DECISION DOCUMENT

Riverview Innovation & Technology Campus
Brownfield Cleanup Program
Tonawanda, Erie County
Site No. C915353
August 2024

Prepared by
Division of Environmental Remediation
New York State Department of Environmental Conservation

DECLARATION STATEMENT - DECISION DOCUMENT

Riverview Innovation & Technology Campus
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Statement of Purpose and Basis

This document presents the remedy for the Riverview Innovation & Technology Campus site a brownfield cleanup site. The remedial program was chosen in accordance with the New York State Environmental Conservation Law and Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York (6 NYCRR) Part 375.

This decision is based on the Administrative Record of the New York State Department of Environmental Conservation (NYSDEC) for the Riverview Innovation & Technology Campus site and the public's input to the proposed remedy presented by NYSDEC.

Description of Selected Remedy

The elements of the selected remedy are as follows:

1. Remedial Design

A remedial design program will be implemented to provide the details necessary for the construction, operation, optimization, maintenance, and monitoring of the remedial program. Green remediation principles and techniques will be implemented to the extent feasible in the design, implementation, and site management of the remedy as per DER-31. The major green remediation components are as follows:

- Considering the environmental impacts of treatment technologies and remedy stewardship over the long term;
- Reducing direct and indirect greenhouse gases and other emissions;
- Increasing energy efficiency and minimizing use of non-renewable energy;
- Conserving and efficiently managing resources and materials;
- Reducing waste, increasing recycling and increasing reuse of materials which would otherwise be considered a waste;
- Maximizing habitat value and creating habitat when possible;
- Fostering green and healthy communities and working landscapes which balance ecological, economic and social goals;
- Integrating the remedy with the end use where possible and encouraging green and sustainable re-development; and
- Additionally, to incorporate green remediation principles and techniques to the extent feasible in the future development at this site, any future on-site buildings shall be constructed, at a minimum, to meet the 2020 Energy Conservation Construction Code of

New York (or most recent edition) to improve energy efficiency as an element of construction.

As part of the remedial design program, to evaluate the remedy with respect to green and sustainable remediation principles, an environmental footprint analysis will be completed. The environmental footprint analysis will be completed using an accepted environmental footprint analysis calculator such as SEFA (Spreadsheets for Environmental Footprint Analysis, USEPA), SiteWise(TM) (available in the Sustainable Remediation Forum [SURF] library) or similar NYSDEC accepted tool. Water consumption, greenhouse gas emissions, renewable and non-renewable energy use, waste reduction and material use will be estimated, and goals for the project related to these green and sustainable remediation metrics, as well as for minimizing community impacts, protecting habitats and natural and cultural resources, and promoting environmental justice, will be incorporated into the remedial design program, as appropriate. The project design specifications will include detailed requirements to achieve the green and sustainable remediation goals. Further, progress with respect to green and sustainable remediation metrics will be tracked during implementation of the remedial action and reported in the Final Engineering Report (FER), including a comparison to the goals established during the remedial design program.

Additionally, the remedial design program will include a climate change vulnerability assessment, to evaluate the impact of climate change on the project site and the proposed remedy. Potential vulnerabilities associated with extreme weather events (e.g., hurricanes, lightning, heat stress, and drought), flooding, and sea level rise will be identified, and the remedial design program will incorporate measures to minimize the impact of climate change on potential identified vulnerabilities.

2. Track 1 Excavation

Excavation of on-site soils from the Track 1 Perimeter Area (approximately 4.7 acres) which exceed unrestricted SCOs, as defined by 6 NYCRR Part 375-6.8. If a Track 1 cleanup is achieved, a Cover System will not be a required element of the remedy in this area. Collection and analysis of confirmation samples at the remedial excavation extents will be used to verify that unrestricted SCOs have been achieved in this area. If confirmation sampling indicates that unrestricted SCOs were not achieved at the stated remedial extents, the Applicant must notify NYSDEC, submit the sample results and, in consultation with NYSDEC, determine if further remedial excavation is necessary.

Excavated soil from this area which does not meet the criteria/conditions described in remedial elements 3, 4, or 5 may be used anywhere beneath the cover system described in remedial element 7 to backfill other excavations or re-grade the site.

Clean fill meeting the requirements of 6 NYCRR Part 375-6.7(d) will be used to replace the excavated soil as needed to establish the designed grades at the site.

3. Biotreatment

Biodegradation will be employed to treat approximately 13,400 tons of petroleum contamination in soil from the Heavy Equipment Maintenance/Oil House Area, TP-BCP-14 Area, Compressor

Building Fill Area, MW-BCP-19 Area, and Former Wastewater Treatment Tank Area. Soil that exhibits nuisance conditions (as defined in Commissioner Policy CP-51 Section G) related to petroleum contamination will be treated to remove these conditions. The biological breakdown of contaminants through aerobic respiration may be enhanced by treatment amendments. The exact treatment method will be finalized during the Remedial Design based on the results of the ST24 Bioremediation Interim Remedial Measures Work Plan [March 2023].

4. In-Situ Solidification

In-situ solidification (ISS) will be implemented to treat purifier waste residuals proximate to TP-BCP-35 (approximately 2,000 tons) and TP-BCP-46 (approximately 1,800 tons). The need for a surface soil cut to contain the increased soil volume created by the soil mixing or better access the targeted residuals will be determined in the Remedial Design. ISS is a process that binds the soil particles in place, creating a low permeability mass. The contaminated soil will be mixed in place, together with solidifying reagents or other binding reagents, using an excavator or augers. Portland cement is often used as the primary binder, although less carbon-intensive amendments will be considered. The soil and binding reagents are mixed to produce a solidified mass resulting in a low permeability monolith. Prior to the full implementation of this technology, bench-scale laboratory testing and on-site pilot scale studies will be conducted to define design parameters, amendment types, and dosages more clearly. Bench tests will consist of collecting soil from source areas and mixing with a variety of amendments and doses in a controlled atmosphere, followed by testing resulting hydraulic conductivity and unconfined-compressive strength. Pilot tests may be conducted using successful amendment mixes from the bench test prior to full scale design.

Typical design requirements are that solidified mass would produce a hydraulic conductivity of 1.0x10-6 cm/sec or less and would also result in an unconfined compressive strength of 50 psi or higher, pending future uses that may include construction above the solidified mass. The solidified mass will be covered with a cover system as described in remedial element 7 to prevent direct exposure to the solidified mass. The resulting solid matrix reduces or eliminates mobility of contamination and reduces or eliminates the matrix as a source of groundwater contamination.

5. In-Situ Solidification and Consolidation

In-situ solidification (ISS) will be implemented to treat up to 25,800 tons of soil exhibiting the following characteristics:

•grossly contaminated soil, as defined in 6 NYCRR Part 375-1.2(u), including material stockpiled in the Thaw Shed;
•soil exceeding the 6 NYCRR Part 371 hazardous waste criteria for benzene or other coking related constituents;
•soil containing viscous or mobile coal tar;
•non-aqueous phase liquids (NAPL);
•soil exceeding a site-specific protection of groundwater SCO for ammonia, to be developed during the remedial design; and
•soil with visual waste material or NAPL.

ISS is a process that mixes reagents with contaminated soil to physically modify the material to

meet remedial goals, allowing it to be placed back on-site. Under this process the contaminated soil will be mixed in-situ with solidifying agents, such as Portland Cement or lime-kiln dust, to reduce or eliminate the mobility and leachability of the above source materials. Prior to the full implementation of this technology, bench-scale laboratory testing and on-site pilot scale studies will be conducted to define design parameters, amendment types, and dosages more clearly. Bench-scale tests will consist of collecting soil from source areas and mixing it with a variety of amendments and doses in a controlled atmosphere, followed by testing to confirm the effectiveness of the amendments. Pilot tests will then be conducted using successful amendment mixes from the bench test prior to full scale design.

Treated soil will be placed in designated consolidation areas, as described in remedial element 6, after mixing to reduce the areal extent of treated materials across the site and simplify long-term monitoring and management. Samples of the mixed soil will be collected at a frequency determined in the Remedial Design and will be tested for toxicity characteristic leaching procedure (TCLP) and any other parameters determined during the Remedial Design.

6. Consolidation Areas

On-site materials described in remedial element 5 will be treated by ISS, excavated, consolidated on-site, and capped. The movement of some materials in the consolidation areas must be consistent with the United States Environmental Protection Agency's (USEPA) Area of Contamination Policy. The extent of the Area of Contamination will be defined in the Remedial Design. Additional solid wastes or soil exceeding the commercial SCOs may also be placed into the consolidation areas. Approximately 25,800 tons of material will be placed in the consolidation areas. The consolidation areas will be located in the former Production Area and will receive an engineered cap system designed, constructed, and maintained in conformance with the substantive requirements of 6 NYCRR Part 360 solid waste regulations. The upper 1 foot of the engineered cap must also meet the cover requirements of remedial element 7.

