Feasibility Study Report
Gibson Scrapyard (851058)

Steuben County, Gibson, New York
Work No. Assignment D009806-05

Prepared for

New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, New York 12233-7017

Prepared by

EA Engineering, P.C. and Its Affiliate
EA Science and Technology
269 W. Jefferson Street
Syracuse, New York 13202
315-431-4610

September 2023
Version: FINAL
EA Project No. 1602505

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Donald F. Conan, P.E., P.G. — 8 September 2023
EA Engineering, P.C. — Date

Liane DeSantis, Project Manager — 8 September 2023
EA Science and Technology — Date

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LIST OF ACRONYMS AND ABBREVIATIONS

µg/kg	Microgram(s) per kilogram
µg/L	Microgram(s) per liter
amsl	Above mean sea level
ARAR	Applicable or relevant and appropriate requirements
ARGO	ARGO Systems, LLC
AWQS	Ambient water quality standard
bgs	Below ground surface
BTEX	BTEX benzene, toluene, ethylbenzene, and total xylenes
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	Contaminant of concern
COD	Chemical oxygen demand
CY	Cubic yard(s)
DDE	Dichloro-diphenyl-dichloroethylene
DER	Division of Environmental Remediation
EA	EA Engineering, P.C. and its affiliate EA Science and Technology
EPA	U.S. Environmental Protection Agency
ERT	Electrical resistivity tomography
ESA	Environmental Site Assessment
F	Fahrenheit
FEMA	Federal Emergency Management Agency
FS	Feasibility study
ft	Foot (foot)
GHG	Greenhouse gas
GRA	General Response Action
IC	Institutional controls
in.	Inch(es)
MEC	Munitions and explosives of concern
mg/kg	Milligram(s) per kilogram
mg/L	Milligram(s) per liter
mm	Millimeter
MMBTU	Million British thermal units
mph	Miles per hour
MPPEH	Material potentially presenting an explosive hazard

LIST OF ACRONYMS AND ABBREVIATIONS (CONTINUED)

No.	Number
NOx	Nitrogen oxides
6 NYCRR	Title 6 New York Code of Rules and Regulations
NYCRR	New York Code of Rules and Regulations
NYSDEC	New York State Department of Environmental Conservation
PAH	Polycyclic aromatic hydrocarbon
PCB	Polychlorinated biphenyl
PDI	Pre-Design Investigation
P.E.	Professional Engineer
PFAS	Per- and polyfluoroalkyl substances
PFOS	Perfluorooctanesulfonic acid
P.G.	Professional Geologist
PM_{10}	Particulate matter of diameter 10 microns
PPE	Personnel protective equipment
QC	Quality control
RA	Remedial action
RAO	Remedial action objective
RCP	Representative concentration pathways
RCRA	Resource Conservation and Recovery Act
RI	Remedial investigation
ROW	Right(s)-of-way
SCG	Standards, Criteria, and Guidance
SCO	Soil cleanup objective
SI	Site investigation
SiteWise	SiteWise™ Tool for Green and Sustainable Remediation
Sox	Sulfur oxides
SVOC	Semivolatile organic compound
TAL	Target Analyte List
The ARGO Team	ARGO Systems, LLC and its subcontractor EA Engineering, P.C. and its affiliate EA Science and Technology
TKN	Total kjeldahl nitrogen
TOC	Total organic carbon
TSCA	Toxic Substances Control Act
UST	Underground storage tank
UU	Unrestricted use
UXO	Unexploded ordnance
VOC	Volatile organic compound

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1. INTRODUCTION AND PROJECT OVERVIEW

EA Engineering, P.C. and its affiliate EA Science and Technology (EA), under contract to the New York State Department of Environmental Conservation (NYSDEC), Work Assignment Number (No.) D009806-05, was tasked to perform a remedial investigation (RI) and feasibility study (FS) at the Gibson Scrapyard Site (Site) (No. 851058) located at the end of Main Street in the Hamlet of Gibson, Town of Corning, Steuben County, New York. The Site is listed as Class 2 in the State Registry of Inactive Hazardous Waste Disposal Sites (list of superfund sites), meaning that the Site represents a significant threat to public health or the environment, and action is required.

1.1 PURPOSE AND SCOPE

This FS Report has been prepared to develop and evaluate alternatives for remedial action (RA) and determine, which alternative is the most protective of public health and the environment, and conforms to relevant and appropriate Standards, Criteria, and Guidance (SCGs) for the Site.

The FS was prepared in accordance with the most recent versions of the Guidance for Conducting Remedial Investigations and Feasibility Studies under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (U.S. Environmental Protection Agency [EPA] 1988) and Division of Environmental Remediation (DER)-10, Technical Guidance for Site Investigation and Remediation (NYSDEC 2010), and focused on remedial alternatives proven effective at addressing site-related contamination.

1.2 REPORT ORGANIZATION

The FS report has been organized as follows:

- ***Section 1***—Introduction and Project Overview
- ***Section 2***—Summary of RI and Exposure Assessment
- ***Section 3***—Development of Remedial Action Objectives (RAOs)
- ***Section 4***—General Response Actions (GRAs)
- ***Section 5***—Identification and Screening of Technologies
- ***Section 6***—Scoping and Development of Remedial Alternatives
- ***Section 7***—Costing and Evaluation Criteria
- ***Section 8***—Detailed Analysis of Alternatives and Recommendations
- ***Section 9***—Green Remediation
- ***Section*** 10—References.

1.3 BACKGROUND

1.3.1 Site Location

The Site is located at 2972 Main Street in the Hamlet of Gibson in the Town of Corning, Steuben County, New York (**Figure 1-1**) in a rural residential and undeveloped area. The Site is comprised of 3.2-acres from three parcels, bounded by Narrows Creek to the south, residential property to the

southeast, the Norfolk Southern Railroad and Interstate-86 to the west, and a steep wooded hillside to the east and north. The Norfolk Southern Railroad tracks are located approximately 25 feet (ft) west of the site boundary. The Site and surrounding area are shown on **Figure 1-2**. The Gibson Fire Department is located to the southeast on the opposite side of Narrows Creek, within 500 ft of the Site.

1.3.2 Site History

The Site reportedly operated as an industrial waste landfill from about 1940 to 1950. The Corning Materials facility, a metal scrap recycler, then operated at the Site from 1950 to 1975, and accepted waste from industries including Ingersoll Rand, Corning Glass, Westinghouse, and General Electric. The Site was listed as a Resource Conservation and Recovery Information System large quantity generator for hazardous waste. Waste was reported to be buried at depths of up to 15 ft below ground surface (bgs). Previous investigations identified World War II munitions debris potentially from the Seneca Army Depot, polychlorinated biphenyls (PCBs) oil, drums of solvents, and lead powder as potential waste streams. During the RI, medium caliber practice projectiles (i.e., 20 to 30 millimeter) were identified within the upper 5 ft of site soil. In addition, there are verbal accounts that the facility historically detonated munitions on-site (Fagan Engineers 1998).

1.3.3 Current Site Land Use

The Site is zoned by the Town of Corning as vacant residential land and is currently unoccupied. The vacant property contains no structures other than a concrete slab associated with a former weigh station and is not under any current use. The southern half of the Site is overgrown with knee- to waist-high grasses, shrubs, and brush while the northern portion of the Site contains open areas with little to no vegetative growth. The ground surface at the Site is covered with metal and other small debris including tires, tubing, hose, and piping, typical of a former dump site. Two separate areas of the Site contain mounds of concrete, asphalt, and soil/gravel fill materials deposited on-site during construction activities for the nearby Interstate-86.

Transient individuals have been observed occupying a wooden structure resembling a large shed, located north of the footbridge at the southern entrance to the Site. The structure occupies the property formally identified as 2971 Main Street, Gibson, New York. None of the individuals attempted to enter the Site during RI field activities.

1.3.4 Physiography

The Site is approximately 900 ft above mean sea level (amsl). The nearest surface water feature is Narrows Creek, which is located adjacent to the southern boundary of the Site and flows east to west draining into the nearby Chemung River. The eastern border of the Site is defined by a steep slope that is the southern extent of Denmark Hill (U.S. Geological Survey 2016). The Site is described as generally flat and vegetated with low brush and small trees. Scattered metal debris is visible at the surface and numerous mounds of construction debris are present. A high-resolution topographic survey of the Site was conducted by Prudent Engineering from 26 to 28 April 2021 and is provided on **Figure 1-3**; the survey data are provided in Appendix J of the RI (EA 2022).

1.3.5 Geology

1.3.5.1 Soil

Native soil identified at the Site consist of the Chenango channery silt loam characterized by 3–8 percent slope and those of the Lordstown-Arnot association characterized by a 40–70 percent slope. The Chenango channery silt loam is described as well-drained gravelly loam developed over sandy and gravelly glaciofluvial deposits, which were derived from sandstone, shale, and siltstone, with an average depth to the water table of above 13 – 28 feet. The Lordstown-Arnot association consists of shallow to moderately deep, well-drained, and moderately well-drained soil, formed from a thin layer of glacial till on gently sloping ridges, hilltops, and valley sides (Natural Resources Conservation Services 2021).

1.3.5.2 Bedrock

Based on review of the Finger Lakes Geologic Map of New York Sheet (Rickard and Fisher 1970), the Site is located within the West Falls Group and is part of the Upper Devonian Age Gardeau Formation. This formation consists of shale and siltstone. Bedrock outcrops of shale and siltstone are visible on the eastern border of the Site.

1.3.6 Site Hydrology/Hydrogeology

As noted in Section 1.3.4, the topography of the Site is characterized by large open areas that are flat, with several vegetated mounds of various fill and waste material. While these mounds influence the flow of local precipitation, snowmelt, and other surface water drainage, flow is limited to areas immediately adjacent to the base of the mounds.

There are no discernible channels or conduits on-site that would otherwise collect and influence the flow of surface water runoff, and it is expected that for the majority of the Site, any precipitation or other surface water runoff infiltrates into the subsurface and recharges local groundwaters. The Site is flanked by a steep wooded cliff to the east and a railroad berm to the west and pinches out to the north where the cliff and berm meet; it is expected that any off-site migration of surface water is limited to the areas at the southern terminus of the Site, where the land slopes down to Narrows Creek.

Narrows Creek is a small, shallow, rocky perennial stream, which exhibits low sediment deposition. It flows to the southwest and drains into the larger Chemung River. The Chemung River is a broad, rocky high gradient river. Water depths along the eastern edge of the Chemung River range from 1 to 4 ft. Both Narrows Creek and the Chemung River are designated as Class C water bodies, meaning that they are protected for uses such as secondary recreation, fishing, wildlife, fish consumption, aquatic life including propagation, survival and maintenance of biological integrity, and agriculture.

The 100-year floodplain of Narrows Creek has not been mapped, while the 100-year floodplain for the Chemung River was mapped prior to the construction of Interstate-86. Currently the Federal Emergency Management Agency (FEMA) maps (FEMA 2022) indicate the 100-year floodplain

of the Chemung River is confined to the Chemung River channel by the adjacent railroad embankment and therefore does not impact the Site; however, the mapped floodplain boundaries do not take into account changes in watershed development, or climate change impacts on precipitation.

Bedrock beneath the Site is shallow, ranging from roughly 12 to 15 ft. bgs at the north end of the Site and dipping southward to depths below 40 ft. Static groundwater elevations and general groundwater flow direction were estimated based on gauging data collected from monitoring wells during groundwater sampling in May 2021. Groundwater elevation contours and general flow direction are presented in **Figure 1-4**. Groundwater elevations range from approximately 924.9 ft amsl at MW-03 to approximately 911.2 ft amsl at MW-02, and groundwater flows predominately in the west-southwest direction toward the Chemung River.

1.3.7 Climate

The climate of the site and surrounding region (Steuben County) is generally marked by warm summers and cold winters, with an average maximum summer temperature of 77.4 degrees Fahrenheit (F) and an average minimum winter temperature of 14.6 degrees F. The average annual temperature for the 1990s-2010s was 44.8 degrees F, and average annual rainfall for the same time period was 35.83 inches; however, like much of upstate New York, the site is subject to seasonal drought (New York Climate Change Science Clearinghouse, 2022). Severe weather that may occur in the region includes, but is not limited to, tropical storms and hurricanes, severe thunderstorms, freezing conditions, and heavy snowfall. Additional baseline climate data and a climate vulnerability assessment is provided in Section 7.3.

1.3.8 Ecological Resources

No federally listed or proposed endangered or threatened species under jurisdiction of the U.S. Fish and Wildlife Service have been identified at the site area, and no listed or suspected critical habitats are present. However, the NYSDEC Environmental Resource Mapper (NYSDEC 2022a) and NYSDEC List of Endangered, Threatened, and Special Concern Fish and Wildlife Species of New York State (NYSDEC 2022b) indicates that the Narrows Creek and Chemung River water bodies are aquatic habitats for some endangered, threatened, and special concern animal species in the vicinity of the Site. The threatened species include the brook floater (*Alasmidonta varicose*) and green floater (*Lasmigona subviridis*); and the swallowtail shiner (*Notropis procne*) is a high priority species of greatest conservation need (NYSDEC 2022b).

1.3.9 Utilities

Utilities intersecting with the Site include 40 ft of an overhead electric utility line in the south-east corner of the Site, and roughly 160 ft of a fiber optic line that runs from east to west in the southern part of the Site. There is also an electrical cabinet located in the southwest corner of the Site.

1.3.10 Site Access and Ownership

The Site has limited access via a partially paved road at the terminus of Main Street (**Figure 1-1**), which is located at the south end of the Site and northeast of the intersection of Main Street, College Avenue, and Delaware Avenue in Gibson, New York. A small steel bridge crosses over Narrows Creek and connects Main Street with the Site. Vehicles are prohibited from crossing the bridge by concrete blockades. The Site is also accessible via the right-of-way (ROW) along the eastern side of the Norfolk Southern Railroad.

The Site is comprised of three parcels (318.11-01-001, 318.00-01-003, 318.11-01-041), which are owned by Corning Waste Materials Inc (**Figure 1-3)**. The adjacent parcel to the north and west is owned by Pennsylvania Lines, LLC; adjacent parcels east of the Site are owned by Calvary Baptist Church of Corning, and private owners. A portion of the south end of the site consists of the northern extent of Main Street and NYS right-of-way.

1.3.11 Area of Concern

Based on historic site operations, the area of concern consists of the three parcels owned by Corning Waste Materials Inc. The area is bounded by Narrows Creek to the south, residential property to the southeast, the Norfolk Southern Railroad and Interstate-86 to the west, and a steep wooded hillside to the east and north.

1.4 PREVIOUS INVESTIGATIONS

1.4.1 Phase 1 Environmental Site Assessment

According to a Phase I Environmental Site Assessment (ESA) conducted on the property in 1997 (Fagan Engineers 1998), the Corning Materials facility, a metal scrap recycler, operated at the Site from 1950 to the mid-1980s. The Site was also reportedly operated as an industrial waste landfill from about 1940 to 1950. A former employee at the facility was interviewed as part of the ESA and stated that industrial waste was accepted from Ingersoll Rand, Corning Glass, Westinghouse, and General Electric, including World War II munitions materials, PCB oil, lead powder, and drums of solvents. Waste was reported to be buried at depths of up to 15 ft below the surface. The Site was listed as a Resource Conservation and Recovery Information System large quantity generator for hazardous waste. Additionally, the facility historically detonated munitions on-site.

No formal recommendations were made as a result of the Phase I ESA conducted in 1997. It determined that there is an environmental condition associated with the site, in that it was an industrial waste landfill and scrapyard.

1.4.2 Phase I Brownfields Environmental Site Assessment

The ARGO Systems, LLC (ARGO) Team (ARGO and its subcontractor EA), under contract to EPA, completed a Phase I Brownfields ESA in April 2009 (The ARGO Team 2009). The 2009 Phase I ESA consisted of a review of current and historical activities, and conditions at the property and surrounding properties, including non-intrusive visual inspections of the property on

10 and 17 March 2009; review of local, state, and federal regulatory database records; review of available historical records; a survey of adjacent land uses; and interviews with local government officials and residents, including a former employee from the Site.

The following environmental conditions, including current and historical site conditions, were identified during the completion of the 2009 Phase I ESA:

- Scrap metal wastes and industrial wastes littered the ground surface.
- Areas with no vegetation or stressed vegetation were observed.
- A historical record on the New York State Spills database indicated there was a spill on-site that included petroleum-stained concrete and soil, which was closed by the NYSDEC with no remedial activities required.
- Historical photographs obtained from the Town of Corning showed scrap metal and some 55-gallon drums stored on the property.
- A former employee reported that scrap metal was pounded into the ground to a depth of up to 15 ft bgs.
- Based on an interview with a former employee, the Site received potential munitions and munitions-related waste material from the Seneca Army Depot.
- Spills/releases might have occurred in association with the railroad embankment and station that historically was located on and near the property.

As a result of the known and reported history at the Site, the 2009 Phase I ESA Report concluded that the potential for release of hazardous materials may have occurred on-site, and that further investigation of the Corning Materials site was warranted.

1.4.3 Phase II Site Investigation

The ARGO Team, under contract to EPA, completed a subsequent Phase II Site Investigation (SI) in February 2010 to evaluate existing on-site conditions, assess potential environmental impacts, evaluate possible human exposure to chemicals of concern, and to develop a general remedial approach to address site impacts (The ARGO Team 2010). Sample locations are included on **Figure 1-5**. The SI consisted of the following field activities:

- Excavation of 15 test pits to depths of 5.5 to 15 ft bgs inside the limits of waste to determine the characteristics, consistency, and depth of waste materials. A total of 17 subsurface soil samples were collected from the test pits, with a minimum of 1 soil sample collected from each test pit where waste material (metal, plastic, paint cans, black fill/burnt soil, munitions debris, etc.) was visually observed.

- Advancement of 9 soil borings to depths of 1.5 to 24 ft bgs and collection of 22 subsurface soil samples, with approximately 1 sample collected from each 5-ft interval.

- Installation of 2 temporary monitoring wells at soil borings that encountered groundwater. The monitoring wells consisted of 1-inch (in.) polyvinyl chloride casing (capped) and 10 ft of 0.010-slot screen, which was inserted into the open borehole.

- Off-site laboratory analysis of 39 subsurface soil samples (including quality assurance/quality control [QC] samples) collected from test pits and soil borings for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), Target Analyte List (TAL) metals including mercury, PCBs, and explosives.

- Collection of groundwater samples from 2 temporary monitoring wells and off-site laboratory analysis of groundwater samples for VOCs, SVOCs, TAL metals including mercury, PCBs, and munitions parameters.

- Collection of 2 surface water grab samples from Narrows Creek along the southern boundary of the Site and off-site laboratory analysis for VOCs, SVOCs, and TAL metals including mercury.

- Collection of a water grab sample from an underground storage tank (UST) encountered during test pitting at a depth of approximately 5 ft bgs and off-site laboratory analysis for VOCs and SVOCs.

- Completion of a site survey to provide topographic information and record locations of sampling points, structures, and site features for the preparation of a base map and cross sections.

Areas of concentrated construction and/or industrial waste, including munitions debris, concrete (bridge footers, rebar), car parts, paint cans, drums, and black granular fill consisting of cinders/coal and crushed asphalt were observed in select locations. Munitions debris was encountered at multiple locations across the Site and included: spent small arms munitions debris (.50 caliber, 7.62 millimeter [mm], etc.); spent medium caliber munitions debris (30 mm target practice rounds); and a projectile fuze (rendered safe scrap). Based on site conditions and the number and type of munitions debris located during the investigation, there is potential to find live MEC.

Surficial material, including waste/debris observed in the southern and central portions of the Site consisted of fill, household waste, and construction waste while scrapyard metal waste and industrial materials waste were observed in the northern portion of the Site. Grass-covered roadway construction materials were observed in two large mounds within the central portion.

Subsurface waste material in the southern portion of the Site consisted primarily of household and construction wastes, with some metal waste (e.g., pipes, rods, wires) and rubber (e.g., tires, hosing). The amount and variety of metal waste increased to the north while the amount of

household waste decreased. A majority of waste material in the central portion consisted of metal (e.g., pipes, rods, wires, sheets) and construction waste, with some scrapyard metal and industrial waste. Subsurface waste in the northern portion, immediately north of the roadway construction surface fill, consisted primarily of scrap yard metal/industrial metal/waste with some construction waste.

A map depicting the lateral distribution of surface waste characteristics and a series of corresponding cross sections depicting the vertical extent of various waste materials were compiled as part of the Phase II SI (The ARGO Team 2010), using data collected from soil borings and test pits. Various types of waste materials were observed in subsurface soil at several soil boring and test pit locations. The vertical extent of the waste layer ranged from approximately 1 ft thick in the central portion of the property adjacent to the concrete slab-on-grade foundation, to approximately 10.3 ft thick in the north. Depth to groundwater was recorded during the RI to range from 13 to 28 ft bgs; therefore, groundwater does not appear to intersect the fill material. Native soil was encountered at depths ranging from 2 to 15 ft bgs. Bedrock was not encountered in any of the soil borings or test pits.

PCBs and metals were detected in soil samples collected from 0 to 20 ft bgs, with concentrations of PCBs, lead, chromium, and mercury exceeding New York Codes, Rules and Regulations (NYCRR) Title 6 (6 NYCRR) Part 375 Soil Cleanup Objectives (SCOs) for Unrestricted Use (UU). The maximum concentrations of PCBs, lead, chromium, and mercury in surface soil were 103 milligrams per kilogram (mg/kg), 14,400 mg/kg, 1,970 mg/kg, and 12.5 mg/kg, respectively. The maximum concentrations of PCBs, lead, chromium, and mercury in subsurface soil were 110 mg/kg, 10,700 mg/kg, 2,100 mg/kg, and 18.5 mg/kg, respectively. New York State regulates wastes containing PCBs at concentrations of 50 mg/kg or greater as hazardous wastes. Soil containing PCBs at concentrations exceeding 50 mg/kg are considered Toxic Substances Control Act (TSCA) hazardous waste.

Analytical results indicated that overburden soil was impacted with PCB contamination, likely resulting from historical landfill activities at the Site. Analytical results for TAL metals indicated that shallow soil (0 to 5 ft bgs) was consistently impacted with high levels of metals across the entire Site, while deeper overburden soil was impacted in locations where signs of historical landfill activities were evident.

Several metals, including aluminum, chromium, iron, lead, manganese, and sodium, were detected in groundwater at concentrations greater than the NYSDEC Class GA Ambient Water Quality Standards (AWQS). Lead was reported at concentrations greater than the Class GA AWQS of 25 micrograms per liter (µg/L). The maximum concentration of lead in groundwater was 103 µg/L; however, as temporary monitoring wells were not developed after installation, high turbidity may have resulted in elevated metals detections.

A UST that was disposed of at the scrapyard was encountered at a depth of approximately 5 ft bgs. The tank was highly decomposed and filled with groundwater. Petroleum-related VOCs, including benzene, toluene, ethylbenzene, and total xylenes (BTEX), were detected in a water sample collected from the UST at concentrations greater than Class GA AWQS.

Several VOCs were detected in groundwater collected west and likely downgradient of the UST, with concentrations of petroleum-related VOCs (BTEX and methyl tert-butyl ether) greater than Class GA AWQS.

Contaminants were not detected in surface water samples collected from Narrows Creek at concentrations greater than the NYSDEC AWQS for surface water.

The Phase II SI results indicated that on-site surface and subsurface soil was significantly impacted by several chemical constituents including SVOCs, PCBs, and metals (The ARGO Team 2010). Additionally, sample analysis for explosives via Method M8330 during the RI reported one sample with detected concentrations of total explosives; therefore, the presence of munition debris presents a data gap and safety concern with respect to future intrusive activities at the site. A qualitative human exposure assessment indicated that there were both complete and potential pathways through which on-site and off-site populations could be exposed to potentially hazardous materials related to the Site. The Phase II Report concluded that the surface condition of the property in its current state presents a physical hazard for human health and wildlife and should be addressed to protect human health and the environment either through elimination (removal) or engineering controls (surface cover, fencing). The report recommended completion of an RI and FS to characterize the Site and identify potential RA alternatives.

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2. SUMMARY OF REMEDIAL INVESTIGATION AND EXPOSURE ASSESSMENT

The following sections briefly summarize the environmental impacts at the Gibson Scrapyard site as determined during the RI (EA 2022). Media that were evaluated during the RI included surface and subsurface soil/fill material, groundwater, and sediment and surface water. RI sampling locations are shown on **Figure 2-1**.

This section is organized by media of potential concern. The impacts associated with the environmental media are based on analytical results, and their comparison with the appropriate SCGs referenced below based on site use:

- **Soil**—6 NYCRR Part 375 Environmental Remediation Programs – SCOs (NYSDEC 2006)
- **Surface Water and Groundwater**—NYCRR Part 703.5 Surface Water and Groundwater Quality Standards and Groundwater Effluent Limitations, as presented in the Division of Water Technical and Operational Guidance Series 1.1.1, (NYSDEC 1998)
- **Sediment**—Screening and Assessment of Contaminated Sediment (NYSDEC 2014)
- **Soil and Sediment**— 6 NYCCR Part 371 Identification and Listing of Hazardous Wastes, 14 January 1995.

A full analysis of all data collected during the RI is presented in the RI Report (EA 2022) and results are summarized in the following sections.

2.1 UNDERGROUND STORAGE TANK REMOVAL

A previously identified UST that was originally encountered during the 2010 Phase II Site Investigation (The ARGO Team 2010) at a depth of approximately 5 ft bgs was removed during the RI activities on 10 and 11 November 2020. It appeared that the UST was disposed of at the Site as scrap metal waste, and not actually used in any capacity during prior Site operations. The tank was cylindrical in shape and measured approximately 12 ft. in length and 5 ft. in width. Based on these measurements the volume of the UST was estimated to be about 2000 gallons. Approximately 900 gallons of groundwater that had infiltrated the tank was removed prior to removing the tank from the pit. Four additional anomalies identified during a geophysical survey were also investigated by excavating three test pits on 10 and 11 November 2020. The purpose of the excavations was to determine the source of the geophysical anomalies and to further evaluate and characterize the nature and extent of fill material at the Site. The anomalies were determined to be rebar during the test pit excavation activities.

2.2 SOIL/FILL

Two soil/fill sampling efforts were conducted during the RI; a surface soil sampling effort conducted in December 2019, and a subsequent subsurface soil/fill sampling effort conducted in January 2021. The purpose of these sampling efforts was to determine the nature and extent of contamination of fill material and evaluate the potential for contamination in fill material to

migrate off-site. Analytical results for soil samples collected as part of the RI were compared to UU, Residential, and Commercial SCOs.

2.2.1 Surface Soil/Fill

Surface soil along the corridor of Narrows Creek (a potential ecological resource area) did not contain waste material or contamination. Soil boring logs in the area indicated the top two to four ft of material was comprised of silt, sand, and gravel, and the surface soil sample (SS-01) contained no exceedances of SCOs. The results discussed in the following sections are in reference to the surface soil collected at a distance greater than 100 ft from Narrows Creek.

2.2.1.1 Munitions Debris

Munitions debris were observed in both surface and subsurface soil during the historical investigations. During the Phase II Site Investigation, spent small arms munitions debris (.50 cal, 7.62 mm, etc.), spent medium caliber munitions debris (30 mm target practice rounds), and projectile fuze were observed in test pits TP-01, TP-02, TP-06, TP-14, and TP-15 and at the location of the UST. All munitions debris located during the Phase II Site Investigation were verified by the UXO personnel as rendered safe scrap. During the RI, UXO technician identified a rifle round, small arms shell casing, and an unspent 30 mm round of ammunition from MW-01 and MW-05. Sample analysis for explosives via Method M8330 during the RI reported one sample with detected concentrations of total explosives; therefore, the presence of munition debris presents a data gap and safety concern with respect to future intrusive activities at the site.

2.2.1.2 Polychlorinated Biphenyls

Surface soil analytical results reported total Aroclor concentrations greater than the UU SCO of 0.1 mg/kg in 12 samples, including SS-02, SS-04, SS-05, SS-06, and SS-08 (and the corresponding field duplicate sample), and SS-09 through SS-14, at concentrations ranging from 0.24 to 218 mg/kg. Aroclors 1260 and 1248 were the only detected Aroclors with concentrations greater than the UU SCO of 0.1 mg/kg in multiple samples. Likewise, total Aroclor concentrations were greater than the Commercial SCO of 1 mg/kg in 10 samples (SS-02, SS-04, SS-06, SS-08, SS-09, and SS-11 through SS-14). Surface soil PCB concentrations are shown on **Figure 2-2**.

2.2.1.3 Target Analyte List Metals

Surface soil analytical results reported TAL metals at every sampling location. Eleven metals were detected at concentrations greater than UU SCOs in multiple samples, including (with SCOs) arsenic (13 mg/kg), barium (350 mg/kg), cadmium (2.5 mg/kg), copper (50 mg/kg), lead (63 mg/kg), manganese (1,600 mg/kg), mercury (0.18 mg/kg), nickel (30 mg/kg), selenium (3.9 mg/kg), silver (2 mg/kg), and zinc (109 mg/kg). Nine of these metals were detected at concentrations greater than Residential SCOs in one or more samples, including (with SCOs) arsenic (16 mg/kg), barium (350 mg/kg), cadmium (2.5 mg/kg), copper (270 mg/kg), lead (400 mg/kg), manganese (2,000 mg/kg), mercury (0.81 mg/kg), nickel (140 mg/kg), and zinc (2,200 mg/kg). Seven metals were detected at concentrations exceeding the Commercial SCOs in one or more samples, including (with SCOs) arsenic (16 mg/kg), barium (400 mg/kg), cadmium (9.3

mg/kg), copper (270 mg/kg), lead (1,000 mg/kg), mercury (2.8 mg/kg), and nickel (310 mg/kg). Overall, the highest metals concentrations were reported at sampling locations in the northern portion of the Site (SS-09, SS-11, SS-12, SS-13, and SS-14). Surface soil metals concentrations are shown on **Figure 2-2**.

