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# GENERAL MOTORS -- INLAND FISHER GUIDE OPERABLE UNIT 2 FOCUSED FEASIBILITY STUDY

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# GENERAL MOTORS -- INLAND FISHER GUIDE – OPERABLE UNIT 2 FOCUSED FEASIBILITY STUDY REPORT SYRACUSE, NEW YORK

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# ACRONOMYS AND ABBREVIATIONS

ARARs - Applicable or Relevant and Appropriate Requirements
BERA – Baseline Ecological Risk Assessment
CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act
CFR – Code of Federal Regulations
cfs – cubic feet per second
COC – Contaminant of Concern
CT – Central Tendancy
CY – cubic yards
DER – Division of Environmental Remediation
ESD – Explanation of Significant Differences
FEMA – Federal Emergency Management Agency
FFS - Focused Feasibility Study
ft - feet
GHG – Greenhouse Gas
GM - General Motors
GRA – General Response Action
HHRA – Human Health Risk Assessment
HI – Hazard Indices
HQ – Hazard Quotient
IFG – Inland Fisher Guide
mg/kg – milligram per kilogram
$MTCO_2e$ – metric tons $CO_2$ equivalents
NCP - National Oil and Hazardous Substances Pollution Contingency Plan
NYCRR – New York Codes, Rules, and Regulations
NYS – New York State
NYSDEC - New York State Department of Environmental Conservation
OCDDS – Onondaga County Department of Drainage and Sanitation
ORPS – Onondaga County Department of Finance Office of Real Property Services
OU-2 – Operable Unit 2
PCBs - Polychlorinated Biphenyls
PDI – Pre-Design Investigation
PRGs – Preliminary Remedial Goals
RAOs – Remedial Action Objectives
RACER – Revitalizing Auto Communities Environmental Response
RI/FS – Remedial Investigation/Feasibiltiy Study
RME – Reasonable Maximum Exposure
ROD – Record of Decision
SCO – Soil Cleanup Objective
SCGs – Standards, Criteria and Guidance
sf – Square Feet
SMP – Site Management Plan
SPDES – State Pollutant Discharge Elimination System
SVOC - Semivolatile Organic Compound
USEPA - United States Environmental Protection Agency
USGS – United States Geological Survey
VOC – Volatile Organic Compound
WRI – World Resources Institute

# EXECUTIVE SUMMARY

A remedy was selected to address contaminated sediments and floodplain soils along Ley Creek between Townline Road and Route 11 (a.k.a Brewerton Road) of the General Motors (GM)--Inland Fisher Guide (IFG) Operable Unit 2 (OU2) Subsite of the Onondaga Lake site by the New York State Department of Environmental Conservation (NYSDEC) and United States Environmental Protection Agency (USEPA) in a Record of Decision (ROD) issued in March of 2015 (NYSDEC and USEPA 2015). The ROD followed the submittal by Revitalizing Auto Communities Environmental Response (RACER) Trust of a *Revised Off-site Remedial Investigation Report* (O'Brien & Gere Engineers, Inc. [OBG] 2013a) and an *Off-site Feasibility Study Report* (OBG 2013b). Pre-design investigations to verify remediation limits identified additional impacted soil (Expanded Areas Adjacent to OU2). The volume of soil to be addressed in the Expanded Areas Adjacent to OU2 was found to be substantially greater as a result of this pre-design soil sampling along Ley Creek. As a result of the significantly greater volume of impacted soil, USEPA requested that additional remedial alternatives for contaminated media be evaluated and the evaluation be documented in this Focused Feasibility Study (FFS) Report. This FFS Report will provide the basis for NYSDEC and USEPA to modify the remedy through an Explanation of Significant Differences (ESD) or ROD amendment. The vehicle for modifying the remedy will depend upon whether the change to the remedy is significant or fundamental.

Thus far, RACER Trust has implemented the ROD remedy for a portion of soils north of Ley Creek between LeMoyne Avenue and Route 11 (a.k.a Brewerton Road); for the wetland known as the National Grid Wetland, located west of the former IFG facility on National Grid property; and for areas along the shoulder of Factory Ave directly north of the former IFG facility. These remedial actions are documented in the *RACER Trust Former IFG Facility Operable Unit 2 Residential Area Remediation Construction Completion Report* (OBG 2018) and *RACER Trust Former IFG Facility OU2 National Grid Wetland Remediation Construction Completion Report* (Ramboll 2020). As documented in the *RACER Trust Former IFG Facility OU2 National Grid Wetland Remediation Construction Completion Report* (Ramboll 2020), soil exhibiting polychlorinated biphenyls (PCBs) greater than the corresponding soil cleanup objective (SCO) remained under isolated areas of the access road to the National Grid property.

This report documents the FFS completed for contaminated floodplain soils previously identified in the 2015 ROD and adjacent soils associated the Expanded Area Adjacent to OU2 along Ley Creek between Townline Road and Route 11 (a.k.a. Brewerton Road) and the remaining contaminated soil along the access road on the National Grid property. The area along Ley Creek between Townline Road and Route 11 (a.k.a. Brewerton Road) consists of mixed industrial, commercial, residential, and vacant land. On vacant land along the creek, forested and wetland areas are present. The forested areas consist of a robust mix of species and age classes that range from first year seedlings to mature hardwood trees. In addition to valuable wildlife habitat in this urban setting, these forested floodplain and wetland areas provide other important functions including sediment and nutrient retention and sediment/shoreline stabilization.

To address the contaminated soils, the following remedial action objectives (RAOs) presented in the ROD are adapted below:

- Reduce or eliminate any direct contact and ingestion threat to public health associated with contaminated soils and
- Minimize exposure of ecological receptors to contaminated soils.

To identify the extent of media to be addressed in the FFS, soil concentrations were compared to parcel-specific soil cleanup objectives. The following seven remedial alternatives were developed and evaluated to address the above RAOs:

Alternative 1 – No Further Action

Alternative 1 is the no further action alternative. The no further action alternative is required by the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 CFR Part 300.430) and NYSDEC Division of Environmental Remediation's *Technical Guidance for Site Investigation and Remediation* (DER-10) Section 4.4(b)3 (NYSDEC, 2010a) and serves as a benchmark for the evaluation of action alternatives.

Alternative 2

Alternative 2 includes excavation and off-site disposal of affected floodplain soil, a site management plan (SMP), institutional controls, and periodic reviews. The volumes of soil to be excavated reflect the current and reasonably anticipated future use for each area and acceptable risks to ecological receptors. Alternative 2 represents the 2015 ROD selected remedy, with updated volumes to reflect the pre-design investigation (PDI) of floodplain soil conducted since the ROD was issued. Under Alternative 2, approximately 121,100 cubic yards (CY) of soil would be removed as conceptually shown on the Alternative 2 figure series (**Figure 3-1**).

Alternatives 3A and 3B

Alternatives 3A and 3B include excavation and off-site disposal of affected floodplain soil, *in situ* treatment of soil in both forested areas to preserve this sensitive habitat, and other infrequently used/inaccessible areas north of the creek, an SMP, institutional controls, and five-year reviews. Different from Alternative 2, Alternatives 3A and 3B exclude excavation in areas currently paved on non-residential properties, and areas proposed to receive *in situ* treatment. Alternative 3A differs from Alternative 3B, in that Alternative 3B does not include excavation of impacted soils greater than 6 feet (ft) deep in the area designated as the Old Channel West Area (See Figures 3-2F and 3-3F). In this area under Alternative 3B, the top 6 ft of impacted soil would be removed, original grade restored, and an asphalt cover and vertical barrier would be placed to address potential exposures associated with creek bank erosion and future site use. Additionally, under Alternative 3B, a cover would be placed on and adjacent to the isolated portions of the National Grid Access Road where soil PCB concentrations exceed the SCO. Under Alternative 3A, approximately 42,100 CY of soil would be removed. Under Alternative 3B, approximately 36,100 CY of soil would be removed. Alternatives 3A and 3B assume the surficial 2 ft of impacted soil would be treated in areas proposed to receive *in situ* treatment. Should pilot studies indicate treatment is not effective or implementable, Alternatives 3A and 3B shall include a contingent remedial element, which includes excavation of an additional 68,800 CY (Alternative 3A) and 58,800 CY (Alternative 3B) of soil in areas proposed for treatment, as conceptually shown on the Alternative 3A and 3B figure series (**Figures 3-2 and 3-3**, respectively).

Alternative 4

Alternative 4 includes excavation and off-site disposal of affected floodplain soil, *in situ* treatment of soil in both forested areas to preserve this sensitive habitat, and other infrequently used/inaccessible areas north of the creek, placement of a soil cover, an SMP, institutional controls, and five-year reviews. The volumes of soil to be excavated reflect the current and reasonably anticipated future use for each area and acceptable risks to ecological receptors. Alternative 4 includes the same excavation and treatment as that envisioned for Alternative 3B, however, excavations on non-residential properties are limited to the top 2-ft. In addition to existing paved areas being maintained as covers, restored excavation areas where deeper impacted materials remain above the corresponding SCOs would be maintained as a soil cover. Impacted soils in the area designated as the Old Channel West Area would be addressed by an asphalt cover and vertical barrier following excavation of impacted soil in the top 2 ft to address potential exposures associated with creek bank erosion and future site use. A

cover would be placed on and adjacent to the isolated portions of the National Grid Access Road where soil PCB concentrations exceed the SCO. Under Alternative 4, approximately 10,100 CY of soil would be removed as conceptually shown on the Alternative 4 figure series (**Figure 3-4**). Alternative 4 assumes the surficial 2 ft of impacted soil would be treated in areas proposed to receive *in situ* treatment. Should pilot studies indicate treatment is not effective or implementable, no further action would be taken in the forested areas. For infrequently used/inaccessible areas north of the creek, Alternative 4 shall include a contingent remedial element, which includes excavation of an additional 2,000 CY of soil, as conceptually shown on the Alternative 4 figure series (**Figure 3-4**).

Alternative 5

Alternative 5 includes excavation and off-site disposal of affected floodplain soil, *in situ* treatment of soil in both forested areas to preserve this sensitive habitat, and other infrequently used/inaccessible areas north of the creek, placement of covers, an SMP, institutional controls, and five-year reviews. Alternative 5 is the same as Alternative 4, with excavations on non-residential properties limited to the top 2-ft, followed by restoration to original grades. In addition to existing paved areas being maintained as covers, approximately 3.6 acres of restored excavation areas where deeper impacted materials remain above the corresponding SCOs would be maintained as a soil cover. Similar to Alternative 4, impacted soils in the area designated as the Old Channel West Area would be addressed by an asphalt cover and vertical barrier following excavation of impacted soil in the top 2 ft. A cover would be placed on and adjacent to the isolated portions of the National Grid Access Road where soil PCB concentrations exceed the SCO. Under Alternative 5 approximately 10,100 CY of soil would be removed and disposed off-site. Alternative 5 assumes the surficial 2 ft of impacted soil would be treated in areas proposed to receive *in situ* treatment. Should pilot studies indicate treatment is not effective or implementable, Alternative 5 shall include a contingent remedial element, which, differently from Alternative 4, includes excavation of an additional 27,300 CY of soil and maintenance of an additional 5.68 acres of 2-ft thick soil covers as conceptually shown on the Alternative 5 figure series (**Figure 3-5**).

Alternative 6

Alternative 6 includes excavation and off-site disposal of affected floodplain soil, *in situ* treatment of soil in both forested areas to preserve this sensitive habitat, and other infrequently used/inaccessible areas north of the creek, an SMP, institutional controls, and five-year reviews. The volume of soil to be excavated reflects removal of the top 2 ft of soil to meet 1 milligram per kilogram (mg/kg) PCBs and removal of soil deeper than 2 ft to meet 10 mg/kg PCBs, with the exception of industrial properties where volumes reflect removal of soil to meet 25 mg/kg PCBs. Similar to Alternative 3B, Alternative 6 excludes excavation in existing paved areas for non-residential properties and excavation of impacted soils greater than 6 ft deep in the area designated as the Old Channel West Area. Similar to Alternative 3B, remaining impacted soils in the area designated as the Old Channel West Area are addressed by an asphalt cover and vertical barrier to address potential exposures associated with creek bank erosion and future site use. A cover would be placed on and adjacent to the isolated portions of the National Grid Access Road where soil PCB concentrations exceed the SCO. Alternative 6 was developed in consideration of the cleanup criteria used for Lower Ley Creek (the reach of Ley Creek downstream of Route 11 [a.k.a Brewerton Road])[1]. Under Alternative 6, approximately 31,100 CY of soil would be removed. Alternative 6 assumes the surficial 2 ft of impacted soil would be treated in areas proposed to receive *in situ* treatment. Should pilot studies indicate treatment is not effective or implementable, Alternative 6 shall include a contingent remedial element, which includes excavation of an additional 49,100 CY of soil as conceptually shown on the Alternative 6 figure series (**Figure 3-6**).

Detailed Analysis

[1] Alternative 6 differs from the Lower Ley Creek remedy by excluding existing paved areas on commercial and industrial properties, using 25 mg/kg for industrial properties, and by including *in situ* treatment in certain areas.

Consistent with DER-10 and the NCP, the remedial alternatives developed in the FFS were subjected to a detailed evaluation based on required evaluation criteria and in sufficient detail such that risk management decision makers may appropriately modify the remedy selected in the ROD. The FFS Report provides the basis for NYSDEC and USEPA to modify the remedy through an ESD or ROD amendment. The vehicle for modifying the remedy will depend upon whether the change to the remedy is significant or fundamental.

Based on the detailed analysis of alternatives, Alternative 1 would not satisfy the threshold criteria (overall protection of human health and the environment and compliance with applicable or relevant and appropriate Requirements [ARARs]). The remaining alternatives would satisfy the threshold criteria by providing protection to human health and the environment and addressing the identified ARARs, to the extent practicable.

Further evaluation based on the primary balancing criteria (long-term effectiveness and permanence; reduction of toxicity, mobility, or volume through treatment; short-term effectiveness; implementability; land use; and cost) concludes that Alternatives 2, 3A, 3B, 4, 5, and 6 would address the primary balancing criteria, as these alternatives would provide for adequate and reliable means of mitigating potentially unacceptable risks. Alternatives 2, 3A and 6 would be more disruptive to the community than Alternatives 3B, 4, and 5. Addressing soil in forested areas through *in situ* treatment in Alternatives 3A, 3B, 4, 5, and 6 would have the added benefit of preserving the 7.7 acres of forested wetland habitat that would be disturbed under Alternative 2. Alternatives 3A, 3B, 4, 5, and 6 would reduce toxicity, mobility, or volume through *in situ* treatment of soil in the forested and other infrequently used/inaccessible areas. Though Alternatives 4 and 5 address certain areas through the use of maintained soil covers and institutional controls, as compared to these areas being addressed through excavation and removal under Alternatives 3A, 3B and 6, the protection afforded to human health and the environment is similar. The lowest cost alternatives are Alternatives 4 and 5.