On-site soil which does not meet the criteria/conditions described in remedial elements 3, 4, or 5, or imported clean fill meeting the requirements of 6 NYCRR Part 375-6.7(d), will replace the excavated treated materials as needed to establish the designed grades at the site.

7. Site Cover

A site cover will be required in the Track 4 portion of the site where the upper one foot of exposed surface soil will exceed the applicable soil cleanup objectives (SCOs), to allow for future commercial use of the site. Where a soil cover is to be used it will be a minimum of one foot of soil placed over a demarcation layer, with the upper soil of sufficient quality to maintain a vegetative layer. Soil cover material, including any fill material brought to the site, will meet the SCOs for cover material for the use of the site as set forth in 6 NYCRR Part 375-6.7(d). Substitution of other materials and components may be allowed where such components already exist or are a component of the tangible property to be placed as part of site redevelopment. Such components may include, but are not necessarily limited to pavement, concrete, paved surface parking areas, sidewalks, building foundations and building slabs.

Where a soil cover is required over the ISS treatment area (remedial element 4), the remedial design will strive to maximize the soil thickness to be at least four feet to protect the ISS area

from the freeze-thaw cycle, except in areas where design grades or access restriction prevent this thickness. The soil cover may not be less than one foot in thickness. The upper one foot will meet the SCOs for cover material for the use of the site as set forth in 6 NYCRR Part 375-6.7(d). A building and its foundation are considered suitable cover to protect the ISS treatment area. Where a building and its foundation are considered part of the site cover, the ISS design should include considerations for drainage between the ISS and building foundation and the potential need to design the ISS for a higher strength. For areas where solidified material underlies the cover, the solidified material itself will serve as the demarcation layer due to the nature of the material.

8. Groundwater Collection and Treatment

Groundwater collection and treatment will be implemented to treat residual contamination in groundwater in the northwestern portion of the site and to ensure that contaminated groundwater does not migrate off-site. The groundwater extraction system will be designed and installed so that the capture zone is sufficient to cover the areal and vertical extent of remaining contamination and surround the consolidation areas described in remedial element 6. The extraction system will be designed to create a depression of the water table so that contaminated groundwater is directed towards collection trenches within portions of the Production and North Rail Areas to capture groundwater present in the fill unit.

Further details of the extraction system will be determined during the Remedial Design, considering the results of the Groundwater IRM Work Plan, West Production Area (December 2021). The extracted groundwater will be treated to remove NAPL, coal tar, VOCs, cyanide, ammonia, mercury, and any other contaminants of concern. The operation of the collection and treatment system will continue until the remedial objectives have been achieved, or until NYSDEC determines that continued operation is technically impracticable or not feasible.

9. Utility Closure

Historical utilities that exist at the site will be removed or closed in place to eliminate potential contaminant migration pathways. These utilities include, but are not limited to, the north-south sewer, the box culvert, the Mansion sump, the north storm sewer, former gas supply and distribution lines, process piping, and infrastructure related to the current stormwater management system.

10. Interim Remedial Measure Completion

Many interim remedial measures (IRMs) are in progress and may not be completed before the start of remedial action. The completion of the following IRMs will be part of the overall site remedy, unless the IRM is superseded by the Remedial Design:

- Interim Site Management Work Plan [April 2020];
- Stormwater Pollution Prevention Plan [May 2020];
- Aboveground Storage Tank Management Interim Remedial Measures Work Plan [January 2021];
- CBS and PBS Tank Closure Work Plan [April 2021];
- Secondary Containment IRM Work Plan - Closure [May 2021)];
- Lime Still - IRM Work Plan [October 2021];
- Groundwater IRM Work Plan, West Production Area [December 2021];

- Process Equipment Removal Interim Remedial Measures Work Plan [July 2022];
- ST24 Bioremediation Interim Remedial Measures Work Plan [September 2022];
- Revised Non-Aqueous Phase Liquid Response, East End of Coal Yard Tunnel Conveyor Control and Junction Building [January 2023]; and
- Source Area Solidification Interim Measure Work Plan [October 2023].

11. Easement

Imposition of an institutional control in the form of an environmental easement for the controlled property not included in the Track 1 Area (see remedial element 2) which will:

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

12. Site Management Plan

A Site Management Plan is required, which includes the following:

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

Institutional Controls: The environmental easement discussed in remedial element 11.
Engineering Controls: The ISS areas discussed in remedial element 4, the consolidation areas discussed in remedial element 6, the soil cover discussed in remedial element 7, and the groundwater collection and treatment system discussed in remedial element 8.

This plan includes, but may not be limited to:

- o an Excavation Plan which details the provisions for management of future excavations in areas of remaining contamination;
- o descriptions of the provisions of the environmental easement including any land use and groundwater restrictions;
- o a provision for evaluation of the potential for soil vapor intrusion for any occupied buildings on the site, including provision for implementing actions recommended to address exposures related to soil vapor intrusion;
- o a provision that should a building foundation or building slab be removed in the future, a cover system consistent with that described in remedial element 7 will be placed in any areas where the upper one foot of exposed surface soil exceeds the applicable soil cleanup objectives (SCOs);
- o provisions for the management and inspection of the identified engineering controls;
- o maintaining site access controls and NYSDEC notification; and
- o the steps necessary for the periodic reviews and certification of the institutional and/or engineering controls.

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

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

c. an Operation and Maintenance (O&M) Plan to ensure continued operation, maintenance, optimization, monitoring, inspection, and reporting of any mechanical or physical components of the remedy. The plan includes, but is not limited to:

- procedures for operating and maintaining the remedy;
- compliance monitoring of treatment systems to ensure proper O&M as well as providing the data for any necessary permit or permit equivalent reporting;
- maintaining site access controls and NYSDEC notification; and
- providing the NYSDEC access to the site and O&M records.

Declaration

The remedy conforms with promulgated standards and criteria that are directly applicable, or that are relevant and appropriate and takes into consideration NYSDEC guidance, as appropriate. The remedy is protective of public health and the environment.

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Date

Michael Cruden, Director
Remedial Bureau E

DECISION DOCUMENT

Riverview Innovation & Technology Campus
Tonawanda, Erie County
Site No. C915353
August 2024

SECTION 1: SUMMARY AND PURPOSE

The New York State Department of Environmental Conservation (NYSDEC), in consultation with the New York State Department of Health (NYSDOH), has selected a remedy for the above referenced site. The disposal of contaminants at the site has resulted in threats to public health and the environment that would be addressed by the remedy. The disposal or release of contaminants at this site, as more fully described in this document, has contaminated various environmental media. Contaminants include hazardous waste and/or petroleum.

The New York State Brownfield Cleanup Program (BCP) is a voluntary program. The goal of the BCP is to enhance private-sector cleanups of brownfields and to reduce development pressure on "greenfields." A brownfield site is real property, where a contaminant is present at levels exceeding the soil cleanup objectives or other health-based or environmental standards, criteria or guidance, based on the reasonably anticipated use of the property.

NYSDEC has issued this document in accordance with the requirements of New York State Environmental Conservation Law and 6 NYCRR Part 375. This document is a summary of the information that can be found in the site-related reports and documents.

SECTION 2: CITIZEN PARTICIPATION

NYSDEC seeks input from the community on all remedies. A public comment period was held, during which the public was encouraged to submit comment on the proposed remedy. All comments on the remedy received during the comment period were considered by NYSDEC in selecting a remedy for the site. Site-related reports and documents were made available for review by the public at the following document repositories:

DECInfo Locator - Web Application
https://gisservices.dec.ny.gov/gis/dil/index.html?rs=C915353

Buffalo and Erie County Public Library- Kenmore Branch
Attn: Mary Muscarella
160 Delaware Rd
Kenmore, NY 14217
Phone: (716) 873-2842

Buffalo and Erie County Public Library- Central
Attn: April Tompkins
One Lafayette Square
Buffalo, NY 14203
Phone: 716-858-8900

Receive Site Citizen Participation Information By Email

Please note that NYSDEC's Division of Environmental Remediation (DER) is "going paperless" relative to citizen participation information. The ultimate goal is to distribute citizen participation information about contaminated sites electronically by way of county email listservs. Information will be distributed for all sites that are being investigated and cleaned up in a particular county under the State Superfund Program, Environmental Restoration Program, Brownfield Cleanup Program and Resource Conservation and Recovery Act Program. We encourage the public to sign up for one or more county listservs at http://www.dec.ny.gov/chemical/61092.html

SECTION 3: SITE DESCRIPTION AND HISTORY

Site Location: The approximately 86.46-acre Riverview Innovation & Technology Campus site is located in a commercial/industrial area at 3875 River Road in the Town of Tonawanda, Erie County. The site is bound by the Huntley fly-ash landfill and vacant property to the north, railroad and utility property to the east, the 3821 River Road Inc. Site (Site No. C915003) and utility property to the south, and Vanocur Refractories and Swift River Associates to the west.