2.2.1.4 Semivolatile Organic Compounds

Surface soil analytical results reported SVOCs (primarily polycyclic aromatic hydrocarbon [PAH] compounds) at 12 of the 14 sampling locations. Seven PAH compounds were detected at concentrations greater than UU and Residential SCOs at sampling locations SS 05, SS-09, SS-13, and SS-14. These exceedances included (with their respective SCOs) benzo[a]anthracene (1 mg/kg), benzo[a]pyrene (1 mg/kg), benzo[b]fluoranthene (1 mg/kg), benzo[k]fluoranthene (0.8 mg/kg, 1 mg/kg), chrysene, (1 mg/kg), dibenz[a,h]anthracene (0.33 mg/kg), and indeno[1,2,3 cd]pyrene (0.5 mg/kg). In addition, benzo[b]fluoranthene and indeno[1,2,3 cd]pyrene were detected at concentrations exceeding the UU and Residential SCOs at locations SS-11 and SS-12; the concentration of benzo[k]fluoranthene did not exceed Residential SCOs at SS-14. Four PAH compounds were detected at concentrations greater than Commercial SCOs, including (with SCOs) benzo[a]anthracene (5.6 mg/kg) at location SS-05; benzo[a]pyrene (1 mg/kg) at locations SS-05, SS-09, SS-13, and SS-14; benzo[b]fluoranthene (5.6 mg/kg) at location SS-05; and dibenz[a,h]anthracene (0.56 mg/kg) at location SS-05. Overall, the highest SVOC concentrations were reported at SS-05. Surface soil SVOC exceedances of UU SCOs were co-located with PCB exceedances of UU SCOs.

PAHs can be common in fill material, especially in the type of fill material observed on-site in the mounds of concrete, asphalt, and soil/gravel fill materials that were deposited during construction activities for the nearby Interstate-86. PAHs can also originate from combustion and would be consistent with observations in previous investigations of layers of black granular fill, cinders, coal, crushed asphalt, and similar material in the subsurface.

2.2.1.5 Volatile Organic Compounds

There were limited concentrations of VOCs detected exceeding SCOs in site surface soil samples collected during the RI. Surface soil analytical results reported acetone at concentrations greater than the UU SCO of 0.05 mg/kg in 9 samples, including SS-02, SS-03, SS-04, SS-06, SS-07, SS-09, SS-11, SS-12, and SS-14, at concentrations ranging from 1.2 to 210 mg/kg. Acetone was detected greater than the Residential SCO of 100 mg/kg in 2 of those samples, SS-03 (160 mg/kg) and SS-04 (210 mg/kg). Analytical results also reported methylene chloride at concentrations greater than the UU SCO of 0.05 mg/kg in 1 sample, SS-11, at a concentration of 0.073 mg/kg. It should be noted that while acetone and methylene chloride were detected at concentrations greater than established SCOs, these analytes are common laboratory contaminants (EPA 2014) and were detected in the laboratory QC samples. It is unlikely that the concentrations of acetone and methylene chloride observed here are related to the Site.

2.2.1.6 Pesticides

Surface soil analytical results reported pesticides at 10 of the 14 sampling locations. Three pesticides were detected at concentrations greater than UU SCOs in multiple samples including (with SCOs) dieldrin (0.005 mg/kg), endrin (0.014 mg/kg), and P,P'- Dichloro-diphenyl-dichloroethylene (DDE) (0.0033 mg/kg). Dieldrin was detected at concentrations greater than the Residential SCO of 0.039 mg/kg in 8 samples, SS-02, SS-04, SS-06, SS-09, and SS-11 through SS-14, and at concentrations greater than the Commercial SCO of 1.4 mg/kg in 2 samples, SS-09 and SS-12.

2.2.1.7 Per- and Polyfluoroalkyl Substances

Of the 3 surface soil samples collected for analysis of Per- and polyfluoroalkyl substances (PFAS), analytical results reported perfluorooctanesulfonic acid (PFOS) at concentrations greater than NYSDEC's current guidance value of 0.88 micrograms per kilogram (µg/kg) for unrestricted site use in 2 samples, SS-09 and SS-12, at concentrations of 2 and 2.4 µg/kg, respectively.

2.2.2 Subsurface Soil/Fill

2.2.2.1 Polychlorinated Biphenyls

Subsurface soil analytical results reported total Aroclor concentrations greater than the UU SCO of 0.1 mg/kg in 11 samples, including SB-MW01-6FT, SB-MW01-20FT, SB-MW01-25FT, SB-MW02-8FT, SB-MW02-13FT, SB-MW03-6FT, SB-MW04-5FT, SB-MW04-13FT, SB-MW05-5FT, SB-MW05-11FT, and SB-MW06-11FT, at concentrations ranging from 0.18 to 206 mg/kg. Aroclors 1260, 1254, and 1242 were the only detected Aroclors with concentrations greater than the UU SCO of 0.1 mg/kg in multiple samples. Similarly, total Aroclor concentrations were greater than the Commercial SCO of 1 mg/kg in 6 samples (SB-MW01-6FT, SB-MW01-20FT, SB-MW03-6FT, SB-MW04-5FT, SB-MW05-11FT, and SB-MW06-11FT). Additionally, subsurface soil PCB concentrations exceeded 10 mg/kg[1] at 3 locations, SB-MW01 (at the 6-ft interval), SB-MW04 (at the 5-ft interval), and SB-MW05 (at the 11-ft interval). Subsurface soil PCB concentrations are shown on **Figure 2-3**.

2.2.2.2 Targe Analyte List Metals

Subsurface soil analytical results reported TAL metals at all sampling locations. Eleven metals were detected at concentrations greater than UU and Residential SCOs in multiple samples, including (with their respective SCOs) arsenic (13 mg/kg, 16 mg/kg), barium (350 mg/kg), cadmium (2.5 mg/kg), copper (50 mg/kg, 270 mg/kg), lead (63 mg/kg, 400 mg/kg), manganese (1,600 mg/kg, 2,000 mg/kg), mercury (0.18 mg/kg, 0.81 mg/kg), nickel (30 mg/kg, 140 mg/kg), selenium (3.9 mg/kg, 36 mg/kg), silver (2 mg/kg, 36 mg/kg), and zinc (109 mg/kg, 2,200 mg/kg). Seven of these metals were detected at concentrations exceeding the Commercial SCOs in one or more samples, including (with SCOs) arsenic (16 mg/kg), barium (400 mg/kg), cadmium

[1]A TSCA self-implementing PCB criterion of 10 mg/kg is being compared to PCB concentrations in subsurface soil.

(9.3 mg/kg), copper (270 mg/kg), lead (1,000 mg/kg), mercury (2.8 mg/kg), and nickel (310 mg/kg). Ten metals were detected at concentrations exceeding the protection of groundwater SCOs in one or more samples, including (with SCOs) arsenic (16 mg/kg), barium (820 mg/kg), cadmium (7.5 mg/kg), copper (1,720 mg/kg), lead (450 mg/kg), manganese (2,000 mg/kg), mercury (0.73 mg/kg), nickel (130 mg/kg), selenium (4 mg/kg), and silver (8 mg/kg). Overall, the highest metals concentrations were reported in SB-MW01-6FT. Subsurface soil metals concentrations are shown on **Figure 2-3**.

2.2.2.3 Volatile Organic Compounds

Subsurface soil analytical results reported acetone at concentrations greater than the UU and protection of groundwater SCO of 0.05 mg/kg in five samples, including SB-MW01-6FT, SB-MW03-6FT, SB-MW03-7FT, SB MW04-5FT, and SB-MW05-5FT, at concentrations ranging from 0.061 to 1.3 mg/kg. In addition, methyl ethyl ketone (2-butanone) was reported at a concentration greater than the UU and protection of groundwater SCO of 0.12 mg/kg in one sample, SB-MW05-5FT, at a concentration of 0.2 mg/kg. It should be noted that while acetone was detected at concentrations greater than established SCOs, this analyte is a common laboratory contaminant (EPA 2014) and was detected in the laboratory QC samples. It is unlikely that the concentrations of acetone observed here is related to the Site.

2.2.2.4 Semi-Volatile Organic Compounds

Subsurface soil analytical results reported SVOCs (primarily PAHs) at 5 of the 6 sampling locations (SVOCs were not detected at MW-02). Five PAHs were detected at concentrations greater than UU and Residential SCOs, including (with their respective SCOs) benzo[a]anthracene (1 mg/kg), benzo[a]pyrene (1 mg/kg), benzo[b]fluoranthene (1 mg/kg), chrysene, (1 mg/kg), and indeno[1,2,3-cd]pyrene (0.5 mg/kg), in samples SB-MW01-6FT, SB-MW04-5FT, and SB-MW06-11FT. Benzo[k]fluoranthene was detected at concentrations exceeding UU and Residential SCOs (0.8 mg/kg and 1 mg/kg, respectively) in samples SB-MW01-6FT and SB-MW04-5FT, and at a concentration greater than the UU SCO in sample SB-MW06-11FT. UU and Residential SCOs were exceeded in sample SB-MW01-6FT for dibenz[a,h]anthracene (0.33 mg/kg) and dibenzofuran (7 mg/kg, 14 mg/kg). Naphthalene was detected at a concentration greater than the UU SCO of 12 mg/kg in sample SB-MW01-6FT.

Three soil samples exceeded the protection of groundwater SCOs, including (with SCOs) benzo[a]anthracene (1.0 mg/kg), benzo[b]fluoranthene (1.7 mg/kg), benzo[k]fluoranthene (1.7 mg/kg), chrysene (1.0 mg/kg), and naphthalene (12 mg/kg) in sample SB-MW-01-6FT; benzo[a]anthracene (1.0 mg/kg), benzo[b]fluoranthene (1.7 mg/kg) in sample SB-MW-04-5FT; and benzo[a]anthracene, (1.0 mg/kg) and naphthalene (12 mg/kg) in sample SB-MW-06-11FT.

In addition, four PAHs were detected at concentrations greater than Commercial SCOs, including (with SCOs) benzo[a]anthracene (5.6 mg/kg) in sample SB-MW01-6FT; benzo[a]pyrene (1 mg/kg) in samples SB-MW01-6FT, SB-MW04-5FT, and SB-MW06-11FT; benzo[b]fluoranthene (5.6 mg/kg) in sample SB-MW01-6FT; and dibenz[a,h]anthracene (0.56 mg/kg) in sample SB-MW01-6FT. Overall, the highest PAH concentrations were reported

in SB-MW01-6FT. As with surface soil, subsurface soil SVOC exceedances of UU SCOs were co-located with PCB exceedances of UU SCOs.

PAHs can be common in fill material, especially in the type of fill material observed on-site in the mounds of concrete, asphalt, and soil/gravel fill materials deposited during construction activities for the nearby Interstate-86. PAHs can also originate from combustion and would be consistent with observations in previous investigations of layers of black granular fill, cinders, coal, crushed asphalt, and similar material in the subsurface.

2.2.2.5 Pesticides

Subsurface soil analytical results reported pesticides in 16 of the 19 samples. Eight pesticides were detected at concentrations greater than UU SCOs in one or more samples including (with SCOs) beta bhc (beta hexachlorocyclohexane) (0.036 mg/kg), dieldrin (0.005 mg/kg), endrin (0.014 mg/kg), gamma bhc (lindane) (0.1 mg/kg), heptachlor (0.042 mg/kg), P,P'-Dichloro-diphenyl-dichloroethane (DDD) (0.0033 mg/kg), P,P'-DDE (0.0033 mg/kg), and P,P'-Dichloro-diphenyl-trichloroethane (DDT) (0.0033 mg/kg). Dieldrin was detected greater than the Residential SCO of 0.039 mg/kg in six of those samples, SB-MW01-6FT, SB-MW01-20FT, SB-MW04-5FT, SB-MW05-5FT, SB-MW05-11FT, and SB-MW06-11FT, and greater than the Commercial SCO of 1.4 mg/kg in two samples, SB-MW01-6FT and SB-MW04-5FT. Dieldrin was detected at concentrations greater than the protection of groundwater SCOs (0.1 mg/kg) at five locations, SB-MW-01, SB-MW-02, SB-MW-05, SB-MW-06. Endrin was detected at concentrations greater than the protection of groundwater SCOs (0.06 mg/kg) at four locations, SB-MW-01, SB-MW-04, SB-MW-05, and SB-MW-06. Gamma BHC (Lindane) was detected at a concentration greater than the protection of groundwater SCO (0.1 mg/kg) at one location, SB-MW-04.

2.2.2.6 Per- and Polyfluoroalkyl Substances

Of the 3 subsurface soil samples collected for analysis of PFAS, concentrations were greater than NYSDEC's current guidance values for unrestricted site use in 2 samples. PFOS was reported at concentrations greater than the UU value of 0.88 µg/kg in sample SB-MW04-5FT (2.5 µg/kg), and SB-MW05-5FT (0.98 µg/kg). Perfluorooctanoic acid was also reported at a concentration greater than the UU and protection of groundwater SCOs (0.66 µg/kg and 1.1 µg/kg, respectively) in SB-MW04-5FT (1.5 µg/kg).

2.3 GROUNDWATER

Although 9 monitoring wells were installed during the RI, 5 were able to be sampled during the February and May 2021 groundwater sampling events. The wells that could be sampled were MW-01S, MW-01D, MW-02D, MW-03, and MW-04D. The remaining four wells were dry or produced insufficient water for sampling. **Figure 2-1** shows the locations of the monitoring wells.

2.3.1 Polychlorinated Biphenyls

Groundwater analytical results reported a total Aroclor concentration greater than the NYSDEC AWQS Class GA value of 0.09 µg/L in one sample, collected from MW-04D (0.6 µg/L) during the first round of groundwater monitoring. Aroclors 1260 and 1248 were the only detected Aroclors with concentrations greater than the applicable SCGs. PCBs were not detected in any of the groundwater samples collected during the second round of groundwater monitoring (May 2021). Lack of detections could be due in part to eventual stabilization of the aquifer formation around the well screen over time. Information obtained during the RI (EA 2022) suggests that groundwater is not a significant migration mechanism for PCBs contamination at the Site.

2.3.2 Target Analyte List Metals

TAL metals are the only analyte group with reported concentrations exceeding NYSDEC AWQS Class GA values in samples collected during both rounds of groundwater monitoring.

2.3.2.1 February 2021

Groundwater analytical results reported TAL metals at all five sampling locations during the February 2021 groundwater sampling event. Thirteen metals were detected at concentrations greater than NYSDEC AWQS Class GA values in MW-04D, including (with groundwater screening levels) arsenic (0.025 milligrams per liter [mg/L]), barium (1 mg/L), beryllium (0.003 mg/L), boron (1 mg/L), total chromium (0.05 mg/L), copper (0.2 mg/L), iron (0.3 mg/L), lead (0.025 mg/L), magnesium (35 mg/L), manganese (0.3 mg/L), mercury (0.0007 mg/L), nickel (0.1 mg/L), and selenium (0.01 mg/L). Exceedances of groundwater screening levels were also reported for concentrations of iron at MW-01D and MW-03, manganese at MW-03, and sodium (20 mg/L) at MW-01D, MW-01S, and MW-02D.

The number of detected metals observed in groundwater at MW-04D during the first round of sampling is likely a result of fine solids and particulates that remained in the well after development. Like PCBs, metals typically sorb to solids and may be detected at higher concentrations in groundwater when particles are mobilized during the sampling process and collected with the aqueous sample.

2.3.2.2 May 2021

Like the February 2021 sampling event, groundwater analytical results reported TAL metals at five sampling locations. Three metals were detected at concentrations greater than NYSDEC AWQS Class GA values, including (with groundwater screening levels) iron (0.3 mg/L) at MW-01D, MW-03, and MW-04D, manganese (0.3 mg/L) at MW-03 and MW04D, and sodium (20 mg/L) at MW-01D and MW-02D.

Of the 13 metals detected at MW-04D during February 2021 sampling, only iron and manganese were detected during the May 2021 sampling, and at significantly lower concentrations. As with

PCBs, this could be due in part to eventual stabilization of the aquifer formation around the well screen over time resulting in less suspended particulates in the aqueous sample.

Information obtained during the RI (EA 2022) suggests that groundwater is not a significant migration mechanism for metals contamination at the Site.

2.3.3 Pesticides

Groundwater analytical results reported concentrations of dieldrin greater than the NYSDEC AWQS Class GA value of 0.004 µg/L at MW-01S (0.012 mg/L) and MW-04D (0.024 mg/L) during the first round of groundwater monitoring. No other pesticide detections were reported in samples collected during the first round of groundwater monitoring, and no pesticides were detected in samples collected during the second round of groundwater monitoring.

2.3.4 Geochemistry

Groundwater geochemical parameters (i.e., water quality parameters and natural attenuation parameters) were measured in the field and analyzed in the laboratory to further assess groundwater conditions at the Site (specifically, the potential for mobility of heavy metals like cadmium, chromium, and lead). The geochemical parameters analyzed to evaluate natural attenuation processes (including sorption and anion exchange capacity) included total organic carbon (TOC), major anions (chloride, bromide, nitrate/nitrite, and sulfate/sulfide), and chemical oxygen demand (COD). Natural attenuation parameter results from the February 2021 sampling event are included in the RI (EA 2022).

The concentration of heavy metals in soil is influenced by several multi-phase reactions (e.g., inorganic and organic complexation, and oxidation-reduction, precipitation/dissolution, adsorption/desorption reactions). The potential mobility of heavy metals in groundwater is primarily controlled by specific sorption with organic matter and variable charge soil surfaces. The solubility of metals in water is influenced by pH and oxidation-reduction conditions. In general, heavy metals are more soluble at lower oxidation-reduction conditions, where the reduced species predominates (e.g., Fe2+ is more soluble than Fe3+). Oxidation-reduction reactions are also indicated by the reduction of anions, such as sulfate (SO42-) to sulfide (S2-), or nitrate (NO3-) to nitrite (NO2-). The field parameter measurements collected during the RI indicated generally slightly acidic to neutral (6.41 to 7.47 in February 2021 and 6.37 to 7.20 in May 2021), with variable oxidizing and reducing conditions (oxidizing at MW-01D during each event, reducing at MW-04D during each event, and varying from reducing to oxidizing at MW-01S, MW-02D, and MW-03D from February to May 2021). Under these conditions, minimal solubility of heavy metals in groundwater would be expected at MW-01S/D, MW-02D, and MW-03D, while increased solubility of heavy metals would be expected at MW-04D.

2.3.5 Anion Exchange Capacity

To further assess potential metal impacts to groundwater and the influence of anion exchange capacity on desorption of metals from soil/fill material to groundwater, major anions (chloride, bromide, sulfate/sulfide, and nitrate/nitrite) were analyzed in groundwater collected during the

February 2021 sampling event. A high anion exchange capacity indicates a likelihood of high metal concentrations within groundwater, resulting from desorption of positively charged metals from soil/fill particles as they bond with negatively charged anions in groundwater to form soluble compounds. Chloride and sulfate, two commonly detected anions in groundwater, are typically used to measure the dissolution processes occurring at a site.

Chloride was detected in each groundwater sample, with concentrations ranging from 6.4 mg/L at MW-04D to 76.8 mg/L at MW-01S. Sulfate was detected in each groundwater sample, with concentrations ranging from 12.8 mg/L at MW-04D to 22 mg/L at MW-01D. Total Kjeldahl Nitrogen (TKN) and nitrogen as ammonia were not detected at MW-01S, and nitrogen as nitrate/nitrite was not detected at MW 03D. TKN concentrations in remaining wells ranged from an estimated 0.19 mg/L at MW-02D to 4.2 mg/L at MW-04D, while nitrogen as ammonia in remaining wells ranged from an estimated 0.019 mg/L at MW-03D to 0.71 mg/L at MW-04D. Nitrogen as nitrate/nitrite concentrations ranged from 0.18 mg/L at MW-02D to0.35 mg/L at MW-01D. COD is used as a general indicator of the amount of organic compound pollution present in a water sample. COD concentrations ranged from an estimated 5.5 mg/L at MW-04D to 15.9 mg/L at MW-01S. TOC concentrations ranged from 1.1 mg/L at MW-01D to 5.1 mg/L at MW-04D. Bromide and sulfide were not detected in any of the groundwater samples collected.

2.4 SEDIMENT

A total of 8 surface sediment samples were collected (at paired locations with surface water samples); 5 samples were collected near the east shoreline of the Chemung River west of the Site and 3 samples were collected from Narrows Creek south of the Site (**Figure 2-1**). Samples were submitted for laboratory analysis of VOCs, SVOCs, PCBs, TAL metals and mercury, cyanide, herbicides, pesticides, explosives, TOC, and PFAS. Analytical results for surface sediment samples were screened against the sediment guidance values provided in the NYSDEC Freshwater Sediment Class A and Class C Guidance Values (NYSDEC 2014).

Metals were the only analyte group with observed concentrations in surface sediment exceeding NYSDEC Freshwater Sediment Class A and Class C Guidance; exceedances were observed at 7 of the 8 sampling locations. Three metals were detected at concentrations greater than NYSDEC Freshwater Sediment Class A Guidance Values, including (with Class A screening levels) arsenic (10 mg/kg) at sampling locations NSED-01, NSED-02, and NSED-03; lead (36 mg/kg) at sampling locations CSED-05, NSED-01, NSED-02, and NSED-03; and nickel (23 mg/kg) at sampling locations CSED-01, CSED-02, CSED-04, CSED-05, NSED-01, NSED-02, and NSED 03. Only lead was detected at a concentration greater than its NYSDEC Freshwater Sediment Class C Guidance Value of 130 mg/kg, at sampling location NSED-03.

Information obtained through the RI (EA 2022) suggests that this migration mechanism is not significant at the Site.

2.5 SURFACE WATER

A total of 8 surface water samples were collected (at paired locations with surface sediment samples); 5 samples were collected near the east shoreline of the Chemung River west of the Site,

and 3 samples were collected from Narrows Creek south of the Site (**Figure 2-1**). Surface water samples were submitted for laboratory analysis of VOCs, SVOCs, PCBs, total and dissolved TAL metals and mercury, total hardness, cyanide, herbicides, pesticides, explosives, PFAS, and 1,4-dioxane. Analytical results for surface water samples were compared to the NYSDEC AWQS Class C, Type A(C), surface water standards and guidance values (6 NYCRR Part 703.5 Water Quality Regulations, as presented in the Division of Water Technical and Operational Guidance Series 1.1.1, 1998, as amended). No exceedances of surface water screening levels were reported in any of the surface water samples.

2.6 HUMAN HEALTH EXPOSURE ASSESSMENT

A qualitative assessment of human health exposure pathways for all impacted media was completed using analytical data obtained during the RI. Media evaluated include surface and subsurface soil/fill material, groundwater, surface water, and sediment. The exposure assessment concluded that there are actual and potential pathways through which populations on-site and off-site could be exposed to potentially hazardous chemicals related to the former operations at the Gibson Scrapyard Site. Surface and subsurface soil/fill has the greatest potential to impact current and future human receptors due to concentrations of contaminants and exposure pathways including direct contact and incidental ingestion.

There are few distinct human populations both on-site and in the vicinity of the Site that could potentially be exposed to site-related contaminants of concern (COCs) through direct contact with contaminated soil or inhalation of particulates (dust). Current potential on-site populations, which may be exposed, include on-site trespassers, visitors, and workers (i.e., construction/utility workers). While the Site is vacant, it is not fenced to restrict access. Individuals have been observed occupying a wooden structure resembling a shed located north of the footbridge at the southern entrance to the Site. Current off-site populations, which may be exposed, include commercial and industrial workers, construction and utility workers, visitors and residents, and recreationists. Under future use conditions, potential receptors at risk of exposure include on-site trespassers, on-site and off-site construction workers, nearby off-site utility workers, on-site commercial workers, on-site visitors to commercial/industrial establishments, and on-site residents. A summary of the potential exposure pathways, by receptor, medium, and potential for exposure are presented in **Table 2-1**.

Although metals were detected in groundwater samples at concentrations exceeding the NYSDEC Class GA criteria, there is currently no groundwater usage at or in the immediate vicinity of the site (e.g., potable or industrial wells), and no expected future use of groundwater, as connection to a public water supply is available. Shallow on-site groundwater flows toward the Chemung River and Narrows Creek.

3. DEVELOPMENT OF REMEDIAL ACTION OBJECTIVES

Goals for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375 (NYSDEC 2006). The remedial goal for all RAs is restoration of the site to the pre-disposal/pre-release conditions to the extent practicable and legal. RAOs are the medium- or operable unit-specific objectives for the protection of public health and the environment and are developed based on contaminant-specific SCGs to address contamination identified at a site. The areas of concern and the impacts associated with the environmental media were based on laboratory analytical results and their comparison to the SCGs. Although multiple media were evaluated during the RI, including surface water, sediment, and groundwater, under existing conditions only, on-site soil was determined to be the medium of concern because of contaminant concentration and exposure pathways. Surface and subsurface soil at the Site was determined to be impacted by concentrations of PCBs, metals, and SVOCs (primarily PAHs) above the UU SCOs. Exposure pathways and contaminant concentrations are based on current site and climate conditions. It should be noted that site conditions may change as the global and local climate changes (e.g., contaminants may mobilize in floodwater or groundwater, or become exposed via disturbance of overlying soil). However, the actual changes that may occur at the Site are currently not known. A climate vulnerability assessment (Section 7.3) identifies potential impacts due to possible climate change vulnerabilities specific to the site and to the proposed remedial alternatives.

The specific RAOs for human health and environment protection are described in the following table.

Remedial Action Objectives

Soil	Specific RAOs
RAOs for Public Health Protection	Prevent ingestion/direct contact with contaminated soil. Prevent inhalation exposure to contaminants volatilizing from soil. Reduce the risk of direct contact by current and anticipated future human receptors to potential MEC in the surface and subsurface soil.
RAOs for Environmental Protection	Prevent migration of contaminants that would result surface water or sediment contamination. Prevent impacts to biota from ingestion/direct contact with soil causing toxicity or impacts from bioaccumulation through the terrestrial food chain.

Notes:
MEC = Munitions and explosives of concern

In addition to media impacts identified during the RI, one physical consideration that will factor into the implementability of certain technologies is the presence of munitions debris on-site. Although munitions debris were identified during investigation activities in the shallow subsurface and depths of up to 10 ft bgs, the RI did not include a full characterization of MEC. World War II-era munitions debris were also identified on the Site during previous investigations, and the Site is documented as having historically detonated munitions on-site. The presence of munitions debris presents a unique challenge to performing any intrusive activities, either investigation or remediation at the site. This presence requires the assumption that a potential explosive condition is present and intrusive activities must be executed accordingly. Geophysical detection equipment

(e.g., magnetometer or electromagnetic detectors.) is typically used to locate subsurface MEC for avoidance prior to a drill rig or excavator breaking ground; however, with the large amount of metal debris present as a result of historical operations as a scrap yard in addition to potential munitions debris, executing a geophysical survey is impractical. For a removal action, the entire site would be excavated in 1-2 ft lifts, sifted, then the next lift would be visually cleared by a specially trained UXO technician, and the process repeated. This is a painstakingly slow process. The above requirements driven by the potential of an explosive hazard exponentially increase the costs of a removal action effectively making it a non-starter. Alternatives developed as part of this FS will address soil contamination (i.e., PCBs, metals, and SVOCs); however, alternatives will include technologies to address the current site MEC hazards to varying degrees.

3.1 MEDIA CLEANUP GOALS

The media cleanup goals for surface and subsurface soil are based on New York State SCGs, the site-specific risk assessment, COCs, site characteristics, and feasible actions. The COCs for soil at the Gibson Scrapyard Site identified during the RI are PCBs, metals, and SVOCs (primarily PAHs).

The proposed cleanup goals for soil/fill at the Gibson Scrapyard Site are specified in the following table. Since the SVOCs are co-located with PCBs and metals, the estimates are based on exceedances for metals and PCBs.

Soil/Fill – Soil Cleanup Objectives[a]

Constituent	Range of Detections (mg/kg)	Unrestricted Use SCO (mg/kg)	No. of samples above Unrestricted Use SCO/ No. of detections	Commercial Use SCO (mg/kg)	No. of samples above Restricted Use – Commercial SCO/No. of detections	Location Exhibiting Maximum Concentration
Total PCBs (surface soil)[b]	ND-218	0.1	12/14	1	9/14	SS-09
Total PCBs (subsurface soil)[b]	ND-206	0.1	11/18	1	6/18	SB-MW-04

Notes:
(a) 6 NYCRR Part 375 Environmental Remediation Programs SCOs (NYSDEC 2006).
(b) Surface soil indicates 0-2 in. interval and subsurface soil indicates below 2 in.
PCBs analyzed by EPA Method 8082.
Table includes 2 duplicates in sample count.

3.2 EXTENT OF IMPACT TO ENVIRONMENTAL MEDIA

The extent of surface and subsurface soil samples that exceeded SCGs (based primarily on metals and total PCBs concentration) is shown on **Figures 3-1** and **3-2**. As noted in Section 2.2.1, at least the top two ft of surface soil within the 100-ft corridor of Narrows Creek (a potential ecological resource area) did not contain waste material or contamination. The estimated volume of impacted material by area is summarized in the following table.

Estimated Volume of Impacted Material

Media	New York State SCGs[a]	Estimated Volume of Impacted Material	
		CY	Tons[b]
On-site Surface and Subsurface Soil	Unrestricted Use	68,500	109,600

Notes:
(a) 6 NYCRR Part 375 Environmental Remediation Programs SCOs (NYSDEC 2006).
(b) Estimates assume that 1 CY of material is approximately equal to 1.6 tons.
CY = Cubic yard(s)

3.3 POTENTIALLY APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Applicable or relevant and appropriate requirements (ARARs) are local, state, and federal regulations, including environmental laws and regulations that are used in the selection of remedial alternatives, as well as other non-environmental laws and regulations, such as the Occupational Safety and Health Act. The development and evaluation of remedial alternatives presented in Section 6 includes a comparison of alternative site remedies to ARARs. The recommended RA for the Site must satisfy all ARARs unless specific waivers have been granted.

EPA defines "applicable" and "relevant and appropriate" in the revised National Contingency Plan, codified at 40 Code of Federal Regulations (CFR) 300.5 as follows:

- ***Applicable Requirements***—substantive environmental protection requirements, criteria, or limitations promulgated under federal or state law that specifically address a hazardous substance, pollutant, contaminant, RA, location, or other circumstances at a CERCLA site.

- ***Relevant and Appropriate Requirements***—standards of control that address problems or situations sufficiently similar to those encountered at a CERCLA site that their use is well suited to the particular site.

To determine whether a requirement is relevant and appropriate, characteristics of the RA, the hazardous substances present, and the current physical characteristics of the site must be compared to those addressed in the statutory or regulatory requirement. In some cases, a requirement may be relevant, but not appropriate. In other cases, only part of a requirement will be considered relevant and appropriate. When it has been determined that a requirement is both relevant and appropriate, the requirement must be complied with to the same degree as if it were applicable (EPA 1988).

ARARs for RA alternatives at the Gibson Scrapyard Site can be generally classified into one of the following three functional groups: chemical, action, or location-specific.

The following to-be-considered materials (e.g., federal/state criteria, advisories, and guidance values) are non-promulgated advisories or guidance issued by federal or state government, which are not legally binding; and therefore, do not have the status of potential ARARs:

- Federal criteria, advisories, and guidance documents
- State of New York criteria, advisories, and guidance documents.

