not detected in soils samples collected from the property; however, the samples contained elevated levels of mercury. Mercury impacted soil was remediated via excavation and

offsite disposal; however, elevated concentrations of mercury remain in onsite soils (maximum concentration = 766 mg/kg).

During an August 1995 subsurface investigation conducted by Paragon, TPH was detected in the soil and groundwater beneath the Site; however, no chemical concentrations or sampling locations were provided. The NYSDEC has no criteria for TPH in subsurface media, and no further action was recommended on the Site by Paragon.

Summary of the Remedial Investigation

Langan conducted the RI field investigation between 23 June 2013 and 3 July 2013, in accordance with the procedures set-forth in the NYSDEC approved Remedial Investigation Work Plan (RIWP), dated 19 April 2013 (revised 14 June 2013), and approved by NYSDEC on 1 May 2013. The RI field program included the following activities:

1. Completion of a geophysical survey to locate subsurface utilities and previously identified anomalies;
2. Advancement of 62 soil borings and excavation of 84 test pits, and the collection of 295 grab soil samples for laboratory analyses;
3. Installation of 8 groundwater monitoring wells;
4. Gauging of all Site monitoring wells to determine groundwater flow direction;
5. Collection of nine groundwater samples from the eight on-site monitoring wells for laboratory analyses; and
6. Installation of ten soil vapor points, and the collection of four soil vapor samples from the three of the newly-installed soil vapor points and one ambient air sample (four total sampling locations) for laboratory analyses.

A complete summary of findings and analytical results can be found in the Remedial Investigation Report (RIR), prepared by Langan, dated 16 August 2013. Select RIR tables and figures have been included in Appendix A.

Findings of the Remedial Investigation

1. Subsurface conditions at the Site consisted of fill ranging in thickness from 2 to 15 feet underlain by silty sand and clay. Fill material consisted of brown to dark gray and black fine to coarse grained sands with varying levels of silt, clay, gravel, organics (roots), brick, concrete, wood, glass, rubber, slag, and miscellaneous pieces of plastic and metal. The underlying clay appeared to be continuous and was observed to be dense with

increased quantities of coarse sand and fine gravel at depths of 13 to 16 feet below grade or just prior to refusal.

2. Slag is prevalent throughout the development area and is associated with historic filling/dumping at the Site. A Ludlum Geiger counter confirmed that the slag did not exhibit radioactivity.

3. VOCs, SVOCs, Polychlorinated Biphenyls (PCBs), Pesticides and metals were identified in soil throughout the Site at concentrations exceeding the Unrestricted Use SCOs. SVOCs, metals, and PCBs were identified in soil throughout the Site at concentrations exceeding the Restricted Commercial SCOs, and are likely attributed to the site-wide historic dumping and not a localized release.

4. Based on limited chromium Toxicity Characteristic Leaching Procedure (TCLP) analysis, samples from LSB-23-A and LSB-23-S exceeded the Resource Conservation and Recovery Act (RCRA) Hazardous Waste Criteria. These two samples were collected from an anomalous material that was easily identifiable in the field from the surrounding fill material and exhibited a yellowish color. As discussed in the 16 August 2013 RIR, this material was visually delineated with a Geoprobe™ to determine the horizontal and vertical extents of the material. During the proposed development, this material will be handled in accordance with RCRA regulations, as addressed in the IRMWP.

5. Overburden groundwater observed at the Site is likely perched water within the fill layer, confined by the underlying clay layer. pH in groundwater ranged from 6.29 to 12.2, and is likely the result of high concentrations of dissolved metals within the fill material. Hexavalent chromium and total chromium were detected in four samples (LMW-5 through LMW-8) at concentrations exceeding the Ambient Water Quality Standards (AWQS) of 50 ug/L. Impacts to groundwater at the Sabre Park parcel are likely a result of perched water mixing with slag and fill material. The impacted slag and elevated metal concentrations are likely causing the pH of groundwater to rise to the levels observed in the field.

6. VOC impacts in soil gas were identified at concentrations exceeding the New York State Department of Health (NYSDOH) Upper Fence Values, at locations within the footprint of the proposed expansion. A sub-slab vapor intrusion mitigation system will be incorporated into the construction of the expansion, and will be detailed further in the IRM.

Qualitative Human Health Exposure Assessment

An assessment of human health exposure was conducted for both current and future Site uses as a part of the Alternatives Analysis Report (AAR), dated 9 October 2013. The assessment

included an evaluation of potential exposure media, receptor populations, and pathways of exposure to Site-related contaminants of concern (COC). Complete exposure pathways have the following five elements: 1) a contaminant source; 2) contaminant release and transport mechanism; 3) a point of exposure; 4) a route of exposure; and 5) a receptor population.

The conceptual Site model identified a contaminant source (element 1) and a human receptor population (element 5). Also, a point of exposure (element 3) exists/may exist for potential exposure media for soil and groundwater COCs for current Site conditions, and a point of exposure exists for soil gas COCs in select portions of the Site.

Points of exposure during construction/remediation activities include the disturbed and exposed contaminated soil during excavation and contaminated dust and organic vapors arising from the excavation activities. Points of exposure may exist for groundwater COCs because excavation will go into groundwater (perched water). Routes of exposure include ingestion and dermal absorption of contaminated soil or groundwater, inhalation of organic vapors arising from contaminated soil and groundwater, and inhalation of dust arising from contaminated soil. The receptor population includes the construction and remediation workers and, to a lesser extent, the local population. All five elements exist; therefore, completed exposure pathways are present. However, the temporary risk will be minimized by applying appropriate health and safety measures, such as monitoring the air for organic vapors and dust, using vapor and dust suppression measures, maintaining site security, and wearing the appropriate personal protective equipment.

Post-construction conditions will be characterized by a contaminant source (element 1) and a human receptor population (element 5); however a point of exposure (element 3) will not exist for potential exposure media for soil and groundwater COCs. After the structures are constructed, a complete exposure pathway via potential inhalation of subsurface vapors should not exist as long as the existing building slab is sealed and a sub-slab depressurization system is installed.

Summary of the Interim Remedy

The proposed interim remedy achieves all of the remedial action goals established for the project. The proposed remedial measures are effective in both the short-term and long-term and reduces mobility, toxicity and volume of contaminants and uses standard methods that are well established in the industry.

NYSDEC BCP guidelines require that only one remedial alternative be evaluated prior to selection of a remedy intended to meet Track 4 criteria utilizing engineering and institutional controls. The contaminants of concern include some VOCs, SVOCs, metals and PCBs. Consideration has been given to the presence of VOCs in the soil vapor beneath the Site, as

presented in the RIR. No on-Site source of VOCs was identified in the historic fill or soil at the site other than the historic fill itself. The proposed interim remedial measures will include:

1. Implementation of a Community Air Monitoring Program (CAMP) for particulates and VOCs.
2. Excavation and offsite disposal of two hot spots of PCB-impacted soils with concentrations exceeding 10 mg/kg (approx. 925 cubic-yards), and chromium impacted soils with concentrations exceeding the RCRA Hazardous Waste Criteria (approx. 555 cubic-yards);
3. Collection and analysis of soil samples for waste characterization and end-point samples at hot-spot removal locations;
4. Excavation and offsite disposal of excess contaminated soils generated from the proposed development activities (upwards of approximately 8,000 cubic-yards);
5. Design and installation of composite capping/cover system covering the entire Site upon completion of the development, see Figure 4. The capping/cover system will consist of:
    a. Placement of a minimum of 1 foot of soils meeting the Restricted Commercial SCOs (at a minimum) over all landscaped areas;
    b. Asphalt paved parking; and
    c. Concrete building foundations
6. Collection, sampling, and offsite disposal of impacted groundwater removed during construction dewatering (approximately 1,000,000 gallons);
7. Design and installation of sub-slab depressurization systems (SSDS) beneath the entire proposed mall expansion and office building of the relocated Secure Storage facility;
8. Perimeter and work zone air monitoring for VOCs and particulates;
9. Systematic screening (by visual means, odor, and monitoring with PID) of the subsurface conditions during general construction activities, for indications of underground storage tanks (USTs) or previously undetected AOCs, or hot spots;
10. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking & staking excavation areas.
11. Implementation of storm-water pollution prevention measures in compliance with applicable laws and regulations.

12. Performance of activities required for the remedial measures, including permitting requirements and dewatering pretreatment requirements, in compliance with applicable laws and regulations.
13. Submittal of a Final Engineering Report (FER) that describes the remedial activities, certifies that the remedial requirements have been achieved, describes all mitigation measures to be implemented at the Site, and lists any deviations from this IRMWP.

Remedial Design

The Remedial Design will largely consist of the following items:

- Traditional "dig and haul" soil excavation to remove two hot spots and a significant volume of contaminated fill/soils exceeding the restricted commercial SCOs;
- Dewatering and offsite disposal of approximately 1,000,000 gallons of contaminated perched groundwater;
- Installation of a composite capping/cover system, and
- Design and installation of two sub-slab depressurization systems below the mall expansion structure, and the occupied office space for the new Secure Storage building (see Figures 3 and 4).

Upon completion of the interim remedial measures, the SSD system will be tested to confirm that it performs as designed.

Excavation

On-site soils, identified as hot spots and excess contaminated fill material containing slag generated during construction in the proposed development area, would be excavated and transported off-site for disposal. Assuming hot spots may be excavated to an average depth of 10 feet to achieve a Track 4 cleanup, approximately 1,480 cubic yards of soil would be removed. Upwards of approximately 8,000 cubic yards of excess contaminated fill material containing slag may be removed from detention ponds and proposed development areas and disposed of off-site. Site soils may be reused to replace the excavated soil as needed and establish the designed grades at the site.

Vapor Mitigation

In response to the soil vapor findings from the RI, buildings constructed at the Site will require vapor mitigation. Therefore the design of the buildings in this area will include engineering controls consisting of vapor barriers with active SSD systems at the proposed Fashion Outlets

structure and proposed Secure Storage facility office building. Both installations are intended to prevent soil vapor from migrating into the proposed occupied buildings.

INTERIM REMEDIAL MEASURES WORK PLAN

1.0 INTRODUCTION

This Interim Remedial Measures (IRM) Work Plan was prepared by Langan Engineering, Environmental, Surveying, and Landscape Architecture, D.P.C. (Langan) on behalf of Fashion Outlets II, LLC (FO II, LLC) and Macerich-Niagara, LLC (collectively "Macerich" for the purpose of this report). Macerich has entered into the Brownfield Cleanup Program (BCP No. C932162) with the New York State Department of Environmental Conservation (NYSDEC) as a "Volunteer", to investigate and, where necessary, remediate contaminated soil, groundwater, and soil gas encountered during development of the approximate 47.8-acre Site. Macerich is proposing a 225,000 square foot expansion that includes 175,000 square foot of new enclosed gross leasable area to the existing Fashion Outlets of Niagara Falls mall to include 50 new stores and dedicated public common space, and additional asphalt paved parking areas, stormwater detention ponds, and landscaped areas.

A Brownfield Cleanup Program Application was submitted to the NYSDEC on 19 April 2013. A Remedial Investigation was performed at the Site from June 23, 2013 and July 3, 2013. A formal Remedial Investigation Report was submitted to the NYSDEC on 16 August 2013, simultaneously to preparation of this this IRM Work Plan.

The objective of the IRM Work Plan is to provide the means and methods to remediate areas of concern identified during historical assessments and the RI, to be protective of human health and the environment, mitigate the potential further migration of contaminants in soil, groundwater, and/or soil gas and to facilitate redevelopment of this property.

The procedures and reporting requirements contained in this IRM Work Plan are in accordance with NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation (May 2010). Consistent with Sections 1.11 and 5.3 of the DER-10 document, this IRM Work Plan includes the following items:

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- A description of the proposed interim remedial measures, remedial technologies and associated sampling and monitoring;
- A listing of applicable soil cleanup objectives (SCOs) and groundwater standards relating to the work;

- Health and Safety and Community Air Monitoring Plans that describe monitoring procedures and vapor, odor and dust control to be implemented during remedial activities;
- Plans for soil waste characterization and off-site disposal;
- A schedule for implementation and reporting; and,
- A Professional Engineer's certification.

1.1 SITE LOCATION AND DESCRIPTION

The Site subject to the Brownfield Cleanup Agreement (BCA), encompasses approximately 47.8-acres within the Town of Niagara and includes the following parcels:

- ±34-acres former Sabre Park Mobile Home Community located at 1705 Factory Outlet Boulevard (a/k/a Fashion Outlet Boulevard, a/k/a Third Avenue Extension, a/k/a Connection Boulevard - Assessor's Parcel Numbers 160.08-1-2, 160.08-1-6 and 160.08-1-7),
- ±10.35-acre parcel located on the southern portion of the larger approximately ±41.3-acre Fashion Outlets of Niagara Falls (Fashion Outlets) property located at 1900 Military Road, (specifically, a portion of Assessor's Parcel Numbers 145.20-1-15),
- ±3.45-acres on the western side of the Site located at 1755 Factory Outlet Boulevard (a/k/a Fashion Outlet Boulevard, a/k/a Third Avenue Extension, a/k/a Connection Boulevard - Assessor's Parcel Number 160.08-1-1).

A metes and bounds description of the Site is included in Appendix E, and a Site Location Map is provided as Figure 1.

The Sabre Park parcel was previously occupied by 278 mobile home lots from approximately 1972 to 2013. Demolition of the trailers commenced in March 2013 and is expected to be completed by September 2013. The majority of the Site currently consists of asphalt/gravel parking areas, asphalt driveways, and vegetated areas. The Fashion Outlets parcel consists of an asphalt parking lot and some internal parking related roadways. The parcel located at 1755 Factory Outlet Boulevard is currently improved with a Secure Storage facility and associated asphalt parking.

The Project Site is bounded by Factory Outlet Boulevard/Route 190 to the west/northwest, the existing Fashion Outlets of Niagara Falls to the east, and National Grid power lines to the south. A Site plan depicting the existing conditions is included as Figure 2.

1.2 PROPOSED REDEVELOPMENT PLAN

The 225,000 square foot expansion includes 175,000 square feet of new enclosed gross leasable area to the existing Fashion Outlets of Niagara Falls mall to include 50 new stores and dedicated public common space, and additional 1,720,000 square feet of asphalt paved parking areas, 225,000 square feet of clay lined stormwater detention ponds, and 273,750 square feet of landscaped areas.

The Secure Storage facility currently located on the site will be demolished and reconstructed in the southwest corner of the Site. A Site plan depicting the proposed development is included as Figure 3 of Appendix A. The proposed development plans are included as Appendix D.

1.3 DESCRIPTION OF SURROUNDING PROPERTY

The Site is located in an urban setting, occupied by residential and commercial buildings. The Site is bounded to the north by the Fashion Outlets of Niagara Falls, to the east by Wal-Mart, to the west by commercial properties, followed by Factory Outlet Boulevard, Route 190, and a solid waste landfill, and to the south by the National Power Grid power lines and vacant land, followed by commercial buildings.

Based on a State Environmental Quality Review Environmental Assessment Form (SEQR EAF) prepared for the Site by Stantec Consulting Services, Inc. of Rochester, New York (Stantec), the nearest ecological receptor is a 4.3-acre NYSDEC regulated wetland located within 100 feet of the southwestern corner of the Site and potentially down gradient.

2.0 DESCRIPTION OF REMEDIAL INVESTIGATION FINDINGS

Langan conducted the RI field investigation between 23 June 2013 and 3 July 2013, in accordance with the procedures set-forth in the NYSDEC approved Remedial Investigation Work Plan (RIWP), dated 19 April 2013 (revised 14 June 2013), and approved by NYSDEC on 1 May 2013. The RI field program consisted of the installation of 62 soil borings, excavation of 84 test pits, construction of 8 groundwater monitoring wells, and installation of 10 soil vapor probes. A complete summary of findings and analytical results can be found in the Remedial Investigation Report (RIR), prepared by Langan, dated 16 August 2013. Select RIR tables and figures have been included in Appendix A. Below is a summary of the findings and conclusions of the RI activities.

2.1 SUMMARY REMEDIAL INVESTIGATIONS PERFORMED

The objective of the RI was to supplement the existing Site data and to further investigate the areas of concern (AOCs) at the Site. The RI included the following tasks:

1. Completion of a geophysical survey to locate subsurface utilities and previously identified anomalies ;
2. Advancement of 62 soil borings and excavation of 84 test pits, and the collection of 295 grab soil samples for laboratory analyses;
3. Installation of 8 groundwater monitoring wells;
4. Gauging of all Site monitoring wells to determine groundwater flow direction;
5. Collection of nine groundwater samples from the on-site monitoring wells for laboratory analyses; and
6. Installation of ten soil vapor points, and the collection of four soil vapor samples from the three of the newly-installed soil vapor points and one ambient air sample (four total sampling locations) for laboratory analyses.

The RIWP was implemented in accordance with the procedures specified in Langan's Health and Safety Plan (HASP) and Quality Assurance Project Plan (QAPP). A Langan engineer supervised all Site activities.

The RI was conducted in accordance with the NYSDEC approved RIWP dated 19 April 2013 and revised 14 June 2013, prepared by Langan, with the following deviations:

- Five test pits were completed as soil borings due to their location within asphalt drive aisles or due to the proximity of subsurface utilities;

- 19 soil boring locations were completed as soft dig test pits because National Fuel was unable to disconnect the gas mains at the Sabre Park portion of the Site prior to RI activities;
- Four soil boring locations were advanced to a depth of 12 feet below grade since these locations were converted to monitoring wells and groundwater was encountered at a shallow depths; and,
- Soil gas samples were not collected from seven locations due to the presence of water within the soil gas sampling points, which was attributed to the elevated groundwater table, heavy rains, and high permeability of the shallow fill material.

2.1.1 Geophysical Investigation

Nova Geophysical Services of Douglaston, New York (Nova) conducted a geophysical survey of the Site on 23 June through 28 June 2013. The equipment utilized for the survey was a Sensors & Software Noggin ground penetrating radar (GPR) unit equipped with 200 and 250 Mhz antennas with a graphic recorder and video display. The unit, mounted on a three wheel platform, was passed over the selected area in a perpendicular grid pattern. The unit transmits an electromagnetic signal to the subsurface and then detects, amplifies and displays the signal reflection. Any parabolic anomalies noted below grade were graphically displayed and identified as a potential object of concern. Objects of concern were examined for size, shape, and amplitude. The unit was set to detect the features to a depth of 15 feet below grade in the survey locations. Nova also utilized a Fisher T-6 Utility Locator which is capable of finding underground pipes, cables, manhole covers, vaults, valve boxes and other metallic objects.

The GPR survey did not detect any anomalous parabolic features characteristic of underground storage tanks at the site. The GPR survey did detect anomalous parabolic features characteristic of miscellaneous fill materials (concrete, bricks, slag, construction debris) to a depth of approximately 8 feet below grade at locations throughout the Sabre Park portion of the Site. Gas mains, underground stormwater, sanitary, electric and water lines were identified on the Site. Gas mains constructed of untraceable, flexible polyvinyl chloride (PVC) piping within the southern portion of the Site, and small water service connections for each mobile home were unidentifiable by Nova. The presence of miscellaneous building construction materials on the surface from previously demolished mobile homes, as well as subsurface fill materials, caused interference and obstructed utility locating activities. Nova identified water lines, gas mains and electrical utility lines entering the site from Factory Outlet Boulevard along the western portion of the Site.

