PROPOSED REMEDIAL ACTION PLAN

Former Bearoff Metallurgical
State Superfund Project
Colonie, Albany County
Site No. 401069
February 2020

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

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SECTION 1: SUMMARY AND PURPOSE OF THE PROPOSED PLAN

The New York State Department of Environmental Conservation (the Department), in consultation with the New York State Department of Health (NYSDOH), is proposing a remedy for the above referenced site. The disposal of hazardous wastes at the site has resulted in threats to public health and the environment that would be addressed by the remedy proposed by this Proposed Remedial Action Plan (PRAP). The disposal of hazardous wastes at this site, as more fully described in Section 6 of this document, has contaminated various environmental media. The proposed remedy is intended to attain the remedial action objectives identified for this site for the protection of public health and the environment. This PRAP identifies the preferred remedy, summarizes the other alternatives considered, and discusses the reasons for the preferred remedy.

The New York State Inactive Hazardous Waste Disposal Site Remedial Program (also known as the State Superfund Program) is an enforcement program, the mission of which is to identify and characterize suspected inactive hazardous waste disposal sites and to investigate and remediate those sites found to pose a significant threat to public health and environment.

The Department has issued this document in accordance with the requirements of 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 document is a summary of the information that can be found in the site-related reports and documents in the document repository identified below.

SECTION 2: CITIZEN PARTICIPATION

The Department seeks input from the community on all PRAPs. This is an opportunity for public participation in the remedy selection process. The public is encouraged to review the reports and documents, which are available at the following repository:

Watervliet Public Library
1501 Broadway
Watervliet, NY 12189
Phone: (518) 274-4471

A public comment period has been set from:

2/26/2020 to 3/27/2020

A public meeting is scheduled for the following date:

3/10/2020 at 6:30 PM

Public meeting location:

Watervliet Senior Center
1501 Broadway
Watervliet, NY 12189

At the meeting, the findings of the remedial investigation (RI) and the feasibility study (FS) will be presented along with a summary of the proposed remedy. After the presentation, a question-and-answer period will be held, during which verbal or written comments may be submitted on the PRAP.

Written comments may also be sent to:

Kyle Forster
NYS Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, NY 12233
kyle.forster@dec.ny.gov

The Department may modify the proposed remedy or select another of the alternatives presented in this PRAP based on new information or public comments. Therefore, the public is encouraged to review and comment on the proposed remedy identified herein. Comments will be summarized and addressed in the responsiveness summary section of the Record of Decision (ROD). The ROD is the Department's final selection of the remedy for this site.

Receive Site Citizen Participation Information By Email

Please note that the Department'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, Voluntary 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

Location: The Former Bearoff Metallurgical site is located off of Spring Street Road in a suburban area of the Town of Colonie, Albany County. A single residential property borders the southern boundary of the site. There is a cemetery to the south and the Al Tech landfill (Site ID No. 401003) and waste management area to the north and east.

Site Features: The 10.6-acre property is vacant, mostly wooded land with an Unnamed Class D Tributary located on a northeast portion of the property that flows into the Kromma Kill.

Current Zoning and Land Use: The property is listed as 'vacant land' by Albany County and zoned as single family residential. There is evidence of recent dumping of various construction and demolition type wastes on top of the buried metallurgical waste.

Past Use of the Property: Bearoff Metallurgical previously operated at the site. Specific site operations are unclear, but activities at the site appear to have occured between 1952 and 1978 based on aerial photographs. Much of the property was used to bury steel slag and other wastes associated with the metallurgical processes, including stainless steel production, that occurred at the site and at Al Tech Specialty Steel. Albany County auctioned the property during the tax foreclosure process and the current owner purchased the site at auction on January 17, 2013.

Site Geology and Hydrogeology: The overburden consists of steel manufacturing waste fill and clayey till. The fill was found to reside at depths up to 28 feet below grade and consists of slag, metal fragments, brick, fire brick, concrete, sand, and gravel. Beneath the fill, or where it is not present, competent clay resides in the overburden and is underlain by shale bedrock. Groundwater approaches the site from the west, is present at approximately 30 feet below grade on the western and southern portions of the site and flows off the site to the east towards the Hudson River. Overburden or perched groundwater which is impacted by site-related contaminants is not present in the northern and eastern portions of the site where seeps are present. The seeps appear to be caused by infiltrating precipitation migrating through the fill, flowing along the clay surface, and finally discharging along the northern slope of the site. Bedrock groundwater is not impacted by site-related contaminants, and based on fracture angles and water elevations, bedrock groundwater does not appear to be a source of the seeps.

A site location map is attached as Figure 1a and site layout map is attached as Figure 1b.

SECTION 4: LAND USE AND PHYSICAL SETTING

The Department 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 restricted-residential use (which allows for commercial use and industrial use) as described in Part 375-1.8(g) are/is being evaluated in addition to an alternative which would allow for unrestricted use of the site.

A comparison of the results of the investigation to the appropriate standards, criteria and guidance values (SCGs) for the identified land use and the unrestricted use SCGs for the site

contaminants is included in the Tables for the media being evaluated in Exhibit A.

SECTION 5: ENFORCEMENT STATUS

Potentially Responsible Parties (PRPs) are those who may be legally liable for contamination at a site. This may include past or present owners and operators, waste generators, and haulers.

The PRPs for the site, documented to date, include:

Lewis Growick

Bearoff Metallurgical, Inc.

Al Tech Specialty Steel Corporation

C/O CT Corporation System

United States Corporation Company

Albany County

Niagara Mohawk Power Corporation

Corporate Service Company

Albany County acquired the site in or around December 2012 through foreclosure. The current owner acquired the property from Albany County in January 2013 and signed an Order on Consent and Administrative Settlement with the Department in January 2017.

The wastes present at the site appear to be affiliated with the Al Tech Specialty Steel site (Site No. 401003), however Al Tech Specialty Steel is no longer a viable PRP since the company filed a petition for reorganization under Title 11, Chapter 11 of the U.S. Bankruptcy Code.

SECTION 6: SITE CONTAMINATION

6.1: Summary of the Remedial Investigation

A Remedial Investigation (RI) has been conducted. The purpose of the RI was to define the nature and extent of any contamination resulting from previous activities at the site. The field activities and findings of the investigation are described in the RI Report.

The following general activities are conducted during an RI:

- Research of historical information,
- Geophysical survey to determine the lateral extent of wastes,

- Test pits, soil borings, and monitoring well installations,
- Sampling of waste, surface and subsurface soils, groundwater, and soil vapor,
- Sampling of surface water and sediment,
- Ecological and Human Health Exposure Assessments.

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. The Department has developed SCGs for groundwater, surface water, sediments, and soil. The NYSDOH has developed SCGs for drinking water and soil vapor intrusion. The tables found in Exhibit A list the applicable SCGs in the footnotes. 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 hazardous waste 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 in Exhibit A. Additionally, the RI Report contains a full discussion of the data. The contaminant(s) of concern identified at this site is/are:

polychlorinated biphenyls (PCB)	copper
arsenic	mercury
barium	nickel
cadmium	selenium
chromium	

As illustrated in Exhibit A, the contaminant(s) of concern exceed the applicable SCGs for:

- groundwater
- surface water
- soil
- sediment

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 Record of Decision.

There were no IRMs performed at this site during the RI.

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.

Part 1 of a Fish and Wildlife Resources Impact Analysis (FWRIA) was completed in accordance with NYSDEC guidance (NYSDEC, 2010a). The purpose of this assessment was to identify fish and wildlife resources in the vicinity of the site and evaluate the impacts of site-related contaminants on fish and wildlife resources. Based on the findings of the Part 1 FWRIA, there are ecological resources which occur or have the potential to occur within the vicinity of the site, and complete exposure pathways exist to those resources. Potential risk to ecological receptors from contaminants in surface soil and sediment exists due to the detection of contaminants in excess of guidance criteria.

Soil, sediment, surface water, and groundwater samples were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), metals - including hexavalent chromium, and PCB/pesticides. Groundwater has also been analyzed for per-/polyfluoroalkyl substances (PFAS) and 1,4-dioxane. This investigation was conducted when samples from the adjacent Al Tech Specialty Steel Waste Management Area (WMA) suggested the site was a potential source of hexavalent chromium and metals detected in the unnamed tributary to the north.