# 1. INTRODUCTION

The New York State Department of Environmental Conservation (NYSDEC) and General Motors (GM) entered into an Administrative Order on Consent (Index # D700019706; Order), which became effective September 25, 1997. The Order required GM to conduct a Remedial Investigation/Feasibility Study (RI/FS) at the GM--Inland Fisher Guide (IFG) Subsite of the Onondaga Lake Superfund Site. In 2009, following the bankruptcy of GM, Revitalizing Auto Communities Environmental Response (RACER) Trust assumed environmental responsibility for the Subsite. The RI was documented in the *Revised Off-Site RI Report* provided to NYSDEC on March 12, 2013 (OBG 2013a) and approved by NYSDEC on April 11, 2013. Also, in accordance with the Order, remedial alternatives were evaluated for contaminated sediments and floodplain soils along Ley Creek between Townline Road and Route 11 (a.k.a Brewerton Road) and in the National Grid Access Road Area and documented in the *Off-site FS Report* (OBG 2013b). Following the development of the 2013 *Off-site FS Report*, NYSDEC and United States Environmental Protection Agency (USEPA) issued a Record of Decision (ROD) in March of 2015 (NYSDEC and USEPA 2015), designating these areas as Operable Unit 2 (OU2). The ROD called for excavation and off-site disposal of floodplain soil exhibiting concentrations greater than restricted soil cleanup objectives (SCOs) consistent with current and reasonably anticipated future land use, and excavation and off-site disposal of Ley Creek sediments exhibiting concentrations greater than 1 milligram per kilogram (mg/kg) polychlorinated biphenyls (PCBs). The ROD anticipated the excavation and off-site disposal of approximately 15,000 cubic yards (CY) of surface and subsurface soil from the area. As a subset of this, the ROD-anticipated volume of soil to be remediated from the banks of Ley Creek within the reach associated with OU2, combined with the floodplain area, totaled 2,900 CY. In a letter dated March 27, 2020, USEPA took over as enforcement lead for this portion of OU2 of the GM-IFG Subsite of the Onondaga Lake Superfund Site from NYSDEC (USEPA 2020). USEPA is in the process of finalizing an Administrative Settlement and Order on Consent (draft Order) with RACER Trust.

Thus far, RACER Trust has completed soil remediation at 19 residential properties north of Ley Creek between LeMoyne Avenue and Route 11 (a.k.a Brewerton Road) and completed the ROD remediation for the wetland known as the National Grid Wetland, located west of the Former IFG Facility. These remedial actions are documented in the *RACER Trust Former IFG Facility Operable Unit 2 Residential Area Remediation Construction Completion Report* (OBG 2018) and *RACER Trust Former IFG Facility OU2 National Grid Wetland Remediation Construction Completion Report* (Ramboll 2020). As documented in the *RACER Trust Former IFG Facility OU2 National Grid Wetland Remediation Construction Completion Report*, soil exhibiting PCBs greater than the corresponding SCO remained under the access road directly to the east of the remediated wetland on the National Grid property.

As part of pre-design investigations (PDIs) aimed at evaluating the extent of impacted soil along Ley Creek, the volume of soil exhibiting soil concentrations greater than corresponding SCOs in the floodplain and adjacent soils was estimated at 145,000 CY (based on 2018 PDI results), significantly greater than anticipated in the ROD (approximately 2,900 CY). As a result of the significantly greater volume of impacted soil, USEPA requested that remedial alternatives for impacted soil be reevaluated in an FFS. In addition to soil along Ley Creek, USEPA requested that the soil remaining to be addressed on the National Grid property be included in the FFS. Soil PDI sampling was conducted in 2018, 2019 and 2020 to refine the evaluation of floodplain impacts

adjacent to soil impacts identified in the 2015 ROD (Expanded Area Adjacent to OU2), and results have enabled the floodplain volume of soil with concentrations greater than corresponding SCOs to be refined to an estimated 121,100 CY. In addition to the soil sampling efforts, a wetland delineation effort was completed in 2020 for the floodplain encompassing portions of the NYS-designated wetland SYE-6.

This FFS addresses contaminated floodplain soils previously identified in the 2015 ROD and adjacent soils associated the Expanded Area Adjacent to OU2 along Ley Creek between Townline Road and Route 11 (a.k.a. Brewerton Road) along with the remaining contaminated soil along the access road on the National Grid property. The FFS consists of the development of remedial alternatives to address environmental conditions associated with soils in these areas. This document was developed consistent with NYSDEC Division of Environmental Remediation's *Technical Guidance for Site Investigation and Remediation (DER-10)* (NYSDEC 2010a) and USEPA's *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA* (Comprehensive Environmental Response, Compensation, and Liability Act) (USEPA 1988). The FFS adopted the Standards, Criteria, and Guidance (SCGs)[2], site use and selection of SCOs and Preliminary Remediation Goals (PRGs), Remedial Action Objectives (RAOs), media-specific General Response Actions (GRAs), and screening and evaluation of remedial technologies that were presented in the 2013 *Off-site FS Report* (OBG 2013b), and used these in the development of the range of remedial alternatives evaluated in this FFS. In addition, consistent with NYSDEC DER's *Green Remediation Program Policy* (NYSDEC 2011) (DER-31), green remediation concepts were also considered during the evaluation of alternatives in this FFS.

This report has been organized as follows:

- Section 1 presents an introduction and description of the background information on the Site including a summary of the RI risk assessment findings. This section also presents the RAOs and the evaluation of remedial technologies previously presented in the 2013 *FS Report*.
- Section 2 presents the areas and volumes of affected media addressed in the FFS.
- Section 3 documents the assembly of remedial alternatives.
- Section 4 presents the detailed analysis of the alternatives.
- Section 5 presents the FFS conclusions.

### 1.1 Site Description and History

As documented in the *Revised Off-site RI Report* (OBG 2013a), contaminants of concern (COCs) identified for the Former IFG Facility were detected in media in Ley Creek between Townline Road and Route 11 (a.k.a Brewerton Road). In addition, PCBs, which are COCs, were detected in portions of the Federal Emergency Management Agency (FEMA) 100-year floodplain of Ley Creek between Townline Road and Route 11 (a.k.a Brewerton Road), and in the wetland located on the northern portion of the National Grid property directly adjacent to and west of the Former IFG Facility property. These OU2 areas are described below and depicted on **Figure 1-2**. In addition, a brief description and history of the facility is also provided below. The location of the Former IFG Facility is depicted on **Figures 1-1 and 1-2**.

[2] SCGs were presented in the 2013 FS Report, since NYSDEC was the lead agency at that time. The 2013 SCGs are adopted as the Applicable or Relevant and Appropriate Requirements (ARARs) for this FFS.

## 1.2 Ley Creek

Ley Creek is located approximately 150 feet (ft) north of the Former IFG Facility (**Figure 1-2**) and flows west to discharge into Onondaga Lake, approximately 2.5 miles downstream from the facility. As described in the March 1996 *Ley Creek PCB Dredgings Site Feasibility Study Report* (OBG 1996), Ley Creek drains an area of approximately 30 square miles. With the exception of the northeast portion, the Ley Creek drainage basin can generally be described as a highly urbanized area. Portions of the City of Syracuse, and the Towns of Cicero, Clay, DeWitt, Manlius, and Salina are located in the Ley Creek drainage basin. Numerous industries and businesses are located in the Ley Creek drainage basin. Also located in the Ley Creek drainage basin are 14 miles of highway, eight interchanges, a service facility for the New York State Thruway, Syracuse International Airport, and the Air National Guard's Hancock Field. Streets, shopping areas, parking lots, and buildings cover other areas of this drainage basin. The northeast portion of the drainage basin is relatively undeveloped. The large areas of impermeable surfaces in the Ley Creek drainage basin cause rapid runoff during storms, resulting in rapid water level changes in the creek (OBG 1996).

Industrial effluent streams and urban stormwater runoff discharge into Ley Creek. Seven discharges into Ley Creek have been or are permitted which originate(d) from Sunnyside Nursing Home, Oberdorfer Foundries, and Roth Brothers Smelting Corporation, all upstream of the Former IFG Facility; Ley Creek Pump Station, Lyncourt Sewer District, and Syracuse China Corporation, downstream of the Former IFG Facility; and the Former IFG Facility. Townline Road represents the upstream boundary of the Site in Ley Creek. Potential upstream sources of PCBs to Ley Creek include Roth Brothers Smelting Corporation, whose NYSDEC State Pollutant Discharge Elimination System (SPDES) permit includes PCB discharge limits (NYSDEC 1989); Carrier Corporation, which discharges to Ley Creek's upstream tributary, Sanders Creek, and has been documented to use PCBs (NYPIRG 1983); and Hancock Field, where PCB-contaminated soils were stored uncontained and used for fill material at a location approximately 30 ft from Ley Creek (Post Standard 1992).

Ley Creek has been restructured and dredged to aid in stormwater drainage. Water depths in Ley Creek range from less than 3 inches to approximately 4 ft, depending on the time of year and quantity of rainfall. Flow rates also vary greatly, ranging from less than 1 cubic foot per second (cfs) to 1400 cfs (United States Geological Society [USGS] 2011). Ley Creek varies in width from less than 10 ft to more than 30 ft. The shoreline vegetation for the portion of the stream within the study area is dominated by common reed (*Phragmites australis*). The substrate is predominantly gravel and fine inorganic material with little to no submerged or emergent aquatic vegetation. Sediment probing was performed as part or RI activities in 1998 and indicated that the main channel of Ley Creek is primarily hard substrate with no sediment depositional areas. Depositional areas were limited to the edges of the channel (OBG 2000).

As described in the May 1996 *Ley Creek PCB Dredgings Site Feasibility Study Report*, dredged material generated during a channel improvement program conducted by the Onondaga County Department of Drainage and Sanitation (OCDDS) lined the south bank of Ley Creek at the Ley Creek PCB Dredgings Site (O'Brien & Gere 1996). Remediation of the areas receiving the dredged material was documented in the September 2001 *Engineering Report for the Ley Creek PCB Dredgings Site* (OBG 2001). Impacts resulting from these dredging activities in the floodplain along Ley Creek are further described below.

### 1.3 Ley Creek Floodplain

In response to NYSDEC's 2002 comments (Benjamin 2002) on the April 2000 *SRI Report*, soil samples were collected in portions of the FEMA 100-year floodplain along both sides of Ley Creek downstream of the Ley Creek PCB Dredgings Site, from approximately the Route 11 (a.k.a Brewerton Road) bridge to the Town of Salina Highway Department Garage. This area is characterized as mixed commercial and residential with some stretches of undeveloped land between the northern bank of Ley Creek and the New York State Thruway.

As part of the PDI efforts for the 2015 ROD remedy, additional information related to channel improvements in the 1970s was reviewed. This information led to the conclusion that during these channel improvement activities, dredged spoils were deposited in various locations along Ley Creek between Townline Road and Route 11. Subsequent soil sampling conducted as part of this PDI has verified the presence of PCBs in soils in these areas.

Also as part of PDI efforts, a wetland delineation effort was completed along Ley Creek between Townline Road and Route 11 (a.k.a, Brewerton Road). A total of 20.2 acres of this area along the north and south banks of Ley Creek was delineated as wetland. Much of this delineated area consist of forested wetlands. These forested wetlands contain a robust mix of species and age classes that range from first year seedlings to mature hardwood trees with diameters at breast height (dbh) of more than 30-inches. Combined with a dense understory of grasses, forbs, shrubs, and vines, these wetlands provide the following functions and values within the Ley Creek watershed:

**Floodflow Alteration (Storage and Desynchronization)** — The forested floodplain and the wetlands therein provide a significant storage area for surface water, including runoff from adjacent areas and flood flows from Ley Creek, that influences floodplain dynamics downstream of the site. In addition to the volume of storage provided, the evapotranspiration provided by the mature forested area significantly influences the water balance that determines flood dynamics.

**Sediment and Nutrient Retention –** The densely vegetated floodplain slows surface water through the area and promotes settling of suspended sediment to improve water quality downstream of the site. This also allows for retention of nutrients and toxicants that are bound to sediment and vegetative uptake of bioavailable nutrients (*e.g.*, nitrogen, phosphorus), thereby holding them within the project area so that they do not influence downstream aquatic chemistry.

**Sediment/Shoreline Stabilization –** The densely vegetated banks of Ley Creek and throughout the floodplain stabilize soil and reduce erosion and sediment export to downstream resources. The vegetation also reduces thermal impacts on the aquatic resource by shading surface water within both the Creek and wetlands.

**Wildlife Habitat –** The forested floodplain and wetlands support a variety of mammalian, avian, amphibian, and other species within an urban environment.

The forested wetland and surrounding forested aeras (comprising approximately 31.6 acres of well-established forested area), are mostly present on the north bank of Ley Creek, south of the New York State Thruway. These boundaries make this forested area essentially inaccessible and

therefore infrequently used by human receptors. The field observations are documented in **Appendix D**.

### 1.4 National Grid Wetland

The RI included investigation of soil within the wetland located in the northern portion of the National Grid property, an approximately 22-acre parcel directly to the west of the Former IFG Facility property. This wetland is an approximately 10-acre portion of NYS-regulated wetland SYE-6. A drainage ditch is present along the northern edge of the property along Factory Avenue. Upland drainage flows into this wetland from the south and is discharged north to the ditch and through culverts under Factory Avenue towards Ley Creek. Emergent vegetation and deciduous trees and shrubs are the dominant vegetation of SYE-6 (Rhodes and Alexander 1980), and can be observed in the National Grid wetland. This property is zoned for industrial use.

South of the wetland is the Teall Avenue Electrical Substation, an approximately 3-acre fenced-in active substation that dates back to the 1920s. Surface drainage from the substation is to the south, east and north. Historical and existing catch basins appear to have discharged to the southeast and northeast of the substation area (Haley & Aldrich 1999). A gravel access road and an underground electrical duct bank are present between Factory Avenue and the substation and run parallel and proximate to the western edge of the Former IFG Facility property. A closed landfill (NYS Registry Site 734053) is located on the Syracuse China property located to the west of the National Grid property.

Remediation of impacted areas of the wetland began in the summer of 2017. The remedy consisted of the excavation of approximately 11,800 CY of soil exhibiting concentrations of PCBs in excess of 1 mg/kg followed by wetland restoration. Excavation activities were completed in November 2017, and restoration of the wetland was completed in the spring of 2018. The remediation is documented in the *RACER Trust Former IFG Facility OU2 National Grid Wetland Remediation Construction Completion Report* (Ramboll 2020). As documented in the *RACER Trust Former IFG Facility OU2 National Grid Wetland Remediation Construction Completion Report*, soil exhibiting PCBs greater than the corresponding SCO remained in a small portion of the delineated wetland to the south of the remediated wetland and in isolated pockets under the access road located to the east and southeast of the remediated wetland on the National Grid property.