A flexible PVC gas main was encountered during advancement of test pit (LTP-58) on 24 June 2013, not previously identified by Dig Safely or Nova. Emergency services (police and fire

department) and National Fuel were immediately notified of the gas main breach. The local police and fire department came to the site to assess public safety, and evacuated the adjacent businesses to the west of the Site. National Fuel came to the Site and fixed the gas main breach by capping the gas main. To mitigate the potential of striking further active plastic gas mains, soft digging methods were utilized in areas of the site that were shown by utility mapping as service by plastic gas mains. Small water service connections for the existing and formerly demolished mobile homes, consisting of 1 inch diameter copper piping, were encountered throughout the Sabre Park portion of the Site during soft digging. Deviations from the RIWP resulting from the presence of underground utilities are discussed in Section 9 of the RIR.

2.1.2 Soil Investigation

Soil Boring Installation and Sampling

SJB Services, Inc. (SJB) was retained to complete 76 soil borings (LSB-1 through LSB-76) at the Site. The soil borings were advanced within on a 1-acre grid pattern, generally with 1-3 borings per grid, in accordance with the NYSDEC approved RIWP and Field Sampling Plan (FSP). Due to the presence of unidentified subsurface utilities, as discussed in Section 2.1.1, several soil boring location were completed as test pits, resulting in a total of 64 soil borings being advanced during RI activities. All soil borings were advanced with direct-push sampling methods utilizing a Geoprobe™ drill rig, also capable of spinning hollow stem augers. To the extent possible, the borings were advanced in areas of general or suspect soil contamination, including proposed areas of significant historic earthwork/filling activities Soils were collected continuously using 4 foot, 2 inch diameter macrocores. The soil borings were advanced to approximately 15 feet below existing grade, or refusal.

A Langan engineer observed the soil boring activities, screened the soil samples for environmental impacts, and collected environmental samples for laboratory analyses. Soils were screened for organic vapors with a MultiRAE PLUS 5-gas meter that included a photoionization detector (PID) equipped with a 10.6 electron-volt (eV) lamp, and evaluated for visual and olfactory indications of environmental impacts. Soil descriptions were recorded on boring logs, and were electronically scanned and sent to the office at the end of each day to facilitate data tabulation. All non-dedicated drilling equipment was decontaminated between each boring in accordance with the RI Field Sampling Plan. Generally, drill cuttings were backfilled within the borehole at which they were generated. Cuttings were containerized in 55-gallon drums at locations converted to monitoring wells, or at locations where cuttings had gross impacts or were unable to fit into the borehole. Work complied with the procedures identified in the site-specific investigation HASP, in Appendix B of the RIWP.

Up to two samples were collected from each soil boring, as shown on Table 1 of the RIWP. Samples were collected from depths between approximately 0 and 15 feet below existing grade to characterize historic fill at the Site, and to evaluate potential releases to native soils throughout the Site. Samples were generally collected from the capillary fringe and from the interval with the most evident contamination (or boring termination). Soil samples were labeled in accordance with the nomenclature outlined in the FSP.

Samples were collected in laboratory-supplied containers and were sealed, labeled, and immediately placed in a cooler containing ice (to maintain a temperature of approximately 4 degrees Celsius) for delivery to York Analytical Laboratories, Inc. of Stratford, Connecticut (York), a New York State Department of Health (NYSDOH) Environmental Laboratory Accreditation Program (ELAP)-certified analytical laboratory. Soil samples were analyzed for the following:

- Target compound list (TCL) volatile organic compounds (VOCs) via Environmental Protection Agency (EPA) Method 8260;
- TCL semi-volatile organic compounds (SVOCS) via EPA Method 8270;
- Target Analyte List (TAL) metals via EPA Methods 6010, 7470/7471, 9010/9012/9014, and 7196; and,
- PCBs via EPA Method 8082/pesticides via EPA Method 8081 (including the herbicide 2,4,5 TP – Silvex).

Soil results are summarized in Table 2 of Appendix A.

Test Pit Excavation and Sampling

Mark Cerrone, Inc. was retained to excavate 70 test pits (LTP-1 through LTP-70) at the Site. Due to the presence of unidentified subsurface utilities, as discussed in Section 2.2.1, several soil boring location were completed as test pits, resulting in a total of 84 test pits being advanced during RI activities. The test pits were advanced within a one-acre area grid system, generally with 2 test pits per acre, within the Sabre Park portion of the Site. To the extent possible, the test pits were advanced to target general locations of previously identified or suspected soil contamination and remediation areas, including former underground storage tank locations, as well as proposed soil "cut" areas. The test pits were excavated to approximately 10 feet below existing grade or to the observed groundwater depth.

A Langan engineer observed the work, screened the soil for organic vapors with MultiRAE PLUS 5-gas meter that included a PID equipped with a 10.6 electron-volt (eV) lamp and evaluated it for visual and olfactory indications of environmental impacts. Soil descriptions were recorded on test pit logs, and were electronically scanned and sent to the office at the end of each

day to facilitate data tabulation. Excavated test pit materials were placed on plastic sheeting while screening activities took place. Upon completion of these activities, the excavated material was returned to the test pit in the general order it was excavated so that surface material is placed on top and potentially contaminated material is buried. Work complied with the procedures identified in the site-specific investigation HASP (Appendix B of the RIWP).

Up to two soil samples were collected from each test pit from depths between approximately 0 and 10 feet below grade. Select samples were collected from the capillary fringe and the interval with the most evident contamination (or test pit termination). Dedicated plastic trowels were used to collect sufficient materials to fill the sample containers. Soil samples were labeled in accordance with the nomenclature outlined on Table 1 of the RIWP and corresponding sampling location plan (Figure 4 of the RIWP).

The samples were collected in laboratory-supplied containers and sealed, labeled, and immediately placed in a cooler containing ice (to maintain a temperature of approximately 4 degrees Celsius) for delivery to York. Soil samples transported to York Analytical and were analyzed for all analytical parameters listed in 6 New York Codes, Rules and Regulations (NYCRR) Part 375, including:

- TCL VOCs via EPA Method 8260;
- TCL SVOCS via EPA Method 8270;
- TAL metals via EPA Methods 6010, 7470/7471, 9010/9012/9014, and 7196; and,
- PCBs via EPA Method 8082/pesticides via EPA Method 8081 (including the herbicide 2,4,5 TP – Silvex).

Soil results are summarized in Table 2 of Appendix A. Quality Assurance / Quality Control (QA/QC) procedures that were followed are described in the RIWP QAPP.

2.1.3 Groundwater Investigation

SJB was retained to install 8 permanent monitoring wells. Select soil borings (borings LSB-11, 19, 20, 26, 35, 43, 44, 47, and 61) were converted to 1.5 inch permanent groundwater monitoring wells, identified as LMW-1 through LMW-8, and the monitoring well construction logs are included in the RIR as Appendix D. Monitoring wells were installed on 24 and 25 June 2013 at the locations depicted on Figure 4 of the RIWP. Each well was advanced a minimum of 5 feet into the perched water table. The wells were constructed with 1.5 inch diameter threaded, flush-joint, PVC casing and approximately 10 feet of 0.01 inch slot slotted well screen, pre-packed with 20/40 mesh sand, with additional sand approximately 1 to 2 feet above the slotted screen,

followed by a bentonite seal ranging from approximately 1 to 2 feet. Each monitoring well was completed with a flush mounted road box encased in concrete.

Upon completion of the monitoring well installation activities, the locations and elevations of the monitoring wells were surveyed with a Trimble RTK Global Positioning System (GPS) Unit, referencing the New York State Department of Transportation (NYSDOT) cooperative base station network, to determine groundwater flow direction and horizontal gradient. On 2 and 3 July 2013 the top of each PVC well casing was surveyed by Langan. Monitoring wells were developed using dedicated WaTerra foot valve inertial pumps by purging a minimum of four casing volumes of groundwater to remove visible sediment. The wells were developed until purged water appeared free of visible sediment and until pH, temperature and specific conductivity stabilized. The parameters were monitoring using a portable nephelometer, and stabilization was reached once three consecutive readings for each parameter showed less than 10% change. The monitoring wells were developed on 28 and 29 June 2013, and were sampled at least 7 days following installation.

Groundwater levels were measured at each monitoring well using an oil/water interface probe. Monitoring wells were sampled in accordance with the procedures defined in the USEPA Low Stress Purging and Sampling of Groundwater Samples from Monitoring Wells dated July 1996. Water quality parameters including dissolved oxygen, pH, temperature, turbidity, specific conductance, and oxidation-reduction potential were measured in the flow through cell until stabilization was achieved in accordance with the FSP. Once stabilization was achieved, the flow through cell was disconnected and a groundwater sample was collected directly into the laboratory provided sample bottles

All samples were collected in laboratory-supplied containers, sealed, labeled, and immediately placed in a cooler containing ice (to maintain a temperature of approximately 4 degrees Celsius) for delivery to York. Groundwater samples were analyzed for the following parameters:

- TCL VOCs via USEPA method 8260;
- TCL SVOCS via USEPA method 8270;
- TAL metals via USEPA 6010, 7470/7471, USEPA 9010, and USEPA 7196;
- PCBs via USEPA method 8082; and,
- Pesticides (including the herbicide 2,4,5 TP – Silvex) via USEPA method 8081.

All groundwater generated during well development and sample purging activities was collected and containerized in 55-gallon drums, labeled, and placed on-site in a designated location. Monitoring well construction logs and monitoring well sampling logs are included as Appendix

D and Appendix E of the RIR, respectively. Groundwater results are summarized in Table 3 of Appendix A.

2.1.4 Soil Vapor Investigation

SJB was retained to install 10 permanent soil gas sampling points (LSV-1 through LSV-10). A Geoprobe™ was used to advance the stainless steel sampling points. The points were constructed with double woven stainless steel soil gas sampling mesh attached to polyethylene tubing, and a clean sand (Morie #1) filter pack was installed around the screen, with additional sand up to 6 inches above the screen. The remaining annular space was backfilled to grade with hydrated bentonite. Due to shallow water, soil gas screens were set between 2 to 3 feet below ground surface (approximately 1 to 2 feet above the observed water table at the time of installation).

In accordance with the RIWP, tracer gas test was performed using helium gas to confirm the integrity of the bentonite seals prior to sampling. A detection of helium in the sample tubing would indicate that the seal was compromised and should be repaired.

With the seal confirmed, a PID (which pumps air at approximately 0.2 liters per minute) was attached to the polyethylene tubing, and a total volume of at least three times that of the tubing and screen setup was purged (approximately 1.5 liters). The purged soil gas was also monitored with the PID and the values were recorded in the engineer's field book. After purging was complete, a laboratory-supplied 6-liter Summa canister with a flow controller (with a laboratory-preset flow rate of 0.1 liters per minute) was attached to the polyethylene tubing. Each Summa canister arrived from the lab with approximately 29 to 30 inches of mercury vacuum. Sampling was started by fully opening the canister valve. The sample was collected over a period of approximately 120 minutes, with an average flow rate of 0.18 liters per minute. When the canister pressure dropped below 5 inches of mercury, the sample was stopped by closing the valve. Post-sample helium tracer gas tests were not performed.

While conducting tracer gas testing, water was encountered within soil gas probes LSV-1, LSV-3, LSB-4, LSB-6, LSV-7, LSV-8, and LSV-10. Accordingly, soil gas samples could not be collected at these locations. Soil gas sampling was conducted at locations LSV-2, LSV-5 and LSV-9 on 1 July 2013. During sampling of soil gas at location LSV-9, an on-site excavator was observed discharging exhaust at the decontamination area adjacent to the sampling location. Therefore an additional sample and associated field duplicate were collected on 2 July 2013 prior to the excavators performing decontamination procedures. An ambient air sample was collected on each day soil gas sampling was conducted.

Soil gas samples were submitted under chain-of-custody to York for analysis of VOCs by Method TO-15. QA/QC measures included the collection and analysis of two duplicate soil gas

samples and one ambient air sample. QA/QC procedures followed are described in the QAPP found in Appendix C of the RIWP. Soil gas sampling logs are included in Appendix F of the RIR. Soil Vapor results are summarized in Table 4 of Appendix A.

2.1.5 Documentation

Below is a summary of RI findings:

General/Field Observations

- The geophysical survey did not find any anomalies consistent with underground storage tanks (USTs);
- A layer of heterogeneous soils/fill consisting of brown to dark gray and black fine to coarse grained sands with varying levels of silt, clay, gravel, organics (roots), brick, concrete, wood, glass, rubber, slag, and miscellaneous pieces of plastic and metal, was observed at the surface throughout the Sabre Park portion of the property, and just below surface features at the Fashion Outlet and Secure Storage facility parcels. Fill generally extends to an average depth of 5 feet below grade, with a maximum depth of approximately 15 feet below grade at limited locations to the south. This material was underlain by native soil consisting of brown, medium to coarse sand; and, a clay layer which appeared to be continuous and was observed to be dense with increased quantities of coarse sand and fine gravel at depths of 13 to 16 feet below grade or just prior to refusal.
- Slag was observed at over 29 locations throughout the site and generally consisted of a hard, porous, chromium rich material. At select test pit locations Langan observed pieces of slag up to 2 feet in diameter. A Ludlum Geiger counter was utilized to assess the potential radioactivity of the slag; however, no readings were observed above background (0.05 millirems/hour).

Analytical Results

For complete analytical data, see Tables 2 through 4 of Appendix A.

- One or more aromatic and/or halogenated VOCs were detected in 160 of 280 soil samples collected. Of the 160 soil samples, acetone, a common laboratory contaminant was detected in 15 samples exceeding the Unrestricted Use SCO. No other VOCs were detected exceeding the Unrestricted Use SCO. No detected VOCs exceeded the Restricted Commercial SCOs;
- One or more SVOCs (polycyclic aromatic hydrocarbons (PAHs) only) were detected in 162 of 295 soil samples collected. SVOCs were detected in 31

samples at concentrations exceeding the exceeded the Unrestricted Use SCOs, and 16 samples at concentrations exceeding the Restricted Commercial SCOs;

- One or more total metals were detected in each of the 295 soil samples collected. One or more metals were detected in 187 samples at concentrations exceeding the Unrestricted Use SCOs. One or more metals were detected in 27 samples at concentrations exceeding the Restricted Commercial SCOs. Chromium III was identified in 21 of 27 samples exceeding the Restricted Commercial SCOs, at concentrations ranging from 1,500 mg/kg to 6,560 mg/kg. Hexavalent chromium exceeded the Restricted Commercial SCOs in 2 of 27 samples, with concentrations of 486 mg/kg to 506 mg/kg;
- Due to site-wide exceedances of the Restricted Commercial SCOs for chromium, select samples were analyzed for chromium using the toxicity characteristic leaching procedure (TCLP). Chromium was detected in two samples (LSB-23-A and LSB-23-S), at concentrations exceeding the Resource Conservation and Recovery Act (RCRA) Hazardous Waste Criteria of 5 mg/L, indicating a hazardous condition. These two samples were collected from an anomolous material that was easily identifiable in the field from the surrounding fill material and exhibited a yellowish color. As discussed in the 16 August 2013 RIR, this material was visually delineated with a Geoprobe™ to determine the horizontal and vertical extents of the material. This material is being considered a hot spot and will be handled and disposed of offsite in accordance with this IRMWP and requirements of the BCP;
- One or more organochlorine pesticides were detected in 34 of the 295 soil samples collected. Pesticides were detected in 18 samples at concentrations exceeding the Unrestricted Use SCOs. Organochlorine pesticides were not detected at concentrations exceeding the Restricted Commercial SCOs;
- The herbicide Silvex (2,4,5-TP) was detected in 1 of the 295 soil samples (LSB-32-B) at a depth of 6 to 8 ft, at a concentration of 0.0477 mg/kg, below the Unrestricted Use and Restricted Commercial SCOs;
- One or more PCBs were detected in 43 of the 295 soil samples collected. PCBs were detected in 30 samples at concentrations exceeding the Unrestricted Use SCOs. PCBs were detected in 5 samples at concentrations exceeding the Restricted Commercial SCOs. Soil associated with a sample collected from investigation test pit, LTP-46-B, is being considered a hot spot due to elevated concentrations of PCBs (23 mg/kg) exceeding the site-specific criteria of 10

mg/kg, and will be handled and disposed of offsite in accordance with this IRMWP and requirements of the BCP;

- One or more aromatic and/or halogenated VOCs were detected in all 9 groundwater samples collected. The VOCs (cis)1,2-dichloroethylene, trichloroethylene (TCE), and vinyl chloride were detected in one sample (LMW-1) at concentrations exceeding the 6 NYCRR Part 375 Ambient Water Quality Standards (AWQS) for these compounds of 5 ug/L, 19, ug/L, and 13 ug/L, respectively. Acetone, a common laboratory contaminant was detected in all 9 groundwater samples at concentrations below all applicable criteria;
- One or more SVOCs (PAHs only) were detected in all 9 groundwater samples collected. Benzo(k)fluoranthene, was detected in one sample (LMW-8) at a concentration of 0.0526 ug/L, exceeding the AWQS of 0.002 ug/L;
- One or more total metals were detected in all groundwater samples collected. Hexavalent chromium and total chromium were detected in four samples (LMW-5 through LMW-8) at concentrations exceeding the AWQS of 50 ug/L. Manganese was detected in four samples (LMW-1 through LMW-4) at concentrations exceeding the AWQS for manganese of 300 ug/L. Selenium was detected in two samples (LMW-3 and LMW-4) at concentrations exceeding the AWQS for selenium of 10 ug/L;
- Pesticides and herbicides were not detected in any of the groundwater samples at concentrations above the applicable NYSDEC criteria;
- PCBs were not detected in any of the groundwater samples at concentrations above the laboratory analytical method detection limits; and,
- Various chlorinated and petroleum related VOCs were detected in all three of the soil gas samples. VOCs detected in ambient air samples were generally lower than the soil gas samples.

Below is a summary of the RI Conclusions:

1. The geophysical survey and test pit investigation did not reveal the presence of USTs.
2. Slag is prevalent throughout the development area and is associated with historic filling/dumping at the Site. A Ludlum Geiger counter confirmed that the slag did not exhibit radioactivity.
3. VOCs, SVOCs, PCBs, Pesticides and metals were identified in soil throughout the Site at concentrations exceeding the Unrestricted Use SCOs. SVOCs, metals,

and PCBs were identified in soil throughout the Site at concentrations exceeding the Restricted Commercial SCOs. SVOCs and metals are likely attributed to the result of site-wide historic dumping and not a localized release.

4. Based on limited chromium TCLP analysis, samples from LSB-23-A and LSB-23-S exceed the RCRA Hazardous Waste Criteria. During the proposed development, this material will be handled in accordance with RCRA regulations, as addressed in the IRMWP.
5. Overburden groundwater observed at the Site is likely perched water within the fill layer, contained by the underlying clay layer. pH in Groundwater was ranged between 6.29 and 12.2, and is likely the result of high concentrations of dissolved metals within the fill material. Impacts to groundwater at the Sabre Park parcel are likely a result of perched water mixing with slag and fill material. The impacted slag and elevated metal concentrations are likely causing the pH of groundwater to rise to the levels observed in the field.
6. VOC impacts in soil gas were identified at concentrations exceeding the NYSDOH Upper Fence Values, at locations within the footprint of the proposed expansion. A sub-slab vapor intrusion mitigation system will be incorporated into the construction of the expansion, and will be detailed further in the IRM.

Soil, groundwater, and soil vapor sample locations and analytical results are shown on Figures 4 through 8 of Appendix A, and analytical results are summarized in Tables 2 through 4 of Appendix A.