Site Features: The site is a former coke production facility with coke ovens, coke by-products plant, storage tanks, maintenance buildings, boiler house, and coal/coke handling infrastructure previously located in the north-central portion of the site. Most of these historic features were demolished in 2021/22. The southern portion of the site is mainly open area formerly used to store coal and coke piles. The eastern portion of the site was used for outdoor storage of miscellaneous materials.

The site is adjacent to the Operable Units 1 and 2 of the Tonawanda Coke (Site No. 915055) inactive hazardous waste disposal site.

Current Zoning and Land Use: The site is zoned for industrial use and is largely vacant. On-site activities are limited to those needed to support the investigation and remediation of the site.

The surrounding parcels are zoned for commercial or industrial use. The nearest residential area is located approximately 0.4-miles south of the site.

Past Use of the Site: The facility produced metallurgical coke and associated by-products from 1917 until 2018. The facility was owned and operated from 1917 through 1947 by Semet Solvay Company, a subsidiary of Allied Chemical and Dye corporation. In 1947, Semet Solvay Company was merged into Allied Chemical Corporation, which owned and operated the facility until January 1978 when it was sold to the Tonawanda Coke Corporation.

The Tonawanda Coke Corporation operated the facility until it filed for bankruptcy protection in 2018 and all manufacturing on the property was shut down. In September 2019 the bankruptcy court approved the sale of the property to Riverview Innovation & Technology Campus, Inc.

Historically, manufacturing processes used at the plant included: by-products coking; light oil distillation; ammonia recovery; and benzene, toluene, and xylene extraction. Coke was produced from coal by the removal of gasses, liquids (oils), and tar by heating the coal in the absence of oxygen. The resulting carbon "coke" material was used, among other things, for the production of steel. The extracted coke oven gas was used to heat subsequent coking operations or sold as fuel. The liquids and tars were conveyed through pipes to a by-products facility, where they were processed for sale or separated for disposal.

Site Geology and Hydrogeology: Fill material of varying thickness is present over the entire site as the uppermost stratigraphic unit. The fill consists mainly of silt, gravel, cinders, slag, coke, and coke breeze (fine particles of coke). Other industrial wastes are also encountered in the fill. Underlying the fill is a native deposit comprised primarily of red-brown clay, with some silt and gravel lenses, that underlies the entire site. The native clay unit is approximately 45 feet thick, though this varies across the site. Camillus shale bedrock is present directly below the clay unit between 50 and 54 feet below ground surface.

The groundwater at the site occurs in multiple units at the site, with the shallowest groundwater typically within 5-feet of the ground surface. The upper groundwater is perched in the fill on the surface of the clay layer. The fill groundwater is not continuous across the site, varying based on the properties of the fill and topography of the underlying clay. In some areas of the site, the perched fill zone is dry.

The clay unit is an aquitard, limiting the horizontal and vertical migration potential of the groundwater. The hydraulic conductivity in the clay is on the order of 2.1 X 10^-8 centimeters per second. Horizontal flow is to the west or southwest, though actual flow rates are expected to be low based on the low hydraulic conductivity. Very limited vertical mixing between the fill and clay groundwater zones has been observed.

The bedrock groundwater flows to the west.

Surface water at the site is limited to stormwater flow, which is managed through various engineered structures.

A site location map is attached as Figure 1.

SECTION 4: LAND USE AND PHYSICAL SETTING

NYSDEC may consider the current, intended, and reasonably anticipated future land use of the site and its surroundings when evaluating a remedy for soil remediation. For this site, alternatives (or an alternative) that restrict(s) the use of the site to commercial use (which allows for industrial use) as described in Part 375-1.8(g) were/was evaluated in addition to an

alternative which would allow for unrestricted use of the site.

A comparison of the results of the Remedial Investigation (RI) to the appropriate standards, criteria and guidance values (SCGs) for the identified land use and the unrestricted use SCGs for the site contaminants is available in the RI Report.

SECTION 5: ENFORCEMENT STATUS

The Applicant(s) under the Brownfield Cleanup Agreement is a/are Volunteer(s). The Volunteer(s) does/do not have an obligation to address off-site contamination. NYSDEC has determined that this site poses a significant threat to human health and the environment but there are no off-site impacts that require remedial activities; accordingly, enforcement actions are not necessary.

Areas of the former Tonawanda Coke facility that are not part of the BCP site are subject to investigation and remediation under the State Superfund (SSF) program as Tonawanda Coke (Site No. 915055). Honeywell International, Inc. signed a consent order in February 2020 to complete these activities under NYSDEC and NYSDOH oversight.

SECTION 6: SITE CONTAMINATION

6.1: Summary of the Remedial Investigation

A remedial investigation (RI) serves as the mechanism for collecting data to:

- characterize site conditions;
- determine the nature of the contamination; and
- assess risk to human health and the environment.

The RI is intended to identify the nature (or type) of contamination which may be present at a site and the extent of that contamination in the environment on the site, or leaving the site. The RI reports on data gathered to determine if the soil, groundwater, soil vapor, indoor air, surface water or sediments may have been contaminated. Monitoring wells are installed to assess groundwater and soil borings or test pits are installed to sample soil and/or waste(s) identified. If other natural resources are present, such as surface water bodies or wetlands, the water and sediment may be sampled as well. Based on the presence of contaminants in soil and groundwater, soil vapor will also be sampled for the presence of contamination. Data collected in the RI influence the development of remedial alternatives. The RI report is available for review in the site document repository and the results are summarized in section 6.3.

The analytical data collected on this site includes data for:

- groundwater
- surface water
- soil
- sediment

6.1.1: Standards, Criteria, and Guidance (SCGs)

The remedy must conform to promulgated standards and criteria that are directly applicable or that are relevant and appropriate. The selection of a remedy must also take into consideration guidance, as appropriate. Standards, Criteria and Guidance are hereafter called SCGs.

To determine whether the contaminants identified in various media are present at levels of concern, the data from the RI were compared to media-specific SCGs. NYSDEC has developed SCGs for groundwater, surface water, sediments, and soil. The NYSDOH has developed SCGs for drinking water and soil vapor intrusion. For a full listing of all SCGs see: http://www.dec.ny.gov/regulations/61794.html

6.1.2: RI Results

The data have identified contaminants of concern. A "contaminant of concern" is a contaminant that is sufficiently present in frequency and concentration in the environment to require evaluation for remedial action. Not all contaminants identified on the property are contaminants of concern. The nature and extent of contamination and environmental media requiring action are summarized below. Additionally, the RI Report contains a full discussion of the data. The contaminant(s) of concern identified at this site is/are:

naphthalene	petroleum products
toluene	benzene
xylenes (mixed)	polycyclic aromatic hydrocarbons (PAHS)
coal tar	ethylbenzene
cyanide	arsenic
ammonia	cresol(s)
mercury	phenol

The contaminant(s) of concern exceed the applicable SCGs for:

- groundwater
- soil

6.2: Interim Remedial Measures

An interim remedial measure (IRM) is conducted at a site when a source of contamination or exposure pathway can be effectively addressed before issuance of the Decision Document.

The following IRMs have been completed at this site based on conditions observed during the RI:

Mixing Pad Cleaning IRM

The Mixing Pad is a concrete structure that was used for the mixing of coal tar decanter sludge (hazardous waste code: K087) with coal prior to recycling in the coke production process.

Remaining solids and water were removed from the mixing pad for treatment or off-site disposal, and the remaining concrete surface was decontaminated to remove any hazardous waste residuals. IRM activities included:

- Collection and treatment of 300,000 gallons of impacted water. Treated water was discharged under permit to the Town of Tonawanda Publicly Owned Treatment Works (POTW);
- Blasting the concrete surface with dry-ice and garnet mixture to remove hazardous waste residuals;
- Inspection of cleaned surface to confirm integrity of the mixing pad slab and effectiveness of cleaning; and
- Off-site disposal of 54.97 tons of solid residuals as hazardous waste.

The details of the IRM are documented in a July 2021 Construction Completion Report (CCR).

Tank and Pipe Management

Historic water supply and wastewater discharge pipes are present in the northwestern portion of the site. The location of these pipes was confirmed during the IRM and all pipes were cut and plugged. IRM activities included:

- Collection and treatment of 2,000 gallons of water removed from around the pipes. Treated water was discharged under permit to the Town of Tonawanda POTW;
- Cutting and removing at least two feet of pipe near the site boundary; and
- Sealing the upstream and downstream end of the pipe cuts with bricks and hydraulic cement.

The details of the IRM are documented in a July 2021 Construction Completion Report (CCR).

6.3: Summary of Environmental Assessment

This section summarizes the assessment of existing and potential future environmental impacts presented by the site. Environmental impacts may include existing and potential future exposure pathways to fish and wildlife receptors, wetlands, groundwater resources, and surface water. The RI report presents a detailed discussion of any existing and potential impacts from the site to fish and wildlife receptors.

