LABELLA Associates, D.P.C.
Engineering
Architecture
Environmental
Planning

Remedial Alternatives Analysis
NYSDEC BCP Site #C835025

Location:

Canandaigua Multi-Brownfield Site
24, 26, 28, 30, 130, 158 Lakeshore Drive
and 25 Booth Street
Canandaigua, New York

Prepared for:

LeChase Construction
205 Indigo Creek Drive
Rochester, New York 14626

LaBella Project No. 2151037

December 2016

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LaBella Associates, D.P.C.
300 State Street
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NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

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Dan Noll, P.E.
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300 State Street, Suite 201
Rochester, New York 14614

December 19, 2016

Via Email - dnoll@labellapc.com

Re: Remedial Alternatives Analysis
Canandaigua Multi-Brownfield Site (C835025)
Canandaigua (T), Ontario (Co)

Dear Mr. Noll,

The Department has completed its review of the document titled “Remedial Alternatives Analysis NYSDEC BCP Site No. C835025 dated December 7, 2016” (RAA) for the Canandaigua Multi-Brownfield Site. The RAA has presented remedial alternatives that will be protective of public health and the environment.

With the following modifications, the Department has determined that the RAA is acceptable for preparing a Decision Document for the site:

The Department has the following comments regarding the RAA:

1. Please update Figure 7 in the final electronic document and hard copies.

Please return a final electronic copy and have hard copies placed in the document repository for the site.

If you have any questions regarding this letter or I can be of further assistance, please contact me at timothy.schneider@dec.ny.gov or (585) 226-5480.

Sincerely,

Timothy A. Schneider, P.E.
Environmental Engineer 2
Division of Environmental Remediation

ec: B. Schilling, P.E., NYSDEC
M. Cruden, P.E., NYSDEC
L. Schwartz, NYSDEC
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K. Hoffman / B. Ture, LeChase
F Pavia
P D'Amato

CERTIFICATIONS

"I DANIEL P. NOLL *certify that I am currently a NYS registered professional engineer and that this Remedial Alternatives Analysis 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)."*

081996	12/7/16	
NYS Professional Engineer #	Date	Signature

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1.0 Introduction

This Remedial Alternatives Analysis (RAA) provides a summary of remedial alternatives evaluated and selects remedial actions to be implemented for the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Site (BCP) known as the Canandaigua Multi-Brownfield Site located at 24, 26, 28, 30, 130, and 158 Lakeshore Drive, and 25 Booth Street in the City of Canandaigua, New York hereinafter referred to as the "Site". LaBella Associates, D.P.C. ("LaBella") is submitting this RAA on behalf of Canandaigua Lakefront, LLC. The Site was entered into the BCP on October 5th, 2012 and Canandaigua Lakefront, LLC took ownership of the Site in 2015 to remediate impacts and redevelop the Site for mixed-use purposes including residential and commercial structures. A Project Locus Map is included as Figure 1.

The remedial alternatives were evaluated based on the data obtained during pre-BCP activities, a Remedial Investigation (RI), Interim Remedial Measures (IRMs), and Supplemental RI. This RAA summarizes the findings of the RI Report and Construction Completion Report (CCR) for the Site; however, the RI Report and CCR should be referenced for greater details on RI and IRM activities and details on the nature and extent of impacts.

1.1 *Site Description*

The site is comprised of seven (7) contiguous parcels located in the County of Ontario, New York and is identified as the following tax map numbers:

Address	**Tax Map Number**
25 Booth Street	84.18-1-7
24 Lakeshore Drive	84.18-1-20
26 Lakeshore Drive	84.18-1-19
28 Lakeshore Drive	84.18-1-18
30 Lakeshore Drive	84.18-1-15
130 Lakeshore Drive	84.18-1-13
158 Lakeshore Drive	84.18-1-10

The site is situated on an approximately 15.5-acre area bounded by Lakeshore Drive to the south, Booth Street to the west, Muar Street to the east, and Parkway Plaza to the north (see Figure 1). Redevelopment for mixed commercial and residential use of the Site began in 2015 and is currently in progress.

1.2 *Previous Investigations*

Phase I Environmental Site Assessments (all 7 parcels)
Day Environmental Inc. (Day) conducted Phase I ESAs for 30 Lakeshore Drive in 1995 and in 2004. Additionally, Day conducted Phase I ESAs for each individual tax parcel in 2007. The following table summarizes Recognized Environmental Concerns (RECs) identified during each Phase I ESA.

Address	**RECs**
25 Booth Street	Phase I ESA by Day, 2007 • Possible petroleum contamination from current/former ASTs • Potential landfill and fill materials

	• Potential contamination from off-site sources
24 Lakeshore Drive	Phase I ESA by Day, 2007 • Possible landfill and fill materials • Contamination from off-site sources
26 Lakeshore Drive	Phase I ESA by Day, 2007 • Possible landfill and fill materials • Contamination from off-site sources
28 Lakeshore Drive	Phase I ESA by Day, 2007 • Historical use of the assessed property as a dry cleaning facility and gasoline filling station • Possible landfill and fill materials • Potential contamination from off-site sources
30 Lakeshore Drive	Phase I ESA by Day, 1995 • Former presence of a service station Phase I ESA by Day, 2004 • Former presence of a service station • Petroleum contamination and fill identified during the 1996 subsurface investigation Phase I ESA by Day, 2007 • Historical use of the assessed property which include a gasoline filling station and motor home • Potential contamination from off-site sources
130 Lakeshore Drive	Phase I ESA by Day, 2007 • Possible fuel storage tanks- unknown status • Possible landfill and fill materials • Potential contamination from off-site sources
158 Lakeshore Drive	Phase I ESA by Day, 2007 • Possible release from electric transformer • Possible landfill and fill materials • Contamination from off-site sources

Subsurface Investigation (30 Lakeshore Drive) Day 1996

Based on the Phase I ESA conducted by Day in 1995 for 30 Lakeshore Drive, a Subsurface Investigation was conducted by Day at 30 Lakeshore Drive in 1996. This investigation identified petroleum contamination north of the right-of-way along Lakeshore Drive with the greatest impacts identified near a subsurface anomaly (presumably an underground storage tank) identified during a magnetic locator survey.

Limited Phase II ESAs (all 7 parcels) Stantec 2012

Stantec conducted a Limited Phase II ESA at all seven (7) parcels comprising the Site in 2012. The ESA included the following:

- Advancement of 11 test pits
- Advancement of 16 overburden soil borings
- Analysis of 21 soil samples
- Installation of 7 groundwater monitoring wells
- Analysis of 7 groundwater samples

The Limited Phase II ESA identified exceedances of applicable Standards, Criteria, and Guidance (SCGs) in one (1) or more samples from each of the seven (7) parcels as follows:

- Petroleum compounds exceeded SCGs at 25 Booth Street, 24, 26, and 30 Lakeshore Drive
- Metals exceeded SCGs at 25 Booth Street, 24, 26, 28, 30, 130, and 158 Lakeshore Drive
- Pesticides exceeded SCGs at 24, 28, 30, and 158 Lakeshore Drive

In addition, Groundwater SCGs were exceeded at all seven (7) parcels as follows:

- Petroleum compounds exceeded SCGs at 28 and 30 Lakeshore Drive
- Metals exceeded SCGs at 25 Booth Street, 24, 26, 28, 30, 130, and 158 Lakeshore Drive
- Pesticides exceeded SCGs 130 Lakeshore Drive

Remedial Investigation (all 7 parcels), Stantec 2013

A Remedial Investigation (RI) was conducted at the Site by Stantec in 2013 consisting of the following:

- Analysis of 65 passive soil gas (PSG) samples
- Analysis of 33 surface soil samples
- Advancement of 46 soil borings
- Advancement of 11 groundwater monitoring wells
- Analysis of 17 groundwater samples
- Ecological survey

Seven (7) areas of interest (AOIs) were identified during the RI. The AOIs are summarized below:

AOI	Impacts
1	Historic fill material at 25 Booth Street and 30 Lakeshore Drive
2	Petroleum compounds along southern edge of 30 Lakeshore Drive
3	Petroleum Compounds at 130 Lakeshore Drive
4	Pesticides at 130 Lakeshore Drive
5	PCBs in surface soils at 25 Booth Street
6	CVOCs in the Parkway Dry Cleaners Plume (adjacent to the north) at 30 Lakeshore Drive
7	Petroleum compounds at 158 Lakeshore Drive near Hess Station (adjacent to the east)

AOIs identified during the RI are included on Figure 3.

IRM Work Plan, Stantec April 2014

Four (4) AOIs were recommended for IRMs in a NYSDEC-approved IRM Work Plan dated April 2014. The IRM Work Plan proposed that the remainder (i.e., not part of an AOI) of the Site be covered with two (2) feet (ft.) of imported clean fill material to meet the BCP requirements and increase the elevation at areas of the Site, providing an altitude one foot higher than the FEMA flood zone. The details for the cover system were further defined in the Interim Site Management Plan (ISMP) by Stantec dated April 2014.

Interim Site Management Plan, Stantec April 2014

An Interim Site Management Plan (ISMP) was developed by Stantec for use during implementation of the work detailed in the IRM Work Plan and redevelopment of the Site. The ISMP provides a detailed description of all procedures required to manage contamination at the Site during completion of IRMs

including implementation and management of all Engineering Controls (ECs) and Institutional Controls (ICs) and media monitoring.

Design Phase Investigation Work Plan, LaBella August 2014
A Design Phase Investigation Work Plan was submitted to the NYSDEC on August 6th, 2014 to provide further testing in an effort to reduce the volume of fill material necessary to meet BCP requirements at 130 and 158 Lakeshore Drive. A shallow soil boring investigation was implemented in which thirteen (13) and sixteen (16) soil borings were advanced to 2-feet below ground surface (bgs) at 130 and 158 Lakeshore Drive, respectively to identify areas where the top two feet of material met soil SCGs and did not require a cover system. Three (3) locations from the Design Phase Investigation exceeded SCGs and; as such, three (3) additional IRMs were identified (IRM 1, IRM 2, and IRM 3). This Work Plan was approved by the NYSDEC in an email on August 13th, 2014.

IRM Work Plan Addendum, LaBella December 22, 2014
The findings of the Design Phase Investigation were summarized in an IRM Work Plan Addendum which proposed three (3) additional IRMs as follows:

IRM	Impacts
1	Metals at 130 Lakeshore Drive
2	PAHs at 158 Lakeshore Drive
3	Metals at 158 Lakeshore Drive

Refer to Figure 3 for locations of IRMs. IRM 1 was proposed for excavation to depths of up to 2-ft. bgs and backfill with clean imported material. IRM 2 was proposed to be covered with 2-ft. of imported material. IRM 3 was proposed for excavation to depths of up to 2-ft. bgs and backfill with clean imported material. This Addendum was approved by the NYSDEC in an email on December 23rd, 2014.

It is noted that during construction and IRM activities in the summer and fall of 2015, two (2) additional IRMs, IRM 4 and IRM 5, were identified at the Site, as follows:

IRM	Impacts
4	Petroleum at 28 and 30 Lakeshore Drive
5	Petroleum at 158 Lakeshore Drive

In July and August 2015, four (4) underground storage tanks (USTs) were uncovered during Building B-2 construction activities in close proximity to the southern property boundary where the 28 Lakeshore Drive and 30 Lakeshore Drive parcels meet. This area was identified as IRM 4. In December 2015, two (2) USTs were uncovered during the advancements of test pits immediately south of IRM 3. This area was identified as IRM 5. Both IRMs included closure of each UST by removal, associated contaminated soil removal and confirmatory sampling per the requirements specified in the NYSDEC DER-10 guidance document.

IRM Work Plan Addendum No. 2, LaBella May 20, 2015
A parcel to the north of the Site is identified as NYSDEC Site #V00238. There is a known chlorinated volatile organic compound (CVOC) plume emanating from this adjacent parcel. A planned sewer line for the redevelopment extends along the norther property line. As such, an addendum to properly excavate and dispose of soil from the known CVOC groundwater plume area in conjunction with the installation of

a sanitary sewer across 30 Lakeshore Drive was submitted to the NYSDEC. The sewer was installed through the area of CVOC contamination known as AOI 6. AOI6 was identified during the RI which indicated the presence of CVOCs migrating on Site from the northern adjacent property. This addendum proposed installation of clay plugs and anti-seep collars within the sewer trench up and down gradient of the Parkway Plaza Dry Cleaners CVOC plume to prevent to the extent possible further lateral migration of contaminants in groundwater along the sewer line.

Sub-Slab Vapor Mitigation System Specifications- Buildings B-1 and B-2, LaBella July 21, 2015
LaBella submitted sub-slab depressurization system (SSDS) designs and specifications for installation at Building B-1 and Building B-2 to the NYSDEC and NYSDOH on July 21, 2015. The designs were subsequently approved in an email from the NYSDEC dated July 30, 2015. SSDS as-built drawings are included in Construction Completion Report (CCR).

IRM Work Plan Addendum No. 3, LaBella January 2016
A third IRM Work Plan Addendum was submitted on January 19th 2016 to provide an alternative remedial approach for slag, ash, coal and cinders identified in the excavation of IRM 3 at 158 Lakeshore Drive. Twenty-three (23) test pits were advanced proximate IRM 3 to delineate the aerial extent of ash and cinders. An area of approximately 12,000 ft^2 was proposed for 2-ft. of cover material. This addendum was approved in an email on January 28th, 2016.

Sub-Slab Vapor Mitigation System Specifications- Building A, LaBella June 20, 2016
LaBella submitted SSDS designs and specifications for installation at Building A to the NYSDEC and NYSDOH on June 20th, 2016. The design was subsequently approved in an email from the NYSDOH dated September 1, 2016. SSDS as-built drawings are included in the CCR.

Construction Completion Report, LaBella December 2016
ACCR by LaBella dated December 2016 documents the completed IRMs. The CCR was approved by the NYSDEC in December 2016.

Supplemental Remedial Investigation Report, LaBella December, 2016
A Supplemental RI Report by LaBella dated December 2016 documents investigative activities that took place after completion of the RI Report by Stantec (i.e., IRMs and associated addenda and the Design Phase Investigation). The Supplemental RI Report was approved by the NYSDEC in December 2016.

2.0 Standards, Criteria and Guidance

This section identifies the Standards, Criteria and Guidance (SCGs) for the Site. The SCGs identified are used in order to quantify the extent of contamination at the Site that may require remedial work. The SCGs for soil and groundwater are provided below. It should be noted that these SCGs are applied based on the proposed Site use (Restricted Residential).