2.2 SITE HISTORY

Numerous previous environmental reports have been completed (by Langan and others) for the Sabre Park and Fashion Outlets of Niagara Falls parcels. Historic remedial actions have also been performed at the parcels. Previous reports and historic remedial actions are discussed in detail in the 5 July 2011 Phase I Environmental Site Assessments (ESAs) prepared by Langan and will not be discussed in detail in this report; however, a brief summary is presented below.

2.2.1 Past Uses and Ownership

According to a review of title records the Site was owned by Union Carbide Corporation, from 1949 until 1969. According to the Environmental Data Resources (EDR) report, during expansion of the mobile home community to the south in 1978, fill material with elevated levels of organic chemicals was discovered. Information regarding the source or quantity of this fill material was not provided.

2.2.2 Summary of Previous Environmental Investigations by Others

Sabre Park Property

According to a review of title records for the Site, Sabre Park was owned by Union Carbide Corporation from 1949 until 1969. According to the EDR Report, during expansion of the mobile home community to the south in 1978, fill with elevated level of organic chemicals was discovered; however, information regarding the source or quantity of this fill material was not provided. During a 1985/1986 soil sampling event conducted by the United States Environmental Protection Agency (USEPA), organic chemicals were not detected; however, the samples contained mercury. Mercury impacted soil was remediated via excavation and offsite disposal; however, elevated concentrations of mercury remain in on-site soils (maximum concentration = 766 mg/kg).

A follow-up field investigation of the extent of mercury contamination at Sabre Park Trailer Park was conducted by NUS Corporation (NUS) in May 1988. A total of 424 soil samples were screened for total mercury using the Region 2 Fit X-Ray Fluorescence (XRF) system. In addition 125 split samples were sent to an EPA Contract Laboratory Program (CLP) for confirmation. Mercury was detected by XRF at concentrations greater than 40 mg/kg (up to 84 mg/kg) in 14 soil samples collected from the southwestern portion of the Site. Mercury was detected in 41 of 125 CLP samples at concentrations ranging from 0.14 to 54.4 mg/kg. Approximately 1,200 cubic–yards mercury impacted soil was remediated in 1989 by excavation and off-site disposal as a D-listed (D009-mercury) hazardous waste at an off-site soil disposal facility.

During an August 1995 subsurface investigation conducted by Paragon Environmental Services (Paragon), total petroleum hydrocarbons (TPH) were detected in the soil and groundwater at concentrations ranging from 7 to 120 mg/kg in soil, and 0.4 to 0.72 mg/L in groundwater. As the NYSDEC has no criteria for TPH in subsurface media, Paragon was directed to use professional judgment to determine if the TPH concentrations posed a risk to human health or the environment. It was Paragon's opinion that the TPH concentrations in the soil and groundwater at the Site did not pose a risk to human health and no further action was recommended on the Site.

Seven petroleum spills (heating oil, motor oil, non-PCB transformer oil, waste oil) were reported at the Sabre Park property from 1985 to 2010. These spills have all been closed according to the NYSDEC Spills Database.

Based on the historic dumping that occurred at the Sabre Park property, the NYSDEC identified the Site as an Inactive Hazardous Waste Disposal Site. Subsequent to several phases of remediation, the NYSDEC concluded that the Sabre Park property had been properly remediated

and that "no further action" was required. In a letter dated March 21, 1995, the NYSDEC delisted Sabre Park from the Registry of Inactive Hazardous Waste Disposal Sites in New York State.

Fashion Outlets of Niagara Falls Property

According to the 5 July 2011 Phase I ESA conducted by Langan for the Fashion Outlets property, the 1970 and 1980 city directory listings indicate historic uses of the Fashion Outlets property may have included a dry cleaner. The exact location of the former dry cleaner has not been confirmed.

The northwestern portion of the Property (grids 1 through 7 of Figure 4, in Appendix A) was formerly occupied by the Walter Kozdranski Construction Company. This facility has a documented release of diesel fuel oil associated with a former leaking underground storage tank removed in July 1988. A spill report was issued for the Property in July 1988. Reportedly, 5,400 gallons of liquid were removed from the Site but is unclear if the liquids were tank related or groundwater. The spill was closed by the NYSDEC on July 12, 1988. According to the 2004 Phase II Environmental Site Investigation conducted by IVI Due Diligence Services, Inc. (IVI), concentrations of petroleum related SVOCs, including benzo(a)anthracene, chrysene, and benzo(a)pyrene in three of six soil borings locations were detected above the applicable NYSDEC numeric criteria. As the results of this investigation were similar to the information the NYSDEC had on the Kozdranski property when they closed the spill in 1988, no further investigation was recommended by IVI.

The Fashion Outlets property received contaminated fill in late 1960's or early 1970's. A waste area approximately 0.5-acres in size was discovered in the parking area immediately west-northwest of the outlets. In October 1985, a yellow-tan waste material was discovered during the installation of stormwater piping in the northwestern property corner and investigation of the on-site waste material was initiated. The results of the investigations revealed the presence of VOCs, SVOCs, inorganic compounds, and pesticide compounds. Elevated concentrations of N-nitrosodiphenylamine and 1,2,4-trichlorobenzene were detected in on-site soils in October 1985. Six different types of fill were identified on-site: including a yellow-tan resinous waste, white powder-like material, construction and demolition debris, ash and slag. Based on the described fill placement location, it does not appear that this contaminated material was placed within the BCP development Site boundary.

Approximately 12,879 tons of contaminated materials and 7,300 gallons of impacted wastewater were removed from the Fashion Outlets property between January and February of 1994. The results of post-remediation soil sampling activities indicate that elevated concentrations of 2-mercaptobenzothiazole were detected in four of the twenty-four soil samples at concentrations that exceed the applicable numeric soil criteria. Several metals and pesticides were also detected

in soil at concentrations that are below the applicable criteria. The NYSDEC-lead remediation was closed with a Record of Decision in December 1994, which required the property owner to file a deed restriction/covenant prohibiting future use of certain area of the Site for residential purposes. In January 1995, the Site was delisted from the New York State Inactive Hazardous Waste Disposal Site (IHWDS) list (No. 932103).

During additional site remediation activities in November 1994, soil impacted with N-nitrosodiphenylamine, 1,2,4-trichlorobenzene and 2-mercaptobenzothiazole was excavated from the Site and reused beneath an on-site parking lot.

2.3 GEOLOGICAL CONDITIONS

2.3.1 Topography

The elevation of the Site is ranges from 571.63 feet to 575.62 feet above mean sea level, measured in accordance with the North American Vertical Datum of 1988 (NAVD 88). The topography of the Site and the surrounding area slopes gently to the south towards the Niagara River (approximately 1.5 miles away).

2.3.2 Geology

Geological surface features (e.g., rock outcroppings) were not observed at the Site. Based on the Geologic Map of New York, Niagara Sheet (1970) the bedrock beneath the Site is classified as the Lockport Group, consisting primarily of dolostone with incidental amounts of limestone. It is approximately 210-ft thick and overlies the Rochester shale.

According to a Preliminary Geotechnical Report, dated January 31, 2012, prepared by Baron and Associates P.C. of Clarence, New York, surficial materials in the northern portion of the Site generally consist of 1-2 feet of granular fill, with trace amounts of brick and asphalt. Beneath the fill is a layer of sandy silt, silty clay, with trace amounts of gravel and fine to coarse sand. Glacial till was also encountered at select locations. Bedrock was encountered from approximately 10.5 to 14 feet below grade.

During the RI drilling and test pitting activities, Langan observed the following geology:

Fill Material

Fill material consisted of brown to dark gray and black fine to coarse grained sands with varying levels of silt, clay, gravel, organics (roots), brick, concrete, wood, glass, rubber, slag, and miscellaneous pieces of plastic and metal, was observed at the surface throughout the Sabre Park portion of the property, and just below surface features at the Fashion Outlet and Secure Storage

facility parcels. Fill generally extends to an average depth of 5 feet below grade, with a maximum depth of approximately 15 feet below grade at limited locations to the south.

The slag was observed at over 29 locations throughout the site and generally consisted of a hard, porous, chromium rich material. At select test pit locations Langan observed pieces of slag up to 2 feet in diameter. A Ludlum Geiger counter was utilized to assess the potential radioactivity of the slag; however, no readings were observed above background (0.05 millirems/hour).

Silty Sand/Silty Clay Unit

At limited locations, Langan observed silty fine sand beneath the fill layer ranging in thickness from 2 to 4 feet below the fill. A silty/clay layer was observed underlying the fill and/or silty sand layers, encountered at depths of 2 to 12 feet and extended to 16 feet below grade or the boring/test pit termination depth.

Clay Unit

The clay was observed to vary in color from brown, gray and reddish-brown, and contained trace quantities of silt and fine sand. The clay was observed to be dense with increased quantities of coarse sand and fine gravel at depths of 13 to 16 feet below grade or just prior to refusal. Boring refusal was encountered at depths ranging from 10.3 to 15.9 feet below grade, and was generally limited to locations throughout the Fashion Outlets parking lot, Secure Storage facility, and a few locations in the northern section of Sabre Park.

2.3.3 Hydrogeology

Historic geotechnical and groundwater sampling conducted at the Site identified groundwater at depths ranging from 2 to 12 feet below grade. The overburden deposits typical to the project area can have low to moderate hydraulic conductivities. The bedrock is relatively impermeable except where concentrations of fractures, faults or joints are present. Preferential flow occurs through the more permeable zones of the overburden, such as individual sand or gravel layers, and through bedrock fractures and joints.

Langan installed eight permanent monitoring wells throughout the site to determine groundwater depth, flow direction, and water quality. Based on the monitoring well gauging event performed on 2 July 2013 and 23 July 2013, groundwater was encountered at depths ranging from 1.8 to 4.39 feet below grade (elevations 572.50 to 567.23 NAVD 88). A groundwater contour map, included as Figure 9 of Appendix A, was created based on these elevations, indicating that the perched groundwater flows to the north. Bedrock monitoring wells have not been installed at the Site.

Site groundwater is not used as a potable (drinking) water source. Area residents receive their drinking water supply from surface reservoirs located in the Niagara River.

2.3.4 Wetlands

Based on the Niagara County, New York On-Line Mapping System, NYSDEC and National Wetland Inventory (NWI), approximately 4.3-acres of NYSDEC regulated wetland areas are depicted nearby the southern and eastern portions of the Site. This wetland area is located on the adjacent National Grid utility corridor within 100 feet of the southwest property line.

2.4 CONTAMINATION CONDITIONS

This section describes the distribution of contaminants, on and off-Site.

2.4.1 Conceptual Model of Site Contamination

On-Site Contamination

- **Soil –** Slag is prevalent throughout the development area and is associated with historic filling/dumping at the Site. A Ludlum Geiger counter confirmed that the slag did not exhibit radioactivity. VOCs, SVOCs, PCBs, Pesticides and metals were identified in soil throughout the Site at concentrations exceeding the Unrestricted Use SCOs. SVOCs, metals, and PCBs were identified in soil throughout the Site at concentrations exceeding the Restricted Commercial SCOs, and are likely attributed to the result of site-wide historic dumping and not a localized release. Based on limited chromium TCLP analysis, samples from LSB-23-A and LSB-23-S exceed the RCRA Hazardous Waste Criteria. During the proposed development, this material will be handled in accordance with RCRA regulations, as addressed in the IRMWP.

- **Groundwater** – Overburden groundwater observed at the Site is likely perched water within the fill layer, contained by the underlying clay layer. pH in Groundwater was ranged between 6.29 and 12.2, and is likely the result of high concentrations of dissolved metals within the fill material. Impacts to groundwater at the Sabre Park parcel are likely a result of perched water mixing with slag and fill material. The impacted slag and elevated metal concentrations are likely causing the pH of groundwater to rise to the levels observed in the field.

- **Soil Vapor –** VOC impacts in soil gas were identified at concentrations exceeding the NYSDOH Upper Fence Values, at locations within the footprint of the proposed expansion. A sub-slab vapor intrusion mitigation system will be incorporated into the construction of the expansion, and will be detailed further in the IRM.

2.4.2 Description of Areas of Concern

Based on Site observations, the development history of the Site and the findings of the previous reports outlined above, the AOCs investigated during the remedial investigation are as follows:

1. Historic Site Use – The northern portion of Site was historically owned by the Walter Kozdranski Construction Company. As indicated above, this facility has had a documented release of diesel fuel oil associated with a former leaking underground storage tank removed in July 1988. During a 2004 Phase II ESI conducted by IVI, concentrations of petroleum related SVOCs, including benzo(a)anthracene, chrysene, and benzo(a)pyrene were detected in soil above the applicable NYSDEC numeric criteria:

2. Historic Site Use (On-site Dumping) – The northern portion of the Site received contaminated fill in late 1960's or early 1970's. A waste area approximately 0.5-acres in size was discovered in the parking area immediately west-northwest of the current outlet building. The results of the investigations revealed the presence of VOCs, SVOCs, inorganic compounds, and pesticide compounds. Elevated concentrations of N-nitrosodiphenylamine and 1,2,4-trichlorobenzene were detected in on-site soils in October 1985. Six different types of fill were identified on-site: including a yellow-tan resinous waste, white powder-like material, construction and demolition debris, ash and slag; and,

3. Historic Site Use (Former Sabre Park Parcel) – According to a review of title records the former Sabre Park Parcel was owned by Union Carbide Corporation. During expansion of the mobile home community to the south in 1978, fill material with elevated levels of organic chemicals was discovered. This fill material (approx. 1,200 cubic–yards) was subsequently removed from the southern portion of the property and disposed of as a D-listed (D009) hazardous waste at an offsite soil disposal facility in 1989. During a 1985/1986 soil sampling event conducted by the USEPA, organic chemicals were not detected in soils samples collected from the property; however, the samples contained elevated levels of mercury. Mercury impacted soil was remediated via excavation and offsite disposal; however, elevated concentrations of mercury remain in onsite soils (maximum concentration = 766 mg/kg).

During an August 1995 subsurface investigation conducted by Paragon, TPH was detected in the soil and groundwater beneath the Site; however, no chemical concentrations or sampling locations were provided. The NYSDEC has no criteria for TPH in subsurface media, and no further action was recommended on the Site by Paragon.

2.4.3 Identification of Standards, Criteria and Guidance

Site characterization of soils and remedy selection for soil cleanup will be accomplished under 6 NYCRR Part 375, with reference to 6 NYCRR Subpart 375-3 Brownfield Cleanup Program and Subpart 375-6 Remedial Program Soil Cleanup Objectives. The following additional Standards, Criteria, and Guidance (SCGs) will apply to site remediation:

- New York State Groundwater Quality Standards – 6 NYCRR Part 703;
- NYSDEC Ambient Water Quality Standards and Guidance Values – Technical and Operation Guidance Series (TOGS) 1.1.1;
- NYSDEC Draft Brownfield Cleanup Program Guide – May 2004;
- NYSDOH Generic Community Air Monitoring Plan;
- NYS Waste Transporter Permits – 6 NYCRR Part 364;
- NYS Solid Waste Management Requirements – 6 NYCRR Part 360 and Part 364;
- Department of Environmental Remediation (DER) Technical Guidance for Site Investigation and Remediation (DER-10);
- DER Presumptive/Proven Remedial Technologies (DER-15);
- CP-51 – Soil Cleanup Guidance;
- DER Citizen Participation Handbook for Remedial Programs (DER 23);
- DER Green Remediation (DER 31);
- DER Institutional Controls (DER 33).

The following SCGs will apply to the removal of hazardous chromium contaminated soil:

- 29 Code of Federal Regulations (CFR) Part 1910.120 - Hazardous Waste Operations and Emergency Response;
- 29 CFR Part 1916 NYCRR Part 372 - Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities (November 1998);
- 6 NYCRR Part 375 – Identification and Listing of Hazardous Wastes;
- 6 NYCRR Part 376 – Land Disposal Restrictions.

Site characterization of groundwater will be in accordance with TOGS 1.1.1 – Ambient Water Quality Standards & Guidance Values and Groundwater Effluent Limitations and Guidance

Values for Class GA groundwater (Groundwater Quality Standards Part 703). Closure of on-site wells will be conducted in accordance with the CP-43 – Groundwater Monitoring Well Decommissioning if necessary.

Site characterization of soil vapor and soil vapor mitigation measures will be implemented in accordance with the NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York, dated October 2006. A list of SCGs that apply for site characterization and remedial investigation, remedy selection, underground storage tank closure, interim remedial measures, and site management is included as Appendix F.

2.4.4 Soil/Fill Contamination

The contaminants of concern (COC) identified in soil at the Site are associated with historical dumping of fill, which extends to a depth of approximately 15 feet bgs. The COCs include SVOCs, metals (specifically chromium) and PCBs.

Summary of Soil/Fill Data and Comparison with SCGs

A summary of the findings of the soil investigation is provided below:

- One or more aromatic and/or halogenated VOCs were detected in 160 of 280 soil samples collected. Of the 160 soil samples, acetone, a common laboratory contaminant was detected in 15 samples exceeding the Unrestricted Use SCO. No other VOCs were detected exceeding the Unrestricted Use SCO. No detected VOCs exceeded the Restricted Commercial SCOs;
- One or more SVOCs (polycyclic aromatic hydrocarbons (PAHs) only) were detected in 162 of 295 soil samples collected. SVOCs were detected in 31 samples at concentrations exceeding the exceeded the Unrestricted Use SCOs, and 16 samples at concentrations exceeding the Restricted Commercial SCOs;
- One or more total metals were detected in each of the 295 soil samples collected. One or more metals were detected in 187 samples at concentrations exceeding the Unrestricted Use SCOs. One or more metals were detected in 27 samples at concentrations exceeding the Restricted Commercial SCOs. Chromium III was identified in 21 of 27 samples exceeding the Restricted Commercial SCOs, at concentrations ranging from 1,500 mg/kg to 6,560 mg/kg. Hexavalent chromium exceeded the Restricted Commercial SCOs in 2 of 27 samples, with concentrations of 486 mg/kg to 506 mg/kg;
- Due to site-wide exceedances of the Restricted Commerical SCOs for chromium, select samples were analyzed for chromium using the toxicity characteristic

leaching procedure (TCLP). Chromium was detected in two samples (LSB-23-A and LSB-23-S), at concentrations exceeding the RCRA Hazardous Waste Criteria of 5 mg/L, indicating a hazardous condition. These two samples were collected from an anomolous material that was easily identifiable in the field from the surrounding fill material and exhibited a yellowish color. As discussed in the 16 August 2013 RIR, this material was visually delineated with a Geoprobe™ to determine the horizontal and vertical extents of the material. This material is being considered a hot spot and will be handled and disposed of offsite in accordance with this IRMWP and requirements of the BCP;

- One or more organochlorine pesticides were detected in 34 of the 295 soil samples collected. Pesticides were detected in 18 samples at concentrations exceeding the Unrestricted Use SCOs. Organochlorine pesticides were not detected at concentrations exceeding the Restricted Commercial SCOs;
- The herbicide Silvex (2,4,5-TP) was detected in 1 of the 295 soil samples (LSB-32-B) at a depth of 6 to 8 ft, at a concentration of 0.0477 mg/kg, below the Unrestricted Use and Restricted Commercial SCOs; and,
- One or more PCBs were detected in 43 of the 295 soil samples collected. PCBs were detected in 30 samples at concentrations exceeding the Unrestricted Use SCOs. PCBs were detected in 5 samples at concentrations exceeding the Restricted Commercial SCOs. Soil associated with a sample collected from investigation test pit, LTP-46-B, is being considered a hot spot due to concentrations of PCBs (23 mg/kg) exceeding the site-specific criteria of 10 mg/kg, and will be handled and disposed of offsite in accordance with this IRMWP and requirements of the BCP.