Federal and state guidance documents or criteria that are not generally enforceable, but are advisory, do not have the status of potential ARARs. Guidance documents or advisories to be considered in determining the necessary level of cleanup for protection of human health or the environment may be used where no specific ARARs exist for a chemical or situation, or where such ARARs are not sufficient to afford protection.

Federal and state requirements for soil, water, and air were considered to determine if they were ARARs, based on site characteristics, site location, and the alternatives considered. The following sections summarize the specific federal, state, and local ARARs for the RAs that may be taken at the Gibson Scrapyard Site, and for the types of technologies that will be developed into remedial alternatives. As identified at the beginning of Section 3, surface and subsurface soil are currently the impacted media at the Gibson Scrapyard Site; in addition, the COCs identified during the RI consist of PCBs, metals, and SVOCs (primarily PAHs). The RI did not include a full characterization of the MEC on-site. Thus, each of the following ARARs has been chosen for its potential applicability or relevance and appropriateness.

3.3.1 Chemical-Specific Applicable or Relevant and Appropriate Requirements

Chemical-specific requirements are established health- or risk-based numerical values or methodologies that establish cleanup levels or discharge limits in environmental media for specific substances or pollutants. Cleanup standards for impacted soil are defined in 6 NYCRR Part 375 Environmental Remediation Programs with SCOs specified based on current and/or future land use. TSCA, 40 CFR Part 761 provides guidance on capping PCB impacted material on site.

3.3.2 Action-Specific Applicable or Relevant and Appropriate Requirements

Action-specific ARARs set controls or restrictions on the design, implementation, and performance levels of activities related to the management of hazardous substances, pollutants, or contaminants. The potential action-specific ARARs include:

- ***Occupational Safety and Health Act, 29 CFR 1910***—Site activities will be conducted under appropriate Occupational Safety and Health Act standards.

- ***Department of Transportation Rules for Hazardous Materials Transport, 49 CFR, Parts 107, 171.1-500***—Addresses requirements for marking, manifesting, handling, and transport of hazardous materials; applicable if off-site treatment or disposal of wastes is required.

- ***Solid Waste Management Facilities, 6 NYCRR Part 360***—Provides standards and regulations for permitting and operating solid waste management facilities.

- ***Waste Transporter Permits, 6 NYCRR Part 364***—Provides standards and regulations for waste transporters.

- ***Hazardous Waste Management System General, 6 NYCRR Part 370***—Provides standards and regulations for the state hazardous waste management system.

- ***Identification and Listing of Hazardous Wastes, 6 NYCRR Part 371***—Provides standards and regulations for the identification and listing of hazardous wastes.

- ***Hazardous Waste Manifest System and Related Standards for Generators, Transporters, and Facilities, 6 NYCRR Part 372***—Provides standards, regulations, and guidelines for the manifest system, as well as additional standards for generators, transporters, and facilities.

- ***Resource Conservation and Recovery Act (RCRA) Toxicity Characteristic Criteria, 40 CFR Part 261.24***—All waste generated during the removal alternative will be characterized and handled per RCRA regulations.

- ***Land Disposal Restrictions, 6 NYCRR Part 376***—Pertains to alternatives that require land disposal of hazardous wastes.

- ***Environmental Conservation Law, Articles 3, 19, 23, 27, and 70, 6 NYCRR 371***—Identifies characteristic hazardous waste (PCBs) and lists specific wastes. Applies to transportation and all other hazardous waste management practices in New York State. Applicable if hazardous waste (PCBs greater than 50 mg/kg) is generated during remediation.

- ***TSCA, 40 CFR Part 761***—Provides guidance on storage and disposal of PCB-contaminated materials.

3.3.3 Location-Specific Applicable or Relevant and Appropriate Requirements

Location-specific ARARs must be considered when developing alternatives because these types of ARARs may affect or restrict remedial activities. Generally, location-specific requirements serve to protect the individual site characteristics, resources, and specific environmental features. The potential location-specific ARARs include:

- ***Protection of Waters, 6 NYCRR Part 608—***Provides standards, regulations, and guidelines for the protection of waters within the state.

- ***Freshwater Wetlands Permitting, Requirements, Classification, and Implementation, 6 NYCRR Parts 662 through 665—***Provides standards, regulations, and guidelines.

- ***Federal Endangered Species (Section 7) Consultation***—Requires federal agencies to consult with the U.S. Fish and Wildlife Service and the fish and wildlife agencies of states, to ensure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species. Alternatives that adversely affect the northern long-eared bat habitat would be avoided to the extent practicable.

- ***The National Historic Preservation Act of 1966 (Section 106) Consultation, 16 U.S.C. 470***—Requires federal agencies to consult with the State Historic Preservation Offices to assess activities, which may directly or indirectly impact historic properties.

4. GENERAL RESPONSE ACTIONS

In general, remedial technologies fit into one or more categories of GRAs. GRAs are generic, medium-specific, RAs that will satisfy the RAOs. GRAs may include no action, institutional controls (ICs), containment, removal, treatment, disposal, monitoring, or a combination thereof (EPA 1988). The development of RAs for this FS begins with the identification of GRAs that can meet RAOs. These GRAs are then screened based on their effectiveness, implementability, and cost and developed into remedial alternatives to address impacted media at the Site (i.e., soil). GRAs for soil at the Gibson Scrapyard Site (including no action, site management, removal, disposal, and containment) are detailed in the following sections.

4.1 SOIL

Six primary categories of technologies that may be applicable to soil remediation at the Site are included in the following subsections.

4.1.1 No Further Action

The No Further Action Alternative is included for use as the baseline alternative against which other remedial alternatives are compared.

4.1.2 Institutional Controls

Site management (also known as ICs) involves the placement of a restriction on the use of the property that limits human or environmental exposure to COCs, provides notice to any individual who might have physical contact with the site, or prevents actions that would interfere with the effectiveness of a remedial program, or with the effectiveness and/or integrity of site management activities at or pertaining to a site.

4.1.3 Removal

Physical removal of impacted fill would be conducted by excavation, using standard construction equipment (e.g., excavators) to remove material from the ground and load it into transport mechanisms (e.g., trucks) for off-site treatment or disposal.

4.1.4 Treatment

Treatment subjects contaminants to processes that alter their state, transform them to innocuous forms, or immobilize them. Potentially applicable treatment technologies for soil at this site include in situ and ex situ treatment. Treatment includes biological treatment, in situ soil flushing, in situ or ex situ solidification, in situ or ex situ chemical stabilization, thermal destruction, ex situ acid leaching, and ex situ vitrification. A short list of treatment types and their descriptions follows:

- Phytoremediation involves the use of plants to treat the impacted media. This can be achieved through phytoextraction, which involves the physical removal of contaminants from the soil through plant material.

- Soil flushing is the use of water or other suitable aqueous solution to flush contaminants from soil. The fluid is then extracted in situ.

- Stabilization is achieved using amendments that are mixed into the soil matrix and reduce the toxicity and/or mobility of the contaminants. This results in the production of a monolith of waste with high structural integrity and can be done in situ or ex situ.

- Thermal destruction can be conducted in situ or ex situ. Ex situ treatment entails the establishment of a mobile incinerator facility on-site, which uses high heat to volatilize, combust, and destroy organic compounds; in situ treatment entails installation of heating equipment. A pilot study would be required to determine applicability.

- Acid leaching is the use of potentially hazardous acid to remove inorganic contaminants from soil.

- Solvent extraction is the use of organic solvents as an extractant to separate organic and metal contaminants from the effected media.

- Vitrification is the use of electric current to convert contaminants to an inert, solid form. Following vitrification, the contaminants are trapped within the treated area, eliminating mobility.

4.1.5 Disposal

Disposal involves transporting the soil to a TSCA permitted disposal facility or Municipal Solid Waste Landfill or RCRA Subtitle D Non-Hazardous Landfill.

4.1.6 Containment

Contaminated soil and fill could be contained by installing a cover over the waste mass. The existing physical setting would require some grading of on-site fill.

5. IDENTIFICATION AND SCREENING OF TECHNOLOGIES

The potentially applicable technologies based on the GRAs identified earlier in Chapter 4 are screened using the process defined in DER-10, Technical Guidance for Site Investigation and Remediation (NYSDEC 2010). As shown in **Tables 5-1 and 5-2**, these technologies include ICs, monitored natural attenuation, phytoremediation, in situ and ex situ stabilization and solidification, soil flushing, in situ and ex situ thermal destruction, in situ capping, excavation, low temperature thermal desorption, ex situ chemical treatment, off-site disposal, and off-site incineration. Three preliminary screening criteria (i.e., effectiveness, implementability, and cost) were then used to screen these remedial technologies (also shown in **Tables 5-1 and 5-2**) for each media of concern.

5.1 SCREENING CRITERIA

5.1.1 Effectiveness

Effectiveness is a measure of the ability of an option to: (1) reduce toxicity, mobility, or volume of contamination, (2) minimize residual risks, (3) afford long-term protection, (4) comply with ARARs, (5) minimize short-term impacts, and (6) achieve protectiveness in a limited duration. Technologies that offer significantly less effectiveness than other proposed technologies may be eliminated from the alternative development process. Options that do not provide adequate protection of human health and the environment likewise may be eliminated from further consideration.

5.1.2 Implementability

Implementability is a measure of the technical feasibility and availability of the option and the administrative feasibility of implementing it (e.g., obtaining permits for off-site activities, ROW, or construction). Options that are technically or administratively infeasible or that would require equipment, specialists, or facilities that are not available within a reasonable period may be eliminated from further consideration.

5.1.3 Cost

Qualitative relative costs for implementing the remedy are considered. Technologies that cost more to implement, but that offer no benefit in effectiveness or implementability over other technologies, may be excluded from the alternative development process.

5.2 SCREENING SUMMARY

5.2.1 Technologies Not Retained for Further Analysis

From the list of technologies potentially applicable for remediation of the COCs and media of concern at this Site, a few technologies were excluded from further consideration because they were considered ineffective, not implementable at this Site, or too costly relative to the other technologies under consideration. In addition, the presence of munitions debris adds cost and complexity for most technologies; all fill material would need to be screened prior to treatment.

This screening is summarized in **Tables 5-1 and 5-2**.

The reasons for exclusion are detailed below:

- Monitored natural attenuation was not retained because this treatment technology is not effective for the site contaminants.

- Phytoremediation was not retained because it is not applicable for sites with deep contamination and would require a long timeframe with limited effectiveness. In addition, phytoremediation is generally used for lower levels of contamination than what exists at the Site and is limited in effectiveness to the length of the growing season.

- Solidification was not retained because it would lead to an increase in volume of fill and post-remediation use for this expansion is limited. Also, typically solidification is used in situ for the stabilization of deep contamination that is impacting groundwater. The majority of the contamination on-site is above the water table and groundwater is not impacted by site-related contamination due to the presence of a confining layer.

- Soil flushing was not retained due to the high relative cost and unknown level of effectiveness. Soil flushing is an emerging technology, which has not been widely implemented.

- Ex situ thermal destruction was not retained because this treatment technology is not effective at destroying inorganic contaminants.

- Low temperature thermal desorption was not retained because this treatment technology is not effective for treating inorganic contaminants.

- Acid leaching, solvent extraction, and vitrification were not retained due to difficulty of implementation. These technologies also require a long timeframe for implementation with a significantly higher cost than other retained technologies.

5.2.2 Technologies Retained for Further Analysis

The list of technologies potentially applicable for remediation of the COCs and media of concern at this Site are summarized in **Table 5-2**. After eliminating the technologies that were considered either too expensive, not implementable, or ineffective; the remaining technologies were retained to develop remedial alternatives.

The technologies retained for soil include the following:

- No Further Action is retained, as set forth in the CERCLA National Contingency Plan, to automatically pass through the screening and be compared with other technologies.

- ICs that consist of land use restrictions to limit human and environmental exposure were retained due to low cost and ease of implementation.

- Containment would be implemented by placing a soil cover or low permeability cap over remaining impacted soil and MEC.

- Removal through excavation of soil was retained, despite the high cost and difficulty, due to the ability to remove large volumes of contamination from the site.

- Disposal would be implemented through loading and transporting excavated soil to appropriate disposal facilities; soil would be characterized and accepted by the disposal facility prior to transport.

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6. SCOPING AND DEVELOPMENT OF REMEDIAL ALTERNATIVES

Scoping for the FS was completed based on correspondence between EA and the NYSDEC (2022). EA performed the alternative comparison in accordance with DER-10 (NYSDEC 2010) and the EPA publication Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA (EPA 1988). The screening of alternatives was designed to provide a basis for an overall assessment of applicable technologies based on impacted media identified at the site and related areas during the RI.

The scoping and development of the technologies/alternatives selected during the previous step of the FS process and during later discussions with NYSDEC are listed and described below. Alternatives were developed based on requirements set forth in PCB Regulations 40 CFR Part 761.61 for both self-implementing and risk-based cleanups.

The following remedial alternatives are considered for this FS:

- ***Alternative 1***—No Further Action
- ***Alternative 2***—No Further Action with Site Management (Risk-Based)
- ***Alternative 3***—Full Removal of Fill to Unrestricted Use SCOs (Self-Implementing)
- ***Alternative 4***—Partial Removal of Fill with Full 40 CFR Part 761 Cap; remove all soil exceeding 100 mg/kg PCBs (Self-Implementing)
- ***Alternative 5***—Partial Removal of Fill with Full 6 NYCRR Part 375 Soil Cover; remove all soil exceeding 100 mg/kg PCBs (Self-Implementing)
- ***Alternative 6***— No Removal with Full 40 CFR Part 761 Cap (Risk-Based)
- ***Alternative 7***— No Removal with Full 6 NYCRR Part 375 Soil Cover (Risk-Based).

The extent and volume of soil requiring remediation was determined based on data collected during the RI (EA 2022) as well as the Phase II SI (The ARGO Team 2010), where applicable. A 10 percent contingency for volume is built into each alternative, unless otherwise noted (Alternatives 4 and 5), to address areas where soil contamination is not horizontally or vertically delineated. For cost estimation purposes, based on available data, it is assumed that the Site has approximately 68,500 CY (109,600 tons) of fill/soil exceeding UU criteria.

Detailed alternatives screening is presented in **Table 6-1**.

6.1 ALTERNATIVE 1: NO FURTHER ACTION

The No Further Action: Alternative 1 is evaluated as a procedural requirement and as a basis for comparison. No activities would be undertaken to treat or remove the contamination or munitions debris present or otherwise prevent or minimize the potential for exposure to the contamination. This alternative would leave the Site in its present condition.

6.2 ALTERNATIVE 2: NO FURTHER ACTION AND SITE MANAGEMENT

Similar to Alternative 1, Alternative 2 would involve no removal of contamination or munitions debris and require regulatory and public acceptance of restricted/diminished use. Site management would be conducted with land-use controls to reduce the risk of human contact with munitions debris and potential MEC. Land-use controls would include the installation of warning signs along a chain-link fence to be installed along the perimeter, implementation of dig restrictions, and regular inspections of the Site for any changes in condition. Controls would warn workers and trespassers of the potential MEC hazards within the site.

6.3 ALTERNATIVE 3: FULL REMOVAL OF FILL TO UNRESTRICTED USE SOIL CLEANUP OBJECTIVES (SELF-IMPLEMENTING)

Alternative 3 (**Figure 6-1**) includes the removal of all fill material, including soil and debris, for offsite disposal at a permitted facility. This alternative is aimed at removing all fill material to underlying clean, native soil which includes on-site soil that exceeds UU SCOs for total PCBs (0.1 mg/kg) and metals (mainly arsenic [13 mg/kg], lead [63 mg/kg], mercury [0.18 mg/kg], nickel [30 mg/kg] and zinc [109 mg/kg]). Target removal depth will be confirmed and refined following a Pre-Design Investigation (PDI) consisting of PCB site characterization sampling pursuant to 40 CFR Part 761. This includes soil sample collection in a 10-ft by 10-ft grid across the site. A Sonic drill rig would be used to minimize generation of soil cuttings during the PDI, and preference would be given to the closest certified laboratory that can fulfill analysis requirements to minimize greenhouse gas (GHG) emissions associated with sample shipping. GHG emissions and costs associated with PDI activities could be greatly reduced by requesting EPA approval of a modified PCB site characterization sample spacing.

Current volume estimates were developed based on observed fill depth and PCB and metals contamination observed during the Phase II SI (The ARGO Team 2010) and RI (EA 2022). This alternative includes confirmation sampling following excavation to verify that soil exceeding UU SCOs has been removed. This alternative would be a self-implementing clean-up under 40 CFR Part 761.61 and would meet pre-disposal (unrestricted use) conditions as required under DER-10.

Mechanical excavation will be used to remove the contaminated soil/fill. Due to the historical presence of munitions debris and low potential for Material Potentially Presenting an Explosive Hazard (MPPEH), UXO construction support would be implemented during excavation with a UXO technician present during all removal activities. Excavation will be conducted in 1–2-ft lifts using heavy equipment such as long-reach excavators. If suspected MPPEH is identified by the UXO technicians, local Explosive Ordnance Disposal would be contacted for disposal, and UXO

support would be evaluated with the stakeholders. It is assumed for this alternative that no MPPEH will be identified. As an additional safety measure, excavated material will be sifted to further screen for MEC and MPPEH prior to off-site disposal of the soil. Due to the nature of the site as a scrap yard, this sifting would result in segregation of a variety of scrap, not only munitions debris, from the fill material. The need to further identify munitions debris among other miscellaneous debris would decrease productivity and increase the cost of the removal action significantly. Following the excavation and disposal of fill, the areas of soil removal would be restored to pre-excavation topography to the extent practicable with backfill, topsoil, and seed.

Alternative 3 would be implemented as follows:

- Coordination would be necessary for access agreements and associated permits for soil removal from on-site parcels.

- A 40-ft by 16-ft modular steel bridge would be installed at Narrows Creek to provide physical access to the site.

- A detailed 1-ft contour topographic survey would be completed to document the existing conditions of the Site; PDI sampling locations; and delineate the limits of wetlands and waterways, the existing bridge over Narrows Creek, trees, utilities, features in the surrounding area including the adjacent steep embankment, and other relevant existing conditions. The delineation will be used to obtain any necessary permits and authorizations for wetland disturbance/mitigation as required by the NYSDEC.

- A utility locator would be brought on-site to locate known underground utilities or other obstructions that may prove problematic during excavation activities. This information would be used to either re-route these utilities outside the remediation area or to accommodate their locations and future anticipated maintenance.

- Debris and vegetation would be removed from areas to be excavated with UXO construction support. Woodchips generated during clearing activities would be used onsite for erosion and sediment control and site restoration.

Approximately 68,700 CY of contaminated soil/fill with a depth range of approximately 3 to 26 ft would be excavated in 1-2 ft lifts to accommodate for screening for munitions debris. The volume currently includes 10 percent contingency. Excavated soil/fill would be sifted for munitions debris removal prior to being characterized, staged separately based on waste stream, and transported off-site for disposal. Waste streams and approximate quantities are summarized in the following table.

Waste Stream Criteria	Estimated Quantity Material for Off-Site Disposal (CY)
RCRA Hazardous[(a)] (>2,000 mg/kg lead)	12,700
TSCA Hazardous (> 50 mg/kg PCBS)	800
RCRA and TSCA Hazardous (>2,000 mg/kg lead and >5 mg/kg PCBs)	9,200
Nonhazardous Soil and Debris	46,000

Notes:
[(a)]2,000 mg/kg lead was used to estimate quantity of RCRA hazardous based on TCLP analysis conducted during RI activities.

RCRA Hazardous and TSCA Hazardous material would likely need to be transported up to 500 miles for disposal, due to facility requirements. Nonhazardous soil and debris would be transported to the closest waste receiver with the capacity to receive all of the waste. Confirmation samples would be collected following soil removal in a 10-ft by 10-ft grid and every 10 ft along excavation sidewalls to verify that cleanup goals have been met. Samples will be analyzed for site COCs.

When soil/fill has been removed to target depths, and confirmation sample analytical results indicate all soil meet the SCGs, the Site would be restored with the following:

- Clean fill from a local offsite source meeting the requirements of 6 NYCRR Part 375-6.8 (b) for commercial use for on-site will be brought in as needed to backfill and achieve pre-remediation topography to restore the Site and enable re-vegetation and stabilization.

- The excavated and disturbed area within the Site would be stabilized with topsoil obtained from a local offsite source and an appropriate seed mix, in accordance with the native ecology present in similar locations. To add ecological value to the Site, a heterogeneous mix of plantings could be established to create habitat for a variety of species, for an additional cost. The cost estimate developed for this alternative includes a seed mix only.

- Limited monitoring would be conducted as part of the Gibson Scrapyard Site Management Plan to verify any potentially remaining munitions have not surfaced due to erosion or frost-heave.

- A chain-link fence and locking gate from a local fencing company would be installed along the perimeter with signs to prevent access.

In addition to those activities identified earlier in this section which would minimize GHG emissions, such as disposing of materials at the closest appropriate waste receiver, obtaining materials from local sources, and reusing woodchips onsite, the following green remediation elements could also be incorporated in this alternative:

- Use of newer diesel equipment (2007 or newer) or biodiesel in heavy equipment to offset emissions associated with onsite earthwork activities;

- Incorporation of recycled materials such as geotextile fabric and erosion control materials;
- Use of biodegradable and/or recycled seed matting as part of restoration activities;
- Steam cleaning and/or use of phosphate-free or biodegradable detergents and cleaning products for equipment decontamination;
- Use of solar generator to power site trailer and electric tools;
- Covering soils and fill materials with biodegradable tarps and mats to suppress dust while potentially enhancing soil fertility;
- Install erosion control measures to prevent offsite migration of contaminants;
- Purchase of renewable energy credits/certificates to power and/or offset emissions due to remedial activities;
- Implement engine idling reduction plan;
- Establish green requirements and tracking system (e.g., SiteWise™ Tool for Green and Sustainable Remediation [SiteWise]) during remedial action.

A comprehensive evaluation of green remediation strategies was conducted and is presented in Section 8.1.5.

6.4 ALTERNATIVES 4 AND 5: PARTIAL REMOVAL OF FILL WITH FULL 40 CFR PART 761 CAP (ALTERNATIVE 4) OR FULL 6 NYCRR PART 375 SOIL COVER (ALTERNATIVE 5) (SELF-IMPLEMENTING)

Alternatives 4 and 5 (**Figure 6-2**) are the partial removal of soil and off-site disposal at a permitted facility with a full cap or cover and land-use controls. These alternatives are aimed at removing on-site soil exceeding 100 mg/kg PCBs. These alternatives will also include the installation of a 40 CFR Part 761.61 cap (Alternative 4) or 6 NYCRR Part 375 soil cover (Alternative 5) across the Site. These alternatives would be a self-implementing cleanup under 40 CFR Part 761.61 for a low-occupancy site (less than 6.7 hours site exposure per week).

Because contaminants would remain onsite, a hydrologic and hydraulic analysis of various flood events would be conducted as part of a PDI to determine whether additional flood protection should be included in the cap design to address vulnerability to climate change, as discussed in Section 7.3.

As with Alternative 3, mechanical excavation will be used to remove the contaminated soil, with the same measures taken due to munitions debris (i.e., excavation in 1-2 ft lifts, and sifting of excavated materials). UXO technicians would be on-site during all intrusive activities.

Based on samples collected during the Phase II SI (The ARGO Team 2010) and the RI (EA 2022), approximately 7,100 CY of contaminated soil covering approximately 0.5 acres with a depth range of 0 to 12 ft within the commercial use parcels exceed the criteria (100 mg/kg PCBs. Additional site characterization sampling would need to be conducted as part of a PDI to meet the requirements set forth in 40 CFR Part 761.265, which includes collecting soil samples in a 10-ft by 10-ft grid across the site, as described under Alternative 3 in Section 6.3. The estimated removal volume of 7,100 CY used for cost estimating purposes includes 100 percent contingency, in anticipation of additional removal volume resulting from additional characterization sampling.

Alternatives 4 and 5 would include the following activities:

- Coordination would be necessary for access agreements and associated permits for soil removal within on-site parcels.

- A 40-ft by 16-ft modular steel bridge would be installed at Narrows Creek to provide physical access to the site.

- A detailed 1-ft contour topographic survey would be completed to document the existing conditions of the site; PDI sampling locations; and delineate the limits of wetlands and waterways, the existing bridge over Narrows Creek, trees, utilities, features in the surrounding area including the adjacent steep embankment, and other relevant existing conditions. The delineation will be used to obtain any necessary permits and authorizations for wetland disturbance/mitigation as required by the NYSDEC.

- Debris and vegetation would be removed from areas to be capped/covered with UXO construction support. Woodchips generated during clearing activities would be used onsite for erosion and sediment control and site restoration.

Approximately 7,100 CY of contaminated soil with a depth range of approximately 7 to 12 ft would be excavated in 1-2 ft lifts to accommodate for screening for munitions debris. The volume currently includes 100 percent contingency. Excavated soil/fill would be sifted for munitions debris removal prior to being characterized, staged separately based on waste stream, and transported offsite for disposal. Waste streams and approximate quantities are summarized in the table below.

Waste Stream Criteria	Estimated Quantity Material for Off-Site Disposal (CY)
RCRA Hazardous[(a)] (>2,000 mg/kg lead)	0
TSCA Hazardous (> 50 mg/kg PCBS)	0
RCRA and TSCA Hazardous (>2,000 mg/kg lead and >5 mg/kg PCBs)	5,100
Nonhazardous Soil and Debris	2,000

Notes:
[(a)]2,000 mg/kg lead was used to estimate quantity of RCRA hazardous based on TCLP analysis conducted during RI activities.

RCRA Hazardous and TSCA Hazardous material would likely need to be transported up to 500 miles for disposal, due to facility requirements. Nonhazardous soil and debris would be transported to the closest waste receiver with the capacity to receive all of the waste. Confirmation samples would be collected following soil/fill removal in a 10-ft by 10-ft grid and every 10 ft along excavation sidewalls to verify that cleanup goals have been met. Samples will be analyzed for PCBs.

When soil/fill has been removed to target depths and confirmation sample analytical results indicate excavation limits do not contain PCBs exceeding 100 mg/kg, the excavation would be restored to pre-excavation topography to the extent practicable with backfill from an offsite source meeting the requirements of 6 NYCRR Part 375-6.8(b) for commercial use, as appropriate. Minor site grading with construction support from a UXO technician would be required to create an acceptable subgrade; mounded areas would be spread out and minor grading to promote drainage would be conducted. A cap would then be installed across the 3.2-acre Site, as detailed below:

- For both Alternatives 4 and 5, a geotextile demarcation layer (potentially made with recycled materials to offset environmental impacts) would be placed across the cover area, to denote limits of non-remediated soil.

- For Alternative 4, the cap would consist of a 10-in. clay layer, consistent with 40 CFR Part 761.61. An additional 6 in. of topsoil and seed would be placed on top of the clay layer to promote vegetative growth and stability. Materials would be sourced locally.

- For Alternative 5, the soil cover would consist of a 6-in. layer of soil. An additional 6-in. layer of topsoil would be placed to meet the requirements set forth in 6 NYCRR Part 375-3.8 (e)(4)(iii)(b). The cover would be seeded to promote vegetative growth and stability. Materials would be sourced locally.

A locally-sourced chain-link fence, locking gate, and signage as described for Alternative 2 would be installed along the perimeter of the Site to prevent access and exposure to remaining contamination and MEC.

Additional green remediation elements as described under Alternative 3 in Section 6.3 would be applicable to Alternatives 4 and 5. A comprehensive evaluation of green remediation strategies was conducted and is presented in Section 8.1.5.
Annual monitoring would be conducted as part of the Gibson Scrapyard Site Management Plan to assure the restoration is successful and the remedy remains protective. Groundwater monitoring would be conducted at the monitoring well closest to Narrows Creek to ensure groundwater is not transporting contaminants to the creek. The cap/cover would be inspected to maintain that the remedy is in place. ICs in the form of an environmental easement for the controlled property are required, which would include the provision to evaluate soil vapor intrusion potential if any structures are constructed onsite.

6.5 ALTERNATIVES 6 AND 7: NO REMOVAL WITH FULL 40 CRF PART 761 CAP (ALTERNATIVE 6) OR FULL 6 NYCRR PART 375 SOIL COVER (ALTERNATIVE 7) (RISK-BASED)

Alternatives 6 and 7 (**Figure 6-3**) consist of no removal of soil/fill and placement of a 40 CFR Part 761.61cap (Alternative 6) or 6 NYCRR Part 375 soil cover (Alternative 7) across the site and land-use controls. Since PCBs at concentrations greater than 100 mg/kg will remain in place, these alternatives will include exposure pathway analysis as part of the EPA PCB Cleanup Plan for a risk-based approach to establish that the Site does not pose any threat to human health and the environment. As with Alternatives 4 and 5, a hydrologic and hydraulic analysis of various flood events would be conducted as part of a PDI to determine whether additional flood protection should be included in the cap design to address vulnerability to climate change, as discussed in Section 7.3.

Alternatives 6 and 7 would include the following activities:

- Coordination would be necessary for access agreements and associated permits for soil removal within on-site parcels.
- A 40-ft by 16-ft modular steel bridge would be installed at Narrows Creek to provide physical access to the site.
- Debris and vegetation would be removed from areas to be capped/covered.

Alternatives 6 and 7 would be implemented across the 3.2-acre site. Minor site grading with construction support from UXO technicians would be required to create an acceptable subgrade; mounded areas would be spread out and minor grading to promote drainage would be conducted. Construction of the 40 CFR 761.61 cap would be consistent with Alternative 4. Construction of the 6 NYCR Part 375 soil cover would be consistent with Alternative 5. A locally-sourced chain-link fence, locking gate, and signage as described for Alternative 2 would be installed along the perimeter of the Site to prevent access and exposure to remaining contamination and MEC.

Additional green remediation elements as described under Alternative 3 in Section 6.3 would be applicable to Alternatives 4 and 5. A comprehensive evaluation of green remediation strategies was conducted and is presented in Section 8.1.5.

Annual monitoring would be conducted as part of the Gibson Scrapyard Site Management Plan to assure the restoration is successful and the remedy remains protective. Groundwater monitoring would be conducted at the monitoring well closest to Narrows Creek to ensure groundwater is not transporting contaminants to the creek. Soil cover would be inspected to maintain that remedy is in place. ICs in the form of an environmental easement for the controlled property are required, which would include the provision to evaluate soil vapor intrusion potential if any structures are constructed onsite.