Soil:

- New York Codes, Rules, and Regulations (NCYRR) Part 375 Restricted Residential Use Soil Cleanup Objectives (SCOs)
- NYCRR Part 375 Protection of Groundwater SCOs (only applicable to areas where groundwater impacts have been identified)
- NYSDEC Commissioner Policy-51 (CP-51) Restricted Residential Use Soil Cleanup Objectives

(SCOs) for Gasoline and Fuel Oil Contaminated Soils
- NYSDEC CP-51 Protection of Groundwater SCOs for Gasoline and Fuel Oil Contaminated Soils (only applicable to areas where groundwater impacts have been identified)

Groundwater:
- NYCRR Part 703 Groundwater Standards
- NYSDEC TOGS 1.1.1 Ambient Water Quality Standards and Guidance Values

Soil Gas

There are currently no SCGs for soil gas. Soil gas sampling is used as part of the overall Site evaluation.

3.0 Summary of Interim Remedial Measures

3.1 *Summary of IRM Activities*

Seven (7) AOIs were identified in the RI by Stantec, and five (5) IRMs were identified during a Design Phase Investigation and completion of IRMs by LaBella. Remedial measures began in June 2015 and consisted of the following AOIs and IRMs:

AOI and IRM Excavations

	Contaminant of Concern	Location	Remedial Actions	Area of AOI/ IRM (ft^2)	Perimeter of AOI/IRM Excavation (ft.)	Depth (s) of AOI/IRM Excavation (ft. bgs)	Volume of exported material (yd^3)	Tons Exported	Tons Imported
AOI 1[(1)(3)]	Historic fill material (HFM)	25 Booth Street, 24, 26, 28, and 30 Lakeshore Drive	Cover with 2-ft. or building / asphalt	400,000	N/A	1-8	2,500	1,857	NA
AOI 2 (USTs 1-3, and 6-13)	Petroleum	30 Lakeshore Drive	Excavate, remove USTs, and backfill	8,050	427	6-12	2,100	3,323	3,100
AOI 3[(1)]	Petroleum	130 Lakeshore	Excavate and	1,540	146	4	230	375	350

	Contaminant of Concern	Location	Remedial Actions	Area of AOI/ IRM (ft^2)	Perimeter of AOI/IRM Excavation (ft.)	Depth (s) of AOI/IRM Excavation (ft. bgs)	Volume of exported material (yd^3)	Tons Exported	Tons Imported
		Drive	backfill						
AOI 4[(1)]	Pesticides	130 Lakeshore Drive	Excavate and backfill	13,300	753	1-3	900	5,433[(2)]	5,700
AOI 5	PCBs	25 Booth Street	Excavate and backfill	410	81	0.5	8	31	29
AOI 6[(3)]	CVOCs	30 Lakeshore Drive	Install clay plugs in sewer trench	N/A	NA	N/A	1,800	1,177	1,090
AOI 7	Petroleum	158 Lakeshore Drive	Cover with parking lot	50,000	NA	N/A	N/A	N/A	N/A
IRM 1	Metals	130 Lakeshore Drive	Excavate and backfill	17,000	664	2-3	1,580	6,095 [(2)]	5,050
IRM 2[(1)]	PAHs	158 Lakeshore Drive	Cover with 2-ft	20,700	N/A	N/A	N/A	N/A	1,500
IRM 3[(1)]	Metals	158 Lakeshore Drive	Excavate and backfill, cover with 2-ft	11,800[(4)]	34	2-3	6	112	1,300
IRM 4 (USTs 4, 5, 14, and 15)	Petroleum	28 Lakeshore Drive	Excavate, remove USTs, and Backfill	1,990	321	8	520	330	300

	Contaminant of Concern	Location	Remedial Actions	Area of AOI/ IRM (ft^2)	Perimeter of AOI/IRM Excavation (ft.)	Depth (s) of AOI/IRM Excavation (ft. bgs)	Volume of exported material (yd^3)	Tons Exported	Tons Imported
IRM 5 (UST 16/17)	Petroleum	158 Lakeshore Drive	Excavate, remove USTs, and backfill	420	75	10	16	22	20
Total				525,210			9,660	18,755	18,439

(1) These areas are covered with 2-ft of imported material; this is included in the imported volume. A portion of IRM 3 was excavated; however, the area of impacts was determined to be larger than anticipated. Additional cover was placed in an area larger than the IRM 3 excavation.
(2) Subsequent to completing IRM excavation and completing confirmatory soil sampling, these areas were cut an additional 2-4-ft to meet finished site grade as part of the development project. For AOI4 1,311 tons were removed to complete the IRM and an additional 4,122 tons were removed during site grading/development. For IRM1 2,732 tons were removed to complete the IRM and an additional 3,363 tons were removed during site grading/development. The excess exported material is included in the total exported volumes.
(3) The areas that generated this material for incidental disposal resulted from subsurface utility installations and were not identified as AOIs or IRMs; the material was disposed of due to a lack of area to place the spoils beneath clean cover and/or building/parking footprints.
(4) Approximately 80 ft^2 was excavated, the entire AOI was covered.

Areas and volumes are approximate. Refer to Figure 3 for all AOIs and IRMs. Approximately 525,210 square feet, equivalent to approximately 12-acres of the Site were remediated (including cover). A total of approximately 17,000 tons of material were exported off-Site for disposal.

3.2 *Remaining Contamination*

The following table includes remaining soil contamination at the Site.

Remaining Contamination Samples

AOI/ IRM	Parcel	# Documentation Samples Collected	Samples that Exceed SCGs	Exceedances	# Exceeds POGW[(2)]	# Exceeds Restricted Residential
AOI 1	24, 26, 30 Lakeshore Drive and 25 Booth Street	NA	• **GP-12-10** • **GP-12-11** • **GP-19** • **GP-34** • **GP-39** • **GP-42** • **GP-44** • **GP-48** • **GP-53** • **GP-78** • **GP-12-13** • **GP-13-7[(3)]**	Metals: Lead, arsenic, copper, cadmium, mercury SVOCs: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, beno(k)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, chrysene, dibenzofuran, fluoranthene, phenanthrene, pyrene	NA	12
AOI 2	30 Lakeshore Drive	30	• CAN-AOI2-SW4[(1)] • **CAN-AOI2-SW5[(1)]** • **CAN-AOI2-SW6** • CAN-AOI2-SW7 • **CAN-AOI2-SW8** • **CAN-AOI2-SW10** • **CAN-AOI2-SW14[(1)]** • CAN-AOI2-SW27[(1)]	VOCs: Benzene, ethylbenzene, toluene, m,p-xylene, o-xylene, sec-butylbenzene, methyl tert-butyl ether, n-propylbenzene, isopropylbenzene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene SVOCs: benzo(a)anthracene), benzo(a)pyrene, benzo(b)fluoranthene, beno(k)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, chrysene, dibenzofuran	8	5
AOI 3	130 Lakeshore Drive	7	None	None	0	0

AOI/ IRM	Parcel	# Documentation Samples Collected	Samples that Exceed SCGs	Exceedances	# Exceeds POGW[(2)]	# Exceeds Restricted Residential
AOI 4	130 Lakeshore Drive	42	None	None	NA	0
AOI 5	25 Booth Street	4	None	None	NA	0
AOI 7	158 Lakeshore Drive	4	• **TP-12-11**	SVOCs: Indeno(1,2,3-cd)pyrene	NA	1
IRM 1	130 Lakeshore Drive	24	None	None	NA	0
IRM 2	158 Lakeshore Drive		• **LABSB29**	SVOCs: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene	NA	1
IRM 3	158 Lakeshore Drive	1	None	None	NA	0
IRM 4	28 Lakeshore Drive	24	None	None	0	0
IRM 5	158 Lakeshore Drive	13	• **Can-UST 16 Side-1**	Metals: Cadmium	0	1

This table includes investigation sample locations and confirmatory sample locations. All Part 375 Restricted Residential SCO exceedances are below cover material (i.e., 2-ft. clean cover, asphalt, concrete, stone, etc.) (.

Bold font indicates the sample exceeds Restricted Residential Use SCOs.

(1)Denotes the sample was collected from off-Site.

(2) Per discussions with NYSDEC, Acetone is not a site contaminant of concern and as such acetone detections are not included in the above table.

In addition to removing soils above the applicable SCOs, the IRM Work Plan planned to remove "grossly impacted soils" defined as soils observed to have photoionization detector (PID) readings greater than 200 ppm and/or indications of product. The following table represents grossly impacted soils as defined in the IRM Work Plan that remain.

AOI	**# PID Readings Collected**	**Readings > 200 ppm**	**PID Reading (ppm)**
AOI 2	72	FS-37	395

Nineteen (19) existing on-Site endpoint soil sample locations exceed Site-specific SCGs (i.e., Restricted Residential and Protection of Groundwater where groundwater impacts were present). In addition, four (4) off-Site samples south of AOI 2 exceed Site-specific SCGs, and three (3) samples from IRM 1 that exceeded Site-specific SCGs were removed from the Site during regrading. Acetone is not considered to be a Site contaminant and is not included as remaining contamination. Note that a cover system has been placed over areas of remaining contamination. Refer to Figure 4A for all soil sample locations and Figures 4B and 4C for remaining soil contamination.

3.3 *Groundwater*

Six (6) post-IRM groundwater monitoring wells were installed on February 10-11 and February 26, 2016, developed on March 3, 2016 and sampled on March 22, 2016, and June 22-23, 2016. It should be noted that all pre-IRM monitoring wells have been removed to facilitate IRM excavations and/ or redevelopment. Pre-IRM groundwater monitoring data (i.e., wells installed during the Phase II ESA and/or RI) do not represent conditions post-source removal and are; therefore, not included as remaining contamination. Detected compounds did not exceed NYSDEC Part 703 Groundwater Quality Standards in any of the samples collected during the most recent groundwater sampling in June 2016.

In AOI 2 the pre-IRM well CAN-MW-12-3 identified 1,130.2 ppb total volatile organic compounds (VOCs) in October 2013 and post-IRM well CAN-IRM-MW-12-3 identified 30.88 ppb total VOCs in June 2016. This equates to an approximately 97% decrease in total VOCs. Pre-IRM well CAN-MW-20 identified 254.7 ppb total VOCs in October 2013 and post-IRM well CAN-IRM-MW-20 was non-detect for VOCs in June 2016. This is a 100% decrease in total VOCs.

3.4 *Conceptual Site Model*

Based on the cumulative investigative data obtained to date the IRMs have been successful at addressing petroleum impacts on-Site and at reducing groundwater impacts; however, there are two (2) Remedial Areas of Concern (RAOCs) that remain:

a. Petroleum impacts at 30 Lakeshore Drive: Petroleum related VOCs and/ or SVOCs in four (4) on-Site documentation samples in AOI 2 do not meet Restricted Residential Use and/or Protection of Groundwater criteria (CAN-AOI2-SW6,CAN-AOI2-SW7, CAN-AOI2-SW8, and CAN-AOI2-SW10). One (1) field screening location exceeded the 200 ppm threshold indicated in the IRM Work Plan (FS37). The source of this contamination was former USTs associated with a former gasoline filling station. USTs have been removed as part of IRMs in addition to all soil that could be practicably excavated; as such, the source of contamination has been removed.

b. Historic fill material across the Site: SVOC and metals impacts are present at 24, 30, 130, and 158 Lakeshore Drive at concentrations that do not meet Restricted Residential Use criteria. The source of this contamination is historic fill material (HFM), which has been documented across the entire Site. The entire western portion of the Site including 24, 26, 28, 30, Lakeshore Drive and 25 Booth Street, in addition to IRM 1, IRM 2, IRM 5, and AOI 7 which identified metals and/or SVOC impacts, are covered with 2-ft. of material that meets Restricted Residential Use criteria, or an asphalt or concrete cap. In addition, the southern portion of 130 Lakeshore Drive was re-graded post-IRMs to meet proposed Site grades, and was backfilled with a minimum 2-ft. imported material.

3.5 *Summary of Human Exposure Pathways*

People are not drinking the groundwater because the area is served by a public water supply that is not contaminated by the site. People may come into contact with contaminated soil if they trespass on the site and if they dig below the cover material. Volatile organic compounds in groundwater may move into the soil vapor (air spaces within the soil), which in turn may move into overlying buildings and affect indoor air quality. This process, which is similar to the movement of radon gas from the subsurface into the indoor air of buildings, is referred to as soil vapor intrusion. Environmental sampling indicates soil vapor is contaminated on-site and actions have been recommended to address the potential for soil vapor intrusion to occur in future on-site buildings. Off-site soil vapor intrusion sampling is being conducted as part of the Parkway Cleaners site (V00238).

For further details regarding the nature and extent of contamination, refer to the RI Report and Supplemental RI Report.

4.0 Objective

The objective of this RAA is to identify, evaluate and select remedies to address the contamination identified by the RI and IRMs. As defined in NYSDEC DER-10 (Section 4.0) and DER-31, remedial alternatives will be evaluated based on the following criteria:

1) Overall Protection of Public Health and the Environment: This criterion is an evaluation of the ability of each alternative or the remedy to protect public health and the environment during or subsequent to implementation of the alternative.

2) Compliance with SCGs: This criterion evaluates whether the remedial alternative will ultimately result in compliance with the applicable, relevant or appropriate SCGs, to the extent practicable.

3) Long-Term Effectiveness and Permanence: This criterion evaluates if the remedy is effective and permanent in the long-term after implementation (e.g., potential rebound). In the event that remaining impacts will remain as part of the alternative, then the risks and adequacy/reliability of the controls are also evaluated.

4) Reduction of Toxicity, Mobility, or Volume with Treatment: This criterion is an evaluation of the ability of an alternative or remedy to reduce the toxicity, mobility and volume of site contamination. In addition, the reversibility of the contaminant destruction or treatment is evaluated.

5) Short-Term Impact and Effectiveness: This criterion is an evaluation of the potential short-term adverse environmental impacts and human exposures during construction and/or implementation of an alternative or remedy.

6) Implementability: This criterion evaluates the remedial alternative based on its suitability, implementability at the specific site, and availability of services and materials that will be required.

7) Cost: This criterion evaluates the capital, operation, maintenance, and monitoring costs for the remedial alternative. The estimated costs are presented on a present worth basis.

8) Land Use: This criterion is an evaluation of the current, intended and reasonably anticipated future use of the Site and its surroundings, as it relates to an alternative or remedy, when unrestricted levels would not be achieved. The Land Use Evaluation is included as Appendix A.

9) Community Acceptance: This criterion will be evaluated after the public review of the remedy selection process.

10) Green Remediation: This criterion considers all environmental effects of remedy implementation and incorporates alternatives that minimize the environmental footprint of cleanup actions.