During the remedial investigation soil, groundwater, and sediments were analyzed for ammonia, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), metals, cyanide, polychlorinated biphenyls (PCBs), per- and polyfluoroalkyl substances (PFAS), and pesticides to varying degrees. Storm water from pre-existing outfalls has been sampled for ammonia, VOCs, SVOCs, metals, and cyanide on a regular basis according to the Stormwater Pollution Prevention Plan [May 2020]. Based upon investigations conducted to date, the primary contaminants of concern for the site are benzene, toluene, ethylbenzene, total xylenes, naphthalene, phenol, cresols, polycyclic aromatic hydrocarbons (PAHs), arsenic, mercury, cyanide, and ammonia. Coal tars, petroleum products, and other non-aqueous phase liquids (NAPLs) are also present in portions of the site.

Soil: due to the past use of the site, the entire ground surface is covered with various types of fill

material, ranging in depth from 4 to 10 feet below ground surface (bgs). Therefore, the typical distinction between 'surface soil' and 'subsurface soil' is less useful at this site as a significant portion of upper site soils consists almost exclusively of fill. Instead, the soil data was divided between those in the fill unit and those in native silty-clay unit, as summarized below.

Fill Material: one hundred twenty samples of fill were collected from eighty-three distinct locations at depths ranging from 2 inches below ground surface (bgs) to approximately 6 feet bgs. Exceedances of commercial soil cleanup objectives (SCOs) for PAHs are widespread across the site due to the prevalence of coke breeze/coal dust across the site. Exceedances of commercial SCOs for arsenic and cyanide are also present, but not as widespread as PAH impacts. Areas of fill where coking process wastes (NAPL, viscous coal tar, purifier waste, or light oil) are present contain notably higher levels of contamination than those areas of fill without. Areas of petroleum contamination have also been identified in areas formerly used for the storage or use of petroleum products.

Fill material containing coking process wastes tends to impact on-site groundwater, and the protection of groundwater SCOs for benzene, ethyl benzene, toluene, total xylenes, naphthalene, phenol, cresols, and cyanide are exceeded in certain areas of the site where these wastes are present. These exceedances of the protection of groundwater SCOs are attributed to the waste present in the subsurface rather than the availability of contaminants from the fill matrix. Mercury was also detected exceeding its protection of groundwater SCO at a notable number of locations in the fill, but these exceedances only corresponded to mercury exceeding its groundwater quality standard (GWQS) at one location. Therefore, the protection of groundwater SCO for mercury is not considered applicable at the site. The following is a summary of the contaminants of concern detected:

- Benzene: up to 23 parts per million (ppm), CSCO 44 ppm, PGWSCO 0.06 ppm;
- Ethylbenzene: up to 4 ppm, CSCO 390 ppm, PGWSCO 1 ppm;
- Toluene: up to 18 ppm, CSCO 500 ppm, PGWSCO 0.7 ppm;
- Total Xylenes: up to 18.4 ppm, CSCO 500 ppm, PGWSCO 1.6 ppm;
- O-Cresol: up to 15 ppm, CSCO 500 ppm, PGWSCO 0.33 ppm;
- M&P-Cresols: up to 19 ppm, CSCO 500 ppm, PGWSCO 0.33 ppm;
- Phenol: up to 13 ppm, CSCO 500 ppm, PGWSCO 0.33 ppm;
- Naphthalene: up to 1900 ppm, CSCO 500 ppm, PGWSCO 12 ppm;
- Anthracene: up to 580 ppm, CSCO 500 ppm;
- Benzo(a)anthracene: up to 470 ppm, CSCO 5.6 ppm;
- Benzo(a)pyrene: up to 680 ppm, CSCO 1 ppm;
- Benzo(b)fluoranthene: up to 600 ppm, CSCO 5.6 ppm;
- Benzo(k)fluoranthene: up to 230 ppm, CSCO 56 ppm;
- Chrysene: up to 450 ppm, CSCO 56 ppm;
- Dibenz(a,h)anthracene: up to 100 ppm, CSCO 0.56 ppm;
- Dibenzofuran: up to 370 ppm, CSCO 350 ppm;
- Fluoranthene: up to 1500 ppm, CSCO 500 ppm;
- Fluorene: up to 580 ppm, CSCO 500 ppm;
- Indeno(1,2,3-c,d)pyrene: up to 480 ppm, CSCO 5.6 ppm;
- Phenanthrene: up to 1900 ppm, CSCO 500 ppm;

- Pyrene: up to 1100 ppm, CSCO 500 ppm;
- Arsenic: up to 48.6 ppm, CSCO 16 ppm;
- Mercury: up to 16.8 ppm, CSCO 2.8 ppm; and
- Cyanide: up to 549 ppm, CSCO 27 ppm, PGWSCO 40 ppm.

Native Clay: one hundred twelve samples of clay were collected from fifty-one distinct locations at depths ranging from 2 feet bgs to approximately 64.5 feet bgs. Exceedances of commercial SCOs were extremely limited, with only a few detections of various PAHs, arsenic, mercury, and cyanide above commercial SCOs. These locations were from areas of the upper clay that had been previously disturbed or where vertical desiccation cracks in the clay allowed for migration of contamination from the overlying fill. Impacts to the native clay have not been observed beyond 8 to 10 feet bgs, except in one location.

The protection of groundwater SCOs for benzene, ethyl benzene, toluene, total xylenes, naphthalene, phenol, cresols, and cyanide are only exceeded in two areas of the site (MW-BCP-05 and MW-BCP-13) where the relatively deep impacts to the native clay are present. As with the fill unit, this is attributed to the presence of coking process wastes at these locations. The following is a summary of the contaminants of concern detected:

- Benzene: up to 20 ppm, CSCO 44 ppm, PGWSCO 0.06 ppm;
- Ethylbenzene: up to 22 ppm, CSCO 390 ppm, PGWSCO 1 ppm;
- Toluene: up to 25 ppm, CSCO 500 ppm, PGWSCO 0.7 ppm;
- Total Xylenes: up to 58 ppm, CSCO 500 ppm, PGWSCO 1.6 ppm;
- O-Cresol: up to 4.9 ppm, CSCO 500 ppm, PGWSCO 0.33 ppm;
- M&P-Cresols: up to 9.7 ppm, CSCO 500 ppm, PGWSCO 0.33 ppm;
- Phenol: up to 2.8 ppm, CSCO 500 ppm, PGWSCO 0.33 ppm;
- Naphthalene: up to 15000 ppm, CSCO 500 ppm, PGWSCO 12 ppm;
- Acenaphthene: up to 1200 ppm, CSCO 500 ppm;
- Acenaphthylene: up to 1200 ppm, CSCO 500 ppm;
- Anthracene: up to 1200 ppm, CSCO 500 ppm;
- Benzo(a)anthracene: up to 1100 ppm, CSCO 5.6 ppm;
- Benzo(a)pyrene: up to 1100 ppm, CSCO 1 ppm;
- Benzo(b)fluoranthene: up to 1100 ppm, CSCO 5.6 ppm;
- Benzo(g,h,i)perylene: up to 660 ppm, CSCO 500 ppm;
- Benzo(k)fluoranthene: up to 430 ppm, CSCO 56 ppm;
- Chrysene: up to 950 ppm, CSCO 56 ppm;
- Dibenz(ah)anthracene: up to 140 ppm, CSCO 0.56 ppm;
- Dibenzofuran: up to 1200 ppm, CSCO 350 ppm;
- Fluoranthene: up to 3400 ppm, CSCO 500 ppm;
- Fluorene: up to 150 ppm, CSCO 500 ppm;
- Indeno(1,2,3-c,d)pyrene: up to 650 ppm, CSCO 5.6 ppm;
- Phenanthrene: up to 5000 ppm, CSCO 500 ppm;
- Pyrene: up to 2600 ppm, CSCO 500 ppm;
- Arsenic: up to 32.7 ppm, CSCO 16 ppm;
- Mercury: up to 5.1 ppm, CSCO 2.8 ppm; and
- Cyanide: up to 1160 ppm, CSCO 27 ppm, PGWSCO 40 ppm.

Investigation results indicate that site contaminants in soil have limited potential to horizontally migrate on-site due to the discontinuous nature of the fill and the relatively discrete areas of coking process waste disposal. Vertical migration is extremely limited due to the thickness and low permeability of the native clay. Off-site migration of contaminants in soil along the site boundary has not been observed.

Groundwater: Samples were collected from monitoring wells in four different water bearing zones installed to the following general depths: Zone A from 2 to 5 feet bgs in the fill (24 wells), Zone B from 10 to 20 feet bgs in the clay (17 wells), Zone C from 30 to 40 feet bgs in the clay (9 wells), and Zone D in the bedrock greater than 53 feet bgs (4 wells). The exact depth of the monitoring wells was determined based on the observed geology and field indicators.