### 1.5 Former IFG Facility

The Former IFG Facility comprises approximately 65 acres of property located at 1 General Motors Drive in the Towns of Salina and Dewitt, Onondaga County, New York. The Former IFG Facility was constructed in 1952 by the Brown Lipe-Chapin Division of GM on undeveloped land as deeded to GM from Gilbert Mautz, Earl Henry Barton and Bessie Galster Hoffman on April 5, 1951. Various paved parking lots and areas of mowed lawn are present on the facility property. These areas surround the main manufacturing building and related outbuildings. The facility property is bounded to the south by Conrail railroad tracks, a wood pallet recycling facility and an automobile dealership, to the east and northeast by Military Circle (formerly GM Circle) and Townline Road, to the west by an active National Grid (formerly Niagara Mohawk Power Corporation) electrical substation and to the north by Factory Avenue and the Ley Creek PCB Dredgings Site. The facility has been redeveloped for tenant use.

The Former IFG Facility property is located in an area zoned for industrial use. The area surrounding the facility can generally be characterized as highly urbanized. The area is also characterized by a high degree of industrial activity, as evidenced by the presence of current and former manufacturing facilities such as Carrier Corporation, Syracuse China Corporation, New Process Gear and Bristol-Myers Squibb Company. Numerous small industrial businesses are present along Factory Avenue and in nearby areas of the City of Syracuse. Syracuse International Airport-Hancock Field is located approximately 1½ miles north of the facility.

Historically, the Former IFG Facility was used for the manufacture of metal automotive trim components such as bumpers, grills, wheel disks and hubcaps. More recently, the facility was used for the manufacture of interior and exterior plastic trim components such as bumpers, grills and door panels.

The facility began operations in 1952 as the Brown-Lipe-Chapin Division of GM. Operations conducted at the facility included metal die casting; nickel, chromium and copper cyanide electroplating; stamping; polishing; buffing; painting and machining.

In 1961 Brown-Lipe-Chapin merged with another GM division, Ternstedt, and subsequently became part of GM's Fisher Body Division in 1968. During the early 1960s injection molding operations were added to the existing metal operations. Metal finishing and die casting were subsequently reduced and replaced by injection molding by the early 1970s. Pydraul hydraulic oil manufactured by Monsanto was used in die cast machines and injection molding operations until 1968 at the facility. Molvac "A" oil, manufactured by Pennwalt Corporation and including components Aroclor 1254 and Santovac II supplied by Monsanto, were used in the diffusion pumps of three vacuum metallizers until 1969. The facility operated as the Fisher Body Division until 1984, when it became the Fisher Guide Division until 1989. The facility then operated as the Inland Fisher Guide Division of GM from 1989 until the facility ceased manufacturing operations in December 1993.

In 1992, prior to ceasing of manufacturing operations, the facility was operating 127 injection molding machines. After the facility ceased manufacturing operations in 1993, the facility was reassigned to GM's North American Operations Property Management Group, which was later redesignated the Worldwide Facilities Group. Details regarding historical facility operations are summarized in the 2013 *FS Report* (OBG 2013b).

### 1.6 Summary or Remedial Investigation and Risk Assessments

A summary of RI findings pertaining to the floodplain along Ley Creek between Townline Road and Route 11 (a.k.a Brewerton Road) is presented below:

#### 1.6.1 Nature and Extent of Contamination

COCs identified for OU2 were detected in environmental media in Ley Creek between Townline Road and Route 11 (a.k.a Brewerton Road). In addition, facility-related COCs were detected in portions of the FEMA 100-year floodplain of Ley Creek between Townline Road and Route 11 (a.k.a Brewerton Road) and in the wetland located on the northern portion of the National Grid property directly adjacent to and west of the Former IFG Facility property. As described in the 2013 *FS Report*, groundwater discharging from the facility would be addressed with on-site (OU1) efforts.

Since submittal of the *Revised Off-site RI Report* and the 2013 *FS Report*, over 2,250 soil samples from over 500 locations were collected for pre-design investigations in 2018, 2019 and 2020 to evaluate the presence of PCBs in floodplain soils. Figures presenting these analytical data results are included in **Appendix A**.

Based on the evaluation of soil samples collected from the Ley Creek Floodplain Area and National Grid Wetland and Access Road Area, PCBs, volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs) and site-related metals (arsenic, chromium, copper, lead, nickel, and zinc) are present at concentrations above corresponding Part 375 Unrestricted SCOs. PCBs, SVOCs and site-related metals were present at concentrations above the corresponding Part 375 SCOs for the Protection of Ecological Receptors in these areas as well. The refinement of the extent of impacts in the floodplain has focused on PCBs, the main COC (*i.e.*, Primary ecological risk driver and found to be collocated with the other COCs). The nature and extent of contamination can be summarized as follows:

- ***Ley Creek Floodplain Area***. Soil samples collected along the 100-year floodplain of Ley Creek between Townline Road and Route 11 (a.k.a Brewerton Road) exhibited concentrations of PCBs greater than the Part 375 Restricted SCOs of 1 mg/kg (residential, commercial, and ecological uses) and 25 mg/kg (industrial use) for PCBs in several locations along portions of both the northern and southern banks of Ley Creek. The locations of samples exceeding the SCOs corresponding to property zoning and use are included on **Figures 2-1A through 2-1H**.

- ***National Grid Wetland and Access Road Area.*** This property is zoned for industrial use. Soil samples collected on the National Grid property to the west of the Former IFG Facility that are included in this FFS include the following:

    - Soils within the delineated wetland between the already-completed National Grid wetland remediation and west of the steep bank leading up to the property access road exhibited PCB concentrations greater than the Part 375 Restricted SCO of 1 mg/kg for ecological areas.
    - Soils along the steep bank leading up to the property access road exhibited PCB concentrations greater than the Part 375 Restricted SCO of 25 mg/kg for industrial use.
    - Soil beneath the access road exhibited PCB concentrations greater than the Part 375 Restricted SCO of 25 mg/kg for industrial use.
    - The locations of samples exceeding the SCOs corresponding to this property zoning and ecological resources are illustrated on **Figure 2-1H**.

### 1.6.2 Summary of Risk Assessments

As summarized in the 2013 *FS Report*, a Human Health Risk Assessment and a Baseline Ecological Risk Assessment were conducted for OU2.

#### 1.6.2.1 Human Health Risk Assessment

The *Revised Off-Site Human Health Risk Assessment (HHRA)* addressed exposures to media, including those in the above-mentioned areas. Health risks were evaluated for the following potential human receptor populations identified for the OU2 areas studied:

- Current and future child fish consumers (exposed to fish tissue)
- Current and future adolescent fisherpersons (exposed to surface water, surface sediment (0-1 ft bgs), fish tissue, surface soil, and outdoor air)
- Current and future adult fisherpersons (exposed to surface water, surface sediment (0-1 ft bgs), fish tissue, surface soil, and outdoor air)
- Future dredge workers (exposed to surface water, surface and subsurface sediment (0-3 ft bgs), surface soil (0-1 ft bgs), and outdoor air)
- Current and future older child trespassers (exposed to surface water, surface soil (0-1 ft bgs), and outdoor air)
- Current and future adult trespassers (exposed to surface water, surface soil (0-1 ft bgs), and outdoor air)
- Future utility workers (exposed to surface and subsurface soil (0-10 ft bgs), and outdoor air)

Hazard indices (HI) and cancer risks were derived based on the reasonable maximum exposure (RME) and central tendency (CT) exposure parameters, which were established in accordance with USEPA Risk Assessment Guidance for Superfund. The derived cancer risks were within acceptable limits for all receptors. The non-cancer hazard for the dredge worker was also within acceptable regulatory limits. Non-cancer hazards for all other receptors exceeded the acceptable threshold (HI of 1). Unacceptable RME HIs ranged from 4.0 for the child fish consumer to 200 for the utility worker. These hazards are driven by:

- Highly chlorinated PCBs[3] in fish tissue.
- Less chlorinated PCBs[4] and highly chlorinated PCBs in Ley Creek and the Ley Creek Floodplain (Exposure Unit-1) surface sediment (0-1 ft bgs).
- Less chlorinated PCBs, highly chlorinated PCBs, and total PCBs in the Ley Creek Floodplain Area, National Grid Wetland Area and Factory Avenue Area (Exposure Unit-2) surface soil and subsurface soil (0-10 ft bgs).

There are uncertainties inherent in every risk assessment and, in general, the approaches for dealing with this uncertainty overestimate risk/hazard. Therefore, the risk values estimated should generally be thought of as high-end estimates of the risk, and actual risks are probably lower than the calculated values. The primary area of uncertainty that is unique to this HHRA is related to the impact of outliers in the datasets on exposure point concentrations and hazard estimates. An evaluation of outliers and their effect on hazard estimates highlights the possibility that targeted excavation and removal of surface soil and sediment is likely to bring the hazard associated with OU2 concentrations closer to an acceptable level.

#### 1.6.2.2 Baseline Ecological Risk Assessment

The *Off-Site Baseline Ecological Risk Assessment (BERA)* was prepared for the Off -Site Areas and is included as **Appendix E** of the *Revised Off-site RI Report* (O'Brien & Gere 2013a). Potentially impacted communities in include those associated with the Ley Creek Area, the National Grid Wetland Area, and the Ley Creek Floodplain Area.

Potential ecological risk to aquatic receptors in the Ley Creek Exposure Area based on screening results indicated that risks to the benthic invertebrate community are the result of direct contact exposures to total PCBs and PAHs, and potential risks to fish are related to the metals barium

[3] Highly chlorinated PCBs were defined as Aroclors 1248, 1254, 1260, and 1268.

[4] Less chlorinated PCBs were defined as Aroclors 1221, 1232, 1016, and 1242.

and iron in Ley Creek surface water. Food chain models for piscivorous birds (belted kingfisher and great blue heron) and semi-piscivorous mammals (mink) at Ley Creek indicated only two contaminants (methylmercury and total PCBs) had no observed adverse effects level (NOAEL)-based hazard quotients (HQs) greater than one, but less than 10. Methylmercury is not considered a site-related metal.

Screening results for terrestrial plants and soil invertebrates in the National Grid Wetland Area indicated that the primary risk drivers are metals (chromium, copper, lead, and zinc) and total PCBs. The food chain model for insectivorous birds (American robin) and insectivorous mammals (short-tailed shrew) resulted with the following contaminants with HQs greater than one: metals, total PCBs, and bis(2-ethylhexyl)phthalate.

Risk to terrestrial plants and soil invertebrates in the Ley Creek Floodplain Exposure Area based on screening is driven primarily by chromium and total PCBs. The food chain model for American robin and short-tailed shrew for this area resulted in metals (chromium, lead, thallium, vanadium and zinc) and total PCBs with HQs greater than one. Thallium and vanadium are not considered site-related metals.

### 1.7 Remedial Action Objectives

RAOs are medium-specific goals for protecting human health and the environment. RAOs form the basis for the FFS by providing overall goals for facility remediation. RAOs were developed and presented in the 2013 *FS Report* (OBG 2013b). To address the contaminated soils, the following RAOs presented in the ROD are adapted below:

- Reduce or eliminate any direct contact and ingestion threat to public health associated with contaminated soils and
- Minimize exposure of ecological receptors to contaminated soils.

### 1.8 Remedial Technologies and Process Options

The identification, screening and evaluation of potentially applicable remedial technology types and process options for soil were presented in the 2013 *FS Report*. The screening and evaluation of process options for soil is presented in Table 6-1 of the 2013 FS Report, included here as **Appendix B**. As a result of that screening and evaluation the following representative process options were identified: institutional controls (environmental easement/deed restriction), containment (vegetated/asphalt/gravel cover), removal (mechanical excavation), and disposal (on-site consolidation and commercial landfill). For purposes of this FFS, the containment and treatment process options are being revisited as follows:

***Containment - Vertical Barrier***

A vertical containment for the purpose of mitigating bank erosion is retained as a representative option for containment in addition to a cover.

- ***Vertical containment.*** Use of sheet piling or permanent bank armor as a vertical containment of creek bank soils for the purpose of erosion protection. Targeted areas along the creek bank would be protected against erosion to avoid release of contaminated soil into creek.

Vertical containment is considered readily implementable. Vertical containment would be effective for preventing erosion of stream banks.

***Physical/Chemical Treatment - In situ Treatment***

*In situ* treatment using an amendment for the purpose of sequestering PCBs, PAHs and heavy metals is being retained as a representative process option.

***Sequestration.*** Addition of amendment(s) (*e.g.*, activated carbon or biochar) to stabilize and/or otherwise render contaminants less bioavailable and toxic. Amendments could be distributed over the surface of the treatment area and mixed into surface soils using standard tilling or aeration equipment and/or injected using a Geoprobe to treat deeper soils.

Sequestration of PCBs, PAHs and heavy metals using amendments such as activated carbon or biochar are potentially effective for rendering PCBs in soil less bioavailable to ecological receptors. Amending soil with activated carbon or biochar is potentially implementable in forested settings. Implementability of injection of the amendments may be limited for shallow depths because of concerns related to amendment surfacing. Treatability studies would need to be conducted to evaluate dosing needs, effectiveness of amendments, completeness of mixing and effectiveness of amendment application and need for additional applications in wetland, forested areas and at different soil depths. A summary of references of remediation using activated carbon and biochar is included as **Appendix F**.

# 2. IDENTIFICATION OF FOCUSED FEASIBILITY STUDY AREAS AND VOLUMES

This FFS addresses floodplain and adjacent soils along Ley Creek between Townline Road and Route 11 (a.k.a Brewerton Road) and in the National Grid Access Road Area. Volumes of affected media were estimated based on the nature and extent of contamination identified in the March 2013 *Revised Off-site RI Report* (OBG 2013a) and subsequent PDI activities conducted along Ley Creek to evaluate PCB impacts in floodplain and adjacent soils. The rationale for the selection of PRGs for media volume calculations is presented in this section.

## 2.1 PRGs used for Volume Estimation

Consistent with 6 New York Codes, Rules, and Regulations (6 NYCRR) 375-1.8 (f) and DER-10 4.2 (i) (NYSDEC 2006; NYSDEC 2010a), the current, intended and reasonably anticipated future property uses are considered when selecting SCOs. The following property use information is relevant to these areas:

- The majority of the property parcels in the study area are zoned Industrial I-1 and a few parcels are zoned Residential-R-1A (based on Town of Salina Zoning Maps[5] and Town of Salina zoning code[6]).
- Property use is further identified as commercial, industrial/utility, public services or vacant use by Onondaga County Department of Finance Office of Real Property Services (ORPS)
- Certain residential properties extend north across Ley Creek. The northern portions of these properties abut with New York State (NYS) property currently occupied by Interstate 90 (NYS Thruway), rendering this portion of these properties landlocked and inaccessible/non-developable.
- One residential zoned property is currently vacant, but contains numerous underground utilities rendering this property non-developable.
- NYS has designated a portion of the property located north of Ley Creek as NYS designated wetland SYE-6. In November 2020, as part of PDI activities, a wetland delineation effort was completed along Ley Creek between Townline Road and Route 11 (a.k.a Brewerton Road). Wetland conditions were observed over approximately 20.2 acres of this area, as illustrated on **Figures 2-1A** through **2-1G** and the wetland delineation memo included as **Appendix D**.