5.0 Remedial Action Objectives

Remedial action objectives (RAOs) are medium-specific objectives for the protection of public health and the environment and are developed based on contaminant-specific SCGs established by NYSDEC and/or NYSDOH. The following have been defined for this Site based on the current, intended and reasonably anticipated future use of the Site and its surroundings. An assessment of future use was completed based on requirements of Part 375 1.8(f)(9) and is provided in Appendix A.

Soil RAOs

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil.
- Prevent inhalation of or exposure from contaminants volatilizing from contaminants in soil.

Groundwater RAOs

RAOs for Public Health Protection

- Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards.
- Prevent contact with, or inhalation of volatiles, from contaminated groundwater.

Soil Vapor

RAOs for Public Health Protection

• Mitigate impacts to public health resulting from existing, or the potential for, soil vapor intrusion into buildings at a site.

6.0 Development of Remedial Alternatives

This section develops the remedial alternatives being considered for addressing the RAOCs identified for the Site. The following two (2) RAOCs exist for the Site and were evaluated for remedial alternatives:

1. RAOC #1 – Petroleum impacts at 30 Lakeshore Drive

2. RAOC #2- Historic fill material across the Site

6.1 *Evaluation of Alternatives*

This alternatives analysis evaluates three (3) remedial alternatives for each RAOC. Since the alternatives are evaluated separately for each RAOC, there are some tasks which overlap each analysis (e.g., reporting, etc.). Based on this, the alternatives are evaluated separately initially but the total cost and scope for the selected remedy will be adjusted for the final site wide remedial approach (refer to Section 9.0). An alternative to meet Track 1 Cleanup criteria was evaluated for each RAOC. The following three (3) alternatives were evaluated for use at the Site.

a. *Unrestricted Use Cleanup:* An alternative assessing Unrestricted Use for the Site was assessed. This alternative would require that soils exceeding Unrestricted Use SCOs and/or PID readings exceeding 200 ppm be removed from the Site. Under this alternative, areas known to contain HFM would be also be removed. There are a total of twenty two (22) remaining soil sample locations that exceed Unrestricted Use SCOs and one (1) remaining field screening location that exceeds 200 ppm. Note that acetone is not considered a Site contaminant and is not included as remaining contamination. Implementation of Alternative 1 for both RAOCs will result in Unrestricted Use Cleanup across the Site. This alternative would require an excavation area of approximately 450,000 square feet (ft^2) (including areas of known HFM) and would include locations shown on Figure 5. The areas of excavation would extended to the nearest soil sample that meets SCOs, 10-ft. beyond IRM excavations for documentation samples, or a radius of approximately 15-ft. if the sample was not within an IRM excavation. Soils exceeding Unrestricted Use SCOs would be removed to 1-ft. above and below each sample of remaining contamination. The RI Report indicated that HFM was encountered beginning at depths ranging from 2 to 8-ft. bgs, with thicknesses ranging from 0.2 to 6-ft, with the exception of GP/MW-12-4 in which HFM was 11.2-ft. thick. For the purpose of this assessment, HFM in the western portion of the Site is assumed to be on average 6-ft. thick beginning at 2-ft. bgs and extending to 8-ft. bgs (note, depths of HFM account for the existing cover system). This alternative assumes that locations of HFM in the western portion of the Site will be excavated from 2-8-ft. bgs and only HFM containing material would require off-Site disposal. It should be noted that HFM was encountered in IRM 3 at 158 Lakeshore Drive and a series of test pits were completed to vertically delineated HFM; HFM in this area extends to 3-ft. bgs. A total of approximately 90,000 cubic yards (yd^3) of material or 125,000 tons would be excavated for off-Site disposal to meet

Unrestricted Use SCOs and remove all HFM from the Site. Excavated material would be disposed of off-Site at a NYCRR Part 360 landfill. This alternative would require that newly constructed buildings (Buildings A, B-1 and B-2) be demolished and reconstructed in order to remove contamination beneath the building footprints.

b. *Restricted Residential Use Cleanup:* An alternative assessing Site-specific SCGs (i.e., Restricted Residential Use and Protection of Groundwater in areas of groundwater impacts) for the Site was assessed. This alternative would require that soils exceeding Restricted Residential Use SCOs and Protection of Groundwater SCOs, where applicable, and PID readings greater than 200 ppm be removed from the Site. The areas of excavation would extended to the nearest soil sample that meets SCOs, 10-ft. beyond IRM excavations for documentation samples, or a radius of approximately 15-ft. if the sample was not within an IRM excavation. Under this alternative, areas containing HFM would not be removed, unless the HFM contains soil samples that do not meet Restricted Residential Use SCOs, as shown on Figure 6. There are a total of nineteen (19) remaining soil sample locations that exceed Site-Specific SCGs (Restricted Residential Use SCOs and/or Protection of Groundwater SCOs in areas of groundwater impacts), and one (1) remaining field screening location that exceeds 200 ppm. Note that acetone is not considered a Site contaminant and is not included as remaining contamination. Implementation of Alternative 2 for both RAOCs will result in Restricted Residential Use Cleanup across the Site. A total of approximately 13,000 yd^3 of material or 19,000 tons would be excavated for off-Site disposal to meet Site-Specific SCGs across the Site. Excavated material would be disposed of off-Site at a NYCRR Part 360 landfill. This alternative would require demolition and reconstruction of Building B-1 in order to remove HFM samples containing metals and/or SVOCs that were relocated to beneath the building footprint, and removal of all HFM to 8-ft. beneath Building B-1. This alternative would include the development of a Site Management Plan (SMP) and implementation of ICs and ECs.

c. *No Further Action with Site Cover and ICs/ ECs Remedy:* This alternative would be a BCP Track 4 Restricted Use with generic soil cleanup objectives remedy. This alternative would utilize the existing cover EC and ICs in the form of a SMP and Environmental Easement. This alternative would include on-Site management in accordance with a SMP which would include an Excavation Work Plan (EWP) and Health and Safety Plan (HASP). The SMP would place ECs and ICs on the Site. The SMP would require evaluating and/or mitigating soil vapor intrusion for future Site buildings, soil screening during ground-intrusive work, maintenance of a cover system, and restricted use of the Site. This method would not include active remediation but rather management to ensure that the location of impacted materials are known and any disturbance of these materials is conducted in accordance with the appropriate regulations. It should be noted that the Site is covered with 2-ft. of clean cover material or a cap consisting of asphalt and/or concrete to comply with Restricted Residential criteria and meet final Site grades. Refer to Figure 7 for final cover.

The three (3) abovementioned alternatives were evaluated for both RAOCs and are listed below.

1. **RAOC #1 – Petroleum impacts at 30 Lakeshore Drive**

A description of proposed applications for the alternatives evaluated is included below.

Alternative 1: Unrestricted Use Cleanup (BCP Track 1): This alternative for RAOC #1 would include excavation of soils that exceed Unrestricted Use SCOs proximate AOI 2 at 30 Lakeshore Drive. Four (4) on-Site soil samples were left in place in AOI 2 that exceed Unrestricted Use SCOs for VOCs and/or SVOCs (note, acetone is not considered a Site contaminant). In addition, one (1) field screening location left in place exceeds 200 ppm. Under this alternative, remaining contamination in AOI 2 would be excavated for off-Site disposal. Soils would be removed vertically to 1-ft. below each remaining contamination soil sample and laterally to the nearest soil sample that meets SCOs, 10-ft. beyond IRM excavations for documentation samples, or a radius of approximately 15-ft. if the sample was not within an IRM excavation. A total area of approximately 4,600 ft^2 would be excavated to depths ranging from 6 to 13-ft. bgs as shown on Figure 5. A total of approximately 200 yd^3 or 260 tons of petroleum-contaminated material would be disposed of off-Site. It should be noted that acetone was detected in several soil samples in IRM 4 and AOI 2 at concentrations that exceed Unrestricted Use SCOs. The concentrations of acetone are anticipated to be attributed to laboratory artifacts and are not included in this alternative. Off-Site samples are not included in this RAOC. Confirmatory soil samples would be collected from excavations in accordance with DER-10. It is assumed that shoring will be necessary along the southern property boundary due to the close proximity of utilities and the sidewalk. If groundwater accumulates in the excavations, it would be pumped to a temporary storage container for disposal via sanitary sewer pending issuance of a discharge permit. This alternative assumes ICs and ECs, including an SMP and SSDS, would not be required.

Alternative 2: Restricted Residential Use Cleanup (BCP Track 4): This alternative for RAOC #1 would include excavation of soils that exceed Restricted Residential Use or Protection of Groundwater SCOs and field screening locations that exceed 200 ppm proximate AOI 2 at 30 Lakeshore Drive as shown on Figure 6. Four (4) on-Site soil samples were left in place during excavation of AOI 2 that exceed Site-specific SCGs for petroleum-related VOCs and/or SVOCs (AOI2-SW6, AOI2-SW7, AOI2-SW8, and AOI2-SW10 at current depths of 7-ft. bgs). In addition, one (1) field screening location left in place exceeds 200 ppm (FS37). Under this alternative, these five (5) locations would be excavated for off-Site disposal. Soils would be removed vertically to 1-ft. below each remaining contamination soil sample and laterally to the nearest soil sample that meets SCOs, 10-ft. beyond IRM excavations for documentation samples, or a radius of approximately 15-ft. if the sample was not within an IRM excavation. A total area of approximately 4,600 ft^2 would be excavated to depths ranging from 7 to 13-ft. bgs. Soils would be excavated for off-Site disposal beginning at the sample elevation and extending vertically to 1-ft. below each remaining contamination sample (i.e., clean backfill and/or cover placed above remaining contamination soil samples would not require off-Site disposal). A total of approximately 200 yd^3 or 260 tons of petroleum-contaminated material would be disposed of off-Site. Off-Site samples are not included in this RAOC. Confirmatory soil samples would be collected from excavations in accordance with DER-10. If groundwater accumulates in the excavations, it would be pumped to a temporary storage container for disposal via sanitary sewer pending issuance of a discharge permit. This alternative would also inherently remove all Unrestricted Use exceedances because all Unrestricted Use exceedances in AOI 2 (excluding acetone) also exceed Protection of Groundwater or Restricted Residential SCOs;

as such, this alternative assumes ICs and ECs, including an SMP and SSDS, would not be required.

Alternative 3 – No Further Action *with Site Cover and ICs/ ECs Remedy* (BCP Track 4): This alternative includes no further action with Site Cover and ICs/ ECs. On-Site management would manage remaining petroleum impacts in place. The source of contamination (i.e., USTs associated with former gasoline filling stations and petroleum-impacted soil and groundwater) has been removed; however, impacts remain in AOI 2. Under this alternative, remaining impacts would be managed in-place in accordance with a SMP and Environmental Easement. The SMP will require that all occupied on-Site buildings operate and maintain a SSDS to mitigate potential soil vapor intrusion, or be assessed for SVI to determine the need for mitigation. For the purpose of this assessment, the SSDS being installed in Buildings A, B-1, and B-2 are assumed to be completed and only the operational costs are included. Future buildings would also require a SSDS or SVI assessment to determine the need for mitigation. In addition, the use of groundwater at the Site is restricted. It should be noted that areas of remaining contamination are covered with 2-ft. of clean imported material or a cap in order to meet finished Site grades and to comply with future anticipated Site use (Restricted Residential). A demarcation layer was placed prior to covering areas of remaining contamination to differentiate between the cover system and potentially contaminated material. Refer to Figure 7 for a representation of the final cover system/ cap.

2. **RAOC #2 - Historic fill material across the Site**

A description of proposed applications for the alternatives evaluated is included below.

Alternative 1: Unrestricted Use Cleanup (BCP Track 1): This alternative for RAOC #1 would include excavation of soils that contain HFM at the Site. HFM was identified across a majority of 24, 26, 28, 30 Lakeshore Drive and 25 Booth Street during investigative activities generally to depths of up to 6-ft. bgs. In addition, during excavation of IRM 3, HFM was noted in the top 3-ft. This assessment assumes average thickness of HFM to be 3-ft. This alternative would consist of excavation and disposal of all known HFM as shown on Figure 5. Several soil samples detected metals and/or SVOCs at concentrations that exceed Unrestricted Use SCOs. The elevated metals and/or SVOCs in soil are anticipated to be attributed to HFM. It should be noted that acetone is not considered a Site contaminant and exceedances of acetone are not included in this RAOC. In addition, there are three (3) remaining soil sample locations with PCBs above Unrestricted Use SCOs at depths of 0-5-ft. bgs. Since these are within the area of known HFM, those sample locations are included in this RAOC for cost estimating purposes. Under this alternative, all soils that exceed Unrestricted Use SCOs and/or contain HFM would be removed. A total area of approximately 440,000 ft^2 would be excavated to depths ranging from 2 to 11-ft. bgs. Soils would be excavated for off-Site disposal beginning at the sample elevation or start of HFM and extending vertically to 1-ft. above and below each remaining contamination sample (i.e., clean backfill and/or cover placed above remaining contamination soil samples would not require off-Site disposal) or to the depth below HFM in which native material is encountered. A total of approximately 100,000 yd^3 or 140,000 tons of HFM and metals/SVOC-contaminated material would be disposed of off-Site. Confirmatory soil samples would be collected from excavations in accordance with DER-10. It is assumed that

shoring will be necessary along the southern property boundary due to the close proximity of utilities and the sidewalk. This alternative would require that newly constructed Buildings A, B-1 and B-2 be demolished and reconstructed to excavate HFM beneath the buildings. If groundwater accumulates in the excavations, it would be pumped to a temporary storage container for disposal via sanitary sewer pending issuance of a discharge permit. Refer to Figure 5 for locations of known HFM and soil samples that exceed Unrestricted Use SCOs. This alternative assumes ICs and ECs, including an SMP and SSDS, would not be required.