Zone A: groundwater impacts in Zone A were generally collocated to areas where fill contamination or coking process wastes were present. The most significant impacts have been observed in the former byproducts processing area in the northwest portion of the site. Isolated impacts in the coal/coke yards are also present due to the historic disposal or release of coking process wastes. Where impacts are present, GWQS are most commonly exceeded for benzene, ethyl benzene, toluene, xylenes, naphthalene, phenol, cresols, mercury, cyanide, and ammonia. PAHs detected exceeding GWQS are not considered mobile in groundwater except in areas of coal tar impacts. Both light non-aqueous phase liquid (LNAPL) and dense non-aqueous phase liquid (DNAPL) have been observed in two monitoring wells located in the former byproducts processing area.

The following is a summary of the contaminants of concern in this groundwater zone:

- Benzene: up to 5000 parts per billion (ppb), GWQS 1 ppb;
- Ethylbenzene: up to 190 ppb, GWQS 5 ppb;
- Toluene: up to 2100 ppb, GWQS 5 ppb;
- Total Xylenes: up to 1480 ppb, GWQS 5 ppb;
- O-Cresol: up to 3800 ppb, no GWQS;
- M&P-Cresols: up to 5900 ppb, no GWQS;
- Phenol: up to 2300 ppb, GWQS 1 ppb;
- Naphthalene: up to 14000 ppb, GWQS 10 ppb;
- Mercury: up to 4.6 ppb, GWQS 0.7 ppb;
- Cyanide: up to 751000 ppb, GWQS 200 ppb; and
- Ammonia: up to 254000 ppb, GWQS 2000 ppb.

Zone B: groundwater impacts in Zone B are similar to those in Zone A, but limited in extent where contamination is most significant or vertical migration was possible due to desiccation cracks in the native clay. Where impacts are present, GWQS are most commonly exceeded for benzene, ethyl benzene, toluene, xylenes, naphthalene, phenol, cresols, mercury, cyanide, and ammonia. PAHs detected exceeding GWQS are not considered mobile in groundwater except in areas of coal tar impacts.

The following is a summary of the contaminants of concern in this groundwater zone:

- Benzene: up to 1300 parts per billion (ppb), GWQS 1 ppb;

- Ethylbenzene: up to 78 ppb, GWQS 5 ppb;
- Toluene: up to 970 ppb, GWQS 5 ppb;
- Total Xylenes: up to 1340 ppb, GWQS 5 ppb;
- O-Cresol: up to 340 ppb, no GWQS;
- M&P-Cresols: up to 880 ppb, no GWQS;
- Phenol: up to 95 ppb, GWQS 1 ppb;
- Naphthalene: up to 19000 ppb, GWQS 10 ppb;
- Mercury: up to 9.4 ppb, GWQS 0.7 ppb;
- Cyanide: up to 6230 ppb, GWQS 200 ppb; and
- Ammonia: up to 2490 ppb, GWQS 2000 ppb.

Zone C: groundwater impacts to Zone C are nonexistent except for singular exceedances of the GWQS for phenol and cyanide at one location each. Some metals are present in the Zone C groundwater, but they are not attributable to the contamination at the site, nor are they present in dissolved samples of groundwater.

The following is a summary of the contaminants of concern in this groundwater zone:
- Phenol: up to 3.2 ppb, GWQS 1 ppb; and
- Cyanide: up to 1680 ppb, GWQS 200 ppb.

Zone D: there are no impacts from the site to the Zone D groundwater. Some metals are present in the Zone D groundwater, but they are not attributable to the contamination at the site, nor are they present in dissolved samples of groundwater.

Investigation results indicate that site contaminants are not migrating off-site via groundwater flow in any of the monitored water bearing zones. Contaminated Zone A groundwater is capable of infiltrating existing stormwater infrastructure in the former byproducts processing area resulting in potential off-site migration of groundwater contamination via stormwater.

Stormwater: as part of the Stormwater Pollution Prevention Plan stormwater samples are collected from Outfall 001 (process area), Outfall 002 (coal and coke yards), and Outfall 004 (combined flow of Outfall 001 and Outfall 002). Ammonia, cyanide, and mercury have frequently been detected in excess of their action levels at Outfall 001, and to a lesser extent at Outfall 004. Many corrective measures have been implemented to improve stormwater quality, with mixed results. The following is a summary of the above contaminants:

- Ammonia: action level 1.5 ppm, Outfall 001 max 9.82 ppm, Outfall 002 max 4 ppm, Outfall 004 max 5.61 ppm;
- Cyanide: action level 0.03 ppm, Outfall 001 max 0.2 ppm, Outfall 002 max 0.0255 ppm, Outfall 004 max 0.0372 ppm; and
- Mercury: action level 50 parts per trillion (ppt), Outfall 001 max 1400 ppt, Outfall 002 max 41.2 ppt, Outfall 004 max 370 ppt.

Based on the monitoring completed to date, off-site migration of site contaminants from the Outfall 001 drainage area remains possible.

Sediments: six sediment samples were collected from six locations, the majority being from the on-site stormwater management ponds in the coal and coke yards. These stormwater management ponds were constructed into the existing fill while Tonawanda Coke was still in operation. The remaining samples were collected from surface areas adjacent to a primarily off-site state wetland.

Because the sediment samples were collected from either fill material in constructed stormwater management infrastructure or surface materials that are not normally submerged the results have been compared to the commercial SCOs. Very limited impacts were detected in the sediments, with only benzo(a)pyrene (a PAH) and arsenic detected exceeding their commercial SCOs at two and one location, respectively. The following is a summary of the contaminants of concern detected above CSCOs:

- Benzo(a)pyrene: up to 1.3 ppm, CSCO 1 ppm; and
- Arsenic: up to 21.3 ppm, CSCO 16 ppm.

There are no natural sediments present at the site. Investigation results indicate that site contaminants are not migrating off-site via sediment transport.

6.4: Summary of Human Exposure Pathways

This human exposure assessment identifies ways in which people may be exposed to site-related contaminants. Chemicals can enter the body through three major pathways (breathing, touching or swallowing). This is referred to as *exposure*.

Access is restricted by a fence. However, people who enter may come into contact with exposed hazardous waste source materials at the surface and contaminants in soil and groundwater by walking on the site, digging or otherwise disturbing the surface. Contaminated groundwater at the site is not used for drinking or other purposes and the site is served by a public water supply that obtains water from a different source not affected by this contamination. Volatile organic compounds in soil vapor (air spaces within the soil) may move into buildings and affect the indoor air quality. This process, which is similar to the movement of radon gas from the subsurface into the indoor air of buildings, is referred to as soil vapor intrusion. The site is mostly vacant so inhalation of site contaminants in indoor air via vapor intrusion is not a current concern. However, the potential exists for inhalation of site contaminants due to soil vapor intrusion for any future on site development. Environmental sampling indicates soil vapor intrusion, as a result of this site, is not a concern for off-site buildings.

6.5: Summary of the Remediation Objectives

The objectives for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375. The goal for the remedial program is to restore the site to pre-disposal conditions to the extent feasible. At a minimum, the remedy shall eliminate or mitigate all significant threats to public health and the environment presented by the contamination identified at the site through the proper application of scientific and engineering principles.

The remedial action objectives for this site are:

Groundwater

RAOs for Public Health Protection

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

RAOs for Environmental Protection

- Restore ground water aquifer to pre-disposal/pre-release conditions, to the extent practicable.
- Prevent the discharge of contaminants to surface water.
- Remove the source of ground or surface water contamination.

Soil

RAOs for Public Health Protection

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

RAOs for Environmental Protection

- Prevent migration of contaminants that would result in groundwater or surface water contamination.

Soil Vapor

RAOs for Public Health Protection

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

SECTION 7: ELEMENTS OF THE SELECTED REMEDY

The alternatives developed for the site and the evaluation of the remedial criteria are presented in the Alternative Analysis. The remedy is selected pursuant to the remedy selection criteria set forth in DER-10, Technical Guidance for Site Investigation and Remediation and 6 NYCRR Part 375.

The selected remedy is a Multiple Cleanup Tracks remedy.

The selected remedy is referred to as the Track 1 Perimeter Removal and Track 4 Source Control Actions remedy.