Soil: The primary contaminants of concern at the site are PCBs, metals, and polycyclic aromatic hydrocarbons (PAHs). PCBs are present at concentrations up to 300 parts per million (ppm) within the upper 1 foot of site soils in two localized areas near the northern slope of the site. PCBs are primarily limited to the upper 2 feet of site soils at concentrations above the restricted residential use soil cleanup objective (RRSCO) of 1 ppm, except for a single detection of 23 ppm at 8 to 9 feet below grade. Metals are present at depths ranging from 0 to 18 feet bgs, including arsenic up to 59.5 ppm (RRSCO is 16 ppm), barium up to 12,100 ppm (RRSCO is 400 ppm), trivalent chromium up to 109,000 ppm (RRSCO is 180 ppm), hexavalent chromium up to 178 ppm (RRSCO is 110 ppm and protection of groundwater SCO (PGWSCO) is 19 ppm), mercury up to 29.9 ppm (RRSCO is 0.81 ppm), and nickel up to 51,300 ppm (RRSCO is 310 ppm). PAHs were also detected at two locations at depths of 0 to 2 feet bgs, including concentrations of

benzo(a)pyrene up to 2.8 ppm (RRSCO is 1 ppm), benzo(a)anthracene up to 2.9 ppm (RRSCO is 1 ppm), benzo(b)fluoranthene up to 2.4 ppm (RRSCO is 1 ppm), and ideno(1,2,3-cd)pyrene up to 1 ppm (RRSCO is 0.5 ppm). Concentrations of metals above RRSCOs have been detected outside the site boundary to the west and east.

Sediment: Sediments within the unnamed tributary on the north eastern portion of the site are impacted by site related contaminants. Total chromium is present at concentrations up to 1,420 ppm and nickel was detected at concentrations up to 711 ppm, compared to their Class A guidance values of 43 and 23 ppm, respectively. Sediment that meets the Class A guideline value can be considered to present little or no potential for risk to aquatic life. PCBs were also detected at concentrations up to 0.14 ppm. Impacted sediments extend downstream and off-site toward the Al Tech Waste Management Area.

Surface Water: Surface water samples were also collected along the unnamed tributary and co-located with sediment sampling locations. Hexavalent chromium was detected on-site and off-site at concentrations above class C surface water standards (11 parts per billion (ppb)) at concentrations up to 514 ppb.

Groundwater: Chromium was initially not detected in filtered overburden groundwater samples but was subsequently detected at a concentration of 320 parts per billion (ppb) (standard is 50 ppb) in one unfiltered sample. Other than chromium, naturally occurring metals including manganese, iron, magnesium, and sodium are present in overburden groundwater. Hexavalent chromium was detected in the porewater of three different seeps with concentrations ranging from 59 to 2,110 ppb. Additional metals were detected at elevated concentrations in the seeps, including barium up to 2,600 ppb (standard is 1000 ppb) and selenium up to 100 ppb (standard is 10 ppb). PCBs were detected within the seep pore-water at concentrations ranging from 0.36 to 0.41 ppb (standard is 0.09 ppb). No site-related contaminants were detected above standards in the deeper bedrock aquifer.

Due to the lack of volatile organic compounds found in other media, no soil vapor samples were collected.

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.*

The site is not fenced and persons who enter the site could contact contaminants in the soil by walking on the soil, digging or otherwise disturbing the soil. People are not drinking the contaminated groundwater since the area is served by a public water system that is not affected by this contamination. People may come into contact with contaminated surface water or sediment if they enter the tributary.

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.

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.

RAOs for Environmental Protection

- Prevent migration of contaminants that would result in groundwater or surface water contamination.
- Prevent impacts to biota from ingestion/direct contact with soil causing toxicity or impacts from bioaccumulation through the terrestrial food chain.

Surface Water

RAOs for Public Health Protection

- Prevent ingestion of water impacted by contaminants.
- Prevent surface water contamination which may result in fish advisories.

RAOs for Environmental Protection

- Restore surface water to ambient water quality criteria for the contaminant of concern.
- Prevent impacts to biota from ingestion/direct contact with surface water causing toxicity and impacts from bioaccumulation through the marine or aquatic food chain.

Sediment

RAOs for Public Health Protection

- Prevent direct contact with contaminated sediments.
- Prevent surface water contamination which may result in fish advisories.

RAOs for Environmental Protection

- Prevent releases of contaminant(s) from sediments that would result in surface water levels in excess of (ambient water quality criteria).
- Prevent impacts to biota from ingestion/direct contact with sediments causing toxicity or impacts from bioaccumulation through the marine or aquatic food chain.
- Restore sediments to pre-release/background conditions to the extent feasible.

SECTION 7: SUMMARY OF THE PROPOSED REMEDY

To be selected, the remedy must be protective of human health and the environment, be cost-effective, comply with other statutory requirements, and utilize permanent solutions, alternative technologies or resource recovery technologies to the maximum extent practicable. The remedy must also attain the remedial action objectives identified for the site, which are presented in Section 6.5. Potential remedial alternatives for the Site were identified, screened and evaluated in the FS report.

A summary of the remedial alternatives that were considered for this site is presented in Exhibit B. Cost information is presented in the form of present worth, which represents the amount of money invested in the current year that would be sufficient to cover all present and future costs associated with the alternative. This enables the costs of remedial alternatives to be compared on a common basis. As a convention, a time frame of 30 years is used to evaluate present worth costs for alternatives with an indefinite duration. This does not imply that operation, maintenance, or monitoring would cease after 30 years if remediation goals are not achieved. A summary of the Remedial Alternatives Costs is included as Exhibit C.

The basis for the Department's proposed remedy is set forth at Exhibit D.

The proposed remedy is referred to as the Excavation, Consolidation, Impermeable Cap System, and Soil Cover remedy.

The estimated present worth cost to implement the remedy is $5,410,000. The cost to construct the remedy is estimated to be $5,010,000 and the estimated average annual cost is $13,200.

The elements of the proposed 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; and
- Integrating the remedy with the end use where possible and encouraging green and sustainable re-development.

2. Excavation

Excavation and off-site disposal of overburden soils containing polychlorinated biphenyls (PCBs) above the hazardous waste threshold of 50 ppm. Based on existing data, the excavation volume is approximately 1,000 cubic yards.

Excavation and off-site disposal of sediments containing PCBs, chromium, and other metals at concentrations above the Class A sediment guidance values. Approximately 500 cubic yards of sediment will be removed and disposed of at a permitted facility. Following removal, documentation samples would be collected from the limits of the excavation areas and submitted for laboratory analysis. Site restoration would occur following the collection of these samples.

Restoration of the stream, banks, and floodplain buffer area will include placement of clean soil in the removal areas to pre-existing grades, followed by seeding/planting of disturbed soil areas. The details of the stream restoration and floodplain buffer area will be addressed by the remedial design. Remediation and restoration of the tributary will be consistent with the requirements of 6 NYCRR Part 608.

3. Consolidation/Capping

On-site soils which exceed Restricted Residential Soil Cleanup Objectives (RRSCOs) and impacted off-site soils which exceed Residential Soil Cleanup Objectives (RSCOs) for metals and PCBs, but which do not exceed the criteria for off-site disposal as described in remedial element 2, will be excavated, consolidated on-site above the water table, and covered with a two foot soil cover. The cover system in the areas directly uphill of the stream will be enhanced with an impermeable cap to prevent site-related contaminants from migrating into the stream via leachate seeps.

The two-foot cover system is illustrated as the brown hatched area on Figure 4 (approximately 6 acres). The cap system is illustrated as the yellow and brown hatched area on Figure 4. The cap system for this area will be designed, constructed and maintained in conformance with the relevant substantive requirements of 6 NYCRR Part 360 solid waste regulations, with a minimum of two feet of soil above the impermeable layer that meets RRSCOs.

Documentation sampling will be conducted to demonstrate that all impacted soils from the site exceeding RRSCOs, and all site-related soils present off-site, will have been removed, capped or covered. The site will be graded to improve surface drainage and minimize surface water from infiltrating into the capped and covered areas.

4. Backfill

Clean fill meeting the requirements of 6 NYCRR Part 375-6.7(d) will be imported to replace the excavated soil associated with Paragraphs 2 and 3 above, and to establish the designed grades at the site.

5. Institutional Control

Imposition of an institutional control in the form of an environmental easement for the controlled property which will:

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

6. 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 Element No. 5 above.

   Engineering Controls:

   - The cover system discussed in Element No. 3 above.

This plan includes, but may not be limited to:

- an Excavation Plan which details the provisions for management of future excavations in areas of remaining contamination;

- a provision should redevelopment occur to ensure no soil exceeding protection of groundwater concentrations will remain below storm water retention basin or infiltration structures;

- descriptions of the provisions of the environmental easement including any land use, groundwater, and surface water use restrictions;

- provisions for the management and inspection of the identified engineering controls;

- maintaining site access controls and Department notification;

- the steps necessary for the periodic reviews and certification of the institutional and/or engineering controls; and

- monitoring and maintenance of sediment traps installed to control contaminated sediment from entering and re-impacting drainageways during the remedial action and a timeframe applicable to stabilizing the streambeds.

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

- monitoring of surface water and sediments to assess the performance and effectiveness of the remedy;

- monitoring of the success of stream restoration with repairs as needed;

- monitoring and maintenance of the cap system; and

- a schedule of monitoring and frequency of submittals to the Department.

