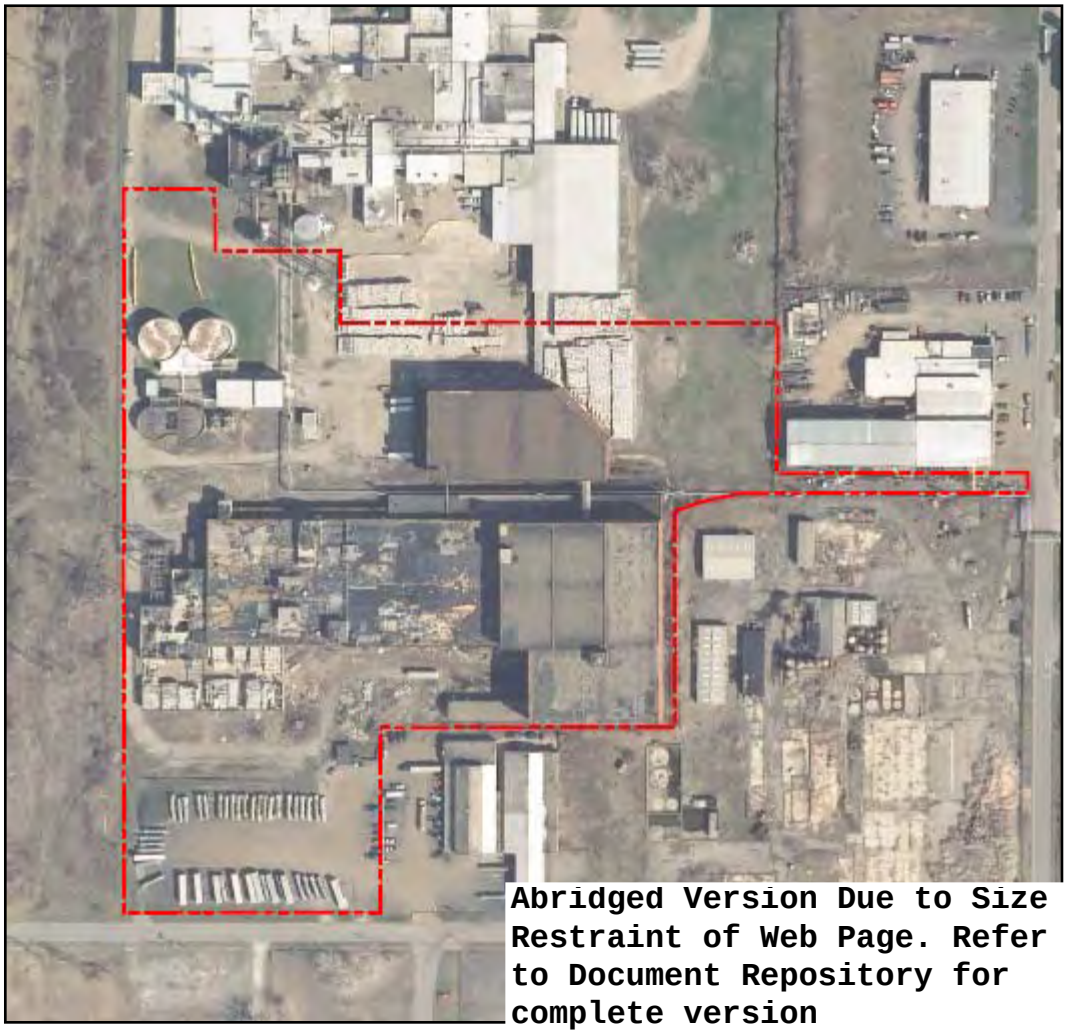

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Greenpac Mill, LLC

Remedial Alternatives Analysis and Interim Remedial Measure Construction Completion Report

Former Mill No. 2 Site
City of Niagara Falls, Niagara County, New York
NYSDEC BCP Site Number C932150

March 2012

Prepared By:

ERM Consulting & Engineering, Inc.
5788 Widewaters Parkway
DeWitt, New York 13214

Certification Statement
Remedial Alternatives Analysis and Interim Remedial Measure Construction Completion Report

I, John Mohlin, certify that I am currently a NYS registered professional engineer, I had primary direct responsibility for the implementation of the subject construction program (except as noted below), and I certify that the *Soil Excavation IRM Work Plan (June 2011)* was implemented and that all construction activities were completed in substantial conformance with the DER-approved Work Plan.

I further certify that the Alternatives Analysis (Section 3.0) 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).

This certification statement, however, does not constitute certification of work completed by others. The completion of work set forth in the *Revised Addendum to the Soil Excavation Work Plan (23 December 2011)* is certified by Los Alamos Technical Associates in their report provided as Appendix B. The completion of work set forth in the *Interim Remedial Measure Work Plan – Demolition of Mill No. 2 (August 2010)* and *IRM Work Plan for Demolition of Building No. 10 and the Wastewater Pre-Treatment Plant (June 2011)* is certified by Ontario Specialty Contracting, Inc. in their letter and documentation provided as Appendix E.

John Mohlin, P.E.
License No. 077921

3/8/12
Date

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

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ACRONYMS AND ABBREVIATIONS

AA	Alternatives Analysis
Allied	Allied Waste Services
ARS	American Radiation Services, International
ASP	Analytical Services Protocol
BCA	Brownfield Cleanup Agreement
BCP	Brownfield Cleanup Program
BDA	Beardsley Design Associates
C&S	C&S Engineers, Inc.
CAMP	Community Air Monitoring Program
Cerrone	Cerrone, Inc.
CME	CME Associates, Inc.
COC	Certificate of Completion
COPC	Chemical of Potential Concern
cpm	Counts per Minute
DER	Division of Environmental Remediation
DUSR	Data Usability Summary Report
EDD	Electronic Data Deliverable
EDP	Equis Data Processor
ELAP	Environmental Laboratory Approval Program
EQ	Environmental Quality Landfill
ERM	ERM Consulting and Engineering, Inc.
ESCP	Erosion Control Sediment Plan
ETA	Existing Transformer Area
EVS	Environmental Visualization Software©
FER	Final Engineering Report
GPR	Ground Penetrating Radar
GPS	Global Positioning Equipment and Software Device
GRD	Greater Radiological Dimensions, Inc.
Greenpac	Greenpac Mill, LLC
HASP	Health and Safety Plan
Ingalls	Ingalls Site Development, Inc.
IRM	Interim Remedial Measure
LATA	Los Alamos Technical Associates, Inc.
Metzger	Metzger Construction
mg/kg	Milligrams per kilogram
MMT	MiniMill Technologies, Inc.
Modern	Modern Corporation
MW	Monitoring Well
NFWB	Niagara Falls Water Board
Norampac	Norampac Industries, Inc.
NORM	Naturally Occurring Radioactive Material
NYCRR	New York Codes, Rules, and Regulations
NYPA	New York Power Authority

NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYSGS	New York State Geologic Survey
OS	Open Space
OSC	Ontario Specialty Contracting
OSHA	Occupational Safety and Health Administration
Paradigm	Paradigm Environmental Services, Inc.
PCBs	Polychlorinated Biphenyls
PID	Photoionization Detector
PPE	Personal Protective Equipment
ppm	Parts per million
QA/QC	Quality Assurance / Quality Control
RAD	Radiologically affected
RAOs	Remedial Action Objectives
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
SCGs	Standards, Criteria, and Guidance
SCOs	Soil Cleanup Objectives
SMP	Site Management Plan
SOP	Standard Operating Procedure
SVOCs	Semivolatile Organic Compounds
SWPPP	Storm Water Pollution Prevention Plan
TAL	Target Analyte List
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
TICs	Tentatively Identified Compounds
TWA	Time-Weighted Average
µg/kg	Micrograms per kilogram
VOCs	Volatile Organic Compounds
WWTP	Wastewater Treatment Plant
Yarussi	Yarussi Construction, Inc

1.0 INTRODUCTION

ERM Consulting and Engineering, Inc. (ERM) has prepared this Interim Remedial Measure (IRM) Construction Completion and Alternative Analysis (AA) Report on behalf of Greenpac Mill, LLC (Greenpac) to summarize the approach and results of environmental remediation at the Former Mill No. 2 Site located at 4001 Packard Road in the City of Niagara Falls, Niagara County, New York (the Site; see Figure 1-1). Greenpac entered into a Brownfield Cleanup Agreement (BCA) with the New York State Department of Environmental Conservation (NYSDEC) and the Site has been identified by the NYSDEC as Brownfield Cleanup Program (BCP) Site Number C932150.

IRM activities at the Site were performed in substantial conformance with the following NYSDEC-approved work plans:

- IRM Work Plan for the Demolition of Mill No. 2 dated (C&S Engineers, Inc. (C&S), 2010b);
- IRM Work Plan for Demolition of Building No. 10 and the Wastewater Pre-Treatment Plant (ERM, 2011b);
- Soil Excavation IRM Work Plan dated June 2011 (ERM, 2011c); and
- Addendum to the Soil Excavation IRM Work Plan (ERM, 2011e).

These Work Plans were prepared in substantive conformance with NYSDEC's Division of Environmental Remediation (DER)-10 guidance document entitled "Technical Guidance for Site Investigation and Remediation" (NYSDEC, 2010). The work conducted to implement these work plans is summarized in this report.

The goal for the BCP for the Site is attainment of a BCP Track 2 cleanup. Therefore, an AA was performed to identify and evaluate remedial alternatives consistent with a Track 2 cleanup. The results of the AA are also summarized in this report.

1.1 SITE DESCRIPTION

General Site layout and the location of selected Site features are presented in Figure 1-2. The Site originally consisted of the Former Mill No. 2 (i.e., Main Parcel) and was subsequently expanded to its present limits (Figure 2) through addition of the Northern Extension and the CSX Corridor parcels. Collectively, these three parcels contain 18.52 acres. The Site is located within a highly industrialized urban area in the City of Niagara Falls, Niagara County, New York. Adjoining properties include an active paper mill (Mill No. 1) operated by Norampac Industries, Inc. (Norampac) to

the north; National Grid property to the west; Royal Avenue, Frank's Vacuum Service, and the Former Frontier Chemical Site (NYSDEC Inactive Hazardous Waste Disposal Site No. 9-32-110) to the south; and the former Frontier Chemical Site, 47th Street, and Sentry Metal Services to the east.

1.1.1 Topography/Regional Drainage

The Site is located within the Ontario Lowland physiographic province (Bloom, 1978). Bedrock at the Site has been previously mapped by the New York State Geologic Survey (NYSGS) as the Upper Silurian Lockport Group (Rickard and Fisher, 1970) consisting predominantly of dolostone. Native surficial geologic material at the Site has been previously mapped by the NYSGS as glaciolacustrine silt and clay (Cadwell, 1988). Non-native surficial material consists of historic fill that is widespread through the Site and surrounding areas. The historic fill material consists predominantly of black to brownish-black sand with pulverized coal, ash, brick and other industrial-type debris. Historic fill material at the Site is generally 2- to 4-feet thick.

Topography of the Site and surrounding areas is generally flat with very little topographic relief. Surface water or wetlands are not present within 0.25-mile of the Site based on review of maps at the City of Niagara Falls Department of Planning and Environmental. The nearest surface water body is Gill Creek, which is located approximately 0.35-mile west of the Site. Portions of the Site are within a Special Flood Hazard Area (Zone AE, formerly designated as the "100-year floodplain") as mapped by the City of Niagara Falls Department of Planning and Environmental.

1.1.2 Site Utilities

Standard utilities including electric, gas, water, sanitary sewers, and storm water sewers are present at and adjacent to the Site. There are two large-diameter sanitary sewers that run north-south through the Site. The Former Mill No. 2 has been inactive since 1982 (Labella, 2008a); therefore, many of the utilities formerly in use in the Former Mill No. 2 were abandoned or inactive. Buildings, operations, and utilities associated with the Former Mill No. 2 were associated with paper manufacturing, finishing, and packaging operations of finished goods. Sanitary sewers at the Site are connected to the publicly-owned treatments works and are regulated by the Niagara Falls Water Board, who also provides municipal water service to the Site and surrounding properties. Electric service is provided by National Grid. Gas service is provided by National Fuel Gas.

1.1.3 Site Hydrogeology

Geologic units encountered at the Site during the Remedial Investigation (RI) include (listed from surface down to bedrock):

- brown to black gravel and historic fill material (Unit 1);
- light colored silty sand to sandy-silt gravel (Unit 2);
- reddish-brown silt and silty gravel (Unit 3);
- dark gray dolomitic limestone of the Lockport Formation (bedrock).

The gravel and historic fill unit consists predominantly of brown to gray gravel fill or dark gray to black historic fill. The fill material is widespread across the Site and is generally less than 3-feet thick, but ranges from 0.3- to 13.5-feet in thickness.

The light-colored silty sand to sandy-silt gravel unit consists predominantly of yellow-brown sandy silt with trace amounts of dark gray gravel. Thickness ranges from 0- to 8-feet.

The reddish-brown silt and silty gravel unit consists predominantly of reddish-brown clayey silt to silty gravel. Gravel is often found in horizontal layers. This unit rests on top of bedrock and pieces of bedrock are contained in the lowest layers of this zone. The thickness of Unit 3 ranges between 2.5- and 9-feet.

Bedrock consists of gray dolomitic limestone of the Upper Silurian Lockport Formation. The depth to bedrock is generally 12-feet below ground surface but ranges from 7.5- to 20-feet and appears to slope from the northeast to the southwest.

There is very little shallow overburden ground water at the Site as evidenced by the lack of water present in the main excavation at the Site. When present, ground water consists of thin, isolated lenses that are perched on top of bedrock. A summary of ground water elevations for wells installed during the 2011 RI is presented in Table 5 of the RI Report (ERM, 2012). Depths to ground water measurements in Site wells indicate that ground water, when present, was encountered at depths ranging from approximately 6- to 8-feet bgs. These data suggest the presence of isolated perched ground water lenses sitting on top of relatively impermeable bedrock. Therefore, a ground water contour map was not prepared during the RI due to the apparent lack of laterally continuous shallow ground water at the Site. Where ground water is present, ground water flow at the Site is expected to be predominantly downwards into bedrock based

to downward hydraulic gradients typically present in overburden deposits in this area. The relatively impermeable nature of Unit 3 suggests most ground water flow would occur vertically through fractures, macropores, or other more permeable zones (i.e., gravelly areas).

1.2 SITE HISTORY

Buildings, facilities, and operations associated with the Former Mill No. 2 historically housed paper manufacturing, finishing, and packaging operations of finished goods. The facility was originally constructed in the 1920s and was expanded several times. The northern part of the Site (referred to as the Northern Extension) included a five story warehouse building (Building 10) and the on-Site Wastewater Treatment Plant. Historic plant drawings indicate that Building No. 10 was apparently constructed in 1936 and the Wastewater Treatment Plant was originally constructed in 1940 with additions and improvements being constructed during ensuing years. Paper manufacturing, finishing, and packaging operations continued at the Site until the Former Mill No. 2 became inactive in 1982.

Greenpac entered into a BCA with the NYSDEC in 2010 to address the significant environmental, legal, and financial barriers that hinder redevelopment of the Site. Former Mill No. 2 structures have been demolished to allow construction of a new, state-of-the-art fiberboard recycling facility by Greenpac.

Several subsurface investigations were conducted at the Site to evaluate soil and ground water quality. Previous subsurface investigations performed by others at the Site included:

- Preliminary Subsurface Assessment (Labella, 2008);
- Subsurface Investigation, Main Parcel (C&S, 2009);
- Subsurface Investigation, Northern Extension (C&S, 2010a); and
- CSX Corridor Phase II Investigation (Benchmark, 2011).

ERM was retained by Greenpac to perform a RI at the Site. The goal of the RI was to provide a comprehensive evaluation of soil and ground water across the Site using existing data from previous investigations and new data generated during implementation of the RI in conformance with two NYSDEC-approved RI Work Plans for the Site: one for the Main Parcel (C&S, 2010a) and the other for the Northern Extension (ERM, 2011a). The results of the RI effort are summarized in Section 2.0.

2.0 SUMMARY OF THE REMEDIAL INVESTIGATION

ERM mobilized to the Site in January 2011 and started the RI. Member company subsurface utility clearances were requested through Dig Safely New York. Member company and private subsurface utilities were identified, located, and marked with the input and approval of Norampac and Greenpac and through the use of a geophysical subcontractor. A total of 219 boreholes were advanced for the collection of soil samples and installation of ground water monitoring wells in selected locations. Ten boreholes were completed as ground water monitoring wells. Work was conducted in substantive conformance with procedures contained in the approved RI Work Plans. Ground water monitoring wells were sampled between using minimal drawdown/ low-flow sampling techniques.

2.1 SOIL

The current and future contemplated use of the Site is industrial. The Protection of Ground Water SCOs and the Protection of Ecological Resources Soil Cleanup Objectives (SCOs) do not apply to the Site due to a general lack of these resources at and adjacent to the Site. Therefore, chemical analytical results for soil were compared to the Title 6, New York Code of Rules and Regulations [6 NYCRR] Part 375 SCOs for Industrial Use (referred to as the Industrial SCOs).

Areas of elevated radioactivity were discovered at the Site during implementation of the Soil Excavation IRM. Therefore, a formal Addendum to the RI Work Plans incorporating the investigation of radioactive materials at the Site was prepared by ERM and approved by the NYSDEC (ERM, 2011d). Radiological field screening results were compared to the NYSDEC-approved Site-specific excavation guidance value of 10,000 cpm as measured using a Ludlum Model 2221 meter with a 44-10 probe. As instructed by the NYSDEC, radiation readings were subject to the professional judgment of the radiological field technician and NYSDEC and New York State Department of Health (NYSDOH) specialists in radioactive materials removal.

Review and evaluation of resulting chemical data and radiological investigation results, comparison with applicable standards, criteria, and guidance (SCGs), and mapping through use of a geostatistical software program (EVS) resulted in the lateral and vertical delineation of areas of soil that contain one or more compounds of potential concern (COPCs) at concentrations above applicable SCGs.

Volatile organic compounds (VOCs) were not detected at concentrations above the Industrial SCOs. However, VOCs were detected at concentrations above the applicable Site-specific field screening guidance value of 5 parts-per-million (ppm) as measured using a calibrated photoionization detector (PID) in two areas: chemical hotspots C-6 and C-10.

Elevated radiation was associated with slag and slag-like materials contained in historic fill materials or bedding associated with site utilities and foundations. The slag and slag-like materials are consistent with materials produced during historic industrial operations in western New York. Areas of elevated radiation occurred predominantly in excavation Phases 3, 4, and 5 associated with the construction of the new building. Additionally, seven areas of elevated radiation designated as Rad Zones 1 through 7 were identified in areas outside of the main excavation for the new building.

The following semivolatile organic compounds (SVOCs) and metals were detected in one or more soil samples at concentrations above the Industrial SCOs.

SVOCs

- Benzo(a)anthracene
- Benzo(b)fluoranthene
- Benzo(a)pyrene
- Dibenzo(a,h)anthracene
- Indeno(1,2,3-cd)pyrene

Metals

- Arsenic
- Manganese
- Mercury

Greenpac desires to attain a Track 2 BCP cleanup. Therefore, areas of soil with elevated VOCs, SVOCs, metals, or radiation were removed from the Site to the extent practicable. The removal occurred during implementation of the NYSDEC-approved Soil Excavation IRM Work Plan. The results of the Soil Excavation IRM are presented in this report.

2.2 GROUND WATER

There is very little shallow overburden ground water at the Site as evidenced by the lack of water present in the main excavation at the Site. Shallow ground

water at the Site is limited to thin isolated areas perched on top of bedrock and is laterally and vertically discontinuous. Therefore, lateral contaminant transport in ground water is not anticipated to be significant at the Site. Shallow ground water flow at the Site is expected to be predominantly downwards towards bedrock due to downward hydraulic gradients typically present in overburden deposits in this area as documented during the hydrogeologic investigation of overburden and bedrock at the adjacent Frontier Chemical site (NYSDEC, 2012).

Where shallow ground water is present at the Site, COPCs in Site soil typically are not present in ground water at concentrations above ambient ground water quality standards and guidance values. Areas of soil containing COPCs at concentrations above Industrial SCOs were permanently removed from the subsurface during implementation of the Soil Excavation IRM. Therefore, the Soil Excavation IRM also acted as a source removal and control action for the protection of ground water, further reducing the potential for contamination of ground water at the Site.

VOCs and SVOCs were not detected in shallow ground water at the Site at concentrations exceeding ambient ground water quality standards and guidance values with the exception of two wells installed by Labella in 2008 (wells MW-2 and MW-3) located near the southeastern property line in the perceived down-gradient direction from the Frontier Chemical site. The following COPCs were detected in these two wells at concentrations exceeding ambient ground water quality standards and guidance values.

- Bis(2-ethylhexyl)phthalate
- Chlorobenzene
- 1,2-Dichlorobenzene
- 1,3-Dicholorbenzene
- 1,4-Dichlorobenzene
- cis-1,2-Dichlorethene

These compounds are consistent with compounds reported by the NYSDEC as COPCs at the Frontier Chemical site, and therefore, additional investigation or remediation of compounds solely attributable to an off-Site source is not warranted as set forth in 6 NYCRR Part 375-1.8(d)2. Areas of VOCs in Site soil have been permanently removed from the Site during implementation of the Soil Excavation IRM.
Other ground water quality exceedances in shallow ground water samples collected at the Site are limited to some isolated occurrences of the following metals:

- Antimony

- Iron
- Magnesium
- Manganese
- Sodium

The occurrence and observed concentrations of these naturally-occurring metals is consistent with the anticipated geochemical character of ground water at the Site based on typically low organic carbon content of glacial deposits (Units 2 and 3) and the near-reducing geochemical conditions encountered in Site ground water. Manganese was detected in Site soil at concentrations above NYSDEC Part 375

Protection of Ground Water SCOs. Areas of manganese soil exceeding the Industrial SCO have been permanently removed from the Site during implementation of the Soil Excavation IRM.

These metals are considered as predominantly naturally occurring at the Site and raising only aesthetic and not environmental concerns. As such, further environmental investigation of these metals appears unwarranted. Additionally, the lack of significant mobile ground water at the Site, the City of Niagara Falls Local Law #4 of 2010 (which prohibits the use of ground water for drinking), the proposed use of institutional controls at the Site (an Environmental Easement) to prohibit the use of ground water for drinking, and the soil source area removals performed during implementation of the Soil Excavation IRM all suggest that implementation of ground water quality restoration or plume containment/stabilization are not required at the Site.

2.3 SOIL VAPOR

During a meeting held at the NYSDEC office in Buffalo, New York on 5 April 2011, the NYSDEC and the NYSDOH indicated that assessment of the soil vapor matrix at the Site would not be required if soil containing VOCs at concentrations above 5 ppm above background, as measured in the field using a calibrated PID, was removed during remedial action at the Site. Two such areas were identified during the RI – chemical hotspot C-6 and hotspot C-10. VOC-affected soil in these two areas was removed during the Soil Excavation IRM. Therefore, investigation of soil vapor at the Site was not performed during the RI as approved by the NYSDEC and the NYSDOH.