Alternative 2: Restricted Residential Use Cleanup (BCP Track 4): Under this alternative, soil samples containing metals and/or SVOCs at concentrations that exceed Restricted Residential Use SCOs would be excavated for off-Site disposal. A total of fifteen (15) soil samples contain metals and/or SVOCs at concentrations that exceed Restricted Residential Use SCOs (GP-44, GP-48, GP-42, GP-39, GP-78, GP-34, GP-53, GP-12-11, GP-12-10, GP-12-13, GP-13-7, GP-19, CAN-UST 16 Side-1, LABSB29, and TP-12-11. Note that IRM 1 and AOI 4 were regraded post IRM completion; as such, remaining contamination in this area has been removed from the Site. Refer to Figure 6. Under this alternative, these fifteen (15) locations would be excavated for off-Site disposal. Soils would be removed vertically to 1-ft. above and below each remaining contamination soil sample and laterally to the nearest soil sample that meets SCOs, or a radius of approximately 15-ft.. A total area of approximately 70,000 ft^2 would be excavated to depths ranging from 2 to 8-ft. bgs. A total of approximately 13,000 yd^3 or 19,000 tons of metals/SVOC impacted material would be disposed of off-Site. Confirmatory soil samples would be collected from excavations in accordance with DER-10. Note that areas of suspected or known HFM that is not documented to contain metals and/or SVOCs at concentrations that exceed Restricted Residential Use SCOs would remain in place. This alternative would require demolition and reconstruction of Building B-1 in order to remove HFM samples containing metals and/or SVOCs that were relocated to beneath the building footprint, and removal of all material to 8-ft. beneath Building B-1.If groundwater accumulates in the excavations, it would be pumped to a temporary storage container for disposal via sanitary sewer pending issuance of a discharge permit. This alternative would also require the implementation of ECs and ICs under an SMP. Specifically, an SMP would be in-place to manage remaining impacts (i.e., contaminants above Unrestricted Use SCOs) and ECs consisting of an SSDS for all buildings and a cover system would be maintained. For the purpose of this assessment, the SSDS being installed in Buildings A, B-1, and B-2 are assumed to be completed and only the operational costs are included. Future buildings would also require a SSDS.

Alternative 3 – No Further Action *with Site Cover and ICs/ ECs Remedy* (BCP Track 4): This alternative includes no further action with Site Cover and ICs/ ECs. On-Site management would manage remaining HFM left in place. Under this alternative, HFM would be managed in accordance with a SMP and Environmental Easement. The SMP will contain an EWP containing provisions for managing subsurface material during future subsurface work at the Site. In addition, the SMP will require the use of ECs in the form of a 2-ft. cover system or cap. It should be noted that areas of remaining contamination are covered with 2-ft. of clean imported material or a cap in order to meet finished Site grades and to comply with future anticipated Site use (Restricted Residential). A demarcation layer was placed prior to covering areas of remaining contamination to differentiate between the cover system and potentially contaminated material. Refer to Figure 7 for a representation of the final cover system/ cap.

7.0 Analysis of Alternatives

Remedial alternatives detailed in section 6.0 were evaluated based on the following criteria with the exception of community acceptance which cannot be evaluated at this time prior to initiating a public comment period. Note that although the SCGs determined in the RI report indicate Unrestricted Use SCOs are applicable, it is anticipated that future development will be consistent with Restricted Residential Use.

a) Protection of human health and the environment
b) Compliance with SCGs
c) Reduction of toxicity, mobility, or volume
d) Short-term effectiveness
e) Long-term effectiveness
f) Implementability
g) Cost
h) Land use
i) Community acceptance
j) Green remediation

7.1 *RAOC #1- Petroleum Impacts at 30 Lakeshore Drive*

Alternative 1 – Unrestricted Use Cleanup (BCP Track 1)

Alternative 1 includes excavation of soil samples proximate AOI 2 that exceed Unrestricted Use SCOs and field screening locations above 200 ppm. An estimated 200 yd^3 of impacted material would be excavated for off-Site removal. Documentation sampling would be completed to determine the final extent of excavations. The area would be backfilled with material that meets Unrestricted Use criteria. Refer to Figure 5.

This alternative would be protective to human health and the environment because impacted material would be removed from the Site. This alternative would comply with SCGs. Toxicity, mobility, and volume of contaminants would be removed and; therefore, reduced. This alternative would be effective short-term, and long-term. This alternative would be significantly difficult to implement due to the current redevelopment activities. The estimated costs to implement this alternative are extremely high. This alternative would be consistent with land use as it will meet Restricted Residential Use criteria. This alternative is not considered “green” due to the contributions of impacted soil to landfills and increased truck traffic.

The cost for this alternative is summarized below. A detailed cost summary is included in Table 1.

Estimated Capital Cost.....…$ 11,608
Estimated Annual Cost ..... $ 0
Estimated Total Present Worth Cost .....…$ 11,608

Alternative 2 – Restricted Residential Use Cleanup (BCP Track 4)

Alternative 2 includes excavation of soil samples proximate AOI 2 that exceed Restricted Residential Use SCOs and field screening locations above 200 ppm. An estimated 200 yd^3 of impacted material would be excavated for off-Site removal Documentation sampling would be

completed to determine the final extent of excavations. The area would be backfilled with material that meets Restricted Residential Use criteria. Refer to Figure 6.

This alternative would be protective to human health and the environment because impacted material would be removed from the Site. This alternative would comply with SCGs. This alternative would inherently remove all Unrestricted Use exceedances from AOI 2 and; as such, would not require an SMP. Toxicity, mobility, and volume of contaminants would be reduced by removing soils that exceed Site-specific SCOs. This alternative would be effective short-term, and long-term. This alternative would be slightly difficult to implement. The estimated costs to implement this alternative are moderately high. This alternative would be consistent with land use as it will meet Site-specific SCGs criteria. This alternative is not considered "green" due to the contributions of impacted soil to landfills and increased truck traffic.

The cost for this alternative is summarized below. A detailed cost summary is included in Table 2.

Estimated Capital Cost.....…$ 111,608
Estimated Annual Cost ..... $ 3,220
Estimated Total Present Worth Cost .....…$ 167,288

Alternative 3 – No Further Action with Site Cover and ICs/ ECs Remedy (BCP Track 4)

Description

Under this alternative, active remediation would not be implemented; rather, ICs and ECs would be implemented under an SMP and Environmental Easement. ECs would include installation of an SSDS in all regularly occupied building spaces, and maintenance of a cover system/ cap. Completion of the cover system/ cap is currently in progress. ICs would include restricting the use of groundwater for potable use and restricting the Site use to Restricted Residential.

This alternative would be protective to human health and the environment because impacted material would be covered. In addition, soil vapor intrusion would be assessed, or soil vapors would be mitigated to prevent soil vapor intrusion. This alternative would not comply with SCGs (i.e., material would be left in place that exceeds Restricted Residential and Protection of Groundwater SCOs). This alternative would require an SMP to manage remaining impacts. Toxicity, mobility, and volume of contaminants would be reduced by covering soils that exceed Restricted Residential Use SCOs. This alternative would be effective short-term, and long-term as long as the ECs are maintained. This alternative would be relatively easy to implement. The estimated costs to implement this alternative are relatively low. This alternative would be consistent with land use as it will meet Site-specific SCGs. This alternative is considered "green" due to the reduced carbon footprint compared to excavation of remaining impacts and importing backfill.

The cost for this alternative is summarized below. A detailed cost summary is included in Table 5.

Estimated Capital Cost.....…. $ 0
Estimated Annual Cost $3,220
Estimated Total Present Worth Cost .....….. $ 58,900

7.2 *RAOC #2: Historic fill material across the Site:*

Alternative 1 – Unrestricted Use Cleanup (BCP Track 1)

Alternative 1 includes excavation of areas where soil samples that contain HFM, exceed Unrestricted Use SCOs and/or field screening locations that exceed 200 ppm). An estimated 100,000 yd^3 of impacted material would be excavated for off-Site disposal. Documentation sampling would be completed to determine the final extent of excavations. Implementation of this alternative would require demolition and reconstruction of Buildings A, B-1 and B-2 to excavate HFM beneath the buildings. The area would be backfilled with material that meets Unrestricted Use criteria. Refer to Figure 5.

This alternative would be protective to human health and the environment because impacted material would be removed from the Site. This alternative would comply with all SCGs. Toxicity, mobility, and volume of contaminants would be removed and; therefore, reduced. This alternative would be effective short-term, and long-term. This alternative would be significantly difficult to implement due to the volume of material required for disposal. This alternative will require shoring along the southern property line due to the proximity to utilities and the sidewalk along Lakeshore Drive. The estimated costs to implement this alternative are extremely high. This alternative would be consistent with land use as it will meet Site-specific SCGs. This alternative is not considered "green" due to the contributions of impacted soil to landfills and increased truck traffic (i.e., increased carbon footprint).

The cost for this alternative is summarized below. A detailed cost summary is included in Table 3.

Estimated Capital Cost.....…$ 140,277,028
Estimated Annual Cost ..... $ 0
Estimated Total Present Worth Cost .....…$ 140,277,028

Alternative 2 – Restricted Residential Use Cleanup (BCP Track 4)

Alternative 2 includes excavation of soil samples that exceed Restricted Residential Use SCOs assumed to be a result of HFM. An estimated 13,000 yd^3 of impacted material would be excavated for off-Site disposal Building B-1 would be demolished and rebuilt in order to remove HFM with documented metals and SVOCs that exceed Restricted Residential Use SCOs beneath the building. Documentation sampling would be completed to determine the final extent of excavations. This alternative would require an SMP to manage remaining impacts. The area would be backfilled with material that meets Restricted Residential Use criteria. Refer to Figure 6.

This alternative would be protective to human health and the environment because impacted material would be removed from the Site. This alternative would comply SCGs. Toxicity, mobility, and volume of contaminants would be reduced by removing soils that exceed Restricted Residential Use SCOs. This alternative would be effective short-term, and long-term. This alternative would be slightly difficult to implement. The estimated costs to implement this alternative are moderately high. This alternative would be consistent with land use as it will meet Site-specific SCGs. This alternative is not considered "green" due to the contributions of impacted soil to landfills and increased truck traffic.

The cost for this alternative is summarized below. A detailed cost summary is included in Table 4.

Estimated Capital Cost.....…$ 25,237,910
Estimated Annual Cost ..... $ 3,220
Estimated Total Present Worth Cost .....…$ 25,293,590

Alternative 3 – No Further Action with Site Cover and ICs/ ECs Remedy (BCP Track 4)

Description

Under this alternative, active remediation would not be implemented; rather, ICs and ECs would be implemented under an SMP and Environmental Easement. ECs would include installation and operation of an SSDS in all regularly occupied building spaces or SVI testing to determine the need for mitigation, and maintenance of a cover system/ cap. ICs would include restricting the use of groundwater for potable use and restricting the Site use to Restricted Residential.

This alternative would be protective to human health and the environment because impacted material would be covered. In addition, soil vapors will be mitigated to prevent soil vapor intrusion. This alternative would comply with most SCGs (i.e., material would be left in place that exceeds Restricted Residential and Protection of Groundwater SCOs). Toxicity, mobility, and volume of contaminants would be reduced by covering soils that exceed Restricted Residential Use SCOs. This alternative would be effective short-term, and long-term as long as the ECs are maintained. This alternative would be relatively easy to implement. The estimated costs to implement this alternative are relatively low. This alternative would be consistent with land use as it will meet Site-specific SCGs. This alternative is considered "green" as it results in the smallest carbon footprint of the alternatives.

The cost for this alternative is summarized below. A detailed cost summary is included in Table 5.

Estimated Capital Cost.....…. $ 0
Estimated Annual Cost (years 1-30)..... $3,220
Estimated Total Present Worth Cost .....….. $ 58,900

8.0 Comparative Evaluation of Alternatives and Recommended Actions

The following table compares the remedial alternatives proposed for each RAOC and presents the recommended action for each RAOC. Refer to Table 5 for total estimated costs.

Comparison of Remedial Alternatives and Selection Criteria

	Protection of Human Health and the Environment	Compliance with SCGs	Reduction of Toxicity, Mobility or Volume	Short-Term Effectiveness	Long-Term Effectiveness	Ease of Implementation	Cost-Effective	Appropriate based on Future Anticipated Land Use	Green
RAOC #1: Petroleum impacts at 30 Lakeshore Drive									
Alternative 1: Unrestricted Use Cleanup	X	X	X	X	X			X	
Alternative 2: Restricted Residential Use Cleanup	X		X	X	X			X	
Alternative 3: No Further Action with Site Cover and ICs/ ECs Remedy	X		X	X	X	X	X	X	X
RAOC #2: Historic fill material across the Site									
Alternative 1: Unrestricted Use Cleanup	X	X	X	X	X			X	
Alternative 2: Restricted Residential Use Cleanup	X		X	X	X			X	
Alternative 3: No Further Action with Site Cover and ICs/ ECs Remedy	X		X	X	X	X	X	X	X

denotes selected alternative(s)

9.0 Recommended Remedial Alternatives

Based on the results of the investigations at the Site, the IRMs that have been performed, and the evaluation presented herein, the BCP Volunteer is proposing No Further Action with Site Cover and ICs/ ECs Remedy as the remedy for the site. The remedy proposed is a BCP Track 4: Restricted use with generic soil cleanup objectives remedy. The proposed remedy is referred to as the No Further Action with Site Cover and ICs/ECs Remedy.

RAOC #1– Petroleum impacts at 30 Lakeshore Drive
No further action with Site Cover and ICs/ ECs Remedy is proposed for RAOC #1. Remaining petroleum impacts will be managed in place in accordance with a SMP. The source of contamination has been removed though IRMs in which over 3,000 tons of petroleum-impacted soil and eleven (11) USTs were removed from 30 Lakeshore Drive. Remaining impacts are located at 5-ft. bgs, beneath adequate cover. An SSDS will be operated and maintained in each regularly occupied space to mitigate the potential for soil vapor intrusion or soil vapor intrusion testing will be completed to evaluate the need for mitigation.

RAOC #2– Historic fill material across the Site
No further action with Site Cover and ICs/ ECs Remedy is proposed for RAOC #2. HFM and associated metals and SVOC impacts will be managed in place in accordance with a SMP. A cover system consisting of a minimum 2-ft. clean material and/or a cap consisting of asphalt, concrete, or buildings is placed and will be maintained.

The elements of the remedy are summarized in Section 9.1, 9.2, and 9.3.

9.1 *Engineering Controls*

Sub-Slab Depressurization System- A SSDS will be installed in each regularly occupied building or soil vapor intrusion testing will be completed to evaluate the need for mitigation. Operation and maintenance requirements will be specified in the SMP.

Cover System- A site cover currently exists and will be maintained to allow for restricted residential use of the site. Any site redevelopment will maintain the existing site cover, which consists either of the structures such as buildings, pavement, sidewalks or soil where the upper 2 feet of exposed surface soil meets the applicable soil cleanup objectives (SCOs) for restricted residential use. Any fill material brought to the site will meet the requirements for the identified site use as set forth in 6NYCRR part 375-6.7(d).