Exhibit A

Nature and Extent of Contamination

This section describes the findings of the Remedial Investigation for all environmental media that were evaluated. As described in Section 6.1, samples were collected from various environmental media to characterize the nature and extent of contamination.

For each medium for which contamination was identified, a table summarizes the findings of the investigation. The tables present the range of contamination found at the site in the media and compares the data with the applicable SCGs for the site. The contaminants are arranged into semi-volatile organic compounds (SVOCs), pesticides/ polychlorinated biphenyls (PCBs), and inorganics (metals and cyanide). For comparison purposes, the SCGs are provided for each medium that allows for unrestricted use. For soil, if applicable, the Restricted Use SCGs identified in Section 4 and Section 6.1.1 are also presented.

Waste/Source Areas

As described in the RI report, waste/source materials were identified at the site and are impacting groundwater, soil, surface water, and sediment.

Wastes are defined in 6 NYCRR Part 375-1.2(aw) and include solid, industrial and/or hazardous wastes. Source areas are defined in 6 NYCRR Part 375(au). Source areas are areas of concern at a site where substantial quantities of contaminants are found which can migrate and release significant levels of contaminants to another environmental medium. Wastes and source areas identified at the site include fill material contributing to metals contamination in soils throughout the site, and soils impacted with polychlorinated biphenyls (PCBs) as shown on Figure 2.

Fill Material Wastes: Fill material is present throughout the site at depths up to 25 feet below grade and has impacted soils, sediment, and surface water with heavy metals. The fill material consists of debris associated with metallurgical processes including the refining of stainless steel, which is evident from the detections of chromium throughout site soils, in sediment and surface water.

PCB Source Areas: PCBs were detected in two areas at the top of the northern and northeastern slope of the site with several detections above 50 ppm (New York State hazardous waste threshold) in the upper 1 foot of soils. Approximately 1,000 cy of soil is anticipated to be hazardous waste. PCBs above 1 ppm were detected at a maximum depth of 9 feet below grade. The PCB source areas are close to the steep northern and northeastern banks of the site. Weathering and erosion have likely contributed to the migration of this material down the northern slope, impacting sediments and surface water in the unnamed tributary.

The waste/source areas identified will be addressed in the remedy selection process.

Groundwater

Groundwater samples were collected from overburden and bedrock groundwater to assess contaminant transport on and off-site. Four overburden groundwater wells were attempted; two upgradient wells (one outside of the fill layer and one within the fill layer), and two downgradient wells within the fill layer, but refusal and non-existent water did not provide productive downgradient groundwater wells within the fill layer. Two bedrock groundwater

wells were also installed and sampling results did not show any impacts from site-related contaminants. Pore water samples were collected from shallow wells that intercepted seeps along the northern and northeastern slopes of the site. Results indicate site-related contaminants are present in leachate seeps (PP-02, PP-03, and PP-04) that discharge along the steep northern and northeastern banks of the site, as shown on Figure 5. Besides the pore water that creates the seeps, no dissolved-phase (filtered) contaminants were detected in overburden groundwater, which is only present along the southern and eastern portions of the site. One site-related contaminant of concern, chromium, was detected above standards in an unfiltered sample in one overburden monitoring well located in the south western portion of the site. The residences in the vicinity of the site receive municipal water that is not impacted by the site.

Table 1 - Groundwater

Detected Constituents	Concentration Range Detected (ppb)[a]	SCG[b] (ppb) (*ppt)	Frequency Exceeding SCG
Inorganics			
Barium	14.0-3,900	1000	4/12
Barium	14.0-3,900	1000	4/12
Barium (DISSOLVED)	30.0-1,500	1000	2/4
Chromium, Hexavalent	5.50-3,800	50	5/15
Chromium, Total	0-3,600	50	5/12
Chromium, Total (DISSOLVED)	0-870	50	2/4
Iron	0-8,500	300	9/12
Magnesium	28,700-454,000	35000	10/12
Magnesium (DISSOLVED)	11,800-142,000	35000	3/4
Manganese	11.0-1,000	300	6/12
Manganese (DISSOLVED)	49.0-590	300	2/4
Nickel	0-240	100	2/12
Selenium	0-160	10	4/12
Selenium (DISSOLVED)	0-120	10	2/4
Sodium	12,400-176,000	20000	8/12
Pesticides/PCBs			
PCB-1254 (Aroclor 1254)	0-1.5	0.09	3/14
Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluorooctanesulfonic acid (PFOS)	0-24	10*	1/5

a - ppb: parts per billion, which is equivalent to micrograms per liter, ug/L, in water.
b - SCG: Standard Criteria or Guidance - Ambient Water Quality Standards and Guidance Values (TOGs 1.1.1), 6 NYCRR Part 703, Surface water and Groundwater Quality Standards, and Part 5 of the New York State Sanitary Code (10 NYCRR Part 5).

* - 10 ppt (parts per trillion) is the New York State Recommended Maximum Contaminant Level (MCL) for both PFOS and PFOA

Based on the findings of the RI, the presence of metals and PCBs has resulted in the contamination of leachate seeps along the steep slopes of the site as shown in Figure 5. Water discharge from the seeps is attributed to the migration of precipitation through the waste mass, getting intercepted by the underlying clay surface, and discharging along the northern slope toward the unnamed tributary. The site contaminants that are considered the primary contaminants of concern which will drive the remediation of groundwater to be addressed by the remedy selection process are: chromium, barium, selenium, nickel and PCBs.

Soil

Surface soil samples were collected from depths of 0 to 0.2 feet below grade to assess direct human exposure. Soil samples were also collected from 0.2 to 2 feet below grade to asses soil conditions in the upper 2 feet. Subsurface soil samples were collected from soil cores and test pits at depths up to 30 feet below grade to asses impacts to groundwater and soil. Samples were analyzed for VOCs, SVOCs, metals, PCBs, and pesticides. Results indicate that soils at the site exceed restricted residential SCOs (RRSCOs) for SVOCs, metals, and PCBs.

The results indicate metals are present at concentrations above RRSCOs throughout the site at depths up to 28 feet below grade as shown in Figure 3. Hexavalent chromium was detected at concentrations above the Protection of Groundwater Soil Cleanup Objective (PGWSCO) and is attributed to detections of hexavalent chromium in on and off-site surface water. PCBs are present within a localized area in the northern portion of the site with two areas of elevated concentrations near the northern and northeastern slopes of the site as shown in Figure 2. PCBs detected at concentrations above 50 ppm were primarily limited to the upper foot of site soils. PCBs were detected above the RRSCO in one sample at 9 feet below grade out of 18 subsurface samples that were collected from depths ranging from 3 to 30 feet below grade.

Table 2 - Soil

Detected Constituents	Concentration Range Detected (ppm)[a]	Unrestricted SCG[b] (ppm)	Frequency Exceeding Unrestricted SCG	Protection of Groundwater SCG[d] (ppm)	Frequency Exceeding Restricted SCG	Restricted Use SCG[c] (ppm)	Frequency Exceeding Restricted SCG
SVOCs							
Benzo(A)Anthracene	0-2.90	1	1/46	1	1/46	1	1/46
Benzo(A)Pyrene	0-2.80	1	2/46	22	0/46	1	2/46
Benzo(B)Fluoranthene	0-3.90	1	2/46	1.7	2/46	1	2/46
Benzo(K)Fluoranthene	0-2.20	0.8	2/46	1.7	1/46	3.9	0/46
Chrysene	0-3.20	1	2/46	1	2/46	3.9	0/46
Indeno(1,2,3-C,D)Pyrene	0-1.00	0.5	2/46	8.2	0/46	0.5	2/46
Phenol	0-0.350	0.33	1/46	0.33	1/46	100	0/46
Inorganics							