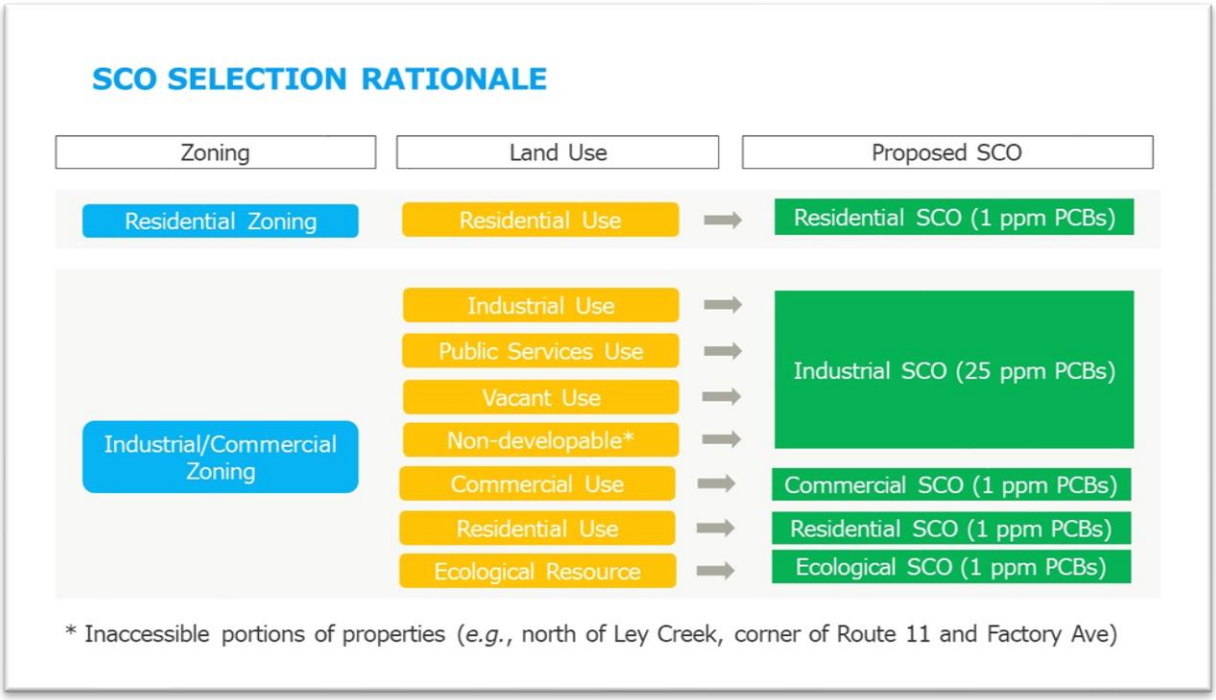
Given that the reasonably anticipated future use for the affected properties is a blend of residential, commercial, and industrial uses, and certain areas are viable habitat for ecological resources, the following 6 NYCRR Part 375 Restricted Use SCOs are identified as appropriate SCOs for OU2 areas:

- 6 NYCRR Part 375 SCOs for Residential Use
- 6 NYCRR Part 375 SCOs for Commercial and Industrial Use
- 6 NYCRR Part 375 SCOs for the Protection of Ecological Resources

The rationale for the selection of applicable SCOs for each property parcel is summarized as follows:

[5] Town of Salina Zoning Maps, updated January 14, 2019.

[6] Town of Salina code Part II General Legislation Chapter 235 Zoning.




The zoning and land use-based selection of SCOs is summarized on Figures 1 through 8 presented in **Appendix C**.

The proposed soil PRGs are the 6 NYCRR Part 375 SCOs for the land use that correspond to a particular OU2 area (*e.g.*, non-wetland areas on residential, commercial and industrial properties in portions of the Ley Creek floodplain and on non-wetland areas on the National Grid property). As the National Grid Wetland and portions of the Ley Creek floodplain (Ley Creek banks and delineated wetlands) are recognized as viable ecological habitat, PRGs for these areas were based on a consideration of ecological resources. As such, the PRGs used in volume calculations for the National Grid delineated wetland not yet remediated and portions of the Ley Creek floodplain (Ley Creek banks and delineated wetlands) are the 6 NYCRR Part 375 SCOs for the protection of ecological resources. The proposed soil PRGs for the National Grid Access Road are the 6 NYCRR Part 375 SCOs for industrial land use, which is the current zoning and reasonably anticipated future land use for this area.

## 2.2 Area and Volume Estimates

Areas of affected media were estimated based on a comparison of existing RI and PDI soil sample results to proposed PRGs for two scenarios: 1) reasonably anticipated future use (residential SCOs, commercial SCOs, industrial SCOs and ecological SCOs, as applicable based on land use) and 2) the use of cleanup objectives of 1 mg/kg PCBs for top 2 ft of soil and 10 mg/kg PCBs for soil deeper than 2 ft below ground surface. Generally, the areal extent of contamination was assumed, for purposes of this FFS, to extend to a sample location exhibiting a concentration less than the corresponding PRG. Removal of soil exhibiting PCBs is anticipated to also address other co-located COCs.

***Reasonably anticipated future use scenario areas and volumes***

Soil volume estimations for the reasonably anticipated future use scenarios are as follows:

- Soil along Ley Creek between Townline Road and Route 11 (a.k.a. Brewerton Road). Within the Ley Creek floodplain along the creek, it is estimated that approximately 117,900 CY of soil exceed a) the 6 NYCRR Part 375 restricted SCOs for the protection of ecological resources in the delineated wetland and along the edges of Ley Creek and b) the NYCRR Part 375 restricted SCOs for residential, commercial and industrial properties. Depths of impact range from 1 to 15 ft below grade. The areal extent of these impacted soils along Ley Creek is approximately 17.5 acres.
- National Grid Property Access Road. On the National Grid property, it is estimated that approximately 2800 CY of soil exceed the 6 NYCRR Part 375 SCOs for industrial use beneath the access road and adjacent bank. Depths of impact range from 4 to 10 ft below grade. The areal extent of these impacted soils is approximately 0.25 acres.
- Remaining National Grid Delineated wetland west of Access Road. On the National Grid property, it is estimated that approximately 400 CY of soil exceed the 6 NYCRR Part 375 SCOs for the protection of ecological resources within the delineated wetland (not previously remediated). Depths of impact range from 2 to 6 ft below grade. The areal extent of these impacted soils is approximately 0.07 acres.

The areal extents of the affected OU2 soil for the reasonably anticipated future uses are illustrated on **Figures 2-1A through 2-1H**.

In addition to the volumes estimated for reasonably anticipated future use, the volume associated with the cleanup criteria of 1 mg/kg PCBs in the top 2 ft of soil and 10 mg/kg PCBs for soil deeper than 2 ft below ground surface for commercial zoning/use properties and ecological areas, and 25 mg/kg PCBs at all depths for industrial properties was also estimated. Soil volume estimations for this scenario are as follows:

- Soil along Ley Creek between Townline Road and Route 11 (a.k.a. Brewerton Road). Within the Ley Creek floodplain along Ley Creek, it is estimated that approximately 79,000 CY of soil exceed 1 mg/kg PCBs in the top 2 ft of soil and 10 mg/kg PCBs for soil deeper than 2 ft below ground surface for commercial zoning/use properties and ecological areas, and 25 mg/kg for industrial properties. Depths of impact range from 1 to 11 ft below grade. The areal extent of these impacted soils along Ley Creek is approximately 18.0 acres.
- National Grid Property Access Road. On the National Grid property, it is estimated that approximately 3,200 CY of soil exceed 1 mg/kg PCBs in the top 2 ft of soil and 10 mg/kg PCBs for soil deeper than 2 ft below ground surface within the delineated wetland (not previously remediated) and beneath the access road and adjacent bank. Depths of impact range from 2 to 10 ft below grade. The areal extent of these impacted soils is approximately 0.32 acres.

The areal extents of the affected OU2 soil for the volume associated with the cleanup criteria of 1 mg/kg PCBs in the top 2 ft of soil and 10 mg/kg PCBs for soil deeper than 2 ft below ground surface are illustrated on **Figures 2-2A through 2-2H**.

# 3. ASSEMBLY OF FOCUSED FEASIBILITY STUDY REMEDIAL ALTERNATIVES

Seven remedial alternatives were assembled for further evaluation of soil along Ley Creek between Townline Road and Route 11 (a.k.a Brewerton Road) and in the immediate vicinity of the access road on the National Grid property located adjacent to the west of the Former IFG Facility. The elements of each alternative are summarized in attached **Table 3-1**. A description of each alternative is included in the following subsections.

## 3.1 Alternative 1 – No Further Action

Alternative 1 is no further action. The no action alternative is required by the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 Code of Federal Regulations [CFR] Part 300.430) and NYSDEC DER-10 Section 4.4(b)3 (NYSDEC, 2010a) and serves as a benchmark for the evaluation of action alternatives.

Because this alternative would result in contaminants remaining on-site above levels that allow for unrestricted use and unlimited exposure, CERCLA would require that the remedy be reviewed at least once every five years. If justified by the review, remedial actions may be required in the future to remove, treat or contain the contaminated soils and wetland sediments.

## 3.2 Common Elements for Alternatives 2 through 6

The following common remedial elements are included in Alternatives 2 through 6:

***Excavation to 1 mg/kg for Residential Zoning/use Properties***

It is anticipated that excavation of soil exhibiting concentrations in excess of 1 mg/kg PCBs would be performed for each property that is zoned and currently used for residential use. Excavation would be limited by obstructions such as buildings and underground utilities. Excavated soils would be managed appropriately off-site. Excavations would be backfilled using acceptable imported fill. Surfaces would be restored. It is anticipated that the depth of excavations on residential property would be as deep as approximately 6 ft below grade.

***Use Restrictions***

It is anticipated that following excavation of soil and due to the presence of obstructions (*e.g.*, underground utilities and buildings) or the use of engineering controls (*e.g.*, asphalt covers), soil would remain in some areas at concentrations above levels that allow for unrestricted land use and unlimited exposure. In such cases, an environmental easement would be recorded for the properties documenting land use restrictions precluding activities that would potentially expose contaminated materials or impair the integrity of engineering controls (*e.g.*, engineered covers) in certain areas without prior review and approval by USEPA and consistent with a SMP. Such restrictions would need to be included on property deeds to be clear during property transfers.

***Site Management Plan (SMP)***

It is anticipated that following excavation of soil and due to the presence of obstructions (*e.g.*, underground utilities and buildings) or agreed upon SCOs consistent with current or anticipated future land use, soil would remain in some areas at concentrations above levels that allow for unrestricted land use and unlimited exposure. As such, an SMP would be implemented to outline

necessary engineering and institutional controls for the handling and management of soil and to develop requirements for periodic site reviews. In addition, consistent with 6 NYCRR Part 375-1.8(h)(3), annual certification of institutional and engineering controls would be required in the SMP, unless a different frequency is approved by USEPA.

***Five-Year Reviews***

Because contaminants would remain on-site above levels that would allow for unrestricted use and unlimited exposure, CERCLA would require that the remedy be reviewed at least once every five years.

### 3.3 Alternative 2 – Property Zoning/Use and Ecological Resource-Based Excavation (2015 ROD Remedy – Expanded Footprint)

In addition to the common elements described above, Alternative 2 would also include excavating soil with PCB concentrations greater than 1 mg/kg at all depths from commercial properties, and excavating soil with PCB concentrations greater than 25 mg/kg at all depths from industrial properties, followed by restoration to existing grades. Alternative 2 would also include excavating soil with PCB concentrations greater than 1 mg/kg at all depths where ecological resources are present (Ley Creek banks on non-residential properties not used for commercial/industrial use and within delineated wetlands). This alternative conforms to the selected remedy in the Record of Decision (ROD) (NYSDEC and USEPA 2015). Specifically, Alternative 2 would comprise the following elements:

- Excavation
  - Excavation of soil with PCB concentrations greater than 1 mg/kg at all depths on residential zoned/use properties and commercial zoned/use properties.
  - Excavation of soil with PCB concentrations greater than 25 mg/kg at all depths on industrial zoned/use properties.
  - Excavation of soil with PCB concentrations greater than 1 mg/kg at all depths where ecological resources are present (*e.g.,* Ley Creek banks not used for residential, commercial, or industrial use and within delineated wetlands).
  - Excavation of soil with PCB concentrations greater than 1 mg/kg at all depths within delineated wetland areas west of the National Grid Access Road (west of steep bank) [7].
  - Excavation of soil with PCB concentrations greater than 25 mg/kg at all depths on the National Grid Access Road, steep bank west of Access Road, and area east of Access Road[6].
- Institutional controls, SMP, and five-year reviews as described above.

Non-common elements are further described below:

***Excavation of soil exhibiting greater than 1 mg/kg PCBs for Commercial Zoning/use Properties and greater than 25 mg/kg PCBs for Industrial Zoning/use Properties***

It is anticipated that excavation of soil exhibiting concentrations in excess of 1 mg/kg PCBs would be performed for each property that is zoned and currently used for commercial use and excavation of soil exhibiting concentrations in excess of 25 mg/kg PCBs would be performed for each property that is zoned for industrial use and currently used for industrial purposes.

[7] As documented in the *RACER Trust Former IFG Facility OU2 National Grid Wetland Remediation Construction Completion Report* (Ramboll 2020), soil exhibiting PCBs greater than the corresponding SCO remained under the access road directly to the east of the remediated wetland on the National Grid property. This area is further described in Section 1.6.1.

Excavation would be limited by structures, such as buildings and underground utilities. Excavated soils would be managed appropriately off-site. Excavations would be backfilled using acceptable imported fill. Surfaces would be restored. It is anticipated that the depth of excavations in commercial- and industrial-use areas would be as deep as approximately 15 ft below grade. For cost estimation purposes, temporary sheet piling was assumed for excavation extending deeper than 4 feet and along the creek. For cost estimation purposes, temporary sheet piling was assumed to extend approximately 30 ft deep. Geotechnical and structural information would be considered during the design phase for excavations near buildings. Structural analysis/evaluations would be performed prior to, during, and following excavation activities.