Soil sample analytical results are summarized and compared with Restricted Commercial SCOs in Table 2 of Appendix A and the results exceeding the SCOs are shown on Figure 6 of the RIR, included in Appendix A.

2.4.5 On-Site and Off-Site Groundwater Contamination

Summary of Groundwater Data and Comparison with SCGs

Groundwater samples were collected for laboratory analysis from all nine newly installed monitoring wells. A summary of the findings of the groundwater investigation is provided below:

- One or more aromatic and/or halogenated VOCs were detected in all 9 groundwater samples collected. The VOCs (cis) 1,2-dichloroethylene,

trichloroethylene (TCE), and vinyl chloride were detected in one sample (LMW-1) at concentrations exceeding the AWQS for these compounds of 5 ug/L, 19, ug/L, and 13 ug/L, respectively. Acetone, a common laboratory contaminant was detected in all 9 groundwater samples at concentrations below all applicable criteria;

- One or more SVOCs (PAHs only) were detected in all 9 groundwater samples collected. Benzo(k)fluoranthene, was detected in one sample (LMW-8) at a concentration of 0.0526 ug/L, exceeding the AWQS of 0.002 ug/L;
- One or more total metals were detected in all groundwater samples collected. Hexavalent chromium and total chromium were detected in four samples (LMW-5 through LMW-8) at concentrations exceeding the AWQS of 50 ug/L. Manganese was detected in four samples (LMW-1 through LMW-4) at concentrations exceeding the AWQS for manganese of 300 ug/L. Selenium was detected in two samples (LMW-3 and LMW-4) at concentrations exceeding the AWQS for selenium of 10 ug/L;
- Pesticides and herbicides were not detected in any of the groundwater samples at concentrations above the applicable NYSDEC criteria; and,
- PCBs were not detected in any of the groundwater samples at concentrations above the laboratory analytical method detection limits.

Groundwater sample analytical results are summarized and compared to SCGs in Table 3 of Appendix A and the results exceeding the SCOs are shown on Figure 7 of the RIR, included in Appendix A.

2.4.6 On-Site and Off-Site Soil Vapor Contamination

Summary of Soil Vapor Data and Comparison with SCGs

Due to water infiltration into the soil gas probes, only 3 of 10 soil gas samples could be collected (LSV-2, LSV-5, and LSV-9) and analyzed for the Target Organic-15 (TO-15) list of compounds. A summary of the soil vapor samples collected during the RI is presented below:

- Various chlorinated and petroleum related VOCs were detected in all three of the soil gas samples. VOCs detected in ambient air samples were generally lower than the soil gas samples.

Soil vapor sample analytical results are summarized and compared to SCGs in Table 4 of Appendix A and the results exceeding the SCOs are shown on Figure 8 of the RIR, included in Appendix A.

2.5 ENVIRONMENTAL AND PUBLIC HEALTH ASSESSMENTS

2.5.1 Qualitative Human Health Exposure Assessment

An assessment of human health exposure was conducted for both current and future conditions in accordance with Appendix 3B of the NYSDEC DER-10, Technical Guidance for Site Investigation and Remediation, dated May 2010. The assessment included an evaluation of potential exposure media, receptor populations, and pathways of exposure to Site-related COCs. Complete exposure pathways have the following five elements: 1) a contaminant source; 2) contaminant release and transport mechanism; 3) a point of exposure; 4) a route of exposure; and 5) a receptor population.

2.5.1. Conceptual Site Model

A conceptual site model has been developed based on the findings of the Site subsurface investigations. The purpose of the conceptual site model is to develop a simplified framework for understanding the distribution of impacted materials, potential migration pathways, and potentially complete exposure pathways, as discussed below.

Potential Sources of Contamination

Sources of contamination at the Site primarily include contaminants from documented historic fill material (some containing slag) which was historically placed at the Site to raise grade for development. Additional sources, such as historical releases or spills have not been identified.

Exposure Media

The media that may have been impacted by the above sources include soil, groundwater, and soil gas. Site soil may have been impacted by any of the former historical operations and/or the nature of the historic fill. Analytical data collected to date indicates that the historic fill underlying the Site is contaminated with VOCs (low-level), PAHs, PCBs, pesticides, and metals. Exceedances in groundwater are likely attributable to on-Site source(s). The source of the detected VOCs in soil gas also is likely also from an on-site source(s).

Receptor Populations

The human receptors for current Site conditions include workers, visitors, and trespassers. Trespassers may be comprised of children, adolescents, and adults, whereas construction workers would be limited to adults. During construction and remediation activities, receptors may include construction and remediation workers. Under future conditions, receptors may likely include workers and visitors.

Potential Exposure Pathways – On-Site

Potential pathways to human receptors include direct contact (dermal absorption), ingestion, and inhalation of identified COCs. An evaluation of potential exposure pathways is provided below.

It should be noted that, the Site and surrounding areas are serviced by municipal water as required by the Town of Niagara Zoning Law Article VII, Chapter 135, Section 95 – Use of Town water required, which states that all premises within the Town requiring the use of water shall have connection with and exclusively use Town water. Use of ground water at the Site for drinking will be further prohibited through filing of an Environmental Easement. Therefore, current and future potential pathways for ground water are not complete based on current and future legal restrictions of ground water use at the Site and surrounding areas.

The proposed development plan includes the installation of stormwater sewers at depths below the observed perched groundwater table. Due to these conditions there is the potential for water to infiltrate the stormwater system and flow into the stormwater detention ponds. Although this presents a potential future exposure pathway to COCs in the perched groundwater, watertight fittings will be specified for the stormwater system in order to mitigate the potential for groundwater infiltration, therefore minimizing the exposure pathway.

Current Site Conditions

Site soil is currently covered by grass or covered by existing impervious cover (asphalt pavement and concrete). Therefore, a potential exposure pathway from COCs in soil to human receptors exists under current conditions.

The Site and surrounding areas obtain their drinking water supply from municipal sources, and not from Site groundwater. Therefore, a potential exposure pathway from groundwater to human receptors does not exist.

A potential exposure pathway from COCs in soil gas to human receptors is not currently complete on the Site given there are no occupied structures within the footprint of the proposed expansion. In addition, there are no subgrade foundations to trap vapors and the site is ventilated to the open air. .

Construction/Remediation Activities

Future construction and remediation activities at the Site will include demolition of the paved areas, and excavation and the removal of some impacted soil. Therefore, the potential exists for exposure of soil COCs to construction workers via dermal absorption, ingestion, and inhalation. The future construction activities may result in exposure to the public and construction workers of Site soil gas COCs through volatilization of vapors into the air and Site soil COCs through the generation and off-Site migration of dust. However, such exposures would be of short duration

limited only to intrusive activities. Working in accordance with a Health and Safety Plan, a Soil Management Plan, and a Community Air Monitoring Plan, as well as donning personal protective equipment, and applying vapor and dust suppression measures to prevent off-Site migration of contaminants during construction would make this potential migration pathway incomplete.

Future/Post-Construction Conditions

Upon completion of the proposed construction activities, the Site will primarily be covered by buildings, parking lots, and roads. These structures will prevent direct human exposure to any contaminated materials that may be left in place. After the buildings are constructed, a complete exposure pathway via potential inhalation of subsurface soil gas should not exist as long as the existing building slabs are sealed. However, vapor intrusion to indoor air presents a low but potential exposure pathway that will be addressed by a soil vapor barrier and sub-slab depressurization system.

As discussed above, infiltration into the proposed stormwater system presents a potential future exposure pathway to COCs in the perched groundwater. Watertight fittings will be specified for the stormwater system in order to mitigate the potential for groundwater infiltration, minimizing the exposure pathway.

Potential Exposure Pathways – Off-Site

The adjacent and surrounding areas are serviced by municipal water and the use of groundwater for drinking is prohibited by the City of Niagara Falls Local Law #4 of 2010. Therefore, current and future potential pathways for groundwater are not complete for off-site areas based on current legal restrictions of groundwater use.

Bedrock groundwater conditions have not been assessed.

Evaluation of Human Health Exposure

According to DER-10, Appendix 3B, a complete exposure pathway to human receptors requires all of the following five elements: 1) a contaminant source; 2) contaminant release and transport mechanisms; 3) a point of exposure; 4) a route of exposure; and 5) a receptor population. If any of the above five elements do not exist for current or future Site conditions, then a complete exposure pathway does not exist.

Current Conditions

The conceptual Site model identified a contaminant source (element 1) and a human receptor population (element 5). Also, a point of exposure (element 3) exists/may exist for potential exposure media for soil and groundwater COCs for current Site conditions, and a point of exposure exists for soil gas COCs in select portions of the Site.

Construction/Remediation Activities

Contaminant sources and contaminant release and transport mechanisms are those identified for the current conditions. Points of exposure during construction/remediation activities include the disturbed and exposed contaminated soil during excavation and contaminated dust and organic vapors arising from the excavation activities. Points of exposure will exist for groundwater COCs because excavation will go into groundwater (perched water). Routes of exposure include ingestion and dermal absorption of contaminated soil or groundwater, inhalation of organic vapors arising from contaminated soil and groundwater, and inhalation of dust arising from contaminated soil. The receptor population includes the construction and remediation workers and, to a lesser extent, the local population. All five elements exist; therefore, completed exposure pathways are present. However, the temporary risk will be minimized by applying appropriate health and safety measures, such as monitoring the air for organic vapors and dust, using vapor and dust suppression measures, maintaining site security, and wearing the appropriate personal protective equipment.

Future (Post-Construction) Conditions

Although post-construction conditions will be characterized by a contaminant source (element 1) and a human receptor population (element 5), a point of exposure (element 3) will not exist for potential exposure media for soil and groundwater COCs. After the structures are constructed, a complete exposure pathway via potential inhalation of subsurface vapors should not exist as long as the existing building slab is sealed and a sub-slab depressurization system is installed.

As discussed above, infiltration into the proposed stormwater system presents a potential future exposure pathway to COCs in the perched groundwater. Watertight fittings will be specified for the stormwater system in order to mitigate the potential for groundwater infiltration, minimizing the exposure pathway.

Potential Ecological Risks

The Site is a former urban fill site located within a highly developed, urban area in the Town of Niagara. The future Site use is commercial with the majority of the Site covered by buildings, concrete sidewalks and asphalt, providing little or no wildlife habitat or food value. As such, no unacceptable ecological risks are anticipated under the current or reasonably anticipated future use scenario.

The NYSDEC's decision key contained in Appendix 3C of DER-10 (NYSDEC, 2010) was utilized to evaluate whether or not performance of a Fish and Wildlife Resources Impact Analysis was needed. The RI demonstrated that there is evidence that COCs were released into the environment at the Site. Therefore, the Site can be considered to have been affected by one or more discharge or spill events.

The Site currently contains ecological resources consisting of grassy fields and shrubby areas. Other ecological resources may also be present.

Review of the NYSDEC's internet-based Environmental Resources Management Resource Mapper suggests that the Site and adjacent properties may contain state-regulated freshwater wetlands and rare plants and/or rare animals. However, evidence of significant on-Site ecological resources was not observed during the RI. Additionally, there is no evidence that contamination present at the Site has the potential to migrate to and impact potential off-Site ecological resources. Therefore, a Fish and Wildlife Resources Impact Analysis was not needed based on interpretation of NYSDEC guidance (DER-10 Appendix 3C).

2.6 REMEDIAL ACTION OBJECTIVES

Based on the results of the Remedial Investigation, the following Remedial Action Objectives (RAOs) have been identified for this Site.

2.6.1 Groundwater

RAOs for Public Health Protection

- Prevent ingestion of groundwater containing contaminant levels exceeding drinking water standards; and,
- Prevent leaching of chromium from characteristically hazardous soil to groundwater.

RAOs for the Environment

- Prevent discharge of groundwater that would results in surface water contamination.

2.6.2 Soil

RAOs for Public Health Protection

- Prevent ingestion/direct contact with soil that poses a risk to public health and the environmental given the current and future intended use of the Site; and,
- Prevent inhalation of, or exposure to, contaminants volatilizing from contaminated soil.

RAOs for the Environment

- Prevent migration of contaminants that would results in groundwater or surface water contamination.
- Remove characteristically hazardous soil/fill

2.6.3 Soil Vapor

RAOs for Public Health Protection

- Prevent exposure to contaminants in soil vapor; and,
- Prevent migration of soil vapor into occupied structures.

3.0 DESCRIPTION OF RECOMMENDED REMEDIAL ALTERNATIVE

This section presents the recommended remedial alternative for the Site, as evaluated in the Alternatives Analysis Report dated 9 October 2013, prepared by Langan. The proposed remedial measures for the Site include removal and off-site disposal of soil/fill containing PCBs at concentrations that exceed 10 mg/kg and soil/fill containing characteristically hazardous concentrations of chromium, waste characterization (for the purposes of disposal) and off-site disposal of excess subsurface materials generated during construction activities (as needed), installation of a vapor barrier and sub-slab depressurization systems (SSDS) beneath the proposed mall expansion and new Secure Storage facility office building, installation of an engineered cap/cover throughout the site, and implementation of institutional controls. Presented below is a technical description of the proposed remedy in accordance with the BCP statute and the DER-10 draft regulations.

Short Description

- Excavation and removal of soil containing PCBs exceeding concentrations of 10 mg/kg;
- Excavation and removal of soil containing characteristically hazardous concentrations of chromium (>5 mg/L), as determined by TCLP analysis;
- Excavation and offsite disposal of upwards of approximately 8,000 cubic-yards of construction related spoils, exceeding the restricted commercial SCOs;
- Collection and offsite disposal of approximately 1,000,000-gallons of perched, contaminated groundwater exceeding Part 703 GA criteria.
- Installation of vapor barriers with active SSD systems beneath buildings to the extent required to avoid vapor intrusion.
- Installation of an engineered cap/cover system throughout the Site, consisting of a one foot layer of material, meeting requirements of Appendix 5 (Allowable Constituent Levels for Imported Fill or Soil) in the NYSDEC's guidance document DER-10.:
- 1 foot of soil in landscaped areas;

- At least 6 inches of clay lining the detention ponds;
- Pavement with varying depths of subbase in the parking lots and drive aisles;
- Structural foundations at the proposed building locations;
- Institutional controls that would include groundwater use restrictions and a use restriction allowing commercial/industrial use of the Site, but preventing less restrictive land use (i.e., unrestricted or residential use); and,
- Waste characterization and off-Site disposal of excess fill/soil generated during construction activities associated with the proposed development.

Hot Spot (Soil) Removal

This alternative includes excavation of PCB-impacted soil that exceeds 10 mg/kg at one location at the southwest side of the Site, and removal of characteristically hazardous chromium-impacted soil that consists of one location at the existing Secure Storage facility portion of the Site.

Based on the RI data, PCBs were detected at concentrations exceeding 10 mg/kg at test pit location LTP-46 at a depth ranging approximately 2 to 4 feet below grade. The PCB hot spot removal may consist of an excavation footprint approximately 50 feet by 50 feet, with an excavation depth of 10 feet below grade. It is anticipated this may generate approximately 926 cubic yards of fill/soil.

Removal of characteristically hazardous chromium-impacted fill/soil requires demolition of the existing Secure Storage facility buildings in order to access and remove the material. Based on the RI data, the chromium hot spot removal may consist of an excavation footprint approximately 75 feet by 20 feet, with an excavation depth of approximately 10 feet below grade. The chromium hot spot removal may generate approximately 555 cubic yards of fill/soil.

After all materials are excavated from the corresponding areas, post-excavation endpoint soil samples will be collected at a frequency of 1 sample per 20 linear foot of sidewall, and 1 per 900 square feet of excavation base, plus quality control samples. It is anticipated that the PCB and chromium hot spot excavations may require 13 and 12 post-excavation end point samples, respectively, plus quality control samples. End point samples collected from the PCB hot spot excavation will be analyzed for total PCBs, and end point samples collected from the chromium hot spot excavation will be analyzed for chromium by the TCLP analysis to document compliance with the criteria discussed above.

Thereafter, the excavation would be backfilled and compacted to the required development grade depth with re-usable on-site materials, covered by the engineered cap/cover.

Excess Contaminated Soil/Fill Removal

Based on proposed development plan it is anticipated that upwards of approximately 8,000 cubic yards of excess fill/soil with concentrations exceeding the Restricted Commercial SCOs may be generated during construction activities. The material may be stockpiled on-site, sampled for waste characterization, and dispose offsite at an approved disposal facility.

Contaminated Purge Water Disposal

Based on proposed development it is anticipated that approximately 1,000,000-gallons of perched, contaminated groundwater exceeding Part 703 GA criteria will be pumped from excavations into on-site fractionation tanks prior to off-site disposal. Langan will evaluate treatment options for the perched water prior to disposal and should it be deemed acceptable, we may issue an addendum to this IRMWP discussing treatment options.

Vapor Mitigation

In response to the soil vapor findings from the RI, buildings constructed at the Site may require vapor mitigation. Therefore the design of the buildings in this area will include engineering controls consisting of vapor barriers with active SSD systems at the proposed Fashion Outlets structure and proposed Secure Storage facility office building. Both installations are intended to prevent soil vapor infiltration into constructed buildings.

4.0 REMEDIAL ACTION PROGRAM

4.1 GOVERNING DOCUMENTS

This section provides a summary of the site specific governing documents that apply to this IRMWP.

4.1.1 Site Specific Health & Safety Plan (HASP)

The site-specific HASP is provided in Appendix B. It will apply to all work performed in compliance with implementation of the preferred remedy and until the Site is covered with either 12+ inches of building foundation material or asphalt, two feet of clean fill in unpaved area and all other institutional and engineering controls, and the SSDSs are in place and functioning. It will provide a mechanism for establishing safe working conditions at the Site until the remedy is fully implemented, where safety organization, procedures, and personal protective equipment (PPE) requirements will be established based on an analysis of potential site-related hazards.

The site-specific HASP, at a minimum, will meet the requirements of 29 CFR 1910 and 29 CFR 1926 (which includes 29 CFR 1910.120 and 29 CFR 1926.65).

4.1.2 Construction Quality Assurance Plan (CQAP)

The CQAP is provided in Appendix C, and provides a detailed description of the observation and testing activities that will be used to monitor construction quality and confirm that remedy construction is in conformance with the remediation objectives and specifications. The CQAP includes:

- Responsibilities and authorities of the organizations and key personnel involved in the design and construction of the remedy;
- The qualifications of the quality assurance personnel who demonstrate that they possess the training and experience necessary to fulfill project-specific responsibilities;
- The observations and tests used to monitor construction and the frequency of performance of such activities;
- The sampling activities, sample size, sample locations, frequency of testing, acceptance and rejection criteria, and plans for implementing corrective measures as addressed in the plans and specifications;
- Requirements for project coordination meetings between the Owner and its representatives, the Construction Manager, Excavation Contractor, remedial or environmental subcontractors, and other involved parties;
- A detailed description of field equipment decontamination and management of investigation derived waste;
- Field instrument calibration procedures and sample identification and custody guidelines;
- Description of the reporting requirements for quality assurance activities including such items as daily summary reports, schedule of data submissions, inspection data sheets, problem identification and corrective measures reports, evaluation reports, acceptance reports, and final documentation; and,
- Description of the final documentation retention provisions.

4.1.3 Materials Management Plan (MMP)

This document is built into the body of the IRMWP in Section 5.4. It includes detailed plans for managing all soils/materials that are disturbed at the Site, including excavation, handling, storage, transport and disposal. It also includes all of the controls that will be applied to these efforts to assure effective, nuisance-free performance in compliance with all applicable Federal, State and local laws and regulations.