7. COSTING AND EVALUATION CRITERIA

7.1 COST ASSUMPTIONS

Cost assumptions were prepared for each alternative using EPA's Guide to Developing and Documenting Cost Estimates during the Feasibility Study (EPA 1996). Net present value of the project costs was estimated using an interest rate of 5 percent. The cost assumptions were calculated using the most common products, and application methods available for a remedial alternative. The EPA guidance was used in conjunction with DER-10 Technical Guidance for Site Investigation and Remediation (NYSDEC 2010).

Cost estimates were prepared for each alternative based on the assumptions detailed in Section 6. Appendix A shows the detailed cost estimates developed. A summary of the costs for all alternatives is provided in **Table 7-1**.

7.2 CRITERIA USED FOR ANALYSIS OF ALTERNATIVES

The criteria to which potential remedial alternatives are compared (and used during this detailed analysis) are defined in 6 NYCRR Part 375 (NYSDEC 2006) and are listed below:

- Overall protectiveness of public health and the environment
- Conformance to SCGs
- Long-term effectiveness and permanence
- Reduction in toxicity, mobility, or volume of contamination through treatment
- Short-term impacts and effectiveness
- Implementability
- Cost-effectiveness
- Land use
- Community acceptance.

A description of the criteria and how alternatives are evaluated against them follows.

Overall Protectiveness of Public Health and the Environment—This criterion is an overall evaluation of each alternative's ability to protect public health and the environment.

Conformance to SCGs—Compliance with SCGs addresses whether a remedy would meet environmental laws, regulations, and other standards and criteria. The SCGs were presented in Section 3.

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

Reduction of Toxicity, Mobility, or Volume of Contamination through Treatment—The degree to which the alternative permanently reduces the toxicity, mobility, or volume of hazardous substances including the adequacy of the alternative in destroying the hazardous substances, reduction or elimination of hazardous substance releases and sources of releases, degree of irreversibility of waste treatment process, and characteristics and quantity of treatment residuals generated. Preference is given to alternatives that permanently and significantly reduce the toxicity, mobility, or volume of the wastes at the Site.

Short-Term Impacts and Effectiveness—Evaluation of the short-term effectiveness for an alternative includes consideration of the risk to human health, and the environment associated with the alternative during construction and implementation, and the effectiveness of measures that will be taken to manage such risks. Impacts from RA implementation include vehicle traffic, temporary relocation of residences/buildings, temporary closure of public facilities, odor, open excavations; and noise, dust, and safety concerns associated with extensive heavy equipment activity. The greatest short-term risk to human health is related to safety and general construction activity.

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

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

Land Use—The current and anticipated future use of the Site will be considered. Land use must comply with applicable zoning laws and maps.

Community Acceptance—Public comments will be considered after the close of the public comment period.

7.3 CLIMATE CHANGE VULNERABILITY ASSESSMENT

Although site and remedy vulnerability to climate change are not defined in 6 NYCRR Part 375 (NYSDEC 2006) as criteria for evaluation of potential remedial alternatives, climate change will nonetheless impact the long-term and cost-effectiveness of proposed remedial actions and will have implications for the design of the selected remedy. In addition to assessing the criteria listed in Section 7.2, EA performed a climate change vulnerability assessment and developed design and maintenance recommendations for the remedial alternatives proposed in this FS. Potential impacts were identified based on possible climate change vulnerabilities specific to the site and to the proposed remedial alternatives. Vulnerabilities were assessed using climate projections for the 2090s (where available) because the design life of the proposed remedies is likely to extend to the end of the century or longer, during which time the site must continue to meet the RAOs. A high (conservative) emissions scenario was used in the analysis in order to assess the worst-case

conditions. Understanding the worst-case scenario is important in the initial analysis to understand the range of conditions that the design may have to account for. Data sources for climate data used are listed in **Tables 7-2 through 7-7** and in Appendix B. Long-term site conditions and maintenance were also considered as elements of site risk or as recommendations for reducing site risk. Appendix B provides an overview of the methods and data sources used in this assessment.

7.3.1 Climate Exposure Assessment

The Gibson Scrapyard site faces the following climate change vulnerabilities that should be considered in the design of any remedial action in order to most fully achieve the RAOs.

- ***Precipitation*—**Under a high-emissions scenario,[2] Steuben County is projected to receive as much as 3.85 additional inches of rain per year by 2090, over a current baseline of 35.83 inches annually. Additional projections for precipitation are provided in **Table 7-2**.

- ***Drought*—**Currently, projected future climate data for drought are not available in areas of the United States that do not regularly experience multi-year droughts. However, historically, upstate New York has been subject to seasonal drought. Current climate trends are leading to less frequent, more intense precipitation events, reduced snowfall, and reduced snowpack due to frequent thaws during winter months. These trends, in combination with increased summer temperatures, may lead to more extreme seasonal drought conditions in the Northeast, and this should be factored into the site design. Additional projections for drought are provided in **Table 7-3**.

- ***Wind*—**Gibson Scrapyard is currently located in a region of New York State designated as Zone III, meaning it can be subject to wind speeds as high as 200 miles per hour measured 10 meters above the ground (FEMA, 2011). There are currently scattered stands of large trees (trees greater than 4 in. in diameter) on the site. Screening-level factors related to wind are summarized in **Table 7-3**.

[2]Climate change projections are based on both global climate models and representative concentration pathways (RCPs). A global climate model is a mathematical representation of the Earth's climate, which uses atmospheric greenhouse gases and aerosols, as well as land use changes, to simulate physical exchanges between the ocean, atmosphere, land, and ice (Rosenzweig and Solecki 2019). RCPs are varying trends of greenhouse gases, aerosols, and land use changes included as inputs to global climate models. Two RCPs are commonly used to develop projections: (1) RCP 4.5, defined as an intermediate scenario reflecting no change in climate and fossil fuel policies; and (2) RCP 8.5, defined as a high-emissions or worst-case scenario. For this report a high emissions scenario (RCP 8.5) was applied in order to assess the worst-case climate change risk for the site and proposed remedies.

- ***Temperature*—**Under a high-emissions scenario[2], Steuben County is projected to experience the following by 2090:

  — More days each year greater than 90 degrees F
  — Fewer days per year where the temperature falls below 32 degrees F
  — An increase in the average maximum summer temperature
  — An increase in the average maximum winter temperature
  — An increase in the average minimum winter temperature.

  Detailed projections data for temperature are summarized in **Tables 7-4 and 7-5**.

- ***Flooding*—**Gibson Scrapyard is located on the north bank of Narrows Creek near the confluence of Narrows Creek and the Chemung River. The 100-year floodplain is not mapped by FEMA for Narrows Creek; therefore, it is currently not possible to know whether the site is within the 100-year floodplain. Based on site topography, it has been assumed that the site may be partially within the 100-year floodplain. The site is located at a relatively flat area where the creek valley associated with Narrows Creek widens suddenly, and therefore may be a spillover location for high flows moving down the creek valley.

  Narrows Creek is a high-gradient stream (streambed slope is approximately 5.5%) with high scour potential. The stream appears incised, which may worsen the potential for bank erosion and collapse.

  Access to the site is via a bridge which is in poor condition. The banks of Narrows Creek have been armored in the vicinity of the bridge, which indicates previous scour damage at this location, most likely caused by constriction of the stream by the bridge. A constriction in a stream channel can cause accelerations in flow velocity that can worsen the potential to erode a stream's bed and banks, potentially undermining infrastructure and/or leading to changes in the stream alignment.

  Downstream of the site, where Narrows Creek empties into the Chemung River, sediment deposits have formed, and sediment must sometimes be removed manually to prevent flow from backing up.

  Review of topographic mapping indicates that the Norfolk Southern Railroad and Interstate-86 are built on embankments that may act as levees, protecting the site from flooding from the Chemung River. Although this may currently protect the site from flooding, it may also mean that the site is dependent on maintenance of the railroad and highway embankments to protect the site from flooding, and failure of these embankments may have severe impacts on the site. Screening-level factors and projections related to flooding are summarized in **Table 7-6**.

- ***Sea Level Rise*—**Gibson Scrapyard is an inland site located 930 feet amsl and is therefore not at risk due to sea level rise or storm surge now or in the foreseeable future. Screening-

level factors and projections related to previous site impacts, sea level rise, and erosion are summarized in **Table 7-7**.

7.3.2 Remedial Alternatives Vulnerability Assessment

An analysis was performed to evaluate the sensitivity of each proposed remedial alternative to various climate risks and apply specific criteria to assess the severity of the risk to each Alternative from each climate risk factor. A remedial alternative is considered more sensitive to a given climate change risk factor if the risk factor would prevent the remedial alternative from achieving the RAOs. Additionally, criteria developed for six major climate risk factors (temperature, precipitation/flooding, drought, wind, storm surge, sea level rise) were used to approximate the level of climate change exposure at the site and estimate the sensitivity of the proposed remedy to each climate risk factor. Where projection data are available for these risk factors, projections through the end of the century were used to assess the worst-case scenarios for each remedial alternative through the end of the century, with the understanding that these remedial alternatives will remain in place for decades. A description of the methods used for this assessment is detailed in Appendix B, and the results of the climate vulnerability assessment (presented as a matrix) are provided in **Table 7-8**.

The matrix can act as a decision-support tool that informs the criteria outlined in Section 7.2, as climate change risks will impact long-term effectiveness and permanence of the remedy; the ability of the remedy to reduce toxicity, mobility, or volume of contamination; short-term impacts and effectiveness; and cost-effectiveness. As the potential for a climate risk factor to impact the site increases, an X is placed along the x-axis in the matrix (increasing as the X moves from left to right along the x-axis), and as a remedial alternative's sensitivity to a climate factor increases, the X is placed along the y-axis (increasing vertically along the y-axis). By assessing both of these factors, an X is placed in one of nine boxes, assessing both climate risk exposure and remedy (Alternative) sensitivity to that factor. The boxes in the matrix are color coded according to the level of risk that results from the combination of these two assessments as a visual aid. The color categories are defined as follows:

- Red indicates remedy sensitivity is high and risk due to climate change is high.
- Orange indicates remedy sensitivity is high and risk due to climate change is moderate or remedy sensitivity is moderate and risk due to climate change is high.
- Yellow indicates remedy sensitivity is high and risk due to climate change is low or remedy sensitivity is moderate and risk due to climate change is moderate, or remedy sensitivity is low and risk due to climate change is high.
- Light green indicates remedy sensitivity is low and risk due to climate change is moderate or remedy sensitivity is moderate and risk due to climate change is low.
- Green indicates remedy sensitivity is low and risk due to climate change is low.

7.3.2.1 Remedial Alternative Vulnerability Assessment Results and Recommendations.

Table 7-9 provides both an explanation for the remedy sensitivity ranking for each Alternative and specific management recommendations to reduce remedy sensitivity and therefore increase climate resiliency for each Alternative. These recommendations have not yet been incorporated into any of the alternatives but should be considered in the design phase of the remedy, if not earlier. It is important to note that these recommendations are based on the best historical and projected climate data available at the time of the analysis, and climate science is an area of ongoing research. It may be appropriate and necessary to revisit recommendations and maintenance decisions for the site as more accurate climate projections become available over time, to best achieve the goals of protecting human health and safety.

Alternative 1: The results of the analysis indicated that Alternative 1 is the most vulnerable to climate change risk factors, due the uncontrolled way in which climate change risk factors could interact with the site. The greatest climate risks to Alternative 1 come from flooding and wind because these climate risk factors have a high potential to disturb the site and increase exposure to contaminated fill. It should be noted that the topography of the site and surrounding areas may reduce wind exposure at the site, but this cannot be determined without more detailed analysis. Similarly, there are multiple uncertainties surrounding the severity of potential flooding at the site. The 100-year flood zone for Narrows Creek has not been mapped, and multiple topographic factors will play a role in the extent and depth of flooding at the site for any given flood event. However, the site's location directly adjacent to Narrows Creek, at the confluence of Narrows Creek and the Chemung River, and downstream of a confined section of Narrow Creek, as well as patterns of bank erosion and sediment deposition along this section of Narrows Creek indicate some potential for severe flooding.

Temperature extremes, and wildfire each pose a moderately high risk due to lower potential for exposure but could still have severe consequences for contaminant exposure if they were to occur on the site. Drought is considered a moderate risk as the site is in a region with increasing temperatures but also increasing rainfall amounts. Historically the region has been subject to seasonal drought, and this is likely to continue due to changing precipitation patterns that cause rain to fall in more intense events with less potential for infiltration of rainfall and longer gaps between precipitation events. Storm surge and sea level rise are shown in the matrix as having a moderate risk due to the severe potential impacts if the site were to be inundated; however, as this is an inland site there is no actual risk of site exposure to storm surge/sea level rise, and this factor will not be discussed again.

No recommendations are provided for Alternative 1 because it is defined as the No Action alternative and management recommendations cannot be implemented under this definition.

Alternative 2: Alternative 2 faces the same climate risks as Alternative 1 for all climate risk factors but is defined to allow site management activities. Recommendations for site management activities that may reduce remedy sensitivity include:

- Mowing the site to reduce the growth of woody vegetation and therefore reduce the risk of wildfire or of extreme winds toppling large trees.

- Seeding the site with non-invasive (preferably native) drought-resistant vegetation following large die-offs of vegetation following drought or other events that may kill off vegetation. Native vegetation is best adapted to regional climate and soil conditions and is likely to require reduced maintenance over time, especially in the face of seasonal drought. Vegetation should be selected based on soil conditions, rooting depth, drought tolerance. Maintaining vegetation on the site will reduce the risk of erosion on the site.

- Installation of a permanent access bridge sized according to NYSDEC's aquatic connectivity guidelines (i.e., a bridge with a span of at least 1.25 times the bankfull width of the stream) in order to reduce the risk of bank scour and washout of the bridge. This action will improve site access for maintenance activities. In addition, sizing the crossing to span the bankfull flow will and reduce the risk of streambank scour adjacent to the site, which could threaten the site if the channel were to migrate rapidly.

Alternative 3: Alternative 3 (full removal of fill containing contaminants) faces the least risk from climate change, as any changes that occurred to the site due to climate change will not have an impact on the RAOs if the contamination no longer remains on the site. No recommendations are needed for this alternative.

Alternatives 4 and 5: The risks from climate change to Alternatives 4 and 5 are generally considered more moderate because the impact of cap failure on the RAOs as a result of any climate change impacts, would be reduced due to the partial removal of contaminated materials from the site. Flooding is still considered a severe risk (red category) and multiple design and maintenance recommendations are provided in addition to those listed above for Alternative 2. These include:

- Perform a hydrologic and hydraulic analysis of various flood events, including the 100- and 500-year floods under both current and projected future climate change conditions to obtain the most accurate information about the extent of the floodplain under different scenarios. Also include a scour analysis of Narrows Creek to determine the risk of erosion of the streambanks adjacent to the site and the risk of deposition at the mouth of Narrows Creek, as this deposition could lead to backwater flooding. In all analyses, flooding on the Chemung River should also be accounted for, as it may influence water levels along Narrows Creek and the site under some flood conditions. Two-dimensional hydraulic modeling may be most appropriate for modeling the complex hydraulics that occur at the confluence of Narrows Creek and the Chemung River, as well as any role the highway and railroad embankments may play in providing flood protection to the site.

- Consider inundation areas from the analysis above when determining where to remove contaminated fill versus where to cap the fill in place. Areas more likely to be inundated should be prioritized for fill removal.

- Consider floodplain reconnection along Narrows Creek or installation of a berm on site if the hydraulic analysis indicates such measures are needed to reduce flood risk to site.

- Conduct a scour analysis of the portion of Narrows Creek adjacent to the site. Replace armoring of streambanks on the site with nature-based streambank stabilization, as appropriate, to reduce the risk of streambank scour and reduce maintenance needs.

- Limit cap/cover slopes to reduce the risk of surface erosion due to runoff or flood events.

The risk of wind events is reduced to moderately severe (orange) (compared to Alternatives 1 and 2, for which it is considered severe [red]) by the removal of fill, which will reduce the risk of exposure by overturned trees. Similarly, compared to Alternatives 1 and 2, the risk of drought, temperature extremes, and wildfire drop somewhat due to the removal of some of the contaminated fill. The recommendations for Alternative 2 for each of these categories apply to Alternatives 4 and 5 as well. An additional recommendation is made to incorporate measures into the design of the cap or cover to limit the impact of burrowing animals, which may increase with more extreme temperatures.

Alternatives 6 and 7: These Alternatives, which involve capping or covering the contaminants in place, face essentially the same risks due to climate change as Alternative 1 and somewhat more climate change risk than Alternatives 4 and 5, because failure of the cap would result in a high impact to the RAOs. However, the risks due to climate change to Alternatives 6 and 7 may be reduced by applying the same recommendations provided for Alternatives 2, 4, and 5 above.

7.4 ENVIRONMENTAL IMPACT ASSESSMENT

Several programs have been developed and are available to compute quantifiable green and sustainable metrics of activities such as investigation, construction, or other field activities conducted as part of remedial action and long-term monitoring. These metrics can be used by project managers and stakeholders to evaluate potential remedial actions during the FS and later stages of the remedial process. Alternatives 2 through 7 in this FS were analyzed with one such program, SiteWise; this analysis is described in the sections below.

7.4.1 Introduction to SiteWise

Developed by Battelle, the U.S. Navy, and the U.S. Army Corps of Engineers, SiteWise (version 3.2) was designed to calculate the environmental footprint of remedial actions in terms of sustainability metrics. SiteWise was developed to incorporate green and sustainable remediation into the site remediation processes and provide a quantifiable assessment. The tool is able to provide a detailed evaluation of several quantifiable sustainability metrics, including GHGs, energy usage, criteria air pollutants, water usage, resource consumption and accident risk.

Provided in a series of Microsoft Excel worksheets, SiteWise uses a building-block assessment of each alternative to reduce the redundancy in the sustainability evaluation and facilitate the identification of specific activities that have the greatest environmental footprint. Each alternative is divided into building blocks or modules and individual footprints of the modules are calculated. Then, the overall footprint of each remedial alternative is estimated by combining the individual footprints. The output of SiteWise is a series of tables and graphs that visually compare the green and sustainable remediation metrics.

7.4.1.1 Inputs and Assumptions

SiteWise was used to compare Alternatives 2 through 7 in this FS. The input values of SiteWise were divided into sections, including pre-construction activities, construction activities, transportation and disposal, restoration activities, and engineering control maintenance. Specific inputs include materials to be used onsite, transport of materials, equipment, and labor to and from the site, and equipment usage. The assumptions from the cost estimation apply to the values of the individual line items of the SiteWise inputs, which are presented in **Appendix C**.

7.4.1.2 Comparison of Results

The results of the SiteWise analysis are provided in a series of bar graphs presented on **Figure 7-1** and in **Appendix C** . The bar graphs in **Figure 7-1** summarize five different categories (i.e., residual handling, equipment use and miscellaneous, transportation equipment, transportation personnel, and consumables) and provide a comparison of GHG emissions, and total energy usage for Alternatives 2 through 7. Additional graphical outputs (included in **Appendix C**) include onsite and total nitrogen oxides (NO_x) emissions, sulfur oxides (SO_x) emissions, and particulate matter of diameter 10 microns (PM_{10}) emissions, and landfill space usage. In addition, an output summary table with quantifiable data is presented in **Appendix C**. Further discussion of the SiteWise analysis results is included in Sections 8.1.5.

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8. DETAILED ANALYSIS OF ALTERNATIVES AND RECOMMENDATIONS

The purpose of this FS was to develop, screen, and evaluate potential remedial alternatives for the Gibson Scrapyard Site. Remedies were identified and screened in accordance with EPA (1988 and 1996) and NYSDEC (1998, 2006, 2010) guidance. The comparison of alternatives and recommendations are described below and summarized in **Table 8-1**.

The following remedial alternatives are considered for this FS:

- ***Alternative 1***—No Further Action
- ***Alternative 2***—No Further Action with Site Management (Risk-Based)
- ***Alternative 3***—Full Removal of Fill to Unrestricted Use SCOs (Self-Implementing)
- ***Alternative 4***—Partial Removal of Fill with Full 40 CFR Part 761 Cap; remove all soil exceeding 100 mg/kg PCBs; Full Cap (Self-Implementing)
- ***Alternative 5***—Partial Removal of Fill with Full 6 NYCRR Part 375 Soil Cover; remove all soil exceeding 100 mg/kg PCBs; Full Soil Cover (Self-Implementing)
- ***Alternative 6***— No Removal with Full 40 CFR Part 761 Cap (Risk-Based)
- ***Alternative 7***— No Removal with Full 6 NYCRR Part 375 Soil Cover (Risk-Based).

8.1 COMPARISON OF GIBSON SCRAPYARD REMEDIAL ALTERNATIVES

8.1.1 Overall Protection of Public Health and the Environment

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

Alternative 1 does not fulfill this criterion since no action is involved. Alternative 2 provides more protection than Alternative 1 but less protection than Alternatives 3 through 7. Alternative 2 offers some protection to public health with ICs but will not physically remove risk of exposure to contamination and MEC. Alternative 3 provides the most overall protection of public health and the environment by completely removing the contaminants exceeding UU SCOs. Alternatives 4 and 5 provide less protection than Alternative 3 but more protection than Alternatives 6 and 7 since Alternatives 4 and 5 include a partial removal of the most contaminated soils with remaining contamination contained under a cap or soil cover. Alternatives 6 and 7 offer more protection than Alternatives 1 and 2, by containing the contaminated soil/fill under a cap or soil cover. Alternatives 6 and 7 close-off the exposure pathway; thereby, preventing human and ecological contact to contaminated material.

8.1.2 Standards, Criteria, and Guidance

Compliance with SCGs addresses whether a remedy will meet environmental laws, regulations, and other standards and criteria.

Alternatives 1 and 2 do not meet this criterion. Unlike Alternatives 1 and 2, Alternatives 3 to 7 satisfy the SCGs. Alternative 3 meets this criterion by removing all soil and fill material exceeding UU SCOs. Alternatives 4 and 5 meet this criterion by addressing the most contaminated soil via removal and off-site disposal and installing a cap or soil cover over the remaining soil. Alternatives 6 and 7 also satisfies this criterion as they would achieve the SCGs for the intended site use by containing contaminated media on-site and under a cap or soil cover.

8.1.3 Long-Term Effectiveness and Permanence

This criterion evaluates the long-term effectiveness of the remedial alternatives after implementation, under current site and climate conditions. If fill or treated residuals remain on-site after the recommended remedy has been implemented, the following items are evaluated: (1) the magnitude of the remaining risks, (2) the adequacy of the engineering and/or ICs intended to limit the risk, and (3) the reliability of these controls.

Alternatives 1 and 2 do not provide long-term effectiveness or permanence; however, Alternatives 3 through 7 satisfy this criterion. Alternative 3 provides the most long-term effectiveness and permanence, because contaminants at concentrations exceeding respective SCGs would be permanently removed from the Site. Alternatives 4 through 7 provide less permanence than Alternative 3 because the installation of a cover system would require inspections and maintenance to ensure long-term effectiveness. Incorporation of green remediation measures identified in Section 6 will not reduce the long-term effectiveness or permanence of any of the alternatives.

8.1.3.1 Climate Change Resiliency

When climate change is taken into account, the evaluation of long-term effectiveness has the potential to change significantly. To that end, each alternative was analyzed with regard to climate risks, as discussed in Section 7.3 and Appendix B. A general summary of the relative risk is provided here; additional details about the risks faced by each alternative are previously discussed in Section 7.

Alternatives 1 and 2 are the most vulnerable to climate change which presents the greatest risk to the RAOs; the ability to provide long-term effectiveness or permanence decreases in the face of climate change. Alternative 3 faces the least risk from climate change, as there would be no contaminated material left on site to be exposed by climate change impacts, satisfying the long-term effectiveness criterion even in the face of climate change. Alternatives 4 and 5 face moderate risk due to climate change. Alternatives 6 and 7 are more vulnerable to climate change than Alternatives 4 and 5 but less vulnerable to climate change impacts than Alternatives 1 and 2. Alternatives 4 through 7 are expected to have a reduced long-term effectiveness and permanence due to climate change impacts compared to if climate conditions were to remain unchanged.

8.1.4 Reduction of Toxicity, Mobility, or Volume of Contamination

Preference is given to alternatives that permanently and significantly reduce the toxicity, mobility, or volume of contamination at the Site.

Alternatives 1 and 2 do not reduce the toxicity, mobility, or volume of contamination. Alternatives 3 through 5 reduce toxicity, mobility, and volume of contamination onsite through soil removal; however, Alternative 3 provides permanent effectiveness to this criterion by a complete removal of contaminated soil. Alternatives 6 and 7 provide a reduction of mobility with the installation of a cover system but do not provide a reduction in toxicity or volume like Alternatives 3 through 5.

8.1.5 Short-Term Impacts and Effectiveness

This criterion evaluates the potential short-term adverse impacts of the RA upon the community, the workers, and the environment during the construction and/or implementation. The length of time needed to achieve the remedial objectives is also estimated and compared against the other alternatives. In addition, results from the SiteWise analysis (described in Section 7.4) were used to evaluate the expected short-term environmental impacts. **Figure 7-1** compares the GHG emissions and total energy used for Alternatives 2 through 7, calculated using SiteWise, and are discussed further below. An additional output summary table with tabular data is presented in **Appendix C**).

Alternative 1 has no short-term impacts because no RA is proposed in this alternative. This alternative is ineffective at meeting the RAOs. Alternative 2 has short-term impacts to site workers during the installation a fence. Risks can be minimized with site-specific health and safety controls, including the use of appropriate PPE. This alternative is effective for human health risk RAOs associated with contact of fill but is ineffective at meeting RAOs for environmental protection. From the SiteWise analysis, Alternative 2 has minimal GHG emissions and total energy usage, estimated at 2.82 metric tons and 36 million British thermal units (MMBTU), respectively.

Alternatives 3 through 7 pose increased short-term risks to the public during excavation and grading, through the production of dust; these effects can be reduced through the implementation of standard dust mitigation construction practices. Workers can potentially be exposed to impacted media and MEC during excavation and soil sieving activities involved in Alternatives 3 through 7. Risks can be minimized by implementing health and safety controls, including the use of appropriate PPE.

While Alternatives 3 through 7 impact green remediation goals in the form of air emissions due to material transport and onsite earthwork activities, Alternative 3 has the greatest short-term environmental impacts since it would require transportation of the largest amount of soil (removal and backfill). A portion of the material being removed under Alternative 3 and all of the material being removed under Alternatives 4 and 5 (half of the volume of Alternative 3) would have to be disposed of at a TSCA approved PCB commercial storage and disposal facility; the material would likely have to be transported approximately 500 miles each direction. Air emissions due to site excavation, soil sifting, backfill, and grading activities will be greatest for Alternative 3, as the

greatest amount of material needs to be removed, processed and backfilled. The results from the SiteWise analysis indicate that Alternative 3 has the greatest impacts for all of the green and sustainable remediation metrics, including GHG emissions exceeding 6,300 metric tons and energy usage estimated at 98,000 MMBTU (**Figure 7-1**). In addition, emissions for NO_x, SO_x, and PM_{10} for Alternative 3 are significantly greater than the other alternatives (**Appendix C**).

Alternatives 4 and 5 involve excavation, soil sifting and backfill of 33 and 28%, respectively of the volume of soil for Alternative 3. Following Alternative 3, Alternatives 4 and 5 have the next greatest short-term environmental impact with GHG emissions exceeding 5,000 metric tons and energy usages estimated greater than 66,000 MMBTU, as shown on **Figure 7-1**. Alternatives 4 through 7 will have similar amounts of material transport for the soil cover and cap materials, which will be from a local source, as fill and cover materials are available in the Corning, NY area. The short-term environmental impacts of Alternative 6 and 7 include estimated GHG emissions exceeding 4,300 metric tons and estimated energy usage exceeding 56,000 MMBTU (**Figure 7-1**).

Alternatives 3 through 7 are effective for meeting the RAOs for human health and the environment in the short term.

8.1.6 Implementability

This criterion evaluates the technical and administrative feasibility of implementing each alternative.

All alternatives are implementable and have been executed nationally. Implementing Alternatives 3 through 7 will present challenges because each alternative requires soil sieving activities to address the potential MEC within the fill. Implementation of Alternative 3 has the most challenges because this alternative requires more excavation into the subsurface and more offsite transportation and disposal than Alternatives 4 and 5. Alternatives 6 and 7 are more implementable than Alternatives 4 and 5 because excavation is not required.

8.1.7 Cost-Effectiveness

This criterion evaluates estimated capital costs, as well as annual operation, maintenance, and monitoring costs, on a present-worth basis.

Alternative 1 is the least expensive and the least effective alternative, as no RA would take place. Alternative 2 is the second least expensive alternative but also the second least effective. Alternative 3 is the most expensive alternative but also the most effective at remediating soil contamination. Alternatives 4 and 5 would not be cost effective due to the MEC clearance costs associated with the fill removal component of the alternatives. Alternatives 6 and 7 are effective in minimizing risk to potential receptors and are less expensive than Alternatives 3 through 5, because MEC clearance is required for surface soil only rather than the entire depth of fill.

Green remediation measures including sourcing local backfill, clay, topsoil, and fence materials will have a positive impact on remedial action costs. This will offset any more expensive green alternatives such as use of recycled materials (e.g., geotextile) and use of a solar generator onsite.

8.1.8 Land Use

Alternative 1 has no land use restrictions because no actions would be taken administratively or otherwise. Alternatives 2 and 4 through 7 require land use restrictions, such as environmental deed restriction, limiting future use of the Site since contamination would remain. Alternative 3 involves removal of soil and fill material; however, due to the potential for munitions debris and MEC to still be present at the site, the future use of the Site would still be limited, though not as limited as for Alternatives 2 and 4 through 7.

8.1.9 Community Acceptance

This criterion evaluates concerns of the community regarding the investigation and the evaluation of alternatives. Gibson Scrapyard Site remedial approach has not been presented to the community for comment at the time of this report.