9.2 *Institutional Controls*

An IC in the form of an environmental easement for the controlled property which will:

- require the remedial party or site owner to complete and submit to the Department a periodic certification of institutional and engineering controls in accordance with Part 375-1.8 (h)(3);
- allow the use and development of the controlled property restricted residential use as defined by Part 375-1.8(g), although land use is subject to local zoning laws;
- restrict the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the NYSDOH or County DOH; and

• require compliance with the Department approved Site Management Plan.

9.3 *Site Management Plan*

A SMP is required which includes the following:

a) An Institutional and Engineering Control Plan that identifies all use restrictions and engineering controls for the site and details the steps and media-specific requirements necessary to ensure the following institutional and/or engineering controls remain in place and effective:

Institutional Controls: The Environmental Easement discussed above in Section 9.2.

Engineering Controls: The soil cover discussed above and sub-slab depressurization system components put into service at the property.

This plan includes, but may not be limited to:

- an Excavation Plan which details the provisions for management of future excavations in areas of remaining contamination;
- a provision should redevelopment occur to ensure no soil exceeding protection of groundwater concentrations will remain below storm water retention basin or infiltration structures.
- descriptions of the provisions of the environmental easement including any land use, and groundwater use restrictions;
- a provision for evaluation of the potential for soil vapor intrusion if future buildings are developed on the site, including provision for implementing actions recommended to address exposures related to soil vapor intrusion approved by the Department prior to occupancy;
- provisions for the management and inspection of the identified engineering controls;
- maintaining site access controls and Department notification; and
- the steps necessary for the periodic reviews and certification of the institutional and/or engineering controls.

b) A Monitoring Plan to assess the performance and effectiveness of the remedy. The plan includes, but may not be limited to:

- monitoring of groundwater to assess the performance and effectiveness of the remedy/IRM;
- a schedule of monitoring and frequency of submittals to the Department;
- monitoring for vapor intrusion for any occupied existing or future buildings developed on the site, as may be required by the Institutional and Engineering Control Plan discussed above.

10.0 Deliverables

The information and data obtained during the remedy will be documented in the FER. The FER will be completed in accordance with DER-10. Based on the fact that the cover system is included in the ISMP and the limits have been further defined through various addenda, a Remedial Action Work Plan (RAWP) for implementation of the selected remedy does not appear to be warranted.

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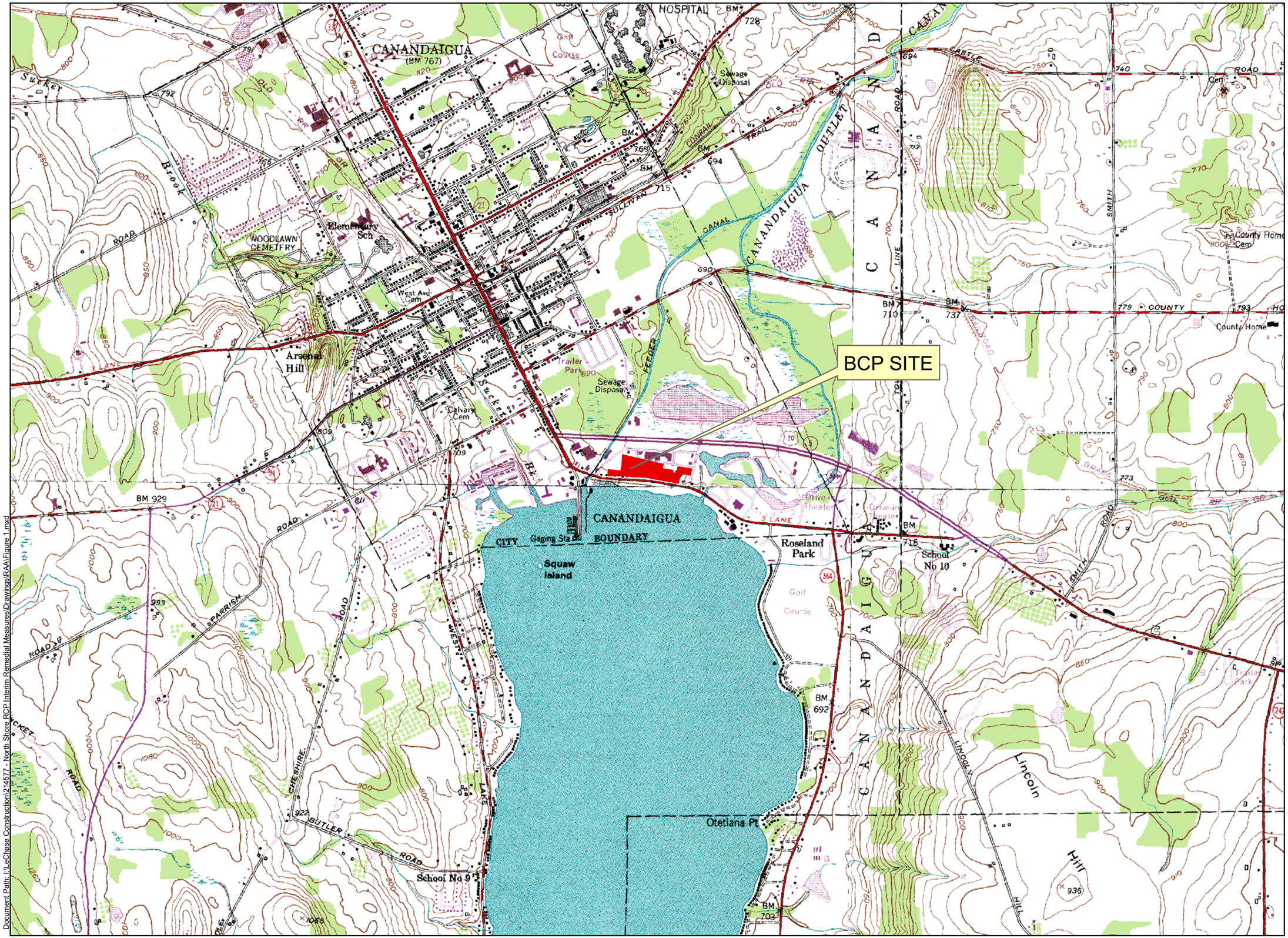
Rochester, New York 14614

Figures



Document Path: I:\LeChase Construction\214577 - North Shore RCP Interim Remedial Measures\Drawings\RAA\Figure 1.mxd

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Remedial Alternatives Analysis

Canandaigua Multi-Brownfield Site, New York

NYSDEC BCP #C835025

Site Location Map
USGS Topographic Map

0 2,000
Feet
1 inch = 2,000 feet
Intended to print as 11x17

N
W E
S

FIGURE 1

214577

Document Path: \\PROJECTS1\Projects\AM-5\LeChase Construction\214577 - North Shore RCP Interim Remedial Measures\Drawings\RAI\Figure 2- BCP Site.mxd

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Remedial Alternatives Analysis

Canandaigua Multi-Brownfield Site, New York

NYSDEC BCP #C835025

BCP Site

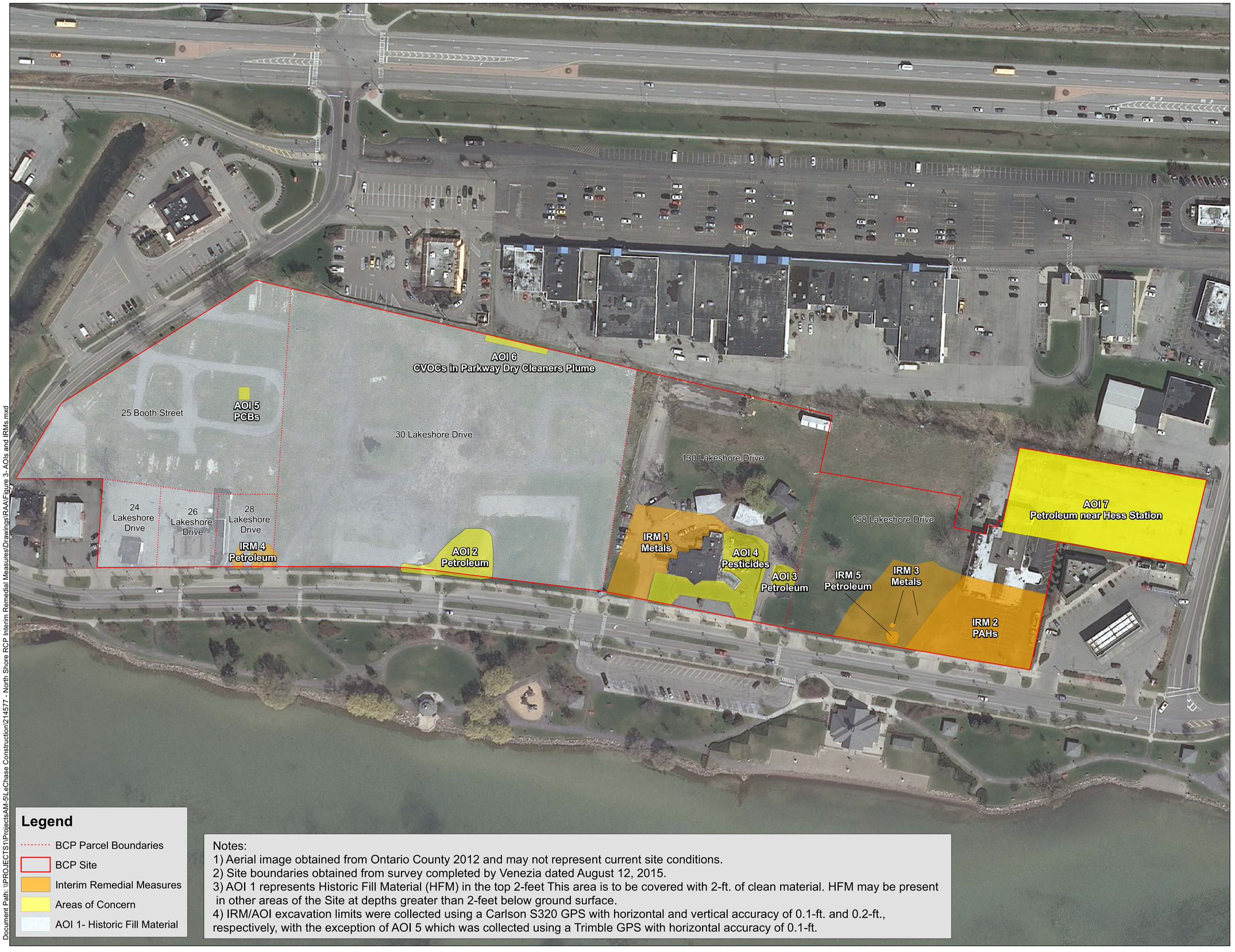
0 75 150
Feet
1 inch = 75 feet
Intended to print on ARCH D

Site boundaries obtained from survey completed by Venezia dated August 12, 2015.

N
W E
S

FIGURE 2

214577



Legend

- BCP Parcel Boundaries
- BCP Site
- Interim Remedial Measures
- Areas of Concern
- AOI 1- Historic Fill Material

Notes:
1) Aerial image obtained from Ontario County 2012 and may not represent current site conditions.
2) Site boundaries obtained from survey completed by Venezia dated August 12, 2015.
3) AOI 1 represents Historic Fill Material (HFM) in the top 2-feet This area is to be covered with 2-ft. of clean material. HFM may be present in other areas of the Site at depths greater than 2-feet below ground surface.
4) IRM/AOI excavation limits were collected using a Carlson S320 GPS with horizontal and vertical accuracy of 0.1-ft. and 0.2-ft., respectively, with the exception of AOI 5 which was collected using a Trimble GPS with horizontal accuracy of 0.1-ft.

Document Path: \\PROJECTS1\Projects\AM-5\LeChase Construction\214577 - North Shore RCP Interim Remedial Measures\Drawings\RAA\Figure 3- AOIs and IRMs.mxd

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Remedial Alternatives Analysis

Canandaigua Multi-Brownfield Site, New York

NYSDEC BCP #C835025

Areas of Interest
and
Interim Remedial Measures

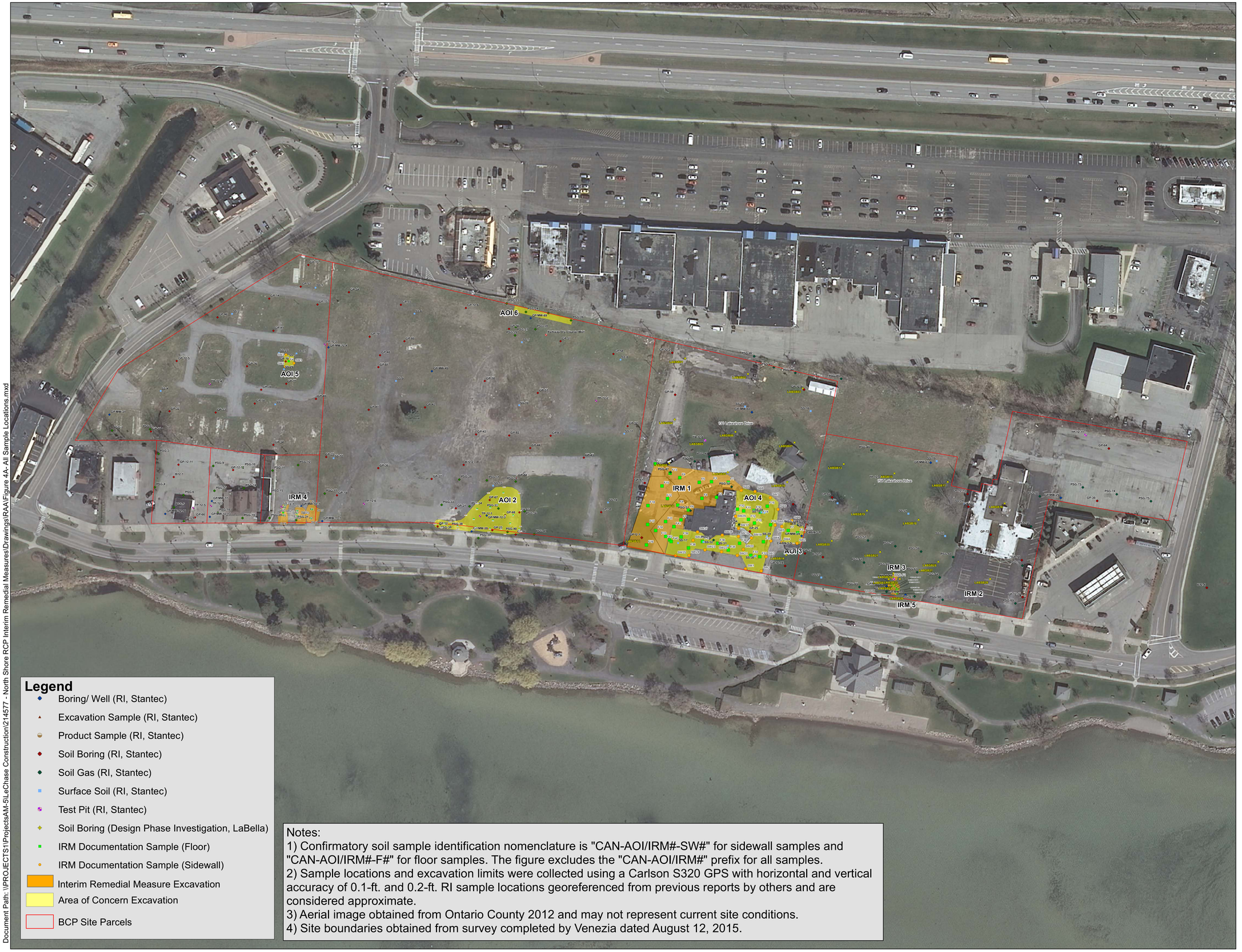
0 70
Feet
1 inch = 70 feet
Intended to print on ARCH D

Site boundaries obtained from survey completed by Venezia dated August 12, 2015.