4.1.4 Storm-Water Pollution Prevention Plan (SWPPP)

The SWPPP is provided in Section 5.4. The erosion and sediment controls will be in conformance with requirements presented in the New York State Guidelines for Urban Erosion and Sediment Control.

4.1.5 Community Air Monitoring Plan (CAMP)

A CAMP is incorporated into the HASP, which is provided in Appendix B. Real-time air monitoring for VOCs and particulate levels at the perimeter of the exclusion zone or work area will be performed. Continuous monitoring will be performed for all ground intrusive activities and during the handling of contaminated or potentially contaminated media. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling and test pit excavation or trenching.

Periodic monitoring for VOCs will be performed during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. Periodic monitoring during sample collection, for instance, will consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. Depending upon the proximity of potentially exposed individuals, continuous monitoring may be performed during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence. Exceedences of action levels observed during performance of the CAMP will be reported to the NYSDEC Project Manager and included in the Daily Report.

VOC Monitoring, Response Levels, and Actions

VOCs will be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis during invasive work. Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work will be performed using equipment appropriate to measure the

types of contaminants known or suspected to be present. The equipment will be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment will be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities will be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities will resume with continued monitoring;
- If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities will be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities will resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average; and,
- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities will be shutdown.

All 15-minute readings should be recorded and be available for NYSDEC personnel to review. Instantaneous readings, if any, used for decision purposes will also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations will be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring will be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment will be equipped with an audible or visual alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

- If the downwind PM10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed. Work will continue with dust suppression techniques provided that downwind PM10

particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area; and,

- If, after implementation of dust suppression techniques, downwind PM10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work will be stopped and a re-evaluation of activities initiated. Work will resume provided that dust suppression measures and other controls are successful in reducing the downwind PM10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

All readings will be recorded and be available for NYSDEC personnel to review.

4.1.6 Contractors Site Operations Plan (SOP);

The RE will review all plans and submittals for this remedial project (including those listed above and contractor and sub-contractor document submittals) and confirm that they are in compliance with this IRMWP. The RE is responsible to ensure that all later document submittals for this remedial project, including contractor and sub-contractor document submittals, are in compliance with this IRMWP. All remedial documents will be submitted to NYSDEC and NYSDOH in a timely manner and prior to the start of work.

4.1.7 Citizen Participation Plan

A certification of mailing will be sent by Macerich to the NYSDEC project manager following the distribution of all Fact Sheets and notices that includes: (1) certification that the Fact Sheets were mailed, (2) the date they were mailed; (3) a copy of the Fact Sheet, (4) a list of recipients (contact list); and (5) a statement that the repository was inspected on (specific date) and that it contained all of applicable project documents.

No changes will be made to approved Fact Sheets authorized for release by NYSDEC without written consent of the NYSDEC. No other information, such as brochures and flyers, will be included with the Fact Sheet mailing. The approved Citizen Participation Plan for this project is attached in Appendix G.

Document repositories have been established at the following locations and contain all applicable project documents:

Niagara Falls Public Library
1425 Main Street
Niagara Falls, NY 14305
Phone: (716) 286-4894

Hours: Monday: 9 AM to 9 PM, Tuesday: 9 AM to 9 PM, Wednesday: 9 AM to 9 PM, Thursday: 9 AM to 5 PM, Friday: 9 AM to 5 PM, Saturday: 9 AM to 5 PM

NYSDEC Region 9 Office

270 Michigan Avenue

Buffalo, NY 14203

Phone: (716) 851-7000

Hours: Mon. To Fri. 8:30 a.m. to 4:30 p.m.

4.2 GENERAL REMEDIAL CONSTRUCTION INFORMATION

4.2.1 Project Organization

The RE and Qualified Environmental Professionals (QEP) for this project are Joel Landes, PE, and Jamie Barr, LEP, respectively. Principal personnel who will participate in the remedial measures include an on-site environmental scientist or engineer. The on-site environmental scientist/engineer will document that the remedial measures are implemented in accordance with this IRMWP, HASP, MMP, and supporting documents, and promptly report any deviations from these documents to the appropriate team members, the RE, and the QEP so that the issue can be rectified in a timely manner. The environmental scientist/engineer will report directly to the QEP and RE, and will provide daily summary reports of the site remedial activities.

4.2.2 Remedial Engineer

The RE for this project will be Joel Landes, PE. The RE is a registered professional engineer licensed by the State of New York. The RE will have primary direct responsibility for implementation of the remedial program for the Site (BCP number C932162). The RE will certify in the FER that the remedial activities were observed by QEPs under his supervision and that the remediation requirements set forth in the IRMWP and any other relevant provisions of ECL 27-1419 have been achieved in full conformance with that Plan. Other certification requirements are listed later in this IRMWP.

The RE will coordinate the work of other contractors and subcontractors involved in all aspects of remedial construction, including soil excavation, stockpiling, characterization, removal and disposal, air monitoring, emergency spill response services, import of back fill material, and management of waste transport and disposal. The RE will be responsible for all appropriate communication with NYSDEC and NYSDOH.

The RE will review all pre-remedial plans submitted by contractors for compliance with this IRMWP and will certify compliance in the FER.

4.2.3 Remedial Measures Construction Schedule

The anticipated construction schedule for the proposed interim remedial measures and reporting will be finalized when the development plans are determined. If the schedule for remediation and development activities changes, it will be updated and submitted to NYSDEC.

4.2.4 Work Hours

The hours for operation of remedial construction will conform to the requirements of the Town of Niagara, New York or according to specific variances issued by the governing agency. NYSDEC will be notified by Macerich of any variances issued by the Department of Buildings. NYSDEC reserves the right to deny alternate remedial construction hours.

4.2.5 Site Security

Access to the Site will be restricted by perimeter fencing that will surround the work area. To further limit access and augment Site security during the remediation activities, additional measures will be required. These will include the following during performance of the project:

- Security at the Site (including the excavation, staging, handling, decontamination, and storage areas) will be maintained during both work and nonworking hours. The level of Site security will be dependent on the activities being performed and location of activities; however, the following security measures will be implemented: perimeter fencing, temporary fencing and/or barriers, warning tape, maintenance of sign-in/sign-out sheets, and implementation of safe work practices;
- Perimeter Fencing - At a minimum, the site work area will be enclosed with a perimeter security fence, to control access for unauthorized personnel. Access gates will provide ingress and egress access to the Site. A perimeter fence will be installed around the remediation area consisting of an 8-foot high plywood fence, or equivalent;
- Temporary Fencing - The perimeter fence will be supplemented by temporary construction fencing as needed to delineate and secure areas of the ongoing remediation activities. Such temporary fencing may be 4 feet high, and constructed of orange, high-density polyethylene (HDPE) (or engineer approved quivalent). At a minimum, the following areas will be subject to this requirement:
    - Areas where soil removal, stockpiling or loading for offsite transport occurs;
    - Areas designated as health and safety exclusion zones;

- Areas utilized for personal or equipment cleaning activities; and,
- Any areas where the remediation activities may cause a disruption to the normal vehicular or pedestrian traffic.

- Posting of Warning Tape and Signs - Warning tape or sign may be installed at certain locations, such as open excavations, cleaning areas, and stockpile areas;
- Sign-In/Sign-Out Sheet - For the duration of remediation activities, a sign-in/sign-out sheet will be maintained for the Site at the site trailer. All Site personnel and visitors will be required to sign in upon entering the site and sign out upon leaving; and,
- Implementation of Safe Work Practices - Implementation of safe work practices will provide for additional Site security during remediation. Safe work practices that will contribute to overall site security include the following:
    - Maintaining temporary construction fencing and signage around all open excavations;
    - Parking heavy equipment in a designated area each night and removing keys;
    - Maintaining an organized work area, including maintaining access roads, proper storage of all tools and equipment;
    - Conducting a daily security review and health and safety meetings; and
    - Maintaining covers on staging areas.

4.2.6 Traffic Control

A truck route to and from the site from the nearest major highway has been selected considering:

(a) limiting transport through residential areas,

(b) use of defined truck routes,

(c) limiting the total distance to the major thoroughfares, and

(d) safety in access to highways.

Egress points for truck and equipment transport from the Site will be kept clean of dirt and other materials during site remediation and development, and trucks exiting the site will be securely covered. Drivers of trucks leaving the Site with soil/fill will be instructed to proceed without stopping in the vicinity of the site to prevent neighborhood impacts.

4.2.7 Contingency Plan

General

While discovery of previously unknown AOCs is not anticipated during implementation of this on-site remedy and given the extensive investigation of the Site, contingency remediation may be required if previously unknown AOCs are unexpectedly discovered. Such AOCs may include USTs and hot spots of an unknown nature. The need for additional remediation of any newly discovered AOC will be determined at the discretion of the Remediation Engineer in conjunction with NYSDEC and NYSDOH, and will be completed by a qualified remedial contractor. Exploratory test pits may be excavated first to verify the presence, nature, and size of the potential source area. If conditions are uncovered that could be addressed, remediation will then be completed. Remediation will include excavation of the contamination, collection of end-point soil samples for regulatory close out, and off-site disposal of the materials.

Exploratory Test Pits

Test pits may be excavated using a backhoe or the construction excavator to attempt to determine the magnitude and extent if newly discovered impacted areas are identified (e.g., size/number of tanks, etc.), and to collect samples for waste characterization. The Remediation Engineer will determine whether the uncovered material can be confidently field identified as material that the current disposal/treatment can accept (e.g., petroleum-contaminated), or if additional waste characterization is warranted to determine a suitable facility. If the latter is conducted, then additional waste characterization will be performed via test pits and the area will be covered with polyethylene and flagged pending receipt of the test results and identification of a suitable facility.

Excavated materials will be screened using a PID; inspected for staining, odors, or other indications of contamination. Remediation may be performed at the time of the test pit investigation or at a later time. If the latter, the affected area will then be covered with polyethylene sheeting, anchored, and flagged with stakes and caution tape.

For waste characterization purposes, samples will be analyzed for the proposed disposal facility requested analyses, including, but not limited to TCL VOCs, TCL SVOCs, TAL metals, PCBs, pesticides, and/or other waste characterization parameters required by the disposal facility.

Contingency for Hot Spot Areas

If suspect materials are uncovered during remedy implementation that were not previously known, and that may not be suitable onsite re-use or cannot be disposed of at one of the currently

identified disposal facilities, these materials will be investigated through test pits, and samples will be tested for an appropriate suite of analytes.

Test pits may be excavated using a backhoe or the construction excavator to attempt to determine the magnitude and extent if newly discovered impacted areas are identified (e.g., size/number of tanks, etc.), and to collect samples for waste characterization. The Remediation Engineer will determine whether the uncovered material can be confidently field identified as material that the current disposal/treatment can accept (e.g., petroleum-contaminated), or if additional waste characterization is warranted to determine a suitable facility. If the latter is conducted, then additional waste characterization will be performed via test pits and the area will be covered with polyethylene and flagged pending receipt of the test results and identification of a suitable facility.

Excavated materials will be screened using a PID; inspected for staining, odors, or other indications of contamination. Remediation may be performed at the time of the test pit investigation or at a later time. If the latter, the affected area will then be covered with polyethylene sheeting, anchored, and flagged with stakes and caution tape.

For waste characterization purposes, samples will be analyzed for the proposed disposal facility requested analyses, including, but not limited to TCL VOCs, TCL SVOCs, TAL metals, PCBs, pesticides, and/or other waste characterization parameters required by the disposal facility.

If the identified disposal/treatment facility(ies) can accept the materials, it will be directly loaded and transported off-site. If the material cannot be handled by the identified facility(ies), the material may remain in place and subsequently loaded once the analytical data are received and approved by newly identified facility(ies), or it may be excavated and stockpiled pending off-site transport. Stockpiles of this material will generally not exceed 100 cubic yards for proper characterization.

Contingency for Underground Storage Tanks

While discovery of unknown USTs is not anticipated, USTs encountered during remedy implementation will be decommissioned in accordance with NYSDEC STARS Memo #1, the appropriate SPOTS guidance documents, and other applicable NYSDEC UST closure requirements. If construction allows, the tanks will be decommissioned and abandoned in place following the applicable NYSDEC petroleum storage tank closure regulations. In addition to the waste characterization testing required by the disposal facility, the contents of any USTs uncovered will be tested for fingerprint analysis as well as full characterization testing, if appropriate, and the results will be submitted to NYSDEC and NYSDOH immediately upon receipt. If the tank is removed, only then will post-excavation soil samples be collected as per the DER-10 requirements. Any associated petroleum-contaminated soils will be removed in

accordance with NYSDEC STARS Memo #1 Petroleum-Contaminated Soil and Guidance Policy requirements, SPOTS #14, and the site-specific soil cleanup objectives. Any suspect chemical USTs uncovered will be handled similarly, with the contents and any impacted soils tested for an appropriate suite of chemicals to determine the required removal/disposal procedures. Petroleum spills will be reported to the NYSDEC Spill Hotline.

4.2.8 Worker Training and Monitoring

Site workers will be required, at a minimum, to have completed 29 CFR 1910.120 Hazardous Waste Operations and Emergency Response (HAZWOPER), site safety training and medical monitoring for site workers. HAZWOPER training completion certificates will be submitted to the RE before commencement of site work.

4.2.9 Agency Approvals

Macerich will address identified SEQRA requirements for this Site. Permits or government approvals required for remedial construction have been, or will be, obtained prior to the start of remedial construction.

The planned end use for the Site is in conformance with the current zoning for the property as determined by the Town of Niagara Department of Planning. A Certificate of Completion will not be issued for the project unless conformance with zoning designation is demonstrated.

Planned remedial or construction work in regulated wetlands and adjacent areas will be specifically approved by the NYSDEC Division of Natural Resources to ensure that it meets the requirements for substantive compliance with those regulations prior to the start of construction. Nothing in the approved IRMWP or its approval by NYSDEC should be construed as an approval for this purpose.

4.2.10 NYSDEC BCP Signage

A project sign will be erected at the main entrance to the Site prior to the start of remedial activities. The sign will indicate that the project is being performed under the New York State BCP. The sign will meet the detailed specifications provided by the NYSDEC Project Manager and is contained in Appendix H.

4.2.11 Pre-Construction Meeting with NYSDEC

A Pre-Construction meeting will take place prior to the start of major construction activities

4.2.12 Emergency Contact Information

An emergency contact sheet with names and phone numbers is included in Table 2. That document will define the specific project contacts for use by NYSDEC and NYSDOH in the case of a day or night emergency.

4.2.13 Remedial Measures Costs

Langan estimates that the total cost to complete interim remedial measures and environmental components of construction to be approximately $10,000,000 to $15,000,000. An itemized and detailed summary of estimated costs for the remedial activity is provided in Table 1. This will be revised based on actual costs and submitted as an Appendix to the FER.

4.3 SITE PREPARATION

4.3.1 Mobilization

The remediation contractor will mobilize all necessary materials and equipment on Site directly prior to the initiation of any remedial activities. Soil stockpile, equipment decontamination areas and truck egress points will be designated.

4.3.2 Erosion and Sedimentation Controls

Erosion and sediment control measures has been developed in conformance with requirements presented in the New York State Guidelines for Urban Erosion and Sediment Control. Best Management Practices (BMPs) for soil erosion shall be selected to minimize erosion and sedimentation off-site from the start of the remediation to the completion of the development. Accumulated sediment in the BMPs that is removed will be screened for the presence of petroleum and disposed of properly if found.

4.3.3 Stabilized Construction Entrance(s)

During site remediation, continuity will be achieved between the truck wash and the stone-based egress path by placing the truck wash system right before the egress path of the Site. Egress points for truck and equipment transport will be kept clean of dirt and other materials during site remediation and development, so that trucks will be decontaminated prior to departure from the Site.

4.3.4 Utility Marker and Easements Layout

Macerich and its contractors are solely responsible for the identification of utilities that might be affected by work under the IRMWP and implementation of all required, appropriate, or necessary health and safety measures during performance of work under this IRMWP. Macerich and its contractors are solely responsible for safe execution of invasive and other work performed under this IRMWP. Macerich and its contractors must obtain local, State or Federal permits or approvals pertinent to such work that may be required to perform work under this IRMWP. Approval of this IRMWP by NYSDEC does not constitute satisfaction of these requirements.

The presence of utilities and easements on the Site has been investigated by the RE. It has been determined that no risk or impediment to the planned work under this IRMWP is posed by utilities or easements on the Site.

4.3.5 Equipment and Material Staging

Equipment and materials staging areas will be designated during the remediation activities, in coordination with the Construction Manager, to facilitate remediation work and prevent cross-contamination.

4.3.6 Decontamination Area

A temporary decontamination area lined with polyethylene sheeting will be constructed for steam-cleaning or washing excavation and drilling equipment. The location of the decontamination area will be coordinated with the Construction Manager. At a minimum, the decontamination pad will have a 20 mil low-permeability liner, be bermed and sloped to a collection sump to contain and collect fluids, and have side walls to mitigate, to the extent practicable, errant overspray, especially when decontaminating large equipment. Wash waters will be collected and properly disposed as described in the CQAP.

4.3.8 Site Fencing

The entire Site will be secured with a fence at the start of the remedial and construction activities.

4.3.9 Demobilization

After remedial work is complete, all site areas disturbed to accommodate support areas (e.g., staging areas, decontamination areas, storage areas, temporary water management areas, and access area), will be restored to pre-remediation conditions. Temporary access areas (on-Site

and off-Site) will be removed and disturbed access areas will be restored to pre-remediation conditions. All sediment and erosion control measures will be removed and materials will be disposed in accordance with acceptable rules and regulations. All excavation equipment will be decontaminated, and general refuse will be disposed, in accordance with the procedures set forth in the HASP.

4.3.10 Well Abandonment

Proposed development for the Site will require that existing monitoring wells be decommissioned and abandoned pursuant to NYSDEC guidelines and American Society for Testing and Materials (ASTM) D-5299-99.

4.4 REPORTING

The RE responsible for certifying all reports will be an individual licensed to practice engineering in the State of New York. Joel B. Landes, PE of Langan Engineering, Environmental, Surveying and Landscape Architecture, D.P.C., will have this responsibility. All daily and monthly Reports will be included in the FER.

4.4.1 Daily Reports

Daily reports will be provided by electronic media to NYSDEC's project manager while invasive work, contaminated materials handling, and placement of fill over contaminated soils is occurring. If significantly contaminated media is encountered during remedy implementation (other than the contamination expected to be encountered), NYSDEC's project manager will be promptly notified. These findings will be included in the daily electronic media reports. Periodic reports, no less than one per week, will be required until the on-site remediation is completed. A monthly progress report describing the activities conducted during the respective month as outlined in this IRMWP, will be submitted to the NYSDEC. The progress reports will include the following:

- Activities relative to the site during the previous reporting period and those anticipated for the next reporting period;
- Description of approved activity modifications including changes of work scope and/or schedule;
- Sampling results received following internal data review and validation, as applicable; and

- Update of schedule including percentage of project completion, unresolved delays encountered or anticipated that may affect the future schedule, and efforts made to mitigate such delays.

Once the remedy is fully implemented, the progress reports will cease and the Site Management Plan (SMP) annual reporting requirements will commence.

4.4.2 Monthly Reports

Monthly reports will be submitted to NYSDEC and NYSDOH Project Managers within two weeks following the end of the month of the reporting period and will include:

- Activities relative to the Site during the previous reporting period and those anticipated for the next reporting period, including a quantitative presentation of work performed (i.e. tons of material exported and imported, etc.);
- Description of approved activity modifications, including changes of work scope and/or schedule;
- Sampling results received following internal data review and validation, as applicable; and,
- An update of the remedial schedule including the percentage of project completion, unresolved delays encountered or anticipated that may affect the future schedule, and efforts made to mitigate such delays.