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Tables

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Table 5-1. Technology Screening Matrix - Soil/Fill

Technology	Process Options	Effectiveness in Addressing RAOs	Implementability	Key Factors	Cost	Status
No Action						
No Further Action	NA	Ineffective	Easily implemented	NA	None	Retained per NCP
Institutional Controls						
Institutional Controls	Land use restrictions	Effective for human health risk RAOs associated with contact of fill.	Easily implemented	Requires regulatory and public acceptance of restricted/diminished resource use.	Low	Retained for potential combination with other technologies
Monitored Natural Attenuation						
Monitored Natural Attenuation	Reliance on natural processes and chemical change.	Ineffective for treatment of site contaminants.	Easily implemented; requires demonstration of natural processes causing attenuation and subsequent monitoring.	Appropriate only for sites where natural processes serve to permanently bury or sequester chemical contamination. Requires regulatory and public acceptance of short-term restrictions on resource use.	Low	Not retained
In Situ Treatment						
Phytoremediation	Reliance on natural processes and chemical change.	Ineffective due to thickness of fill impacts.	Easily implemented; requires demonstration of natural processes causing degradation and subsequent monitoring.	Appropriate only for sites where chemical contamination is relatively shallow. Requires regulatory and public acceptance of short-term restrictions on resource use.	Low	Not retained
In Situ Stabilization/Solidification	Addition of amendments/reagents to soil/fill to produce monolith with low leachability that physically and chemically binds the COCs into the solidified matrix; requires in situ mixing.	Effective for risk-based RAOs and partially effective for source control; would require a bench-scale treatability study to fully evaluate the effectiveness.	Moderately difficult to implement; munitions removal from contaminated media with soil sieving would need to be conducted prior to addition of amendments. Depth of contaminants and the presence of subsurface debris could limit effectiveness. Requires import of suitable materials/reagents for stabilizing/solidifying the soil.	Would require munitions removal prior to implementation. Volume increase due to bulking may be significant, but is manageable.	High	Not retained
Soil Flushing	Extraction of contaminants from soil through the delivery and extraction of a surfactant or cosolvent, through a network of injection and extraction wells.	Effectiveness would need to be evaluated through bench scale and field pilot tests. The thickness and permeability of the soil/fill may reduce the effectiveness of this technology.	Moderately difficult to implement; munitions removal from contaminated media with soil sieving would need to be conducted prior to flushing. Soil flushing is considered an emerging technology, has not been widely implemented. The flushing solution may alter the physical/chemical properties of the soil system. Technology offers the potential for recovery of metals and can mobilize a wide range of organic and inorganic contaminants from coarse-grained soils.	Would require munitions removal prior to implementation. Capture of groundwater and flushing fluids with desorbed contaminants may need treatment to meet appropriate discharge standards prior to release to local, publicly owned wastewater treatment works or receiving streams; separation of solvents from recovered flushing fluid, for reuse in the process, is a major factor in the cost of soil flushing. Treatment of the recovered fluids results in process sludges and residual solids, such as spent carbon and spent ion exchange resin, which in turn must be appropriately treated before disposal. Residual flushing additives in soil may be a concern.	High	Not retained
Thermal Destruction	High heat is used to volatilize, combust, and destroy organic compounds.	Effective at destroying PCBs and SVOCs but not inorganics.	Difficult to implement; full munitions removal with soil sieving would need to be conducted prior to implementation of thermal technology.	Would require munitions removal prior to implementation.	High	Not retained
In situ Containment						
Capping	Soil cap	Effectively addresses RAOs associated with contact of fill.	Moderately difficult to implement; requires import of sand, stone, soil placement; monitoring of cap thickness; periodic maintenance and monitoring.	Would require minor site grading changes to promote stormwater runoff; effective in long term source control.	Moderate	Retained for consideration
	Impermeable liner (i.e., clay, plastic, etc.)	Effectively addresses RAOs	Moderately difficult to implement; requires periodic maintenance and monitoring.	Would require minor site grading changes to promote stormwater runoff; effective for long term source control and protection of public health; meets PCB cap requirements set forth in 40 CFR 761.61.	Moderate	Retained for consideration

Table 5-1. Technology Screening Matrix - Soil/Fill

Technology	Process Options	Effectiveness in Addressing RAOs	Implementability	Key Factors	Cost	Status
Removal						
Excavation	Mechanical excavation used to remove soil/fill material	Will achieve the RAOs. This is a proven technology for removing contaminated soils.	Moderately difficult to implement; munitions removal from contaminated media with soil sieving would need to be conducted during excavation activities. Sloping of excavation sidewalls would be required to remove all impacted soils.	Would require excavation support by a UXO technician due to presence of munitions; excavation would take longer than for a site without munitions.	High	Retained for consideration
Ex Situ On-Site Treatment/Disposal						
Solidification or Stabilization	Amendments added to modify physical and chemical properties of material to facilitate handling and disposal.	Effective at immobilizing inorganics and PCBs.	Moderately difficult to implement; munitions removal from contaminated media with soil sieving would need to be conducted prior to addition of amendments. Can be performed on small batches as material is staged for transport. Requires import and addition of soil amendments. Result is decreased water content, toxicity, and mobility of contaminants. Disposal volumes will likely increase.	Requires use of soil amendments to achieve stabilization. Oversized material and debris, along with munitions, would need to be screened prior to treatment.	Moderate	Not retained
Low Temperature Thermal Desorption (LTTD)	Contaminated soils are excavated and heated at temperatures below 800ºF to volatilize organic contaminants. Treated soils may be returned to the site for reuse or landfilled.	Effective for meeting the site RAOs for PCBs and SVOCs but not inorganics.	Moderately difficult to implement; full munitions removal with soil sieving would need to be conducted prior to implementation of thermal technology. Requires establishment of a mobile LTTD facility at the site and sufficient power supply. Pilot study would need to be conducted to determine applicability.	The efficiency of the system may limit the rate of soil removal. Would require bench-scale or field-scale testing prior to implementation. Treatment is conducted on-site in a mobile unit that is transported or constructed at the site.	High	Not retained
Thermal Destruction	High heat is used to volatilize, combust, and destroy organic compounds.	Effective at destroying PCBs and SVOCs but not inorganics.	Moderately difficult to implement; full munitions removal with soil sieving would need to be conducted prior to implementation of thermal technology. Requires establishment of a mobile incinerator facility onsite. Pilot study would need to be conducted to determine applicability.	Rate of treatment may limit rate of excavation. Oversized material and debris will need to be separated out prior to treatment.	High	Not retained
Chemical Treatment	Acid leaching used to remove inorganics from soil/fill	Effective for inorganics, not for PCBs	Difficult to implement; munitions removal from contaminated media with soil sieving would need to be conducted prior to treatment; requires establishment of a designated treatment facility using potentially hazardous chemicals to remove inorganics from fill.	Requires long term use of facilities for soil/fill treatment and disposal or recycling of leached fluids; rate of treatment may limit rate of excavation and disposal; requires use and maintenance of specialized equipment and chemicals.	High	Not retained
	Solvent extraction to remove organics from soil/fill	Effective for PCBs; inorganics may restrict disposal options	Difficult to implement; munitions removal from contaminated media with soil sieving would need to be conducted prior to treatment; requires establishment of a designated treatment facility; will result in concentrated contaminant requiring disposal.	Requires laboratory scale treatability study prior to design of system; may require several passes through system to achieve cleanup criteria.	High	Not retained
	Vitrification used to convert inorganic contaminants to inert forms	Effective for inorganics; not commonly used for PCBs	Difficult to implement; munitions removal from contaminated media with soil sieving would need to be conducted prior to treatment; requires establishment of a designated treatment facility using high temperature processes to vitrify soil/fill.	Requires long-term use of facilities for soil/fill treatment and disposal; rate of treatment may limit rate of excavation and disposal; requires use and maintenance of specialized equipment.	High	Not retained

Table 5-1. Technology Screening Matrix - Soil/Fill

Technology	Process Options	Effectiveness in Addressing RAOs	Implementability	Key Factors	Cost	Status
Off-Site Treatment and Disposal						
Off-Site Disposal	Off-site commercial landfill	Effective for meeting the site RAOs	Moderately difficult to implement; munitions removal from contaminated media with soil sieving would need to be conducted during excavation activities; requires identification of landfills capable of accepting material; landfill capacity and permitting may limit excavation and disposal rates.	Material may require dewatering, stabilization, or treatment to meet criteria for acceptance. Long-range transport may be required dependent on landfill capacity/location.	High	Retained for potential combination with other technologies
Off-Site Incineration	Soils are excavated and transported to an off-site incineration facility. High heat is used to volatilize, combust, and destroy organic compounds.	Effective at destroying PCBs	Moderately difficult to implement; munitions removal from contaminated media with soil sieving would need to be conducted during excavation activities; pilot study would need to be conducted to determine applicability.	Rate of treatment may limit rate of excavation. Oversized material and debris will need to be separated out prior to treatment.	High	Retained for potential combination with other technologies

Notes:
ºF = Degrees Farhenheit
COC = Contaminant of concern
CFR = Code of Federal Regulations
LTTD = Low temperature thermal desorption
NA = Not applicable
NCP = National Contingency Plan
PCB = Polychlorinated biphenyl
RAO = Remedial Action Objective
SVOC = Semivolatile organic compound
UXO = Unexploded ordnance

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Table 5-2. Proposed Remedial Alternatives

Remedial Alternative	Compliance with RAO	Effectiveness	Implementability	Reduction of toxicity, mobility, and volume	Cost
No Further Action	No	Ineffective	Easily implemented.	NA	No cost.
No Further Action with Site Management (Risk-Based) - site use and access restrictions	No	Effective for human health risk RAOs associated with contact of fill. Not effective at meeting RAOs for Environmental Protection.	Easily implemented. Requires regulatory and public acceptance of restricted/diminished resource use.	Not effective for reduction of toxicity, mobility, or volume; no reduction of munitions.	Low capital investment, low long-term monitoring costs.
Full Removal of Fill (Self-Implementing) to Unrestricted Use SCOs	Yes	Effective for meeting the site RAOs.	Difficult and time consuming to implement; full volume of fill will need to be screened for munitions with soil sieving to be conducted during all excavation activities; would require excavation support by a UXO technicians due to presence of munitions; would require longer excavation times.	Effective for reduction of toxicity, mobility, and volume of contaminated fill. Munitions would be removed to the extent practicable, using current technologies; however risk associated with munitions would remain, long term monitoring would be required, and the site would not be open to unrestricted use.	High capital investment. Will require long-range transport of munitions debris, depending on items found and landfill capacity/location. Higher cost than typical removal of same volume due to required sieving, UXO technician/construction support, and landfill costs.
Partial Removal of Fill (Self-Implementing) - Remove all soil >100 ppm PCBs from commercial parcels, all soil >10 ppm PCBs for residential parcel; full 40 CFR Part 761 cap	Yes	Effective for meeting the site RAOs.	Moderately difficult to implement; PCB characterization would be required to delineate all PCB contamination onsite; excavation volume of fill will need to be screened for munitions with soil sieving to be conducted during all excavation activities; would require excavation support by a UXO technician due to presence of munitions; would require longer excavation times.	Effective for reduction of toxicity and mobility of contaminants; volume of contaminated fill would be slightly reduced. Limited reduction of munitions.	High capital investment; moderate long-term monitoring and operation and maintenance costs. Will require long-range transport of munitions debris, depending on items found and landfill capacity/location. Higher cost than typical removal of same volume due to required sieving, UXO technician/construction support, and landfill costs.
Partial Removal of Fill (Self-Implementing) - Remove all soil >100 ppm PCBs from commercial parcels, all soil >10 ppm PCBs for residential parcel; full 6 NYCRR Part 375 cover system	Yes	Effective for meeting the site RAOs.	Moderately difficult to implement; PCB characterization would be required to delineate all PCB contamination onsite; excavation volume of fill will need to be screened for munitions with soil sieving to be conducted during all excavation activities; would require excavation support by a UXO technician due to presence of munitions; would require longer excavation times.	Effective for reduction of toxicity and mobility of contaminants; volume of contaminated fill would be slightly reduced. Limited reduction of munitions.	High capital investment; moderate long-term monitoring and operation and maintenance costs. Will require long-range transport of munitions debris, depending on items found and landfill capacity/location. Higher cost than typical removal of same volume due to required sieving, UXO technician/construction support, and landfill costs.
40 CFR Part 761 Cap (Risk-Based)	Yes	Effective for meeting the site RAOs.	Moderately difficult to implement; requires periodic maintenance and monitoring; would require minor site grading changes to promote stormwater runoff; effective for long-term source control and protection of public health.	Effective for reducing mobility of contaminants; no reduction of volume of contaminants or munitions.	Moderate capital investment; moderate long-tern maintenance and monitoring costs.
6 NYCRR Part 375 cover system (Risk-Based)	Yes	Effective for meeting the site RAOs.	Moderately difficult to implement; requires periodic maintenance and monitoring; would require minor site grading changes to promote stormwater runoff; effective for long-term source control and protection of public health.	Effective for reducing mobility of contaminants; no reduction of volume of contaminants or munitions.	Moderate capital investment; moderate long-tern maintenance and monitoring costs.

Notes:
CFR = Code of Federal Regulations
COC = Contaminant of concern
DER = Division of Environmental Remediation
EPA = U.S. Environmental Protection Agency
NA = Not applicable
NYCRR = New York Code of Rules and Regulations
PAH = Polycyclic aromatic hydrocarbons
PCB = Polychlorinated biphenyl
ppm = Part(s) per million
RAO = Remedial action objective
SCO = Soil Cleanup Objective
SVOC = Semivolatile organic compound
UXO = Unexploded ordnance
VOC = Volatile organic compound

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Table 6-1. Alternatives Screening

Surface and Subsurface Soil							
	Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4**	**Alternative 5**	**Alternative 6**	**Alternative 7**
	No Further Action	**No Further Action with Site Management (Risk-Based)**	**Full Removal of Fill to Unrestricted Use SCOs (Self-Implementing)**	**Partial Removal of Fill with 40 CFR Part 761 Cap - Remove all soil exceeding 100 ppm PCBs from commercial parcels, all soil exceeding 10 ppm PCBs for residential parcel; Full Cap (Self-Implementing)**	**Partial Removal of Fill with 6 NYCRR Part 375 Soil Cover - Remove all soil exceeding 100 ppm PCBs from commercial parcels, all soil exceeding 10 ppm PCBs for residential parcel; Full Soil Cover (Self-Implementing)**	**No Removal with 40 CFR Part 761 Cap (Risk-Based)**	**No Removal with 6 NYCRR Part 375 Soil Cover (Risk-Based)**
Size and Configuration of Process Options	NA	NA	Approximately 68,700 CY of contaminated soil covering 3.4 acres and a depth range of 3-26 ft would be removed from the Site by excavation in 1-2 ft lifts. Instrument-assisted munitions clearance methods would be used with support from a UXO technician. Soil would be sifted for munitions prior to disposal. The 109,600 tons of removed soil would be disposed of at the appropriate permitted waste landfills, including RCRA (lead) and TSCA. Clean fill would be used to backfill to surrounding elevations. Final restoration would consist of topsoil and seed.	Approximately 7,100 CY of contaminated soil covering 0.5 acres and a depth range of 0-12 ft would be removed from the site by excavation in 1-2 ft lifts. Instrument-assisted munitions clearance methods would be used with support from a UXO technician. Soil would be sifted for munitions prior to disposal. The 11,360 tons of removed soil would be disposed of at a permitted waste landfill. Clean fill would be used to backfill, as needed. The remaining contaminated soil would be covered with a 40 CFR Part 761 cap across the full 3.4-acre site. The cap would consist of a 10-in. clay layer, consistent with 40 CFR Section 761.61. Final restoration would consist of 6-in. of topsoil and seed.	Approximately 7,100 CY of contaminated soil covering 0.5 acres and a depth range of 0-12 ft would be removed from the site by excavation in 1-2 ft lifts. Instrument-assisted munitions clearance methods would be used with support from a UXO technician. Soil would be sifted for munitions prior to disposal. The 11,360 tons of removed soil would be disposed of at a permitted waste landfill. Clean fill would be used to backfill, as needed. The remaining contaminated soil would be covered with a 6 NYCRR Part 375 soil cover across the full 3.4-acre site. The cover would consist of a total 12-in. soil layer. The soil cover would include 6-in. of topsoil and seed for final restoration.	Contaminated soil would be covered with a 40 CFR Part 761 cap across the full 3.4-acre site. The cap would consist of a 10-in. clay layer, consistent with 40 CFR Section 761.61. Final restoration would consist of 6-in. of topsoil and seed.	Contaminated soil would be covered with a 6 NYCRR Part 375 soil cover across the full 3.4-acre site. The cover would consist of a total 12-in. soil layer. The soil cover would include 6-in. of topsoil and seed for final restoration.
Time for Remediation	NA	1 Month	33 Months	8 Months	8 Months	6 Months	6 Months
Spatial Requirements	NA	The Gibson Scrapyard Site is 3.4 acres in size. There is sufficient space to install the land-use controls.	The Gibson Scrapyard Site is 3.4 acres in size. The entire site is to be remediated. There is sufficient space to execute a remedial action.	The Gibson Scrapyard Site is 3.4 acres in size. Of which 0.5 acres represents the area to be excavate, and 3.4 acres represents the area to be capped. There is sufficient space to execute a remedial action.	The Gibson Scrapyard Site is 3.4 acres in size. Of which 0.5 acres represents the area to be remediated, and 3.4 acres represents the area to be soil-covered. . There is sufficient space to execute a remedial action.	The Gibson Scrapyard Site is 3.4 acres in size. The entire Site is to be capped. There is sufficient space to execute a remedial action.	The Gibson Scrapyard Site is 3.4 acres in size. The entire Site is to be soil-covered. There is sufficient space to execute a remedial action.
Options for Disposal	NA	NA	Off-site disposal through approved hazardous waste and general waste facilities. Consideration for treatment and reuse of soils would be handled by the facility.	Off-site disposal through approved hazardous waste and general waste facilities. Consideration for treatment and reuse of soils would be handled by the facility.	Off-site disposal through approved hazardous waste and general waste facilities. Consideration for treatment and reuse of soils would be handled by the facility.	NA	NA
Substantive Technical Permit Requirements	NA	NA	NA	NA	NA	NA	NA
Limitations or Other Factors Necessary to Evaluate Alternatives	NA	NA	Disposal facilities will require TCLP analysis for waste characterization prior to acceptance. A PDI consisting of PCB characterization would need to be conducted to refine excavation and disposal volumes.	Disposal facilities will require TCLP analysis for waste characterization prior to acceptance. A PDI consisting of PCB characterization would need to be conducted to refine excavation and disposal volumes.	Disposal facilities will require TCLP analysis for waste characterization prior to acceptance. A PDI consisting of PCB characterization would need to be conducted to refine excavation and disposal volumes.	Disposal facilities will require TCLP analysis for waste characterization prior to acceptance.	Disposal facilities will require TCLP analysis for waste characterization prior to acceptance.
Public Impacts	Will not reduce exposure to contaminants.	Will not reduce exposure to contaminants.	Noise, dust, and traffic may disturb local residents.	Noise, dust, and traffic may disturb local residents.	Noise, dust, and traffic may disturb local residents.	Noise, dust, and traffic may disturb local residents.	Noise, dust, and traffic may disturb local residents.
Beneficial and/or Adverse Impacts on Fish and Wildlife Resources	Because soil would be left untreated, the potential for surface contact could impact wildlife resources.	Because soil would be left untreated, the potential for surface contact could impact wildlife resources.	Only on-site soil was determined to be the medium of concern because of contaminant concentration and exposure pathways. Potential for surface contact would be removed.	Only on-site soil was determined to be the medium of concern because of contaminant concentration and exposure pathways. Potential for surface contact would be removed.	Only on-site soil was determined to be the medium of concern because of contaminant concentration and exposure pathways. Potential for surface contact would be removed.	Only on-site soil was determined to be the medium of concern because of contaminant concentration and exposure pathways. Potential for surface contact would be removed.	Only on-site soil was determined to be the medium of concern because of contaminant concentration and exposure pathways. Potential for surface contact would be removed.
Net Present Worth	**$0.00**	**$457,786.00**	**$10,749,178.00**	**$3,710,868.00**	**$3,524,771.00**	**$1,087,845.00**	**$901,749.00**

Notes:
CFR = Code of Federal Regulations
CY = Cubic yard(s)
DER-10 = New York State Department of Conservation Division of Environmental Remediation Technical Guidance for Site Investigation and Remediation, dated 2010
ft = Foot (feet)
in = inch(es)
NA = Not applicable
NYCRR = New York Codes, Rules and Regulations
PCB = Polychlorinated biphenyl
ppm = Part(s) per million
SCO = Soil cleanup objective
TBD = To be determined
TCLP = Toxicity Characteristic Leaching Procedure

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Table 7-1. Alternative Cost Summary

Alternative	Description	Capital Cost	Construction Time (months)	Annual Site Management Costs Years 1-5 Years 6-30	Five Year Review Costs (Years 5, 10, 15, 20, 25 and 30)	Net Present Worth (Capital + LTM)
1	No Further Action	$ -	0	$ -	$ -	$ -
2	No Further Action with Site Management (Risk-Based)	$ 156,916	1	$ 10,043.00	$ 14,216.00	$ 457,786
3	Full Removal of Fill to Unrestricted Use SCOs (Self-Implementing)	$ 10,682,793	33	$ -	$ 14,216.00	$ 10,749,178
4	Partial Removal of Fill with 40 CFR Part 761 Cap; remove all soil exceeding 100 ppm PCBs from commercial parcels, all soil exceeding 10 ppm PCBs for residential parcel; Full Cap (Self-Implementing)	$ 3,409,998	8	$ 10,043.00	$ 14,216.00	$ 3,710,868
5	Partial Removal of Fill with 6 NYCRR Part 375 Soil Cover; remove all soil exceeding 100 ppm PCBs from commercial parcels, all soil exceeding 10 ppm PCBs for residential parcel; Full Soil Cover (Self-Implementing)	$ 3,223,901	8	$ 10,043.00	$ 14,216.00	$ 3,524,771
6	No Removal with 40 CFR Part 761 Cap (Risk-Based)	$ 786,975	6	$ 10,043.00	$ 14,216.00	$ 1,087,845
7	No Removal with 6 NYCRR Part 375 Soil Cover (Risk-Based)	$ 600,879	6	$ 10,043.00	$ 14,216.00	$ 901,749

Notes:
CFR = Code of Federal Regulations
LTM = Long-term management
NYCRR = New York Codes, Rules and Regulations
PCB = Polychlorinated biphenyl
ppm = Part(s) per million
SCO = Soil cleanup objective

Table 7-2. Climate Change Vulnerability Site Risk Factors: Precipitation

Baseline Total Annual Precipitation	Projected Change in Total Annual Precipitation (High Emissions Scenario, 2090s, inches)	Projected Total Annual Precipitation (High Emissions Scenario, 2090s, inches)	Baseline Number of Days with Precipitation >1 inch	Projected Change in Number of Days with Precipitation >1 inch (High Emissions Scenario, 2090s)	Projected Total Number of Days with Precipitation >1 inch (High Emissions Scenario, 2090s)
35.83	+3.85	39.68	2.6	+1.3	3.9

References:

New York Climate Change Mapping Tool. 2022. New York Climate Change Mapping Tool. Accessed 19 May. https://www.nyclimatescience.org/map

Table 7-3. Climate Change Vulnerability Site Risk Factors: Drought and Wind

Site Subject to Seasonal or Multi-Year Drought?	Design Wind Speed	On-site Structures Susceptible to High Winds? (e.g., cranes, structures on buildings, stacks)	Large Trees (>4 inches diameter) on Site?
Seasonal	200 mph (Zone III)	No	Yes – in small stands

References:

Federal Emergency Management Agency Federal Insurance and Mitigation Administration. 2021. *The 2021 International Building Code: A Compilation of Wind Resistant Provisions*. https://www.fema.gov/sites/default/files/documents/fema_international-building-code_10152021.pdf

Table 7-4. Climate Change Vulnerability Site Risk Factors: Temperature - Summer

Baseline Annual Number of Days above 90°F	Projected Change in Annual Number of Days above 90°F (High Emissions Scenario, 2090s)	Projected Total Annual Number of Days above 90°F (High Emissions Scenario, 2090s)	Baseline Maximum Summer Temperature, °F	Projected Change in Maximum Summer Temperature (°F High Emissions Scenario, 2090s)	Projected Maximum Summer Temperature (°F, High Emissions Scenario, 2090s)
2.1	+52.4	54.5	77.4	+11.9	89.3

References:

New York Climate Change Mapping Tool. 2022. New York Climate Change Mapping Tool. Accessed 19 May. https://www.nyclimatescience.org/map

Table 7-5. Climate Change Vulnerability Site Risk Factors: Temperature - Winter

Baseline Annual Number of Days below 32°F	Projected Change in Annual Number of Days Below 32°F (High Emissions Scenario, 2090s)	Projected Total Annual Number of Days Below 32°F (High Emissions Scenario, 2090s)	Baseline Maximum Winter Temperature, °F	Projected Change in Maximum Winter Temperature (°F, High Emissions Scenario, 2090s)	Projected Maximum Winter Temperature (°F, High Emissions Scenario, 2090s)	Baseline Minimum Winter Temperature, °F	Projected Change in Minimum Winter Temperature (°F, High Emissions Scenario, 2090s)	Projected Minimum Winter Temperature (°F, High Emissions Scenario, 2090s)
170.6	-64.9	105.7	32.9	+9.5	42.4	14.6	+12.2	26.8

References:

New York Climate Change Mapping Tool. 2022. New York Climate Change Mapping Tool. Accessed 19 May. https://www.nyclimatescience.org/map

Table 7-6. Climate Change Vulnerability Site Risk Factors: Flooding

Site Located in Mapped Floodplain/Flood Hazard Area?	Site in Susceptible Location and Protected by Levees, Floodwalls, Heavily Channelized Stream/Canal, or Pumping?	Site Adjacent to Navigable Waterways?	Shallow Groundwater at Site?	Site Subsurface Geology composed of Limestone or Similar?
No, but Site is located in a River Corridor and/or in Proximity to a Mapped Flood Zone	Yes – Site is protected from Chemung River floods by railroad and highway embankments	No	No	No

References:
FEMA'S National Flood Hazard Layer (NHFL) Viewer. 2022. FEMA's National Flood Hazard Layer (NHFL) Viewer. Accessed 7 July. https://hazardsfema.maps.arcgis.com/apps/webappviewer/index.html?id=8b0adb51996444d4879338b5529aa9cd

Table 7-7. Climate Change Vulnerability Site Risk Factors: Previous Site Impacts, Sea Level Rise, and Erosion

Previous Documented Site Impacts	Coastal Location?	Sea Level Rise Elevation at Which Flooding is Expected to Occur	Steep Grades on Site?
None	No	Not applicable.	No

References:

Climate Central. 2021. Coastal Risk Screening Tool. Accessed 28 February 2022. https://coastal.climatecentral.org/

Table 7-8. Remedy Vulnerability Assessment

Long-Term Remedy Component	Description of Remedy Component Concerns due to Climate Change	Climate Change Risk Factors					
		Temperature	Precipitation/Flooding	Drought	Wind	Storm Surge/Sea Level Rise	Wildfires
		Average annual temp for Steuben County: projected to increase10.6 deg above baseline by 2090 (High Emissions Scenario) Air Freezing Index for Ithaca ranges 1376-2317 deg F days, depending on return period based on data from 1951-1980.	Site immediately adjacent to Narrows Creek (100-year floodplain unmapped). Site likely located in current or future 100-year flood zone.	Region has no history of multi-year drought.	Located in an area subject to a design wind speed of 200 mph or more.	Inland location (located outside of any 500-year coastal floodplain)	Area with or adjacent to high fuel density (including mature forests, scrubland, or grasslands) and increasing tendency for seasonal drought
Alternative 1: No Further Action	Preventing exposure to contaminants from precipitation and runoff, flooding, rising groundwater, or other site disturbance. Increased temperatures may change wildlife behavior and therefore risk of exposure.	Climate Exposure: Medium; Remedy Sensitivity: Medium	Climate Exposure: High; Remedy Sensitivity: High	Climate Exposure: Low; Remedy Sensitivity: Low	Climate Exposure: High; Remedy Sensitivity: Medium	Climate Exposure: Low; Remedy Sensitivity: Low	Climate Exposure: Medium; Remedy Sensitivity: Medium
Alternative 2: No Further Action with Site Management (Risk-Based)	Preventing exposure to contaminants from precipitation and runoff, flooding, rising groundwater, or other site disturbance. Site management activities such as mowing may limit risk due to wind and wildfire.	Climate Exposure: Medium; Remedy Sensitivity: Medium	Climate Exposure: High; Remedy Sensitivity: High	Climate Exposure: Low; Remedy Sensitivity: Low	Climate Exposure: Very High; Remedy Sensitivity: Medium	Climate Exposure: Low; Remedy Sensitivity: Low	Climate Exposure: Medium-High; Remedy Sensitivity: Medium
Alternative 3: Full Removal of Fill to Unrestricted Use of SCOs (Self-Implementing)	No concerns, as contaminants would not be present on site.	Climate Exposure: Medium-Low; Remedy Sensitivity: Low	Climate Exposure: Very High; Remedy Sensitivity: Low	Climate Exposure: Low; Remedy Sensitivity: Medium	Climate Exposure: Very High; Remedy Sensitivity: Low	Climate Exposure: Medium-Low; Remedy Sensitivity: Low	Climate Exposure: Medium-Low; Remedy Sensitivity: Low
Alternatives 4 and 5: Partial Removal of Fill with Full Cap or Full Soil Cover	Maintaining landfill cover vegetation/increase subsidence of cover. Increased Freeze/thaw cycles can increase soil fracturing and increase infiltration.	Climate Exposure: Medium-Low; Remedy Sensitivity: Medium	Climate Exposure: High; Remedy Sensitivity: Medium	Climate Exposure: Medium; Remedy Sensitivity: Low	Climate Exposure: Medium-High; Remedy Sensitivity: Medium	Climate Exposure: Medium-Low; Remedy Sensitivity: Low	Climate Exposure: Medium-High; Remedy Sensitivity: Medium
Alternatives 6 and 7: No Fill Removal and Installation of Full Cap or Full Soil Cover	Maintaining landfill cover vegetation/increase subsidence of cover. Increased Freeze/thaw cycles can increase soil fracturing and increase infiltration.	Climate Exposure: Medium; Remedy Sensitivity: Medium	Climate Exposure: High; Remedy Sensitivity: High	Climate Exposure: Low; Remedy Sensitivity: Low	Climate Exposure: High; Remedy Sensitivity: Medium	Climate Exposure: Low; Remedy Sensitivity: Low	Climate Exposure: Medium; Remedy Sensitivity: Medium

Notes:
Long-Term Remedy Component = Remedy component that requires long-term maintenance/inspections. Assessment assumes that remedy will be operated more than 10 years.
Factors in Remedy Sensitivity are provided in Table 7-9.