2.4 QUALITATIVE HUMAN HEALTH EXPOSURE ASSESSMENT

Potential exposure pathways at the Site that are complete under current Site conditions and uses include direct contact with soil, incidental ingestion of soil, and inhalation of soil for on-Site commercial workers and on-Site construction or utility workers. Direct contact with soil and inhalation of soil represent the greatest risk concerning frequency and duration of exposure for on-Site commercial workers and on-Site construction and utility workers. The risk is greatest during intrusive activities (e.g., disturbance of surface soil or subsurface soil excavation). Control measures such as proper implementation and compliance with the Site-specific Health and Safety Plan (HASP), use of appropriate personal protective equipment (PPE), dust suppression techniques, and the use of institutional controls will greatly reduce the potential risk of exposure. These considerations will be addressed in a Site Management Plan (SMP) that will be submitted to the NYSDEC for review and approval. Soil containing COPCs or radiation above applicable SCGs will be permanently removed from the Site through remedial activities. Therefore, currently complete exposure pathways will be considered incomplete for current and future industrial use of the Site subsequent to the completion of remedial action.

The Site and surrounding areas are serviced by municipal water and the use of ground water for drinking is prohibited by the City of Niagara Falls Local Law #4 of 2010. Use of ground water at the Site for drinking will be further prohibited through filing of an Environmental Easement. Therefore, current and future potential pathways for ground water are not complete based on current and future legal restrictions of ground water use at the Site and surrounding areas.

2.5 FISH AND WILDLIFE RESOURCES IMPACT ANALYSIS

The Site is largely developed with buildings, roads, utilities infrastructure, paved or concrete surfaces, and little or no significant vegetation. The NYSDEC's decision key contained in Appendix 3C of DER-10 (NYSDEC, 2010) was utilized to evaluate whether or not performance of a Fish and Wildlife Resources Impact Analysis was needed. The RI demonstrated that there is evidence that COPCs were released into the environment at the Site. Therefore, the Site can be considered to have been affected by one or more discharge or spill events.

The National Grid property and the New York Power Authority (NYPA) property to the west of the Site are zoned "OS" (Open Space) by the City of Niagara Falls. These two properties contain ecological resources consisting of grassy fields and shrubby areas. Other ecological resources may also be present on these two properties. Review of the NYSDEC's internet-based Environmental

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

3.0 ALTERNATIVES ANALYSIS

This section provides an analysis of the selected remedial approach by media using the Remedy Selection Evaluation Criteria identified in Section 4.2 of Guidance Document DER-10: *Technical Guidance for Site Investigation and Remediation* (NYSDEC, 2010). Because this is a BCP site, and in accordance with DER-10 Section 4.4(d)2, two alternatives for Site soil are evaluated as follows:

- one alternative will achieve the cleanup Track and intended use identified for the site; and
- the other alternative will achieve unrestricted use relative to soil contamination, without the use of institutional/engineering controls.

One alternative is evaluated for Site ground water.

3.1 REMEDIAL GOALS & REMEDIAL ACTION OBJECTIVES

This section presents the remedial goals and remedial action objectives (RAOs) established for the Site media of interest (i.e., soil and ground water). Remedial goals are derived from the statute 6 NYCRR Part 375 and NYSDEC guidance. The remedial goals for this Site are:

- to be protective of public health and the environment, given the intended use of the Site; and
- to include removal or elimination, to the extent feasible, of identifiable source of contamination regardless of the intended use of the Site.

As discussed in DER-10 Section 4.1(c), Remedial Action Objectives (RAOs), are medium-specific objectives for the protection of public health and the environment, and are developed based on contaminant-specific standards, criteria, and guidance (SCGs) to address contamination identified at a site. In the case of protection of human health, RAOs usually reflect the concentration of COPC and the potential exposure route. Protection may be achieved by reducing potential exposure (e.g., use restrictions, limiting access) as well as by reducing concentrations. RAOs may also be required for protection of environmental receptors.

Media that are candidates for remedial evaluation are identified based on the nature and extent of contamination and applicable or relevant and appropriate SCGs. Site media of interest are soil and ground water as identified during the RI, and discussed in Section 2.0. The applicability of the following NYSDEC

Generic RAOs for this Site was evaluated as follows:

Soil

Prevent ingestion/direct contact with contaminated soil.
Several SVOCs and metals were identified in Site soil above the Industrial SCOs. In addition, areas of elevated radioactivity were discovered at the Site during implementation of the Soil Excavation IRM. Therefore, this RAO is applicable for development of Site-specific RAOs.

Prevent inhalation of or exposure to contaminants volatilizing from contaminants in soil.
During a meeting held at the NYSDEC office in Buffalo, New York on 5 April 2011, the NYSDEC and the NYSDOH indicated that assessment of the soil vapor matrix at the Site would not be required if soil containing VOCs at concentrations above 5 ppm above background as measured in the field using a calibrated PID was removed during remedial action at the Site. Therefore, this RAO is applicable for development of Site-specific RAOs.

Prevent migration of contaminants that would result in ground water or surface water contamination.
As identified in the RI, the SCOs for the protection of ground water do not apply at this Site because:

- Local Law No. 4 of 2010 prohibits the installation of potable water supply wells in the City of Niagara Falls and therefore the use of ground water in the area for drinking is not contemplated;
- a Site-specific restriction on ground water use is planned as an institutional control at the Site;
- shallow ground water is limited to thin isolated areas perched on top of bedrock and is laterally discontinuous; and
- contaminants in Site soil generally are not present in shallow ground water samples collected at the Site at concentrations above ambient ground water quality standards and guidance values.

In addition, surface water is not present on or adjacent to the Site. Therefore, this RAO is not applicable.

Prevent impacts to biota from ingestion/direct contact with soil causing toxicity or impacts from bioaccumulation through the terrestrial food chain.
Evidence of significant on-Site ecological resources was not observed during the RI. Additionally, there is no evidence that contamination present at the Site has the potential to migrate to and impact potential off-Site ecological resources on adjacent properties. Therefore, this RAO is not applicable.

Ground Water

Prevent ingestion of ground water with contaminant levels exceeding drinking water standards.
Ground water at the Site contains some contaminants above ambient water quality standards and guidance values. Therefore, this RAO is applicable for development of Site-specific RAOs.

Prevent contact with, or inhalation of volatiles, from contaminated ground water.
The NYSDEC and NYSDOH indicated in a meeting on 5 April 2011 that investigation or mitigation of VOCs for the vapor intrusion pathway would not be required at the Site if VOC-affected soil was addressed during the Soil Excavation IRM (as it has been). As such, this potential exposure pathway was classified in the RI as incomplete. Therefore, this RAO is not applicable.

Restore ground water aquifer to pre-disposal/pre-release conditions, to the extent practicable.
The lack of significant mobile ground water at the Site, local regulations restricting ground water use, the proposed use of institutional controls at the Site to further prohibit the use of ground water for drinking, and source area removals during implementation of the Soil Excavation IRM suggest that implementation of ground water quality restoration or plume containment/ stabilization are not required at the Site. Therefore, this RAO is not applicable.

Prevent the discharge of contaminants to surface water.
There is very little shallow overburden ground water at the Site. Shallow ground water flow at the Site is expected to be predominantly downwards towards bedrock due to downward hydraulic gradients typically present in overburden deposits in this area. For these reasons, lateral contaminant transport in ground water is not anticipated to be significant. Therefore, this RAO is not applicable.

Remove the source of ground or surface water contamination.
As discussed in DER-10 Section 1.3, a source area is a discrete area of soil, sediment, surface water or ground water containing contaminants in sufficient concentrations to migrate in that medium, or to release significant levels of contaminants to another environmental medium, which could result in a threat to public health and the environment. A source area typically includes, but is not limited to, a portion of a site where a substantial quantity of any of the following is present:

1. concentrated solid or semi-solid hazardous substances;

2. non-aqueous phase liquids; or
3. grossly-contaminated media.

None of these conditions were identified in the RI. Therefore, this RAO is not applicable.

Based on the above discussion, guidance for development of RAOs in DER-10 Section 4.1(c), and the NYSDEC Generic RAOs, the Site-specific RAOs will be as follows:

Soil

- SRAO1 – Prevent ingestion/direct contact with soil that poses a risk to public health and the environment given the current and future intended industrial use of the Site; and
- SRAO2 - Prevent inhalation of or exposure to contaminants volatilizing from contaminants in soil.

Ground Water

- GWRAO1 – Prevent ingestion of ground water with contaminant levels exceeding drinking water standards.

The following sections provide an evaluation of selected remedies by media.

3.2 EVALUATION OF REMEDIAL ALTERNATIVES FOR SOIL

Remedial action performed under the NYSDEC's BCP is predicated on future Site use as described in the NYSDEC's Soil Cleanup Guidance Policy CP-51 (NYSDEC, 2011). The current use and contemplated future use of the Site is industrial as stated in the BCA and Greenpac desires attainment of a BCP Track 2 cleanup. The following sections evaluate:

- the selected remedy for soil that will achieve the Track 2 Cleanup and intended industrial use for the site; and
- an alternative remedy which will achieve unrestricted use relative to soil contamination, without the use of institutional/engineering controls.

3.2.1 Summary of Remedial Alternatives

3.2.1.1 Selected Remedial Action (Restricted Industrial Use)

The Site has been adequately investigated to evaluate the nature and extent of contamination in excess of applicable SCGs. Consistent with the NYSDEC-approved Soil Excavation IRM Work Plan (ERM, 2011c) and the approved Addendum to the Soil Excavation IRM Work Plan (ERM, 2011e), a Track 2 cleanup was implemented that achieved the Industrial SCOs for the top 15-feet of soil, or to the top of bedrock, whichever is shallower. The top of bedrock typically occurs at depths less than 15-feet at the Site. The remedy consisted of excavation and off-Site disposal of soil above the Industrial SCOs. Furthermore, the NYSDEC and the NYSDOH indicated in a meeting on 5 April 2011 that assessment or mitigation of vapor intrusion at the Site would not be required if soil containing VOCs at concentrations above 5 ppm as measured in the field using a calibrated PID was removed during remedial action at the Site. Two such areas were identified during the RI – chemical hotspot C-6 and hotspot C-10 (see Section 4.3 for details), and additional areas were encountered during excavation activities. Therefore, soil exhibiting PID measurements above 5 ppm was also removed. Except for some localized areas that were being addressed during the preparation of this document (see Section 6.0 for details), impacts to soil have been addressed through completion of the Soil Excavation IRM.

During implementation of the Soil Excavation IRM, radiologically-impacted soil was detected at the Site. SCGs for radiation are not contained within 6 NYCRR Part 375. Therefore, the radiological investigation results were evaluated against measured background levels at the Site at the instruction of the NYSDEC and the NYSDOH. Based on measured background levels, the NYSDEC approved an excavation screening criteria of 10,000 counts-per-minute (cpm) for the Site as listed in the NYSDEC-approved Addendum to the RI Work Plan (ERM, 2011d). As required by the NYSDEC, the excavation screening criteria were locally modified based on the professional judgment of GRD's technician and NYSDEC and NYSDOH specialists in radioactive materials remediation. After consultation with the NYSDEC and the NYSDOH, excavation and off-Site disposal at a permitted disposal facility located out-of-state was selected to address areas of elevated radiation within the BCP Site Boundary. Excavation continued until excavation guidance values for radiation were achieved as determined by the NYSDEC.

In addition to the active remediation presented above, a deed restriction will be established which only permits industrial use of the Site. A SMP will be prepared to inform current and future property owners regarding the distribution of affected soil exhibiting concentrations in excess of NYSDEC's Residential SCOs, as well as soil exceeding the Industrial SCOs below a depth of 15 feet, and to specify the manner in which intrusive work may be conducted in these areas if deemed necessary. The SMP will also include relevant considerations for periodic review of Site institutional controls.

The combination of these institutional controls with the completed Soil Excavation IRM activities will comprise the final remedy for Site soil.

3.2.1.2 Unrestricted Use

Under this remedial alternative, all soil constituents present above the Unrestricted Use SCOs would be excavated. Based on modeling conducted during the RI, this would involve excavation of approximately 78,000 in-place cubic yards of soil. The volume of radiologically-impacted soil is not currently known. While excavating soil to achieve the Unrestricted Use SCOs, it would be screened and all soil above the 10,000 cpm screening criteria would be excavated and disposed at a permitted disposal facility located out-of-state.

Since all soil exceeding Unrestricted Use SCOs would be removed from the Site, a deed restriction or other institutional controls addressing soil would not be required.

3.2.2 Overall Protectiveness of the Public Health and the Environment

3.2.2.1 Selected Remedial Action (Restricted Industrial Use)

The soil RAOs have been established to protect public health and the environment and are listed below:

- SRAO1 – Prevent ingestion/direct contact with soil that poses a risk to public health and the environment given the current and future intended industrial use of the Site; and
- SRAO2 - Prevent inhalation of or exposure to contaminants volatilizing from contaminants in soil.

With two exceptions, these soil RAOs have been achieved. With the exception of two inaccessible areas (see discussion of the transformer area and soil near sample CONF-110 in Section 4.3.6 and Section 6.0), all soil exceeding the Industrial SCOs and present above a depth of 15 feet (or top of bedrock) has been excavated and disposed off-Site. Affected soil in the transformer area will be excavated and disposed off-Site under the SMP once the area is accessible. For the soil near CONF-110, Greenpac is planning to submit a demonstration to the NYSDEC of the technical impracticability of additional soil excavation in this area as a basis for preservation of a BCP Track 2 cleanup for the Site. Any soil with chemical constituents exceeding Industrial SCOs below a depth of 15 feet will be managed in-place under a SMP which will limit disturbance of the soil without the proper controls. As such, the selected remedy will prevent

ingestion/direct contact with soil above the Industrial SCOs, and will meet SRAO1.

The NYSDEC and the NYSDOH indicated in a meeting on 5 April 2011 that assessment or mitigation of vapor intrusion at the Site would not be required if soil containing VOCs at concentrations above 5 ppm as measured in the field using a calibrated PID was removed during remedial action at the Site. Two such areas were identified during the RI, as well as additional areas identified during excavation activities, and all soil exhibiting PID readings above 5 ppm was removed. Hence, SRAO2 is met as well.

Furthermore, excavation and off-Site disposal of radiologically-impacted soil proceeded until excavation guidance values for radiation were achieved as determined by the NYSDEC. It is therefore concluded that the selected remedy is protective of public health and the environment.

3.2.2.2 Unrestricted Use

This remedy would remove all soil from the Site that exceeds Unrestricted Use SCOs. Therefore, the selected remedy will prevent ingestion/direct contact with soil poses a risk to public health and the environment regardless of the future use of the Site, and would meet SRAO1.

In addition, the remedy would also remove soil containing VOCs at concentrations above 5 ppm as measured in the field using a calibrated PID. In doing so, NYSDEC and NYSDOH would not require assessment or mitigation of vapor intrusion at the Site. Hence, SRAO2 would also be met.

Furthermore, excavation and off-Site disposal of radiologically-impacted soil would proceed during the excavation of chemically-impacted soil until excavation guidance values for radiation were achieved as determined by the NYSDEC. It is therefore concluded that this alternative remedy would be protective of public health and the environment.

3.2.3 Standards, Criteria & Guidance (SCGs)

The primary SCGs that apply to these remedies are provided in Table 3-1.

3.2.3.1 Selected Remedial Action (Restricted Industrial Use)

The selected remedial action was designed to meet all applicable SCGs for soil, and has done so. In addition, this remedy has met the site-specific screening level for VOCs (i.e., soil containing VOCs greater than 5 ppm as measured with a PID), and radiation (10,000 cpm).

3.2.3.2 Unrestricted Use

The remedial action to meet Unrestricted Use SCOs is anticipated to meet all applicable SCGs for soil. In addition, this remedy would meet the site-specific screening level for VOCs (i.e., soil containing VOCs greater than 5 ppm as measured with a PID), and radiation (10,000 cpm).

3.2.4 Long-Term Effectiveness and Permanence

3.2.4.1 Selected Remedial Action (Restricted Industrial Use)

With the exception of the transformer area, the excavation activities permanently removed from the Site all soil containing chemical constituents exceeding the Industrial SCOs above a depth of 15 feet or top of bedrock. Affected soil in the transformer area will be permanently removed once the area is accessible. Any soil deeper than 15 feet, and containing chemical constituents above the Industrial SCOs, will be managed under a SMP. The SMP will be established to prevent exposure to soil that poses a risk to public health and the environment given the intended industrial use of the Site.

During the excavation, all soil containing VOCs above 5 ppm as measured with a PID was permanently removed from the Site. Furthermore, excavation and permanent off-Site disposal of radiologically-impacted soil proceeded until excavation guidance values for radiation were achieved as determined by the NYSDEC.

Therefore, this remedy will be effective over the long term.

3.2.4.2 Unrestricted Use

This remedy would permanently remove from the Site all soil containing chemical constituents above the Unrestricted Use SCOs. During these activities, soil would be screened and any found containing radiation above the 10,000 cpm screening level would be permanently disposed off-Site. Furthermore, all soil containing VOCs above 5 ppm as measured with a PID would be permanently removed from the Site.

Therefore, this remedy will be effective over the long term.

3.2.5 Reduction of Toxicity, Mobility or Volume of Contamination

3.2.5.1 Selected Remedial Action (Restricted Industrial Use)

As discussed in Section 3.2.4.1, impacted soil will be permanently removed from the Site. The overall toxicity and volume will remain unchanged. The mobility of the contaminants will be reduced via placement in a regulated disposal facility.

3.2.5.2 Unrestricted Use

As discussed in Section 3.2.4.2, impacted soil would be permanently removed from the Site. The overall toxicity and volume would remain unchanged. The mobility of the contaminants would be reduced via placement in a regulated disposal facility.

3.2.6 Short-Term Impact and Effectiveness

3.2.6.1 Selected Remedial Action (Restricted Industrial Use)

During implementation of the Soil Excavation IRM, potential risks due to exposure to affected material were addressed with a HASP. A Community Air Monitoring Program (CAMP) was implemented during intrusive activities at the Site to allow rapid identification, evaluation, and response to any potential risks to the community, Site workers and/or the environment. Corrective action consisted of engineering controls (e.g., dust suppression techniques, venting, sloping, shoring, etc.) to address potential concerns as they occurred. During the excavation work, there was an increase in truck traffic associated with transportation of soil for off-Site disposal, as well as imported material for backfill. The selected remedy consists of the already-completed Soil Excavation IRM. Therefore, there are no further short-term risks.

3.2.6.2 Unrestricted Use

To achieve Unrestricted Use SCOs, additional excavation would be required beyond that which was conducted for the Soil Excavation IRM. Potential risks due to exposure to affected material would still be addressed with a Health & Safety Plan. The CAMP would be implemented as it was during the Soil Excavation IRM.

During the additional excavation work required to achieve Unrestricted Use SCOs, there would be a significant increase in truck traffic associated with transportation of approximately 51,000 in-place cubic yards of soil to an off-Site disposal facility, and a corresponding volume of imported backfill material. Assuming an average load of 10 cubic yards, this translates into an additional 5,100 trucks transporting soil off-Site, as well as 5,100 trucks bringing backfill material to the Site. The duration of the Soil Excavation IRM was approximately six months to remove 104,000 cubic yards of soil (additional soil was excavated as part of the site redevelopment). Assuming a similar level of effort to achieve Unrestricted Use SCOs would require approximately another three months of excavation activities. This would delay the opening of the proposed new recycling facility at the Site by a similar timeframe.

3.2.7 Implementability

3.2.7.1 Selected Remedial Action (Restricted Industrial Use)

The completed Soil Excavation IRM, along with the proposed institutional controls, comprises the selected remedy. The property owner is conducting the remedy and agrees to the establishment of a deed restriction which limits the Site to industrial use. Therefore, there is no need to obtain other approvals for the deed restriction. Hence, the remedy is implementable.

3.2.7.2 Unrestricted Use

In order to achieve the Unrestricted Use SCOs, no approvals are required from other agencies, and the equipment is readily available to perform the excavations. No deed restriction would be required under this remedy. Therefore, the remedy is implementable. However, as discussed in Section 3.2.6.2, an additional three months of remedial work are estimated to achieve the Unrestricted Use SCOs.

3.2.8 Cost Effectiveness

3.2.8.1 Selected Remedial Action (Restricted Industrial Use)

Table 3-2 presents a summary of significant costs associated with the implementation of the selected remedial action. The remedial costs already incurred to achieve Industrial SCOs and to address radiologically-impacted soil have totaled approximately $16.2 million.

3.2.8.2 Unrestricted Use

Table 3-2 also presents the estimated costs to achieve Unrestricted Use SCOs and to address radiologically-impacted soil. This estimated cost is $26.1 million, which is approximately $9.9 million more than the cost of the selected remedial action.

3.2.9 Land Use

3.2.9.1 Selected Remedial Action (Restricted Industrial Use)

The Site originally consisted of the Former Mill No. 2, which historically housed paper manufacturing, finishing, and packaging operations of finished goods. The Site has been inactive since 1982, and is being redeveloped to allow construction of a state-of-the-art fiberboard recycling facility. This remedy will achieve Industrial SCOs, will remove soil containing radioactive materials above background levels, and will remove soil containing VOCs as measured with a PID above the site-specific screening level. This will allow for construction and operation of the planned new fiberboard recycling facility.

3.2.9.2 Unrestricted Use

Cleanup of the Site to Unrestricted Use SCOs ultimately will allow for construction and operation of the planned new fiberboard recycling facility. However, as noted in Section 3.2.6.2, the additional volume of soil required for removal could delay the opening of the facility by approximately 3 months.

3.2.10 Community Acceptance

As discussed in DER-10 Section 4.2(j), this criterion will be evaluated after the public review of the remedy selection process as part of the final NYSDEC selection/approval of a remedy for the Site. This criterion will be evaluated in consideration of the remedy needed to achieve SCOs for Industrial Use and Unrestricted Use of the Site.

3.2.11 Evaluation Summary & Recommended Alternative

Both remedies will permanently remove from the Site affected soil such that the soils RAOs are met. In addition, both remedies will allow for continued industrial use of the property as a new fiberboard recycling facility. However, to meet the Unrestricted Use SCOs, an additional 51,000 cubic yards would need to be excavated and transported off-Site for disposal. This would occur at an estimated additional cost of $9.9 million, along with a significant increase in

truck traffic, and a delayed opening of the new recycling facility by three months. Furthermore, these efforts to achieve Unrestricted Use SCOs would not provide greater protection to human health and the environment given the intended industrial use of the property. For these reasons, the selected remedy for soil is the completed Soil Excavation IRM, a deed restriction limiting the Site to industrial use, and implementation of a SMP.