4.4.3 Other Reporting

Photographs will be taken of remedial activities and submitted to NYSDEC in digital (JPEG) format. Photos will illustrate remedial program elements and will be of acceptable quality. Representative photos of the Site prior to interim remedial measures will be provided. Representative photos will be provided of each contaminant source, source area and Site structures before, during and after remediation. Photos will be submitted to NYSDEC on CD or other acceptable electronic media and will be sent to NYSDEC's Project Manager (2 copies) and to NYSDOH's Project Manager (1 copy). CD's will have a label and a general file inventory structure that separates photos into directories and sub-directories according to logical interim remedial measures components. A photo log keyed to photo file ID numbers will be prepared to provide explanation for representative photos. For larger and longer projects, photos should be submitted on a monthly basis or another agreed upon time interval.

Job-site record keeping for remedial work will be appropriately documented. These records will be maintained on-Site at all times during the project and be available for inspection by NYSDEC and NYSDOH staff.

4.4.4 Complaint Management Plan

Complaints from the public regarding nuisance or other Site conditions will be reported directly to the NYSDEC project manager, and included in the daily reports.

4.4.5 Deviations from the Interim Remedial Measures Work Plan

In cases where the site activities deviate from the IRMWP due to unforeseen Site conditions, a detailed description of the conditions and required deviations from the IRMWP will be submitted to the NYSDEC project manager. The description will include the reasons that dictate deviation from the IRMWP, any changes/editions to the IRMWP, and how the proposed remedy is affected.

5.0 INTERIM REMEDIAL MEASURES: MATERIAL REMOVAL FROM SITE

The material to be removed from the Site includes soil that exceeds the RCRA hazardous waste characterization thresholds, PCBs in excess of 10 mg/kg, constructions spoils exceeding the restricted commercial SCOs, and contaminated groundwater removed for dewatering purposes. Endpoint soil samples will be collected in accordance with DER-10 as each area is remediated. Waste characterization samples will be collected to determine the nature of the material in order to obtain disposal facility approvals, prior to offsite removal.

5.1 SOIL CLEANUP OBJECTIVES

The SCOs for this Site are Track 4 site specific SCOs with institutional and engineering controls. Site specific SCOs include PCBs <10 mg/kg and RCRA hazardous soils and fill. On-site and off-site soil and materials management will be conducted in accordance with the Soil Management Plan as described below. Table 2 of Appendix A summarizes all soil samples that exceed the SCOs proposed for the interim remedial measures. Spider maps that show all soil samples that exceed the SCOs proposed for the interim remedial measures are shown in Figures 5 through 8 in the RIR included as Appendix A. UST closures, if necessary, will at a minimum conform to criteria defined in DER-10.

5.2 REMEDIAL PERFORMANCE EVALUATION (POST EXCAVATION END-POINT SAMPLING)

Endpoint samples will be taken for soil to confirm the efficacy of the remedial measures. The CQAP (Appendix C) was developed to define the methods and procedures for conducting the endpoint sampling. The CQAP includes general field guidelines, sample equipment decontamination, soil sampling procedures, and field instrument descriptions and calibration procedures. The following subsections detail the endpoint sampling plan for soil.

5.2.1 End-Point Sampling Frequency

The number of endpoint soil samples collected within the excavations is based on one bottom sample for every 900 square feet of excavation area and one sidewall sample for every 20 linear feet of perimeter. However, samples collected during the RI and as part of waste characterization for off-site disposal may be used to supplement the required sampling frequency upon approval from the NYSDEC. A reduced-frequency endpoint sampling plan may be proposed, with supporting rationale, in accordance with section 1.6 of the DER-10.

5.2.2 Methodology

The soil endpoint samples will be taken within the excavation areas. The samples will be collected when the limits of the remediation excavation have been reached and will be collected for specific AOCs and will be analyzed for an abbreviated parameter list consisting of the target COCs. End point samples will be submitted for laboratory analyses under standard chain of custody protocol to an NYSDOH ELAP-accredited laboratory.

5.2.3 Reporting of Results

Data collected during the field investigation will be reduced and reviewed by the laboratory QA personnel, and a report on the findings will be tabulated in a standard format. The criteria used to identify and quantify the analytes will be those specified for the applicable methods in the USEPA SW-846 and subsequent updates. The data package provided by the laboratory will contain all items specified in the USEPA SW-846 appropriate for the analyses to be performed, and be reported in standard format. Data will also be submitted to NYSDEC in the standardized Electronic Data Deliverable (EDD) EQuIS format.

5.2.4 QA/QC

Each set of samples will be analyzed concurrently with calibration standards, method blanks, matrix spikes (MS), matrix spike duplicates (MSD) or laboratory duplicates, and QC check samples (if required by the protocol). MS/MSD samples, as applicable, will be designated by the field personnel. If no MS/MSD samples have been designated, the laboratory will contact the Langan Project Manager for corrective action. Refer to the CQAP in Appendix C for further details on QA/QC procedures.

5.2.5 DUSR

A data usability summary report (DUSR) will be prepared by a third party and will be reviewed by the RE before issuance. The DUSR will present the results of data assessment, including a summary assessment of laboratory data packages, sample preservation and COC procedures, and a summary assessment of precision, accuracy, representativeness, comparability, and completeness for each analytical method. Refer to the CQAP in Appendix C for further details on DUSRs.

5.2.6 Reporting of End-Point Data in FER

Chemical labs used for all end-point sample results and contingency sampling will be NYSDOH ELAP certified. End point sampling, including bottom and side-wall sampling, will be

performed in accordance with DER-10 sample frequency requirements or reduced frequency agreed upon by NYSDEC. The FER will provide a tabular and map summary of all end-point sample results and exceedances of SCOs.

5.3 ESTIMATED MATERIAL REMOVAL QUANTITIES

The following are material types to be disposed or reused during remediation:

- **Site Fill Material**: Upwards of 8,000 cubic yards of excess contaminated fill material (exceeding restricted commercial SCOs) containing slag will be removed from detention ponds and proposed development areas and disposed of off-site, see Figure 3. Material to be disposed of off-site will be sampled for characterization, transported off-site, and disposed at a facility certified to accept the material. Sampling will be undertaken in conformance with the requirements of the disposal facility.
- **Hazardous-chromium and PCB contaminated material**: A portion of the material removed from the Site will be hazardous for chromium or contain PCBs at a concentration exceeding 10 mg/kg. Prior to excavation in these areas, waste characterization samples (TCLP) will be collected to properly determine the nature of the material, see Figure 3. Handling and disposal will be conducted as per the procedures outlined in this IRMWP.
- **Chromium Impacted Perched Water:** Perched contaminated groundwater exceeding Part 703 GA criteria encountered during site development activities will be pumped from excavations into on-site fractionation tanks prior to off-site disposal. Langan will evaluate treatment options for the perched water prior to disposal.

The estimated quantity of soil/fill to be removed from the Site is upwards of 8,000 cubic yards. The estimated quantity of soil/fill expected to be reused/relocated on Site is approximately 40,000 cubic yards. The estimated quantity of groundwater to be disposed of off-site is approximately 1,000,000 gallons.

5.4 MATERIALS MANAGEMENT PLAN

This section presents the approach to managing, disposing, and reusing soil, fill, and debris excavated from the Site. This plan is based on the current knowledge of Site conditions, and will be augmented with the additional data collected during remediation. The RE will monitor and document the handling and transporting of material removed from the Site to a proper disposal facility as a regulated waste or as an unregulated waste, as applicable. The RE will assist the remedial contractor in identifying impacted materials during excavation, determining materials suitable for direct load out versus temporary on-site stockpiling, selection of samples for waste

characterization, and determining the proper off-site disposal facility. Separate stockpile areas will be constructed as needed for the various materials to be excavated or generated, with the intent to most efficiently manage and characterize the materials and to avoid co-mingling impacted materials with non-impacted soil. The following sections provide a detailed description of the Materials Management Plan.

5.4.1 Soil Screening Methods

This subsection presents the procedures that will be used to field screen soils for previously unknown AOCs, following building demolition and during construction excavation. Unknown AOCs may include potential buried structures and associated impacted soils such as USTs, transformer pads, and other structures that could represent past pathways of chemical or waste disposal to the ground. Field sampling methods and quality control procedures are presented in Appendices B and C, respectively.

During subsurface excavation activities conducted for on-going construction work, the Remediation Engineer will inspect exposed subsurface soils for visual evidence of USTs or other structures such as former floor drains, sumps, drywells, etc. In addition, the exposed soils will be screened for volatile organic compounds using a PID on an approximate 10 ft by 10 ft grid or 10 foot intervals for linear cuts/excavations. Excavation may proceed if no unusual conditions are observed. If positive readings greater than 5 parts per million (ppm) above background levels are detected, procedures described in the Health and Safety Plan will be implemented. The affected area will then be covered with plastic sheeting, anchored, and flagged with stakes and caution tape to avoid disruption until the area can be further investigated and/or remediated.

During intrusive construction work, soil will be continuously inspected for chemical or petroleum odors or staining, and field screened with a PID. The PID readings will be obtained either from soil contained within the excavator bucket and/or directly off the excavation sidewalls or bottom. The excavated material will then be handled in accordance with the remaining sections of this document.

All primary contaminant sources (including but not limited to tanks and hotspots) identified during Site Characterization, RI, and Interim Remedial Measures will be surveyed by a surveyor licensed to practice in the State of New York. This information will be provided on maps in the FER.

Screening will be performed by QEPs. Resumes will be provided for all personnel responsible for field screening (i.e. those representing the RE) of invasive work for unknown contaminant sources during remediation and development work.

5.4.2 Stockpile Methods

Soil stockpile areas will be constructed for staging of site soil, pending loading or characterization testing. Separate stockpile areas will be constructed to avoid co-mingling materials of differing types (e.g. historic fill and chromium hazardous soil). Stockpile areas will meet the following minimum requirements:

- The excavated soil will be placed onto a minimum of two layers of 8-mil polyethylene sheeting of sufficient strength and thickness or equivalent to prevent puncture during use;
- Equipment and procedures will be used to place and remove the soil that will minimize the potential to jeopardize the integrity of the liner;
- Stockpiles will be covered at the designated times (see below) with minimum 8-mil plastic sheeting or tarps which will be securely anchored to the ground. Stockpiles will be routinely inspected and broken sheeting covers will be promptly replaced;
- Stockpiles will be covered upon reaching their capacity of approximately 2,000 cubic yards until ready for loading. Stockpiles that have not reached their capacity will be covered at the end of each work day;
- Each pile will be staked and labeled with a number to coincide with labeling on the associated sample container for proper correlation of the analytical results to the pile;
- Stockpiles will be inspected at a minimum once each week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by NYSDEC;
- Soil stockpiles will be continuously encircled with silt fences. Hay bales will be used as needed near catch basins, surface waters and other discharge points; and,
- A dedicated water truck equipped with a water cannon will be available on-Site for dust control.

Each soil stockpile will not exceed 2,000 cubic yards. Each pile will be staked and labeled with a number to coincide with labeling on the associated sample container for proper correlation of the analytical results to the pile.

5.4.3 Materials Excavation and Load Out

The RE or a QEP under his/her supervision will oversee invasive work and the excavation and load-out of excavated material. Macerich and its contractors are solely responsible for safe execution of invasive and other work performed under this Plan. The presence of utilities and easements on the Site has been investigated by the RE and the project team. It has been preliminarily determined that no risk or impediment to the planned work under this Interim Remedial Measures Work Plan is posed by identified utilities or easements on the Site. Additional investigation to determine the location of utilities and easements will be performed by the Construction Manager prior to demolition and excavation activities at the Site, in accordance with applicable regulations.

Loaded vehicles leaving the Site will be appropriately lined, tarped, securely covered, manifested, and placarded in accordance with appropriate Federal, State, local, and NYSDOT requirements (and all other applicable transportation requirements). A truck wash will be operated on-site. The RE will have primary responsibility for ensuring that all outbound trucks will be washed at the truck wash before leaving the Site until the remedial construction is complete. Locations where vehicles enter or exit the Site shall be inspected daily for evidence of off-site sediment tracking. The RE will also have primary responsibility for ensuring that all egress points for truck and equipment transport from the Site will be clean of dirt and other materials derived from the Site during Site remediation and development. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to site-derived materials.

Macerich and associated parties preparing the remedial documents submitted to the State, and parties performing this work, are completely responsible for the safe performance of all invasive work, the structural integrity of excavations, and for structures that may be affected by excavations (such as building foundations and bridge footings). Macerich, the RE, and the Construction Manager will attend a pre-construction meeting with NYSDEC to ensure that Site development activities will not interfere with, or otherwise impair or compromise, remedial activities proposed in this IRMWP.

Each hotspot to be remediated will be removed as shown on Figure 3 and end-point remedial performance sampling completed before excavations related to Site development commence proximal to the hotspot.

Macerich maintains the right to petition NYSDEC to screen soil if required by the selected disposal facility(ies).

All primary contaminant sources (including but not limited to tanks and hotspots) identified during Site Characterization, Remedial Investigation, and Interim Remedial Measures will be

surveyed by a surveyor licensed to practice in the State of New York. The survey information will be shown on maps to be reported in the FER.

5.4.4 Materials Transport Off-Site

Following waste characterization sampling, soils and groundwater will be loaded, in a manner that minimizes the potential for inadvertent releases to the environment, unsafe conditions for onsite personnel, and delays or complications in project implementation. All excavated soil, fill, and solid waste, and perched groundwater proposed for off-site disposal will be handled, transported, and disposed in accordance with applicable Part 360 regulations and other applicable local, state, and federal regulations. The proposed disposal facility(ies) and/or re-use site(s) will be reviewed and approved with NYSDEC before any materials leave the site.

The Contractor will provide the appropriate permits, certifications, and written commitments from disposal facilities to accept the material throughout the life of the contract. All submittals will be reviewed by Langan and submitted to the NYSDEC as required. Commitment letters will be supplied on the facility's letterhead, and include the FONF Expansion site as the originating site, the specific analytical data provided to and reviewed by the facility, a statement that the facility is in compliance with its permit, any restrictions on delivery schedules or other conditions that may cause rejection of transported materials, and the accepted daily quantities of soil that may be disposed.

The Remediation Engineer will observe the load-out of all excavated material and perched groundwater. Once the loading of any container, dump truck, or trailer is completed, the material will be immediately transported to the offsite disposal and/or recycling facility. All transport of materials will be performed by licensed haulers in accordance with appropriate local, state, and federal regulations. Loaded vehicles leaving the site will be appropriately lined, tarped, securely covered, manifested, and placarded in accordance with appropriate federal, state, local, and NYSDOT requirements (or other applicable transportation requirements). Egress points for truck and equipment transport from the Site will be clean of dirt and other materials during site remediation and development.

In accordance with the dust suppression plan, the Remediation Engineer will work with the Contractor to ensure that all trucks and equipment leaving the Site are decontaminated at the truck wash until contaminated soil is removed from the Site.

Any hazardous wastes derived from on-site will be stored, transported, and disposed off-site in full compliance with applicable local, state, and federal regulations.

A truck route to and from the site from the nearest major highway (Niagara Thruway) has been selected considering:

(a) limiting transport through residential areas,

(b) use of defined truck routes,

(c) limiting the total distance to the major thoroughfares, and

(d) safety in access to highways.

The Excavation Contractor will continue to use these transportation routes.

Because of the size of the Site, we do not anticipate the need to queue trucks offsite. Egress points for truck and equipment transport from the Site will be kept clean of dirt and other materials during site remediation and development, and trucks exiting the site will be securely covered.

5.4.5 Materials Disposal Off-Site

The disposal locations have not yet been determined. Disposal locations will be established at a later date and reported to the NYSDEC Project Manager.

The quantity of material anticipated to be disposed off-Site includes approximately 1,480 cubic yards of hazardous chromium and PCB-contaminated soil from hot spot excavations, and upwards of approximately 8,000 cubic yards of excess contaminated fill material containing slag that will be removed from detention ponds and proposed development areas. Approximately 1,000,000 gallons of perched contaminated groundwater will be stored in on-site fractionation tanks and disposed of off-site.

Soil/fill/solid waste excavated and removed from the Site will be treated as contaminated and regulated material and will be disposed in accordance with all local, State (including 6NYCRR Part 360) and Federal regulations. If disposal of soil/fill from this Site is proposed for unregulated disposal (i.e. clean soil removed for development purposes), a formal request with an associated plan will be made to NYSDEC's Project Manager. Unregulated off-Site management of materials from this Site is prohibited without formal NYSDEC approval.

The following documentation will be obtained and reported by the RE for each disposal location used in this project to fully demonstrate and document that the disposal of material derived from the Site conforms with all applicable laws: (1) a letter from the RE or Macerich to the receiving facility describing the material to be disposed and requesting formal written acceptance of the material. This letter will state that material to be disposed is contaminated material generated at an environmental remediation Site in New York State. The letter will provide the project identity and the name and phone number of the RE. The letter will include as an attachment a summary of chemical data for the material being transported (including Site Characterization data); and (2)

a letter from all receiving facilities stating it is in receipt of the correspondence (above) and is approved to accept the material. These documents will be included in the FER.

Non-hazardous historic fill and contaminated soils taken off-Site will be handled, at a minimum, as a Municipal Solid Waste per 6 NYCRR Part 360-1.2

Historical fill and contaminated soils from the Site are prohibited from being disposed at Part 360-16 Registration Facilities (also known as Soil Recycling Facilities).

Soils that are contaminated but non-hazardous and are being removed from the Site are considered by the Division of Solid & Hazardous Materials (DSHM) in NYSDEC to be Construction and Demolition (C&D) materials with contamination not typical of virgin soils. These soils may be sent to a permitted Part 360 landfill. They may be sent to a permitted C&D processing facility without permit modifications only upon prior notification of NYSDEC Region 2 DSHM. This material is prohibited from being sent or redirected to a Part 360-16 Registration Facility. In this case, as dictated by DSHM, special procedures will include, at a minimum, a letter to the C&D facility that provides a detailed explanation that the material is derived from a DER remediation Site, that the soil material is contaminated and that it must not be redirected to on-site or off-site Soil Recycling Facilities. The letter will provide the project identity and the name and phone number of the RE. The letter will include as an attachment a summary of all chemical data for the material being transported.

The FER will include an accounting of the destination of material removed from the Site during the interim remedial measures, including excavated soil, contaminated soil, historic fill, solid waste, and hazardous waste, non-regulated material, and fluids. Documentation associated with disposal of material must also include records and approvals for receipt of the material. This information will also be presented in a tabular form in the FER.

Bill of Lading system or equivalent will be used for off-site movement of non-hazardous wastes and contaminated soils. This information will be reported in the FER.

Hazardous wastes derived from on-site will be stored, transported, and disposed of in full compliance with applicable local, State, and Federal regulations.

Appropriately licensed haulers will be used for material removed from this Site and will be in full compliance with all applicable local, State and Federal regulations.

Waste characterization will be performed for off-site disposal in a manner suitable to the receiving facility and in conformance with applicable permits. Sampling and analytical methods, sampling frequency, analytical results and QA/QC will be reported in the FER. All data available for soil/material to be disposed at a given facility must be submitted to the disposal facility with suitable explanation prior to shipment and receipt.

5.4.6 Materials Reuse On-Site

The RI soil sampling results indicate that the on-site soil/fill contains concentrations of SVOCs, PCBs, and metals that exceed the Part 375 Restricted Commercial SCOs. In addition, the RI revealed a localized area of soil containing chromium at concentrations that exceeds the RCRA Hazardous Waste Criteria.