Detected Constituents	Concentration Range Detected (ppm)[a]	Unrestricted SCG[b] (ppm)	Frequency Exceeding Unrestricted SCG	Protection of Groundwater SCG[d] (ppm)	Frequency Exceeding Restricted SCG	Restricted Use SCG[c] (ppm)	Frequency Exceeding Restricted SCG
Arsenic	0-59.5	13	16/56	16	15/56	16	15/56
Barium	7.40-12,100	350	25/56	820	20/56	400	24/56
Cadmium	0-36.1	2.5	12/56	7.5	3/56	4.3	5/56
Chromium, Hexavalent	0-178	1	31/52	19	8/52	110	1/52
Chromium, Total	0.0420-109,000	30	45/56	NS	-	110	36/56
Copper	0-2,600	50	31/54	1720	1/54	270	17/54
Lead	0-461	63	22/56	450	1/56	400	1/56
Manganese	250-15,700	1600	21/54	2000	19/54	2000	19/54
Mercury	0-29.9	0.18	17/56	0.73	4/56	0.81	3/56
Nickel	20.0-51,300	30	48/54	130	35/54	310	32/54
Selenium	0-120	3.9	27/56	4	26/56	180	0/56
Silver	0-3.50	2	7/56	8.3	0/56	180	0/56
Zinc	0-427	109	20/54	2480	0/54	10000	0/54
Pesticides/PCBs							
Aldrin	0-0.00560	0.005	1/46	0.19	0/46	0.097	0/46
Dieldrin	0-4.90	0.005	13/46	0.1	4/46	0.2	4/46
Endrin	0-1.50	0.014	5/46	0.06	4/46	11	0/46
P,P'-DDD	0-0.0100	0.0033	2/46	14	0/46	13	0/46
P,P'-DDE	0-0.0440	0.0033	6/46	17	0/46	8.9	0/46
P,P'-DDT	0-5.50	0.0033	16/46	136	0/46	7.9	0/46
PCB-1232 (Aroclor 1232)	0-0.340	0.1	1/108	3.2	0/108	1	0/108
PCB-1248 (Aroclor 1248)	0-15.0	0.1	1/108	3.2	1/108	1	1/108
PCB-1254 (Aroclor 1254)	0-300	0.1	57/108	3.2	23/108	1	35/108
PCB-1260 (Aroclor 1260)	0-10.0	0.1	28/108	3.2	5/108	1	16/108
PCB-1262 (Aroclor 1262)	0-2.10	0.1	2/108	3.2	0/108	1	1/108
PCB-1268 (Aroclor 1268)	0-0.600	0.1	1/108	3.2	0/108	1	0/108

Detected Constituents	Concentration Range Detected (ppm)[a]	Unrestricted SCG[b] (ppm)	Frequency Exceeding Unrestricted SCG	Protection of Groundwater SCG[d] (ppm)	Frequency Exceeding Restricted SCG	Restricted Use SCG[c] (ppm)	Frequency Exceeding Restricted SCG
Polychlorinated Biphenyl (PCBs)	0-300	0.1	32/108	3.2	18/108	1	23/108

a - ppm: parts per million, which is equivalent to milligrams per kilogram, mg/kg, in soil;
b - SCG: Part 375-6.8(a), Unrestricted Soil Cleanup Objectives.
c - SCG: Part 375-6.8(b), Restricted Use Soil Cleanup Objectives for the Protection of Public Health for Restricted Residential Use, unless otherwise noted.
d - SCG: Part 375-6.8(b), Restricted Use Soil Cleanup Objectives for the Protection of Groundwater.
NS - not specified; no standard

The primary contaminants of concern in soil are PCBs and metals as depicted on Figure 2 and 3. The metals are attributed to the site-wide presence of fill material at depths up to 28 feet below grade. PCBs are less widespread and more localized within the northern portion of the site with most detections present within the upper foot of site soils, with only one detection above RRSCOs at a depth of nine feet below grade.

Based on the findings of the Remedial Investigation, the site-wide presence of fill material and PCBs has resulted in the contamination of soil. The site contaminants identified in soil which are considered the primary contaminants of concern, to be addressed by the remedy selection process are, chromium (hexavalent and total), nickel, barium, cadmium, arsenic, copper, mercury, and PCBs. The limited SVOC detections above the RRSCOs are not considered contaminants of concern but will still be addressed by the proposed remedy.

Surface Water

Surface water samples were collected during the RI from off-site and on-site locations. The samples were collected to assess the surface water conditions on and off-site. The results indicate that contaminants in surface water at the site exceed the Department's SCG for chromium (hexavalent and total) on-site and at off-site, downgradient locations.

Table 3 - Surface Water

Detected Constituents	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)	Frequency Exceeding SCG
SVOCs			
Bis(2-ethylhexyl)phthalate	0-3.9	0.6	1/5
Inorganics			
Aluminum	72-5,000	100	7/10
Chromium, Total	2.5-620	*	4/10
Chromium, Hexavalent	0-514	11	6/10
Iron + Manganese	126-5,530	500	6/10
Selenium	0-32	4.6	6/10
Pesticides/PCBs			

Detected Constituents	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)	Frequency Exceeding SCG
Gamma-BHC/Lindane	0-0.014	0.008	2/5
Heptachlor epoxide	0-0.01	0.0003	1/5

a - ppb: parts per billion, which is equivalent to micrograms per liter, ug/L, in water.
b - SCG: Class C Surface Water Standard, Ambient Water Quality Standards and Guidance Values (TOGs 1.1.1) and 6 NYCRR Part 703: Surface Water and Groundwater Quality Standards.
* - Class C Surface Water Standard for total chromium is a function of hardness as calcium carbonate and ranged from 327 – 427 ppb

Based on the findings of the Remedial Investigation, the site-wide presence of fill material impacted with metals has resulted in the contamination of surface water. As noted on Figure 6, the primary surface water contaminant of concern which will drive remediation of surface water to be addressed by the remedy selection process is hexavalent chromium.

Sediments

Sediment samples were collected during the RI from the unnamed tributary that flows through the northwest corner of the site. Samples were collected from off-site locations upstream and downstream of the site, and where the tributary flows through the site. The samples were collected to assess the potential for impacts to tributary sediment from the site. The results indicate that on-site and off-site sediment exceed the Department's SCGs for sediments for chromium, nickel, arsenic, copper, and PCBs. The concentrations of contaminants of concern were compared to the Class A guidelines specified in Commissioner Policy – 60, Screening and Assessment of Contaminated Sediment.

Table 4 - Sediment

Detected Constituents	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)	Frequency Exceeding SCG	SCG[c] (ppm)	Frequency Exceeding SCG
Inorganics					
Arsenic	5.5-14.3	10	6/14	33	0/14
Chromium, Total	28.8-1,420	43	9/14	110	9/14
Copper	23.4-78.7	32	8/14	150	0/14
Nickel	38.3-711	23	3/14	49	11/14
Zinc	66.6-138	120	1/14	460	0/14
Pesticides/PCBs					
PCB-1254 (Aroclor 1254)	0-0.21	0.1	2/14	1	0/14
Polychlorinated biphenyl (PCBs)	0-0.21	0.1	2/14	1	0/14

a - ppm: parts per million, which is equivalent to milligrams per kilogram, mg/kg, in sediment;

b - SCG: Class B lower limit – sediment is Class A if below this level; Class B sediments "are slightly to moderately contaminated and additional testing is required to evaluate potential risk", NYSDEC Commissioner Policy-60, Screening and Assessment of Contaminated Sediment;
c - SCG: Class C lower limit – sediment is Class C if above this level; Class C sediments "are considered highly contaminated and are likely to pose a risk to aquatic life", NYSDEC Commissioner Policy-60, Screening and Assessment of Contaminated Sediment.

The primary contaminants of concern in sediment are chromium and nickel associated with the metallurgical-related fill material present throughout the site. These metals, along with the presence of PCBs, are contributing to impacts to sediments in the unnamed tributary, likely from the erosion of waste material down the steep northern bank into the tributary. As shown in Figure 6, the most elevated sediment contamination is found downstream of the impacted seep (PP-02) that discharges into the tributary.

Based on the findings of the Remedial Investigation, the presence of metals and PCBs has resulted in the contamination of sediment. The site contaminants that are considered the primary contaminants of concern which will drive the remediation of sediment to be addressed by the remedy selection process are, chromium, nickel, and PCBs.

Exhibit B

Description of Remedial Alternatives

The following alternatives were considered based on the remedial action objectives (see Section 6.5) to address the contaminated media identified at the site as described in Exhibit A.

Alternative 1: No Action

The No Action Alternative is evaluated as a procedural requirement and as a basis for comparison. This alternative leaves the site in its present condition and does not provide any additional protection to public health and the environment.

Alternative 2: Restoration to Pre-Disposal or Unrestricted Conditions

This alternative achieves all of the SCGs discussed in Section 6.1.1 and Exhibit A and meets the unrestricted soil cleanup objectives listed in Part 375-6.8(a). This alternative includes excavation and off-site disposal of all waste and soil contamination above the unrestricted soil cleanup objectives. This alternative does not rely on institutional or engineering controls to prevent future exposure. There is no Site Management, no restrictions, and no periodic review. This alternative has no annual monitoring and maintenance costs.

Capital Cost:..... *$17,900,000*

Alternative 3: Excavation, Consolidation, Impermeable Cap System, and Soil Cover

This alternative includes excavation and off-site disposal of soil contaminated with PCBs at concentrations greater than 50 ppm and impacted stream sediments. Consolidation and grading of remaining soils, on-site and off-site, impacted with PCBs and metals will occur followed by placement of a site-wide cover system. A two foot soil cover will be placed across the majority of the site, however, the cover will be enhanced in the areas directly adjacent to the stream. In those areas an impermeable cap system will be installed. The cap will be placed over areas directly uphill of the stream to prevent site-related contaminants from migrating into the stream via leachate seeps. The cover and cap systems will be designed to prevent direct exposure and stormwater infiltration to stop contamination mobilization. This alternative includes institutional controls for long term monitoring of surface water to evaluate the effectiveness of the remedy. Institutional controls will also regulate site access and place land use restrictions on the property. The exact extent of the impermeable cover will be determined during the design.