3.3 EVALUATION OF GROUND WATER REMEDY

3.3.1 Summary of Remedial Action

The RI identified the following compounds in one or more ground water samples at concentrations above ambient ground water quality standards or guidance values:

VOCs

- Chlorobenzene
- 1,2-Dichlorobenzene
- 1,3-Dichlorobenzene
- 1,4-Dichlorobenzene
- 1,2-Dichloroethane
- cis-1,2-Dichloroethene

SVOCs

- Bis(2-ethylhexyl)phthalate

Metals

- Antimony
- Iron
- Magnesium
- Manganese
- Sodium

The VOCs and SVOCs are located in MW-2 and MW-3 near the southeastern property line in the perceived downgradient direction from the Frontier Chemical property. These compounds are consistent with compounds derived from the Frontier Chemical Site and are attributable to an off-Site source as set forth in 6 NYCRR Part 375-1.8(d)2. These results suggest that low levels of VOCs and SVOCs may be migrating onto the Site from an up-gradient source.

The remedy for ground water will consist of institutional controls. The City of Niagara Falls Local Law No. 4 for the Year 2010 prevents the use of ground water as a public supply, or for other purposes, by prohibiting construction or operation of new water supply wells. Enforcement of this regulation will prevent contact with affected Site ground water. In addition, a deed restriction will be established prohibiting ground water use to further prevent contact with affected Site ground water.

3.3.2 Overall Protectiveness of the Public Health and the Environment

All potable water is supplied to the Site by the Niagara Falls Water Board (NFWB) public water supply system. There are no private drinking water wells at the Site or serving the surrounding residential areas. An industrial supply well is located on the Norampac property north of the Site, and will be used at the Site as a source of water for cooling and process purposes only. It is not intended for potable use. As a result, this is an incomplete exposure pathway. Niagara Falls Local Law No. 4 for the Year 2010 prohibits construction or operation of a new water production well in the City of Niagara Falls. Under this remedy, this law will continue to be enforced at the Site. This will prevent consumption of ground water at the Site. To further protect public health and prevent consumption of Site ground water, the deed restriction will prohibit any use of Site ground water. Therefore, the proposed remedy will achieve the applicable remedial action objective:

GWRAO1 – Prevent ingestion of ground water with contaminant levels exceeding drinking water standards.

3.3.3 Standards, Criteria & Guidance (SCGs)

The primary Standards, Criteria, & Guidance (SCGs) that will apply to this remedy are provided in Table 3-1. Under the proposed remedy ground water contaminants will remain at concentrations above ambient ground water quality standards and guidance values. However, further remediation of ground water appears unwarranted as discussed below.

Measurement of ground water elevations in monitoring wells across the Site reveals that there is very little shallow overburden ground water at the Site. Shallow ground water at the Site is limited to thin isolated areas perched on top of bedrock and is laterally and vertically discontinuous. Observations of very little ground water entry into excavations at the Site during implementation of the Soil Excavation IRM support this conclusion. Transmissive (mobile) ground water is highly limited in occurrence and volume and is limited to fractures,

macropores, or gravelly zones. A laterally consistent saturated zone (ground water) above bedrock is not present at the Site and therefore lateral contaminant transport in ground water is not anticipated to be significant at the Site. Experience at other sites with similar geology, including the results of ground water investigations conducted at the adjacent Frontier Chemical property, suggests that shallow ground water flow at the Site is predominantly downward toward bedrock due to downward hydraulic gradients in these units.

Where shallow ground water is locally present at the Site, contaminants present in Site soil typically are not present in ground water samples collected at the Site at concentrations above ambient ground water quality standards and guidance values. These data are consistent with relatively short residence time for shallow ground water in the subsurface at the Site and suggest that contaminants in Site soil do not pose a significant threat to ground water quality at the Site. Additionally, areas of soil containing contaminants at concentrations above Industrial SCOs were permanently removed from the subsurface during implementation of the Soil Excavation IRM, which further reduces the potential for significant contamination of ground water.

VOCs and SVOCs were not detected in Site ground water at concentrations exceeding ambient ground water quality standards and guidance values with the exception of two wells (MW-2 and MW-3) located near the southeastern property line immediately down-gradient of the Frontier Chemical property. The following compounds were detected in these wells at concentrations exceeding ambient ground water quality standards and guidance values.

- Bis(2-ethylhexyl)phthalate
- Chlorobenzene
- 1,2-Dichlorobenzene
- 1,3-Dicholorbenzene
- 1,4-Dichlorobenzene
- cis-1,2-Dichlorethene

These compounds are consistent with compounds derived from the Frontier Chemical Site and are attributable to an off-Site source as set forth in 6 NYCRR Part 375-1.8(d)2. These results suggest that low levels of VOCs and SVOCs may be migrating onto the Site from an up-gradient source. Investigation or remediation of background ground water conditions is not warranted for this Site consistent with 6 NYCRR Part 375-1.8(d)2. On-Site soil in the vicinity of these monitoring wells was removed and replaced with clean backfill material.

Other exceedances in ground water samples collected at the Site are limited to the following metals:

- Antimony
- Iron
- Magnesium
- Manganese
- Sodium

The observed concentrations of these metals, commonly found in natural rock-forming minerals, is consistent with the anticipated geochemical character of ground water at the Site based on typically low organic carbon content of glacial deposits and the near-reducing conditions encountered in Site ground water as documented by generally low dissolved oxygen and oxidation-reduction potential readings. These metals are considered as predominantly naturally occurring at the Site and raising only aesthetic and not environmental concerns.

In summary, further monitoring or remediation of background ground water conditions is not warranted. Potable water for the Site and surrounding areas is provided by the municipal water supply. Additionally, implementation of the Soil Excavation IRM, the lack of significant mobile ground water at the Site, local law which prohibits the use of ground water, and the ephemeral, highly localized occurrence of shallow ground water exceedances due either to up-gradient sources or natural geochemical conditions suggest that implementation of ground water quality restoration and plume containment/stabilization are not required at the Site.

3.3.4 Long-Term Effectiveness and Permanence

As part of this remedy, contaminants will remain in ground water at concentrations above ambient ground water quality standards and guidance values. The local regulation prohibiting construction or operation of new production wells, as well as the proposed deed restriction on ground water use at the Site will effectively achieve GWRAO1 - Prevent ingestion of ground water with contaminant levels exceeding drinking water standards – as long as they remain in place.

3.3.5 Reduction of Toxicity, Mobility or Volume of Contamination

The concentrations of metals are consistent with the anticipated geochemical character of ground water at the Site, and no appreciable decrease in the level of these compounds is expected. There is anticipated to be some decrease in the concentrations of SVOCs and VOCs due to ongoing natural attenuation processes.

While the implementation of this remedy is not expected to achieve a significant reduction in toxicity, mobility, or volume of contamination, the institutional controls restricting ground water use will achieve GWRAO1 - Prevent ingestion of ground water with contaminant levels exceeding drinking water standards.

3.3.6 Short-Term Impact and Effectiveness

There will be no on-Site remedial activities to address ground water. Therefore, there are no short-term impacts associated with this remedy. In addition, the remedy will achieve the sustainability and "green remediation" guidelines identified in DER-10 Section 1.14.

3.3.7 Implementability

This remedy is readily implementable. The local regulation prohibiting construction or operation of new water production wells is already in place and enforced. The property owner is conducting the remedy and agrees to the establishment of a deed restriction on ground water use. Therefore, there is no need to obtain other approvals for the deed restriction.

3.3.8 Cost Effectiveness

Other than legal costs to establish the deed restriction, there are no significant costs to implement this remedy. Therefore, this remedy is cost-effective.

3.3.9 Land Use

The Site originally consisted of the Former Mill No. 2, which historically housed paper manufacturing, finishing, and packaging operations of finished goods. The Site has been inactive since 1982, and is being redeveloped to allow construction of a state-of-the-art fiberboard recycling facility. The institutional controls restricting ground water use will allow continued use of the property in this capacity.

3.3.10 Community Acceptance

As discussed in DER-10 Section 4.2(j), this criterion will be evaluated after the public review of the remedy selection process as part of the final NYSDEC selection/approval of a remedy for the Site.

3.3.11 Evaluation Summary

The ground water remedy consists of:

- Enforcement of the local law prohibiting construction or operation of new water production wells; and
- Establishing a deed restriction on ground water use.

These institutional controls restricting ground water use will be protective of human health by achieving GWRAO1 - Prevent ingestion of ground water with contaminant levels exceeding drinking water standards – as long as the controls remain in place. The remedy is readily implementable and cost-effective, and there are no short-term impacts. The institutional controls restricting ground water use will allow for construction and operation of the planned new fiberboard recycling facility. Therefore, this is an effective remedy to address contaminants in ground water above ambient water quality standards and guidance values.

4.0 FIELD REMEDIATION ACTIVITIES

As stated in the Soil Excavation IRM Work Plan, the remedial activities would involve excavation of affected soil containing compounds of potential concern at concentrations above applicable SCOs as defined in 6 NYCRR Part 375-6.8. Because Greenpac desires a Track 2 cleanup, the SCOs are intended to be applied to the top 15 feet of soil (or to bedrock if less than 15 feet) consistent with NYSDEC's "*Soil Cleanup Guidance*" Policy dated 21 October 2011 (CP-51). The current and contemplated use for the Site is industrial. Therefore, the remedy consisted of excavation and off-Site disposal of soil above Industrial SCOs (referred to as the "Chemical Hot Spots" in areas outside the Main Excavation in the footprint of the new building). Furthermore, the NYSDEC and the NYSDOH indicated in a meeting on 5 April 2011 that assessment or mitigation of vapor intrusion at the Site would not be required if soil containing VOCs at concentrations above 5 ppm as measured in the field using a calibrated PID was removed during remedial action at the Site. Therefore, in addition to the two areas identified during the RI, screening of excavated soil was conducted with a PID, and soil exhibiting measurements above 5 ppm was also removed. During the excavation activities, radiologically-affected (RAD) soil was encountered at the Site. Based on measured background levels, the NYSDEC approved an excavation screening criteria of 10,000 cpm for the Site. During the RI, these areas were identified, and are referred to as "RAD Hot Spots".

As discussed in Section 3.1, the Site-specific RAOs for soil are as follows:

- SRAO1 – Prevent ingestion/direct contact with soil that poses a risk to public health and the environment given the current and future intended industrial use of the Site; and
- SRAO2 - Prevent inhalation of or exposure to contaminants volatilizing from contaminants in soil.

With the exception of two inaccessible areas (see discussion of the transformer area and soil in the vicinity of sample CONF-110 in Section 4.3.6 and Section 6.0), all soil above Industrial SCOs and RAD Hot Spots, as well as all soil above the Site-specific PID and radiologically screening levels, have been excavated and disposed off-Site. Therefore, the soil RAOs have been, or will be met (as described in Section 6.0).

In addition to excavation of soil from the Chemical and RAD Hot Spots, soil was also excavated as part of the construction and installation of foundations for the new recycling facility building (i.e., the new building footprint, also referred to as

the Main Excavation) and all other required foundation areas within the Site (e.g., the Wastewater Treatment Plant).

Upon initiation of excavation work at the Site, all Soil Management at the Site was performed according to Table 4-1 – Soil Management by Categories as presented in the June 2011 Soil Excavation IRM Work Plan. Excavated soil in the new building footprint that was suitable for reuse in off-Site areas pending soil analysis in accordance with Part 375 and DER-10 was classified as "clean". Excavated soil that was greater than the Residential SCO was classified as "contaminated" during the Site excavation and required transportation and disposal off-site at a NYSDEC-approved soil disposal, recycling, or reuse facility. As excavation work proceeded, additional details regarding these "clean" and "contaminated" classifications were discussed and more fully evaluated with the NYSDEC. Based upon these revised evaluations, ultimate soil reuse and soil disposal was performed according to Table 4-2 – Summary of Actual Soil Excavation, Handling and Disposal.

All excavated soils were screened in the field and segregated for reuse on-Site, reuse off-Site, or disposal off-Site at a permitted soil disposal or recycling facility pending the results of sampling and laboratory analyses in conformance with NYSDEC technical requirements for soil reuse and remedial action implementation compliance as contained in DER-10.

Excavated soils were examined in the field for visual, olfactory, or PID field screening evidence of potential contamination by the on-site competent person. Based on these field evaluations, Figure 4-1 shows the extent of the excavation for the proposed new building for the paperboard recycling facility and the actual extent of Chemical and RAD Hot Spot excavations completed during the Soil Excavation IRM which was generally performed between 9 July 2011 and 31 December 2011. In summary, the following approximate quantities of soil were shipped off-Site:

- 67,827 tons to Allied Landfill in Niagara Falls, New York for reuse;
- 135,839 tons to Allied & Modern Landfills in Niagara Falls, New York for disposal; and
- 20,087 tons of radiologically-affected soil to Environmental Quality Landfill in Belleville, Michigan.

Further details regarding soil transportation and off-Site disposal/reuse is described in Sections 4.2.2, 4.3.2, and 4.4.2.

The effectiveness of the Soil Excavation IRM was assessed through collection of confirmation soil samples in conformance with DER-10 technical requirements

and comparison of the post-remediation sampling results with pre-remediation sampling results.

Work performed, results, and conclusions from the Soil Excavation IRM effort are summarized and presented in Sections 4.1 through 4.4 and 4.6 through 4.9 below:

- Remedial Mobilization;
- Excavation of Soil from New Building Footprint;
- Excavation of Soil from Chemical Hot Spots;
- Excavation of Radiologically-Affected Soil;
- Handling of Crushed Concrete and Brick;
- Handling Water from Excavations;
- Other Soil Handling and Management; and
- Health and Safety and Air Monitoring.

In addition, although not a component of the Soil Excavation IRM, the building demolition activities covered under the following two documents are summarized in Section 4.5:

- Interim Remedial Measure Work Plan – Demolition of Mill No. 2 (C&S, 2010b); and
- IRM Work Plan for Demolition of Building No. 10 and the Wastewater Pre-Treatment Plant (June 2011).

4.1 REMEDIAL MOBILIZATION

The entry point from Royal Avenue to the project area was guarded by security personnel. Also, Norampac had a closed circuit video surveillance system that was capable of viewing the area adjacent to the Former Mill No. 2. The surveillance system was monitored on a regular basis.

New building foundation soil excavation work was initiated on 9 July 2011 according to the plan and approach prepared by the excavation contractor, Ingalls Site Development, Inc. (Ingalls) of West Seneca, New York. Ingalls performed soil excavation work from the 9th of July through 7 November 2011. Yarussi Construction, Inc. (Yarussi) of Niagara Falls, New York and Mark Cerrone, Inc. (Cerrone) of Niagara Falls, New York performed soil excavation work from 1 November 2011 until 31 December 2011. Throughout this period, additional excavation was conducted as part of the site redevelopment (e.g., the Wastewater Treatment Plant Area), as well as to address Chemical and RAD hot spots. ERM field representatives were on-site whenever excavation work was being performed between 9 July 2011 and 31 December 2011.

Excavation controls, as necessary, were installed per the engineering/structural design and controls established by CME Associates, Inc. (CME) of Buffalo, New York. As necessary, the excavation contractors protected, removed and/or replaced existing utilities during excavation activities. The excavation contractors evaluated soil type and slope of excavation walls appropriately in conformance with Occupational Safety and Health Administration (OSHA) Publication 2226 (OSHA , 2002)and any applicable federal, state, or local laws, rules, codes, standards, or regulations. Entry of personnel into any excavation area greater than 4-feet in depth was not permitted unless all applicable provisions of any relevant excavation safety regulations were satisfied. De-watering of excavation areas was performed as necessary based on Site conditions. Construction de-watering effluent was managed by the excavation contractors in a manner consistent with applicable regulations and is discussed in greater detail in Section 4.7.

Soil excavation activities have the potential to generate fugitive dust. Standard preventative measures were employed where applicable including covering of soil piles during precipitation events and at the end of each work day. The primary dust control technique was the application of a fine water spray. Monitoring of fugitive dust as required by the NYSDEC CAMP was performed by ERM during Site excavation activities. Additional details are presented in Section 4.9.

Staging areas for the temporary storage of excavated "clean" soil, or any affected soil that was not be live-loaded for off-site transport and disposal, was constructed in the northern part of the BCP Site. Temporary excavation staging areas were generally constructed with double layer of 6-mil polyethylene sheeting bermed at the sides with hay bales or equivalent material of similar mass and shape. Staged excavated soil was covered at the end of each work day and during moderate or heavy precipitation events.

4.1.1 Underground Utilities

Prior to initiating excavation work, all underground utilities potentially affected by the project were identified by MMT. MMT filed requests with Dig Safely New York to facilitate the identification, location, and marking of subsurface utilities. In addition, private utility clearance using ground penetrating radar (GPR) and/or other appropriate technologies was also conducted. As appropriate, certain utilities needed to be protected and remain active while others were shutdown/de-energized, terminated, and/or removed to facilitate excavation activities.

4.1.2 Soil Erosion and Sediment Control

The New York State Standards and Specifications for Soil Erosion and Sediment Controls require an Erosion & Sediment Control Plan (ESCP) for any construction activity that disturbs one or more acres. As part of their Storm Water Pollution Prevention Plan (SWPPP), Beardsley Design Associates of Dewitt, New York (BDA) incorporated an ESCP for implementation by the excavation contractors in a manner consistent with the New York State Standards and Specifications for Soil Erosion and Sediment Control.

Soil erosion and sedimentation controls were installed at the Site to minimize the potential for erosion and migration of excavated soil and to control precipitation and storm water runoff in IRM work areas. Sedimentation controls included silt fence and hay bales around excavation, grading, and soil staging areas. A silt fence was installed along the perimeter of excavation work areas. The silt fence was anchored a minimum of 6-inches into the ground and staked every 10-feet. Hay bales or equivalent were used in conjunction with the silt fence in any low-lying areas or areas that could be expected to receive a greater amount of run-off. Inspections and proper maintenance of the controls was performed during IRM activities.

The SWPPP requires weekly inspections and inspections after rain events. The records show the inspections performed by CME were all rated "satisfactory". The SWPPP and the inspection records are presented in Appendix A.

4.1.3 Storm Water Management

The area of disturbance of soil excavation activities exceeded 5-acres. Therefore, as previously discussed in Section 4.1.2, BDA prepared a full SWPPP for the project. A Notice of Intent for storm water discharges from construction activities in New York was filed with the NYSDEC. The SWPPP was implemented by the excavation contractors in a manner consistent with the New York State Standards and Specifications for Soil Erosion and Sediment Control.

The SWPPP requires weekly inspections and inspections after rain events. The records show the inspections performed by CME were all rated "satisfactory". The SWPPP and the inspection records are presented in Appendix A.

4.1.4 Excavation for New Utilities

Numerous excavations for temporary utilities were provided for construction trailers located at the southern portion of the BCP Site that MMT and their subcontractors used during the soil excavation work. Several excavations for new utilities associated with the new recycling facility building were completed by the excavation contractors. Additional and specific area details are presented in Section 4.8.

4.2 EXCAVATION OF SOIL FROM NEW BUILDING FOOTPRINT

4.2.1 Summary of Excavation Activities

The Soil Excavation IRM Work Plan identified the activities and tasks associated with the excavation of soil within the Site. The new building footprint is located within the Site and soil from the excavation was managed as indicated in Table 4-2. Any loads of material transported off-Site as "clean soil" met Residential SCOs. Excavated solid waste material which could not be used for reuse were materials exceeding Residential SCOs, containing fill/nuisance materials, elevated PID readings, and/or elevated radiological levels. Delineation of soil above Residential and Industrial SCOs is presented in Figures 2-1 and 2-2. The final extents of the excavations are presented in Figure 4-1.

The area for the new building footprint was divided into five phases. Soil in Phases 1 through 4 was excavated to bedrock which occurs at approximately 12 feet. Therefore, all soil above Industrial SCOs was removed from Phases 1 through 4. In Phase 5, the target depth for the foundation of this building was six feet. For structural reasons, the excavation proceeded to greater depths (and to bedrock in some areas). Furthermore, soil above Industrial SCOs in Phase 5 was excavated to depths of 9 to 12 feet in order achieve the Track 2 BCP cleanup requirements.

Excavation was completed according to the plan and approach of the excavation contractor. Any areas and depths delineated above Residential SCOs were determined solid waste material to be excavated and transported off-site for disposal. Additional field screening of soil within the excavation area included visual, olfactory, and PID screening for VOCs. A Ludlum 2221 with a 44-10 probe was used to screen soil for RAD material. Soil exceeding these screening criteria was also deemed a solid waste requiring off-Site disposal.

Clean soil reused on-site was temporarily staged north-northeast of the BCP boundary. RAD soil was temporarily staged on the northern portion of the Site

following the procedures outlined in Section 4.1. Additional details for staging and handling RAD soil is provided in Appendix B.

4.2.2 Transportation & Off-Site Disposal or Reuse

Documentation provided by MMT accounting for the daily transport and off-Site disposal or reuse of soil excavated from the new building area (as well as other areas of the Site) is provided in Appendix C.

Excavated soil was screened for VOCs, RAD material, and nuisance characteristics, live loaded onto trucks, and manifested. Soil was screened with a PID for VOCs and a Ludlum 2221 with a 44-10 probe for RAD material. The PID was used to screen for VOCs exceeding the 5 ppm action level approximately every three to five buckets. Details on RAD screening are provided in Appendix B. Soil which exhibited visual or olfactory evidence of contamination were not reused and sent off-Site for disposal. Soil was sent to Allied Waste Services (Allied) or Modern Corporation (Modern) in Niagara Falls, New York in accordance with Table 4-2. Any RAD soil was temporarily staged before loading and sent off-site to Environmental Quality (EQ) Facility in Belleville, Michigan. Clean soil determined by modeled delineations as below Residential SCOs and meeting field screening criteria was sent to Allied or Modern for reuse, or reused on-site if determined structurally suitable.

All off-Site transport vehicles transporting soil were equipped with a weatherproof tarp which was secured over each shipment of soil leaving the Site. Enclosed transport units (trucks or containers for rail shipment) were used for RAD material leaving the Site. Additional information on transport of RAD material is included in the Los Alamos Technical Associates, Inc. (LATA) report in Appendix B. All soil leaving the Site was weighed upon arrival at the designated disposal/reuse facility, and this documentation is provided in Appendix C.

4.2.3 Confirmation & Documentation Sampling

The purpose of the confirmation sampling was to verify excavations were completed to the appropriate extent. As part of the confirmation sampling program, excavation documentation samples were collected. Because most soil within the proposed building footprint was excavated, these samples were used to verify the modeled extents of soil above Residential SCOs which would require the excavated soil to be deemed solid waste and sent off-Site for disposal. Confirmation and documentation soil sampling was conducted in general accordance with Section 5.4(b)5 of DER-10. Due to the size and quantity of the excavations, a reduced sampling frequency was utilized after approval from

NYSDEC. A sampling plan would be presented to NYSDEC for a specific area, and, only after receiving NYSDEC approval of the plan would the sampling be conducted.

Confirmation and documentation samples were collected from excavation walls and the excavation floor in areas which did not reach bedrock. Depths for wall and floor samples varied throughout the site to target specific areas (i.e., intervals with greatest impacts during previous sampling in these areas). Analytical parameters consisted of:

- Target Compound List (TCL) VOCs plus 10 TICs (EPA Method 8260)
- TCL SVOCs plus 20 TICs (EPA Method 8270)
- TCL PCBs (EPA Method 8082)
- TCL Pesticides (EPA Method 8081A)
- Target Analyte List (TAL) Metals (not including cyanide) (EPA Method 6010B) plus Mercury (EPA Method 7471A)

Confirmation and documentation sample locations are shown on Figure 4-2. A summary of all results is provided on Tables 4-3a to 4-3f. Table 4-3f identifies sample results above the Residential SCOs from confirmation and documentation samples collected within the Main Excavation.