***Excavation of soil exhibiting greater than 1 mg/kg PCBs in Ecological Areas***

It is anticipated that excavation of soil exhibiting concentrations in excess of 1 mg/kg PCBs would be performed for portions of properties that are deemed to be ecological resources (Ley Creek banks not used for commercial or industrial purposes and properties within the delineated wetland and within delineated wetland areas west of the National Grid Access Road). Excavation would be limited by structures such as utilities. Excavated soils would be managed appropriately off-site. Excavations would be backfilled using acceptable imported fill. Surfaces would be restored in accordance with appropriate restoration plans (*e.g.*, vegetation would be replaced in consideration of current habitat). The restoration plans would be developed to preserve existing habitat (*e.g.*, restore existing wetland or forested areas). Based on PDI results, it is anticipated that the depth of excavations in ecological areas would be as deep as approximately 10 ft below grade. For cost estimation purposes, temporary sheet piling was assumed for excavation extending deeper than 4 feet and along the creek. For cost estimation purposes, temporary sheet piling was assumed to extend approximately 30 ft deep.

***Excavation of soil exhibiting greater than 25 mg/kg PCBs for the National Grid Access Road, Steep Bank West of Access Road and Area East of Access Road***

It is anticipated that excavation of soil exhibiting concentrations in excess of 25 mg/kg PCBs would be performed for the National Grid Access Road, steep bank west of access road, and an area east of the access road. Excavation would be limited by underground utilities. Excavated soils would be managed appropriately off-site. Excavations would be backfilled using acceptable imported fill. Surfaces would be restored. It is anticipated that the depth of excavations would be as deep as approximately 10 ft below grade.

***Volumes and Areas for Alternative 2***

**Figures 3-1A through 3-1H** conceptually illustrate the anticipated areas of remediation under Alternative 2. Remediation areas would be refined during the design phase, based on existing data and field conditions. It is anticipated that Alternative 2 would address approximately 17.5 acres of area along the Ley Creek floodplain between Townline Road and Route 11 (a.k.a Brewerton Road) and approximately 0.32 acres on the National Grid property directly west of the Former IFG Facility.

**Table 3-2** provides a summary of estimated areas and volumes associated with this alternative. An estimated total volume of 121,100 CY of soil would be excavated from this area and disposed off-site. Of this volume, approximately 34,800 CY are anticipated to exhibit concentrations greater than 50 mg/kg PCBs (and thus would be managed as hazardous waste in NYS).

With the exception of soil in the immediate vicinity of underground utilities or permanent structures, soil exhibiting PCB concentrations above the corresponding PRGs would be removed under Alternative 2.

### 3.4 Alternative 3A – Covers and Property Zoning/Use/Ecological Resource-Based Excavation and *In Situ* Treatment

Alternative 3A would include the same elements as 2, however, excavation areas would exclude existing paved areas on commercial and industrial properties and certain forested and infrequently used/inaccessible areas. As such, Alternative 3A would include excavating soil with PCB concentrations greater than 1 mg/kg at all depths in non-paved areas from commercial properties, and excavating soil with PCB concentrations greater than 25 mg/kg at all depths in non-paved areas from industrial properties, followed by restoration to existing grades. These paved areas would be maintained as covers for these areas. Certain forested and other infrequently used/inaccessible areas located north of Ley Creek as depicted on Figures **3-2A through 3-2H** would be addressed through *in situ* treatment. Specifically, Alternative 3A would comprise the following elements:

- Treatment
  - *In situ* treatment for soil using a carbon-based amendment would be applied in certain forested areas and other infrequently used/inaccessible areas with PCB concentrations above the corresponding SCOs. These areas are depicted on Figures **3-2A through 3-2H.**
  - Should pilot studies indicate treatment is not effective or implementable, Alternative 3A shall include a contingent remedial element for these areas, which consists of excavation as described below.
- Excavation
  - Excavation of soil with PCB concentrations greater than 1 mg/kg on residential zoned/used properties excluding infrequently used/inaccessible areas subject to *in situ* treatment.
  - Excavation of soil with PCB concentrations greater than 1 mg/kg at all depths on commercial zoned/used properties excluding paved areas and areas subject to *in situ* treatment.
  - Excavation of soil with PCB concentrations greater than 25 mg/kg at all depths on industrial zoned/use properties excluding paved areas and areas subject to *in situ* treatment.
  - Excavation of soil with PCB concentrations greater than 1 mg/kg at all depths where ecological resources are present (*e.g.,* Ley Creek banks not used for residential, commercial, or industrial use and within delineated wetlands) excluding areas subject to *in situ* treatment.
  - Excavation of soil with PCB concentrations greater than 1 mg/kg at all depths within delineated wetland areas west of the National Grid Access Road (west of steep bank).
  - Excavation of soil with PCB concentrations greater than 25 mg/kg at all depths on the National Grid Access Road, steep bank west of Access Road, and area east of Access Road.

- Covers
  - Maintain asphalt pavement on commercial zoned/use properties where PCB concentrations greater than 1 mg/kg exist at any depth and asphalt cover exists already[8].
  - Maintain asphalt pavement for industrial zoned/use properties where PCB concentrations greater than 25 mg/kg exist at any depth and asphalt cover exists already[7].
- Institutional controls, SMP, and periodic reviews.
  - Institutional controls and the SMP would include requirements for areas of properties where soil over the respective cleanup objectives remains
  - Periodic site reviews would be conducted in accordance with the SMP.

Non-common elements, and elements not described above, are further described below:

***Excavation of soil exhibiting greater than 1 mg/kg PCBs for Commercial Zoning/use Properties and greater than 25 mg/kg PCBs for Industrial Zoning/use Properties***

It is anticipated that excavation of soil in non-paved areas and areas not subject to *in situ* treatment exhibiting concentrations in excess of 1 mg/kg PCBs would be performed for each property that is zoned or currently used for commercial use and excavation of soil exhibiting concentrations in excess of 25 mg/kg PCBs would be performed for each property that is zoned for industrial use or currently used for industrial purposes. Excavation would be limited by structures such as buildings and underground utilities. Excavated soils would be managed appropriately off-site. Excavations would be backfilled using acceptable imported fill. Surfaces would be restored in accordance with appropriate restoration plans (*e.g.*, vegetation would be replaced in consideration of current habitat). The restoration plans would be developed to preserve existing habitat (*e.g.*, restore existing wetland or forested areas). It is anticipated that the depth of excavations on commercial- and industrial-use properties would be as deep as approximately 15 ft below grade. For cost estimation purposes, temporary sheet piling was assumed for excavation extending deeper than 4 feet and along the creek. For cost estimation purposes, temporary sheet piling was assumed to extend approximately 4 ft deep. Geotechnical and structural information would be considered during the design phase for excavations near buildings. Structural analysis/evaluations would be performed prior/during and following excavation activities.

***In situ treatment of soil in certain forested areas and infrequently used/inaccessible areas***

Soil above the corresponding SCOs in certain forested areas and other infrequently used/inaccessible areas would be addressed by *in situ* treatment, allowing for the preservation of mature trees and habitat. Treatment of PCBs in soil would consist of addition of amendment(s) (*e.g.*, activated carbon or biochar) to stabilize and/or otherwise render PCBs less bioavailable. The use of carbon-based sorbents has been demonstrated to reduce the mobility and bioavailability of PCBs and has been applied to wetland soils. Amendments could be distributed over the surface of the treatment area and mixed into the surface soils using standard tilling or aeration equipment without the need to remove mature trees or significantly disturb wetlands. Laboratory treatability studies would need to be conducted to evaluate dosing needs and effectiveness of amendments, particularly if biochar is chosen as the amendment. Field pilot

[8] For commercial and industrial properties some pavement may be added to address small areas adjacent to buildings/pavement in lieu of excavation.

studies would be implemented to evaluate depths and completeness of mixing and long-term effectiveness of amendment application in wetland and forested areas. For purposes of this FS, amendment application was assumed to address where impacts exist in the top 2 ft of soil using surface application. A summary of carbon-based sorbent use for soil remediation is included as **Appendix F**. Should pilot studies indicate treatment is not effective or implementable, Alternative 3A excavation shall be the contingent remedy for these areas.

***Paved areas for Commercial and Industrial Zoning/use Properties***

Existing pavement on commercial and industrial properties over soil exhibiting concentrations in excess of 1 mg/kg PCBs (commercial use properties) and 25 mg/kg PCBs (industrial-use properties) would be maintained as covers. For purposes of this FFS, in some instances, asphalt pavement may be added to address small areas adjacent to buildings/pavement in lieu of excavation. The added pavement is anticipated to match surrounding grades and conform with existing drainage patterns. Soil excavated to allow installation of paving would be managed appropriately off-site.

***Volumes and Areas for Alternative 3A***

**Figures 3-2A through 3-2H** conceptually illustrate the anticipated areas of remediation under Alternative 3A. Remediation areas would be refined during the design phase, based on existing data and field conditions. It is anticipated that Alternative 3A would address approximately 17.5 acres of area along the Ley Creek floodplain between Townline Road and Route 11 (a.k.a Brewerton Road) and approximately 0.27 acres on the National Grid property directly west of the Former IFG Facility.

**Table 3-2** provides a summary of estimated areas and volumes associated with this alternative. An estimated total volume of 42,100 CY of soil would be excavated under this alternative and disposed off-site. Of this volume, approximately 14,400 CY are anticipated to exhibit concentrations greater than 50 mg/kg PCBs (and thus would be managed as hazardous waste in NYS).

Alternative 3A also includes *in situ* treatment of soil in the forested areas and other infrequently used/inaccessible areas north of the creek. The total area estimated to receive the treatment is approximately 10.4 acres. Using an assumption of distribution withing the top 2 ft through surface application, approximately 27,200 CY of impacted material would be treated across the 10.4 acres.

Under Alternative 3A, in addition to soil in the immediate vicinity of underground utilities or permanent structures, an estimated 79,000 CY of soil exhibiting PCB concentrations above the corresponding SCOs would remain beneath existing pavement covers and within the treatment footprint. Of this volume, it is estimated that approximately 20,400 CY would exhibit concentrations greater than 50 mg/kg PCBs.

The area of paved covers to be maintained under Alternative 3A is estimated to be approximately 0.83 acres. As described above, institutional controls would require continued inspection to document the long-term effectiveness of these covers.

Should pilot studies indicate treatment is not effective or implementable, Alternative 3A shall include a contingent remedial element for these areas, which consists of excavation of an additional 68,800 CY of soil. Of this volume, approximately 14,200 CY are anticipated to exhibit concentrations greater than 50 mg/kg PCBs (and thus would be managed as hazardous waste in NYS).

### 3.5 Alternative 3B – Covers and Property Zoning/Use/Ecological Resource-Based Excavation with Containment in Old Channel West Area and *In Situ* Treatment

Alternative 3B would include the same elements as 3A, however, excavation in the Old Channel West Area would be limited to a depth of 6 ft (*i.e*., PCB concentrations above the corresponding SCOs would remain in soils deeper than 6 ft). Soil with PCB concentrations above the corresponding SCOs that is located deeper than 6 ft would be addressed with new asphalt paving and a vertical barrier along Ley Creek to address potential exposures associated with creek bank erosion and future site use. Specifically, Alternative 3B would comprise the following elements:

- Treatment
  - I*n situ* treatment for soil using a carbon-based amendment would be applied in the forested areas and other infrequently used/inaccessible areas with PCB concentrations above the corresponding SCOs. These areas are depicted on Figures **3-3A through 3-3H.**
  - Should pilot studies indicate treatment is not effective or implementable, Alternative 3B shall include a contingent remedial element for these areas, which consists of excavation as described below.
- Excavation
  - Excavation of soil with PCB concentrations greater than 1 mg/kg on residential zoned/used properties excluding infrequently used/inaccessible areas subject to *in situ* treatment.
  - Excavation of soil with PCB concentrations greater than 1 mg/kg at all depths on commercial zoned/used properties excluding paved areas, areas subject to *in situ* treatment, and soil in the Old Channel West Area deeper than a depth of 6 ft.
  - Excavation of soil with PCB concentrations greater than 25 mg/kg at all depths on industrial zoned/use properties excluding paved areas, areas subject to *in situ* treatment, and soil in the Old Channel West Area deeper than a depth of 6 ft.
  - Excavation of soil with PCB concentrations greater than 1 mg/kg at all depths where ecological resources are present (*e.g.,* Ley Creek banks not used for residential, commercial, or industrial use and within delineated wetlands) excluding areas subject to *in situ* treatment.
  - Excavation of soil with PCB concentrations greater than 1 mg/kg at all depths within delineated wetland areas west of the National Grid Access Road (west of steep bank).
  - Excavation of soil with PCB concentrations greater than 25 mg/kg in the top 2 ft on the National Grid Access Road, steep bank west of Access Road, and area east of Access Road.

- Covers
  - Provide/maintain asphalt pavement on commercial zoned/use properties where PCB concentrations greater than 1 mg/kg exist at any depth and asphalt cover exists already.

  - Provide or maintain asphalt pavement on industrial zoned/use properties where PCB concentrations greater than 25 mg/kg exist at any depth and asphalt cover exists already.
  - Provide asphalt paving and a vertical barrier for commercial and industrial zoned/use properties in the Old Channel West Area where PCB concentrations above the corresponding SCOs exist below 6 ft bgs
  - Following excavation, extend low permeability cover system (or other configuration selected during remedial design) from neighboring property to the east to cover areas of National Grid Access Road, steep bank west of access road, and area east of access road that exceed SCOs.
- Institutional controls, SMP, and periodic reviews.
  - Institutional controls and the SMP would include requirements for areas of properties where soil with PCB concentration above the respective cleanup objectives remains
  - Periodic site reviews would be conducted in accordance with the SMP.

Non-common elements, and elements not described above, are further described below:

***Paving and Vertical Containment for Old Channel West Area***

Following excavation to remove soil exhibiting concentrations greater than 1 mg/kg for commercial properties and 25 mg/kg for industrial properties present in the top 6 ft of soil in the Old Channel West Area, the excavation would be backfilled using acceptable imported fill. The surface would be restored using asphalt. The added pavement is anticipated to match surrounding grades in accordance with property owner requirements. This asphalt surface would be maintained as an engineering control to address potential exposures associated potential future site use.

In addition to the paved cover, a vertical containment system would be installed along the bank of Ley Creek in the Old Channel West Area, to minimize potential erosion of Ley Creek banks in this area that could result in potential exposure of remaining impacted soil at depth. For purposes of cost estimation in this FFS, this vertical containment system is assumed to consist of the sheet piling used to facilitate overburden excavation. This would consist of sheet piles driven to approximately 30 ft in depth along the shoreline of Ley Creek. This vertical containment system would be maintained as an engineering control.

***Cover System***

Following excavation to remove soil exhibiting concentrations greater than 25 mg/kg from the National Grid Access Road, steep bank west of access road, and area east of access road, the area would be graded and covered with a cover to address potential future direct contact. For purposes of the cost estimate, a low permeability system comprising a linear low-density polyethylene (LLDPE) flexible membrane cover overlain by barrier protection fill material followed by a surface material consisting of either vegetated topsoil or gravel for the Access Road has been assumed as an extension of the low permeability cover system present on the adjacent former IFG facility. The configuration of this cover would be finalized during the remedial design. This cover system would be maintained as an engineering control.