Table 7-9. Remedy Vulnerabilities and Recommendations

Long-Term Remedy Component	Description of Remedy Component Concerns due to Climate Change	Climate Change Risk Factors					
		Temperature	Precipitation/Flooding	Drought	Wind	Storm Surge/Sea Level Rise	Wildfires
Alternative 1: No Further Action	Risk to Proposed Remedy	Frost heave may move contaminants toward the surface of the soil, increasing exposure risk. Increased summer temperatures may increase burrowing activity by animals seeking refuge from extreme heat.	Extreme precipitation and flooding of the site could mobilize contaminants by exposing the fill to scour or dissolving contaminants in floodwaters and/or high groundwater.	Drought may kill or weaken vegetation on site, exposing the fill to greater risk of erosion and mobilization by wind or future precipitation.	High winds may topple large trees that grow on an unmaintained site, disturbing a large amount of fill and exposing contaminated soils that would otherwise be located below the ground surface.	See Precipitation/ Flooding	May result in the death of vegetation on site, expose soils to disturbance, and potentially mobilize or chemically alter contaminants due to extreme heat.
	Recommendations:	No recommendations available, as no site alteration or management activities are proposed.					
Alternative 2: No Further Action with Site Management (Risk-Based)	Risk to Proposed Remedy	See Alternative 1 Risks	See Alternative 1 Risks	See Alternative 1 Risks. Management activities may limit remedy vulnerability.	See Alternative 1 Risks. Management activities may limit remedy vulnerability.	See Precipitation/ Flooding	See Alternative 1 Risks. Management activities may limit remedy vulnerability.
	Recommendations:	None	Maintain vegetation on the site to reduce erosion risk. Install a permanent access bridge across Narrows Creek with a span of 1.25x bankfull width to reduce risk of bridge failure or bank scour.	Seeding the site periodically or as needed with drought-resistant herbaceous vegetation may help the site recover from drought events.	Mow the site to limit the growth of woody vegetation and reduce the risk of trees being uprooted by high winds.	None	Mow the site to limit the growth of woody vegetation and reduce remedy vulnerability to wildfire.
Alternative 3: Full Removal of Fill to Unrestricted Use of SCOs (Self-Implementing)	Risk to Proposed Remedy	None. Full removal of contaminated fill will eliminate concerns about exposure to contamination.					
	Recommendations:	None needed due to full removal of contaminated fill.					
Alternatives 4 and 5: Partial Removal of Fill with Full Cap or Full Soil Cover	Risk to Proposed Remedy	Freeze-thaw cycles may increase soil fracturing and allow infiltration. Increased summer temperatures may increase burrowing activity by animals seeking refuge from extreme heat; burrows may allow infiltration.	Extreme precipitation and flooding of the site could mobilize contaminants by eroding the cap or dissolving contaminants in floodwaters and/or high groundwater. Erosion of the nearby streambanks could also lead to scour of the channel banks severe enough to allow scour of the cap and fill from the east side.	Drought may kill or weaken vegetation on site, exposing the cap/cover to greater risk of erosion and failure.	High winds may topple large trees that grow on an unmaintained site, creating large cavities in the cap/cover and exposing the fill beneath.	See Precipitation/ Flooding	May result in the death of vegetation on site and damage to cap integrity.
	Recommendations:	Incorporate measures to limit burrowing activity or its impacts on the cap/cover.	See Alternative 2 Recommendations. Conduct a hydraulic and hydrologic study to determine areas of the site at highest risk of flooding. Prioritize areas likely to be inundated for fill removal. Perform a scour analysis to determine the potential for streambank scour and install nature-based scour protection along the streambank. Consider floodplain reconnection along Narrows Creek or installation of a berm on site if needed to reduce flood risk to site. Minimize the slope of the cap's surface to reduce potential for erosion.	See Alternative 2 Recommendations	See Alternative 2 Recommendations	None	See Alternative 2 Recommendations
Alternatives 6 and 7: No Fill Removal and Installation of Full Cap or Full Soil Cover	Risk to Proposed Remedy	See Alternatives 4 and 5 Risks.	See Alternatives 4 and 5 Risks.	See Alternatives 4 and 5 Risks.	See Alternatives 4 and 5 Risks.	See Precipitation/ Flooding	See Alternatives 4 and 5 Risks.
	Recommendations:	See Alternatives 4 and 5 Recommendations	See Alternatives 4 and 5 Recommendations.	See Alternative 2 Recommendations	See Alternative 2 Recommendations	None	See Alternative 2 Recommendations

Notes:
Long-Term Remedy Component = Remedy component that requires long-term maintenance/inspections. Assessment assumes that remedy will be operated more than 10 years.

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Table 8-1. Alternative Evaluation Summary

	Surface and Subsurface Soil						
	Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4**	**Alternative 5**	**Alternative 6**	**Alternative 7**
	No Further Action	**No Further Action with Site Management (Risk-Based)**	**Full Removal of Fill to Unrestricted Use SCOs (Self-Implementing)**	**Partial Removal of Fill with Full 40 CFR Part 761 Cap - Remove all soil exceeding 100 ppm PCBs from commercial parcels, all soil exceeding 10 ppm PCBs for residential parcel (Self-Implementing)**	**Partial Removal of Fill with Full 6 NYCRR Part 375 Soil Cover - Remove all soil exceeding 100 ppm PCBs from commercial parcels, all soil exceeding 10 ppm PCBs for residential parcel (Self-Implementing)**	**No Removal with Full 40 CFR Part 761 Cap (Risk-Based)**	**No Removal with Full 6 NYCRR Part 375 Soil Cover (Risk-Based)**
(1) Overall Protection of the Public Health and the Environment							
	There is no reduction of risk with this alternative. The exposure pathways would continue to pose unacceptable risk to all receptors.	Offers some protection to public health with institutional controls but will not physically remove risk of exposure.	Reduces potential for human and ecological contact and migration of contaminants through complete removal of soil exceeding UU SCOs.	Reduces potential for human and ecological contact and migration of contaminants through the removal of the most contaminated soil. The potential for an exposure pathway via surface contact is reduced with placement of a cap over the remaining contaminated soil.	Reduces potential for human and ecological contact and migration of contaminants through the removal of the most contaminated soil. The potential for an exposure pathway via surface contact is eliminated with a soil cover above the remaining contaminated soil.	The potential for an exposure pathway via surface contact is eliminated with a cap above the contaminated soil.	The potential for an exposure pathway via surface contact is eliminated with a soil cover above the contaminated soil.
(2) Standards, Criteria and Guidance							
	Does not meet SCG criterion.	Does not meet SCG criterion.	Will meet UU SCOs for soil.	This criterion is fulfilled through removal of the most contaminated soil and containing the remaining contaminated soil under a cap.	This criterion is fulfilled through removal of the most contaminated soil and containing the remaining contaminated soil under a soil cover.	This criterion is fulfilled by closing off the exposure pathway via cap and preventing human and ecological contact to contaminated material.	This criterion is fulfilled by closing off the exposure pathway via soil cover and preventing human and ecological contact to contaminated material.
(3) Long-Term Effectiveness and Permanence							
	This alternative will not provide long-term effectiveness or permanence. This alternative offers no controls.	This alternative will not provide long-term effectiveness or permanence. Institutional controls and long-term site management are required.	This criterion is fulfilled because contaminants at concentrations exceeding respective SCGs would be permanently removed from the site.	Will effectively reduce exposure and prevent transport. Effectiveness would be ensured via long-term monitoring of cap conditions. Institutional controls and long-term site management are required.	Will effectively reduce exposure and prevent transport. Effectiveness would be ensured via long-term monitoring of soil cover conditions. Institutional controls and long-term site management are required.	Will effectively reduce exposure and prevent transport. Effectiveness would be ensured via long-term monitoring of cap conditions. Institutional controls and long-term site management are required.	Will effectively reduce exposure and prevent transport. Effectiveness would be ensured via long-term monitoring of soil cover conditions. Institutional controls and long-term site management are required.
(4) Reduction of Toxicity, Mobility, or Volume of Contamination							
Amount of Hazardous Materials Destroyed, Treated, or Removed	None	None	Hazardous materials would be removed and disposed of at a permitted facility.	Limited hazardous materials would be removed and disposed of at a permitted facility. Hazardous material will be capped to reduce or eliminate the risk of toxic mobility.	Limited hazardous materials would be removed and disposed of at a permitted facility. Hazardous material will be soil-covered to reduce or eliminate the risk of toxic mobility.	Hazardous material will be capped to reduce or eliminate the risk of toxic mobility.	Hazardous material will be soil-covered to reduce or eliminate the risk of toxic mobility.
Degree of Expected Reductions in Toxicity, Mobility, or Volume	None	None	Will reduce the toxicity, volume and mobility of contamination via soil removal and disposal in permitted facilities that take measures to reduce or eliminate the risk of toxin mobility.	Will reduce the toxicity and volume of contamination via removal of soil exceeding 10 ppm PCBs in residential parcels and 100 ppm PCBs in commercial parcels and disposal in a permitted facilities that take measures to reduce or eliminate the risk of toxin mobility. Will reduce the mobility of remaining contamination onsite via capping.	Will reduce the toxicity and volume of contamination via removal of soil exceeding 10 ppm PCBs in residential parcels and 100 ppm PCBs in commercial parcels and disposal in a permitted facilities that take measures to reduce or eliminate the risk of toxin mobility. Will reduce the mobility of remaining contamination onsite through use of a soil cover.	Contaminated soil will be capped to reduce or eliminate the risk of toxic mobility.	Contaminated soil will be contained with a soil cover to reduce or eliminate the risk of toxic mobility.
Irreversible Treatment?	NA	NA	Yes	Yes	Yes	Yes	Yes
Residuals Remaining After Treatment	Yes	Yes	No soil above UU SCOs.	No soil exceeding 100 ppm PCBs in commercial parcels and 10 ppm PCBs in residential parcels. Undisturbed MEC may also remain on-site after remediation.	No soil exceeding 100 ppm PCBs in commercial parcels and 10 ppm PCBs in residential parcels. Undisturbed MEC may also remain on-site after remediation.	Contaminated soil up to known maximum values of 218 ppm PCBs, 149 ppm Arsenic, 2,250 ppm Barium, 21,000 ppm Copper, 77,900 ppm Lead, 3,530 ppm Manganese, 476 ppm Mercury, 7,560 ppm Nickel, 284 ppm Silver, and 9,700 ppm Zinc. Undisturbed MEC may also remain on-site after remediation.	Contaminated soil up to known maximum values of 218 ppm PCBs, 149 ppm Arsenic, 2,250 ppm Barium, 21,000 ppm Copper, 77,900 ppm Lead, 3,530 ppm Manganese, 476 ppm Mercury, 7,560 ppm Nickel, 284 ppm Silver, and 9,700 ppm Zinc. Undisturbed MEC may also remain on-site after remediation.
(5) Short-Term Impact and Effectiveness							
Community Protection	There is no action; and therefore, no additional risk to the community.	The installation of institutional controls may produce dust.	Increased short-term risks to the public during excavation activities and transport of equipment and materials to and from site. Dust/residuals will be produced during on-site activities. These can be mitigated through standard construction practices. This alternative poses the greatest short-term impact since it would require transportation of the largest amount of soil (remove and backfill).	Increased short-term risks to the public during excavation activities and transport of equipment and materials to and from site. Dust/residuals will be produced during on-site activities. These can be mitigated through standard construction practices.		Increased short-term risks to the public during transport of equipment and materials to and from site. Dust/residuals will be produced during on-site activities. These can be mitigated through standard construction practices.	
Worker Protection	There is no action; and therefore, no workers will be present on site.	Workers can potentially be exposed to contaminated media during excavation. . Risks can be minimized by implementing health and safety controls and appropriate monitoring.	Workers can potentially be exposed to contaminated media and MEC during excavation and soil sieving activities. Work around heavy equipment carries potential risk to workers. Risks can be minimized by implementing health and safety controls and appropriate monitoring. This alternative poses the greatest short-term impact to workers.	Workers can potentially be exposed to contaminated media and MEC during excavation. Work around heavy equipment carries potential risk to workers. Risks can be minimized by implementing health and safety controls and appropriate monitoring.		Work around heavy equipment carries potential risk to workers. Risks can be minimized by implementing health and safety controls and appropriate monitoring.	
Environmental Impacts	There are no short-term impacts associated with this alternative.	Wastes produced will include contaminated PPE.	Wastes produced will include a large volume of soil and contaminated PPE. Wastes will be managed in compliance with ARARs. Limited short-term environmental impacts associated with implementation and air emissions. Greatest short-term impacts on green remediation goals due to material transport.	Wastes produced will include a moderate volume of soil and contaminated PPE. Wastes will be managed in compliance with ARARs. Limited short term environmental impacts associated with implementation and air emissions.		Wastes produced will include contaminated PPE. Wastes will be managed in compliance with ARARs. Limited short term environmental impacts associated with implementation and air emissions.	

Table 8-1. Alternative Evaluation Summary

	Surface and Subsurface Soil						
	Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4**	**Alternative 5**	**Alternative 6**	**Alternative 7**
	No Further Action	**No Further Action with Site Management (Risk-Based)**	**Full Removal of Fill to Unrestricted Use SCOs (Self-Implementing)**	**Partial Removal of Fill with Full 40 CFR Part 761 Cap - Remove all soil exceeding 100 ppm PCBs from commercial parcels, all soil exceeding 10 ppm PCBs for residential parcel (Self-Implementing)**	**Partial Removal of Fill with Full 6 NYCRR Part 375 Soil Cover - Remove all soil exceeding 100 ppm PCBs from commercial parcels, all soil exceeding 10 ppm PCBs for residential parcel (Self-Implementing)**	**No Removal with Full 40 CFR Part 761 Cap (Risk-Based)**	**No Removal with Full 6 NYCRR Part 375 Soil Cover (Risk-Based)**
(6) Implementability							
Ability to Construct and Operate	NA	Institutional controls can be implemented and have been used nationally. Potential MEC may	Excavation and disposal alternatives can be implemented and have been used nationally. Potential MEC may present challenges.	Excavation and disposal technologies can be implemented and have been used nationally. Caps and soil covers have been implemented and used nationally. Able to be implemented with appropriate equipment. Potential MEC may present challenges.		Caps and soil covers have been implemented and used nationally.	
Monitoring Requirements	NA	Perimeter monitoring recommended. A UXO technician will be present during on-site activities.	Confirmation samples will be collected and analyzed to confirm removal of contamination. Perimeter air monitoring and initial characterization recommended. A UXO technician will be present during on-site activities.	Confirmation samples will be collected and analyzed to confirm removal of contamination. Perimeter air monitoring and initial characterization recommended. Cap must be inspected periodically. A UXO technician will be present during on-site activities.	Confirmation samples will be collected and analyzed to confirm removal of contamination. Perimeter air monitoring and initial characterization recommended. Cap must be inspected periodically. A UXO technician will be present during on-site activities.	Perimeter air monitoring and initial characterization recommended. Cap must be inspected periodically. A UXO technician will be present during on-site activities.	Perimeter air monitoring and initial characterization recommended. Cap must be inspected periodically. A UXO technician will be present during on-site activities.
Availability of	NA	Equipment and specialists are available for the implementation of all of these technologies.					
Ability to Obtain Approvals and	NA	Ability to obtain approvals and coordinate with other agencies assumed to be possible.					
(7) Cost Effectiveness							
Cost	**$0.00**	**$457,786.00**	**$10,749,178.00**	**$3,710,868.00**	**$3,524,771.00**	**$1,087,845.00**	**$901,749.00**
(8) Land Use							
	NA	Restricted	Unrestricted for contamination; Land Use Controls remain in place for munitions	Restricted	Restricted	Restricted	Restricted
(9) Community Acceptance							
	TBD	TBD	TBD	TBD	TBD	TBD	TBD

Notes:
ARARs = Applicable or Relevant and Appropriate Requirements
CFR = Code of Federal Regulations
MEC = Munitions and explosives of concern
NA = Not applicable
NYCRR = New York Codes, Rules and Regulations
PCB = Polychlorinated biphenyl
PPE = Personal protective equipment
ppm = Part(s) per million
SCG = Standards, Criteria and Guidance
SCO = Soil cleanup Objective
TBD = To be determined
UU = Unrestricted use
UXO = Unexploded ordnance

Figures

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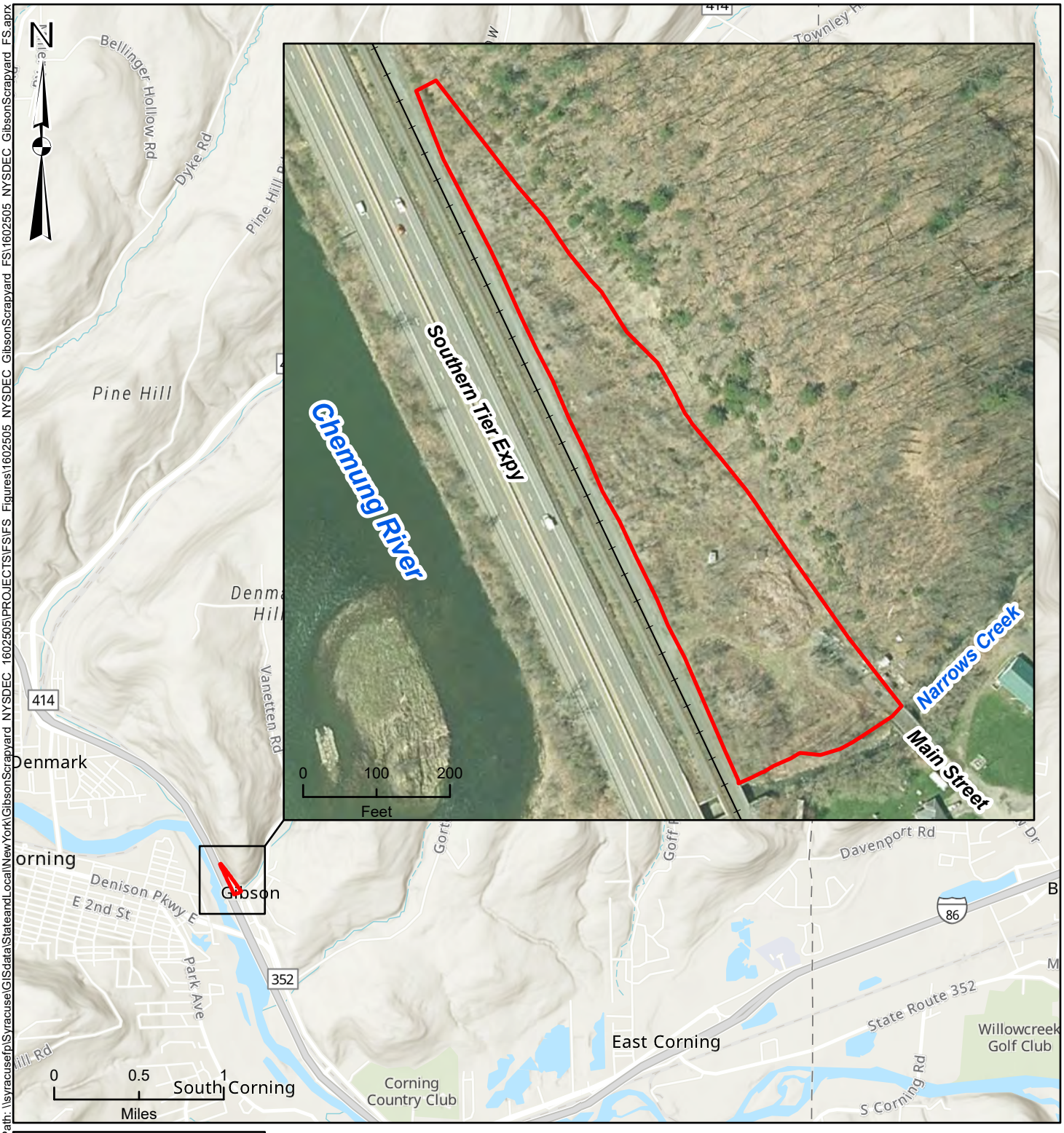

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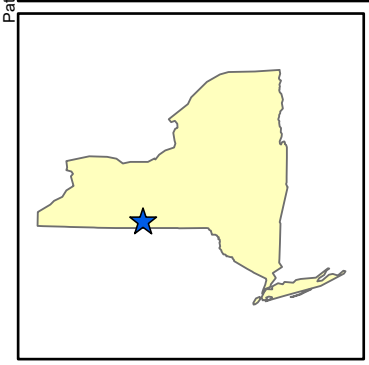

Legend

- Site Boundary
- Norfolk Southern Railroad
- Site Location

Figure 1-1
Site Location
Gibson Scrapyard (851058)
Gibson, New York

Notes:

Data Source: NYS GPO 2022, Imagery: ESRI 2018

NEW YORK STATE | Department of Environmental Conservation

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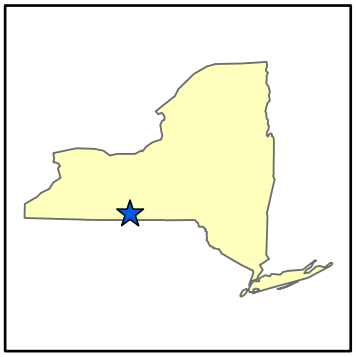


Legend

- Site Boundary
- Construction Waste/Fill Mounds
- Test Pit
- Site Location
- Concrete Foundation
- Norfolk Southern Railroad
- Former Underground Storage Tank

Figure 1-2
Site Features
Gibson Scrapyard (851058)
Gibson, New York

Notes:

Data Source: Imagery: ESRI 2018

NEW YORK STATE Department of Environmental Conservation

NOTES:

1. HORIZONTAL COORDINATES REFERENCED TO THE NEW YORK STATE PLANE COORDINATE SYSTEM (NYSNET), CENTRAL ZONE (3102) BASED ON NAD 83 (2011).

2. VERTICAL DATUM BASED ON NAVD 88 (NYSNET).

3. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY DIG SAFELY – NEW YORK FOR ALL UNDERGROUND UTILITY LOCATIONS PRIOR TO ANY EXCAVATION.

4. UTILITY INFORMATION HAS BEEN PLOTTED FROM AVAILABLE SOURCES AND THEIR LOCATIONS AND SIZE SHOULD BE CONSIDERED APPROXIMATE ONLY.

5. ALL SUBSURFACE LOCATIONS SHOWN ARE APPROXIMATE AND SHALL BE USED FOR PRELIMINARY ENGINEERING ONLY.

6. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING EXACT UTILITY LOCATIONS, SIZES, AND ELEVATIONS PRIOR TO COMMENCING CONSTRUCTION. IF UNCHARTED OR MISPLOTTED UTILITIES ARE ENCOUNTERED, THE CONTRACTOR IS REQUIRED TO NOTIFY THE OWNER IMMEDIATELY.

7. PRIOR TO BEGINNING ANY WORK, THE CONTRACTOR IS RESPONSIBLE FOR THE VERIFICATION OF SURVEY CONTROL POINTS USED IN THE VERTICAL AND HORIZONTAL POSITIONING OF DESIGNED IMPROVEMENTS AND FOR NOTIFYING THE E.I.C OF ANY DISCREPANCIES FOUND.

MONITORING WELL LOCATIONS

Pnt.	Northing	Easting	Ground Elev.	Riser Elev. Shallow	Riser Elev. Deep	Desc.
254	780171.2	698539.7	929.51	932.62	932.52	MW-1
332	780281.5	698416.8	930.74	933.24	933.15	MW-2
634	780431.3	698492.3	935.44	938.15**		MW-3
992	780545.9	698307.9	932.34	935.28	935.43	MW-4
1070	780701.8	698293.6	931.59	934.55**		MW-5
1221	780827.9	698167.7	932.10	935.20**		MW-6

Horizontal Coordinates reference to the New York State Plane Coordinate System, Central Zone based on NAD 83 (2011). Vertical Datum is NAVD88. Horizontal and Vertical control was established by NYSNET RTK.

** Only one riser pipe. Not marked.*

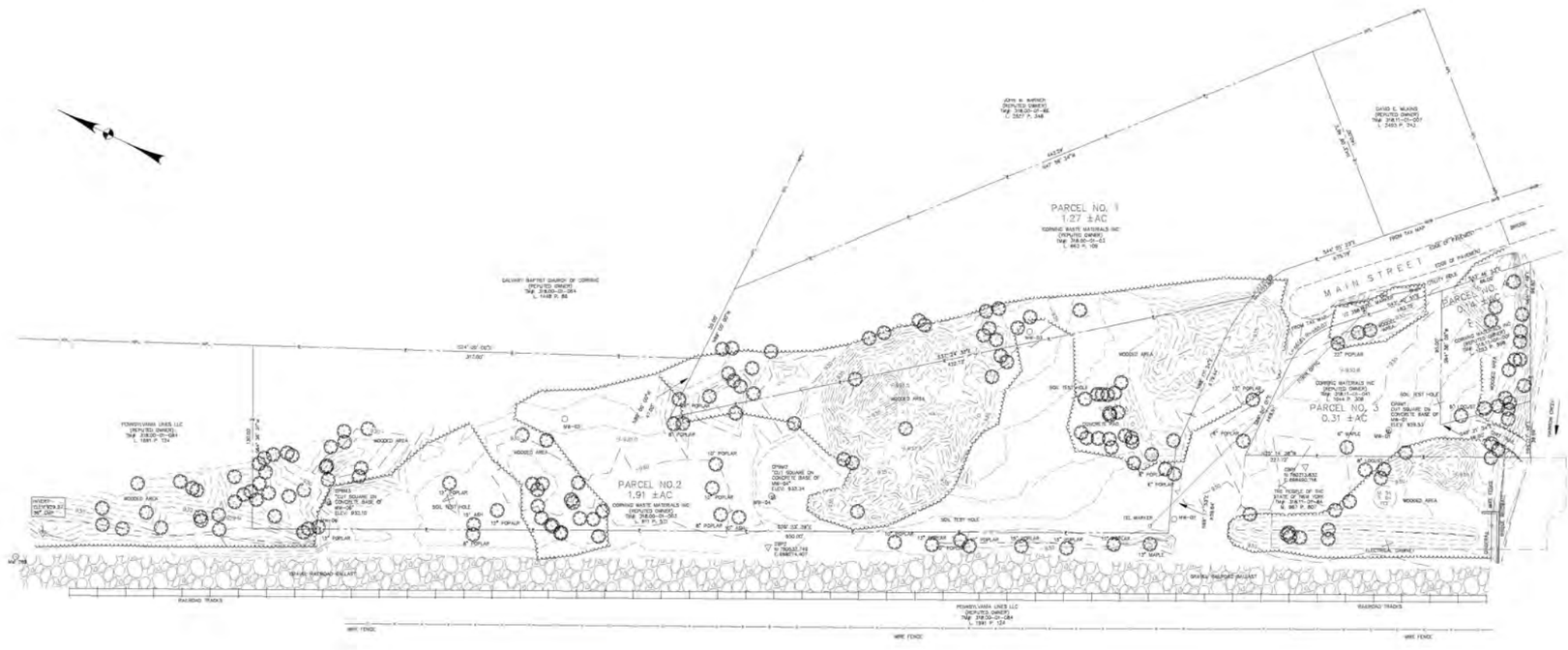
BENCHMARK TABLE

BM	Northing	Easting	Ground Elev.	Description
1	780171.06	698538.61	929.51	CUT SQUARE ON CONCRETE BASE OF MW-01
2	780544.33	698307.52	932.34	CUT SQUARE ON CONCRETE BASE OF MW-0
3	780826.62	698167.24	932.09	CUT SQUARE ON CONCRETE BASE OF MW-0

LEGEND

- BASELINE ANGLE POINT
- BENCHMARK
- CABLE MARKER
- GUY ANCHOR
- IRON PIPE / IRON PIN
- SIGN/POST
- UTILITY POLE
- UTILITY POLE W/LIGHT
- WELL
- UTILITY UNKNOWN MANHOLE
- SANITARY MANHOLE SMH
- STORM MANHOLE
- INLET
- ELECTRICAL
- HYDRANT
- FFE FINISHED FLOOR ELEVATION
- REC. PL. RECORD PLANS
- BUILDING/STRUCTURE
- TREE OR BUSH CLUSTER / WOOD LINE
- BUSHES / SMALL ORNAMENTAL TREES
- CONIFEROUS TREE
- DECIDUOUS TREE
- HB — HIGHWAY BOUNDARY
- R — PROPERTY LINE
- X — FENCING
- STONE WALL
- UE — UNDERGROUND ELECTRIC
- W — WATER LINE
- G — GAS LINE
- O.H. — OVER HEAD UTILITY
- O.H.E. — OVER HEAD UTILITY ELECTRICAL
- O.H.T/C — OVER HEAD UTILITY TEL./CABLE

LOCATION MAP
NOT TO SCALE



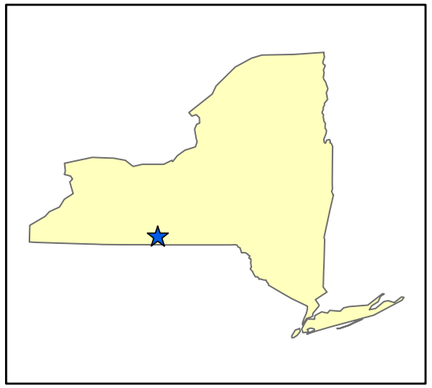
REFERENCES:

1. DEED REFERENCES:
   - LIBER 1448 PAGE 86
   - LIBER 2527 PAGE 348
   - LIBER 2828 PAGE 119
   - LIBER 811 PAGE 571
   - LIBER 1044 PAGE 308
   - LIBER 1023 PAGE 598
   - LIBER 2751 PAGE 27
   - LIBER 663 PAGE 108
   - NYS DOT APPROPRIATION 11291
   - NYS DOT APPROPRIATION 1151011

THE HEREBY SIGNED SURVEYOR CERTIFIES TO THE PEOPLE OF THE STATE OF NEW YORK ACTING THROUGH THE COMMISSIONER OF THE DEPARTMENT OF ENVIRONMENTAL CONSERVATION THAT THIS IS AN ACCURATE MAP OF AN ACTUAL SURVEY COMPLETED 5/4/2021, SUBJECT TO ANY STATE OF FACTS AN ACCURATE ABSTRACT MAY REVEAL.