The elements of the selected remedy, as shown in Figure 2A and 2B, are as follows:

1. Remedial Design

A remedial design program will be implemented to provide the details necessary for the construction, operation, optimization, maintenance, and monitoring of the remedial program. Green remediation principles and techniques will be implemented to the extent feasible in the

design, implementation, and site management of the remedy as per DER-31. The major green remediation components are as follows:

- Considering the environmental impacts of treatment technologies and remedy stewardship over the long term;
- Reducing direct and indirect greenhouse gases and other emissions;
- Increasing energy efficiency and minimizing use of non-renewable energy;
- Conserving and efficiently managing resources and materials;
- Reducing waste, increasing recycling and increasing reuse of materials which would otherwise be considered a waste;
- Maximizing habitat value and creating habitat when possible;
- Fostering green and healthy communities and working landscapes which balance ecological, economic and social goals;
- Integrating the remedy with the end use where possible and encouraging green and sustainable re-development; and
- Additionally, to incorporate green remediation principles and techniques to the extent feasible in the future development at this site, any future on-site buildings shall be constructed, at a minimum, to meet the 2020 Energy Conservation Construction Code of New York (or most recent edition) to improve energy efficiency as an element of construction.

As part of the remedial design program, to evaluate the remedy with respect to green and sustainable remediation principles, an environmental footprint analysis will be completed. The environmental footprint analysis will be completed using an accepted environmental footprint analysis calculator such as SEFA (Spreadsheets for Environmental Footprint Analysis, USEPA), SiteWise(TM) (available in the Sustainable Remediation Forum [SURF] library) or similar NYSDEC accepted tool. Water consumption, greenhouse gas emissions, renewable and non-renewable energy use, waste reduction and material use will be estimated, and goals for the project related to these green and sustainable remediation metrics, as well as for minimizing community impacts, protecting habitats and natural and cultural resources, and promoting environmental justice, will be incorporated into the remedial design program, as appropriate. The project design specifications will include detailed requirements to achieve the green and sustainable remediation goals. Further, progress with respect to green and sustainable remediation metrics will be tracked during implementation of the remedial action and reported in the Final Engineering Report (FER), including a comparison to the goals established during the remedial design program.

Additionally, the remedial design program will include a climate change vulnerability assessment, to evaluate the impact of climate change on the project site and the proposed remedy. Potential vulnerabilities associated with extreme weather events (e.g., hurricanes, lightning, heat stress, and drought), flooding, and sea level rise will be identified, and the remedial design program will incorporate measures to minimize the impact of climate change on potential identified vulnerabilities.

2. Track 1 Excavation

Excavation of on-site soils from the Track 1 Perimeter Area (approximately 4.7 acres) which exceed unrestricted SCOs, as defined by 6 NYCRR Part 375-6.8. If a Track 1 cleanup is

achieved, a Cover System will not be a required element of the remedy in this area. Collection and analysis of confirmation samples at the remedial excavation extents will be used to verify that unrestricted SCOs have been achieved in this area. If confirmation sampling indicates that unrestricted SCOs were not achieved at the stated remedial extents, the Applicant must notify NYSDEC, submit the sample results and, in consultation with NYSDEC, determine if further remedial excavation is necessary.

Excavated soil from this area which does not meet the criteria/conditions described in remedial elements 3, 4, or 5 may be used anywhere beneath the cover system described in remedial element 7 to backfill other excavations or re-grade the site.

Clean fill meeting the requirements of 6 NYCRR Part 375-6.7(d) will be used to replace the excavated soil as needed to establish the designed grades at the site.

3. Biotreatment

Biodegradation will be employed to treat approximately 13,400 tons of petroleum contamination in soil from the Heavy Equipment Maintenance/Oil House Area, TP-BCP-14 Area, Compressor Building Fill Area, MW-BCP-19 Area, and Former Wastewater Treatment Tank Area. Soil that exhibits nuisance conditions (as defined in Commissioner Policy CP-51 Section G) related to petroleum contamination will be treated to remove these conditions. The biological breakdown of contaminants through aerobic respiration may be enhanced by treatment amendments. The exact treatment method will be finalized during the Remedial Design based on the results of the ST24 Bioremediation Interim Remedial Measures Work Plan [March 2023].

4. In-Situ Solidification

In-situ solidification (ISS) will be implemented to treat purifier waste residuals proximate to TP-BCP-35 (approximately 2,000 tons) and TP-BCP-46 (approximately 1,800 tons). The need for a surface soil cut to contain the increased soil volume created by the soil mixing or better access the targeted residuals will be determined in the Remedial Design. ISS is a process that binds the soil particles in place, creating a low permeability mass. The contaminated soil will be mixed in place, together with solidifying reagents or other binding reagents, using an excavator or augers. Portland cement is often used as the primary binder, although less carbon-intensive amendments will be considered. The soil and binding reagents are mixed to produce a solidified mass resulting in a low permeability monolith. Prior to the full implementation of this technology, bench-scale laboratory testing and on-site pilot scale studies will be conducted to define design parameters, amendment types, and dosages more clearly. Bench tests will consist of collecting soil from source areas and mixing with a variety of amendments and doses in a controlled atmosphere, followed by testing resulting hydraulic conductivity and unconfined-compressive strength. Pilot tests may be conducted using successful amendment mixes from the bench test prior to full scale design.

Typical design requirements are that solidified mass would produce a hydraulic conductivity of 1.0x10-6 cm/sec or less and would also result in an unconfined compressive strength of 50 psi or higher, pending future uses that may include construction above the solidified mass. The solidified mass will be covered with a cover system as described in remedial element 7 to prevent direct exposure to the solidified mass. The resulting solid matrix reduces or eliminates

mobility of contamination and reduces or eliminates the matrix as a source of groundwater contamination.

5. In-Situ Solidification and Consolidation

In-situ solidification (ISS) will be implemented to treat up to 25,800 tons of soil exhibiting the following characteristics:

•grossly contaminated soil, as defined in 6 NYCRR Part 375-1.2(u), including material stockpiled in the Thaw Shed;
•soil exceeding the 6 NYCRR Part 371 hazardous waste criteria for benzene or other coking related constituents;
•soil containing viscous or mobile coal tar;
•non-aqueous phase liquids (NAPL);
•soil exceeding a site-specific protection of groundwater SCO for ammonia, to be developed during the remedial design; and
•soil with visual waste material or NAPL.

ISS is a process that mixes reagents with contaminated soil to physically modify the material to meet remedial goals, allowing it to be placed back on-site. Under this process the contaminated soil will be mixed in-situ with solidifying agents, such as Portland Cement or lime-kiln dust, to reduce or eliminate the mobility and leachability of the above source materials. Prior to the full implementation of this technology, bench-scale laboratory testing and on-site pilot scale studies will be conducted to define design parameters, amendment types, and dosages more clearly. Bench-scale tests will consist of collecting soil from source areas and mixing it with a variety of amendments and doses in a controlled atmosphere, followed by testing to confirm the effectiveness of the amendments. Pilot tests will then be conducted using successful amendment mixes from the bench test prior to full scale design.

Treated soil will be placed in designated consolidation areas, as described in remedial element 6, after mixing to reduce the areal extent of treated materials across the site and simplify long-term monitoring and management. Samples of the mixed soil will be collected at a frequency determined in the Remedial Design and will be tested for toxicity characteristic leaching procedure (TCLP) and any other parameters determined during the Remedial Design.

6. Consolidation Areas

On-site materials described in remedial element 5 will be treated by ISS, excavated, consolidated on-site, and capped. The movement of some materials in the consolidation areas must be consistent with the United States Environmental Protection Agency's (USEPA) Area of Contamination Policy. The extent of the Area of Contamination will be defined in the Remedial Design. Additional solid wastes or soil exceeding the commercial SCOs may also be placed into the consolidation areas. Approximately 25,800 tons of material will be placed in the consolidation areas. The consolidation areas will be located in the former Production Area and will receive an engineered cap system designed, constructed, and maintained in conformance with the substantive requirements of 6 NYCRR Part 360 solid waste regulations. The upper 1 foot of the engineered cap must also meet the cover requirements of remedial element 7.

On-site soil which does not meet the criteria/conditions described in remedial elements 3, 4, or 5,

or imported clean fill meeting the requirements of 6 NYCRR Part 375-6.7(d), will replace the excavated treated materials as needed to establish the designed grades at the site.

7. Site Cover

A site cover will be required in the Track 4 portion of the site where the upper one foot of exposed surface soil will exceed the applicable soil cleanup objectives (SCOs), to allow for future commercial use of the site. Where a soil cover is to be used it will be a minimum of one foot of soil placed over a demarcation layer, with the upper soil of sufficient quality to maintain a vegetative layer. Soil cover material, including any fill material brought to the site, will meet the SCOs for cover material for the use of the site as set forth in 6 NYCRR Part 375-6.7(d). Substitution of other materials and components may be allowed where such components already exist or are a component of the tangible property to be placed as part of site redevelopment. Such components may include, but are not necessarily limited to pavement, concrete, paved surface parking areas, sidewalks, building foundations and building slabs.