With one exception, the confirmation and documentation sample results obtained from within the proposed footprint of the new facility were below Residential SCOs. Documentation sample EXC-010 at a depth of 3.0-feet (sample obtained 15 September 2011 in the eastern third of Grid 63) contained chromium at a concentration of 40.5 milligrams per kilogram (mg/kg) which exceeds the Residential SCO of 36 mg/kg. A review of the ERM daily reports indicates that on 18 and 19 October 2011, soil from Grid 63, as well as Grids 64, 58 and 52 were either taken to Allied as "contaminated" or staged on site for reuse per the requirements presented in Table 4-2. Because all confirmation and documentation sample results (except for EXC-010) are below Residential SCOs in the footprint of the new building, this:

- Verifies the modeled extents of soil above Residential SCOs; and
- Confirms all soil above the Industrial SCOs was excavated to the appropriate extents, thereby meeting the Track 2 cleanup requirements for this area.

4.2.4 On-Site Reuse and Backfill

In accordance with the soil management requirements outlined in Tables 4-1 and 4-2, soil excavated from the footprint of the new building which did not exceed Industrial SCOs, and met the applicable screening criteria (RAD, PID, visual, olfactory), and was determined structurally sound by MMT was reused on-Site as backfill. However, the majority of the material used for backfill was based on the specific structural requirements for the new building. This material consisted of crushed concrete from on-Site building demolition operations, and two-inch crushed rock from LaFarge Quarry in Niagara Falls, New York. In addition, small areas within Phase 5 were excavated and backfilled with flowable fill (which does not contain fly ash). A summary of all backfill imported to the Site is presented in Appendix D and further details relating to backfill materials are presented in Section 4.8. Additional information regarding on-site reuse of crushed concrete is provided in Section 4.6.

4.2.5 Variations from IRM Work Plan

Although crushed brick from demolition activities was sampled and found to contain chemical constituents above Industrial SCOs, it was temporarily used for roadways with the footprint of the new building to assist with excavation operations (as well as other on-Site roads). This was approved by NYSDEC, and by request of NYSDEC was replaced with approved crushed concrete or two-inch crushed rock. Additional detail and discussion of demolition activities and the handling of crushed brick is provided in Section 4.6.

4.2.6 Media Remaining to be Addressed by SMP

All soil within the proposed building footprint above industrial SCOs and the PID and RAD screening criteria have been removed and disposed off-Site. Therefore, no further excavation is necessary in this area to meet the BCP Track 2 cleanup for this Site. In addition, all soil has been excavated to bedrock in Phases 1 through 4 of the Main Excavation. Therefore, no media remains to be addressed by a SMP in these areas. Additional modeling will be conducted during the development of the SMP to identify if any soil remains above Residential SCOs in Phase 5.

4.3 EXCAVATION OF SOIL FROM CHEMICAL HOT SPOTS

4.3.1 Summary of Excavation Activities

During the RI, 10 Chemical Hot Spots were identified outside the Main Excavation where soil contained constituents above the Industrial SCOs and/or the 5 ppm screening level as measured with a PID. The location of these hot spots are provided in Figure 2-1a through 2-1e. Chemical hot spot excavation began in early November 2011. Hot spot locations for C-1 through C-9 were marked out in the field prior to digging and excavated to the approximate horizontal and vertical extents identified in Figures 2-1a through 2-1e. For C-10, the final extents were based on field screening results with a PID. Excavation depths were measured from the ground surface using a laser level until the target depth was reached. The horizontal extent of the excavations was recorded with a Global Positioning Equipment and Software Device (GPS), and the overall extents of the hot spot excavations are provided in Figure 4-1.

Excavated material was field screened and either live-loaded onto trucks or staged in a designated area north of Phase V for later transport to a disposal facility. Staged material was underlain and covered with 6-mil polyethylene sheeting. Water infiltrating and pooling in excavations was pumped into 20,000-gallon frac tanks which were then sampled and analyzed for site specific contaminants. Upon review of the sample results and consent from the Niagara County Water Board, remediation-derived water was released into the public sewer system; more information can be found in Section 4.7.

The extent of soil above Industrial SCOs associated with Chemical Hot Spot C-1 was initially modeled with EVS. During December 2011, the eastern portion of Hot Spot C-1 was excavated to the extents shown in Figure 4-1. The western portion of Hot Spot C-1 is located beneath an existing electrical substation, and adjacent areas. The substation is currently inaccessible. The area surrounding the substation is referred to as the Existing Transformer Area (ETA) as shown in Figure 1-2. A series of test pits were performed on 17 December 2011, and confirmed that additional excavation needed to be conducted in the areas associated with the ETA. This work will be performed as described in Section 6.0.

During the RI, PID readings above the 5-ppm screening level were identified in soil boring B-138 at depths of 7 to 9feet. This area is referred to as Chemical Hot Spot C-6. Soil was excavated to bedrock (approximately 9.5 feet), and the final extents (see Figure 4-1) were based field screening with a PID, and confirmation sampling. The confirmation samples were collected at a depth of 7.0 feet and

analyzed for the area specific contaminants (TCL VOCs via EPA Method 8260) (see Table 4.3). All sample results were below the Industrial SCOs.

Hot spot C-10 located southeast of Phase 3 in the Main Excavation was delineated in the field using PID, olfactory, and visual techniques. The excavated soil was transported to Allied or Modern disposal facilities in tarped and manifested trucks. Final excavation extents were below 5 ppm PID screening criteria. In addition, confirmation samples were collected at a depth of approximately nine feet and analyzed for the area specific contaminants (TCL VOCs via EPA Method 8260) (see Table 4.3). All sample results were below the Industrial SCOs. Additional details for this area are provided in Section 4.8.3.

Chemical Hot Spot C-8 is located in planned area for the new Wastewater Treatment Plant. Soil was excavated in this area to the meet the modeled limits of Industrial SCOs. The final extents of these excavations were based on confirmation samples (see Section 4.3.3 for additional details). Upon receipt of sampling results below Industrial SCOs, the excavation proceeded to the required limits for the new Wastewater Treatment Plant. All additional soil removed was handled as outlined in Table 4-2.

4.3.2 Transportation & Off-Site Disposal for Reuse

Non-hazardous soil from Chemical Hot Spots was excavated and sent Allied and Modern waste facilities. Soil was live loaded into trucks that were tarped, manifested, screened for RAD, and inspected for loose material prior to leaving the Site. Instances where soil was not live loaded, material was stored on-Site in designated storage areas to be disposed of at a later date. Documentation provided by MMT accounting for the daily transport and off-Site disposal of soil from Chemical Hot Spots can be found in Appendix C.

4.3.3 Confirmation Samples

Confirmation sampling was conducted in general conformance with DER-10 Section 5.4(b) 5, and was approved by NYSDEC prior to implementation. Confirmation samples were collected from the walls and floors of the excavations, whose locations are shown on Figure 4-2. The frequency of samples varied from DER-10 and was approved by NYSDEC. Sample depth was biased towards zones of previous contamination and analyzed for area specific contaminants that were previously found above Industrial SCOs. Confirmation sample results are presented in Table 4-3a through 4-3f. All confirmation sample results were below Industrial SCOs except for CONF-043 and CONF-110.

Sample CONF-043 was collected along the southwest wall of C-8 and was in exceedance of the Industrial SCO for arsenic at 16 milligrams per kilogram (mg/kg). The area was re-excavated and additional confirmation samples CONF-112 and CONF-113 were collected and analyzed for TAL Metals plus mercury. Results of CONF-112 and CONF-113 were below Industrial SCOs and prompted no further excavation.

Sample CONF-110 in C-7 exceeded the Industrial SCOs for arsenic and mercury. This sample is located beneath an active steam line in an area that cannot be further excavated without removing the active steam line, which is necessary for ongoing Norampac production operations. Greenpac is planning to submit a demonstration to the NYSDEC of the technical impracticability of additional soil excavation in this area as a basis for preservation of a BCP Track 2 cleanup for the Site.

4.3.4 On-Site Reuse & Backfill

Chemical hot spots were backfilled with crushed concrete from on-Site building demolition operations, and virgin two-inch crushed rock from LaFarge Quarry in Niagara Falls, New York. A summary of backfill imported to the Site is presented in Appendix D and further details relating to backfill materials are presented in Section 4.8. Additional information regarding on-site reuse of crushed concrete is provided in Section 4.6.

4.3.5 Variations from the IRM Work Plan

In the vicinity of confirmation sample CONF-110 in Chemical Hot Spot C-7 (see Figure 4-2), certain areas were not excavated due to concrete pillars supporting the overhead steam line in the excavation. Because of the close proximity of the excavation and small amount of soil to be excavated, it was determined that further excavation was not practical and could jeopardize the integrity of the steam line. As discussed in Section 4.3.3, Greenpac is planning to submit a demonstration to the NYSDEC of the technical impracticability of additional soil excavation in this area as a basis for preservation of a BCP Track 2 cleanup for the Site.

4.3.6 Media Remaining to be Addressed by SMP

Areas of C-1 are located in the ETA and were not addressed during the Soil Excavation IRM. In addition, the area associated with the B-201E exceedance of manganese also requires further excavation. As described in further detail in Section 6.0, excavation of these areas at a later date will be a requirement of the

SMP. The area in C-7 to be addressed with a demonstration of technical impracticability will also need to be addressed in the SMP.

With the exception of these areas, no soil containing chemical constituents above Industrial SCOs is known to remain at the Site. Therefore, no further excavation is necessary to meet the BCP Track 2 cleanup for this Site.

4.4 EXCAVATION OF RADIOLOGICALLY-AFFECTED SOIL

4.4.1 Summary of Excavation Activities

Radiologically-impacted soil requiring excavation was identified during the RI and noted as RAD Hot Spots. In addition, screening for radiologically-impacted soil was conducted during other excavation activity at the Site. In addition to the RAD Hot Spots, other areas screened included:

- Phase 3, 4, and 5of the footprint of the new building;
- Chemical Hot Spots; and
- Beneath the Building 10 pad.

Phases I & II were not screened for RAD soil because material had already been excavated from these areas. The initial detection of RAD soil was based on screening of soil from Phase 3 by the Allied facility. Phases I & II had previously been screened for RAD material at Allied Landfill, and screening never indicated RAD issues with this soil.

Further details on these activities are covered in the Completion Report prepared by LATA and can be found in Appendix B, Section 7.

4.4.2 Transportation & Off-Site Disposal

Radiologically-impacted soil was transported off-Site to Environmental Quality in Bellville, Michigan. Before leaving the Site, all transport vehicles were scanned by GRD using a Ludlum 2241-3 meter with a 44-38 probe to ensure all contamination levels and dose rates were acceptable for containers leaving the Site. Further details regarding transportation and disposal of these materials is covered in the Completion Report prepared by LATA and can be found in Appendix B, Section 8.

4.4.3 Confirmation Sampling

No confirmation sampling was performed as RAD excavation extents were delineated with field screening techniques per NYSDEC approval. Field screening of soil was conducted by Greater Radiological Dimensions, Inc. (GRD) radiological technicians using a Ludlum 2221 with a 44-10 probe. This approach was approved by the NYSDEC.

4.4.4 On-Site Reuse and Backfill

RAD Hot Spot excavations were backfilled with crushed concrete from on-Site building demolition operations, and virgin two-inch crushed rock from LaFarge Quarry in Niagara Falls, New York. A summary of backfill imported to the Site is presented in Appendix D and further details relating to backfill materials are presented in Section 4.8. Additional information regarding on-site reuse of crushed concrete is provided in Section 4.6.

4.4.5 Media remaining to be addressed by SMP

A portion of RAD Hot Spot R-1 in the ETA was not accessible and could not be excavated. As described in further detail in Section 6.0, excavation of this area at a later date will be a requirement of the SMP.

4.5 BUILDING DEMOLITION

Demolition work performed at the BCP Site was under the direction of Ontario Specialty Contracting (OSC) under contract to MMT. Asbestos surveys and sampling were performed by AFI Environmental. Air monitoring during building demolition was provided by OSEA, Inc..

OSC has presented demolition documentation as shown in Appendix E. Within the documentation is a certification letter from OSC stating all work done at this BCP site "was performed according to all applicable federal, state and local codes and regulations".

The significant structures that were demolished at the site were the Former Mill No. 2, Building 10, and the two southernmost tanks for the Wastewater Treatment Plant. The demolition of these structures was based on the following work plans:

- Interim Remedial Measure Work Plan – Demolition of Mill No. 2 (C&S, 2010b); and

- IRM Work Plan for Demolition of Building No. 10 and Wastewater Pre-Treatment Plant (ERM, 2011b).

No storm water permits were required by the City of Niagara Falls or the NFWB for demolition activities to occur onsite. Silt fence was installed along the western, eastern, and southern Franks Vacuum Service boundaries to intercept any possible sediment moving offsite. OSC installed a chain link fence around the demolition area creating approximately 50 to 80 foot buffer zone around the structure that was present during demolition activities.

4.6 HANDLING OF CRUSHED CONCRETE AND BRICK

As discussed in Section 4.5, OSC performed demolition work at the BCP Site at the same time excavation work was proceeding. OSC would stage concrete and brick debris containing rebar and other associated metal material in large piles at the northeastern portion of the BCP Site. Due to the estimated large quantity of material available for recycling and reuse (approximately 60,000-tons; 42,000-tons of concrete and 18,000-tons of brick), MMT proposed crushing of the concrete and brick material to use as backfill after the removal of the rebar and associated metal debris. The NYSDEC stated crushing of the concrete and brick for use as backfill on the BCP Site was acceptable provided analytical testing was performed according to DER-10 Table 5.4(e)10.

OSC used hydraulic hammer drill equipment to remove rebar from the staged concrete and brick. The rebar and any other associated metal were staged for recycling. The concrete and brick was segregated into separate piles for handling by Metzger Construction of Niagara Falls, New York (Metzger).

Metzger mobilized a crushing machine, the associated conveyor belts and the appropriate support equipment (i.e., loaders, hand tools, etc.) to prepare for crushing activities in the mid-July 2011. Metzger initiated crushing activities on 22 July 2011. Concrete and brick materials were segregated after crushing operations. ERM performed initial sampling based on the guidance presented in DER-10 Table 5.4(e)10. Details on handling of the concrete and brick piles are presented in Table 4-4. All sampling results associated with concrete and brick crushing operations are presented in Table 4.5.

Initial sampling of concrete and brick was performed based on the guidance as presented in DER-10 Table 5.4(e)10. After review of the analytical data associated with the first six samples (as shown in Table 4-5a through 4.5e) and with consideration of DER-10 Table 5.4(e)10, ERM proposed a reduced sampling protocol. This new protocol consisted of collection of one composite sample for each 1000 cubic yards (crusher totalizer, which measured in tons was used to determine quantities produced, i.e., 1000 yards is ~ 2,000 tons) of crushed concrete for the following parameters:

- TCL SVOCs plus 20 TICs
- TCL PCBs
- TCL Pesticides
- TAL Metals (not including cyanide) plus Mercury

ERM also proposed that analysis of every other sample would also include VOCs in order to provide VOC data at a more reasonable frequency for the

contemplated recycled materials. This provided one sample for VOC (TCL VOCs plus 10 TICs) analysis at a rate of every 2000 cubic yards of crushed material. This revised sampling plan was acceptable to the NYSDEC and was followed for the remainder of on-site crushing operations.

The following field protocols were put into place to identify sampled piles of concrete and brick An orange safety cone with a red flag sticking out of the top was labeled with the appropriate Pile number (i.e. PILE No.1) and placed next to that pile until the analytical results had been reviewed by the NYSDEC. Upon approval of the Pile for use as backfill (per the NYSDEC), an additional label of "Approved" was added to the safety cone and the red flag removed (if the pile was not approved, an additional label of "Not Approved" was to be added to the cone). This clearly distinguished between piles still awaiting approval versus piles that could be moved out of the staging area for use as backfill (i.e., meeting Industrial SCOs or with NYSDEC variance approval) or proper disposal in the designated landfill (not meeting Industrial SCOs).

Results of crushed brick and crushed concrete sample analyses are presented on Tables 4-5a through 4-5e. Table 4.5e indicates that crushed brick samples (BR-001, BR-014, BR-015, BR-016 and BR-017) and the combination brick and concrete debris (BRConc-02D, BRConc-03, BRC-03A, and BRConc-04) had exceedances of the benzo(a)pyrene Industrial SCO of 1,100 micrograms per kilogram (µg/kg). These concentrations ranged from 1,300 to 6,300 µg/kg. Crushed brick and the combination crushed brick and concrete was segregated into separate piles and used for roadway construction during IRM soil removal operations. After soil removal was completed in an area, these roadways were excavated and shipped off-site for disposal at Allied as “contaminated” material.

Concrete samples 001, 009, 011 and 025 had exceedances of the Industrial SCO for benzo(a)pyrene ranging from 1,200 to 1,400 µg/kg (the Industrial SCO is 1,100 µg/kg). Concrete sample 021 had an exceedance (1,280 µg/kg) of the dibenzo(a,h)anthracene Industrial SCO of 1,100 µg/kg. These sample results were reviewed with the NYSDEC and variances were granted to use these piles as backfill.

Three off-site sources of crushed concrete were proposed by MMT as potential sources of Site backfill. ERM also sampled these proposed sites as discussed below. Analytical results were compared to Appendix 5 of DER-10: Allowable Constituent levels for Imported Fill or Soil - Subdivision 5.4(e).

On 10 October 2011, ERM personnel mobilized to the Lackawanna, New York area and obtained three samples from a local recycle facility that had a large stockpile of crushed concrete. One (Lacconc-01) of the three samples (See Table

4.4e) had a significant restricted Industrial Exceedance for Benzo(a)pyrene (4,900 µg/kg). After review of the analytical results and discussions with the NYSDEC, it was determined that the recycle facility in Lackawanna was not on the approved NYSDEC Construction and Demolition Debris Processing Facility list. Crushed concrete from this facility was not obtained for use at the BCP Site.

On 12 December 2011, ERM personnel mobilized to the LaFarge Construction and Demolition Debris Processing Facility on Quarry Road in Niagara Falls, New York and obtained four samples that had a large stockpile of crushed concrete. All four of the Quarry Road sample results (See Table 4.5a through 4.5d – Concrete and Brick Summary) indicate the crushed material was acceptable as per Appendix 5 of DER-10: Allowable Constituent levels for Imported Fill or Soil - Subdivision 5.4(e). The Quarry Road Facility is listed on the NYSDEC Construction and Demolition Debris Processing Facility list and the NYSDEC approved the use of the Quarry Road crushed concrete for use at the BCP Site as documented in the weekly minutes of 14 and 20 December 2011. As of December 31, 2011, crushed concrete from this facility had not been transported to the BCP Site for use as Site backfill.

Also on 12 December 2011, ERM personnel mobilized to a concrete batching facility on New Road in Niagara Falls, New York and obtained four samples from a stockpile of crushed concrete (remains from the washout of the concrete delivery trucks). Three of the four sample results (See Table 4.5a through 4.5d) indicated the crushed material was acceptable as per Appendix 5 of DER-10: Allowable Constituent Levels for Imported Fill or Soil - Subdivision 5.4(e). One of the four samples (See Table 4.5e) exceeded the Industrial SCO for Benzo(a)pyrene. After review of the analytical results and discussions with the NYSDEC, it was determined that the concrete batch plant on New Road was not on the approved NYSDEC Construction and Demolition Debris Processing Facility list. As of 31 December 2011, crushed concrete from the New Road facility had not been approved for use at the BCP Site for use as Site backfill.

4.7 HANDLING WATER FROM EXCAVATIONS

During the course of the soil excavation work at the BCP Site, there were three significant excavations that were not completely backfilled prior to rain events occurring. Runoff water from these rain events accumulated in these three excavations and had to be pumped out and properly containerized for appropriate sampling prior to proper disposal according to all applicable local, state and federal rules and regulations.

The first area was in Hot Spot Area C-10 (also field identified by ERM as Grids 83 and 88 in the southeast corner of the BCP Site where ERM personnel noted elevated PID readings above the action level of 5-ppm. VOC affected soil was excavated from these areas and staged for characterization prior to disposal. Additional information on the soil excavation work performed in these grids is discussed in Sections 4.3 and 4.8.

The excavations to remove VOC-affected soils in Grids 83 and 88 were generally performed to depths of 9 to 12-feet below grade and resulted in two separate excavation areas, one in Grid 83 and one in Grid 88. To characterize the water, ERM obtained separate samples from each Grid excavation on October 7, 2011. Water sampled on October 7, 2011 from Grids 83 and 88 was sent under proper Chain of Custody to Paradigm Environmental Services, Inc. (Paradigm) in Rochester, New York and analyzed for a full suite of parameters. Test results obtained on 18 October 2011 indicated the water in Grid excavations 83 and 88 was not a Resource Conservation & Recovery Act (RCRA) hazardous waste. The 18 October 2011 Paradigm test results along with all documentation relating to handling of water from the BCP Site excavations are presented in Appendix C.

Between 18 October and 14 November 2011, water from these Grid excavations was pumped into a 21,000-gallon Baker tank (frac tank). MMT contacted the NFWB to determine the proper protocols to follow to obtain permission to dispose of the staged water within the NFWB waste water system. Mr. Al Zaepfel of the Enforcement Division was contacted and provided ERM with a list of parameters needed for approval of the disposal of water through the waste water system of the NFWB. The list of parameters to be analyzed and the associated compound limits acceptable at the NFWB are presented in Appendix C.

On 14 November 2011, ERM obtained a sample of the water from the frac tank and under proper Chain of Custody submitted the sample to Paradigm for analyses according to the parameters requested by the NFWB. Test results (results are presented in Appendix C) were obtained on 22 November 2011 and sent to the NFWB.

During the review of the data, the NFWB was informed that radiologically-affected soil had been encountered at the BCP Site and requested additional testing, specifically analysis for radioactive isotopes (uranium, thorium and radium). On 13 December 2011, ERM obtained additional samples (filtered and unfiltered) from the frac tank for radiological analyses. The samples were placed in a cooler with ice and shipped via Federal Express under proper Chain of Custody to American Radiation Services, Inc. in Port Allen, Louisiana (ARS). Laboratory Test results (presented in Appendix C) from ARS were received on 13 January 2012 and forwarded to the NFWB and the NYSDEC.

The NYSDEC reviewed the data and informed the NFWB in a letter dated January 19, 2012 that "The low levels of Naturally Occurring Radioactive Material (NORM) detected in the waters from the collection tank are at normal background levels and should not prevent the discharge to the on-site waste water treatment plant (WWTP)". The 19 January, 2012 letter from the NYSDEC to the NFWB is presented in Appendix C. On January 20, 2012, the NFWB authorized the disposal of 20,000-gallons of water into the NFWB system through the Norampac WWTP as documented in the NFWB letter to Greenpac as presented in Appendix C.