STATE OF NEW YORK — LICENSED LAND SURVEYOR

GRAPHIC SCALE
(IN FEET)



Legend

- Site Location

Source: Prudent Engineering 2021
Map Date: April 2022

Figure 1-3
Existing Conditions
Gibson Scrapyard (851058)
Gibson, New York

NEW YORK STATE Department of Environmental Conservation

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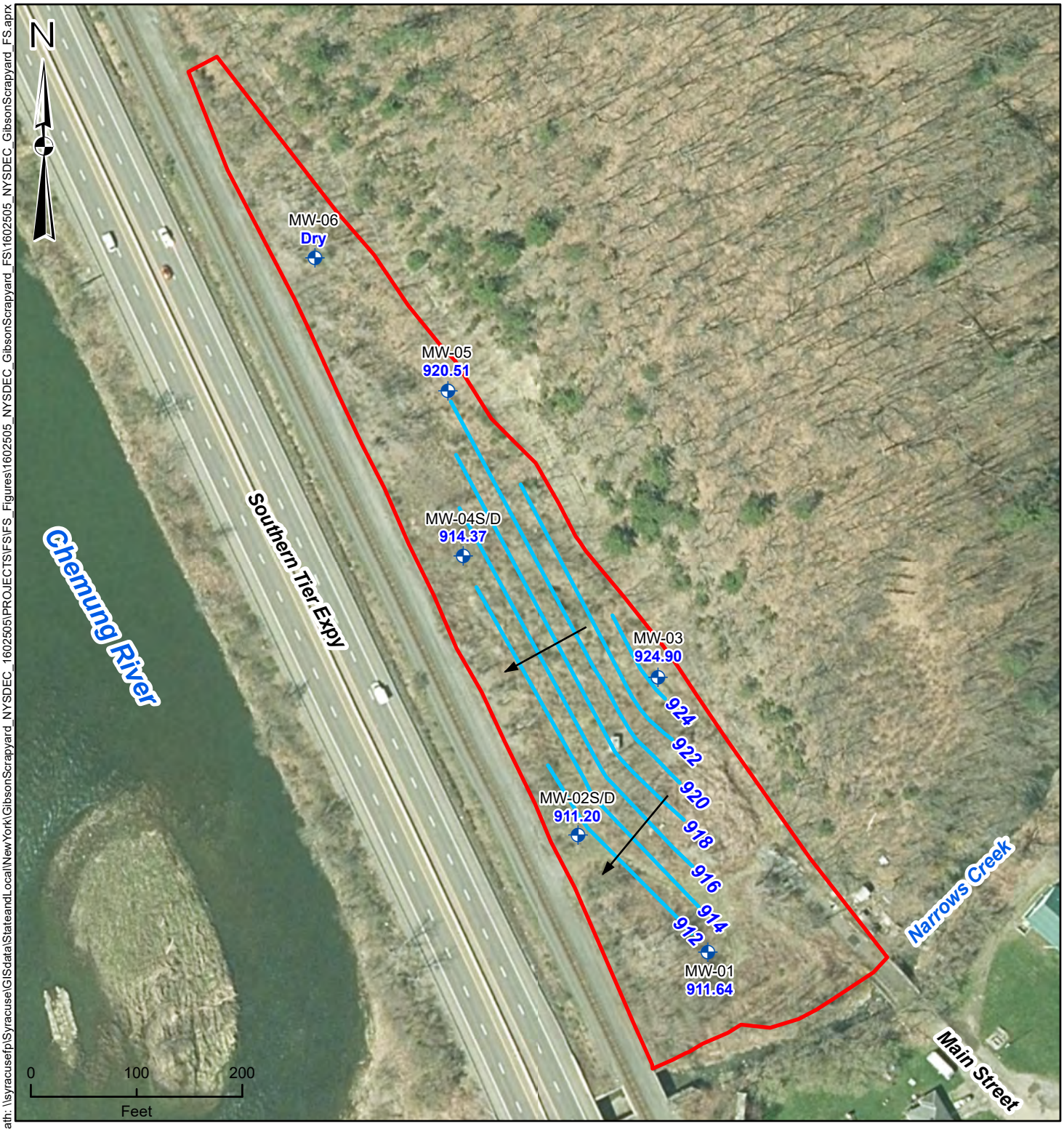

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Legend

- Site Boundary
- Estimated Groundwater Elevation
- Estimated Groundwater Flow Direction
- Monitoring Well
- Site Location

Notes:
Groundwater elevations are presented in feet above mean sea level. Elevations are based on gauging data collected from shallow wells during the second round of groundwater sampling.

Data Source: Imagery: ESRI 2018

Figure 1-4
Groundwater Elevation and Estimated Flow Direction
26 May 2021
Gibson Scrapyard (851058)
Gibson, New York

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Legend

- Site Boundary
- Test Pit
- Soil Boring
- Surface Water Sample Locations
- Site Location

Notes:

Data Source: Imagery: ESRI 2018

Figure 1-5
Phase II Site Investigation
Sampling Locations
Gibson Scrapyard (851058)
Gibson, New York

NEW YORK STATE | Department of Environmental Conservation

Legend

- Site Boundary
- Monitoring Well/Soil Boring Locations
- Surface Soil Sampling Locations
- Sediment and Surface Water Sampling Locations
- Site Location

Notes:
Subsurface soil samples coincide with monitoring well and groundwater sampling locations.

Data Source: Imagery: ESRI 2018

Figure 2-1
Remedial Investigation Sampling Locations
Gibson Scrapyard (851058)
Gibson, New York

NEW YORK STATE | Department of Environmental Conservation

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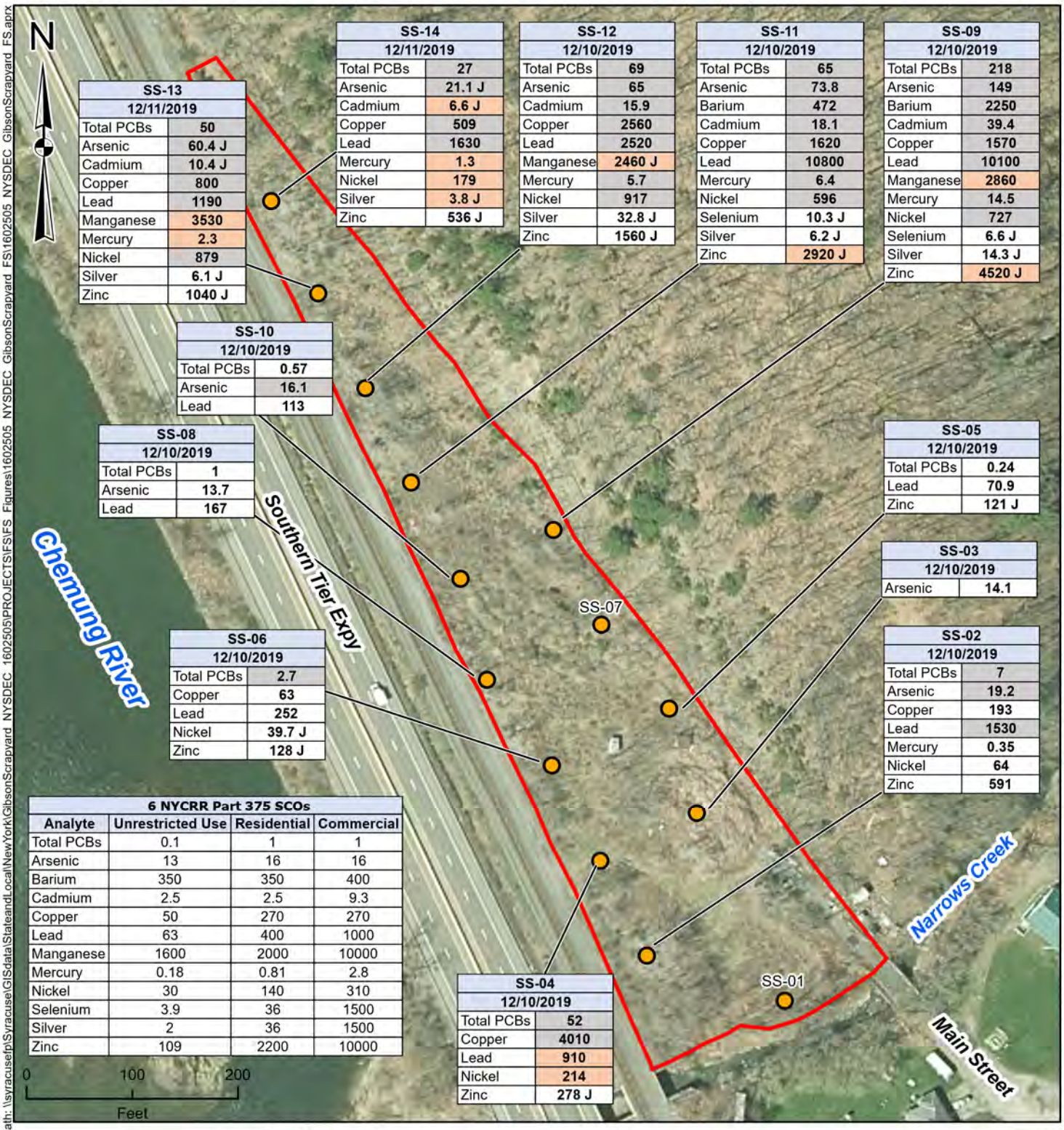

6 NYCRR Part 375 SCOs			
Analyte	Unrestricted Use	Residential	Commercial
Total PCBs	0.1	1	1
Arsenic	13	16	16
Barium	350	350	400
Cadmium	2.5	2.5	9.3
Copper	50	270	270
Lead	63	400	1000
Manganese	1600	2000	10000
Mercury	0.18	0.81	2.8
Nickel	30	140	310
Selenium	3.9	36	1500
Silver	2	36	1500
Zinc	109	2200	10000

Legend

- Site Boundary
- Surface Soil Sampling Locations
- Site Location

Figure 2-2
Remedial Investigation
Surface Soil PCBs and Metals Exceedances
Gibson Scrapyard (851058)
Gibson, New York

Notes:
All concentrations in units of milligram per kilogram
Bold values indicate concentrations exceeding Unrestricted Use SCOs.
Orange shaded values indicate concentrations exceeding Residential Use SCOs.
Grey shaded values indicate concentrations exceeding Commercial Use SCOs.
J = Estimated value; NYCRR = New York Codes, Rules, and Regulations;
PCB = Polychlorinated biphenyl; SCO = Soil Cleanup Objective
Data Source: Imagery: ESRI 2018

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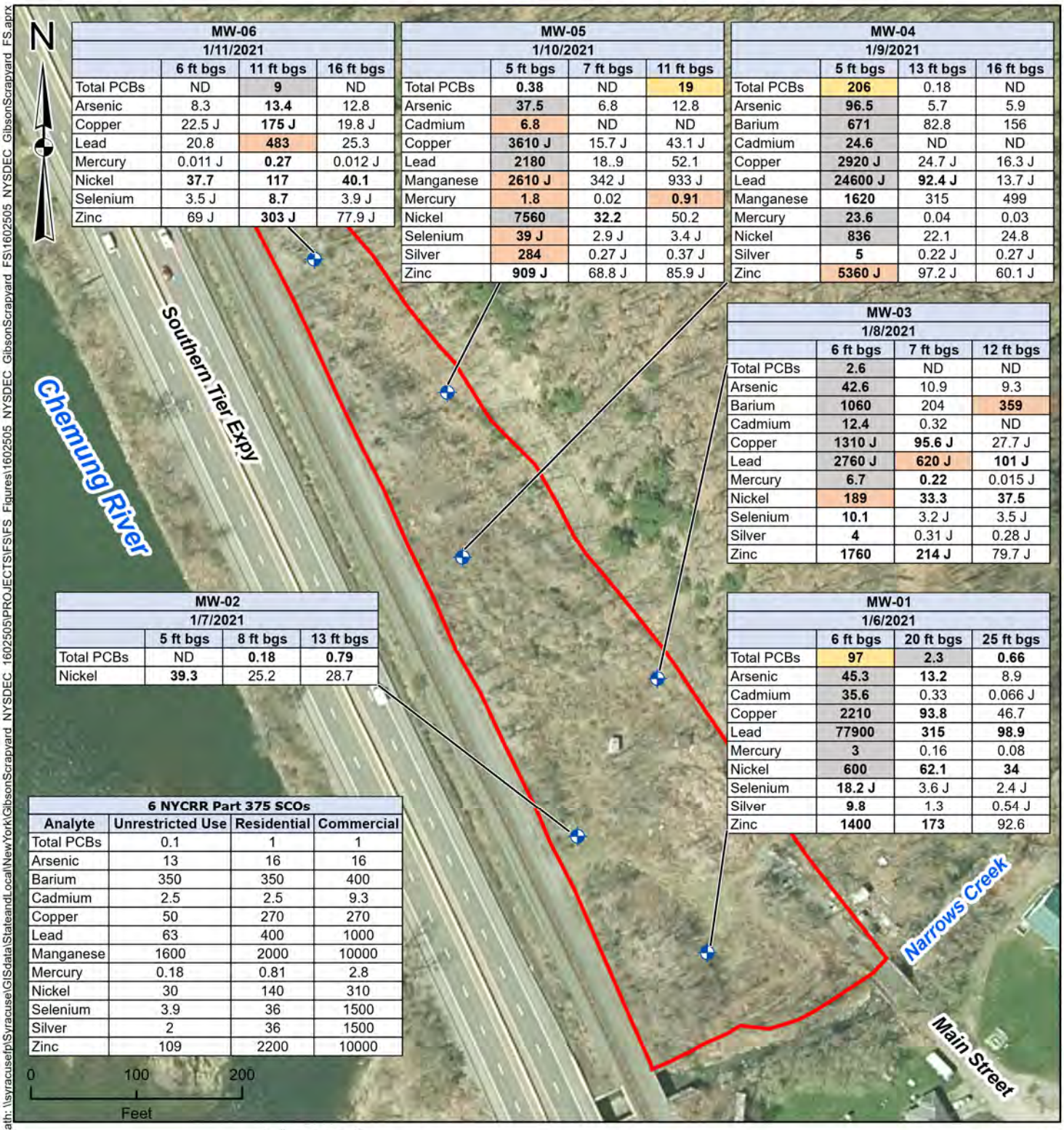

MW-06			
1/11/2021			
	6 ft bgs	11 ft bgs	16 ft bgs
Total PCBs	ND	**9**	ND
Arsenic	8.3	**13.4**	12.8
Copper	22.5 J	**175 J**	19.8 J
Lead	20.8	**483**	25.3
Mercury	0.011 J	**0.27**	0.012 J
Nickel	**37.7**	**117**	**40.1**
Selenium	3.5 J	**8.7**	3.9 J
Zinc	69 J	**303 J**	77.9 J

MW-05			
1/10/2021			
	5 ft bgs	7 ft bgs	11 ft bgs
Total PCBs	**0.38**	ND	**19**
Arsenic	**37.5**	6.8	12.8
Cadmium	**6.8**	ND	ND
Copper	**3610 J**	15.7 J	43.1 J
Lead	**2180**	18..9	52.1
Manganese	**2610 J**	342 J	933 J
Mercury	**1.8**	0.02	**0.91**
Nickel	**7560**	**32.2**	50.2
Selenium	**39 J**	2.9 J	3.4 J
Silver	**284**	0.27 J	0.37 J
Zinc	**909 J**	68.8 J	85.9 J

MW-04			
1/9/2021			
	5 ft bgs	13 ft bgs	16 ft bgs
Total PCBs	**206**	0.18	ND
Arsenic	**96.5**	5.7	5.9
Barium	**671**	82.8	156
Cadmium	**24.6**	ND	ND
Copper	**2920 J**	24.7 J	16.3 J
Lead	**24600 J**	**92.4 J**	13.7 J
Manganese	**1620**	315	499
Mercury	**23.6**	0.04	0.03
Nickel	**836**	22.1	24.8
Silver	**5**	0.22 J	0.27 J
Zinc	**5360 J**	97.2 J	60.1 J

MW-03			
1/8/2021			
	6 ft bgs	7 ft bgs	12 ft bgs
Total PCBs	**2.6**	ND	ND
Arsenic	**42.6**	10.9	9.3
Barium	**1060**	204	**359**
Cadmium	**12.4**	0.32	ND
Copper	**1310 J**	**95.6 J**	27.7 J
Lead	**2760 J**	**620 J**	**101 J**
Mercury	**6.7**	**0.22**	0.015 J
Nickel	**189**	**33.3**	**37.5**
Selenium	**10.1**	3.2 J	3.5 J
Silver	**4**	0.31 J	0.28 J
Zinc	**1760**	**214 J**	79.7 J

MW-02			
1/7/2021			
	5 ft bgs	8 ft bgs	13 ft bgs
Total PCBs	ND	**0.18**	**0.79**
Nickel	**39.3**	25.2	28.7

MW-01			
1/6/2021			
	6 ft bgs	20 ft bgs	25 ft bgs
Total PCBs	**97**	**2.3**	**0.66**
Arsenic	**45.3**	**13.2**	8.9
Cadmium	**35.6**	0.33	0.066 J
Copper	**2210**	**93.8**	46.7
Lead	**77900**	**315**	**98.9**
Mercury	**3**	0.16	0.08
Nickel	**600**	**62.1**	**34**
Selenium	**18.2 J**	3.6 J	2.4 J
Silver	**9.8**	1.3	0.54 J
Zinc	**1400**	**173**	92.6

6 NYCRR Part 375 SCOs			
Analyte	Unrestricted Use	Residential	Commercial
Total PCBs	0.1	1	1
Arsenic	13	16	16
Barium	350	350	400
Cadmium	2.5	2.5	9.3
Copper	50	270	270
Lead	63	400	1000
Manganese	1600	2000	10000
Mercury	0.18	0.81	2.8
Nickel	30	140	310
Selenium	3.9	36	1500
Silver	2	36	1500
Zinc	109	2200	10000

Legend

- Site Boundary
- Monitoring Well/Soil Boring Locations
- Site Location

Notes:
All concentrations in units of milligram per kilogram (mg/kg)
Bold values indicate concentrations exceeding Unrestricted Use SCOs.
Orange shaded values indicate concentrations exceeding Residential Use SCOs.
Grey shaded values indicate concentrations exceeding Commercial Use SCOs.
Yellow shaded values indicate PCB concentrations exceeding the TSCA self-implementing PCB criterion of 10 mg/kg in subsurface soil.
bgs = below ground surface; ft = feet; J = Estimated value; ND = Non-detect;
NYCRR = New York Codes, Rules, and Regulations; PCB = Polychlorinated biphenyl;
SCO = Soil Cleanup Objective; TSCA = Toxic Substances Control Act

Data Source: Imagery: ESRI 2018

Figure 2-3
Remedial Investigation
Subsurface Soil PCBs and Metals Exceedances
Gibson Scrapyard (851058)
Gibson, New York

NEW YORK STATE | Department of Environmental Conservation

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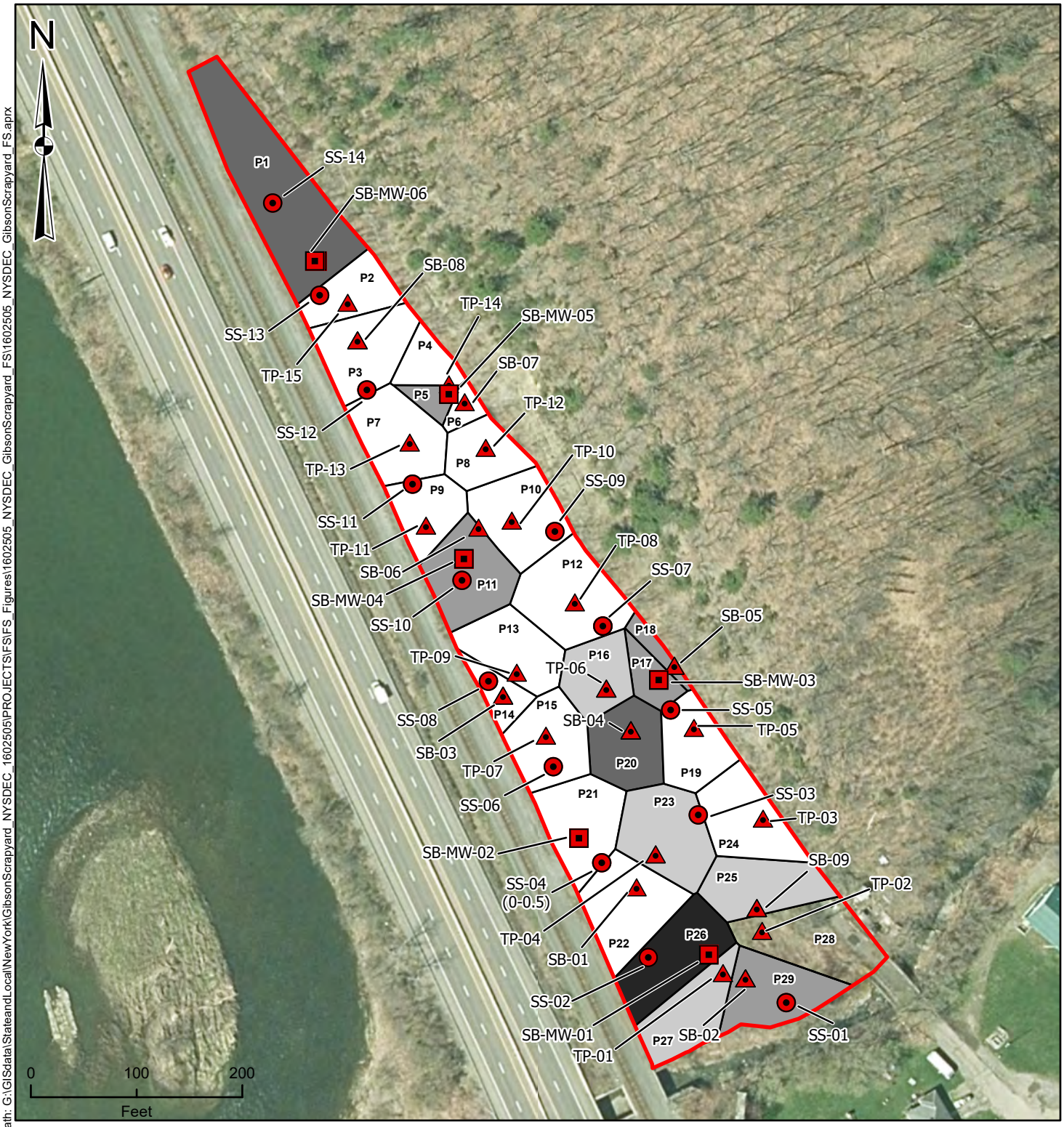

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Legend

Site Boundary

Soil Sample (Year)
- 2010
- 2019
- 2021
- Site Location

Maximum Metals Exceedance Depth
- No Exceedance (Colorless)
- 0-5 ft
- 5-10 ft
- 10-15 ft
- 15-20 ft
- 20-25 ft

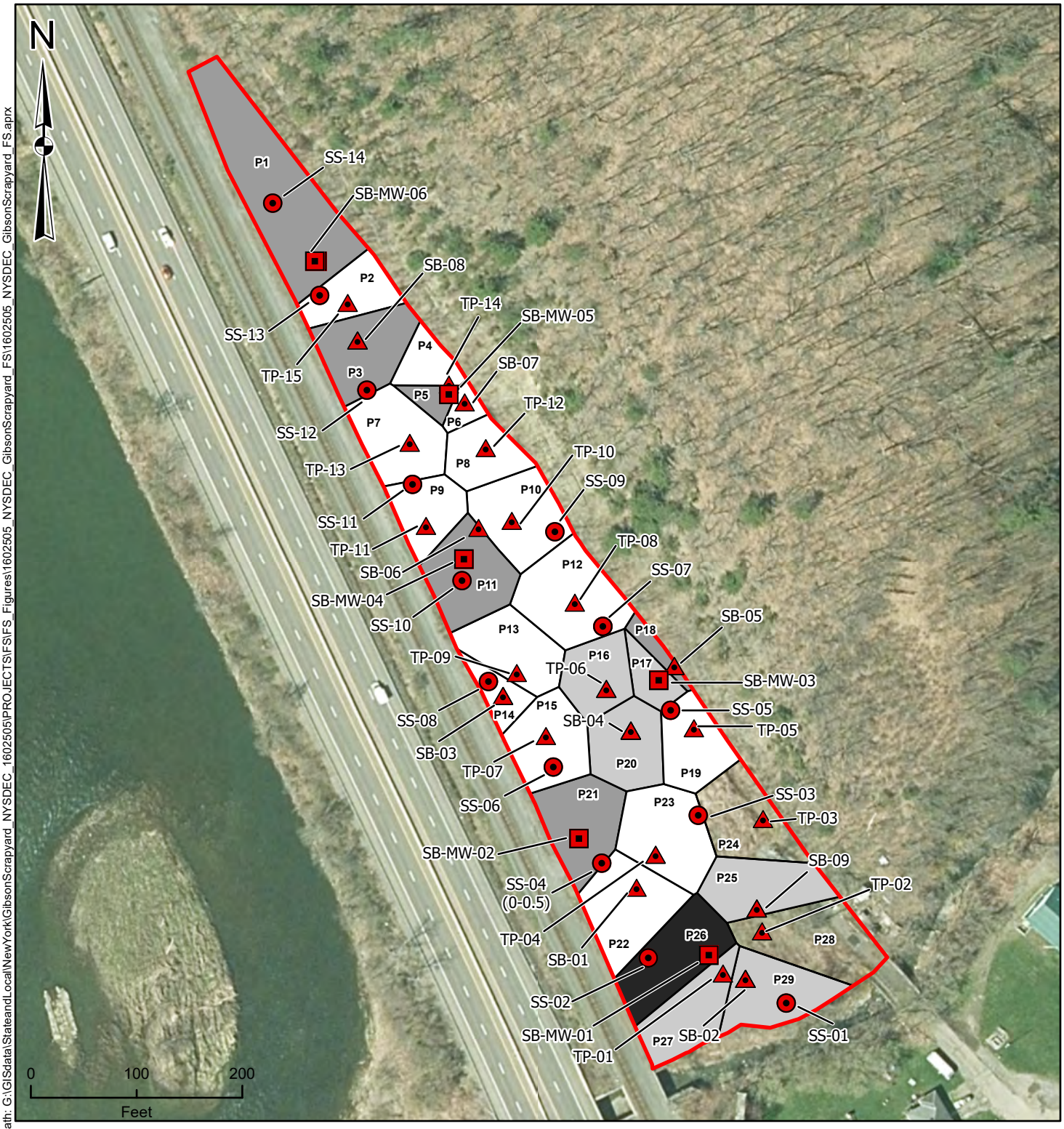
Note:
Exceedance depth was based on 6 NYCRR Part 375 Unrestricted Use Soil Cleanup Objectives.

ft = feet

Data Source: Imagery: ESRI 2018

Figure 3-1
2019-2021 Remedial Investigation and 2010 Site Investigation
Surface and Subsurface Soil Metals
Gibson Scrapyard (851058)
Gibson, New York

NEW YORK STATE Department of Environmental Conservation



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Legend

Site Boundary

Soil Sample (Year)
- 2010
- 2019
- 2021
- Site Location

Maximum PCBs Exceedance Depth (ft)
- No Exceedance (Colorless)
- 0-5
- 5-10
- 10-15
- 15-20
- 20-25

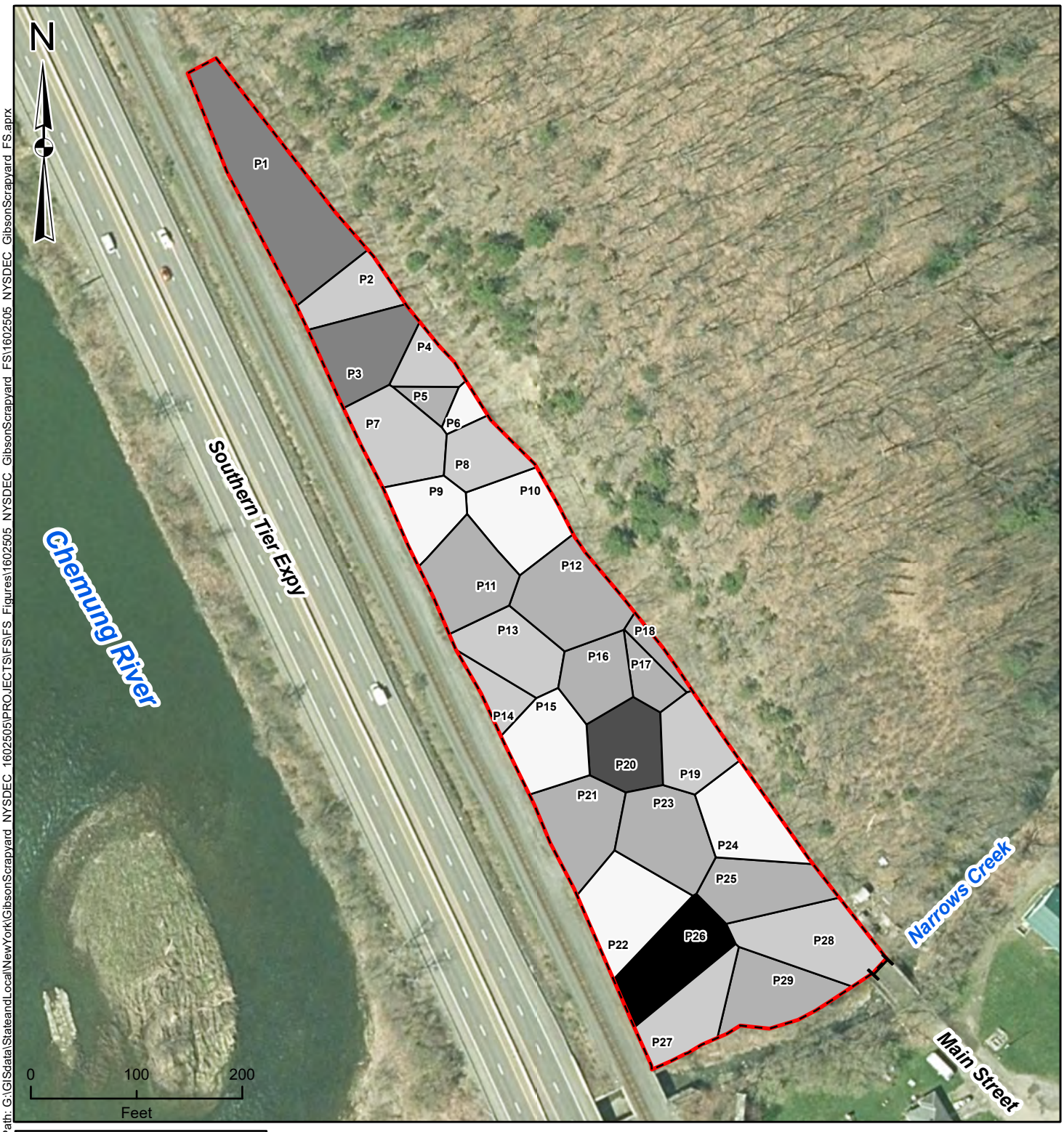
Note:
Exceedance depth was based on 6 NYCRR Part 375 Unrestricted Use Soil Cleanup Objectives.

ft = feet
PCB = Polychlorinated biphenyl

Data Source: Imagery: ESRI 2018

Figure 3-2
2019-2021 Remedial Investigation and 2010 Site Investigation
Surface and Subsurface Soil PCBs
Gibson Scrapyard (851058)
Gibson, New York

NEW YORK STATE Department of Environmental Conservation



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Legend

- Site Boundary
- Fence Line
- Gate
- Site Location

Excavation Depth

- 0-5 ft
- 5-10 ft
- 10-15 ft
- 15-20 ft
- 20-25 ft
- >25 ft

Note:
Excavation depth was based on 6 NYCRR Part 375 Unrestricted Use SCOs

ft = feet
NYCRR = New York Codes, Rules, and Regulations
SCO = Soil Cleanup Objective

Data Source: Imagery: ESRI 2018

Figure 6-1
Alternative 3—Full Removal of Fill to Unrestricted Use SCOs (Self-Implementing)
Gibson Scrapyard (851058)
Gibson, New York

NEW YORK STATE Department of Environmental Conservation

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Data Source: Imagery: ESRI 2018

Legend

- Site Boundary
- Fence Line
- Gate
- 40 CFR Part 761 Cap or 6 NYCRR Part 375 Soil Cover
- Site Location

Excavation Depth

- 0-5 ft
- 5-10 ft
- 10-15 ft
- 15-20 ft
- 20-25 ft
- >25 ft

Notes:
Excavation depth was based on NYSDEC preferred remedy of soil exceeding 10 mg/kg PCBs for residential parcels and soil exceeding 100 mg/kg PCBs for commercial.