Where a soil cover is required over the ISS treatment area (remedial element 4), the remedial design will strive to maximize the soil thickness to be at least four feet to protect the ISS area from the freeze-thaw cycle, except in areas where design grades or access restriction prevent this thickness. The soil cover may not be less than one foot in thickness. The upper one foot will meet the SCOs for cover material for the use of the site as set forth in 6 NYCRR Part 375-6.7(d). A building and its foundation are considered suitable cover to protect the ISS treatment area. Where a building and its foundation are considered part of the site cover, the ISS design should include considerations for drainage between the ISS and building foundation and the potential need to design the ISS for a higher strength. For areas where solidified material underlies the cover, the solidified material itself will serve as the demarcation layer due to the nature of the material.

8. Groundwater Collection and Treatment

Groundwater collection and treatment will be implemented to treat residual contamination in groundwater in the northwestern portion of the site and to ensure that contaminated groundwater does not migrate off-site. The groundwater extraction system will be designed and installed so that the capture zone is sufficient to cover the areal and vertical extent of remaining contamination and surround the consolidation areas described in remedial element 6. The extraction system will be designed to create a depression of the water table so that contaminated groundwater is directed towards collection trenches within portions of the Production and North Rail Areas to capture groundwater present in the fill unit.

Further details of the extraction system will be determined during the Remedial Design, considering the results of the Groundwater IRM Work Plan, West Production Area (December 2021). The extracted groundwater will be treated to remove NAPL, coal tar, VOCs, cyanide, ammonia, mercury, and any other contaminants of concern. The operation of the collection and treatment system will continue until the remedial objectives have been achieved, or until NYSDEC determines that continued operation is technically impracticable or not feasible.

9. Utility Closure

Historical utilities that exist at the site will be removed or closed in place to eliminate potential

contaminant migration pathways. These utilities include, but are not limited to, the north-south sewer, the box culvert, the Mansion sump, the north storm sewer, former gas supply and distribution lines, process piping, and infrastructure related to the current stormwater management system.

10. Interim Remedial Measure Completion

Many interim remedial measures (IRMs) are in progress and may not be completed before the start of remedial action. The completion of the following IRMs will be part of the overall site remedy, unless the IRM is superseded by the Remedial Design:

- Interim Site Management Work Plan [April 2020];
- Stormwater Pollution Prevention Plan [May 2020];
- Aboveground Storage Tank Management Interim Remedial Measures Work Plan [January 2021];
- CBS and PBS Tank Closure Work Plan [April 2021];
- Secondary Containment IRM Work Plan - Closure [May 2021)];
- Lime Still - IRM Work Plan [October 2021];
- Groundwater IRM Work Plan, West Production Area [December 2021];
- Process Equipment Removal Interim Remedial Measures Work Plan [July 2022];
- ST24 Bioremediation Interim Remedial Measures Work Plan [September 2022];
- Revised Non-Aqueous Phase Liquid Response, East End of Coal Yard Tunnel Conveyor Control and Junction Building [January 2023]; and
- Source Area Solidification Interim Measure Work Plan [October 2023].

11. Easement

Imposition of an institutional control in the form of an environmental easement for the controlled property not included in the Track 1 Area (see remedial element 2) which will:

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

12. Site Management Plan

A Site Management Plan is required, which includes the following:

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

Institutional Controls: The environmental easement discussed in remedial element 11.
Engineering Controls: The ISS areas discussed in remedial element 4, the consolidation areas discussed in remedial element 6, the soil cover discussed in remedial element 7, and the groundwater collection and treatment system discussed in remedial element 8.

This plan includes, but may not be limited to:

- an Excavation Plan which details the provisions for management of future excavations in areas of remaining contamination;
- descriptions of the provisions of the environmental easement including any land use and groundwater restrictions;
- a provision for evaluation of the potential for soil vapor intrusion for any occupied buildings on the site, including provision for implementing actions recommended to address exposures related to soil vapor intrusion;
- a provision that should a building foundation or building slab be removed in the future, a cover system consistent with that described in remedial element 7 will be placed in any areas where the upper one foot of exposed surface soil exceeds the applicable soil cleanup objectives (SCOs);
- provisions for the management and inspection of the identified engineering controls;
- maintaining site access controls and NYSDEC notification; and
- the steps necessary for the periodic reviews and certification of the institutional and/or engineering controls.

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

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

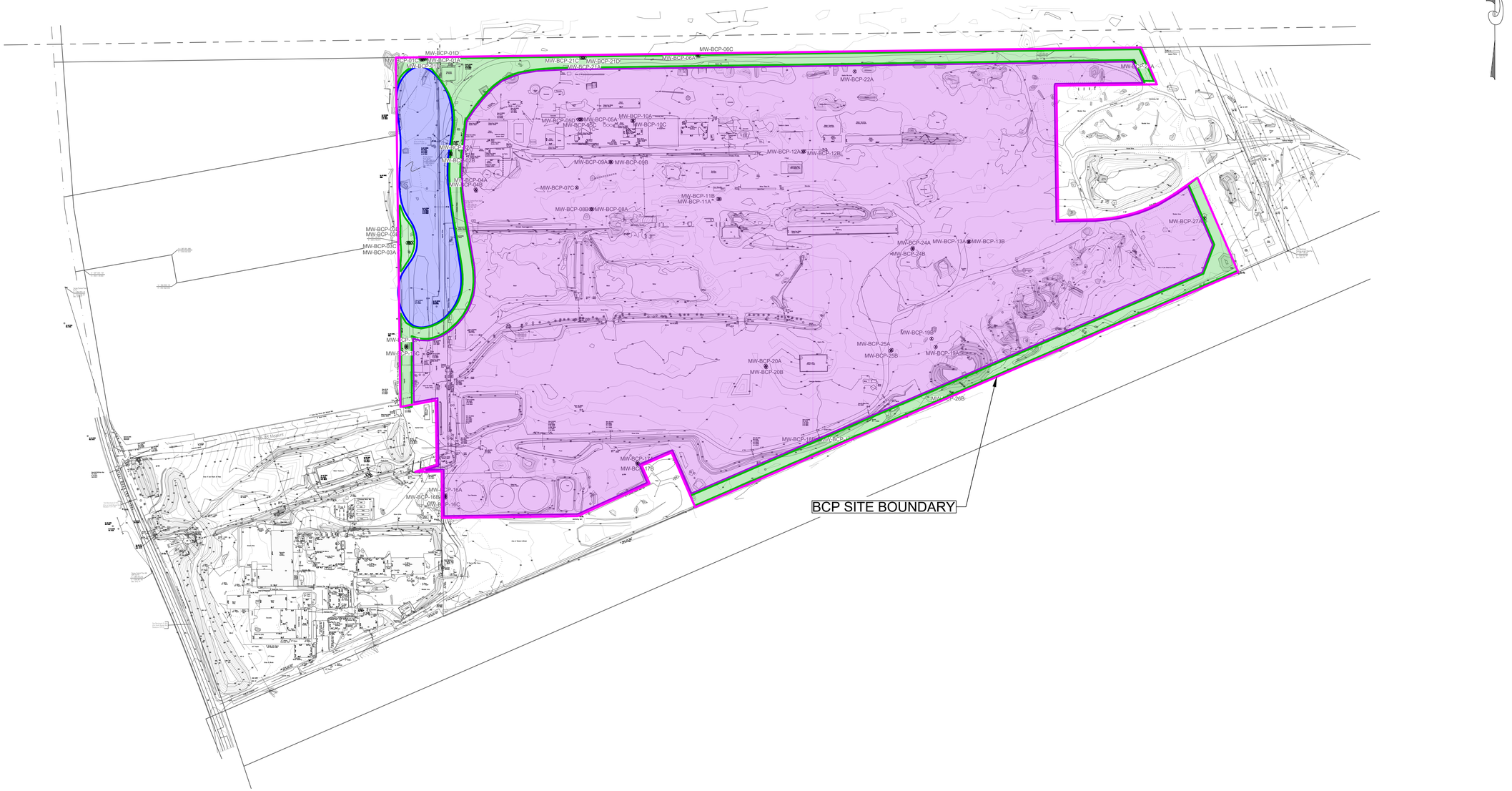
c. an Operation and Maintenance (O&M) Plan to ensure continued operation, maintenance, optimization, monitoring, inspection, and reporting of any mechanical or physical components of the remedy. The plan includes, but is not limited to:

- procedures for operating and maintaining the remedy;
- compliance monitoring of treatment systems to ensure proper O&M as well as providing the data for any necessary permit or permit equivalent reporting;
- maintaining site access controls and NYSDEC notification; and
- providing the NYSDEC access to the site and O&M records.