N
W E
S

FIGURE 3

214577



Notes:
1) Confirmatory soil sample identification nomenclature is "CAN-AOI/IRM#-SW#" for sidewall samples and "CAN-AOI/IRM#-F#" for floor samples. The figure excludes the "CAN-AOI/IRM#" prefix for all samples.
2) Sample locations and excavation limits were collected using a Carlson S320 GPS with horizontal and vertical accuracy of 0.1-ft. and 0.2-ft. RI sample locations georeferenced from previous reports by others and are considered approximate.
3) Aerial image obtained from Ontario County 2012 and may not represent current site conditions.
4) Site boundaries obtained from survey completed by Venezia dated August 12, 2015.

Document Path: \\PROJECTS1\Projects\AM-5\LeChase Construction\214577 - North Shore RCP Interim Remedial Measures\Drawings\RAA\Figure 4A- All Sample Locations.mxd

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Remedial Alternatives Analysis

Canandaigua Multi-Brownfield Site, New York

NYSDEC
BCP #C835025

Cumulative Testing Locations

AS-BUILT
DECEMBER 14, 2016

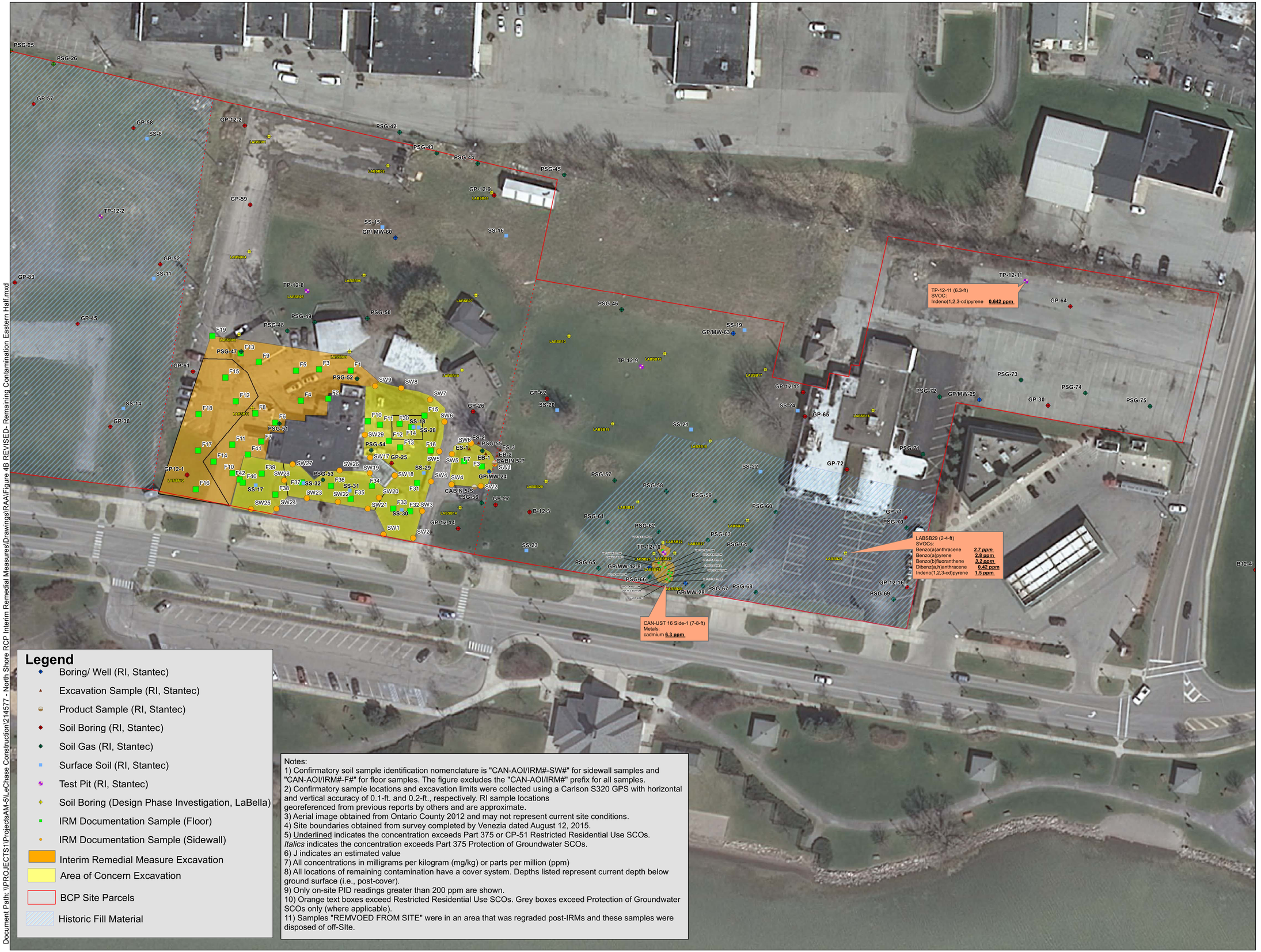
0 75 150
Feet
1 inch = 75 feet
Intended to print on ARCH D

Site boundaries obtained from survey completed by Venezia dated August 12, 2015.

N
W E
S

FIGURE 4A

214577



Legend

- Boring/ Well (RI, Stantec)
- Excavation Sample (RI, Stantec)
- Product Sample (RI, Stantec)
- Soil Boring (RI, Stantec)
- Soil Gas (RI, Stantec)
- Surface Soil (RI, Stantec)
- Test Pit (RI, Stantec)
- Soil Boring (Design Phase Investigation, LaBella)
- IRM Documentation Sample (Floor)
- IRM Documentation Sample (Sidewall)
- Interim Remedial Measure Excavation
- Area of Concern Excavation
- BCP Site Parcels
- Historic Fill Material

Notes:
1) Confirmatory soil sample identification nomenclature is "CAN-AOI/IRM#-SW#" for sidewall samples and "CAN-AOI/IRM#-F#" for floor samples. The figure excludes the "CAN-AOI/IRM#" prefix for all samples.
2) Confirmatory sample locations and excavation limits were collected using a Carlson S320 GPS with horizontal and vertical accuracy of 0.1-ft. and 0.2-ft., respectively. RI sample locations georeferenced from previous reports by others and are approximate.
3) Aerial image obtained from Ontario County 2012 and may not represent current site conditions.
4) Site boundaries obtained from survey completed by Venezia dated August 12, 2015.
5) Underlined indicates the concentration exceeds Part 375 or CP-51 Restricted Residential Use SCOs. *Italics* indicates the concentration exceeds Part 375 Protection of Groundwater SCOs.
6) J indicates an estimated value
7) All concentrations in milligrams per kilogram (mg/kg) or parts per million (ppm)
8) All locations of remaining contamination have a cover system. Depths listed represent current depth below ground surface (i.e., post-cover).
9) Only on-site PID readings greater than 200 ppm are shown.
10) Orange text boxes exceed Restricted Residential Use SCOs. Grey boxes exceed Protection of Groundwater SCOs only (where applicable).
11) Samples "REMVOED FROM SITE" were in an area that was regraded post-IRMs and these samples were disposed of off-SIte.

Document Path: \\PROJECTS1\Projects\AM-5\LeChase Construction\214577 - North Shore RCP Interim Remedial Measures\Drawings\RAA\Figure 4B REVISED- Remaining Contamination Eastern Half.mxd

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Remedial Alternatives Analysis

Canandaigua Multi-Brownfield Site, New York

NYSDEC BCP #C835025

Remaining Contamination Above SIte Specific SCGs
130 and 158 Lakeshore Drive

AS-BUILT
DECEMBER 14, 2016

0 40 80
Feet
1 inch = 40 feet
Intended to print as ARCH D

Site boundaries obtained from survey completed by Venezia dated August 12, 2015.

N W E S

FIGURE 4B

214577

GP-53 (6.5-7-ft)
RELOCATED ON-SITE
SVOC:

Anthracene	210 ppm
Benzo(a)anthracene	470 ppm
Benzo(a)pyrene	390 ppm
Benzo(b)fluoranthene	540 ppm
Benzo(g,h,i)perylene	210 ppm
Benzo(k)fluoranthene	200ppm
Chrysene	450 ppm
Dibenz(a,h)anthracene	22 ppm
Ideno(1,2,3-cd)pyrene	190 ppm
Fluoranthene	1,000 ppm
Phenanthrene	800 ppm
Pyrene	830 ppm

GP-48 (3.6-4.5-ft)
Metals:

Cadmium	288 ppm

GP-44 (6-7-ft)
SVOC:

Benzo(a)anthracene	120 ppm
Benzo(a)pyrene	85 ppm
Benzo(b)fluoranthene	110 ppm
Benzo(k)fluoranthene	46ppm
Chrysene	110 ppm
Dibenz(a,h)anthracene	21 ppm
Ideno(1,2,3-cd)pyrene	46 ppm
Fluoranthene	250 ppm
Phenanthrene	260 ppm
Pyrene	180 ppm

GP-39 (3.2-4.2-ft)
RELOCATED ON-SITE
Metals:

Lead	2,510 ppm
Mercury	12.4 ppm
Nickel	545 ppm

GP-78 (3-3.5-ft)
RELOCATED ON-SITE
Metals:

Lead	2,850 ppm

GP-42 (4.2-6.5-ft)
Metals:

Copper	7,160 ppm

GP-34 (3.7-4.3-ft)
RELOCATED ON-SITE
Metals:

Lead	1,040 ppm
Arsenic	16.5 ppm

GP-19 (5-5.6-ft)
SVOC:

Benzo(a)anthracene	8 ppm
Benzo(a)pyrene	8.5 ppm
Benzo(b)fluoranthene	9.6 ppm
Benzo(k)fluoranthene	5 ppm
Chrysene	9.6 ppm
Ideno(1,2,3-cd)pyrene	5.4 ppm
Metals:	
Lead	695 ppm

GP-12-11 (3-5-ft)
SVOC:

Benzo(a)pyrene	1.21 ppm
Benzo(b)fluoranthene	1.35 ppm
Ideno(1,2,3-cd)pyrene	0.618 ppm
Metals:	
Arsenic	58.1 ppm
Lead	417 ppm

CAN-AOI2-SW10 (12-ft)
SVOC

Ideno(1,2,3-cd)pyrene	0.680 ppm

CAN-AOI2-SW8 (7-ft)
VOC:

benzene	0.35 ppm J

SVOC:

Banz(a)anthracene	2.8 ppm
Benzo(a)pyrene	2.5 ppm
Benzo(b)fluoranthene	4.1 ppm
Benzo(k)fluoranthene	1.3 ppm
Chrysene	2.7 ppm
Dibenz(a,h)anthracene	0.53 ppm J
Ideno(1,2,3-cd)pyrene	2.7 ppm

GP-10 (3-5-ft)
SVOC:

Benzo(a)anthracene	1.02 ppm
Benzo(a)pyrene	1.4 ppm
Benzo(b)fluoranthene	1.83 ppm
Ideno(1,2,3-cd)pyrene	1.82 ppm
Metals:	
Lead	1,750 ppm

FS-37
PID = 395 ppm

CAN-AOI2-SW7 (7-ft)
VOC:

benzene	0.067 ppm J

GP-12-13 (4.3-6.3-ft)
SVOC:

Ideno(1,2,3-cd)pyrene	0.618 ppm

GP-13-7 (2.8-4.6-ft)
SVOC:

Benzo(a)anthracene	4.7 ppm
Benzo(a)pyrene	5.2 ppm
Benzo(b)fluoranthene	7.5 ppm
Benzo(k)fluoranthene	3 ppm
Chrysene	5.9 ppm
Ideno(1,2,3-cd)pyrene	3.2 ppm

CAN-AOI2-SW27 (7-ft)
OFF-SITE
VOC:

benzene	0.43 ppm J
ethylbenzene	3.1 ppm J

CAN-AOI2-SW14 (7-ft)
OFF-SITE
VOC:

ethylbenzene	94 ppm
isopropylbenzene	47 ppm J
methyl tert-butyl ether	12 ppm
n-propylbenzene	88 ppm
o-xylene	7 ppm J
m,p-xylene	43 ppm
sec-butylbenzene	26 ppm J
SVOC:	
Benz(a)anthracene	2 ppm
Benzo(a)pyrene	1.6 ppm
Benzo(b)fluoranthene	1.9 ppm
Indeno(1,2,3-cd)pyrene	.99 ppm

CAN-AOI2-SW5 (7-ft)
OFF-SITE
VOC:

1,2,4-trimethylbenze	62 ppm
1,3,5-trimethylbenzene	55 ppm
benzene	8 ppm
toluene	2.4 ppm J
o-xylene	6.3 ppm J
m,p-xylene	7.3 ppm
SVOC:	
Banz(a)anthracene	16 ppm
Benzo(a)pyrene	12 ppm
Benzo(b)fluoranthene	19 ppm
Benzo(k)fluoranthene	5.5 ppm
Chrysene	14 ppm
Dibenz(a,h)anthracene	2.4 ppm J
Ideno(1,2,3-cd)pyrene	11 ppm

CAN-AOI2-SW4 (7-ft)
OFF-SITE
VOC:

benzene	1.4 ppm J
ethylbenzene	1.2 ppm J
m,p-xylene	2 ppm

CAN-AOI2-SW6 (7-ft)
SVOC:

Benz(a)anthracene	14 ppm
Benzo(a)pyrene	14 ppm
Benzo(b)fluoranthene	17 ppm
Benzo(k)fluoranthene	5.7 ppm
Chrysene	13 ppm
Dibenz(a,h)anthracene	2.7 ppm J
Ideno(1,2,3-cd)pyrene	11 ppm

AOI 5

Parkway Dry Cleaner Well

Legend

- Boring/ Well (RI, Stantec)
- Excavation Sample (RI, Stantec)
- Product Sample (RI, Stantec)
- Soil Boring (RI, Stantec)
- Soil Gas (RI, Stantec)
- Surface Soil (RI, Stantec)
- Test Pit (RI, Stantec)
- IRM Documentation Sample (Floor)
- Soil Boring (Design Phase Investigation, LaBella)
- IRM Documentation Sample (Sidewall)
- Building B-1
- Relocated Asphalt Millings
- Interim Remedial Measure Excavation
- Area of Concern Excavation
- BCP Site Parcels
- Historic Fill Material

Notes:
1) Confirmatory soil sample identification nomenclature is "CAN-AOI/IRM#-SW#" for sidewall samples and "CAN-AOI/IRM#-F#" for floor samples. The figure excludes the "CAN-AOI/IRM#" prefix for all samples.
2) Confirmatory sample locations and excavation limits were collected using a Carlson S320 GPS with horizontal and vertical accuracy of 0.1-ft. and 0.2-ft. RI sample locations georeferenced from previous reports by others and are approximate.
3) Aerial image obtained from Ontario County 2012 and may not represent current site conditions.
4) Site boundaries obtained from survey completed by Venezia dated August 12, 2015.
5) Underlined indicates the concentration exceeds Part 375 or CP-51 Restricted Residential Use SCOs. *Italics* indicates the concentration exceeds Part 375 Protection of Groundwater SCOs.
6) J indicates an estimated value
7) All concentrations in milligrams per kilogram (mg/kg) or parts per million (ppm)
8) All locations of remaining contamination have a cover system. Depths listed represent current depth below ground surface (i.e., post-cover).
9) Only on-site PID readings greater than 200 ppm are shown.
10) Samples indicated RELOCATED ON-SITE were moved during development activities and are not currently in the exact locations shown. These samples were placed beneath Building B-1.
11) Orange text boxes exceed Restricted Residential Use SCOs. Grey boxes exceed Protection of Groundwater SCOs only (where applicable).

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Remedial Alternatives Analysis

Canandaigua Multi-Brownfield Site, New York

NYSDEC BCP #C835025

Remaining Contamination Above Site Specific SCGs
24, 26, 28, and 30 Lakeshore Drive, and 25 Booth Street

AS-BUILT
DECEMBER 14, 2016

0 40 80
Feet
1 inch = 40 feet
Intended to print as ARCH D

Site boundaries obtained from survey completed by Venezia dated August 12, 2015.

N W E S

FIGURE 4C

214577

Legend

- Area of Interest/ Interim Remedial Measures Excavation
- Historic Fill Material (to be removed under this alternative)
- Excavation Areas for Unrestricted Use Cleanup
- BCP Parcel Boundaries
- BCP Site Parcels

Notes:
1) Aerial image obtained from Ontario County 2012 and may not represent current site conditions.
2) Site boundaries obtained from survey completed by Venezia dated August 12, 2015.
3) **Bold** indicates the concentration exceeds Part 375 or CP-51 Unrestricted Use SCOs.
Underlined indicates the concentration exceeds Part 375 or CP-51 Restricted Residential Use SCOs.
Italics indicates the concentration exceeds Part 375 Protection of Groundwater SCOs.
4) Acetone is not considered a Site contaminant and is not included as remaining contamination.
7) All concentrations in milligrams per kilogram (mg/kg) or parts per million (ppm)
8) All locations of remaining contamination have a cover system. Depths listed represent current depth below ground surface (i.e., post-cover).
9) Only on-site PID readings greater than 200 ppm are shown.
10) Orange text boxes exceed Restricted Residential Use SCOs. Grey boxes exceed Protection of Groundwater SCOs only (where applicable).
11) All HFM to be removed for Unrestricted Use Cleanup.

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Remedial Alternatives Analysis

Canandaigua Multi-Brownfield Site, New York

NYSDEC BCP #C835025

RAOC #1 and #2
Alternative 1
Unrestricted Use Cleanup

AS-BUILT
DECEMBER 14, 2016

It is a violation of New York Education Law Article 145 Sec.7209, for any person, unless acting under the direction of a licensed architect, professional engineer, or land surveyor, to alter an item in any way. If an item bearing the seal of an architect, engineer, or land surveyor is altered; the altering architect, engineer, or land surveyor shall affix to the item their seal and notation "altered by" followed by their signature and date of such alteration, and a specific description of the alteration.

0 75 150
Feet
1 inch = 75 feet
Intended to print as ARCH D

Site boundaries obtained from survey completed by Venezia dated August 12, 2015.

N W E S

FIGURE 5

214577

Document Path: \\PROJECTS1\Projects\AM-5\LeChase Construction\214577 - North Shore RCP Interim Remedial Measures\Drawings\RAA\Figure 5- Unrestricted Cleanup.mxd

Legend

- Area of Interest/ Interim Remedial Measures Excavation
- Historic Fill Material
- Excavation Areas for Restricted Residential Use Cleanup
- BCP Parcel Boundaries
- BCP Site Parcels

Notes:
1) Aerial image obtained from Ontario County 2012 and may not represent current site conditions.
2) Site boundaries obtained from survey completed by Venezia dated August 12, 2015.
3) Underlined indicates the concentration exceeds Part 375 or CP-51 Restricted Residential Use SCOs
4) *Italics* indicates the concentration exceeds Part 375 or CP-51 Protection of Groundwater SCOs.
5) Orange text boxes indicate samples left in place above Restricted Residential Use SCOs.
6) J indicates an estimated value
7) All concentrations in milligrams per kilogram (mg/kg) or parts per million (ppm)
8) All locations of remaining contamination have a cover system. Depths listed represent current depth below ground surface (i.e., post-cover).
9) Samples with Restricted Residential Use exceedances were relocated beneath Building B-1. This alternative would require demolishing Building B-1 to remove all material beneath it, and rebuilding Building B-1.

Document Path: \\PROJECTS1\Projects\AM-5\LeChase Construction\214577 - North Shore RCP Interim Remedial Measures\Drawings\RAA\Figure 6- Restricted Residential Cleanup.mxd

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Remedial Alternatives Analysis

Canandaigua Multi-Brownfield Site, New York

NYSDEC BCP #C835025

RAOC #1 and #2
Alternative 2
Restricted Residential Use Cleanup

AS-BUILT
DECEMBER 14, 2016

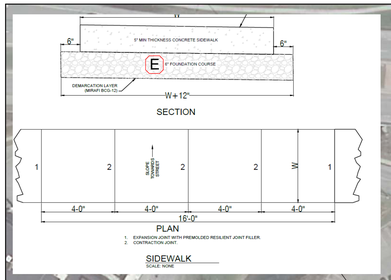
0 75 150
Feet
1 inch = 75 feet
Intended to print as ARCH D

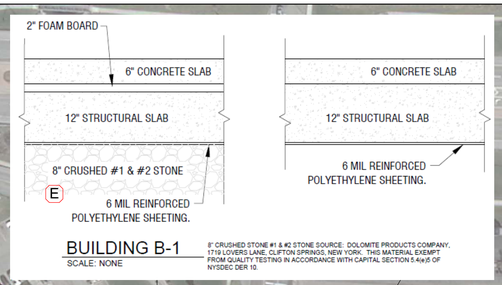
Site boundaries obtained from survey completed by Venezia dated August 12, 2015.

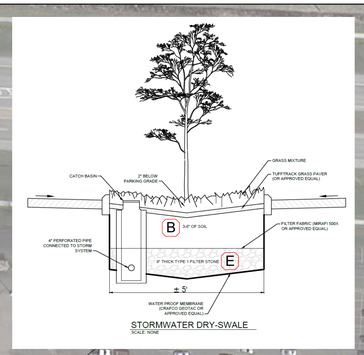
N W E S

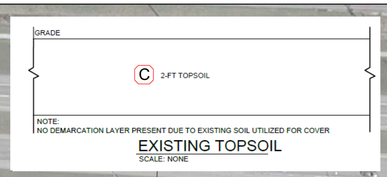
FIGURE 6

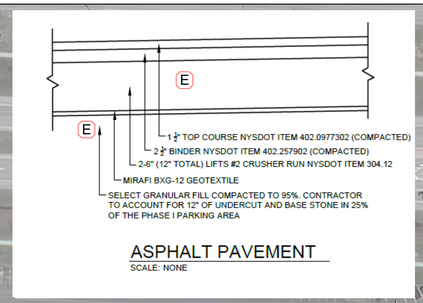
214577

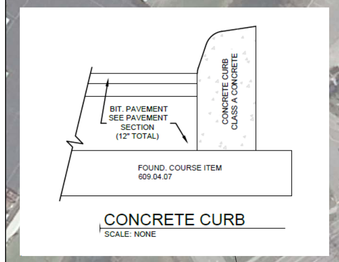


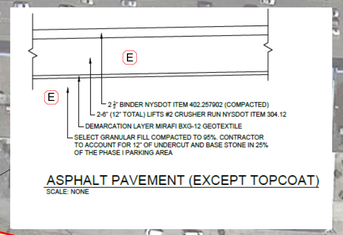


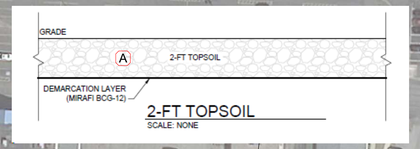


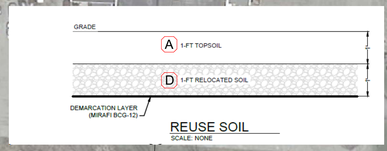


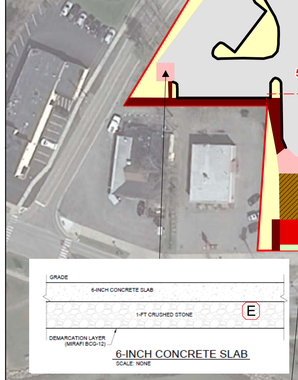


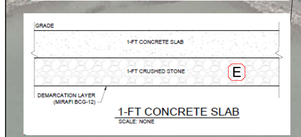


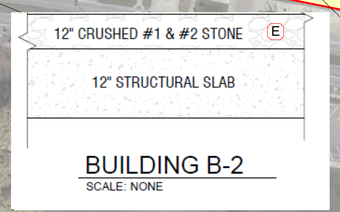


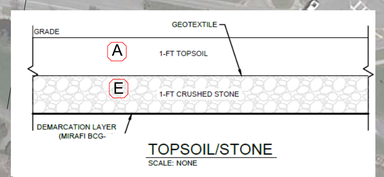


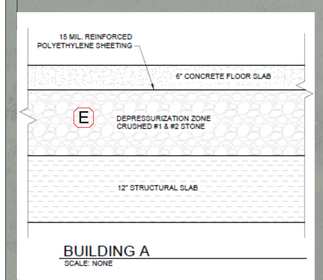


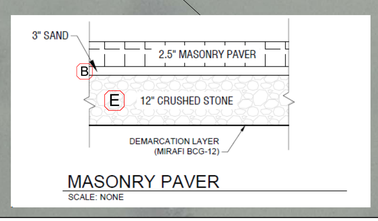


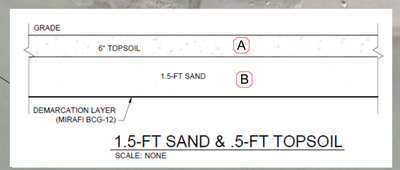












Legend

- BCP Site
- BCP Parcel Boundaries
- Concrete Curb
- Concrete Sidewalk
- 1.5-ft. sand 0.5-ft. topsoil
- Pavers
- 2-ft. crushed stone
- 2-ft. existing topsoil
- 1-ft. crushed stone 1-ft. topsoil
- Areas of SVI Remedial System Installed Components
- Phase I Development Buildings
- Concrete Pad
- 2 ft. imported topsoil
- Reused Soil and 1-ft. Topsoil
- Asphalt Pavement
- swale
- Asphalt Pavement without Top Coat

Notes:
1) Site boundaries obtained from survey completed by Venezia dated August 12, 2015. Refer to Appendix 1 for the Site Survey.
2) A demarcation layer is placed beneath all soil/ stone cover.
3) Phase I of development is currently in progress. Limits of soil/stone cover, asphalt, swale, and sidewalks were located using a Carlson S320 GPS with horizontal and vertical accuracy of 0.1-ft. and 0.2-ft., respectively. Drawing represents conditions as of December 7th, 2016. Stone/ soil cover thicknesses listed are minimum and may have more than indicated.
4) Refer to sub-slab depressurization system (SSDS) as-builts (Figures 15-18) of the CCR for information on SSDS construction.

Source:

- A — Hammocks Drive Soil Pile, Canandaigua, New York Approval: Soil quality data collected per NYSDEC DER 10 5.4(e); Department approval via email dated April 4, 2016
- B — Spallina Materials, Inc., 8222 State Routes 5 and 20, West Bloomfield, New York Approval: Soil quality data collected per NYSDEC DER 10 5.4(e); Department approval via email dated July 23, 2015
- C — Existing topsoil in place prior to development phase Approval: Soil quality data collected per pre Design Investigation WP. Department approval of IRMAddendum WP for data assessment via email dated December 23, 2014
- D — NE corner of 158 Lakeshore Dr. beneath current parking area Approval: Reused on-site soils per approved ISMP, NYSDEC DER-10 Sec 5.4(a) and Department email dated April 22, 2016
- E — Dolomite Products Company, 1719 Lovers Lane, Clifton Springs, New York. This material exempt from quality testing in accordance with capital section 5.4(e)5 of NYSDEC DER 10.

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Remedial Alternatives Analysis

Canandaigua Multi-Brownfield Site, New York

NYSDEC BCP #C835025

As-Built
Cover System
and Limits of SVI
Remedial System
Installed Components

AS-BUILT
DECEMBER 14, 2016

0 75 150
Feet
1 inch = 75 feet
Intended to print as ARCH D

Site boundaries obtained from survey completed by Venezia dated August 12, 2015.