During December 2011, excavation in Chemical Hot Spot C-7 occurred (See Section 4.3 for additional excavation information). The excavations to remove chemically-affected soils in "hot spot" area C-7 were generally performed to depths of 3 to 9-feet below grade. Between 12 and 30 December 2011, water from this "hot spot" excavation was pumped into two 21,000-gallon frac tanks (Frac 01 and Frac 02).

On 10 January 2012, ERM obtained a sample of the water from each frac tank and under proper Chain of Custody submitted the samples to Paradigm for analyses according to the parameters requested by the NFWB. Test results (results are presented in Appendix C) were obtained on 20 January 2012 and sent to the NFWB through MMT.

On 24 January 2012, Norampac sent a letter to the NFWB stating that MMT could dispose of 20,000-gallons of water through their waste water system. On that same date, MMT determined the volume of water to be disposed through the Norampac waste water system. Volumes of water in the frac tanks were as summarized below:

- Grids 83 and 88 Frac Tank: **8,300-gallons**
- Frac 01: **5,314-gallons**
- Frac 02: **11,373-gallons**

Total: 24,987-gallons

MMT contacted the NFWB on 24 January 2012 and requested the approved quantity of water to be disposed through the Norampac waste water system be increased from 20,000-gallons to 25,000-gallons. In a letter dated January 30, 2012 from the NFWB to Greenpac, permission was granted to change the quantity of water to be disposed through the Norampac waste water system from 20,000-gallons to 25,000-gallons.

On 26 January 2012, MMT and their subcontractors transferred the 8,300-gallons of water in the frac tank associated with Grids 83 and 88 to the Norampac facility and discharged it through the Norampac waste water system.

On 31 January 2012, MMT and their subcontractors transferred the 5,314-gallons of water in Frac 01 to the Norampac facility and discharged it through the Norampac waste water system. On 10 February 2012, MMT and their subcontractors transferred the 11,373-gallons of water in Frac 02 to the Norampac facility and discharged it through the Norampac waste water system. Total volume of water discharged through the Norampac waste water system to the NFWB was 24,987-gallons.

4.8 OTHER SOIL HANDLING AND MANAGEMENT

During soil excavation work at the BCP Site, soil handling and management issues developed that could not be categorized properly in previous Sections of this report. These issues are discussed in appropriate detail below.

4.8.1 Materials Proposed for Site Backfill

A teleconference call regarding the use of backfill materials at the Site was held on Friday, 13 May 2011 at 11:00AM. Specific NYSDEC requirements discussed during the teleconference, ERM's letters dated 20 May 2011, and follow-up discussions are summarized below.

- All backfill materials must meet allowable constituent levels for imported fill or soil for the contemplated land use as listed in Appendix 5 of NYSDEC's DER-10 Technical Guidance for Site Investigation and Remediation (DER-10).
- Backfill materials derived from crushed rock from a permitted mine or quarry does not require laboratory analysis, regardless of the amount of fines in the backfill material.
- All backfilling activities must be inspected by the certifying engineer so that off-spec materials, if encountered, can be rejected.
- Sand pit material from MKB, Inc. has been used on other projects in Region 9. Based on prior experience with this source, use of sand from MKB, Inc. is approved at the site by the NYSDEC without gradation or chemical analysis.
- E-mail correspondence from the NYSDEC dated 17 May 2011 indicates that flowable fill with fly ash is considered backfill and is therefore subject to laboratory testing as outlined in DER-10.
- Crushed concrete and crushed brick generated from the site is subject to laboratory testing as outlined in DER-10.

A Site-specific table was developed based on this teleconference, and presented to NYSDEC in the ERM 20 May 2011 letter. An updated summary was provided to NYSDEC on 5 August 2011, as part of the weekly meeting minutes. This updated table is presented below as a guidance document that was observed during Site work. The highlighted sections below indicate material ultimately used for backfill at the Site. The flowable fill was used for structural purposes in isolated areas of Phase 5 of the Main Excavation.

Material Evaluated for Use as Backfill

Material Type	Source	Approved by	Volume / Weight	Specs	% Fine through Sieve No. 80	Special Notes	Analysis Required (Y/N) NYSDEC Approval (Y/N)
No. 1 Stone	LaFarge North America 8875 Quarry Road – Niagara Falls, New York 14304 Tel: 716-439-1300	NYSDOT Meets Coarse Aggregate 703-02	5,000 T	Available	~ 0.5	Crushed rock from a permitted quarry in Lockport	Analysis Required – N NYSDEC Approval – Y analysis is not needed for backfill derived from crushed rock from a permitted quarry.
2" ROC NYSDOT Subase Type 2 304.12	LaFarge North America, Inc 8875 Quarry Road – Niagara Falls, New York 14304 Tel: 716-439-1300	NYSDOT Meets Coarse Aggregate 703-02	5,000 T	Available	16.8 (no analysis of fines >10% needed (crushed rock source)	Crushed rock from a permitted quarry in Lockport	Analysis Required – N NYSDEC Approval – Y
2" Crusher Run	LaFarge North America 8875 Quarry Road – Niagara Falls, New York 14304 Tel: 716-439-1300	NYSDOT	25,000 T	Available	10	Crushed rock from a permitted quarry in Niagara Falls	Analysis Required - N NYSDEC Approval – Y See attached documents in Appendix D.
Sand Pit Material	MKB, Inc – This source has history with NYSDEC – approved by Mike Hinton	NYSDEC MLR No. 90659	8,000 T	NA	NA	Letter stating that it comes from a virgin site – letter attached.	Analysis Required – N NYSDEC Approval - Y
Ready Mix Flowable Fill	United Materials, Inc. 3949 Forest Parkway, Suite 400 North Tonawanda, NY 14120 716-213-5832	NYSDOT	16,000 cu.yd	Available	NA	Composition : Pozzolan / Flyash - ~81% (Duke Energy) Water - ~15% Portland Cement - ~ 4% (St. Mary Cement)	Analysis Required – Y NYSDEC Approval – Per NYSDEC e-mail dated 17 May 2011, fly ash needs testing per DER-10 Table 5.4(e) 10 – ERM to sample material for analysis and provide results to NYSDEC.

Ready Mix Flowable Fill	United Materials, Inc. 3949 Forest Parkway, Suite 400 North Tonawanda, NY 14120	NYSDOT	16,000 cu.yd	Available	NA	Without Fly Ash and use of virgin sand from a permitted quarry	Analysis Required – N NYSDEC Approval - Y
Material Type	**Source**	**Approved by**	**Volume / Weight**	**Specs**	**% Fine through Sieve No. 80**	**Special Notes**	**Analysis Required (Y/N) NYSDEC Approval (Y/N)**
Grey 2" minus Recycled Concrete	Swift River Associates, Inc. 4051 River Road Tonawanda, NY 14150 716-875-0902	Meets NYSDOT Specifications	60,000 T	Available	9	Stockpile CP11-5	Analysis Required – N* NYSDEC Approval - Y * - Testing of fines per DER-10 Table 5.4(e) 10 is required only if fines are present at >10%.
Crushed Concrete	Norampac, Inc 4000 Packard Ave, NF, NY Old Mill No. 2	NA	42,000 T	NA	NA – sampling must be representative of all material.	Crushed concrete obtained from the demolished floors, slabs & foundations of Old Mill No. 2	Analysis Required - Y NYSDEC Approval - Testing of representative samples per DER-10 Table 5.4(e) 10 is required.
Crushed Bricks	Norampac, Inc 4000 Packard Ave, NF, NY Old Mill No. 2	NA	18,000 T	NA	NA – sampling must be representative of all material.	Crushed bricks from the Old Mill No. 2	Analysis Required - Y NYSDEC Approval - Testing of representative samples per DER-10 Table 5.4(e) 10 is required.
Dura-Fill	LaFarge North America, Inc. (Local Distributor) 8875 Quarry Road – Niagara Falls, New York 14304 Tel: 716-439-1300	NYSDEC	Approx. 28,500 T	NA	NA	Commercial Product – Tested Once by ERM – no industrial exceedances	Analysis Required – No Additional Analyses required NYSDEC Approval – Given at Site Meeting 8-3-11 as it is a commercial product

Additional materials proposed as Site backfill that were tested by ERM and the results of the testing and ultimate resolution relating to disposal are presented in the Table below. Laboratory Test Results associated with these samples are presented in Table 4.5a-e.

Sample ID	Source/ Location of Sample	Highest SCO Exceeded	Comments
BF-02	Flowable fill installed as trench backfill in Royal Ave parking lot	Industrial	Disposed off site in a permitted landfill
BF-03	Duke Energy Fly Ash Rochester, NY	Industrial	Cannot be used as backfill at the site
BF-04	Suez Energy Fly Ash Syracuse, NY	Industrial	Cannot be used as backfill at the site
F-05	Crushed Concrete from site (sampled at Lafarge quarry in Lockport, NY)- this was a "preliminary" sample taken to determine if on-site concrete could be used – material never brought to the Site.	Protection of Ground Water	One slight exceedance for acetone (protection of ground water) and one slight exceedance for zinc (unrestricted); additional sampling performed as described in Section 4.6

4.8.2 Utility Excavations – Construction Trailer Area

During mobilization activities at the Site, excavations for the utility infrastructure associated with the Construction Trailer area at the southern portion of the BCP Site were performed. Soil samples associated with these excavations are presented in the table below. Results of the testing and ultimate resolution relating to disposal are presented in the Table below. Laboratory Test Results associated with these samples are presented in Table 4.5a-e.

Sample ID	Source/ Location of Sample	Highest SCO Exceeded	Comments
EM-01	Water disconnect excavation / Royal Ave parking lot	None	Unrestricted use
EM-02	Water disconnect excavation / Royal Ave parking lot	Industrial	Dispose off site in a permitted landfill
EM-03	Water disconnect excavation / Royal Ave parking lot	None	Unrestricted use
EM-04	Electrical trench excavation Royal Ave parking lot / Royal	Unrestricted	Dispose off site

	Ave parking lot		
EM-05	Water-line trench excavation Royal Ave parking lot / Royal Ave parking lot	Unrestricted	Dispose off site
EM-06	2 roll-offs from former building No.4 floor trenches / near former Mill No.1	Commercial	Dispose off site

One utility trench was installed in this area for services to construction office trailers and backfilled with flowable fill known to contain fly ash. This occurred prior to development of the approved backfill table above. The trench measures approximately 390 feet long by 1-foot wide and 4-feet deep (approximately 58 cubic yards). The material was subsequently analyzed and found to contain one or more metals at a concentration above its Industrial SCO. Based on that evaluation, additional use of flowable fill with fly ash was disapproved. Going forward only flowable fill indicated in the table above (Dura-Fill) was used. Given the relatively small volume, this material is planned to be left in place.

4.8.3 Miscellaneous

Additional waste sampling not previously identified is summarized below. On 28 July 2011, while excavation was being performed along the northern portion of Phase 5 in the footprint of the new facility to assist in the construction of site access roads, an abandoned cast iron pipe line was encountered. The purpose of this line was unknown but anticipated to be associated with wastewater disposal. As such, an ERM representative obtained a sample of the material coating the inside of the pipe (pipe scrapings) for laboratory analyses (TCL VOCs, TCL SVOCs, TAL Metals TCL Pesticides and PCBs) to determine if the pipe scrapings could be a potential substance limiting the ability to recycle the cast iron. The sample was sent to Test America under proper Chain of Custody and results were obtained on 17 August 2011. Laboratory Test Results associated with these samples are presented in Appendix C and indicate that the pipe scrapings are all below unrestricted SCOs and would not restrict the cast iron piping from being recycled.

Analysis for Target Compound Leachate Procedure (TCLP) barium and lead was requested by the disposal facility on the soil in the two roll-offs associated with sample EM-06 noted in Section 4.8.2 above. ERM obtained the samples on 15 July 2011 and sent them to Paradigm under proper Chain of Custody. Laboratory Test Results associated with these samples were obtained on 20 July 2011 and indicated the soil in the roll-offs was not a toxic hazardous waste on the basis of barium or lead. Results of these samples (WAS-001 East and WAS-002 West) are presented in Appendix C.

OCS was the demolition contractor for MMT at the site and at the end of July 2011 was working on the demolition of the WWTP in the northwest portion of the Site. They encountered two settling tanks containing solidified sludge material and requested ERM obtain two samples to determine if the material had any hazardous characteristics. ERM obtained the samples on 28 July 2011 and sent them to Paradigm under proper Chain of Custody. The samples were analyzed for TCLP VOCs, TCLP SVOCs, TCLP Metals, Reactivity, and Ignitability. Laboratory Test Results associated with these samples were obtained on 4 August 2011 and indicated the material in the settling ponds was not a hazardous waste. Results of these samples (Waste-003 and Waste-004) are presented in Appendix C.

As initially discussed in Section 4.7, ERM personnel noted elevated PID readings above the action level of 5-ppm in Grid (Quad) 88 in the southeast corner of the BCP Site on 28 September 2011. ERM obtained a sample of the VOC-affected soil in an effort to determine appropriate disposal characteristics and to determine if it could be a potential hazardous waste. Samples of the soil were submitted under the proper Chain of Custody to Paradigm for analysis. Elevated chlorobenzene compounds were detected in the original round of sampling results received on 12 October 2011 and then ERM requested additional analysis for TCLP metals, TCLP SVOCs, and TCLP VOCs. Results received from Paradigm on 17 October 2011 indicated the material was non-hazardous.

ERM also oversaw the excavation and stockpiling of these VOC-affected soils in the southeast corner of the BCP site until the lab results were received. Upon receipt of all data, it was determined that the VOC–affected soil would be transported to Allied for disposal as contaminated material. All October 2011 Paradigm test results along with documentation relating to VOC-affected soil from Grid 88 at the BCP Site are presented in Appendix C.

4.9 HEALTH & SAFETY AND AIR MONITORING

On-Site air monitoring was conducted consistent with the requirements of the CAMP and the project Health and Safety Plan (HASP). In accordance with the CAMP, air monitoring stations were established on the northeast and southwest corners of the site excavation area. Each monitoring station (labeled NE and SW) was equipped with a PID to measure VOCs, and a Mini-Rae dust monitor to measure for particulate emissions less than 10 micrometers in size (PM-10). Readings were collected approximately every 10 minutes during intrusive activities, and recorded. Due to the dynamic project schedule and excavation extent, the locations of the air monitoring equipment changed with the scope of the excavation.

Appendix F provides the dust and VOC data collected by the monitoring stations. Daily PID summary data is provided in Appendix F-1. Daily DustTrak summary data recorded but not downloaded due to equipment malfunctions are provided in Appendix F-2. Air monitoring data downloaded from the northeast and southwest DustTraks are provided in Appendix F-3 and F-4. Any air monitoring equipment malfunctions and errors were addressed prior to the next use.

The PM-10 level exceeded the 100 microgram per cubic meter action level sporadically throughout the excavation period and measures including watering down the excavation area were taken to control dust. There were also sporadic PM-10 levels above the 150 microgram per cubic meter action level, and additional spraying of water and/or modifying work activities was utilized to reduce these levels. Visible dust was not observed leaving the Site. There were limited occurrences where the NE and SW PID readings exceeded the 5 ppm action level established in the CAMP, but the durations were short-term (less than 15 minutes), and the time-weighted average (TWA) for each day was less than 5 ppm.

PID monitoring was also conducted within the work zone to monitor for potential worker exposure and satisfy the requirements of the HASP. The HASP established a PID action level of 5 ppm sustained for 15 minutes. While there were PID readings in the work zone that exceeded 5 ppm, these were all of short duration (less than 15 minutes).

During excavations, a PID was used by an inspector to screen every three to five buckets of soil excavated. There were occasional exceedances of the 5 ppm action level for VOCs in soil in some areas. This was addressed by segregating the soil with readings greater than the action level and transporting it to Allied or

Modern as "contaminated" soil for disposal. In these VOC areas, every bucket of soil was screened by an inspector with a PID until readings reached below 5 ppm. Then inspection of every third to fifth bucket with the PID for VOC readings resumed. Any RAD soil with exceedances of the 5 ppm action level was addressed by segregating the soil as RAD waste and transporting it to Environmental Quality Facility in Bellville, Michigan.

Additional air monitoring information completed by LATA is located in Appendix B.

5.0 ANALYTICAL DATA

The samples collected during the Soil Excavation IRM for chemical analysis were analyzed by Test America Laboratories located in Edison, New Jersey, Test America Laboratories located in Buffalo, New York, and Paradigm Environmental Services, Inc. located in Rochester, New York. All three laboratories are NYSDOH Environmental Laboratory Approval Program (ELAP)-certified to perform the analytical methods used in this investigation. A NYSDEC Analytical Services Protocol (ASP) Category B deliverable was provided by the laboratories for all data. Radiological testing for waste characterization purposes was performed by American Radiation Services, Inc. located in Port Allen, Louisiana.

A data usability evaluation was conducted on all IRM data by ERM's Project QA/QC Officer in conformance with guidelines presented in DER-10 Appendix 2B (NYSDEC, 2010) and using the applicable USEPA Region II Data Review Standard Operating Procedures (SOPs). A Data Usability Summary Report (DUSR) was generated for all data except waste characterization samples.

The laboratory analytical data was qualified, where appropriate, based on the data usability evaluation. Qualifier codes were used to indicate the qualitative and quantitative reliability of the data. All laboratory analytical data generated during the 2011 IRM were found to be valid and usable with the qualifications noted in DUSR. Table 4-3, Table 4-5, and Table 4-6 present the analytical data with the final validation qualifiers.

Consistent with NYSDEC guidance contained in DER-10 Section 3.14 (b), the ASP Category B deliverables and the DUSR are not presented as attachments to the IRM report. The data will be transmitted electronically to NYSDEC on or about March 16, 2012 in electronic format following the guidelines set forth in the Electronic Data Deliverable (EDD) Manual, NYSDEC EDD Format v.1 (or most recent version), July 1, 2011. The following tabs will be populated:

- DataProvider_v1;
- Subfacility_v1;
- Location_v1;
- Sample_v1; and
- TestResultsQC_v1.

The EDD will be checked using the Earthsoft EQuIS Data Processor (EDP) software. The EDP Sign and Submit feature will be used to format the EDD into a .zip file which should allow the association of the data with the correct

NYSDEC Site (Facility Name and Facility Code), however the Site is not present in the valid values file and therefore the EDD will be manually named according to the following convention: the date, the time, Site ID (C932150), and the Format File name used to create the EDD. The file will be emailed to the NYSDEC EIMS Administrator at nyenvdata@gw.dec.state.ny.us and the NYSDEC Project Manager.

6.0 UPCOMING ACTIVITIES & REPORTS

As discussed in previous sections, the following areas where soil contains constituents above the Industrial SCOs were not addressed during the Soil Excavation IRM:

- ETA, including the vicinity of sample location B-201E in Chemical Hot Spot C-1; and
- Vicinity of sample CONF-110 (located on the south wall of Chemical Hot Spot C-7).

The ETA and adjacent areas will be addressed once the existing electrical substation within the ETA is accessible. Remaining soil to be excavated consists of a portion of Chemical Hot Spot C-1, and a portion of RAD Hot Spot R-1. The excavation of these areas will be performed following issuance of the Certificate of Completion (COC) during the site management phase of this project, and is anticipated to be in Fall 2012. Soil will be excavated and managed following the requirements of the Soil Excavation IRM Work Plan (ERM, 2011c), as well as the December 2011 Addendum addressing radiological impacts.

At confirmation soil sample CONF-110, arsenic and mercury were detected at concentrations above the Industrial SCOs. This sample is located beneath an active steam line in an area that cannot be further excavated without removing the active steam line, which is necessary for ongoing Norampac production operations. Greenpac is planning to submit a demonstration to the NYSDEC of the technical impracticability of additional soil excavation in this area as a basis for preservation of a BCP Track 2 cleanup for the Site.

Other remaining activities for this cleanup are anticipated to be preparation of an Environmental Easement including a final ALTA-quality survey, and preparation of the SMP. The SMP will be developed using the NYSDEC template, will follow the requirements of DER-10 Section 6.2, and will include the following items:

1. summary of all institutional controls;
2. a provision to add the environmental easement or deed restriction as an appendix to the SMP upon its execution/issuance;
3. excavation requirements for the ETA;

4. distribution of affected soil exhibiting concentrations in excess of NYSDEC's Residential SCOs, as well as soil exceeding the Industrial SCOs below a depth of 15 feet;
5. excavation plan specifying removal, management and handling of soil encountered during excavation of the site, which exceeds the Residential SCOs, as well as soil exceeding the Industrial SCOs below a depth of 15 feet;
6. notification requirements for conducting intrusive activities described above;
7. requirements for on-Site Soil reuse;
8. requirements for material brought on-Site for backfill;
9. health and safety requirements;
10. community air monitoring requirements;
11. monitoring well decommissioning;
12. property transfer provisions; and
13. periodic review requirements.

Upon submittal/approval of the SMP, a Final Engineering Report (FER) will be prepared that conforms to the requirements of DER-10 Section 5.8. Since practically all remediation work is presented in this current document, the FER is anticipated to be somewhat limited in content. The document will be developed using NYSDEC's template FER, and will include the following:

1. certification statement following the requirements of DER-10 Section 1.15 (similar to this document, the certification by ERM will apply only to work set forth in the Soil Excavation IRM Work Plan (June 2011);
2. Site survey with Metes and Bounds description;
3. identification of RAOs;
4. description of selected remedy;
5. summary of this document (i.e., *Remedial Alternatives Analysis and Interim Remedial Measure Construction Completion Report*);
6. contamination remaining at the Site;
7. identification of institutional controls required, including mechanisms to implement, maintain, monitor and enforce such controls;
8. documentation for the executed deed restriction; and
9. reference to the previously-submitted and approved SMP.