***Volumes and Areas for Alternative 3B***

**Figures 3-3A through 3-3H** conceptually illustrate the anticipated areas of remediation under Alternative 3B. Remediation areas would be refined during the design phase, based on existing data and field conditions. It is anticipated that Alternative 3B would address approximately 17.5 acres along the Ley Creek floodplain between Townline Road and Route 11 (a.k.a Brewerton Road) and approximately 0.27 acres on the National Grid property directly west of the Former IFG Facility.

**Table 3-2** provides a summary of estimated areas and volumes associated with this alternative. An estimated total volume of 36,100 CY of soil would be excavated from this area and disposed off-site. Of this volume, approximately 5,500 CY are anticipated to exhibit concentrations greater than 50 mg/kg PCBs (and thus would be managed as hazardous waste in NYS).

Alternative 3B also includes *in situ* treatment of soil in the forested areas and other infrequently used/inaccessible areas north of the creek. The total area estimated to receive the treatment is approximately 10.4 acres. Using an assumption of distribution withing the top 2 ft through surface application, approximately 27,200 CY of impacted material would be treated across the 10.4 acres.

Under Alternative 3B, in addition to soil in the immediate vicinity of underground utilities or permanent structures, an estimated 85,000 CY of soil exhibiting PCB concentrations above the corresponding SCOs would remain beneath existing and new covers and within the treatment footprint. Of this volume, it is estimated that approximately 29,300 CY would exhibit concentrations greater than 50 mg/kg PCBs.

The area of paved covers to be maintained under Alternative 3B is estimated to be approximately 1.56 acres. In addition, approximately 0.25 acres of cover are included under Alternative 3B for the National Grid Access Road area. As described above, institutional controls would require continued inspection to document the long-term effectiveness of these covers.

Should pilot studies indicate treatment is not effective or implementable, Alternative 3B shall include a contingent remedial element for these areas, which includes excavation of an additional 58,800 CY of soil. Of this volume, approximately 15,500 CY are anticipated to exhibit concentrations greater than 50 mg/kg PCBs (and thus would be managed as hazardous waste in NYS).

## 3.6 Alternative 4 – Extended Covers and Limited Property Zoning/Use-Based Excavation with Containment in Old Channel West Area and *In Situ* Treatment

Alternative 4 would include the same elements as 3B, however, under Alternative 4 excavation of soil on commercial and industrial properties not subject to *in situ* treatment would be limited to 2 ft in depth, followed by restoration to existing grades. In addition to existing paved areas over remaining impacted materials being maintained as covers, restored 2 ft deep excavation areas where deeper impacted materials remain would be maintained as a 2 ft thick vegetated soil cover. Specifically, Alternative 4 would comprise the following elements:

- Treatment
    - I*n situ* treatment for soil using a carbon-based amendment would be applied in the forested areas and other infrequently used/inaccessible areas with PCB concentrations

above the corresponding SCOs. These areas are depicted on Figures **3-4A through 3-4H.**
    - Should pilot studies indicate treatment is not effective or implementable, Alternative 4 shall include a contingent remedial element for these areas, which consists of no further action in these areas.

- Excavation
    - Excavation of soil with PCB concentrations greater than 1 mg/kg on residential zoned/used properties excluding infrequently used/inaccessible areas subject to *in situ* treatment.
    - Excavation of soil with PCB concentrations greater than 1 mg/kg in top 2 ft on commercial zoned/used properties. Paved areas and areas subject to *in situ* treatment would be excluded from excavation.
    - Excavation of soil with PCB concentrations greater than 25 mg/kg in top 2 ft on industrial zoned/use properties. Paved areas and areas subject to *in situ* treatment would be excluded from excavation.
    - Excavation of soil with PCB concentrations greater than 1 mg/kg in top 2 ft where ecological resources are present (*e.g.,* Ley Creek banks not used for residential, commercial, or industrial use and within delineated wetlands). Areas subject to *in situ* treatment would be excluded from excavation.
    - Excavation of soil with PCB concentrations greater than 1 mg/kg at all depths within delineated wetland areas west of the National Grid Access Road (west of steep bank).
    - Excavation of soil with PCB concentrations greater than 25 mg/kg in the top 2 ft on the National Grid Access Road, steep bank west of Access Road, and area east of Access Road.
- Covers
    - Provide/maintain asphalt pavement on commercial zoned/use properties where PCB concentrations greater than 1 mg/kg remain at any depth.
    - Maintain 2 ft soil covers for commercial zoned/use properties where PCB concentrations greater than 1 mg/kg remain deeper than 2 ft.
    - Provide/maintain asphalt pavement for industrial zoned/use properties where PCB concentrations greater than 25 mg/kg remain at any depth.
    - Maintain 2 ft soil covers for industrial zoned/use properties where PCB concentrations greater than 25 mg/kg remain deeper than 2 ft.
    - Maintain 2 ft soil covers for ecological areas (*e.g.,* Ley Creek banks not used for residential, commercial, or industrial use and within delineated wetlands) where PCB concentrations greater than 1 mg/kg remain deeper than 2 ft.
    - Provide asphalt paving and a vertical barrier for commercial and industrial zoned/use properties in the Old Channel West Area where PCB concentrations above the corresponding SCOs exist greater than 2 ft.
    - Following excavation, extend low permeability cover system (or other configuration selected during remedial design) from neighboring property to the east to cover areas of National Grid Access Road, steep bank west of access road, and area east of access road that exceed SCOs.
- Institutional controls, SMP, and periodic reviews.
    - Institutional controls and the SMP would include requirements for areas of properties where soil over the respective cleanup objectives remains

- Periodic site reviews would be conducted in accordance with the SMP.

Non-common elements, and elements not described above, are further described below:

***Soil Covers for Ley Creek banks soils exhibiting soil concentrations greater than 1 mg/kg PCBs (commercial and industrial properties)***
Vegetated soil covers would be constructed along Ley Creek banks where soils exhibit concentrations greater than 1 mg/kg on commercial and industrial properties. The vegetated soil cover would consist of placement of 2 ft of acceptable imported fill, suitable for establishment of vegetated covers. The installation of this cover would require the removal of existing vegetation and excavation of the top 2 ft of soil, such that existing grades can be maintained. Excavated soils would be managed appropriately off-site. Restoration would be consistent with restoration plans and is anticipated to consist of existing vegetation. The restoration plans would be developed to preserve existing habitat (*e.g.*, restore existing wetland or forested areas). Consideration for potential erosion of the vegetated soil cover would be addressed during the design phase. The limits of soil covers would be based on sampling conducted to date.

***Volumes and Areas for Alternative 4***
**Figures 3-4A through 3-H** conceptually illustrate the anticipated areas of remediation under Alternative 4. Remediation areas would be refined during the design phase, based on existing data and field conditions. It is anticipated that Alternative 4 would address approximately 3.4 acres of area along the Ley Creek floodplain between Townline Road and Route 11 (a.k.a Brewerton Road) and approximately 0.27 acres on the National Grid property directly west of the Former IFG Facility.

**Table 3-2** provides a summary of estimated areas and volumes associated with this alternative. An estimated total volume of 10,100 CY of soil would be excavated from this area and disposed off-site. Of this volume, approximately 3,100 CY are anticipated to exhibit concentrations greater than 50 mg/kg PCBs (and thus would be managed as hazardous waste in NYS).

Alternative 4 also includes *in situ* treatment of soil in the forested areas and other infrequently used/inaccessible areas north of the creek. The total area estimated to receive the treatment is approximately 10.4 acres. Using an assumption of distribution withing the top 2 ft through surface application, approximately 27,200 CY of impacted material would be treated across the 10.4 acres.

Under Alternative 4, in addition to soil in the immediate vicinity of underground utilities or permanent structures, an estimated 111,000 CY of soil exhibiting PCB concentrations above the corresponding SCOs would remain beneath existing and new covers and within the treatment footprint. Of this volume, it is estimated that approximately 31,700 CY would exhibit concentrations greater than 50 mg/kg PCBs.

The area of paved covers to be maintained under Alternative 4 is estimated to be approximately 1.56 acres. In addition, approximately 3.6 acres of soil cover along Ley Creek and 0.25 acres of cover for the National Grid Access Road area are included under Alternative 4. As described above, institutional controls would require continued inspection to document the long-term effectiveness of these covers.

Should pilot studies indicate treatment is not effective or implementable, Alternative 4 shall include a contingent remedial element for these areas, which consists of no further action in the forested areas and excavation of an additional 2,000 CY of soil for infrequently used/inaccessible areas north of the creek. Of this volume, approximately 200 CY are anticipated to exhibit concentrations greater than 50 mg/kg PCBs (and thus would be managed as hazardous waste in NYS).

### 3.7 Alternative 5 – Extended Covers and Limited Property Zoning/Use-Based Excavation with Containment in Old Channel West Area and *In Situ* Treatment

Alternative 5 would include the same elements as 3B, however, under Alternative 5 excavation of soil on commercial and industrial properties not subject to *in situ* treatment would be limited to 2 ft in depth, followed by restoration to existing grades. In addition to existing paved areas over remaining impacted materials being maintained as covers, restored 2 ft deep excavation areas where deeper impacted materials remain would be maintained as a 2 ft thick vegetated soil cover. In addition, soil impacts in the Old Channel West Area would be addressed with new asphalt paving and a vertical barrier along Ley Creek. Soil impacts beneath the National Grid Access Road, steep bank west of access road, and area east of access road would be addressed by extending the cover system from the neighboring property to the east. Specifically, Alternative 5 would comprise the following elements:

- Treatment
  - I*n situ* treatment for soil using a carbon-based amendment would be applied in the forested areas and other infrequently used/inaccessible areas with PCB concentrations above the corresponding SCOs. These areas are depicted on Figures **3-5A through 3-5H.**
  - Should pilot studies indicate treatment is not effective or implementable, Alternative 5 shall include a contingent remedial element for these areas, which consists of excavation and soil covers as described below.
- Excavation
  - Excavation of soil with PCB concentrations greater than 1 mg/kg on residential zoned/used properties excluding infrequently used/inaccessible areas subject to *in situ* treatment.
  - Excavation of soil with PCB concentrations greater than 1 mg/kg in top 2 ft on commercial zoned/used properties. Paved areas and areas subject to *in situ* treatment would be excluded from excavation.
  - Excavation of soil with PCB concentrations greater than 25 mg/kg in top 2 ft on industrial zoned/use properties. Paved areas and areas subject to *in situ* treatment, would be excluded from excavation.
  - Excavation of soil with PCB concentrations greater than 1 mg/kg in top 2 ft where ecological resources are present (*e.g.,* Ley Creek banks not used for residential, commercial, or industrial use and within delineated wetlands) excluding areas subject to *in situ* treatment. It is assumed that existing trees and vegetation would be cleared prior to excavation/cover placement.
  - Excavation of soil with PCB concentrations greater than 1 mg/kg at all depths within delineated wetland areas west of the National Grid Access Road (west of steep bank).

  - Excavation of soil with PCB concentrations greater than 25 mg/kg in the top 2 ft on the National Grid Access Road, steep bank west of Access Road, and area east of Access Road.
- Covers
  - Provide/maintain asphalt pavement on commercial zoned/use properties where PCB concentrations greater than 1 mg/kg exist at any depth.
  - Provide/maintain 2 ft soil covers in restored 2-ft excavation areas for commercial zoned/use properties and along Ley Creek banks where PCB concentrations greater than 1 mg/kg remain at depth. The placement of these covers would follow excavation, such that original grades may be maintained.
  - Provide or maintain asphalt pavement for industrial zoned/use properties where PCB concentrations greater than 25 mg/kg exist at any depth.
  - Provide/maintain 2 ft soil covers in restored 2-ft excavation areas for industrial zoned/use properties and along Ley Creek banks where PCB concentrations greater than 1 mg/kg remain at depth.
  - Provide asphalt paving/vertical barrier for commercial and industrial zoned/use properties in the Old Channel West Area where PCB concentrations above the corresponding SCOs exist.
  - Following excavation, provide/maintain 2 ft of cover in delineated wetlands where impacts are greater than 2 ft deep.
  - Following excavation, extend low permeability cover system (or other configuration selected during remedial design) from neighboring property to the east to cover areas of National Grid Access Road, steep bank west of access road, and area east of access road that exceed SCOs.
- Institutional controls, SMP, and periodic reviews.
  - Institutional controls and the SMP would include requirements for areas of properties where soil over the respective cleanup objectives remains
  - Periodic site reviews would be conducted in accordance with the SMP.

***Volumes and Areas for Alternative 5***

**Figures 3-5A through 3-5H** conceptually illustrate the anticipated areas of remediation under Alternative 5. Remediation areas would be refined during the design phase, based on existing data and field conditions. It is anticipated that Alternative 5 would address approximately 13.6 acres of area along the Ley Creek floodplain between Townline Road and Route 11 (a.k.a Brewerton Road) and approximately 0.27 acres on the National Grid property directly west of the Former IFG Facility.

**Table 3-2** provides a summary of estimated areas and volumes associated with this alternative. An estimated total volume of 10,100 CY of soil would be excavated from this area and disposed off-site. Of this volume, approximately 3,100 CY are anticipated to exhibit concentrations greater than 50 mg/kg PCBs (and thus would be managed as hazardous waste in NYS).

Alternative 5 also includes *in situ* treatment of soil in the forested areas and other infrequently used/inaccessible areas north of the creek. The total area estimated to receive the treatment is approximately 10.4 acres. Using an assumption of distribution withing the top 2 ft through surface application, approximately 27,200 CY of impacted material would be treated across the 10.4 acres.

Under Alternative 5, in addition to soil in the immediate vicinity of underground utilities or permanent structures, an estimated 111,000 CY of soil exhibiting PCB concentrations above the corresponding SCOs would remain beneath existing pavement and soil covers and within the treatment footprint. Of this volume, it is estimated that approximately 31,700 CY would exhibit concentrations greater than 50 mg/kg PCBs.

The area of paved covers to be maintained under Alternative 5 is estimated to be approximately 1.56 acres. In addition, approximately 3.6 acres of soil cover along Ley Creek and 0.25 acres of cover for the National Grid Access Road area are included under Alternative 5. As described above, institutional controls would require continued inspection to document the long-term effectiveness of these covers.

Should pilot studies indicate treatment is not effective or implementable, Alternative 5 shall include a contingent remedial element for these areas, which includes excavation of an additional 27,300 CY of soil. Of this volume, approximately 6,700 CY are anticipated to exhibit concentrations greater than 50 mg/kg PCBs (and thus would be managed as hazardous waste in NYS). The contingent remedial element would also include maintenance of an additional 5.68 acres of 2-ft thick soil covers.