Present Worth:..... *$5,410,000*
Capital Cost:..... *$5,010,000*
Annual Costs:..... *$13,200*

Alternative 4: Excavation, Consolidation, and Impermeable Cap System

This alternative includes excavation and off-site disposal of soil contaminated with PCBs at concentrations greater than 50 ppm. In addition, all soil outside the consolidation area that exceeds restricted residential SCOs will be excavated and consolidated in the on-site area. More extensive consolidation is included in this Alternative than in Alternative 3 to reduce the footprint of the waste mass. This alternative also includes installation of an

impermeable cap system over the consolidation area to prevent direct exposure, minimize stormwater infiltration and contamination mobilization. Following installation of the cap, the impacted sediments in the unnamed tributary will be excavated and disposed off-site. As discussed in Alternative 3, institutional controls are included for long term monitoring of surface water to evaluate effectiveness of the remedy, to regulate site access, and place land restrictions on the property.

Present Worth: *$9,920,000*
Capital Cost: *$9,520,000*
Annual Costs: *$13,200*

Exhibit C

Remedial Alternative Costs

Remedial Alternative	Capital Cost ($)	Annual Costs ($)	Total Present Worth ($)
No Action	0	0	0
Restoration to Pre-Disposal Conditions	17,900,000	0	17,900,000
Excavation, Consolidation, Impermeable Cap System, and Soil Cover	5,010,00	13,200	5,410,000
Excavation, Consolidation, and Impermeable Cap System	9,520,000	13,200	9,920,000

Exhibit D

SUMMARY OF THE PROPOSED REMEDY

The Department is proposing Alternative 3: "Excavation, Consolidation, Impermeable Cap System, and Soil Cover" as the remedy for this site. Alternative 3 achieves the remediation goals for the site by removing contaminated sediments in the unnamed tributary and capping the consolidated waste mass beneath an impermeable cap system to prevent further contaminant mobilization from infiltrating precipitation, or beneath a soil cover to prevent direct exposure. The remedy also removes PCBs present at concentrations above the 50 ppm hazardous waste threshold and includes institutional controls to monitor the effectiveness of the remedy. The elements of this remedy are described in Section 7. The proposed remedy is depicted in Figure 4.

Basis for Selection

The proposed remedy is based on the results of the RI and the evaluation of alternatives. The criteria to which potential remedial alternatives are compared are defined in 6 NYCRR Part 375. A detailed discussion of the evaluation criteria and comparative analysis is included in the FS report.

The first two evaluation criteria are termed "threshold criteria" and must be satisfied for an alternative to be considered for selection.

1. Protection of Human Health and the Environment. This criterion is an overall evaluation of each alternative's ability to protect public health and the environment.

The proposed remedy satisfies this criterion by relocating contaminated soils to a consolidated area beneath a cap system or soil cover to prevent human exposure. The cap system also prevents further migration of contaminants into the sediment and surface water of the unnamed tributary. Alternative 1 does not provide any protection to public health and the environment and will not be evaluated further. Alternative 2, by removing all soil above the UUSCOs, and by removing all impacted stream sediment, meets the threshold criteria. Alternatives 3 and 4 both reduce the potential for migration of site-related contamination by encapsulating the waste with an impermeable cap system.

2. Compliance with New York State Standards, Criteria, and Guidance (SCGs). Compliance with SCGs addresses whether a remedy will meet environmental laws, regulations, and other standards and criteria. In addition, this criterion includes the consideration of guidance which the Department has determined to be applicable on a case-specific basis.

Alternative 3 and 4 comply with SCGs to the extent practicable. They address PCB source areas, rely on a cap system and/or soil cover to prevent exposures and releases to the environment, and achieve Class A guidelines for metals in stream sediments. Alternative 2 will result in full compliance with site specific and chemical specific SCGs as it will return the site to pre-disposal conditions whereas Alternative 3 and 4 result in a lesser degree of compliance with site specific and chemical specific SCGs since contamination will be present beneath a cap system that encompasses a larger area. Therefore Alternative 2 ranks highest for meeting site specific and chemical-specific SCGs, followed by Alternatives 3 and 4.

The next six "primary balancing criteria" are used to compare the positive and negative aspects of each of the remedial strategies.

3. Long-term Effectiveness and Permanence. This criterion evaluates the long-term effectiveness of the remedial alternatives after implementation. If wastes or treated residuals remain on-site after the selected remedy has been implemented, the following items are evaluated: 1) the magnitude of the remaining risks, 2) the adequacy of the engineering and/or institutional controls intended to limit the risk, and 3) the reliability of these controls.

Long-term effectiveness is best accomplished by the alternative that involves excavation of all the contaminated soils and sediment (Alternatives 2). Alternative 3 and 4, through the use of institutional controls and long-term monitoring, will ensure their long-term effectiveness, but are not as permanent as removing all contaminated media as proposed in Alternative 2. The degree of long-term effectiveness and permanence between Alternative 3 and Alternative 4 is uncertain since both require approximately the same amount of maintenance. Both Alternative 3 and 4 reduce potential impacts to the tributary since contaminated soils uphill of the tributary will be beneath an impermeable surface cap. Alternative 3 does not include the same degree of consolidation as proposed with Alternative 4 and will result in a larger cap system to maintain. Therefore, Alternative 2 is best at achieving long-term effectiveness, followed by both Alternatives 3 and 4.

4. Reduction of Toxicity, Mobility or Volume. Preference is given to alternatives that permanently and significantly reduce the toxicity, mobility or volume of the wastes at the site.

Alternative 3 and 4 both control potential exposures with the cap and cover system and institutional controls which both reduce mobility of remaining contaminants. Both Alternative 3 and 4 include removal of PCBs present at concentrations above 50 ppm, thereby reducing the volume of contamination at the site. Alternative 2 includes removal of the total volume of contamination present at the site which reduces the toxicity, mobility and volume better than any other alternative.

5. Short-term Impacts and Effectiveness. The potential short-term adverse impacts of the remedial action upon the community, the workers, and the environment during the construction and/or implementation are evaluated. The length of time needed to achieve the remedial objectives is also estimated and compared against the other alternatives.

The short-term impacts of Alternative 2 create a high level of impact to the community due to the large amount of trucking needed to remove all contaminated soil and sediment from the site. Both Alternatives 3 and 4 have approximately the same amount of short-term impacts, with Alternative 3 needing slightly less time than Alternative 4 to achieve remediation goals. Alternative 3 and 4 require the same degree of off-site trucking to remove PCBs at concentrations above 50 ppm. The consolidation included in Alternative 4 may require a slightly longer duration of equipment operation, leading to a slightly higher degree of short-term impact to the community than with Alternative 3. The degree of short-term impacts between Alternative 3 and 4 is unclear and potentially insignificant, however the time needed to achieve the remediation goals with Alternative 2 is the longest and has the highest impact on the community.

6. Implementability. The technical and administrative feasibility of implementing each alternative are evaluated. Technical feasibility includes the difficulties associated with the construction of the remedy and the ability to monitor its effectiveness. For administrative feasibility, the availability of the necessary personnel and materials is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, institutional controls, and so forth.

Alternatives 3 and 4 are similarly implementable in that they both include excavation of sediment and PCB impacted soils. Alternative 3 is slightly more implementable because less consolidation is proposed than with Alternative 4. The degree to which Alternative 3 is more implementable is uncertain since both Alternatives will require some consolidation prior to installation of a cap system. The cap system proposed in Alternative 4 is smaller than that required in Alternative 3, making Alternative 4's cap system slightly easier to implement and maintain. While the lack of monitoring included with Alternative 2 is more implementable than the monitoring required under Alternative 3 and 4, the significant quantity of material required for excavation makes Alternative 2 the least implementable alternative.

7. Cost-Effectiveness. Capital costs and annual operation, maintenance, and monitoring costs are estimated for each alternative and compared on a present worth basis. Although cost-effectiveness is the last balancing criterion evaluated, where two or more alternatives have met the requirements of the other criteria, it can be used as the basis for the final decision.

There are significant differences between the costs of each alternative, with Alternative 2 having the highest cost at almost twice the cost of Alternative 4, and Alternative 3 costing the least amount. The long-term maintenance costs of Alternative 3 and 4 are estimated to be the same, but Alternative 4 may have slightly less maintenance costs due to the smaller cap footprint which may require less maintenance. Alternative 2 does not have any long-term maintenance costs, but due to the significant capital cost difference compared to Alternatives 3 and 4, the lack of monitoring and maintenance costs with Alternative 2 does not make it more cost-effective compared with the other alternatives. Alternative 3 is therefore the most cost effective, followed by Alternative 4, and then 2.