7.0 REFERENCES CITED

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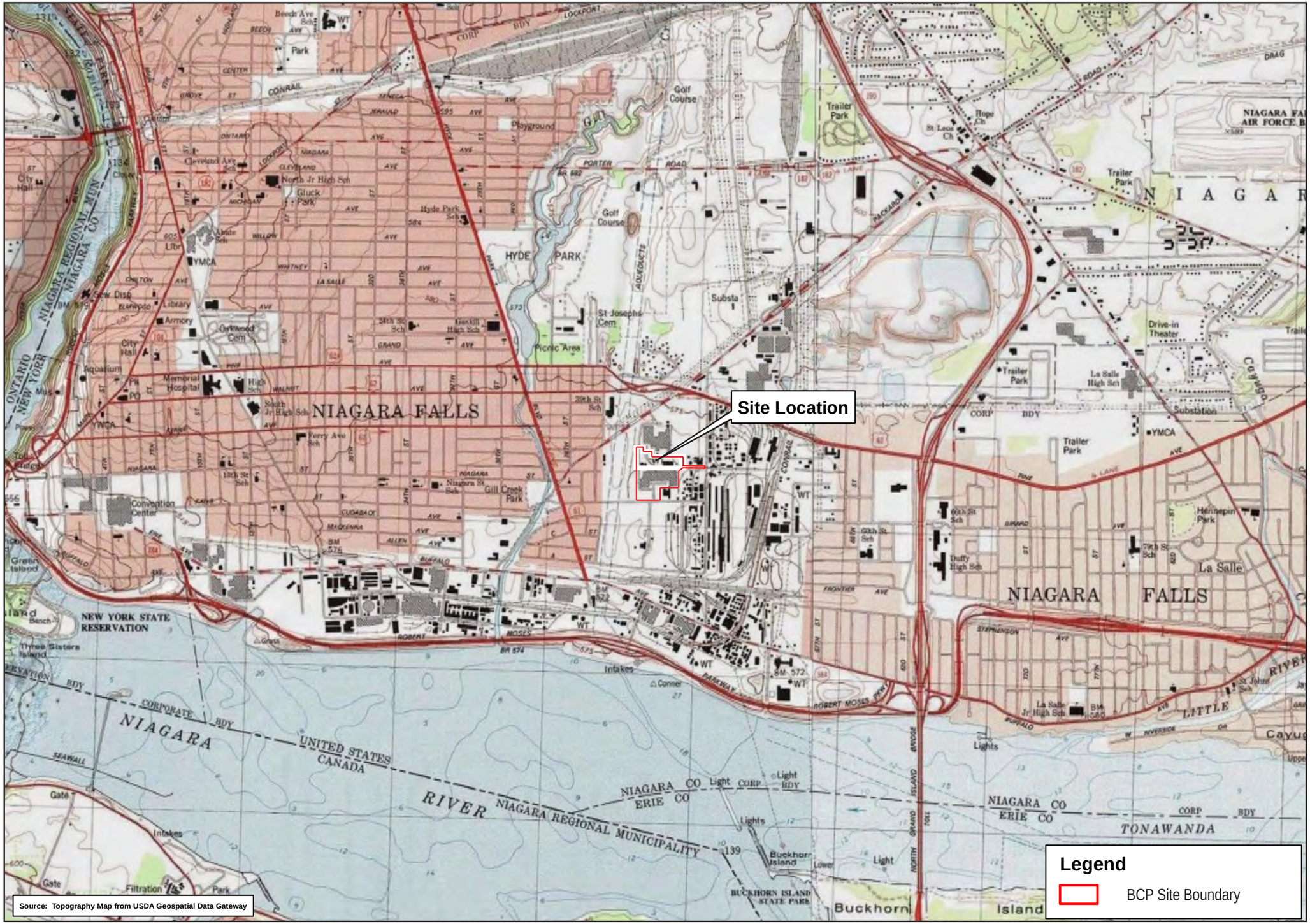
Figures



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0 2,000 Feet

Figure 1-1 - Site Location Map
Greenpac Mill, LLC
Niagara Falls, New York
NYSDEC BCP Site #C932150

ERM

N

Packard Road

47th Street

WWTP A

WWTP B

WWTP C

Phase 1

Phase 2

Phase 3

Phase 4

Phase 5

Existing
Electrical Substation

Proposed
Electrical Substation

Royal Ave

Legend:

- Norampac's No Dig Zone
- Greenpac Mill Proposed Building Outline
- Main Excavation Phases
- BCP Site Boundary
- ETA Area
- Former Building Outline
- Excavation Grid

Source: Aerial photography (April 2008) from New York State GIS Clearinghouse.
Data for all property lines, perimeters and building outlines were obtained from the MiniMill Technologies provided CAD files.

80 0 80 160 320

Figure 1-2 - Site Layout Map
Greenpac Mill, LLC
NYSDEC BCP Site No. C932150
Niagara Falls, New York

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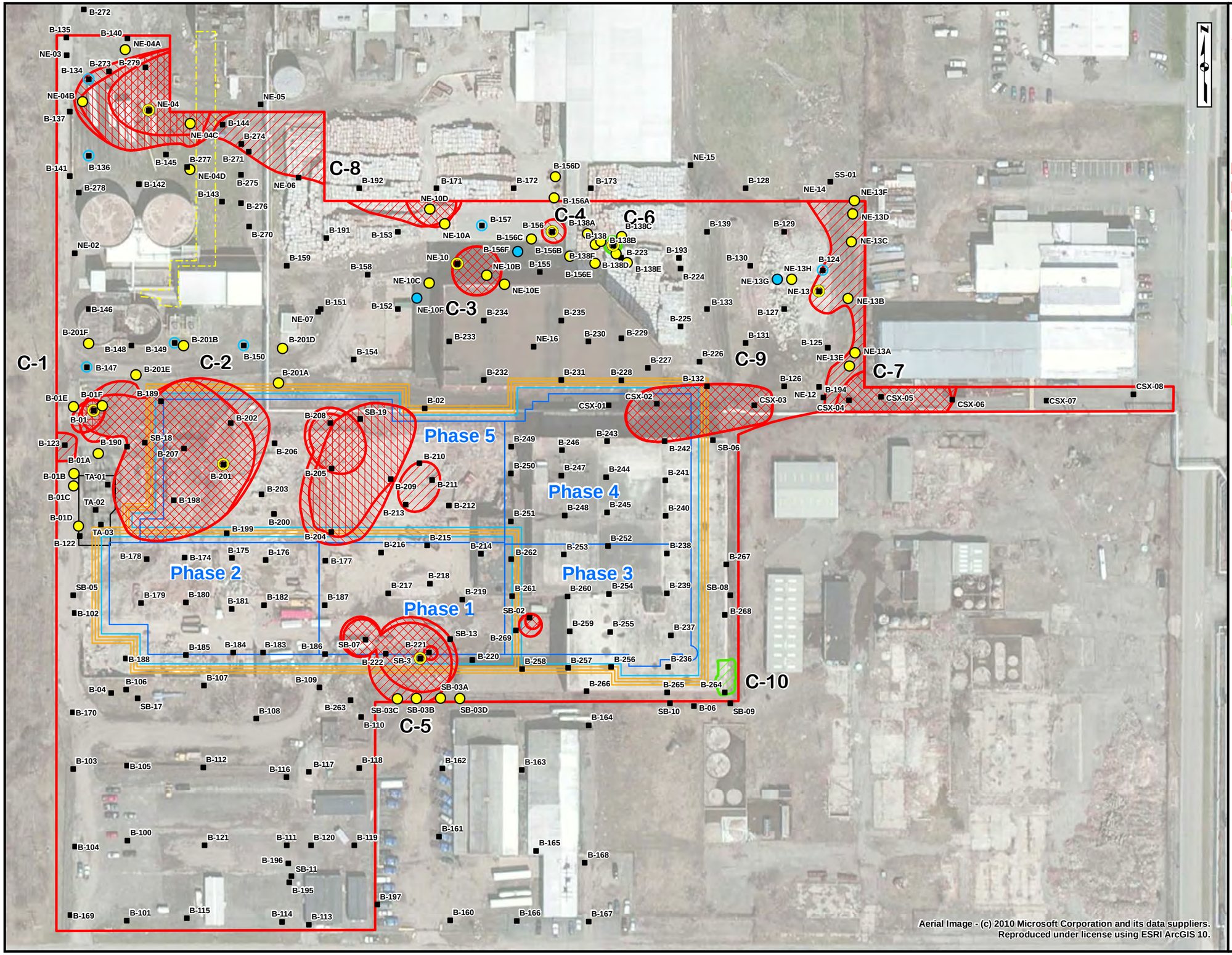

Legend

- BCP Site Boundary
- Excavation Phase
- Oversize Excavation
- Excavation Benching
- Norampac's No Dig Zone
- C-# Chemical Hotspot

Exceeds Restricted Industrial SCO

- 569 -566 ft (0 - 3 ft bgs)
- 566 - 563 ft (3 - 6 ft bgs)
- 563 - 560 ft (6 - 9 ft bgs)
- 560 - 557 ft (9 - 12 ft bgs)

VOC Exceedence

- 569 -566 ft (0 - 3 ft bgs)
- 566 - 563 ft (3 - 6 ft bgs)
- 563 - 560 ft (6 - 9 ft bgs)
- 560 - 557 ft (9 - 12 ft bgs)
- Soil Boring
- Hotspot Boring
- Hotspot Delineation Boring
- RI Boring Used for Hotspot Delineation
- Hotspot Delineation Boring (No Sample Taken)

bgs Below Ground Surface

Note:
These results are based on laboratory analysis and modeling of chemicals previously detected on-site, and does not include modeling of radiological impacts. Soil determined to be suitable for re-use must be free of debris, historical fill, or non-native materials.

0 50 100 200 Feet

1:1,450

Figure 2-1a - Areas Exceeding Restricted Industrial Soil Cleanup Objectives

Greenpac Mill
Niagara Falls, NY
NYSDEC BCP Site No. C932150
08 February 2012

ERM

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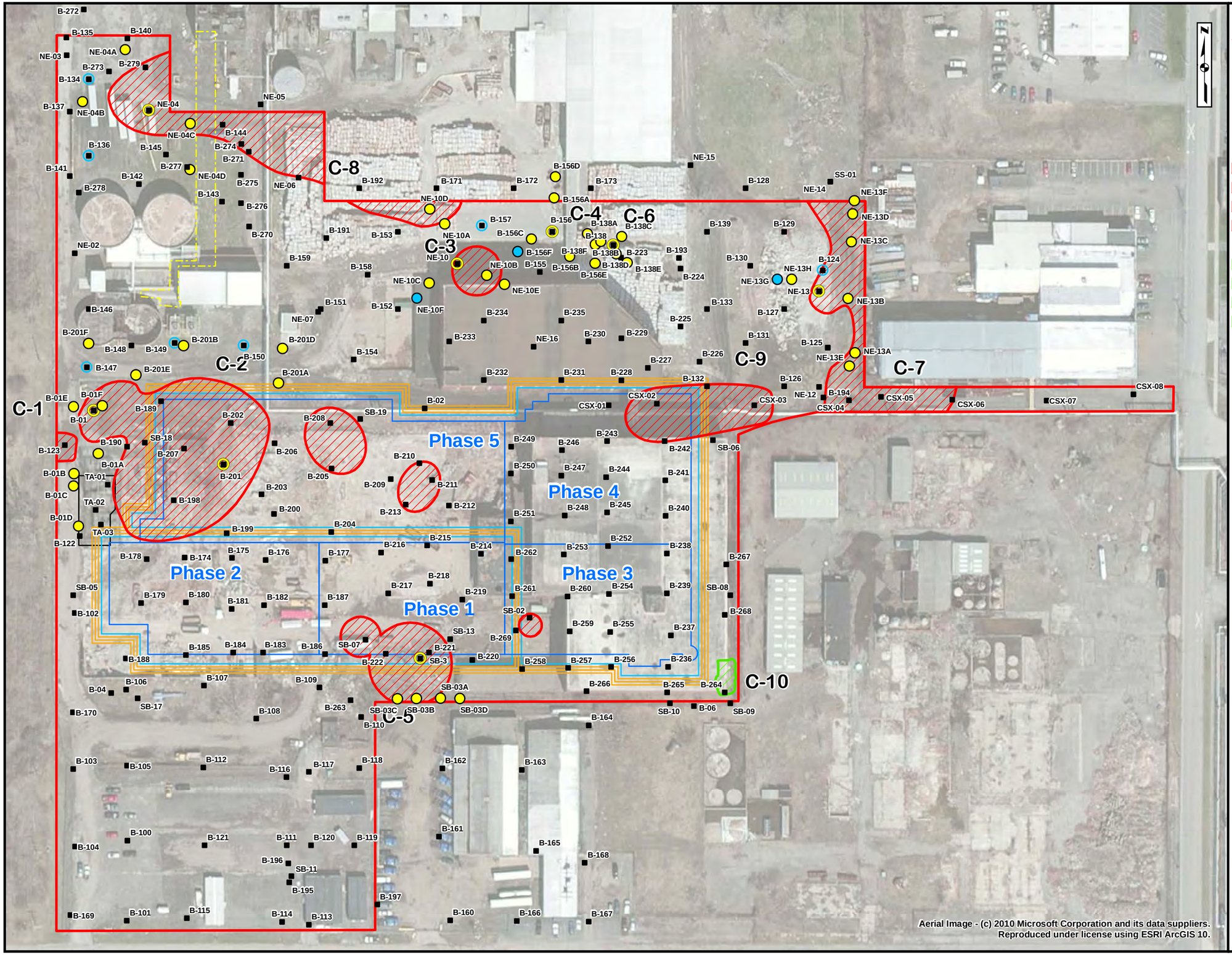

Legend

- BCP Site Boundary
- Excavation Phase
- Oversize Excavation
- Excavation Benching
- Norampac's No Dig Zone
- C-# Chemical Hotspot

Exceeds Restricted Industrial SCO

- 569 -566 ft (0 - 3 ft bgs)
- 566 - 563 ft (3 - 6 ft bgs)
- 563 - 560 ft (6 - 9 ft bgs)
- 560 - 557 ft (9 - 12 ft bgs)

VOC Exceedence

- 569 -566 ft (0 - 3 ft bgs)
- 566 - 563 ft (3 - 6 ft bgs)
- 563 - 560 ft (6 - 9 ft bgs)
- 560 - 557 ft (9 - 12 ft bgs)
- Soil Boring
- Hotspot Boring
- Hotspot Delineation Boring
- RI Boring Used for Hotspot Delineation
- Hotspot Delineation Boring (No Sample Taken)

bgs Below Ground Surface

Note:
These results are based on laboratory analysis and modeling of chemicals previously detected on-site, and does not include modeling of radiological impacts. Soil determined to be suitable for re-use must be free of debris, historical fill, or non-native materials.

0 50 100 200 Feet

1:1,450

Figure 2-1b - Areas Exceeding Restricted Industrial Soil Cleanup Objectives 569 - 566 ft.

Greenpac Mill
Niagara Falls, NY
NYSDEC BCP Site No. C932150
08 February 2012

ERM

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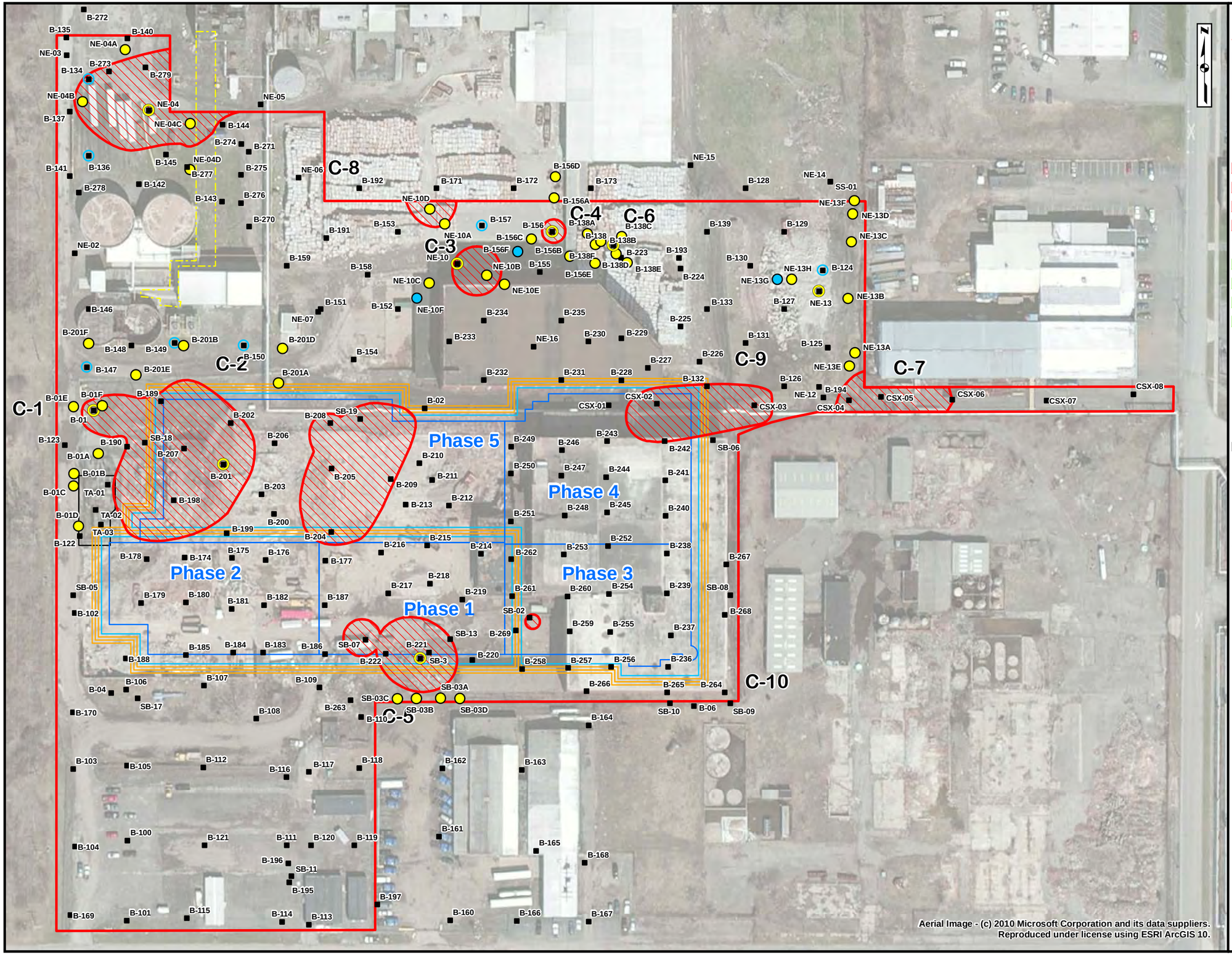

Legend

- BCP Site Boundary
- Excavation Phase
- Oversize Excavation
- Excavation Benching
- Norampac's No Dig Zone
- C-# Chemical Hotspot

Exceeds Restricted Industrial SCO

- 569 -566 ft (0 - 3 ft bgs)
- 566 - 563 ft (3 - 6 ft bgs)
- 563 - 560 ft (6 - 9 ft bgs)
- 560 - 557 ft (9 - 12 ft bgs)

VOC Exceedence

- 569 -566 ft (0 - 3 ft bgs)
- 566 - 563 ft (3 - 6 ft bgs)
- 563 - 560 ft (6 - 9 ft bgs)
- 560 - 557 ft (9 - 12 ft bgs)
- Soil Boring
- Hotspot Boring
- Hotspot Delineation Boring
- RI Boring Used for Hotspot Delineation
- Hotspot Delineation Boring (No Sample Taken)

bgs Below Ground Surface

Note:
These results are based on laboratory analysis and modeling of chemicals previously detected on-site, and does not include modeling of radiological impacts. Soil determined to be suitable for re-use must be free of debris, historical fill, or non-native materials.

0 50 100 200 Feet

1:1,450

Figure 2-1c - Areas Exceeding Restricted Industrial Soil Cleanup Objectives 566 - 563 ft.

Greenpac Mill
Niagara Falls, NY
NYSDEC BCP Site No. C932150
08 February 2012

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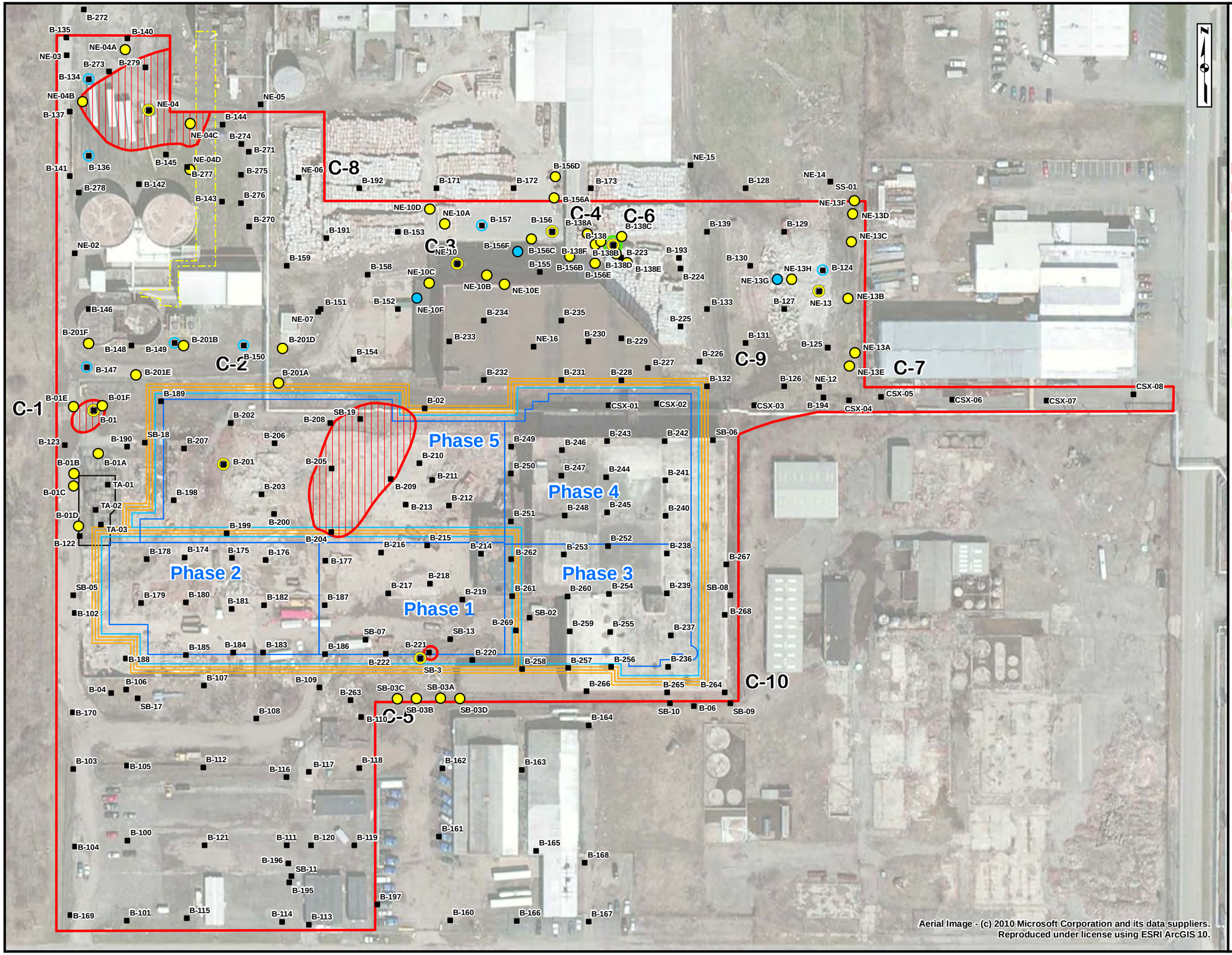

Legend

- BCP Site Boundary
- Excavation Phase
- Oversize Excavation
- Excavation Benching
- Norampac's No Dig Zone
- C-# Chemical Hotspot

Exceeds Restricted Industrial SCO

- 569 -566 ft (0 - 3 ft bgs)
- 566 - 563 ft (3 - 6 ft bgs)
- 563 - 560 ft (6 - 9 ft bgs)
- 560 - 557 ft (9 - 12 ft bgs)

VOC Exceedence

- 569 -566 ft (0 - 3 ft bgs)
- 566 - 563 ft (3 - 6 ft bgs)
- 563 - 560 ft (6 - 9 ft bgs)
- 560 - 557 ft (9 - 12 ft bgs)
- Soil Boring
- Hotspot Boring
- Hotspot Delineation Boring
- RI Boring Used for Hotspot Delineation
- Hotspot Delineation Boring (No Sample Taken)

bgs Below Ground Surface

Note:
These results are based on laboratory analysis and modeling of chemicals previously detected on-site, and does not include modeling of radiological impacts. Soil determined to be suitable for re-use must be free of debris, historical fill, or non-native materials.