### 3.8 Alternative 6 – Covers and 1 mg/kg PCB- and 10 mg/kg PCBs[9]-Based Excavation with Containment in Old Channel West Area and *In Situ* Treatment

Alternative 6 would include excavating soil with PCB concentrations greater than 1 mg/kg in top 2 ft and greater than 10 mg/kg deeper than 2 ft from commercial properties and ecological areas, and excavating soil with PCB concentrations greater than 25 mg/kg from industrial properties, followed by restoration to existing grades. However, excavation would not occur on commercial and industrial properties for areas currently covered by paved surfaces (*e.g.*, parking lots or paved storage areas) and forested and other infrequently used/inaccessible areas. These paved areas would be maintained as covers for these areas. For commercial and industrial properties, some asphalt pavement may be added to address small areas adjacent to buildings/pavement in lieu of excavation. Certain forested and other infrequently used/inaccessible areas located north of Ley Creek as depicted on **Figures 3-6A through 3-6H** would be addressed through *in situ* treatment. In the Old Channel West Area, Alternative 6 would include excavating soil with PCB concentrations greater than 1 mg/kg in top 2 ft and greater than 10 mg/kg from 2 ft to 6 ft from commercial properties, and excavating soil with PCB concentrations greater than 25 mg/kg from industrial properties to a depth of 6 ft. Soil with PCB concentrations greater than 10 mg/kg (commercial) and 25 mg/kg (industrial) in this area that is located deeper than 6 ft would be addressed with new asphalt paving and a vertical barrier as described under Alternative 3B. Specifically, Alternative 6 would comprise the following elements:

[9] Consistent with CP-51 and a Soil Cleanup Objective [SCO] specified in the Lower Ley Creek Record of Decision. *CP-51 Soil Cleanup Guidance* issued October 21, 2010 by New York State Department of Environmental Conservation (NYSDEC) can be found at https://www.dec.ny.gov/docs/remediation_hudson_pdf/cpsoil.pdf. *Record of Decision – Lower Ley Creek Subsite of the Onondaga lake Superfund Site* issued in September 2014 by United States Environmental Protection Agency can be found at http://www.epa.gov/r02earth/superfund/npl/onondagalake/index.html

- Treatment
  - *In situ* treatment for soil using a carbon-based amendment would be applied in certain forested areas and other infrequently used/inaccessible areas with PCB concentrations above the corresponding SCOs. These areas are depicted on Figures **3-6A through 3-6H.**
  - Should pilot studies indicate treatment is not effective or implementable, Alternative 6 shall include a contingent remedial element for these areas, which consists of excavation as described below.
- Excavation
  - Excavation of soil with PCB concentrations greater than 1 mg/kg on residential zoned/used properties excluding infrequently used/inaccessible areas subject to *in situ* treatment.
  - Excavation of soil with PCB concentrations greater than 1 mg/kg in top 2 ft and greater than 10 mg/kg deeper than 2 ft on commercial zoned/used properties. Paved areas, areas subject to *in situ* treatment, and soil in the Old Channel West Area deeper than a depth of 6 ft would be excluded from excavation.
  - Excavation of soil with PCB concentrations greater than 25 mg/kg on industrial zoned/use properties. Paved areas, areas subject to *in situ* treatment, and soil in the Old Channel West Area deeper than a depth of 6 ft would be excluded from excavation.
  - Excavation of soil with PCB concentrations greater than 1 mg/kg in top 2 ft and greater than 10 mg/kg deeper than 2 ft in ecological areas excluding areas subject to *in situ* treatment.
  - Excavation of soil with PCB concentrations greater than 1 mg/kg in top 2 ft and greater than 10 mg/kg deeper than 2 ft within delineated wetland areas west of the National Grid Access Road (west of steep bank).
  - Excavation of soil with PCB concentrations greater than 25 mg/kg in top 2 ft on the National Grid Access Road, steep bank west of Access Road, and area east of Access Road.
- Covers
  - Provide/maintain asphalt pavement on commercial zoned/use properties where PCB concentrations greater than 1 mg/kg exist in top 2 ft or greater than 10 mg/kg exist in soils deeper than 2 ft.
  - Provide or maintain asphalt pavement for industrial zoned/use properties where PCB concentrations greater than 25 mg/kg exist at any depth.
  - Provide asphalt paving/vertical barrier for Old Channel West Area where PCB concentrations above the corresponding SCOs exist greater than 6 ft.
  - Extend low permeability cover system (or other configuration selected during remedial design) from neighboring property to the east to cover areas of National Grid Access Road, steep bank west of access road, and area east of access road that exceed SCOs.
- Institutional controls, SMP, and periodic reviews.
  - Institutional controls and the SMP would include requirements for areas of properties where soil over the respective cleanup objectives remains
  - Periodic site reviews would be conducted in accordance with the SMP.

Non-common elements, and elements not described above, are further described below:

***Excavation of soil exhibiting greater than 1 mg/kg PCBs in top 2 ft and greater than 10 mg/kg PCBs at depths greater than 2 ft***

It is anticipated that excavation of non-paved soil exhibiting concentrations of PCBs in excess of 1 mg/kg PCBs in the top 2 ft would be performed, for each property that is zoned or currently used for commercial purposes. In addition, for each property that is zoned for or currently used for commercial use, excavation of soil exhibiting concentrations of PCBs in excess of 10 mg/kg PCBs at depth greater than 2 ft would be performed. Excavation would be limited by obstructions such as buildings and underground utilities. Excavated soils would be managed appropriately off-site. Excavations would be backfilled using acceptable imported fill. Surfaces would be restored in accordance with appropriate restoration plans (*e.g.*, vegetation would be replaced in consideration of current habitat). The restoration plans would be developed to preserve existing habitat (*e.g.*, restore existing wetland or forested areas).

It is anticipated that the depth of excavations for Alternative 6 would be as deep as approximately 6 ft below grade. For cost estimation purposes, temporary sheet piling was assumed for excavation extending deeper than 4 feet and along the creek. For cost estimation purposes, temporary sheet piling was assumed to extend approximately 30 ft deep.

***Excavation of soil exhibiting greater than 1 mg/kg PCBs in top 2 ft and soil exhibiting greater than 10 mg/kg PCBs at depths greater than 2 ft for Ecological Areas***

It is anticipated that excavation of soil exhibiting concentrations of PCBs in excess of 1 mg/kg PCBs in the top 2 ft would be performed, for each ecological area (Ley Creek banks not used for commercial or industrial use) and delineated wetlands and the delineated wetland portion west of the National Grid Access road. In addition, soil exhibiting concentrations of PCBs in excess of 10 mg/kg PCBs at depth greater than 2 ft would be excavated, for each ecological area. Excavation would be limited by utilities. Excavated soils would be managed appropriately off-site. Excavations would be backfilled using acceptable imported fill. Restoration would be consistent with restoration plans and is anticipated to consist of existing vegetation (grasses, shrubs and trees). Consideration for potential erosion of the vegetated soil cover along the creek banks would be addressed during the design phase.

It is anticipated that the depth of excavations in ecological areas would be as deep as approximately 10 ft below grade. For cost estimation purposes, temporary sheet piling was assumed for excavation extending deeper than 4 feet and along the creek. For cost estimation purposes, temporary sheet piling was assumed to extend approximately 30 ft deep.

***Volumes and Areas for Alternative 6***

**Figures 3-6A through 3-6H** conceptually illustrate the anticipated areas of remediation under Alternative 6. Remediation areas would be refined during the design phase, based on existing data and field conditions. It is anticipated that Alternative 6 would address approximately 18.0 acres of area along the Ley Creek floodplain between Townline Road and Route 11 (a.k.a Brewerton Road) and approximately 0.32 acres on the National Grid property directly west of the Former IFG Facility.

**Table 3-2** provides a summary of estimated areas and volumes associated with this alternative. An estimated total volume of 31,100 CY of soil would be excavated from this area and disposed

off-site. Of this volume, approximately 7,800 CY are anticipated to exhibit concentrations greater than 50 mg/kg PCBs (and thus would be managed as hazardous waste in NYS).

Alternative 6 also includes *in situ* treatment of soil in the forested areas and other infrequently used/inaccessible areas north of the creek. The total area estimated to receive the treatment is approximately 12.1 acres. Using an assumption of distribution withing the top 2 ft through surface application, approximately 32,700 CY of impacted material would be treated across the 12.1 acres.

Under Alternative 6, in addition to soil in the immediate vicinity of underground utilities or permanent structures, an estimated 90,000 CY of soil exhibiting PCB concentrations above the corresponding 1 mg/kg PCBs would remain beneath existing and new pavement covers and within the treatment footprint. Of this volume, it is estimated that approximately 27,000 CY would exhibit concentrations greater than 50 mg/kg PCBs.

The area of paved covers to be maintained under Alternative 6 is estimated to be approximately 1.56 acres. In addition, approximately 0.25 acres of cover are included under Alternative 6 at the National Grid Access Road area. As described above, institutional controls would require continued inspection to document the long-term effectiveness of these covers.

Should pilot studies indicate treatment is not effective or implementable, Alternative 6 shall include a contingent remedial element for these areas, which includes excavation of an additional 49,100 CY of soil. Of this volume, approximately 14,300 CY are anticipated to exhibit concentrations greater than 50 mg/kg PCBs (and thus would be managed as hazardous waste in NYS).

# 4. DETAILED ANALYSIS OF REMEDIAL ALTERNATIVES

This section documents the detailed analysis of the seven remedial alternatives that were developed during the FFS. The detailed analysis of the alternatives was conducted consistent with NYSDEC DER-10 Section 4.2 (NYSDEC 2010a) and USEPA's Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA (USEPA 1988). This section describes the individual and comparative analysis of the remedial alternatives with respect to nine evaluation criteria that embody the specific statutory requirements that must be evaluated to satisfy the DER-10 and CERCLA remedy selection requirements.

## 4.1 Individual Analysis of Alternatives

NYSDEC DER-10 Section 4.2 indicates that, during remedy selection, ten evaluation criteria should be categorized into three groups: threshold criteria, primary balancing criteria, and modifying criteria. The threshold criteria must be satisfied for an alternative to be eligible for selection. The primary balancing criteria are used to balance the differences between the alternatives. The modifying criteria are formally considered during the USEPA development of, and public comment on, the Proposed Plan. The criteria are described below:

**Table 1 – Remedial Alternative Evaluation Criteria**

| Criterion | Considerations |
|---|---|
| **Threshold Criteria** | |
| Overall protectiveness of human health and the environment | • Achievement and maintenance of adequate protection<br>• Elimination, reduction, or control of site risks through treatment, engineering, or institutional controls<br>• Assessment relative to the current, intended, and reasonably anticipated future use of the Site and its surroundings. |
| Compliance with ARARs | • Attainment of chemical-, location-, and action-specific ARARs<br>• Grounds for invoking a waiver, if necessary. |
| **Primary Balancing Criteria** | |
| Long-term effectiveness and permanence | • Magnitude of potential residual risk from materials remaining at the conclusion of the remedial activities.<br>• Adequacy and reliability of controls necessary to manage materials left on Site. |
| Reduction of toxicity, mobility, or volume through treatment | • Treatment or recycling processes employed, and materials treated<br>• Amount of hazardous substances, pollutants, or contaminants treated or recycled<br>• Degree of expected reduction of mobility, toxicity, or volume of the waste due to treatment or recycling<br>• Degree to which treatment would be irreversible<br>• Type and quantity of residuals that would remain following treatment, considering the persistence, toxicity, mobility, and propensity to bioaccumulate<br>• Degree to which treatment would reduce the inherent hazards posed by the Site. |

| Criterion | Considerations |
|---|---|
| Short-term effectiveness | • Short-term potential risks to the community during implementation<br>• Potential impacts to workers and effectiveness/reliability of protective measures<br>• Potential environmental impacts and the effectiveness/reliability of mitigative measures<br>• Time until protection would be achieved. |
| Implementability | • Technical difficulties and unknowns<br>• Reliability of the technology<br>• Ease of undertaking additional remedial actions<br>• Ability to monitor the effectiveness of the remedy<br>• Activities needed to coordinate with other offices and agencies<br>• Ability and time required to obtain any necessary agency approvals and permits<br>• Availability of adequate off-site treatment, storage, and disposal capacity/services<br>• Availability of necessary equipment and specialists<br>• Provisions to obtain necessary additional resources<br>• Availability of prospective technologies. |
| Cost | • Capital costs<br>• Annual O&M costs<br>• Periodic O&M costs<br>• Present worth cost. |
| Land Use[10] | • Consistency with land use |
| **Modifying Criteria** | |
| State acceptance | • Indicates whether, based on its review of the RI/FS reports and the Proposed Plan, the State supports, opposes, and/or has identified any reservations with the preferred response measure. |
| Community acceptance | • Summarizes the public's general response to the response measures described in the Proposed Plan and the RI/FS reports. Community acceptance would be assessed in a ROD amendment and includes determining which of the response measures the community supports, opposes, and/or has about. |

The objective of the detailed analysis of alternatives was to analyze and present sufficient information to allow the alternatives to be compared and a remedy selected. The analysis consisted of an individual assessment of each alternative with respect to the evaluation criteria that encompass statutory requirements and overall feasibility and acceptability. The summary of this analysis is presented in **Table 4-1**.

### 4.2 Comparative Analysis of Alternatives

The detailed analysis of alternatives also included a comparative evaluation designed to consider the relative performance of the alternatives and identify major trade-offs among them. The

[10] Land use is not a criterion under the NCP; however, it is a primary balancing criterion under NYSDEC's guidance entitled *DER-10/Technical Guidance for Site Investigation and Remediation* (NYSDEC 2010a). For this reason, it is retained as a primary balancing criterion for the detailed analysis of alternatives at this Site.

comparative evaluation of the alternatives is presented in the following subsections. In the comparative analysis of alternatives, the performance of each alternative relative to the others was evaluated for each criterion. As noted in Section 4.1, the detailed evaluation with respect to the FS criteria for each of the alternatives is presented in **Table 4-1**.

### 4.2.1 Overall Protection of Human Health and the Environment

Alternative 1, the no further action alternative, would not provide protection of human health relative to potential exposure to contaminated soil. Alternatives 2 through 6 would provide for human health protection relative to potential exposure to contaminated soil through soil removal, covers, and institutional controls. Alternatives 2 and 6 provide protection by removal of impacted soils. Alternatives 3A, 3B, 4, and 5 provide a similar level of protection as Alternatives 2 and 6, however, in some areas, this protectiveness relies on the proper maintenance of asphalt and soil covers, and *in situ* treatment. Both excavation and properly maintained covers would adequately address potential risks to human health. The *in situ* treatment and institutional controls included in Alternatives 3A, 3B, 4, 5, and 6 would adequately address potential risks to receptors. Should pre-design evaluations indicate treatment to be ineffective or not implementable, contingent remedial elements are outlined for each alternative. The contingent remedies for Alternatives 3A, 3B, 5 and 6 would adequately address potential risks to receptors through excavation and/or maintained covers. In the event that treatment is not implemented for Alternative 4, this alternative would rely on institutional controls and the relative inaccessibility to provide protection to human receptors. The Alternative 4 contingent remedy (no action) provides the least protection to ecological receptors, however, the existing valuable forested habitat would be preserved. As described in Section 1.3, the existing forested habitat provides a variety of functions and values within the watershed, including flood attenuation, sediment and nutrient retention, sediment/shoreline stabilization, and wildlife habitat. It also provides a valuable aesthetic element within an urban setting.