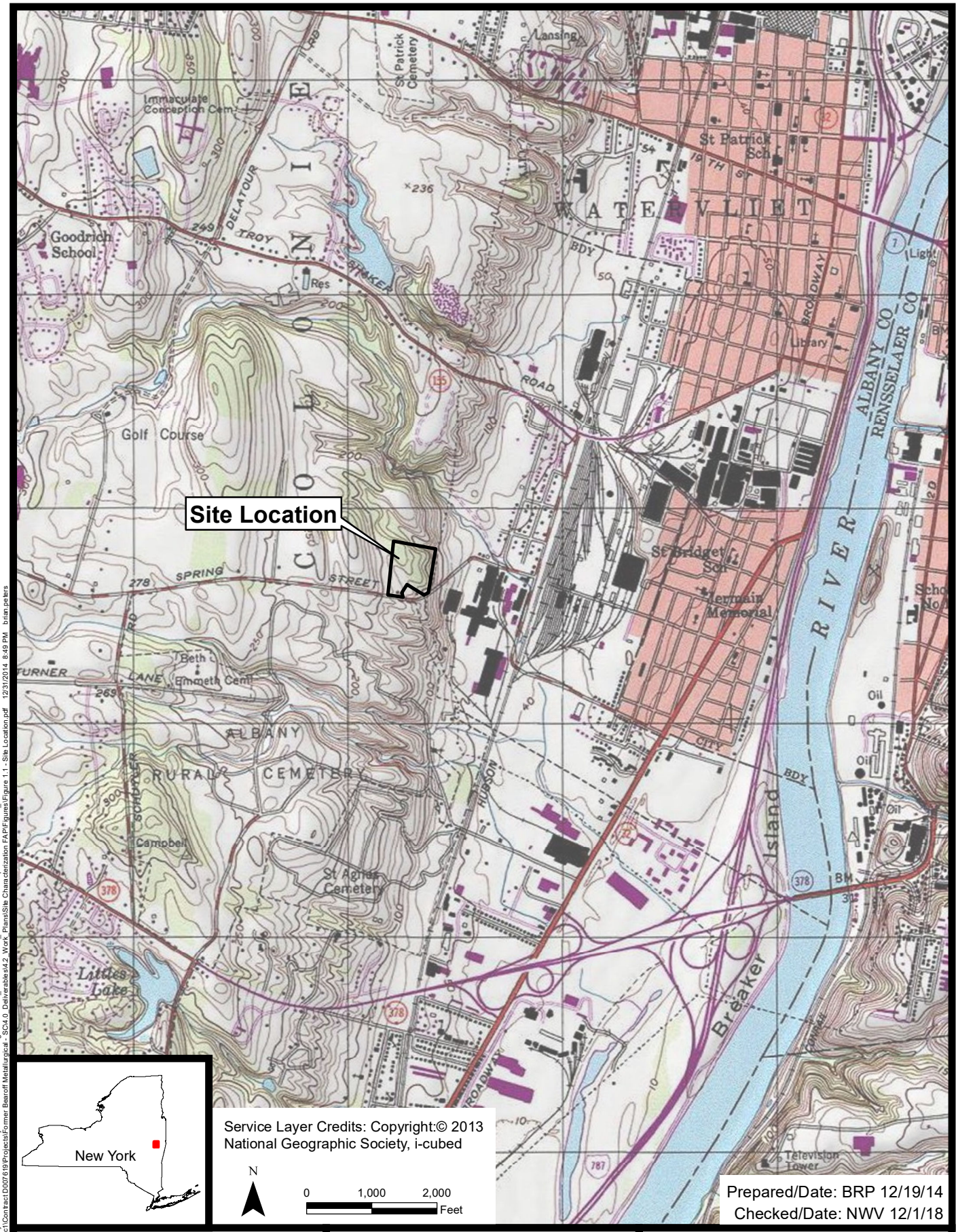
8. Land Use. When cleanup to pre-disposal conditions is determined to be infeasible, the Department may consider the current, intended, and reasonable anticipated future land use of the site and its surroundings in the selection of the soil remedy.

Since the anticipated use of the site is restricted residential, Alternative 2 best achieves this criterion since it allows unrestricted use of the site. Alternatives 3 and 4 are less desirable since institutional and engineering controls are required to ensure the public and the environment are protected from remaining contamination. These controls ensure that restricted residential use of the site can be maintained, but to a lesser degree than Alternative 2. Therefore, Alternative 2 allows for the least restrictive land use, and the degree to which Alternative 3 or 4 will negatively affect land use more is uncertain.

The final criterion, Community Acceptance, is considered a "modifying criterion" and is taken into account after evaluating those above. It is evaluated after public comments on the Proposed Remedial Action Plan have been received.

9. Community Acceptance. Concerns of the community regarding the investigation, the evaluation of alternatives, and the PRAP are evaluated. A responsiveness summary will be prepared that describes public comments received and the manner in which the Department will address the concerns raised. If the selected remedy differs significantly from the proposed remedy, notices to the public will be issued describing the differences and reasons for the changes.

Alternative 3 is being proposed because, as described above, it satisfies the threshold criteria and provides the best balance of the balancing criteria.



NYSDEC Site # 401069
Former Bearoff Metallurgical
Colonie, New York

MACTEC

Site Location

Project 3611171207 Figure 1A

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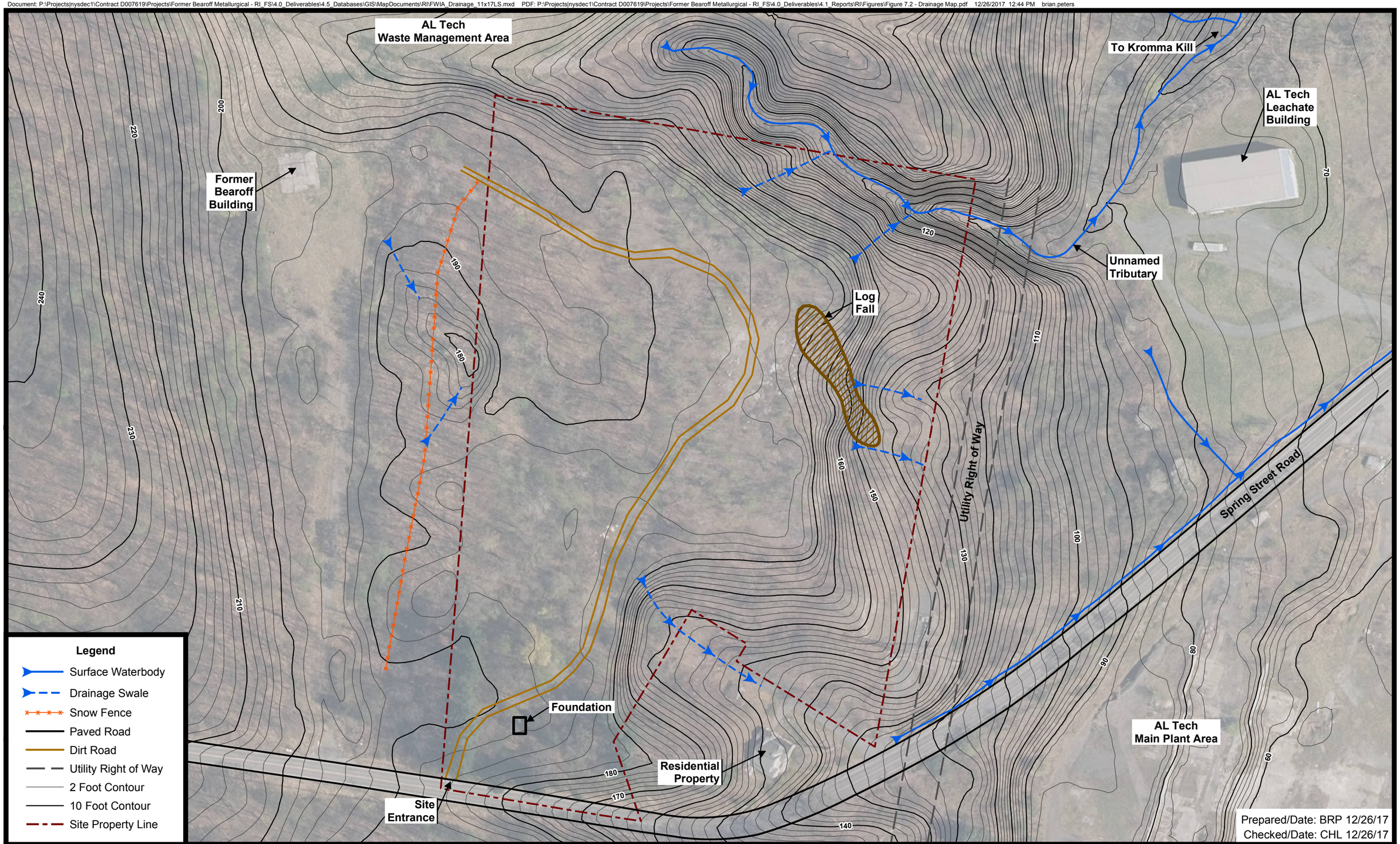
PDF: P:\Projects\nysdec1\Contract D007619\Projects\Former Bearoff Metallurgical - SC\4.0_Deliverables\4.2_Work_Plans\Site Characterization FAP\Figures\Figure 1.1- Site Location.pdf 12/31/2014 8:49 PM brian.peters