PCB-impacted soil at concentrations above 10 mg/kg and the soil that has been identified with characteristically hazardous concentrations for chromium will be excavated for off-site disposal as described in Section 5.4.5. We believe the volume of this material to be approximately 1,480 cubic yards. An attempt will be made to re-use all other excavated soils onsite for grading. These impacted materials will be covered by asphalt, concrete, building, or a minimum of 1 foot of soils meeting the Restricted Commercial SCOs at a minimum. As such, and given the Track 4 cleanup approach, excavated soil/fill other than these hot spot areas will be reused for backfill, unless identified to be grossly contaminated. This fill reuse strategy is consistent with the future land use (e.g., commercial) and use of engineering and institutional controls to prevent future exposure to contaminated soils and groundwater that will remain onsite.

Based on the current cut/fill calculations from the design team, we believe the additional volume of excess soils will be upwards of approximately 8,000 cubic yards. This excess fill will require characterization and offsite disposal as described in Section 5.4.5.

Chemical criteria for on-Site reuse of material will be approved by NYSDEC. This proposed criterion for reuse is the Restricted Commercial Use SCOs. The RE will ensure that procedures defined for materials reuse in this IRMWP are followed and that unacceptable material will not remain on-Site.

Organic matter (wood, roots, stumps, etc.) or other solid waste derived from clearing and grubbing of the Site is prohibited for reuse on-Site.

5.4.7 Fluids Management

Dewatering fluids will be handled, transported and disposed of in accordance with applicable local, State, and Federal regulations. Dewatering fluids that do not meet groundwater quality standards will not be recharged back to the land surface or subsurface of the Site. Dewatering fluids will be managed off-Site at a permitted disposal facility. Discharge of water generated during remedial construction to surface waters (i.e. a local pond, stream or river) is prohibited without a State Pollutant Discharge Elimination System (SPDES) permit.

Rainwater that collects on the Site may be allowed to percolate into the soil.

5.4.8 Backfill from Off-Site Sources

Material proposed for import onto the Site will be approved by the RE and will be in compliance with provisions in this IRMWP prior to receipt at the Site. Material from industrial sites, spill sites, other environmental remediation sites or other potentially contaminated sites will not be imported to the Site.

Materials imported to the site for use as backfill will meet the requirements of Appendix 5 (Allowable Constituent Levels for Imported Fill or Soil) in the NYSDEC's guidance document DER-10.. Before soils are brought onto the site, the Site Contractor will supply the Remediation Engineer with the name, location, a brief history, and certified analytical test results for soils originating at the proposed site or facility for review and approval. No imported soils will be allowed onto the site before they are approved by the Remediation Engineer. The fill must be free of organic matter, wood, trash, etc. which cannot be properly compacted. Both the subgrade soils and the clean fill will be compacted following standard construction requirements (to at least 95 % of the maximum dry density as determined by Standard Proctor compaction test, ASTM D698). The fill gradation and surface slope will be such that it is free draining. Material from a permitted recycling facility may be used for backfill, as approved by the RE prior to importing to the Site.

The FER will include the following certification by the RE: "I certify that import of soils from off-Site, including source evaluation, approval and sampling, has been performed in a manner that is consistent with the methodology defined in the IRMWP".

Imported soils will meet requirements of Appendix 5 (Allowable Constituent Levels for Imported Fill or Soil) in the NYSDEC's guidance document DER-10. Non-compliant soils will not be imported onto the Site without prior approval by NYSDEC. Nothing in the approved IRMWP or its approval by NYSDEC should be construed as an approval for this purpose.

Soils that meet 'exempt' fill requirements under 6 NYCRR Part 360, but do not meet backfill or cover soil objectives for this Site, will not be imported onto the Site without prior approval by NYSDEC. Nothing in this IRMWP should be construed as an approval for this purpose. Solid waste will not be imported onto the Site.

Trucks entering the Site with imported soils will be securely covered with tight fitting covers.

Laboratory tests for characterization of a waste stream typically include all or a subset of the following list. The actual testing will be determined by the facility's permit requirements.

- TPH by gas chromatograph/ photoionization device (GC/PID);
- Total VOCs, Method 8260;
- Total SVOCs, Method 8270;

- Total PCBs, Method 8082;
- Total metals (14), Method 6010B;
- Ignitability, corrosivity, and reactivity;
- TCLP VOCs, SVOCs, metals and pesticides and herbicides; and
- Diesel Range Organics (DRO) and Gasoline Range Organics (GRO).

Soil stockpile sampling frequencies and methods (e.g., grab versus composite sampling) will conform to the facility's requirements.

5.4.9 Stormwater Pollution Prevention

This plan identifies standard and site-specific measures that will be implemented by the Remedial Contractor to minimize erosion and sedimentation, and consequently stormwater pollution, during remedy implementation. Measures will include physical methods to control and/or divert surface water flows and to limit the potential for erosion and migration of site soils, via wind (dust) or water. The erosion and sediment controls will be in conformance with the requirements presented in New York State Guidelines for Urban Erosion and Sediment Control.

Barriers and hay bale checks will be installed and inspected once a week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by NYSDEC. All necessary repairs shall be made immediately. Accumulated sediments will be removed as required to keep the barrier and hay bale check functional.

All undercutting or erosion of the silt fence toe anchor shall be repaired immediately with appropriate backfill materials. Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering.

Erosion and sediment control measures identified in the IRMWP shall be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters. Silt fencing or hay bales will be installed around the entire perimeter of the remedial construction area.

5.4.10 Contingency Plan

If USTs or other previously unidentified contaminant sources are found during on-Site remedial excavation or development related construction, sampling will be performed on product, sediment and surrounding soils, etc. Chemical analytical work will be for full scan parameters (TAL metals; TCL volatiles and semi-volatiles, TCL pesticides and PCBs). These analyses will

not be limited to STARS parameters where tanks are identified without prior approval by NYSDEC. Analyses will not be otherwise limited without NYSDEC approval.

Identification of unknown or unexpected contaminated media identified by screening during invasive Site work will be promptly communicated by phone to NYSDEC's Project Manager. These findings will be also included in daily and periodic electronic media reports.

5.4.11 Community Air Monitoring Plan

An air monitoring program will be implemented during remedy implementation to protect the health and safety of site workers and the surrounding community. Although odor problems are not expected, monitoring for potential nuisance odors will also be completed. This effort will include both work areas and perimeter air monitoring programs. The onsite air monitoring program is presented in the site specific HASP and the perimeter air monitoring program is presented in the CAMP. These documents contain vapor and dust monitoring and control action levels. Vapor and dust control measures will be initiated if action levels are exceeded.

The work area/breathing zone air monitoring program will be implemented by employing direct-reading survey instruments to identify the appropriate level of PPE needed based on total organic vapor and particulate concentrations.

A perimeter air monitoring program will be established and will consist of air monitoring stations at the perimeter of the site. Perimeter monitoring will include use of hand held direct-reading survey instruments for total organic vapors and dedicated direct-reading survey instruments for particulate monitoring at each perimeter air monitoring sample station.

Action levels will be established for the worker area/breathing zone and perimeter air monitoring program to determine if health and safety protocols or construction technique modifications need to be performed to reduce vapor or dust emissions from the Site.

Exceedances observed in the CAMP will be reported to NYSDEC and NYSDOH Project Managers and included in the Daily Report.

VOC Monitoring, Response Levels, and Actions

VOCs must be monitored at the downwind perimeter of an active work zone on a continuous basis during remediation and construction activities until the ground is completely capped/covered with clean soil or impervious barrier. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work will be performed using equipment appropriate to the known VOC contaminants on the Site. This equipment should be calibrated daily and should be capable of calculating 15-minute running averages. All 15-minute readings will be recorded and be

available for State personnel to review. Instantaneous readings, if any, used for decision purposes will also be recorded. The measured 15-minute averages will be compared to the levels below:

- If the ambient air concentration of total VOCs at the downwind perimeter of the work area exceeds 5 parts per million (ppm) above background for the 15 minute average, work activities must be halted until the levels readily decreases below 5 ppm (per instantaneous readings);
- If the total VOCs at the downwind perimeter of the work area persist at levels in excess of 5 ppm over background but less than 25 ppm, work must be halted. The source of vapors must be identified and corrective actions must be taken to abate the emissions. Work activities can only resume provided that the concentration is less than 5 ppm over a 15 minute average period; and,
- If the total VOC level is above 25 ppm at the perimeter of the work area, all activities must be shut down and work methods and controls will be re-evaluated.

Particulate Monitoring, Response Levels, and Actions

Dust or particulate concentrations should be monitored continuously at the upwind and downwind perimeters at the site perimeter and active work zones. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring PM10 and capable of integrating over a period of 15 minutes or less for comparison to the airborne particulate action level. The equipment should be equipped with an audible alarm to indicate an exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities. All readings will be recorded and be available for state personnel review. Corrective action is determined by the following levels:

- If the downwind PM-10 at a site perimeter location is 100 micrograms per cubic meter (µg/m3) greater than background for the 15 minute period of if airborne dust is observed at the site perimeter from excavation activity, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that the downwind PM-10 particulate level does not exceed 150 μg/m3 above the upwind level and provided that no visible dust is migrating from the excavation work area; and,
- If, after implementing dust suppression techniques, downwind PM-10 particulate levels are greater than 150 µg/m3 above the upwind level, work must be stopped and re-evaluation of work activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 µg/m3 of the upwind level and in preventing visible dust migration.

Exceedances observed in the CAMP will be reported to NYSDEC and NYSDOH Project Managers and included in the Daily Report.

5.4.12 Odor, Dust and Nuisance Control Plan

The FER will include the following certification by the RE: "I certify that invasive work during the remediation and invasive development work were conducted in accordance with dust and odor suppression methodology defined in the IRMWP."

Odor Control Plan

This odor control plan is capable of controlling emissions of nuisance odors off-site. Specific odor control methods to be used on a routine basis will include the application of foam suppressants or traps over the odor or VOC source areas, if such areas are uncovered. Foam suppressants may include biodegradable foams that are applied over the source material for short-term control of the odor and VOCs. Long-term control of source material can be accomplished using a non-hazardous and nonflammable compound that cures to form a hard surface. Tarps, properly anchored, may also be used to offer long term control of odors and VOCs. If nuisance odors are identified, work will be halted and the source of odors will be identified and corrected. Work will not resume until nuisance odors have been abated. NYSDEC and NYSDOH will be notified of odor events and of other complaints about the project. Implementation of odor controls, including the halt of work, will be the primary responsibility of the RE, who is responsible for certifying the FER.

Necessary means will be employed to prevent on- and off-Site nuisances. At a minimum, procedures will include: (a) limiting the area of open excavations; (b) shrouding open excavations with tarps and other covers; and (c) using foams to cover exposed odorous soils. If odors develop and cannot be otherwise controlled, additional means to eliminate odor nuisances will include: (d) direct load-out of soils to trucks for off-Site disposal; (e) use of chemical odorants in spray or misting systems; and, (f) use of staff to monitor odors in surrounding neighborhoods.

Where odor nuisances have developed during remedial work and cannot be corrected, or where the release of nuisance odors cannot otherwise be avoided due to on-Site conditions or close proximity to sensitive receptors, odor control will be achieved by sheltering excavation and handling areas under tented containment structures equipped with appropriate air venting/filtering systems.

Dust Control Plan

A dust suppression plan that addresses dust management during invasive on-Site work, will include, at a minimum, the items listed below:

- Dust suppression will be achieved through the use of a dedicated on-Site water truck for road wetting. The truck will be equipped with a water cannon capable of spraying water directly onto off-road areas including excavations and stockpiles;
- Clearing and grubbing of larger sites will be done in stages to limit the area of exposed, unvegetated soils vulnerable to dust production;
- Gravel will be used on roadways to provide a clean and dust-free road surface; and,
- On-Site roads will be limited in total area to minimize the area required for water truck sprinkling.

Other Nuisances

A plan for rodent control will be developed and utilized by the contractor prior to and during Site clearing and Site grubbing, and during remedial work. In addition, a plan for noise control will be developed and utilized by the contractor for all remedial work and will conform, at a minimum, to NYCDEP noise control standards.

6.0 RESIDUAL CONTAMINATION TO REMAIN ON-SITE

Residual contaminated soil and groundwater will exist beneath the Site after the remedy is complete; therefore Engineering and Institutional Controls (ECs and ICs) are required to protect human health and the environment.

A vapor mitigation will be implemented beneath Site buildings to protect public health and the environment by appropriately managing potential soil vapor intrusion. Vapor mitigation is discussed below.

6.1 VAPOR MITIGATION SYSTEMS

As a precaution against infiltration of soil vapors, the proposed Fashion Outlets of Niagara Falls Mall addition and the proposed storage facility office will require vapor mitigation. The need for vapor mitigation was determined based on the soil vapor samples collected. Therefore the design of the buildings in this area will include provisions for sub-slab vapor collection and exhaust, and a vapor barrier. The design of these systems is discussed below.

6.1.1 Vapor barrier membrane

A soil vapor barrier will be installed between the concrete foundation slab and underlying soil and gravel. The barrier/membrane system will be installed along the entire footprint of constructed buildings beneath the foundation slab, and will extend along the sides of the foundation slab from the base of the excavation to surface grade level. The vapor barrier will be a minimum of 20 mil thickness and will be installed as a continuous sub-slab membrane.

6.1.2 Sub-slab Depressurization System

The SSDS components will be installed beneath the foundation slab of the proposed buildings in accordance with the NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York, dated October 2006. The SSDS system will include a sub-slab collection layer, riser pipes to convey the collected vapor to the roof, and regenerative blowers installed at the roof terminus of the riser pipe or in an enclosure on the exterior of the building. Prior to initial start-up of the SSDS, the system will be inspected to confirm that all system components are in place. The system will be implemented in accordance with manufacturer's recommendations.

All reports, forms, and other relevant information generated during testing of the SSDS will be (1) available upon request to the NYSDEC and NYSDOH and (2) submitted with the FER, following completion of remedial activities. Inspection of the SSDS will be conducted on an annual basis to establish that it is operational and performing within the design specifications. This plan will be modified for NYSDEC approval in writing. Unscheduled inspections and/or

sampling may take place when a suspected failure of the SSDS has been reported or an emergency occurs that is deemed likely to affect the operation of the system. System O&M requirements will be established in the FER.

7.0 CRITERIA FOR COMPLETION OF MITIGATION SYSTEMS

7.1 Sub-slab Depressurization System [SSDS]

The SSDS will not be discontinued without written approval by NYSDEC and NYSDOH. A proposal to discontinue the SSDS may be submitted by the property owner based on confirmatory data that justifies such request at the time. Systems will remain in place and operational until permission to discontinue use is granted in writing by NYSDEC and NYSDOH. A proposal for termination of the SSDS will be based on post-remediation contaminant levels in sub-slab soil vapor, indoor air (as appropriate) collected from soil vapor probes, and building interiors located throughout the site. The proposal will be based upon several factors, including:

- Soil vapor contamination effects on indoor air quality.

8.0 FINAL ENGINEERING REPORT

An FER and Certificate of Completion will be submitted to NYSDEC following implementation of the interim remedial measures defined in this IRMWP. The FER will provide the documentation that the remedial work required under this RIMWP has been completed and has been performed in compliance with this plan. The FER will provide a comprehensive account of the locations and characteristics of material removed from the Site including the surveyed map(s) of sources. The FER will include as-built drawings for all constructed elements, certifications, manifests, and bills of lading. The FER will provide a description of the changes in the interim remedial measures from the elements provided in the IRMWP and associated design documents. The FER will provide a tabular summary of all performance evaluation sampling results and all material characterization results and other sampling and chemical analysis performed as part of the interim remedial measures. The FER will provide test results demonstrating that all mitigation systems are functioning properly. The FER will be prepared in conformance with DER-10.

The FER will include written and photographic documentation of remedial work performed under this remedy. The FER will also include an itemized tabular description of actual costs incurred during all aspects of the interim remedial measures.

The FER will include an accounting of the destination of material removed from the Site, including excavated contaminated soil, historic fill, solid waste, hazardous waste, non-regulated material, and fluids. Documentation associated with disposal of material must also include records and approvals for receipt of the material. It will provide an accounting of the origin and chemical quality of material imported onto the Site.

Before approval of a FER and issuance of a Certificate of Completion, project reports must be submitted in digital form on electronic media (PDF).

8.1 CERTIFICATIONS

The following certification will appear in front of the Executive Summary of the FER. The certification will be signed by the Remedial Engineer [name] who is a Professional Engineer registered in New York State This certification will be appropriately signed and stamped. The certification will include the following statements:

I _____certify that I am currently a NYS registered professional engineer, I had primary direct responsibility for the implementation of the subject construction program, and I certify that the Remedial Work Plan (or Remedial Design or Plans and Specifications) was implemented and that all construction activities were completed in substantial conformance with the DER-approved Remedial Work Plan (or Remedial Design or Plans and Specifications).

If the Interim Remedial Measures Work Plan (or Remedial Design or Plans and Specifications) identifies time frames to be achieved by the remedial program, the certification must include: The data submitted to DER demonstrates that the remediation requirements set forth in the Remedial Work Plan (or Remedial Design or Plans and Specifications) and all applicable statutes and regulations have been or will be achieved in accordance with the time frames, if any, established in the work plan (or Remedial Design or Plans and Specifications).

If the remedial program requires ICs or ECs, the certification must include: *All use restrictions, institutional controls, engineering controls and/or any operation and maintenance requirements applicable to the site are contained in an environmental easement created and recorded pursuant to ECL 71-3605 and that any affected local governments, as defined in ECL 71-3603, have been notified that such easement has been recorded.*

If the remedial program requires applicable SMP, the certification must include: A*A Site Management Plan has been submitted for the continual and proper operation, maintenance, and monitoring of any engineering controls employed at the site including the proper maintenance of any remaining monitoring wells, and that such plan has been approved by DER.*

If the remedial program requires financial assurance, the certification must include: Any financial assurance mechanisms required by DEC pursuant to Environmental Conservation Law have been executed.

It is a violation of Article 130 of New York State Education Law for any person to alter this document in any way without the express written verification of adoption by any New York State licensed engineer in accordance with Section 7209(2), Article 130, New York State Education Law.

9.0 SCHEDULE

A proposed remediation/construction schedule is included in Appendix I. The NYSDEC will be made aware of significant deviations to the schedule in the daily and monthly report

TABLES

TABLE 1: REMEDIATION COST ESTIMATE
Alternative II - Track 4 Remediation
Fashion Outlets of Niagara Falls

Item No.	Description	Estimated Quantity	Unit	Unit Price	Cost
1	Mobilization, Demobilization, Permits, Maintain Site	1	Lump Sum	$50,000	$50,000
2	Soil Excavation, Stockpile and Loading	35,000	Cubic Yard	$20	$700,000
3	Transport and Disposal of Hazardous Material (Chromium >5 mg/L)	1,480	Tons	$275	$407,000
4	Transport and Disposal of Contaminated Material (PCBs >10 mg/kg)	835	Tons	$195	$162,825
5	Transport and Disposal of Non-Hazardous Contaminated Soil/Fill	12,000	Tons	$50	$600,000
6	Endpoint Sampling	30	Samples	$600	$18,000
7	Waste Characterization	1	Lump Sum	$100,000	$100,000
8	Backfill/ Compact with Gravel	1,500	Cubic Yard	$40	$60,000
9	Dewatering / Fluid Treatment	1,000,000	Gallon	$1.50	$1,500,000
10	Vapor Barrier	1	Lump Sum	$476,000	$476,000
11	Subslab Depressurization Systems	1	Lump Sum	$400,000	$400,000
12	Composite Capping/Cover System - Concrete/Asphalt/Landscaping	1	Lump Sum	$4,200,000	$4,200,000
				Total Capitol Cost	$8,673,825
				Administration, Insurance, & Engineering (20%)	$1,734,765
				Total Estimated Cost for Remediation	**$10,410,000**

Line Item Notes

1 Includes items such as mobilization and demobilization of all labor, equipment, and materials necessary to excavate, transport, and dispose the targeted soil. Also includes any project related permit or regulation fees (excludes potential hazardous waste fees).