N W E S

FIGURE 7

214577

Document Path: \\PROJECTS\1\Projects\AM-5\LeChase Construction\214577 - North Shore RCP Interim Remedial Measures\Drawings\RAA\Figure 7 Cover System.mxd

LaBella Associates, D.P.C.
300 State Street

Rochester, New York 14614

Tables

Table 1
RAOC #1
Alternative 1
Unrestricted Use Cleanup

Capital Cost		Annual Cost	Present Worth
Reporting			
	Remedial Design Work Plan	-	$ 5,000
	Site Management Plan	-	$ 4,000
	Final Engineering Report	-	$ 6,000
	Monthly Progress Reports (4)	-	$ 3,200
	Meetings and Project Management	-	$ 2,500
Subcontractor Fees			
	Mob/Demob/Equipment and Labor	-	$ 20,000
	Excavation and Soil Segregation	-	$ 2,500
	Transportation and disposal of non-hazardous soil	-	$ 10,400
	Backfill	-	$ 5,200
	Frack Tank Rental	-	$ 7,500
	Pumping, carbon treatment, and disposal	-	$ 3,000
Professional Services			
	Coordination	-	$ 10,000
	Field Time	-	
	Field Oversight and Air Monitoring	-	$ 10,000
	Monitoring Equipment	-	$ 5,000
Analytical			
	Documentation Samples (10 for VOCs)		$ 750
	Waste Characterization		$ 2,000
	Contingency (15%)		$ 14,558
	Total Capital Cost		**$ 111,608**

Operation and Maintenance	Annual Cost	Present Worth
	$ -	-
Total Estimated Present Worth Cost		**$ 111,608**

Assumptions:
Estimated 260 tons non-hazardous
Estimated 60,000 gallons of water disposal

Table 2
RAOC #1
Alternative 2
Restricted Residential Use Cleanup

Capital Cost		Annual Cost	Present Worth
Reporting			
	Remedial Design Work Plan	-	$ 5,000
	Site Management Plan	-	$ 4,000
	Final Engineering Report	-	$ 6,000
	Monthly Progress Reports (4)	-	$ 3,200
	Meetings and Project Management	-	$ 2,500
Subcontractor Fees			
	Mob/Demob/Equipment and Labor	-	$ 20,000
	Excavation and Soil Segregation	-	$ 2,500
	Transportation and disposal of non-hazardous soil	-	$ 10,400
	Backfill	-	$ 5,200
	Frack Tank Rental	-	$ 7,500
	Pumping, carbon treatment, and disposal	-	$ 3,000
Professional Services			
	Coordination	-	$ 10,000
	Field Time	-	
	Field Oversight and Air Monitoring	-	$ 10,000
	Monitoring Equipment	-	$ 5,000
Analytical			
	Documentation Samples (10 for VOCs)		$ 750
	Waste Characterization		$ 2,000
	Contingency (15%)		$ 14,558
	Total Capital Cost		**$ 111,608**

Operation and Maintenance	Annual Cost	Present Worth
	$ -	-
Total Estimated Present Worth Cost		**$ 111,608**

Assumptions:
Estimated 260 tons non-hazardous
Estimated 60,000 gallons of water disposal

Table 3
RAOC #2
Alternative 1
Unrestricted Use Cleanup

Capital Cost		Annual Cost	Present Worth
Reporting			
	Remedial Design Work Plan	-	$ 6,000
	Final Engineering Report	-	$ 7,000
	Monthly Progress Reports (6)	-	$ 4,800
	Meetings and Project Management	-	$ 5,000
Subcontractor Fees			
	Removal of existing development and rebuild		$ 100,000,000
	Mob/Demob/Equipment and Labor	-	$ 100,000
	Shoring (Southern and western property line)	-	$ 500,000
	Excavation and Soil Segregation	-	$ 405,000
	Transportation and disposal of non-hazardous soil	-	$ 5,600,000
	Backfill	-	$ 5,600,000
	Frack Tank Rental	-	$ 250,000
	Pumping, carbon treatment, and disposal	-	$ 100,000
	Tax (8%)	-	$ 9,006,224
Professional Services			
	Coordination	-	$ 10,000
	Field Time	-	
	Field Oversight and Air Monitoring	-	$ 120,000
	Monitoring Equipment	-	$ 60,000
Analytical			
	Documentation Samples (600 for SVOCs and metals)		$ 156,000
	Waste Characterization		$ 50,000
	Contingency (15%)		$ 18,297,004
	Total Capital Cost		**$ 140,277,028**

Operation and Maintenance	Annual Cost	Present Worth
	$ -	-
Total Estimated Present Worth Cost		**$ 140,277,028**

Assumptions:

Present worth analysis based on 4% interest rate over estimated project timeframe

Estimated 140,000 tons non-hazardous

Estimated 2,000,000 gallons of water disposal

Table 4
RAOC #2
Alternative 2
Restricted Residential Use Cleanup

Capital Cost		Annual Cost	Present Worth
Reporting			
	Remedial Design Work Plan	-	$ 6,000
	Site Management Plan	-	$ 4,000
	Final Engineering Report	-	$ 7,000
	Monthly Progress Reports (4)	-	$ 3,200
	Meetings and Project Management	-	$ 5,000
Subcontractor Fees			
	Removal of existing development and rebuild		$ 20,000,000
	Mob/Demob/Equipment and Labor	-	$ 60,000
	Shoring (Southern property line)	-	$ 100,000
	Excavation and Soil Segregation	-	$ 13,500
	Transportation and disposal of non-hazardous soil	-	$ 760,000
	Backfill	-	$ 760,000
	Frack Tank Rental	-	$ 62,500
	Pumping, carbon treatment, and disposal	-	$ 25,000
Professional Services			
	Coordination	-	$ 10,000
	Field Time	-	
	Field Oversight and Air Monitoring	-	$ 80,000
	Monitoring Equipment	-	$ 40,000
Analytical			
	Documentation Samples (28 for SVOCs and metals)		$ 7,280
	Waste Characterization		$ 4,000
	Contingency (15%)		$ 3,290,430
	Total Capital Cost		**$ 25,237,910**

Operation and Maintenance		Annual Cost	Present Worth
	Years 1-30		
	Site Visit (Annually)	$ 300	-
	SSDS Operation	$ 1,500	
	Reporting	$ 1,000	-
	Contingency (15%)	$ 420	-
	Total Annual Cost Years 1-30	**$ 3,220**	**$ 55,680**
	Total Estimated Present Worth Cost		**$ 25,293,590**

Assumptions:

Present worth analysis based on 4% interest rate over estimated project timeframe

Estimated 19,000 tons non-hazardous

Estimated 500,000 gallons of water disposal

SSDS assumed 3 systems with single fan each with operating costs of $500 per year per system

Table 5
RAOC #1 and #2
Alternative 3
No Further Action (With Soil Cover, Institutional and Engineering Controls)

Capital Cost	Annual Cost	Present Worth
	$ -	$ -

Operation and Maintenance		Annual Cost		Present Worth	
Years 1-30					
Site Visit (Annually)		$	300	-	
SSDS Operation		$	1,500		
Reporting		$	1,000	-	
	Contingency (15%)	$	420	-	
	Total Annual Cost Years 1-30	**$**	**3,220**	**$**	**55,680**
	Total Estimated Present Worth Cost			**$**	**58,900**
	Total Estimated Present Worth Cost			**$**	**58,900**

Assumptions:

SSDS assumed 3 systems with single fan each with operating costs of $500 per year per system

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Appendix A

Land Use Evaluation

APPENDIX A

LAND USE EVALUATION

The below reasonably anticipated future land use evaluation has been completed for the Site based on the 16 consideration criteria identified in the DER-10 Technical Guidance for Site Investigation and Remediation. These criteria and how they apply to the Site are summarized below.

1. *Current use and historical and/or recent development patterns*: According to the City of Canandaigua: Zoning and Historic Districts Map dated December 2015, the Site is zoned Planned Unit Development (P.U.D.). The surrounding areas are generally zoned Commercial- Lakefront District (C-L) and Parks and Recreational District (P-R).

2. *Applicable zoning laws*: Redevelopment is in progress and is consistent with applicable zoning laws.

3. *Brownfield Opportunity Areas*: The Site is not currently located within a BOA.

4. *Consistency of proposed use with applicable land-use plans formally adopted by a municipality*: The redevelopment at the Site is included in the *City of Canandaigua Comprehensive Plan 2013 Update*. The plan states that the development will consist of mixed-use structures with 457 dwelling units and 77,600 square feet of commercial space and that final site plan will require approval. The final site plan has since been approved.

5. *Proximity to real property currently utilized for residential use and to urban, commercial, industrial, agricultural and recreational areas*: Properties adjacent to the Site are currently being utilized for commercial uses, and recreational areas. The nearest residential property is approximately 0.4 miles to the west of the Site and the nearest agricultural land is approximately 0.15 miles to the north of the Site. Canandaigua Lake is approximately 0.05 miles to the south of the Site, across Lakeshore Drive.

6. *Any written or oral comments submitted by members of the public on the proposed use as part of citizen participation activities*: No comments have been received as part of citizen participation activities.

7. *Environmental justice concerns*: The Site and surrounding properties have historically been utilized for commercial purposes; however, residential properties are located in the vicinity of the Site. There are no environmental justice concerns with the redevelopment.

8. *Federal or state land-use designations*: There are no federal or state land-use designations.

9. *Population growth patterns and projections*:

Population for the City of Canandaigua, obtained from *City of Canandaigua Comprehensive Plan 2013 Update:*

- 1990: 10,725 (2.9% increase)
- 2000: 11,418 (6.5% increase)
- 2010: 10,545 (7.6% decrease)

10. ***Accessibility to existing infrastructure***: The Site is located in a suburban area with access to utilities. Redevelopment is in progress which includes installation of the necessary utilities for future Site structures.

11. ***Proximity of the Site to important cultural resources***: Based on a review of the New York State Historic Preservation Office's (SHPO) Cultural Resource Information System (CRIS), the entire Site is located within an Archeologically Sensitive Area based on a review of CRIS. Any development on the Site will need to be consistent with all of the use, design and performance requirements of the various designated areas.

12. ***Proximity of Site to important federal, state or local natural resources***: Based on a review of the New York State Department of Environmental Conservation's (DEC) Environmental Resource Mapper the eastern portion of the Site is located in the regulated '500-foot wetland check zone' of State Wetland CG-20. The NYSDEC regulates a 100-foot buffer zone around state protected wetlands. If the mapper indicates your site is within the 500-foot check zone, the NYSDEC recommends that professional wetland delineation is performed on the site in order to ensure you're Site is not within the 100-foot buffer zone. Wetland CG-20 is associated with a Class C stream (Canandaigua outlet) and they are both located approximately 350 feet northeast of the Site. The Environmental Resource Mapper indicates that the entire Site is located within a NYS Rare Plant/Animal zone.

Based on a review of the US Fish and Wildlife Service's (USFWS) National Wetlands Inventory (NWI) the Site is located approximately 220-feet north of the Federally-designated lake wetland (i.e. Canandaigua Lake). The nearest Federally-designated freshwater pond wetland is located approximately 350-feet northeast of the Site while the nearest Federally-designated freshwater forested/shrub wetland is approximately 500-feet northwest of the Site. Based on a review of the USFWS's Information for Planning and Conservation (IPac) system, the Federally listed Northern Long-eared Bat (threatened) may be located in the vicinity of the Site. In addition, several migratory birds (birds of conservation concern) were listed for the Site area and include the following: American Bittern, Bald Eagle, Black Tern, Black-billed Cuckoo, blue-winged Warbler, Canada Warbler, Common Tern, Golden-winged Warbler, Least Bittern, Olive-sided Flycatcher, Peregrine Falcon, Pied-billed Grebe, Prairie Warbler, Red-headed Woodpecker, Short-eared Owl, Upland Sandpiper, Willow Flycatcher, and Wood Thrush.

13. ***Potential vulnerability of groundwater contamination that might migrate from the Site****:* Drinking water in the City of Canandaigua supplied from Canandaigua Lake following treatment. The most recent post-IRM groundwater sampling indicated that groundwater at the Site meets applicable Part 703 Groundwater Quality Standards. Some residual off-Site impacts were left in-place; as such, these may contribute to groundwater impacts off-Site. As such, there is a low potential that contaminated groundwater could migrate to Canandaigua Lake; however, the source area was removed and the potential for such contaminants to contribute to detectable levels in drinking water is minute due to the large volume of water involved and the treatment processes. The IRMs have addressed on-Site groundwater to the extent practicable.

14. ***Proximity to floodplains****:* Based on a review of FEMA's FIRM (Community Panel Number 3605970001C, effective September 24, 1982 and Community Panel Number 3605970002C, effective September 24, 1982), the southeastern portion of the Site is located within the Special Flood Hazard Zone A3 (also known as the 100-year flood zone) associated with Canandaigua Lake. The rest of the Site is located in either Flood Zone B (Areas between limits of the 100-year flood zone and 500-year flood zone) or Flood Zone C (Areas of minimal flooding). The remedy includes covering a majority of the Site with 2-ft. of cover material; as such, the anticipated remedy and redevelopment does not pose a threat to surface waters.

15. ***Geography and Geology***: Surface materials at the Site generally consisted of topsoil, sand, silt, gravel, mixtures of asphalt and stone sub-base. Fill material beneath surface material generally consisted of silt, sand, gravel, with varying amounts of ash and cinders. Fill material consisting of trace amounts of brick and glass was identified in some locations containing ash and cinders. Fill material was generally encountered beginning at depths between 0 and 6-inches below ground surface (bgs) and ranged from approximately 0.2 to 6-feet in thickness. Fill material was primarily identified in the western portion of the Site. Beneath the fill material, a swamp deposit consisting of silt or organic silt with varying amounts of wood or organic materials was encountered beneath the fill material. Alluvial deposits consisting of sand and shells were also encountered beneath the fill or swamp deposits from approximately 5 to 9-ft. bgs. Beneath the fill and swamp deposits or alluvial deposits was a glaciolacustrine silt and clay, encountered at depths ranging from 4 to 13-ft. bgs and extending to 23 to 4-ft. bgs. This deposit contained variable amounts of sand, sometimes in seams and layers. In the center portion of the Site, this deposit was not encountered; rather a glacial till ridge was encountered from the ground surface to 50-ft. bgs. Glacial till was encountered beneath the lacustrine deposits in two borings at 73-ft. bgs. Intact bedrock was not identified in any locations. Apparent weathered shale was encountered in some of the borings. According to the Geologic Map of New York, bedrock underlying the Site is shale and limestone of the Skaneateles formation.

16. ***Current institutional controls applicable to the Site***: No institutional controls are currently in place at the Site that would affect redevelopment options. Redevelopment is currently in progress.

Based on the above evaluation of the current, intended and reasonably anticipated future use of the Site and surrounding area, a cleanup to restricted residential use standards does not appear to pose additional environmental or human health risks.