Alternative 1, the no further action alternative, would not be protective of human health and the environment because it would not address the contaminated soils, which present human health and ecological risks. Alternatives 2 through 6 would be protective of the environment because each of these alternatives includes a remedial strategy or treatment technology capable of addressing ecological exposure to contaminated soils. Alternative 2 results in the removal of 7.7 acres of forested wetlands that would be preserved in Alternatives 3A through 6. It is anticipated that it would take several decades to restore this forested wetland habitat. Use of *in situ* treatment of soil in the forested wetlands called for in Alternatives 3A, 3B, 4, 5, and 6 allows for preservation of this important habitat.

### 4.2.2 Compliance with ARARs

The ARARs are presented in **Appendix B**[11]. Because the contaminated soils would not be actively addressed under Alternative 1, the no further action alternative, would not comply with chemical-specific ARARs. Alternatives 2 through 6 provide a means for attaining chemical-specific ARARs for soil. Alternative 2 addresses chemical-specific ARARs through removal of impacted soils. Alternatives 3A through 6 address chemical-specific ARARs through treatment and/or removal of impacted soils. The remaining impacted soil not meeting ARARs would be controlled through reliable means such as covers and institutional controls. Alternatives 4 and 5

[11] SCGs were presented in the 2013 FS Report, since NYSDEC was the lead agency at that time. The 2013 SCGs are adopted as the Applicable or Relevant and Appropriate Requirements (ARARs) for this FFS.

would address the least amount of impacted soils through a combination of excavation and covers, as compared to Alternatives 2, 3A, 3B, and 6.

No location- or action-specific ARARs are identified for Alternative 1, the no further action alternative. Alternatives 2 through 6 would be implemented in accordance with location- and action-specific ARARs. Specifically, construction methods and safety procedures would be implemented to adhere to location- and action-specific ARARs. Institutional controls would be implemented in Alternatives 2 through 6 in general conformance with NYSDEC's guidance DER-33 (NYSDEC 2010c). Alternatives that include cover placement would be consistent with soil cover guidance presented in DER-10 (NYSDEC 2010a). Additionally, Alternatives 2 through 6 would be conducted in a manner consistent with State and Federal wetland and floodplain requirements. With respect to action-specific ARARs, excavation, cover system, and treatment activities would be conducted consistent with applicable standards; earth moving/excavation activities would be conducted consistent with air quality standards; and transportation and disposal activities would be conducted in accordance with applicable State and Federal requirements, by licensed and permitted haulers.

### 4.2.3 Long-Term Effectiveness and Permanence

Alternative 1 would involve no active remedial measures; therefore, it would not be effective in eliminating the potential exposure to contaminants in the soil and it would allow the continued migration of contaminants from the soil to Ley Creek. Alternative 2 would be effective in the long-term and would provide permanent remediation by removing the contaminated source area soils and securely disposing of them. Under Alternatives 3 through 6, in addition to excavation, some of the contaminated soils would be covered with soil or would remain covered by asphalt. The covered areas would require the development of an SMP, long-term O&M, and appropriate institutional controls to protect the covers and prevent exposure.

Alternatives 2 through 6 would each be effective in the long-term and provide permanent remediation, to varying degrees, through soil removal, covers, and *in situ* treatment. To be effective in the long-term and provide permanent remediation, all the action alternatives would require institutional controls to restrict intrusive activities in areas where soil contamination remains. Even implementation of Alternative 2, which calls for the greatest quantity of excavation of soils exceeding corresponding SCOs, would likely result in some soils remaining in the vicinity of buried utilities that would warrant institutional controls.

Alternatives 3 through 6 include *in situ* treatment in certain areas. The site-specific effectiveness and permanence of treatment would be evaluated during pre-design. Should the evaluations indicate treatment to be ineffective or not implementable, contingent remedial elements are outlined for each alternative.

### 4.2.4 Reduction of Toxicity, Mobility, or Volume through Treatment

There would be no reduction in toxicity, mobility, or volume in soil/fill material through treatment provided in Alternative 2. The impacted soil within the 10.4 acres of forested and infrequently used/inaccessible areas would be addressed through *in situ* treatment in Alternatives 3A through 6. While not a treatment process, removal and off-site disposal of impacted soils in Alternatives 2 through 6 would result in a reduction of the toxicity of soil in OU2 areas. In addition, covers

included in Alternatives 3A, 3B, 4, 5, and 6 would result in a reduction of mobility (*i.e.*, potential erosion) of COCs in soil. Covers may not address potential for mobility of certain COCs via infiltration. Quantities addressed by each alternative are summarized as follows:

**Table 2 – Summary of Remediation Quantities**

| Alternative | Cover (acres) | Excavated soil (CY) | Treated soil (acres/CY) |
|---|---|---|---|
| 1 | 0 | 0 | 0 |
| 2 | 0 | 121,100 | 0 |
| 3A | 0.83 | 42,100 | 10.4/27,200 |
| 3B | 1.81 | 36,100 | 10.4/27,200 |
| 4 | 5.41 | 10,100 | 10.4/27,200 |
| 5 | 5.41 | 10,100 | 10.4/27,200 |
| 6 | 1.81 | 31,100 | 12.1/32,700 |

### 4.2.5 Short-term Effectiveness

Alternative 1 does not include any physical construction measures in any areas of contamination and, therefore, would not present any potentially adverse impacts to remediation workers or the community as a result of its implementation. Alternatives 2 through 6 could present some limited adverse impacts to remediation workers through dermal contact and inhalation related to sampling, excavation and/or capping activities. Noise from the excavation under Alternative 2 and the excavation and capping for Alternatives 3 through 6 could present some limited adverse impacts to remediation workers and nearby residents. In addition, post-remediation soil sampling activities would pose some risk. The short-term impacts to remediation workers and nearby residents under all of the alternatives could, however, be mitigated by following appropriate health and safety protocols, by exercising sound engineering practices and by utilizing proper protective equipment.

Alternatives 2 through 6 would require the transport of contaminated soils for disposal. The volume would range from a high of 121,100 cubic yards for Alternative 2 to a low of 10,100 cubic yards for Alternatives 4 and 5. These volumes would require transporting an estimated 10,300 truckloads of material (Alternative 2) to 850 truckloads (Alternatives 4 and 5). It is estimated that 670 truckloads of imported/restoration material would be required for Alternatives 4 and 5 to 8,100 truckloads for Alternative 2. Approximately 15 CY per truckload for imported topsoil/fill and 20 tons per truckload for disposal were assumed for estimating purposes. The greater the number of trucks, the more substantial the adverse impact on local traffic and roadways. The greater the volume of excavated soil, the greater the potential for increased storm water runoff and erosion during construction and excavation activities that would have to be properly managed to prevent or minimize any adverse impacts. Appropriate measures would have to be taken during excavation activities to prevent transport of fugitive dust and exposure of workers and downgradient receptors to PCBs.

Alternative 2 is anticipated to take 3 construction seasons to implement. Alternatives 3A, 3B, and 6 are anticipated to take 2 construction seasons to implement, while it is anticipated that Alternatives 4 and 5 can be constructed in a single construction season. Alternatives 3A through 6 include *in situ* treatment in certain areas. The timeframe to achieve treatment effectiveness

would be evaluated during pre-design. Should the evaluations indicate treatment to be ineffective, contingent remedial elements are outlined for each alternative.

Alternative 1, the no further action alternative, results in the least fuel/energy usage and greenhouse gas (GHG) emissions, however, this alternative does not address potential risks due to exposure to or erosion of impacted soil. Alternative 2 would result in the most fuel/energy use and GHG emissions due to the largest quantity of excavated soil and transportation of spoils and restoration materials required for this alternative. Fuel/energy consumption and GHG emissions are followed in order of greatest to least by Alternatives 3A, 3B, 6, 4, and 5. Implementation of Alternative 2 requires the removal of approximately 7.7 acres of forested wetlands. Under Alternatives 3A through 6, this area is addressed by *in situ* treatment, that would be implemented with minimal impact to the forested habitat. Should pre-design evaluations indicate treatment to be ineffective, contingent remedial elements are outlined for each alternative. Estimated GHG emissions due to construction are summarized as follows:

**Table 3 – Summary of Greenhouse Gas Emissions Estimates**

| Alternative | Total estimated GHG Emissions ($MTCO_2$ equiv.)[1,2] | Total estimated GHG Emissions (Car equiv.)[3] |
|---|---|---|
| 1 | 0 | 0 |
| 2 | 809,000 | 170,000 |
| 3A | 506,000 | 106,000 |
| 3B | 473,000 | 100,000 |
| 4 | 86,000 | 18,000 |
| 5 | 86,000 | 18,000 |
| 6 | 345,000 | 73,000 |

Notes:
1. GHG = greenhouse gas
$MTCO_2$ equiv. = metric tons $CO_2$ equivalents
2. Calculated using the World Resources Institute (WRI) Scope 1 and 2 Methodologies for direct emissions and GHG emissions from electricity generation, respectively (WRI).
3. Calculated using the USEPA passenger vehicles per year emission factor (USEPA 2021).

Impacts to the vegetative community within the existing forested floodplain would also result in the following until mature forest is reestablished:

- Destabilization of soil by removing the root structure associated with mature woody vegetation that minimizes erosion.
- Reduction of evapotranspiration capacity which could increase Ley Creek flow volume and peak flows during storm events.

- Reduction in the retention of nutrients and toxicants within the project area which could influence downstream aquatic chemistry.
- Loss of mature hardwood forest habitat and the flora and fauna that it supports for decades.
- Increase in solar influence on water within the wetlands and Ley Creek which could result in thermal impacts on the resident aquatic flora and fauna.

### 4.2.6 Implementability

Alternative 1 would be the easiest alternatives to implement, as there are no construction activities to undertake. Alternatives 2 through 6 would employ technologies known to be reliable and that can be readily implemented. Equipment, services and materials needed for Alternatives 2 through 6 are readily available. Land-based excavation equipment have been implemented successfully at numerous sites. The actions under all of these alternatives would be administratively feasible.

Alternatives 3A through 6 include *in situ* treatment of wetland soil. Treatment of soil (including in the forested wetland) is anticipated to be implementable while preserving the trees. Implementability and reliability of *in situ* treatment would need to be verified through a treatability and/or pilot test.

### 4.2.7 Cost

Detailed cost estimates for the alternatives are included as **Tables 4-2 through 4-9**. The costs associated with Alternatives 1 through 7 are summarized as follows:

**Table 4 – Summary of Remedial Alternative Cost Estimates**

| Alternative | Total estimated capital cost ($ Million) | Total estimated present worth of O&M (30 years) ($ Million) | Total estimated net present worth cost ($ Million) |
|---|---|---|---|
| 1 | $0 | $0 | $0 |
| 2 | $80.0 | $0.54 | $80.5 |
| 3A | $34.6 | $1.84 | $36.5 |
| 3B | $30.6 | $2.15 | $32.7 |
| 4 | $14.3 | $2.49 | $16.8 |
| 5 | $14.3 | $2.49 | $16.8 |
| 6 | $25.9 | $1.93 | $27.8 |

Note: The 2015 ROD also included removal of sediment from within Ley Creek. Under each remedial alternative, this work, not yet completed, would also be conducted within this study reach. The total estimated capital cost for sediment remediation would be $13.5 M. A detailed estimate is provided as Appendix E.

### 4.2.8 Land Use

Land use is not a criterion under the NCP; however, it is a primary balancing criterion under NYSDEC's guidance entitled *DER-10/Technical Guidance for Site Investigation and Remediation*

(NYSDEC 2010a). Alternative 1 would not be consistent with land use, as it does not provide for protectiveness for land uses present in the study area. Alternatives 2 through 6 would be compatible with current and reasonably anticipated future land use, as impacted soils would be addressed to land use-specific PRGs. Alternative 2 would provide the most disruption to current property owners, as it includes removal of soils under existing business paved parking lots.

#### 4.2.9 Agency Acceptance

Evaluation of the agency acceptance criterion indicates whether, based on its review of the FFS report, other agencies support, oppose, and/or have identified any reservations with the preferred response measure.

#### 4.2.10 Community Acceptance

Evaluation of the community acceptance criterion summarizes the public's general response to the response measures described in the FFS report. Community acceptance would be assessed by USEPA.

# 5. CONCLUSIONS

Seven remedial alternatives were developed and evaluated to address impacted soils previously identified in the 2015 ROD, soils in the Expanded Area Adjacent to OU2 between Townline Road and Route 11 (a.k.a Brewerton Road), and the remaining contaminated soil to be addressed beneath and in the vicinity of the access road on the National Grid property in this FFS Report. Consistent with DER-10 and the NCP, the seven remedial alternatives developed to address these RAOs were subjected to a detailed evaluation based on required evaluation criteria and in sufficient detail such that risk management decision makers may select a remedy for the Site.

Threshold evaluation criteria for alternatives are overall protectiveness of human health and the environment, and compliance with ARARs. As discussed in Section 4, Alternative 1 would not satisfy the threshold criteria, because Alternative 1 would not provide protection of human health and the environment or address ARARs. The remaining alternatives would satisfy the threshold criteria by providing protection to human health and addressing the identified ARARs, to the extent practicable. Therefore, except for Alternative 1, each alternative would be eligible for further evaluation and selection as the final remedy.

Further evaluation based on the primary balancing criteria (long-term effectiveness and permanence; reduction of toxicity, mobility, or volume through treatment; short-term effectiveness; implementability; land use; and cost) concludes that Alternatives 2, 3A, 3B, 4, 5, and 6 would best satisfy the primary balancing criteria, as these alternatives would provide for adequate and reliable means of mitigating potentially unacceptable risks. Alternatives 2, 3A and 6 would be more disruptive to the community than Alternatives 3B, 4, and 5. While Alternative 3A would address deep impacts in the Old Channel West Area, Alternatives 3B, 4, 5 and 6 would address potential risks associated with this material through institutional controls and containment. Alternatives 3A, 3B, 4 5 and 6 would have the added benefit of preserving the forested wetland habitat and each would reduce toxicity, mobility, or volume through treatment by *in situ* treatment of soil in the certain forested and infrequently used/inaccessible areas.

Alternatives 2 through 6 would effectively address the soil cleanup levels. While Alternative 2 is considerably more expensive than the other alternatives, it would not require the monitoring and maintenance of large capped areas included in Alternatives 4 and 5 or lesser capped areas included in Alternatives 3A, 3B and 6.

As part of the process established for remedial alternatives under the draft Order, following review of the evaluations documented in this FFS Report, USEPA will modify the remedy through an ESD or ROD amendment. The vehicle for modifying the remedy will depend upon whether the change to the remedy is significant or fundamental.

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