0 50 100 200 Feet

1:1,450

Figure 2-1d - Areas Exceeding Restricted Industrial Soil Cleanup Objectives 563 - 560 ft.

Greenpac Mill
Niagara Falls, NY
NYSDEC BCP Site No. C932150
08 February 2012

ERM

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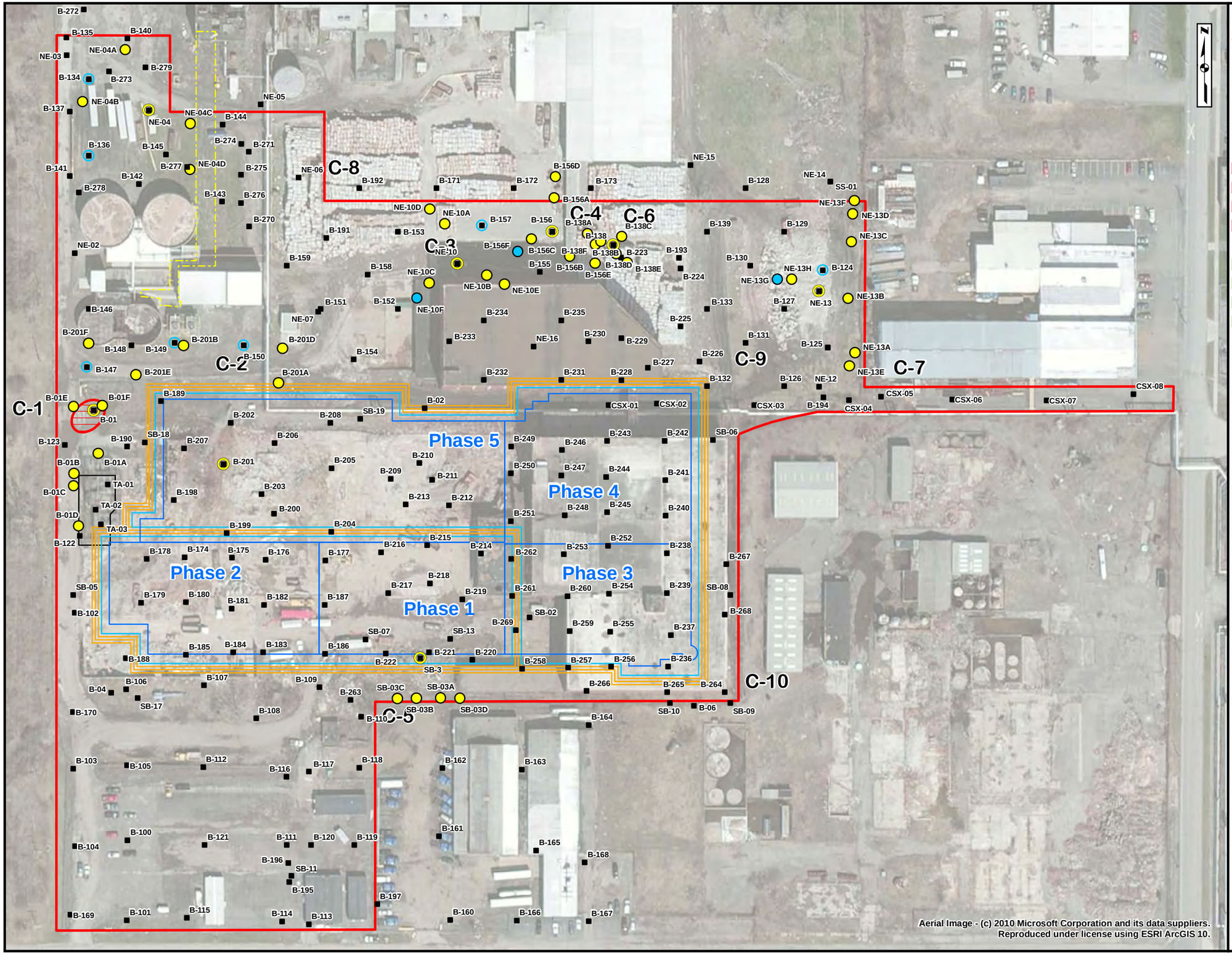

Legend

- BCP Site Boundary
- Excavation Phase
- Oversize Excavation
- Excavation Benching
- Norampac's No Dig Zone
- C-# Chemical Hotspot

Exceeds Restricted Industrial SCO

- 569 -566 ft (0 - 3 ft bgs)
- 566 - 563 ft (3 - 6 ft bgs)
- 563 - 560 ft (6 - 9 ft bgs)
- 560 - 557 ft (9 - 12 ft bgs)

VOC Exceedence

- 569 -566 ft (0 - 3 ft bgs)
- 566 - 563 ft (3 - 6 ft bgs)
- 563 - 560 ft (6 - 9 ft bgs)
- 560 - 557 ft (9 - 12 ft bgs)
- Soil Boring
- Hotspot Boring
- Hotspot Delineation Boring
- RI Boring Used for Hotspot Delineation
- Hotspot Delineation Boring (No Sample Taken)

bgs Below Ground Surface

Note:
These results are based on laboratory analysis and modeling of chemicals previously detected on-site, and does not include modeling of radiological impacts. Soil determined to be suitable for re-use must be free of debris, historical fill, or non-native materials.

0 50 100 200 Feet

1:1,450

Figure 2-1e - Areas Exceeding Restricted Industrial Soil Cleanup Objectives 560 - 557 ft.

Greenpac Mill
Niagara Falls, NY
NYSDEC BCP Site No. C932150
08 February 2012

ERM

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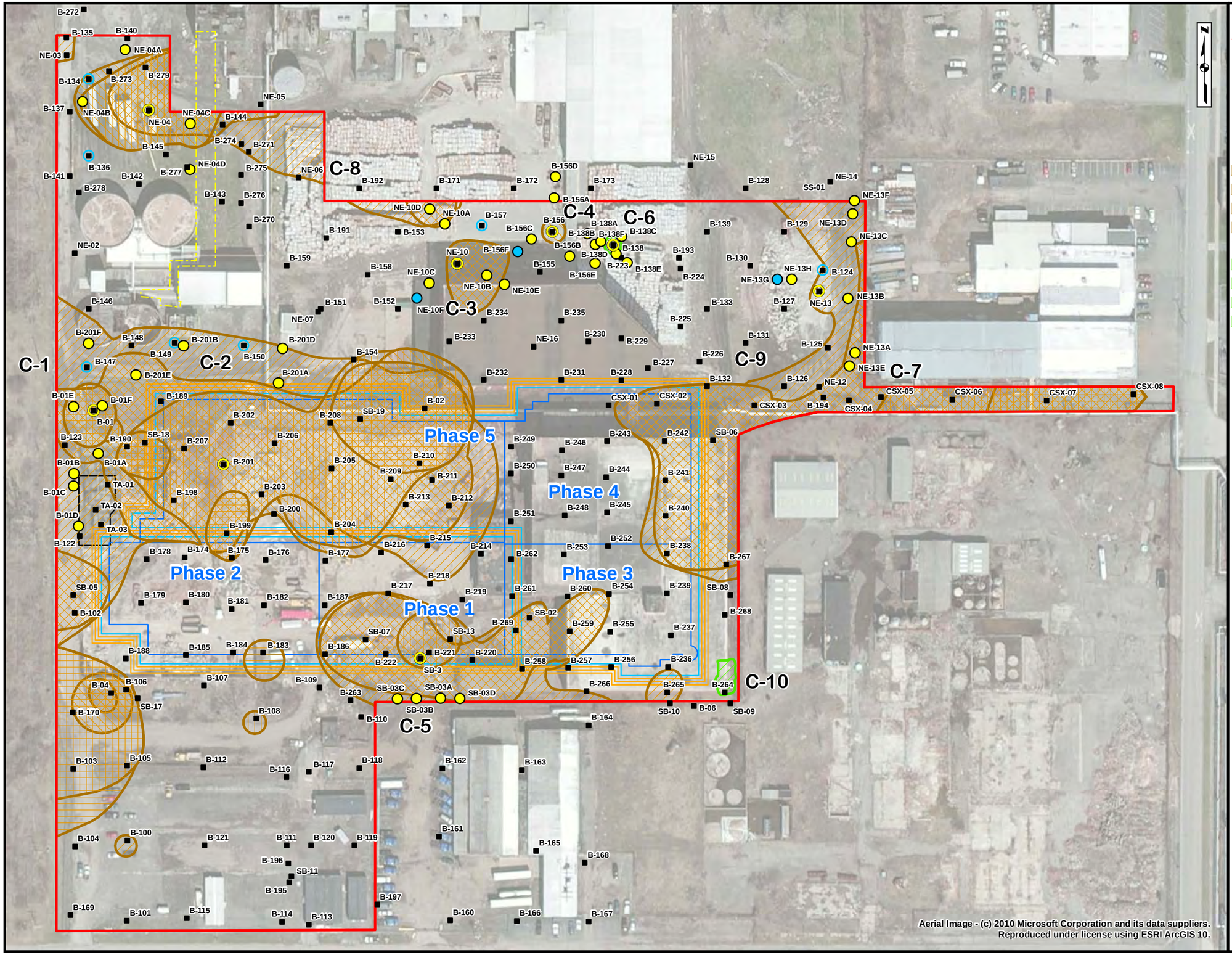

Legend

- BCP Site Boundary
- Excavation Phase
- Oversize Excavation
- Excavation Benching
- Norampac's No Dig Zone
- C-# Chemical Hotspot

Exceeds Residential SCO

- 569 -566 ft (0 - 3 ft bgs)
- 566 - 563 ft (3 - 6 ft bgs)
- 563 - 560 ft (6 - 9 ft bgs)
- 560 - 557 ft (9 - 12 ft bgs)

VOC Exceedence

- 569 -566 ft (0 - 3 ft bgs)
- 566 - 563 ft (3 - 6 ft bgs)
- 563 - 560 ft (6 - 9 ft bgs)
- 560 - 557 ft (9 - 12 ft bgs)
- Soil Boring
- Hotspot Boring
- Hotspot Delineation Boring
- RI Boring Used for Hotspot Delineation
- Hotspot Delineation Boring (No Sample Taken)

bgs Below Ground Surface

Note:
These results are based on laboratory analysis and modeling of chemicals previously detected on-site, and does not include modeling of radiological impacts. Soil determined to be suitable for re-use must be free of debris, historical fill, or non-native materials.

0 50 100 200
Feet

1:1,450

Figure 2-2a - Areas Exceeding Residential Soil Cleanup Objectives
Greenpac Mill
Niagara Falls, NY
NYSDEC BCP Site No. C932150
08 February 2012

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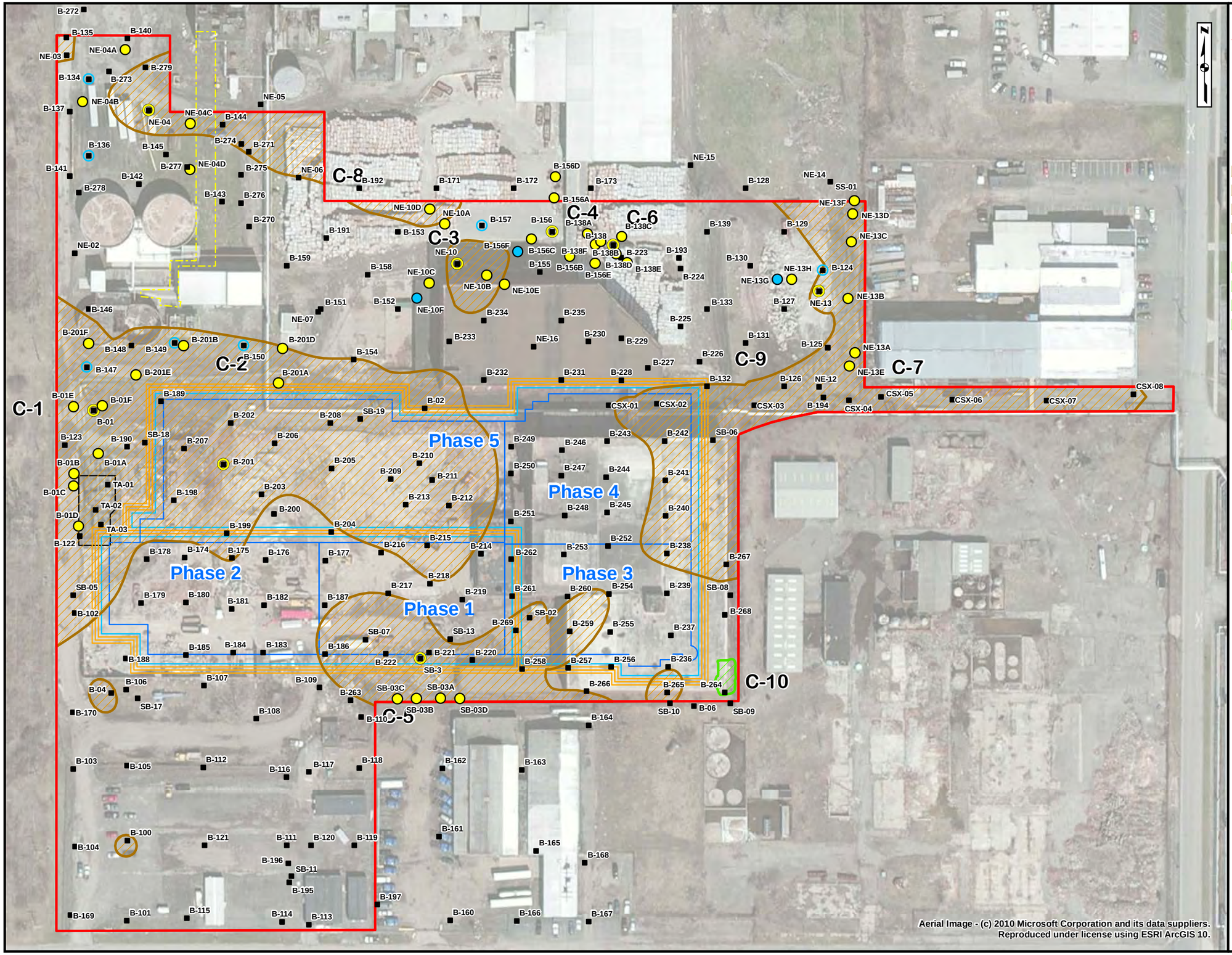

Legend

- BCP Site Boundary
- Excavation Phase
- Oversize Excavation
- Excavation Benching
- Norampac's No Dig Zone
- C-# Chemical Hotspot

Exceeds Residential SCO

- 569 -566 ft (0 - 3 ft bgs)
- 566 - 563 ft (3 - 6 ft bgs)
- 563 - 560 ft (6 - 9 ft bgs)
- 560 - 557 ft (9 - 12 ft bgs)

VOC Exceedence

- 569 -566 ft (0 - 3 ft bgs)
- 566 - 563 ft (3 - 6 ft bgs)
- 563 - 560 ft (6 - 9 ft bgs)
- 560 - 557 ft (9 - 12 ft bgs)
- Soil Boring
- Hotspot Boring
- Hotspot Delineation Boring
- RI Boring Used for Hotspot Delineation
- Hotspot Delineation Boring (No Sample Taken)

bgs Below Ground Surface

Note:
These results are based on laboratory analysis and modeling of chemicals previously detected on-site, and does not include modeling of radiological impacts. Soil determined to be suitable for re-use must be free of debris, historical fill, or non-native materials.

0 50 100 200 Feet

1:1,450

Figure 2-2b - Areas Exceeding Residential Soil Cleanup Objectives 569 - 566 ft.

Greenpac Mill
Niagara Falls, NY
NYSDEC BCP Site No. C932150
08 February 2012

ERM

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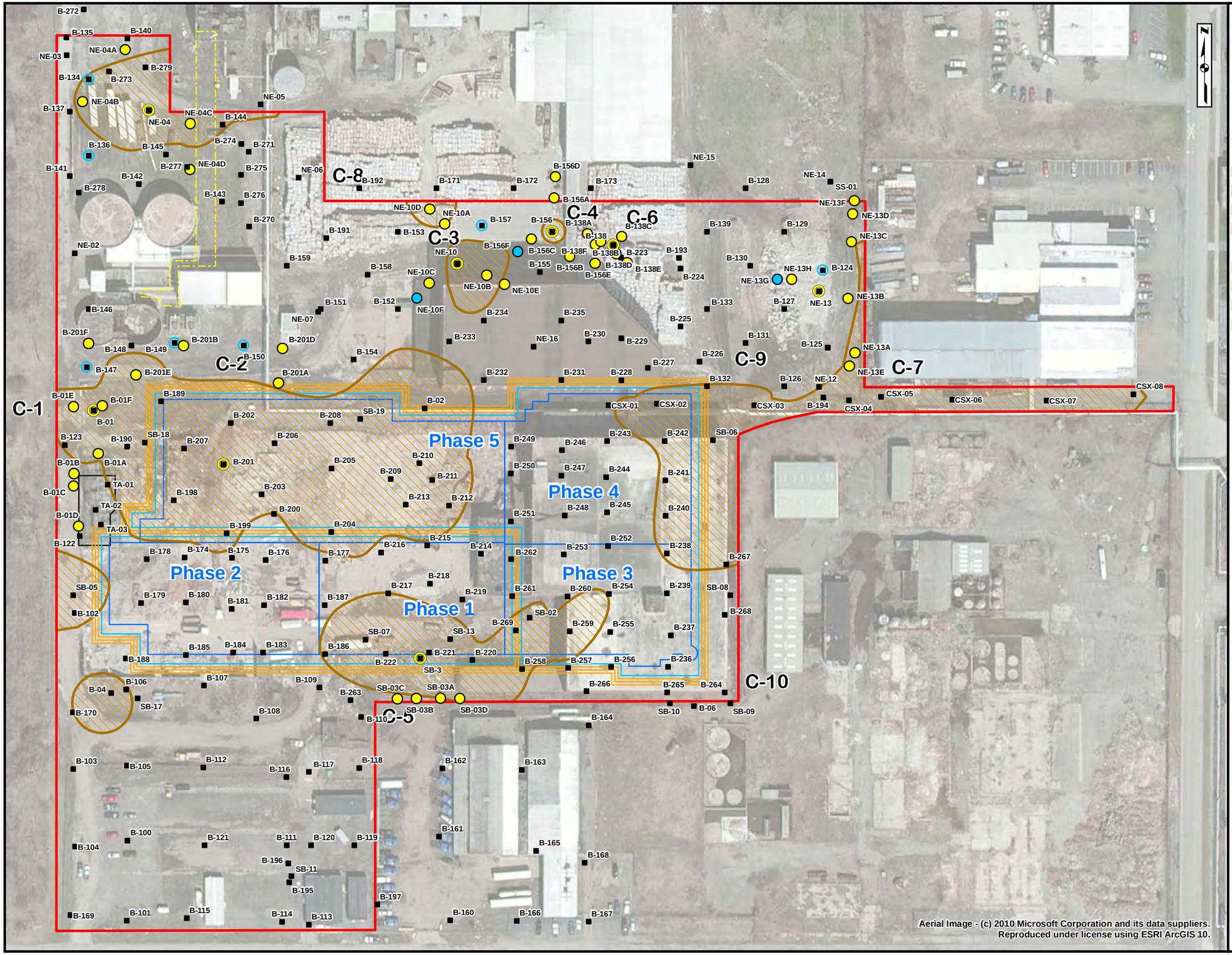

Figure 2-2c - Areas Exceeding Residential Soil Cleanup Objectives 566 - 563 ft.

Greenpac Mill
Niagara Falls, NY
NYSDEC BCP Site No. C932150
08 February 2012

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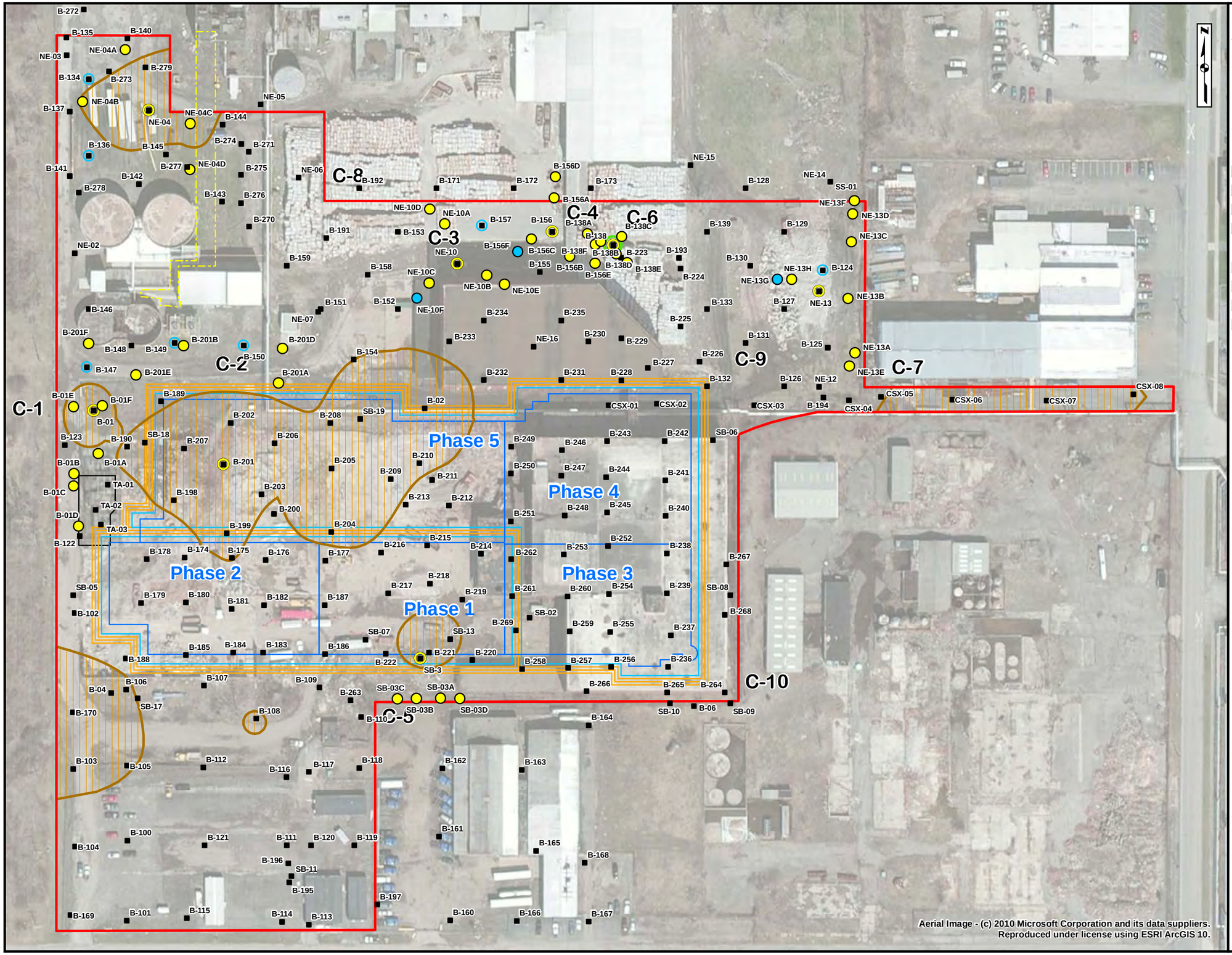

Legend

- BCP Site Boundary
- Excavation Phase
- Oversize Excavation
- Excavation Benching
- Norampac's No Dig Zone
- C-# Chemical Hotspot

Exceeds Residential SCO

- 569 -566 ft (0 - 3 ft bgs)
- 566 - 563 ft (3 - 6 ft bgs)
- 563 - 560 ft (6 - 9 ft bgs)
- 560 - 557 ft (9 - 12 ft bgs)

VOC Exceedence

- 569 -566 ft (0 - 3 ft bgs)
- 566 - 563 ft (3 - 6 ft bgs)
- 563 - 560 ft (6 - 9 ft bgs)
- 560 - 557 ft (9 - 12 ft bgs)
- Soil Boring
- Hotspot Boring
- Hotspot Delineation Boring
- RI Boring Used for Hotspot Delineation
- Hotspot Delineation Boring (No Sample Taken)

bgs Below Ground Surface

Note:
These results are based on laboratory analysis and modeling of chemicals previously detected on-site, and does not include modeling of radiological impacts. Soil determined to be suitable for re-use must be free of debris, historical fill, or non-native materials.