Site Location Figure **DD Figure 1**
Tonawanda Coke, #915055
Riverview Innovation and Technology Campus, #C915353
3800 and 3875 River Road
Tonawanda, NY 14150
October 2020

Author: Ben McPherson Revised: 10/9/2020 N:\private\R9\Tonawanda Coke\Figure 1 - Site Location Map.mxd

LEGEND
- PERIMETER FILL REMOVAL AREA (TRACK 1)
- STORM WATER RETENTION BASIN (TRACK 1)
- TRACK 4 CLOSURE AREA



D

1" = 200'
200' 100' 0' 200'

Reference: Niagara Boundary, Map Showing Topographic Survey of Property Owned by Riverview Innovation & Technology Campus Inc., April 2022

DD Figure 2A

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LIMITS OF TRACK 1 AND 4 CLEANUPS

3875 RIVER ROAD
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INVENTUM ENGINEERING
441 CARLISLE DRIVE
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HERNDON, VIRGINIA 20170
(703) 722-6049
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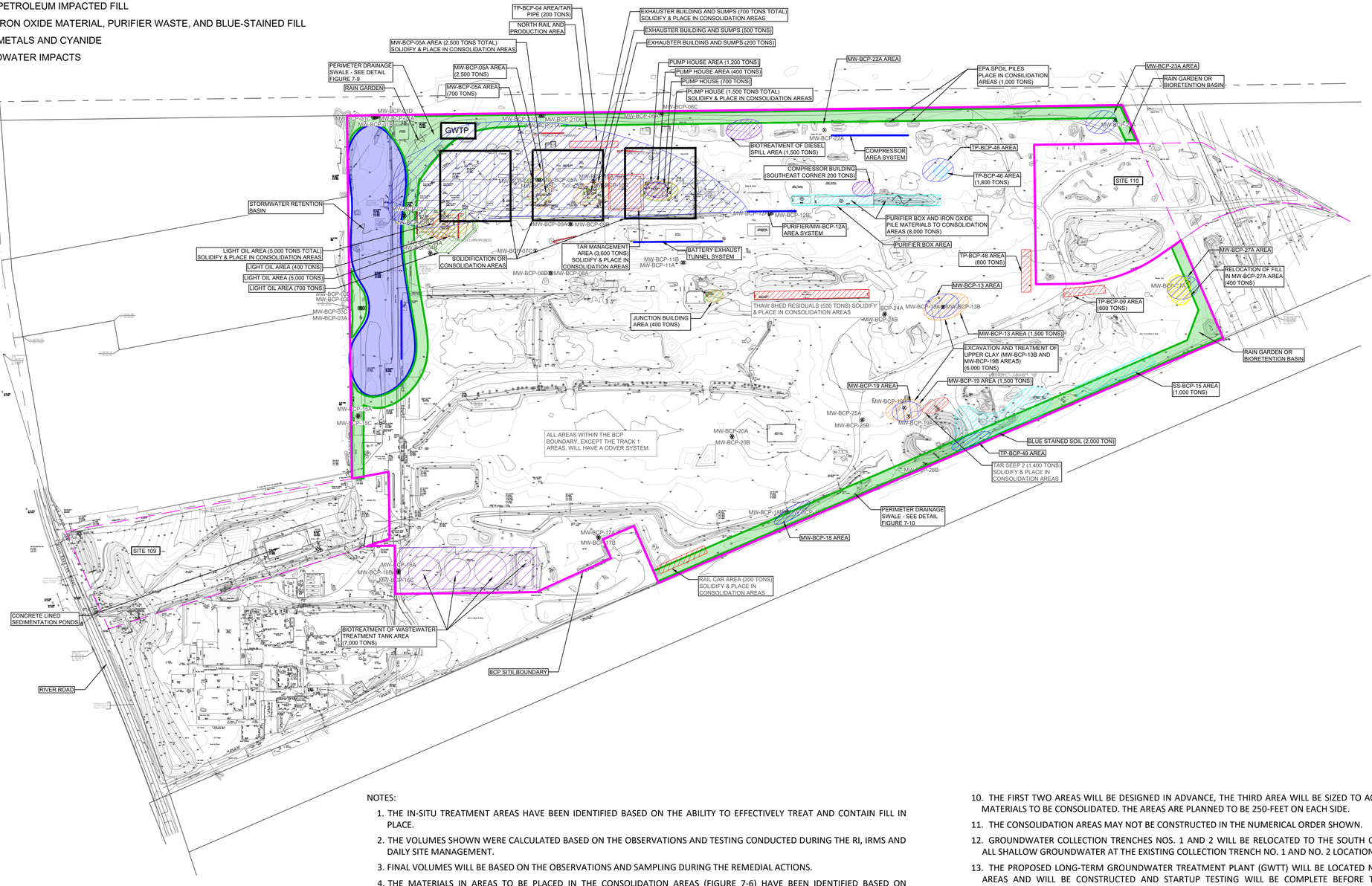
FIGURE 7 - 1

ALTERNATIVES ANALYSIS
AUGUST 2023

LEGEND

- PERIMETER FILL REMOVAL AREA (TRACK 1)
- STORM WATER RETENTION BASIN (TRACK 1)
- OCCURRENCE OF VISCOUS TAR
- OCCURRENCE OF NAPL
- OCCURRENCE OF VOC IMPACTED FILL
- OCCURRENCE OF PETROLEUM IMPACTED FILL
- OCCURRENCE OF IRON OXIDE MATERIAL, PURIFIER WASTE, AND BLUE-STAINED FILL
- OCCURRENCE OF METALS AND CYANIDE
- RESIDUAL GROUNDWATER IMPACTS



NOTES:

1. THE IN-SITU TREATMENT AREAS HAVE BEEN IDENTIFIED BASED ON THE ABILITY TO EFFECTIVELY TREAT AND CONTAIN FILL IN PLACE.
2. THE VOLUMES SHOWN WERE CALCULATED BASED ON THE OBSERVATIONS AND TESTING CONDUCTED DURING THE RI, IRMS AND DAILY SITE MANAGEMENT.
3. FINAL VOLUMES WILL BE BASED ON THE OBSERVATIONS AND SAMPLING DURING THE REMEDIAL ACTIONS.
4. THE MATERIALS IN AREAS TO BE PLACED IN THE CONSOLIDATION AREAS (FIGURE 7-6) HAVE BEEN IDENTIFIED BASED ON MATERIALS THAT WOULD ADVERSELY AFFECT THE STORMWATER MANAGEMENT OR EXCAVATION DURING REDEVELOPMENT.
5. THE EXISTING FILL AROUND THE PERIMETER OF THE BCP SITE VARIES FROM 6- TO 36-INCHES THICK.
6. THE FILL AROUND THE PERIMETER WILL BE REMOVED AND PLACED AS FILL WITHIN THE BCP SITE. SEE DETAIL ON FIGURE 7-10.
7. THE STORMWATER RETENTION BASIN AND PERIMETER BUFFER AREAS WILL BE EXCAVATED TO THE UNDERLYING CLAY AND WILL MEET TRACK 1 STANDARDS.
8. THE CONSOLIDATION AREAS WILL BE CONSTRUCTED TO ALLOW PLACEMENT OF MATERIALS FROM WITHIN THE BCP SITE THAT COULD OTHERWISE LIMIT PROPER GRADING FOR STORMWATER MANAGEMENT OR REDEVELOPMENT.
9. THREE AREAS ARE PROPOSED TO ALLOW PROPER SIZING AND CONSOLIDATION OF THE TARGET MATERIALS.
10. THE FIRST TWO AREAS WILL BE DESIGNED IN ADVANCE, THE THIRD AREA WILL BE SIZED TO ACCOMMODATE THE REMAINING MATERIALS TO BE CONSOLIDATED. THE AREAS ARE PLANNED TO BE 250-FEET ON EACH SIDE.
11. THE CONSOLIDATION AREAS MAY NOT BE CONSTRUCTED IN THE NUMERICAL ORDER SHOWN.
12. GROUNDWATER COLLECTION TRENCHES NOS. 1 AND 2 WILL BE RELOCATED TO THE SOUTH OF THE CONSOLIDATION AREAS. ALL SHALLOW GROUNDWATER AT THE EXISTING COLLECTION TRENCH NO. 1 AND NO. 2 LOCATIONS WILL BE ELIMINATED.
13. THE PROPOSED LONG-TERM GROUNDWATER TREATMENT PLANT (GWTT) WILL BE LOCATED NORTH OF THE CONSOLIDATION AREAS AND WILL BE CONSTRUCTED AND STARTUP TESTING WILL BE COMPLETE BEFORE THE EXISTING FACILITY IN THE MAINTENANCE BUILDING IS REMOVED FOR CONSOLIDATION AREA CONSTRUCTION.

D

1" = 200'
200' 100' 0' 200'

Reference: Niagara Boundary, Map Showing Topographic Survey of Property Owned by Riverview Innovation & Technology Campus Inc., April 2022

DD Figure 2B

DRAWING BY: RB
CHECKED:
APPROVED:

RECOMMENDED REMEDIAL ALTERNATIVE

3875 RIVER ROAD
TONAWANDA, NY 14150

INVENTUM ENGINEERING
441 CARLISLE DRIVE
SUITE C
HERNDON, VIRGINIA 20170
(703) 722-6049
www.InventumEng.com

FIGURE 7 - 2

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