2 Soil Excavation assumes excavation/handling costs for the Niagara Falls area. Based on removal of PCB-impacted soil above 10mg/kg, and assumed excavation depth of 10 feet below grade and a footprint of 50 feet by 50 feet; removal of characteristically hazardous chromium-impacted soil above RCRA Hazardous Waste Criteria, and assumed excavation depth of 10 feet below grade and a footprint of 75 feet by 20 feet. Also includes surplus soil generated during construction of proposed development (upwards of approximately 8,000 CY), and additional fill/soil reuse (assumed 14,000 CY $\pm$)

3 Hazardous chromium-contaminated material transport and disposal assumes union disposal costs for the Niagara Falls area. Density factor of 1.6 tons per CY.

4 Non-hazardous PCB-contamianted material transport and disposal assumes union disposal for the Niagara Falls area. Density factor of 1.6 tons per CY

5 Accounts for off-site disposal of surplus soil generated during construction of proposed development. Assumes upwards of approximately 8,000 cubic yards, and non-hazardous material. Density factor of 1.5 tons per CY

6 Soil endpoint characterization costs includes sample collection and analysis of endpoint samples. Assume endpoint sample frequency will be 1 samples per 20 linear foot of sidewall and 1 sample per 900 square foot of excavation base plus quality control samples.

7 Waste characterization sampling to support disposal or soil/fill.

8 Backfill import, preparation and placement with clean gravel (for hot spot excavations)

9 Accounts for containerizing and off-site transporation & disposal of groundwater encountered during construction. Volume based on area of ponds (225,000 square feet), fill porosity of 30%, and 3 feet of water within the fill layer.

10 Accounts for the installation of a vapor barrier membrane at the interface of the concrete slab and the site sub-grade materials and on all sub-grade wall. Assume 225,000 sq ft of membrane for mall expansion, and 13,000 square feet for Secure Storage facility office at $2 per sq ft.

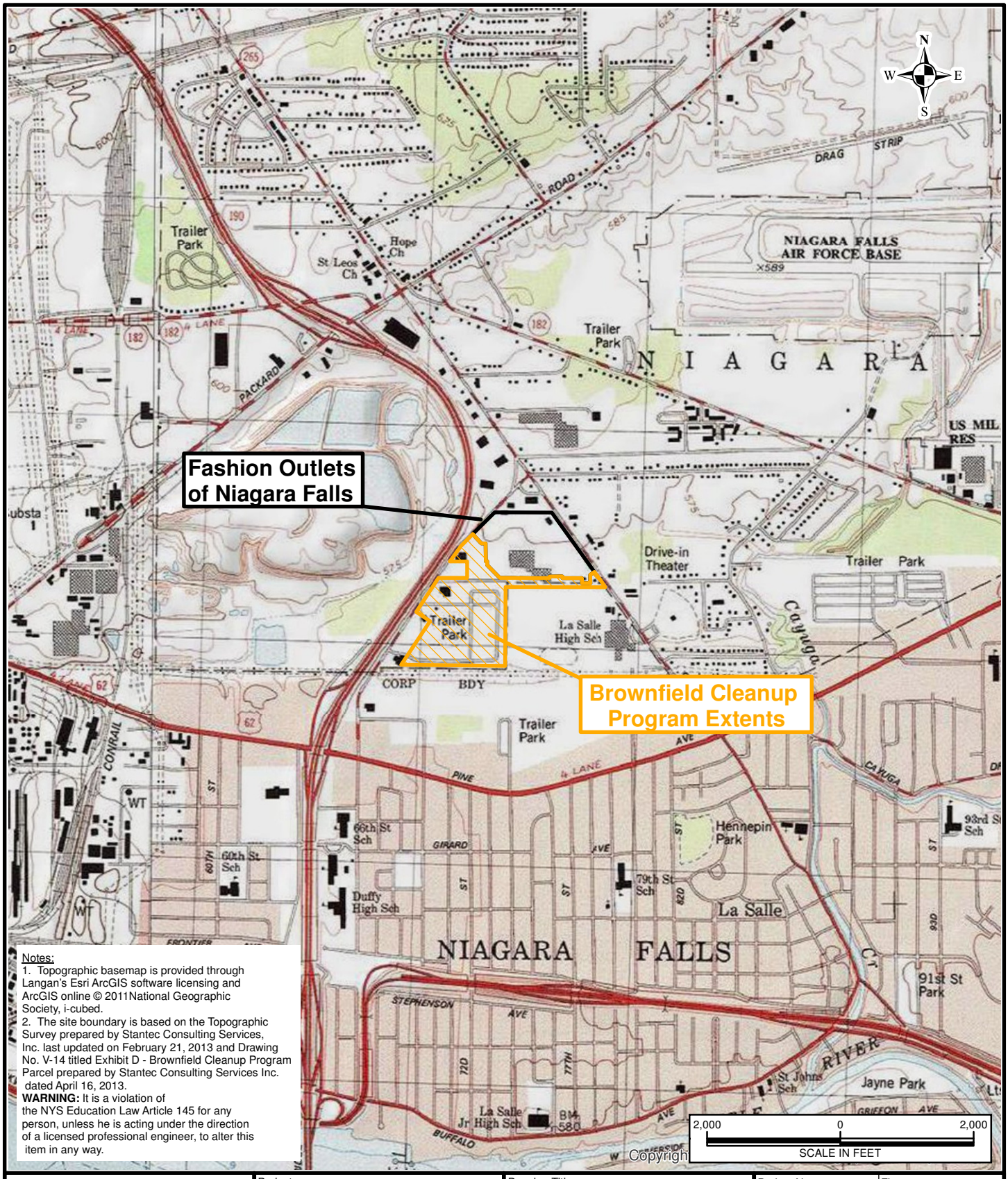
11 Accounts for installation of subslab depressurization systems (SSDS) beneath vapor barrier at mall expansion and Secure Storage facility office. Assumes $250,000 for mall expansion SSDS, and $150,000 for Secure Storage facility office

12 Estimated costs provided by contractors bidding on the project.

Table 2
Emergency Contact Numbers
FONF Expansion/Sabre Park BCP
Town of Niagara, New York
Langan Project No. 140091401

Title	Name	Phone Numer
Program Manager/Remediation Engineer:	Joel Landes, PE	(212) 479-5404
Project Manager:	Jamie P. Barr, LEP	(203) 784-3034
Corporate Health & Safety Officer (CHSO):	Tony Moffa	(215) 756-2523
Field Health & Safety Officer (HSO):	Justin Hall	(203) 640-3180
NYSDEC Spill Hot Line		(800) 457-7362
NYSDEC Project Manager	Glenn May	(716) 851-7220

FIGURES



Notes:
1. Topographic basemap is provided through Langan's Esri ArcGIS software licensing and ArcGIS online © 2011National Geographic Society, i-cubed.
2. The site boundary is based on the Topographic Survey prepared by Stantec Consulting Services, Inc. last updated on February 21, 2013 and Drawing No. V-14 titled Exhibit D - Brownfield Cleanup Program Parcel prepared by Stantec Consulting Services Inc. dated April 16, 2013.

WARNING: It is a violation of the NYS Education Law Article 145 for any person, unless he is acting under the direction of a licensed professional engineer, to alter this item in any way.

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Langan Engineering & Environmental Services, Inc.
Langan Engineering, Environmental, Surveying and Landscape Architecture, D.P.C.
Langan International LLC
Collectively known as Langan

NJ CERTIFICATE OF AUTHORIZATION No. 24GA27996400

Project	FONF Expansion/ Sabre Park BCP TOWN OF NIAGARA NIAGARA COUNTY NEW YORK
Drawing Title	SITE LOCATION MAP
Project No.	140091401
Figure	1
Date	4/4/2013
Scale	1"= 2000'
Drawn By	amf
Last Revised	8/2/2013

Path: \\langan.com\data\EP\data4\140091401\ArcGIS\ArcMap_Documents\2013-07 - RIR\Figure 1 - Site Location Map.mxd

Legend

Proposed Brownfields Cleanup Program Site Extents

A Existing Land Use

A Street Name

Notes:
1. Aerial basemap is provided through Langan's Esri ArcGIS software licensing and ArcGIS online. Source of aerial imagery is US NY Buffalo from 5 April 2011.
2. Land use data was obtained from the Zoning Map of the Town of Niagara dated December 2002 and the Schedule B: Official Zoning Map for the City of Niagara Falls Ver. 11.12.15.
3. Adjacent street names are identified as provided by the Niagara County NY On-Line Mapping System.
4. The BCP boundary is based on the Topographic Survey prepared by Stantec Consulting Services, Inc. last updated on February 21, 2013 and Drawing No. Y-141tled Exhibit D - Brownfield Cleanup Program Parcel prepared by Stantec Consulting Services Inc. dated April 16, 2013.
5. The zipcode for the site and all adjacent properties is 14304.

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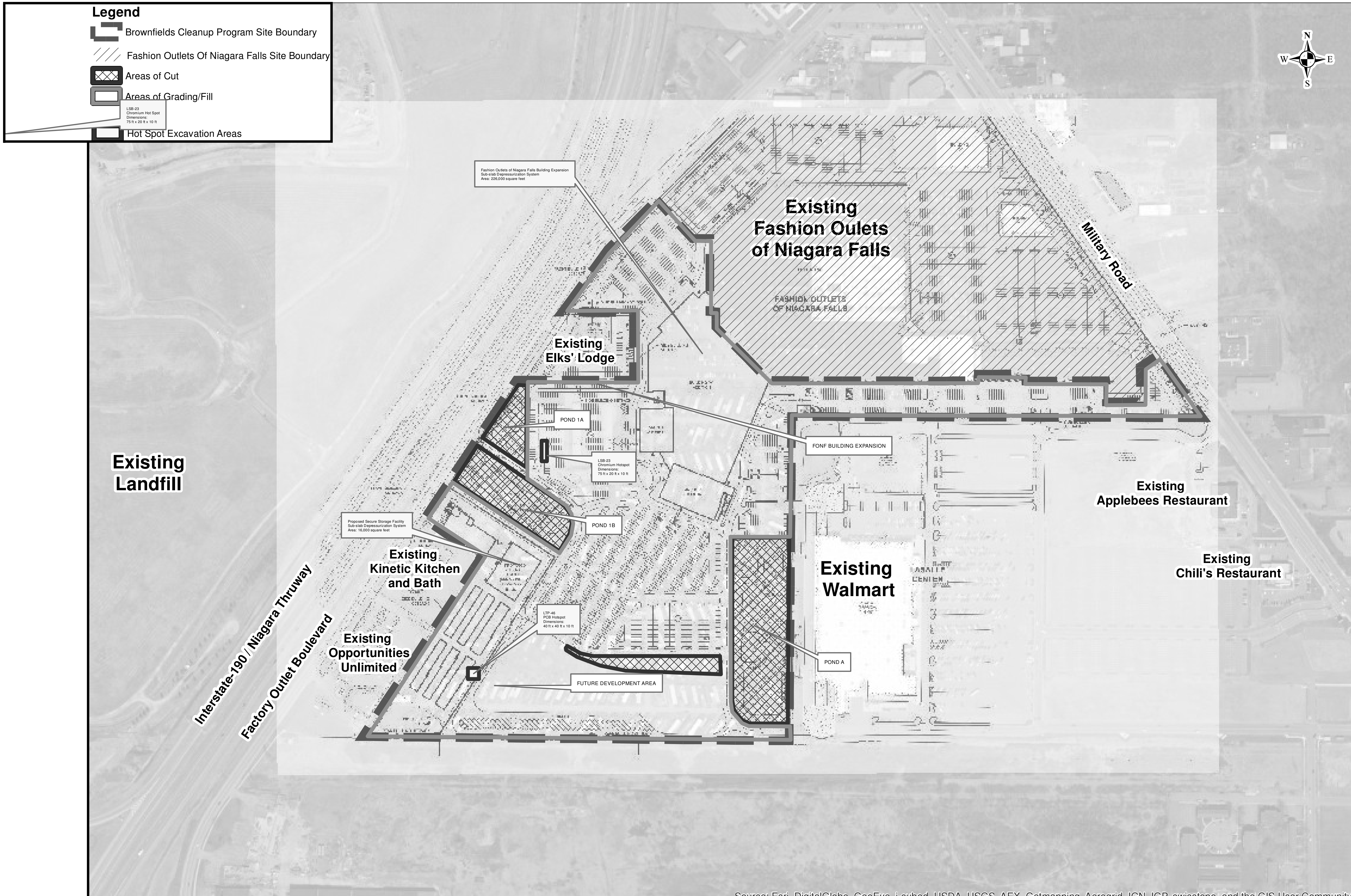
ABU DHABI ATHENS DOHA DUBAI ISTANBUL
NJ CERTIFICATE OF AUTHORIZATION No 24GA27956400

Project
FONF Expansion/ Sabre Park BCP
TOWN OF NIAGARA
NIAGARA COUNTY NEW YORK

Drawing Title
EXISTING CONDITIONS PLAN

Project No.	140091401
Date	4/4/2013
Scale	1" = 200'
Drawn By	amf
Last Revised	8/2/2013
Exhibit	2

LANGAN
PROJECT No. 140091401



Notes:
1. Aerial basemap is provided through Langan's Esri ArcGIS software licensing and ArcGIS online. Source ofaerial imagery is US-NY-Buffalo from15 April 2011.
2. The site boundary is based on the Topographic Survey prepared by Stantec Consulting Services, Inc. last updated on February 21, 2013 and Drawing No. V-14 titled Exhibit D - Brownfield Cleanup Program Parcel prepared by Stantec Consulting Services Inc. dated April 16, 2013.
3. The following proposed soil borings were converted to test pits due to field conditions: LSB-31, LSB-33, LSB-37, LSB-38, LSB-39, LSB-44, LSB-45, LSB-50, LSB-51, LSB-52, LSB-53, LSB-54, LSB-55, LSB-56, LSB-58, LSB-59, LSB-60, LSB-62, LSB-63.
4. The following proposed test pits were converted to soil borings due to field conditions: LTP-1, LTP-2, LTP-3, LTP-13, LTP-45.
5. The following proposed soil gas samples were not collected due to the presence of water in the probe: LSV-1, LSV-3, LSV-4, LSV-6, LSV-7, LSV-8, LSV-10.
6. This plan should be reviewed as a color copy as the sample locations are color coordinated.

WARNING: It is a violation of the NYS Education Law Article 145 for any person, unless he is acting under the direction of a licensed professional engineer, to alter this item in any way.

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LANGAN River Drive Center 1, 619 River Drive, Elmwood Park, NJ 07407-1338 T: 201.794.6900 F: 201.794.0366 www.langan.com NEW JERSEY NEW YORK VIRGINIA CALIFORNIA PENNSYLVANIA CONNECTICUT FLORIDA ABU DHABI ATHENS DOHA DUBAI ISTANBUL Langan Engineering & Environmental Services, Inc. Langan Engineering, Environmental, Surveying and Landscape Architecture, D.P.C. Langan International LLC Collectively known as Langan NJ CERTIFICATE OF AUTHORIZATION No. 24GA27996400	Project **FONF Expansion/ Sabre Park BCP** TOWN OF NIAGARA NIAGARA COUNTY NEW YORK	Drawing Title **CUT AND FILL WITH HOT SPOT EXCAVATIONS**	Project No. 140091401 Date 4/11/2013 Scale 1"= 100' Drawn By amf Last Revised 8/16/2013	Figure 3

Legend

- Fashion Outlets Of Niagara Falls Site Boundary
- Brownfields Cleanup Program Site Boundary
- Clay Lined Ponds (Minimum 6-in Clay Lining)
- Landscaped Areas (Minimum 1-ft of Clean Cover)
- Asphalt/Concrete/Buildings

N

W E

S

Fashion Outlets of Niagara Falls Building Expansion
Sub-slab Depressurization System
Area: 226,000 square feet

Existing
Fashion Oulets
of Niagara Falls

FASHION OUTLETS
OF NIAGARA FALLS

Military Road

Existing
Landfill

Existing
Elks' Lodge

POND 1A

FONF BUILDING EXPANSION

Proposed Secure Storage Facility
Sub-slab Depressurization System
Area: 16,000 square feet

POND 1B

Existing
Applebees Restaurant

Existing
Kinetic Kitchen
and Bath

Existing
Walmart

Existing
Chili's Restaurant

Existing
Opportunities
Unlimited

POND A

FUTURE DEVELOPMENT AREA

Interstate-190 / Niagara Thruway

Factory Outlet Boulevard

Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Notes:
1. Aerial basemap is provided through Langan's Esri ArcGIS software licensing and ArcGIS online. Source ofaerial imagery is US-NY-Buffalo from15 April 2011.
2. The site boundary is based on the Topographic Survey prepared by Stantec Consulting Services, Inc. last updated on February 21, 2013 and Drawing No. V-14 titled Exhibit D - Brownfield Cleanup Program Parcel prepared by Stantec Consulting Services Inc. dated April 16, 2013.
3. The following proposed soil borings were converted to test pits due to field conditions: LSB-31, LSB-33, LSB-37, LSB-38, LSB-39, LSB-44, LSB-45, LSB-50, LSB-51, LSB-52, LSB-53, LSB-54, LSB-55, LSB-56, LSB-58, LSB-59, LSB-60, LSB-62, LSB-63.
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5. The following proposed soil gas samples were not collected due to the presence of water in the probe: LSV-1, LSV-3, LSV-4, LSV-6, LSV-7, LSV-8, LSV-10.
6. This plan should be reviewed as a color copy as the sample locations are color coordinated.

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Langan International LLC
Affiliated by Mace de Langan

Project	FONF Expansion/ Sabre Park BCP TOWN OF NIAGARA NIAGARA COUNTY NEW YORK
Drawing Title	ENGINEERING CONTROLS
Project No.	140091401
Date	4/11/2013
Scale	1"= 100'
Drawn By	amf
Last Revised	8/16/2013
Figure	4

Legend

- 3 — 1-Acre Grid Cell
- Proposed Brownfields Cleanup Program Site Boundary
- Fashion Outlets Of Niagara Falls Site Boundary

N

W E

S

Existing Fashion Oulets of Niagara Falls

FASHION OUTLETS OF NIAGARA FALLS

Military Road

Existing Elks' Lodge

Existing Landfill

Existing Kinetic Kitchen and Bath

Existing Opportunities Unlimited

Existing Walmart

LASALLE CENTER

Existing Applebees Restaurant

Existing Chili's Restaurant

Interstate-190 / Niagara Thruway

Factory Outlet Boulevard

Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

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6. This plan should be reviewed as a color copy as the sample locations are color coordinated.

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Collectively known as Langan

Project	FONF Expansion/ Sabre Park BCP
	TOWN OF NIAGARA
	NIAGARA COUNTY NEW YORK
Drawing Title	PROPOSED DEVELOPMENT PLAN
Project No.	140091401
Date	4/11/2013
Scale	1"= 100'
Drawn By	amf
Last Revised	8/2/2013
Figure	5