0 50 100 200 Feet

1:1,450

Figure 2-2d - Areas Exceeding Residential Soil Cleanup Objectives 563 - 560 ft.

Greenpac Mill
Niagara Falls, NY
NYSDEC BCP Site No. C932150
08 February 2012

ERM

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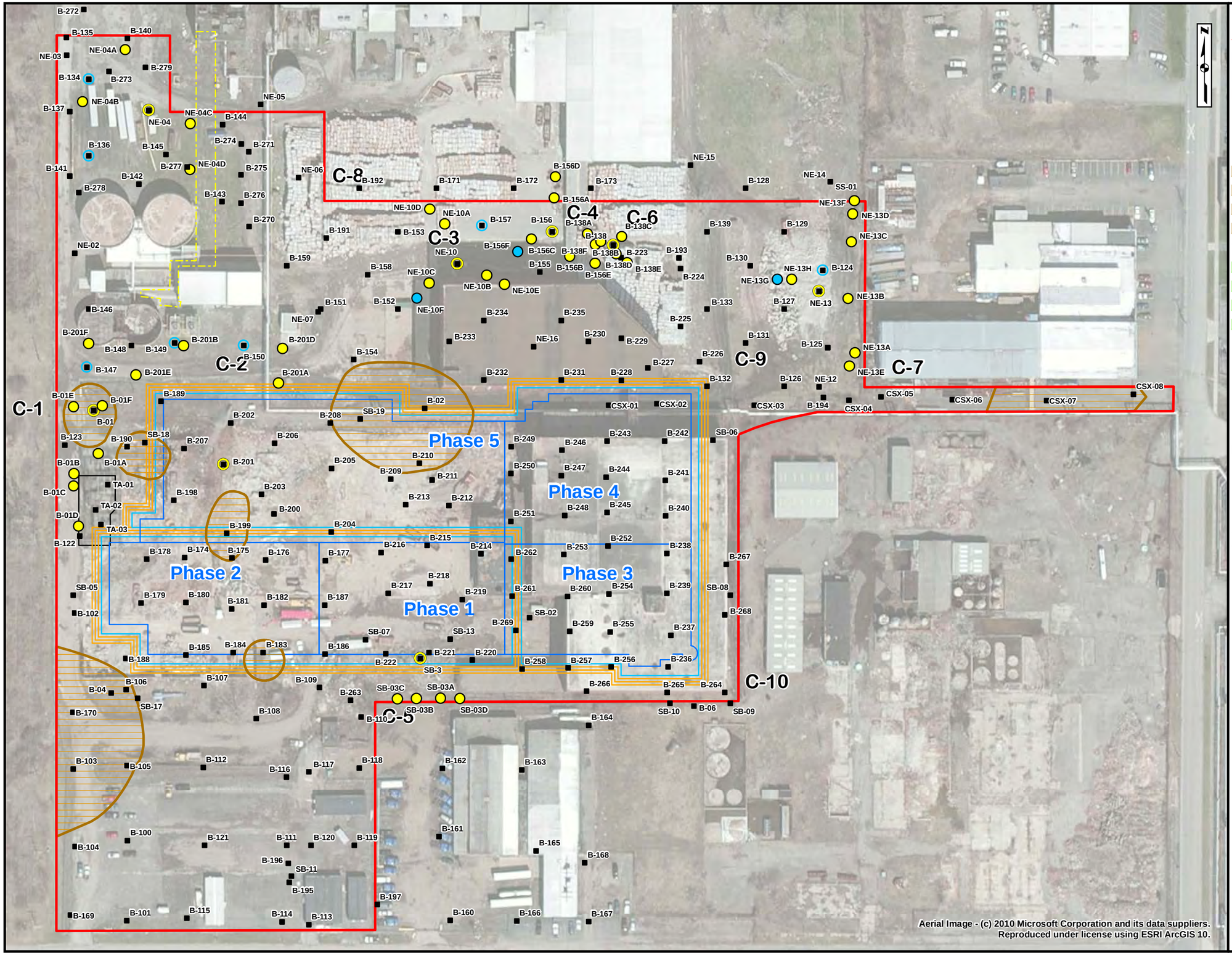

Legend

- BCP Site Boundary
- Excavation Phase
- Oversize Excavation
- Excavation Benching
- Norampac's No Dig Zone
- C-# Chemical Hotspot

Exceeds Residential SCO

- 569 -566 ft (0 - 3 ft bgs)
- 566 - 563 ft (3 - 6 ft bgs)
- 563 - 560 ft (6 - 9 ft bgs)
- 560 - 557 ft (9 - 12 ft bgs)

VOC Exceedence

- 569 -566 ft (0 - 3 ft bgs)
- 566 - 563 ft (3 - 6 ft bgs)
- 563 - 560 ft (6 - 9 ft bgs)
- 560 - 557 ft (9 - 12 ft bgs)
- Soil Boring
- Hotspot Boring
- Hotspot Delineation Boring
- RI Boring Used for Hotspot Delineation
- Hotspot Delineation Boring (No Sample Taken)

bgs Below Ground Surface

Note:
These results are based on laboratory analysis and modeling of chemicals previously detected on-site, and does not include modeling of radiological impacts. Soil determined to be suitable for re-use must be free of debris, historical fill, or non-native materials.

0 50 100 200 Feet

1:1,450

Figure 2-2e - Areas Exceeding Residential Soil Cleanup Objectives 560 - 557 ft.

Greenpac Mill
Niagara Falls, NY
NYSDEC BCP Site No. C932150
08 February 2012

ERM

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N

Packard Road

47th Street

Royal Ave

WWTP A

WWTP B

WWTP C

Rad Zone 1

Rad Zone 2

Rad Zone 3

Rad Zone 4

Rad Zone 5

Rad Zone 6

Rad Zone 7

Phase 1

Phase 2

Phase 3

Phase 4

Phase 5

Existing
Electrical Substation

Proposed
Electrical Substation

Legend:

- Norampac's No Dig Zone
- Greenpac Mill Proposed Building Outline
- Main Excavation Phases
- BCP Site Boundary
- ETA Area
- Former Building Outline
- Rad Zone
- Rad Hot Spot

Source: Aerial photography (April 2008) from New York State GIS Clearinghouse.
Data for all property lines, perimeters and building outlines were obtained from the MiniMill Technologies provided CAD files.

80 0 80 160 320

Figure 2-3 - Delineation of Radiologically-Affected Soil
Greenpac Mill, LLC
NYSDEC BCP Site No. C932150
Niagara Falls, New York

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N

Packard Road

47th Street

Royal Ave

MW-04 Exceedances of New York State TOGS 1.1.1		
Constituent	TOGS 1.1.1 Standard or Guidance Value (ug/L)	6/17/2011 (ug/L)
Iron	300	**33,400**
Magnesium	35,000	**212,000**
Manganese	300	**1,760**
Sodium	20,000	**179,000**

MW-03 Exceedances of New York State TOGS 1.1.1		
Constituent	TOGS 1.1.1 Standard or Guidance Value (ug/L)	6/17/2011 (ug/L)
Magnesium	35,000	**333,000**
Manganese	300	**526**
Sodium	20,000	**217,000**

MW-1 Exceedances of New York State TOGS 1.1.1		
Constituent	TOGS 1.1.1 Standard or Guidance Value (ug/L)	4/17/2008 (ug/L)
None	-	-

MW-02 Exceedances of New York State TOGS 1.1.1		
Constituent	TOGS 1.1.1 Standard or Guidance Value (ug/L)	6/16/2011 (ug/L)
Sodium	20,000	**440,000**

MW-09 Exceedances of New York State TOGS 1.1.1		
Constituent	TOGS 1.1.1 Standard or Guidance Value (ug/L)	6/17/2011 (ug/L)
Antimony	3	**4.9**
Sodium	20,000	**39,900**

MW-2 Exceedances of New York State TOGS 1.1.1		
Constituent	TOGS 1.1.1 Standard or Guidance Value (ug/L)	4/17/2008 (ug/L)
Bis(2-ethylhexyl) phthalate	5	**11**

MW-3 Exceedances of New York State TOGS 1.1.1		
Constituent	TOGS 1.1.1 Standard or Guidance Value (ug/L)	4/17/2008 (ug/L)
1,2-Dichlorobenzene	3	**21**
1,3-Dichlorobenzene	3	**34**
1,4-Dichlorobenzene	3	**25**
1,2-Dichloroethane	0.6	**0.7**
Chlorobenzene	5	**6**
cis-1,2-Dichloroethene	5	**13**

MW-08 Exceedances of New York State TOGS 1.1.1			
Constituent	TOGS 1.1.1 Standard or Guidance Value (ug/L)	6/16/2011 (ug/L)	6/16/2011 DUP (ug/L)
Magnesium	35,000	**502,000**	**507,000**
Sodium	20,000	**178,000**	**179,000**

MW-04 (B-137)
MW-05 (B-171)
MW-06 (B-150)
MW-11
MW-03 (B-147)
MW-07(B-194)
MW-01 (B-169)
MW-08 (B-197)
MW-09 (B-263)
MW-02 (B-170)
MW-1 (SB-5)
MW-2 (SB-8)
MW-10 (B-264)
MW-3 (SB-9)
MW-4 (SB-10)

WWTP A
WWTP B
WWTP C

Phase 1
Phase 2
Phase 3
Phase 4
Phase 5
Phase 6

Existing Electrical Substation

Proposed Electrical Substation

Legend:

- RI Monitoring Well
- Labella Monitoring Well (2008)
- Attempted Monitoring Well
- Norampac's No Dig Zone
- Greenpac Mill Proposed Building Outline
- Main Excavation Phases
- BCP Site Boundary
- Former Building Outline

Source: Aerial photography (April 2008) from New York State GIS Clearinghouse.

Data for all property lines, perimeters and building outlines were obtained from the MiniMill Technologies provided CAD files.

80 0 80 160 320

Figure 2-4 - Areas Exceeding Ambient Groundwater Quality Standards and Guidance Values

Greenpac Mill, LLC

NYSDEC BCP Site No. C932150

Niagara Falls, New York

ERM

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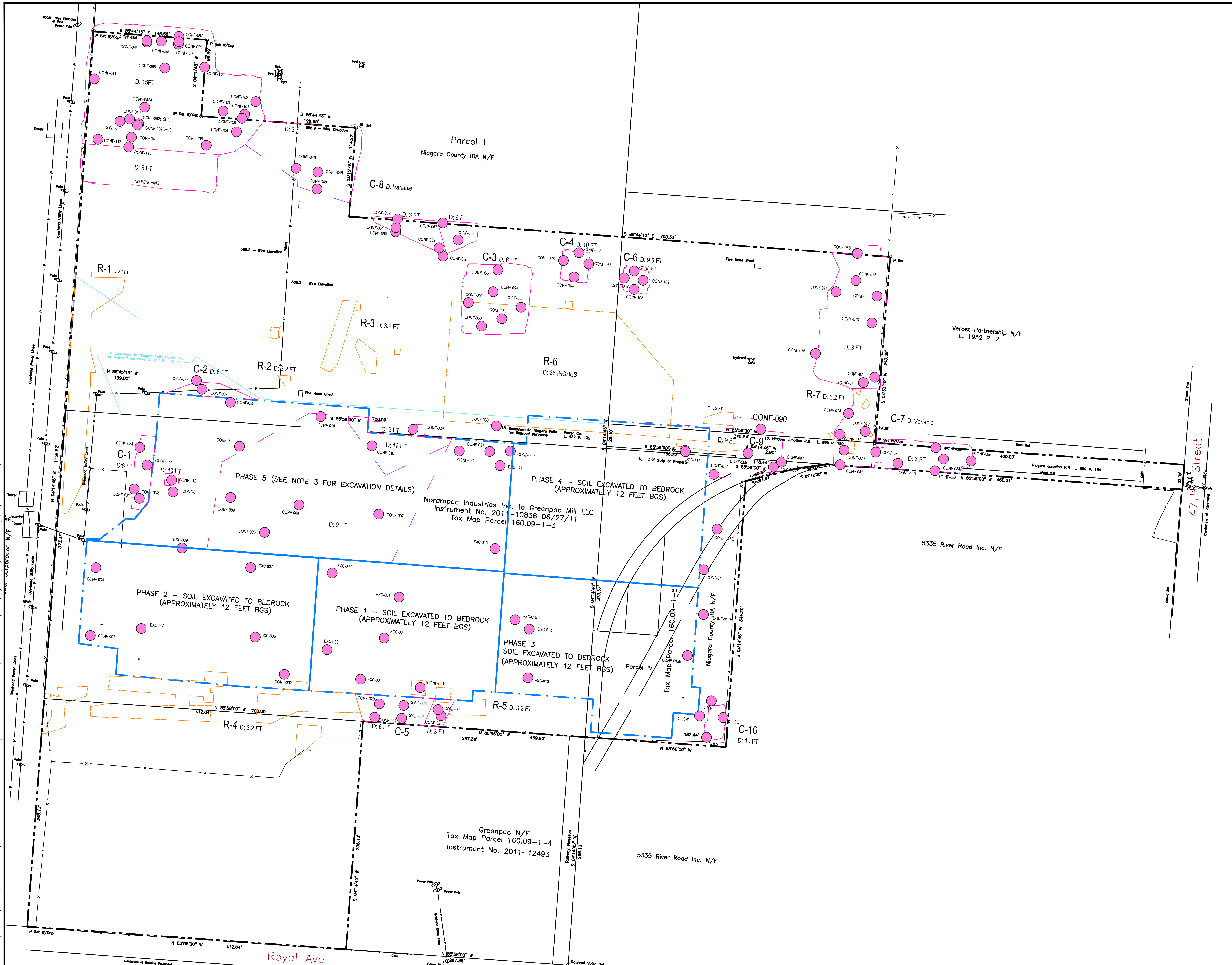

GRAPHIC SCALE

(IN FEET)
1 inch = 60 ft.

LEGEND

- MAIN EXCAVATION EXTENT
- PHASE BOUNDARY FOR MAIN EXCAVATION
- CHEMICAL HOTSPOT EXCAVATION EXTENT
- RADIOLOGICAL HOTSPOT EXCAVATION EXTENT
- D: X FT — FINAL EXCAVATION DEPTH
- CONF-000 — APPROXIMATE CONFIRMATION/EXCAVATION DOCUMENTATION SAMPLE LOCATION
- BCP BOUNDARY
- PROPERTY LINE
- FENCE LINE
- POWER POLE
- OVERHEAD UTILITY
- HYDRANT

NOTES:

1. ALL EXCAVATIONS GREATER THAN 4 FEET IN DEPTH WERE BENCHED AT APPROXIMATELY A 1:1 HORIZONTAL TO VERTICAL RATIO, UNLESS OTHERWISE INDICATED.
2. THE PRESENTED DEPTHS OF SOIL EXCAVATION BELOW THE GROUND SURFACE WERE BASED ON MODELED DATA FROM THE RI THAT UTILIZED APPROXIMATE SITE ELEVATIONS TO DESIGNATE THE DEPTH OF SOILS EXCEEDING SOIL CLEANUP OBJECTIVES. CONFIRMATION SAMPLES WERE TAKEN TO VERIFY THE FINAL EXCAVATION DEPTH WAS SUFFICIENT FOR REMOVAL OF IMPACTED SOIL.
3. THE PRESENTED MAIN EXCAVATION EXTENTS WERE DELINEATED FROM SURVEY DATA PERFORMED BY D.W. HANNIG. THE BOUNDARIES OF PHASE 1 THRU 5 WERE BASED ON FIELD MARKINGS BY MINIMILL. ALL SOIL WITHIN PHASES 1 THRU 4 OF THE MAIN EXCAVATION EXTENTS WAS REMOVED TO BEDROCK AT A DEPTH OF APPROXIMATELY 12 FEET. THE TARGET DEPTH WAS 6 FEET FOR PHASE 5. SOIL WAS REMOVED TO THE EXTENTS SHOWN TO ACHIEVE INDUSTRIAL SCOs IN THOSE AREAS OF PHASE 5. THESE EXTENTS WERE DELINEATED BASED ON FIELD MEASUREMENTS AND OBSERVATIONS RECORDED BY ERM AND MINIMILL. ADDITIONAL SOIL WAS REMOVED FROM PHASE 5 FOR STRUCTURAL PURPOSES AND THOSE EXTENTS ARE NOT PRESENTED.
4. THE PRESENTED CHEMICAL HOTSPOT EXTENTS WERE DELINEATED FROM FIELD MEASUREMENTS AND OBSERVATIONS RECORDED BY ERM.
5. THE PRESENTED RADIOLOGICAL HOTSPOT EXTENTS WERE DELINEATED FROM FIELD MEASUREMENTS RECORDED BY ERM AND FIELD MARKINGS BY MINIMILL.
6. CONFIRMATION AND DOCUMENTATION SAMPLE LOCATIONS WERE DOCUMENTED BY ERM USING GPS EQUIPMENT AND FIELD OBSERVATIONS.
7. THE BASE INFORMATION SHOWN HEREIN IS FROM AN ALTA/ASCM LAND TITLE SURVEY PREPARED BY D.W. HANNIG L.S., P.C., AND COMPLETED 08 MARCH 2011 AND REVISED ON 13 FEBRUARY 2012. ADDITIONAL FEATURES INCLUDING EXCAVATION EXTENTS, PHASE DELINEATION, AND CONFIRMATION SAMPLE LOCATIONS WERE PROVIDED BY ERM.

WARNING:

IT IS A VIOLATION OF THE NYS EDUCATION LAW ARTICLE 145 FOR ANY PERSON, UNLESS HE/SHE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS ITEM IN ANY WAY.

REV.	DATE	DESCRIPTION	BY	CHK
0	03/06/12	ORIGINAL ISSUE	MF	JM

DRAWN BY: DW HANNIG | CADD Review: MF | CHECKED BY: JM

Environmental Resources Management

ERM

GREENPAC MILL, LLC
NYSDEC BCP SITE NO. C932150
NIAGARA FALLS, NEW YORK

SOIL EXCAVATED FROM BCP BOUNDARY

SCALE	PROJECT NUMBER	DRAWING	REV.
AS NOTED		FIGURE 4-1	0

DATE: 03/06/12

USER: elizabeth.mikuckifle FILE: G:\Clients\Greenpac Mill LLC\0128439 – RI Implementation\RRM Construction Completion–AA Report\Figures\Figure 4-1.dwg\Layout1 Wed, 07 Mar 2012 – 11:52am

N

Packard Road

47th Street

Existing
Electrical Substation

Royal Ave

CONF-094
CONF-097
CONF-099
CONF-098
CONF-093
CONF-095
CONF-100
CONF-096
CONF-044
CONF-103
CONF-102
CONF-042A
CONF-043
CONF-101
CONF-046
CONF-106
CONF-042
CONF-092(6FT)
CONF-092(15FT)
CONF-104
CONF-047
CONF-041
CONF-112
CONF-113
CONF-105
CONF-049
CONF-045
CONF-048
CONF-062
CONF-057
CONF-061
CONF-060
CONF-059
CONF-056
CONF-065
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CONF-050
CONF-068
CONF-073
CONF-074
CONF-69
CONF-070
CONF-075
CONF-076
CONF-071
CONF-077
CONF-078
CONF-079
CONF-072
CONF-086
CONF 82
CONF-084
CONF-085
CONF-080
CONF-081
CONF-110
CONF-083
CONF-090
CONF-089
CONF-087
CONF-088
CONF-017
CONF-038
CONF-037
CONF-039
CONF-035
CONF-018
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CONF-021
CONF-020
CONF-010
CONF-022
EXC-011
CONF-034
CONF-011
CONF-033
CONF-012
CONF-006
CONF-031
CONF-032
CONF-009
CONF-008
CONF-007
CONF-005
EXC-010
CONF-016E
CONF-015
EXC-009
EXC-007
EXC-002
CONF-004
EXC-001
CONF-014E
EXC-015
EXC-012
CONF-013E
EXC-003
EXC-008
EXC-006
EXC-005
CONF-003
EXC-013
C-10N
C-10E
EXC-004
CONF-001
CONF-002
CONF-026
C-10W
CONF-028
CONF-027
CONF-024
C-10S
CONF-025
CONF-023

Legend:

- Confirmation or Excavation Documentation Soil Sample
- Greenpac Mill Proposed Building Outline
- Main Excavation Phases
- BCP Site Boundary
- ETA Area
- Main Excavation Extent
- Chemical Hotspot Excavation Extent

Notes:

1. The presented main excavation extents were delineated from survey data performed by D.W. Hannig. The main excavation was to a depth of 6 feet; supplemental excavations as presented were delineated from field measurements recorded by ERM and MiniMill Based on residential SCO contours.
2. The presented chemical hotspot extents were delineated from field measurements and observations recorded by ERM.
3. Documentation Sample Locations were documented by ERM using GPS equipment and field observation.
4. Aerial photography (April 2008) from New York State GIS Clearinghouse. Data for all property lines, perimeters and building outlines were obtained from MiniMill Technologies provided CAD files.

80 0 80 160 320

Figure 4-2 - Documentation & Confirmation Sample Location Map
Greenpac Mill, LLC
NYSDEC BCP Site No. C932150
Niagara Falls, New York

ERM

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