Legend

- Surface Waterbody
- Drainage Swale
- Snow Fence
- Paved Road
- Dirt Road
- Utility Right of Way
- 2 Foot Contour
- 10 Foot Contour
- Site Property Line

Prepared/Date: BRP 12/26/17
Checked/Date: CHL 12/26/17

N

0 55 110 Feet

Albany County color digital orthoimagery (2014) obtained from New York State GIS Clearinghouse at: http://www.nysgis.state.ny.us
1:24,000 scale Hydrography for Troy South quadrangle obtained from Cornell University Geospatial Information Repository (CUGIR) at: http://cugir.mannlib.cornell.edu

NYSDEC Site # 401069
Former Bearoff Metallurgical
Colonie, New York

MACTEC

Site Layout Map

Project 3611171207 Figure 1B

AL Tech
Waste Management Area

1,918 Sq Ft

3,373 Sq Ft

103,922 Sq Ft

353,617 Sq Ft

Unnamed Tributary

Utility Right of Way

Site Entrance

Residential Property

Legend

Soil Contamination:
- PCBs > 1 ppm
- PCBs > 50 ppm
- Estimated Extent of Contamination (PCBs and Metals)
- Approximate Limits of Waste

- Site Property Line
- Paved Road
- Dirt Road
- Utility Right of Way
- 2 Foot Contour
- 10 Foot Contour
- Stream

N

0 40 80 Feet

Soil	Estimated Volume (Cu Ft)	Estimated Volume (Cu Yd)
PCBs > 50 ppm	26,455	980
Extent of Contamination	1,580,000	58,519

Prepared/Date: BRP 01/28/20
Checked/Date: NWV 01/28/20

NYSDEC Site # 401069
Former Bearoff Metallurgical
Colonie, New York

MACTEC

Estimated Extent of PCB Contamination in Soil
Project 3611171207 Figure 2

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AL Tech
Waste Management Area

Note:
Horizontal and vertical extents determined using analytical data and observations of Site fill in borings/test pits.

Unnamed Tributary

Utility Right of Way

Site Entrance

Residential Property

Legend

Soil Contamination Depth:
- 0-0.2 ft bgs
- 0.2-2 ft bgs
- >2 ft bgs

Exceeds Restricted Residential SCO at:
- 0-0.2 ft bgs
- 0.2-2 ft bgs
- >2ft bgs

Approximate Limits of Waste

- Site Property Line
- Paved Road
- Dirt Road
- Utility Right of Way
- 2 Foot Contour
- 10 Foot Contour
- Stream

N

0 40 80 Feet

Soil Sample Criteria:
SCOs - 6 NYCRR Subpart 375-6 Remedial Program Soil Cleanup Objectives, 2006
CP-51 - NYS Soil Cleanup Guidance Policy CP-51, 2010.

Prepared/Date: BRP 01/28/20
Checked/Date: NWV 01/28/20

NYSDEC Site # 401069
Former Bearoff Metallurgical
Colonie, New York

MACTEC

Estimated Extent of Metals in Soil
Exceeding Restricted Residential SCO
Project 3611171207 Figure 3

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Alternative 3: Excavation and off-site disposal of soils and sediment with PCB concentrations >50 mg/kg, consolidation waste from steep slopes, and capping of approximate limits of soil contamination with an engineered cap system. This also includes excavation and off-site disposal of sediment exceeding Class A SGVs from the unnamed tributary.

Site-related waste that extends beyond the property boundary will be assessed and consolidated on-site as applicable with neighboring property zoning and SCOs.

AL Tech
Waste Management Area

Unnamed Tributary

Utility Right of Way

Site Entrance

Residential Property

170
190
120
130
110
90
180
160
150
100
140

Legend

Soil Contamination:
- PCBs > 1 ppm
- PCBs > 50 ppm
- Approximate Limits of Waste
- Site Property Line
- Paved Road
- Dirt Road
- Utility Right of Way
- 2 Foot Contour
- 10 Foot Contour
- Stream

- Excavation and offsite disposal of approximately 1,000 cubic yards of soil with PCBs >50 mg/kg.
- Consolidate soil from steep areas into main site area, estimated 2 acres.
- Cap limits of soil contamination with 6 NYCRR Part 360 engineered cap system, estimated 2 acres.
- Soil Cover, est. 4 acres. All off-site soils will be consolidated on-site.
- Excavation and off site disposal of 509 cubic yards of sediment exceeding Class A SGVs.

N

0 45 90 Feet

Prepared/Date: BRP 02/24/20
Checked/Date: NWV 02/24/20

NYSDEC Site # 401069
Former Bearoff Metallurgical
Colonie, New York

MACTEC

Proposed Alternative

Project 3611171207 Figure 4

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cuments\PRAP\PRAP_Remed_Options_11x17P.mxd PDF: P:\Projects\nysdec1\Contract D007619\Projects\Former Bearoff Metallurgical - RI_FS\4.0_Deliverables\4.5_Databases\GIS\MapDocuments\P

Notes:
PCBs and Pesticides are in ug/L
Metals are in mg/L
U = not detected at the reporting limit
J = estimated concentration
GA/GV = NYS Class GA Standards and Guidance Values
Shaded and bold results indicate exceedance of standard

PZ-01, PZ-03 and MW-02 have historically been dry and have not been sampled

AL Tech Waste Management Area

Former Bearoff Building

AL Tech Leachate Building

Unnamed Tributary

Drainage Ditch

Spring Street Road

Residential Property

AL Tech Main Plant Area

Site Entrance

PZ-01

MW-02

PZ-03

PP-02

Parameter	GA/GV	Sample Date 5/7/2015		Sample Date 10/16/2018	
PCBs (µg/L)					
Aroclor-1254	0.09	0.48	U	**1.5**	
PCB (total)	0.09	0.48	U	**1.5**	
Metals (mg/L)					
Barium	1	**2.0**		**2**	
Chromium	0.05	**2.1**		**3.6**	
Chromium, Hexavalent	0.05	**2.11**	J	**3.8**	
Iron	0.3	**2.3**		**0.12**	
Magnesium	35	**120**		**151**	
Selenium	0.01	**0.1**		**0.16**	

BR-201

Parameter	GA/GV	Sample Date 10/16/2018
Metals (mg/L)		
Magnesium	35	**35.7**

MW-01

Parameter	GA/GV	Sample Date 5/7/2015		Sample Date 8/29/2017	
Pesticides (µg/L)					
Heptaclor epoxide	0.03	**0.031**	J	NS	
Metals (mg/L)					
Iron	0.3	**0.5**		**0.82**	
Magnesium	35	**45.4**		**393**	
Manganese	0.3	**1.0**		**0.92**	
Sodium	20	**176**		**150**	

PP-01

Parameter	GA/GV	Sample Date 5/7/2015
Metals (mg/L)		
Manganese	0.3	**0.59**

BR-202

Parameter	GA/GV	Sample Date 10/16/2018	Sample Date 10/16/2018 (D)
Metals (mg/L)			
Iron	0.3	**0.96**	**0.88**
Magnesium	35	**94.5**	**92.1**
Manganese	0.3	**0.59**	**0.58**

MW-04

Parameter	GA/GV	Sample Date 5/7/2015		Sample Date 8/29/2017	
Metals (mg/L)					
Chromium	0.05	0.004	U	**0.32**	
Iron	0.3	**0.031**	J	**2.2**	
Magnesium	35	**142**		**170**	
Manganese	0.3	**0.51**		**0.082**	
Nickel	0.1	**0.0051**	J	**0.16**	
Sodium	20	**58.7**		**68.1**	

MW- 101

Parameter	GA/GV	Sample Date 8/29/2017	Sample Date 8/29/2017 (D)
Metals (mg/L)			
Sodium	20	**38.1**	**39**

PP-03

Parameter	GA/GV	Sample Date 5/7/2015		Sample Date 10/16/2018		Sample Date 10/16/2018	
PCBs (µg/L)							
Aroclor-1254	0.09	**0.36**	J	NS		NS	
PCB (total)	0.09	**0.36**		NS		NS	
Metals (mg/L)							
Barium	1	**2.6**		**3.9**		**1.5**	
Chromium	0.05	**0.85**		**1.3**		**0.87**	
Chromium, Hexavalent	0.05	**0.266**	J	**0.78**			
Iron	0.3	**8**		**8.5**		**0.056**	
Magnesium	35	**56.4**		**74.2**		**71.2**	
Manganese	0.3	**0.46**		**1**		**0.049**	
Nickel	0.1	**0.032**		**0.24**		**0.0016**	J
Selenium	0.01	**0.13**		**0.13**		**0.12**	

PP-04

Parameter	GA/GV	Sample Date 5/7/2015	
PCBs (µg/L)			
Aroclor-1254	0.09	**0.41**	J
PCB (total)	0.09	**0.41**	
Metals (mg/L)			
Barium	1	**1.2**	
Chromium	0.05	**0.14**	
Chromium, Hexavalent	0.05	**0.059**	
Magnesium	35	**47.6**	
Selenium	0.01	**0.071**	

Legend

- Monitoring Well - Overburden
- Piezometer - Overburden
- Monitoring Well - Bedrock
- Seep
- Northern Overburden Groundwater Extent
- Site Property Line
- Stream
- 2 Foot Contour
- 10 Foot Contour

Note: The interpreted northern overburden groundwater extent is derived from on-site water level measurements from the Site Characterization, Remedial Investigation and Data Gap Investigation.

Prepared/Date: BRP 01/29/20
Checked/Date: NWV 01/29/20

N

0 70 140 Feet

Albany County color digital orthoimagery (2014) obtained from New York State GIS Clearinghouse at: http://www.nysgis.state.ny.us

NYSDEC Site # 401069
Former Bearoff Metallurgical
Colonie, New York

MACTEC

Class GA Groundwater Exceedances

Project 3611171207 Figure 5

SW-109

Parameter	Class C SW	Sample Date 5/7/2015
SVOCs (mg/L)		
Bis(2-Ethylhexyl)phthalate	0.0006	**0.0039** J
Metals (mg/L)		
Aluminum	0.1	**1.3**
Iron + Manganese	0.5	**1.53**

SD-109

Parameter	Class B Lower	Class B Upper	Sample Date 5/7/2015
Metals (mg/kg)			
Arsenic	10	33	**10**
Chromium	43	110	**196**
Copper	32	150	**34.7**
Nickel	23	49	**110**
Zinc	120	460	**138**

SW-201

Parameter	Class C SW	Sample Date 8/2/2017
Metals (mg/L)		
Aluminum	0.1	**0.71**
Iron + Manganese	0.5	**0.629**

SD-201A

Parameter	Class B Lower	Class B Upper	Sample Date 8/2/2017
Metals (mg/kg)			
Arsenic	10	33	**14.3**
Chromium	43	110	**63.4** J
Nickel	23	49	**45.1**

SW-110

Parameter	Class C SW	Sample Date 5/7/2015
Metals (mg/L)		
Aluminum	0.1	**5**
Iron + Manganese	0.5	**5.53**

SW-202

Parameter	Class C SW	Sample Date 8/2/2017
Metals (mg/L)		
Aluminum	0.1	**0.2**
Iron + Manganese	0.5	**1.06**

SW-108

Parameter	Class C SW	Sample Date 5/7/2015
Pesticides (mg/L)		
Gamma-BHC/Lindane	0.000008	**0.00001** J
Metals (mg/L)		
Chromium	*	**0.62** J
Chromium, Hexavalent	0.011	**0.514** J

SW-205

Parameter	Class C SW	Sample Date 8/2/2017	8/2/2017 (D)
Metals (mg/L)			
Chromium, Hexavalent	0.011	**0.11** J	**0.12** J
Selenium	0.0046	**0.0094** J	**0.0095** J

SD-110

Parameter	Class B Lower	Class B Upper	Sample Date 5/7/2015
Metals (mg/kg)			
Chromium	43	110	**420**
Copper	32	150	**49.2**
Nickel	23	49	**215**

SD-108

Parameter	Class B Lower	Class B Upper	Sample Date 5/7/2015
PCBs (mg/kg)			
Aroclor-1254	0.1	1	**0.11** J
PCB (total)	0.1	1	**0.14**
Metals (mg/kg)			
Arsenic	10	33	**13.5**
Chromium	43	110	**316**
Copper	32	150	**78.7**
Nickel	23	49	**711**

SW-203

Parameter	Class C SW	Sample Date 8/2/2017
Metals (mg/L)		
Aluminum	0.1	**0.18** J
Chromium	*	**0.49**
Chromium, Hexavalent	0.011	**0.43**
Selenium	0.0046	**0.031**

SW-103

Parameter	Class C SW	Sample Date 5/7/2015	5/7/2015 (D)
Pesticides (mg/L)			
Gamma-BHC/Lindane	0.000008	**0.00001** J	0.00005 U
Heptachlor epoxide	0.0000003	0.00005 U	**0.00001** J
Metals (mg/L)			
Aluminum	0.1	**4.2** J	**3** J
Chromium	*	**0.45** J	**0.47** J
Chromium, Hexavalent	0.011	**0.492** J	**0.507** J
Iron + Manganese	0.5	**3.32**	**2.568**
Selenium	0.0046	**0.026**	**0.027**

SD-202A

Parameter	Class B Lower	Class B Upper	Sample Date 8/2/2017
Metals (mg/kg)			
Chromium	43	110	**80.9** J
Nickel	23	49	**67.5**

SD-202B

Parameter	Class B Lower	Class B Upper	Sample Date 8/2/2017
Metals (mg/kg)			
Chromium	43	110	**56.2** J
Nickel	23	49	**55.1**

SD-203A

Parameter	Class B Lower	Class B Upper	Sample Date 8/2/2017
PCBs (mg/kg)			
Aroclor-1254	0.1	1	**0.11** J
PCB (total)	0.1	1	**0.14**
Metals (mg/kg)			
Chromium	43	110	**95.8** J
Nickel	23	49	**68.6**

SD-203B

Parameter	Class B Lower	Class B Upper	Sample Date 8/2/2017
Metals (mg/kg)			
Nickel	23	49	**68.6** U

13,738 Sq Ft
~509 Cu Yd

SD-103

Parameter	Class B Lower	Class B Upper	Sample Date 5/7/2015
Metals (mg/kg)			
Chromium	43	110	**316**
Nickel	23	49	**46.3**

SD-204A

Parameter	Class B Lower	Class B Upper	Sample Date 8/2/2017
Metals (mg/kg)			
Arsenic	10	33	**11.1**
Chromium	43	110	**670** J
Copper	32	150	**59.3**
Nickel	23	49	**666**

SD-204B

Parameter	Class B Lower	Class B Upper	Sample Date 8/2/2017
Metals (mg/kg)			
Arsenic	10	33	**12**
Chromium	43	110	**1040** J
Copper	32	150	**56.2**
Nickel	23	49	**709**

SD-205A

Parameter	Class B Lower	Class B Upper	Sample Date 8/2/2017	8/2/2017 (D)
Metals (mg/kg)				
Arsenic	10	33	**13** J	**8.4** J
Chromium	43	110	**393** J	**441** J
Copper	32	150	**44.8**	**61.2**
Nickel	23	49	**229**	**220**

SD-205B

Parameter	Class B Lower	Class B Upper	Sample Date 8/2/2017
Metals (mg/kg)			
Chromium	43	110	**445** J
Copper	32	150	**38.8**
Nickel	23	49	**320**

Surface Water Notes:
Class C SW - surface water standard for waters suitable for fish, shellfish, and wildlife survival.
Yellow highlighted cell indicates an exceedance of the Class C surface water quality standard.
U = not detected at the reporting limit
J = estimated concentration
(D) = Duplicate sample result

Sediment Notes:
SGV- NYS Freshwater Sediment Guidance Value - Table 5 (6/24/2014)
Class B SGV Range - "sediments are slightly to moderately contaminated and additional testing is required to evaluate potential risk"
Class C SGV - values exceeding the Class B range, "sediments are considered highly contaminated and are likely to pose a risk to aquatic life"
Yellow highlighted cell indicates the value is within the Class B SGV range
Red highlighted cell exceeds the Class B Upper Range (Class C)
U = not detected at the reporting limit
J = estimated concentration

Legend

- Estimated Extent of Surface Water and Sediment Contamination
- Hexavalent Chromium in Surface Water:
  - Not Detected
  - Detected < Surface Water Criteria
  - Exceeds Surface Water Criteria
- Metals in Sediment:
  - Not Detected
  - Detected
  - Class B SGV
  - Class C SGV
- Site Property Line
- Utility Right of Way
- Stream
- 2 Foot Contour
- 10 Foot Contour

N

0 20 40 Feet

Prepared/Date: BRP 01/29/20
Checked/Date: NWV 01/29/20

NYSDEC Site # 401069
Former Bearoff Metallurgical
Colonie, New York

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Estimated Extent of Surface Water and Sediment Contamination
Project 3611171207 Figure 6