CFR = Code of Federal Regulations; ft = feet; mg/kg = milligrams per kilograms; NYCRR = New York Codes, Rules, and Regulations; NYSDEC = New York State Department of Conservation; PCBs = Polychlorinated Biphenyls; ppm = Parts per million

Figure 6-2
Alternatives 4 and 5—Partial Removal of Fill with 40 CFR Part 761 Cap (Alt 4) or 6 NYCRR Part 375 Soil Cover (Alt 5) (Self Implementing)
Gibson Scrapyard (851058)
Gibson, New York

NEW YORK STATE | Department of Environmental Conservation

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Data Source: Imagery: ESRI 2018

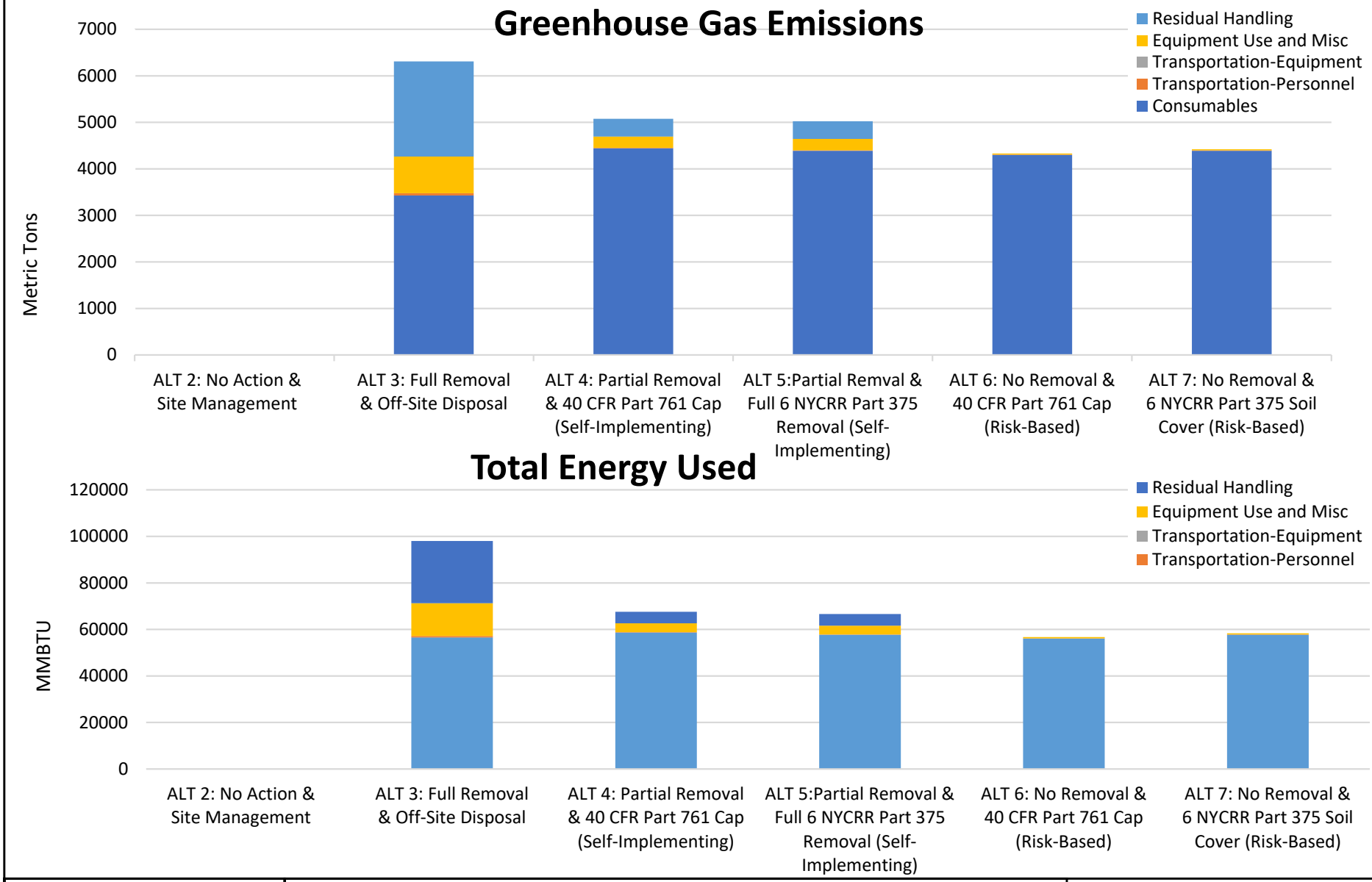
Legend

- Site Boundary
- Fence Line
- Gate
- 40 CFR Part 761 Cap or 6 NYCRR Part 375 Soil Cover
- Site Location

Notes:
CFR = Code of Federal Regulations
NYCRR = New York Codes, Rules, and Regulations

Figure 6-3
Alternatives 6 and 7—No Removal with 40 CFR Part 761 Cap (Alt 6) or 6 NYCRR Part 375 Soil Cover (Alt 7) (Risk-Based)
Gibson Scrapyard (851058)
Gibson, New York

NEW YORK STATE Department of Environmental Conservation



EA Engineering, P.C. and Its Affiliate
EA Science and Technology

NEW YORK STATE Department of Environmental Conservation

Feasibility Study Report
Gibson Scrapyard (851058)
Steuben County, Gibson, New York
Work Assignment No. D009806-05

Figure 7-1.
Remedial Alternatives
Comparison of Greenhouse
Gas Emissions and Total
Energy Used

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Appendix A

Cost Estimates

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Phase Technology Cost Detail Report

Alternative 2: No Further Action with Site Management (Risk-Based)

Software:

RACER Version: RACER® Version 11.5.99.0
Database Location: C:\Users\Administrator\Documents\RACER 11.5\Racer.mdb

Folder:

Folder Name: Gibson Scrapyard

Project:

ID: 851058
Name: Gibson Scrapyard
Category: None

Location

State / Country: NEW YORK
City: CORNING

Location Modifier	Default	User	Reason for changes
	1.110	1.110	

Options

Database: System Costs
Cost Database Date: 2019
Report Option: Calendar

Description Feasibility Study-Remedial Action Alternatives

Site:

ID: 851058
Name: Gibson Scrapyard
Type: None

Media/Waste Type

Primary: Soil
Secondary: Ordnance (not residual)

Contaminant

Primary: PCBs
Secondary: Volatile Organic Compounds (VOCs)

Phase Names

Pre-Study	
Study	
Design	**Safety Level:** E
Removal/Interim Action	**Safety Level:** D
Remedial Action	**Safety Level:** D
Operations & Maintenance	**Safety Level:** D
Long Term Monitoring	**Safety Level:** D
Site Closeout	**Safety Level:** D

In the RACER Preferences the default value for the Safety Level is established. This sets the default value for the safety level for each technology model based on the type of work being completed. Note: RACER Technologies that safety level is not appropriate to change from the default are hard-coded to estimate costs without a safety level productivity factor, which is Safety Level E.

Documentation

Description: Costing for various alternatives for Gibson Scrapyard Feasibility Study.
Support Team: Megan Miller, Liane DeSantis, Kathryn Katzer
References: Remedial Investigation, Feasibility Study

Estimator Information

Estimator Information

Estimator Name: Angela McGinty
Estimator Title: Engineer
Agency/Org./Office: EA Engineering, Science, and Technology, Inc., PBC
Business Address: 1311 Continental Drive
Suite K
Abingdon, MD 21009
Telephone Number: 4106707182
Email Address: amcginty@eaest.com

Estimate Prepared Date: 04/12/2022
Estimator Signature: _____ **Date:** _____

Reviewer Information

Reviewer Name: Megan Miller
Reviewer Title: Engineer
Agency/Org./Office: EA Science and Technology
Business Address: 269 W. Jefferson Street
Syracuse, NY 13202
Telephone Number: 315-565-6557
Email Address: mmiller@eaest.com

Date Reviewed: 04/12/2022
Reviewer Signature: _____ **Date:** _____

Phase Documentation:

Phase Type: Remedial Action
Phase Name: Alternative 2-No Action and Site Management
Description: Chain link fence, gate, and signs; inspections and reports; 5-year Reveiws
Approach: Ex Situ
Start Date: April, 2023
Labor Rate Group: System Labor Rate
Analysis Rate Group: System Analysis Rate
Phase Markup Template: System Defaults

Technology Markups	Markup	% Prime	% Sub.
Site Management	Yes	100	0
Fencing	Yes	100	0
Five-Year Review	Yes	100	0

Total Marked-up Cost: $1,244,656.66

Technologies:

Technology 1: Site Management

Element: Planning Docs

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override

Technology: **Site Management**

33220102	Project Manager	37.00	HR	0.00	77.38	0.00	$2,862.99	False
33220105	Project Engineer	90.00	HR	0.00	80.00	0.00	$7,200.11	False
33220106	Staff Engineer	165.00	HR	0.00	67.57	0.00	$11,148.34	False
33220110	QA/QC Officer	28.00	HR	0.00	52.96	0.00	$1,482.83	False
33220114	Word Processing/Clerical	150.00	HR	0.00	36.29	0.00	$5,442.89	False
33220115	Draftsman/CADD	68.00	HR	0.00	42.29	0.00	$2,875.79	False
33220503	Attorney, Partner, Real Estate	22.00	HR	0.00	154.53	0.00	$3,399.75	False
33240101	Other Direct Costs	1.00	LS	860.32	0.00	0.00	$860.32	False

Total Element Cost: $35,273.01

Element: Planning Meetings

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33010202	Per Diem (per person)	2.00	DAY	0.00	0.00		144.00	$288.00	False
33220102	Project Manager	40.00	HR	0.00	77.38		0.00	$3,095.12	False
33220114	Word Processing/Clerical	32.00	HR	0.00	36.29		0.00	$1,161.15	False
33220115	Draftsman/CADD	16.00	HR	0.00	42.29		0.00	$676.66	False
33240101	Other Direct Costs	1.00	LS	123.32	0.00		0.00	$123.32	False

Total Element Cost: $5,344.25

Element: Implementation

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override

Technology: **Site Management**

18010412	Construction Signs	90.00	SF	27.75	0.00	0.00	$2,497.50	False
33240101	Other Direct Costs	1.00	LS	100.00	0.00	0.00	$100.00	True

Total Element Cost: $2,597.50

Element: Monitoring & Enforcement

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33010104	Sample collection, vehicle mileage charge, car or van	400.00	MI	0.00	0.00		0.30	$119.88	False
33029901	Magnetometer	1.00	DAY	0.00	0.00		104.34	$104.34	False
33040934	UXO Technician II	8.00	HR	0.00	44.38		0.00	$355.02	False
33220102	Project Manager	60.00	HR	0.00	94.36		0.00	$5,661.81	False
33220106	Staff Engineer	120.00	HR	0.00	82.40		0.00	$9,887.66	False
33220110	QA/QC Officer	4.00	HR	0.00	52.96		0.00	$211.83	False
33220112	Field Technician	8.00	HR	0.00	44.93		0.00	$359.42	False
33220114	Word Processing/Clerical	39.00	HR	0.00	44.25		0.00	$1,725.79	False
33220115	Draftsman/CADD	16.00	HR	0.00	42.29		0.00	$676.66	False
33220119	Health and Safety Officer	4.00	HR	0.00	69.23		0.00	$276.90	False
33240101	Other Direct Costs	1.00	LS	706.25	0.00		0.00	$706.25	False

Total Element Cost: $20,085.58

Element: Modification/Termination

Technology: **Site Management**

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33220102	Project Manager	2.00	HR	0.00	77.38		0.00	$154.76	False
33220110	QA/QC Officer	1.00	HR	0.00	52.96		0.00	$52.96	False
33220114	Word Processing/Clerical	1.00	HR	0.00	36.29		0.00	$36.29	False
33240101	Other Direct Costs	1.00	LS	6.10	0.00		0.00	$6.10	False

Total Element Cost: $250.10
Total 1st Year Tech Cost: $63,550.44

Technology 2: **Fencing and Bridge**

Element:

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
18040108	7' Galvanized Chain-link Fence	1,400.00	LF	9.50	10.00		0.00	$28,341.18	True
18040171	Fence, chain link industrial, double swing gates, 8' high, 20' opening, includes excavation, posts & hardware in concrete	1.00	OPN	777.00	1,419.08		0.00	$2,451.82	False
see note*	Modular Steel Bridge, 40' x 16', delivered; 4 laborers 2 days installation	1	EACH	50,000	5,440		0.00	$55,440.00	
18050206	Erosion control, silt fence, polypropylene, 3' high, includes 7.5' posts	1,400.00	LF	1.11	0.49		0.00	$2,236.24	False
33010202	Per Diem (per person)	6.00	DAY	0.00	0.00		144.00	$864.00	True
33029901	Magnetometer	3.00	DAY	0.00	0.00		104.34	$313.02	False
33040934	UXO Technician II	24.00	HR	0.00	54.12		0.00	$1,298.86	False

*Cost obtained from Paragon Bridgeworks

Technology: **Fencing and Bridge**

33220105	Project Engineer	24.00	HR	0.00	80.00	0.00	$1,920.03	False
33430201	Miscellaneous Minor Field Installation	1.00	LS	0.00	0.00	0.00	$500.00	True

Total Element Cost: $93,365.16
Total 1st Year Tech Cost: $93,365.16

Technology 3: Five-Year Review

Element: Document Review

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33220102	Project Manager	12.00	HR	0.00	94.36		0.00	$1,132.36	False
33220105	Project Engineer	15.00	HR	0.00	80.00		0.00	$1,200.02	False
33220108	Project Scientist	11.00	HR	0.00	87.11		0.00	$958.19	False
33220109	Staff Scientist	23.00	HR	0.00	70.35		0.00	$1,618.04	False

Total Element Cost: $4,908.61

Element: Report

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33220102	Project Manager	12.00	HR	0.00	94.36		0.00	$1,132.36	False
33220105	Project Engineer	31.00	HR	0.00	80.00		0.00	$2,480.04	False
33220108	Project Scientist	25.00	HR	0.00	87.11		0.00	$2,177.70	False

Technology: **Five-Year Review**

33220109	Staff Scientist	50.00 HR	0.00	70.35	0.00	$3,517.48	False

Total Element Cost: $9,307.58
Total 1st Year Tech Cost: $14,216.19

Total Phase Element Cost **$171,131.79**

Phase Cost Over Time Report

Alternative 2: No Further Action with Site Management (Risk-Based)

Software:

RACER Version: RACER® Version 11.5.99.0
Database Location: C:\Users\Administrator\Documents\RACER 11.5\Racer.mdb

Folder:

Folder Name: Gibson Scrapyard

Project:

ID: 851058
Name: Gibson Scrapyard
Category: None

Location
State / Country: NEW YORK
City: CORNING

Location Modifier	Default	User	Reason for changes
	1.110	1.110	

Options
Database: System Costs
Cost Database Date: 2019
Report Option: Calendar

Description Feasibility Study-Remedial Action Alternatives

Site:

ID: 851058

Phase Cost Over Time Report

ID: 851058
Name: Gibson Scrapyard
Type: None

Media/Waste Type

Primary: Soil
Secondary: Ordnance (not residual)

Contaminant

Primary: PCBs
Secondary: Volatile Organic Compounds (VOCs)

Phase Names

Pre-Study	
Study	
Design	**Safety Level:** E
Removal/Interim Action	**Safety Level:** D
Remedial Action	**Safety Level:** D
Operations & Maintenance	**Safety Level:** D
Long Term Monitoring	**Safety Level:** D
Site Closeout	**Safety Level:** D

In the RACER Preferences the default value for the Safety Level is established. This sets the default value for the safety level for each technology model based on the type of work being completed. Note: RACER Technologies that safety level is not appropriate to change from the default are hard-coded to estimate costs without a safety level productivity factor, which is Safety Level E.

Documentation

Description: Costing for various alternatives for Gibson Scrapyard Feasibility Study.
Support Team: Megan Miller, Liane DeSantis, Kathryn Katzer
References: Remedial Investigation, Feasibility Study

Estimator Information

Estimator Name: Angela McGinty
Estimator Title: Engineer
Agency/Org./Office: EA Engineering, Science, and Technology, Inc., PBC

Phase Cost Over Time Report

Agency/Org./Office: EA Engineering, Science, and Technology, Inc., PBC
Business Address: 1311 Continental Drive
Suite K
Abingdon, MD 21009
Telephone Number: 4106707182
Email Address: amcginty@eaest.com

Estimate Prepared Date: 04/12/2022
Estimator Signature: _____ **Date:** _____

Reviewer Information

Reviewer Name: Megan Miller
Reviewer Title: Engineer
Agency/Org./Office: EA Science and Technology
Business Address: 269 W. Jefferson Street
Syracuse, NY 13202
Telephone Number: 315-565-6557
Email Address: mmiller@eaest.com

Date Reviewed: 04/12/2022
Reviewer Signature: _____ **Date:** _____

Phase Cost Over Time Report

Technology Name	Technology	2023	2024	2025	2026	2027	2028
Fencing and Bridge	2	$93,365	$0	$0	$0	$0	$0
Five-Year Review	2	$0	$0	$0	$0	$0	$14,216
Site Management	2	$63,550	$0	$20,086	$0	$20,086	$0
Total Phase Cost		$156,916	$0	$20,086	$0	$20,086	$14,216

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Technology Name	Technology	2029	2030	2031	2032	2033	2034
Fencing and Bridge	2	$0	$0	$0	$0	$0	$0
Five-Year Review	2	$0	$0	$0	$0	$14,216	$0
Site Management	2	$20,086	$0	$20,086	$0	$20,086	$0
Total Phase Cost		$20,086	$0	$20,086	$0	$34,302	$0

Phase Cost Over Time Report

Technology Name	Technology	2035	2036	2037	2038	2039	2040
Fencing and Bridge	2	$0	$0	$0	$0	$0	$0
Five-Year Review	2	$0	$0	$0	$14,216	$0	$0
Site Management	2	$20,086	$0	$20,086	$0	$20,086	$0
Total Phase Cost		$20,086	$0	$20,086	$14,216	$20,086	$0

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Technology Name	Technology	2041	2042	2043	2044	2045	2046
Fencing and Bridge	2	$0	$0	$0	$0	$0	$0
Five-Year Review	2	$0	$0	$14,216	$0	$0	$0
Site Management	2	$20,086	$0	$20,086	$0	$20,086	$0
Total Phase Cost		$20,086	$0	$34,302	$0	$20,086	$0

Phase Cost Over Time Report

Technology Name	Technology	2047	2048	2049	2050	2051	2052
Fencing and Bridge	2	$0	$0	$0	$0	$0	$0
Five-Year Review	2	$0	$14,216	$0	$0	$0	$0
Site Management	2	$20,086	$0	$20,086	$0	$20,086	$0
Total Phase Cost		$20,086	$14,216	$20,086	$0	$20,086	$0

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Technology Name	Technology	2053	Total				
Fencing and Bridge	2	$0	$93,365				
Five-Year Review	2	$14,216	$85,297				
Site Management	2	$0	$344,749				
Total Phase Cost		$14,216	$523,411	$0	$0	$0	$0

Phase Technology Cost Detail Report

Alternative 3: Full Removal of Fill to Unrestricted Use SCOs (Self-Implementing)

Software:

RACER Version: RACER® Version 11.5.99.0
Database Location: C:\Users\Administrator\Documents\RACER 11.5\Racer Backup 6 3 2022.mdb

Folder:

Folder Name: Gibson Scrapyard

Project:

ID: 851058
Name: Gibson Scrapyard
Category: None

Location
State / Country: NEW YORK
City: CORNING

Location Modifier	Default	User	Reason for changes
	1.110	1.110	

Options
Database: System Costs
Cost Database Date: 2019
Report Option: Calendar

Description Feasibility Study-Remedial Action Alternatives

Site:

ID: 851058
Name: Gibson Scrapyard
Type: None

Media/Waste Type
Primary: Soil
Secondary: Ordnance (not residual)

Contaminant
Primary: PCBs
Secondary: Volatile Organic Compounds (VOCs)

Phase Names

Pre-Study	
Study	
Design	**Safety Level:** E
Removal/Interim Action	**Safety Level:** D
Remedial Action	**Safety Level:** D
Operations & Maintenance	**Safety Level:** D
Long Term Monitoring	**Safety Level:** D
Site Closeout	**Safety Level:** D

In the RACER Preferences the default value for the Safety Level is established. This sets the default valu for the safety level for each technology model based on the type of work being completed. Note: RACEF Technologies that safety level is not appropriate to change from the default are hard-coded to estimate cost without a safety level productivity factor, which is Safety Level E

Documentation
Description: Costing for various alternatives for Gibson Scrapyard Feasibility Study
Support Team: Megan Miller, Liane DeSantis, Kathryn Katze
References: Remedial Investigation, Feasibility Study

Estimator Information

Estimator Name:	Angela McGinty
Estimator Title:	Engineer
Agency/Org./Office:	EA Engineering, Science, and Technology, Inc., PBC
Business Address:	1311 Continental Drive Suite K Abingdon, MD 21009
Telephone Number:	4106707182
Email Address:	amcginty@eaest.com
Estimate Prepared Date:	04/12/2022
Estimator Signature:	**Date:**

Reviewer Information

Reviewer Name:	Megan Miller
Reviewer Title:	Engineer
Agency/Org./Office:	EA Science and Technology
Business Address:	269 W. Jefferson Street Syracuse, NY 13202
Telephone Number:	315-565-6557
Email Address:	mmiller@eaest.com
Date Reviewed:	04/12/2022
Reviewer Signature:	**Date:**

Phase Documentation:

Phase Type:	Remedial Action
Phase Name:	Alternative 3-Full Removal and Off-Site Disposa
Description:	Full removal, MEC sifting, and off-site disposal; chain link fence, gate, and signs; inspections and reports; 5-year Reveiws
Approach:	Ex Situ
Start Date:	####
Labor Rate Group:	System Labor Rate
Analysis Rate Group:	System Analysis Rate
Phase Markup Template:	System Defaults

Technology Markups	Markup	% Prime	% Sub.
Site Management	Yes	100	0
Fencing	Yes	100	0
Five-Year Review	Yes	100	0
MEC Sifting	Yes	100	0
Clear and Grub	Yes	100	0
MEC Sifting	Yes	100	0
MEC Sifting	Yes	100	0
Off-site Transportation and Waste Disposal	Yes	100	0
Off-site Transportation and Waste Disposal	Yes	100	0
Well Abandonment	Yes	100	0
Remedial Investigation	Yes	100	0

Total Marked-up Cost: $14,983,100.02

Technologies:

Technology 1: Site Management

Element: Planning Docs

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33220102	Project Manager	37.00	HR	0.00	77.38		0.00	$2,862.99	False
33220105	Project Engineer	90.00	HR	0.00	80.00		0.00	$7,200.11	False
33220106	Staff Engineer	165.00	HR	0.00	67.57		0.00	$11,148.34	False
33220110	QA/QC Officer	28.00	HR	0.00	52.96		0.00	$1,482.83	False
33220114	Word Processing/Clerical	150.00	HR	0.00	36.29		0.00	$5,442.89	False
33220115	Draftsman/CADD	68.00	HR	0.00	42.29		0.00	$2,875.79	False
33220503	Attorney, Partner, Real Estate	22.00	HR	0.00	154.53		0.00	$3,399.75	False
33240101	Other Direct Costs	1.00	LS	860.32	0.00		0.00	$860.32	False

Total Element Cost: $35,273.01

Element: Planning Meetings

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33010202	Per Diem (per person)	2.00	DAY	0.00	0.00		144.00	$288.00	False

Technology: Site Management

33220102	Project Manager	40.00	HR	0.00	77.38		0.00	$3,095.12	False
33220114	Word Processing/Clerical	32.00	HR	0.00	36.29		0.00	$1,161.15	False
33220115	Draftsman/CADD	16.00	HR	0.00	42.29		0.00	$676.66	False
33240101	Other Direct Costs	1.00	LS	123.32	0.00		0.00	$123.32	False

Total Element Cost: $5,344.25

Element: Implementation

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
18010412	Construction Signs	90.00	SF	27.75	0.00		0.00	$2,497.50	False
33240101	Other Direct Costs	1.00	LS	100.00	0.00		0.00	$100.00	True

Total Element Cost: $2,597.50

Element: Monitoring & Enforcement

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33010104	Sample collection, vehicle mileage charge, car or van	400.00	MI	0.00	0.00		0.30	$119.88	False
33029901	Magnetometer	1.00	DAY	0.00	0.00		104.34	$104.34	False
33040934	UXO Technician II	8.00	HR	0.00	44.38		0.00	$355.02	False
33220102	Project Manager	60.00	HR	0.00	94.36		0.00	$5,661.81	False
33220106	Staff Engineer	120.00	HR	0.00	82.40		0.00	$9,887.66	False
33220110	QA/QC Officer	4.00	HR	0.00	52.96		0.00	$211.83	False

Technology: Site Management

33220112	Field Technician	8.00	HR	0.00	44.93	0.00	$359.42	False
33220114	Word Processing/Clerical	39.00	HR	0.00	44.25	0.00	$1,725.79	False
33220115	Draftsman/CADD	16.00	HR	0.00	42.29	0.00	$676.66	False
33220119	Health and Safety Officer	4.00	HR	0.00	69.23	0.00	$276.90	False
33240101	Other Direct Costs	1.00	LS	706.25	0.00	0.00	$706.25	False

Total Element Cost: $20,085.58

Element: Modification/Termination

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33220102	Project Manager	2.00	HR	0.00	77.38		0.00	$154.76	False
33220110	QA/QC Officer	1.00	HR	0.00	52.96		0.00	$52.96	False
33220114	Word Processing/Clerical	1.00	HR	0.00	36.29		0.00	$36.29	False
33240101	Other Direct Costs	1.00	LS	6.10	0.00		0.00	$6.10	False

Total Element Cost: $250.10
Total 1st Year Tech Cost: $63,550.44

Technology 2: Fencing and Bridge

Element:

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override

Technology: Fencing and Bridge

18040108	7' Galvanized Chain-link Fence	1,400.00	LF	9.50	10.00	0.00	$28,341.18	True
18040171	Fence, chain link industrial, double swing gates, 8' high, 20' opening, includes excavation, posts & hardware in concrete	1.00	OPN	777.00	1,419.08	0.00	$2,451.82	False
see note*	Modular Steel Bridge, 40' x 16', delivered; 4 laborers 2 days installation'	1	EACH	50,000	5,440	0.00	$55,440.00	
18050206	Erosion control, silt fence, polypropylene, 3' high, includes 7.5' posts	1,400.00	LF	1.11	0.49	0.00	$2,236.24	False
33010202	Per Diem (per person)	3.00	DAY	0.00	0.00	144.00	$432.00	False
33220105	Project Engineer	24.00	HR	0.00	80.00	0.00	$1,920.03	False
33430201	Miscellaneous Minor Field Installation	1.00	LS	0.00	0.00	0.00	$500.00	True

Total Element Cost: $91,321.28
Total 1st Year Tech Cost: $91,321.28

*Cost obtained from Paragon Bridgeworks

Technology 3: Five-Year Review

Element: Document Review

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33220102	Project Manager	12.00	HR	0.00	94.36		0.00	$1,132.36	False
33220105	Project Engineer	15.00	HR	0.00	80.00		0.00	$1,200.02	False
33220108	Project Scientist	11.00	HR	0.00	87.11		0.00	$958.19	False
33220109	Staff Scientist	23.00	HR	0.00	70.35		0.00	$1,618.04	False

Total Element Cost: $4,908.61

Element: Report

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33220102	Project Manager	12.00	HR	0.00	94.36		0.00	$1,132.36	False
33220105	Project Engineer	31.00	HR	0.00	80.00		0.00	$2,480.04	False
33220108	Project Scientist	25.00	HR	0.00	87.11		0.00	$2,177.70	False
33220109	Staff Scientist	50.00	HR	0.00	70.35		0.00	$3,517.48	False

Total Element Cost: $9,307.58
Total 1st Year Tech Cost: $14,216.19

Technology 4: Clear and Grub

Element:

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
17010102	Selective clearing, brush, medium clearing, with dozer and brush rake, excludes removal offsite	1.00	ACR	0.00	131.75		0.00	$242.04	False
17010211	Site clearing trees, with 335 H.P. dozer, to 12" diameter	75.00	EA	0.00	5.50		0.00	$1,057.38	False
17010212	Site clearing trees, with 335 H.P. dozer, to 24" diameter	25.00	EA	0.00	8.23		0.00	$528.21	False
17010315	Grub stumps, with 335 H.P. dozer, to 12" diameter	75.00	EA	0.00	3.29		0.00	$707.91	False
17010316	Grub stumps, with 335 H.P. dozer, to 24" diameter	25.00	EA	0.00	32.93		0.00	$2,359.88	False
17010402	Chipping brush, medium brush	1.00	ACR	0.00	1,662.32		0.00	$2,125.09	False
17010501	Grub and stack, 140 H.P. dozer	121.00	CY	0.00	3.29		0.00	$677.38	False

Total Element Cost: $7,697.89
Total 1st Year Tech Cost: $7,697.89

Technology 5A MEC Sifting

Element: Site Visit

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33010104	Sample collection, vehicle mileage charge, car or van	100.00	MI	0.00	0.00		0.30	$29.97	False
33010108	Sedan, Automobile, Rental	3.00	DAY	0.00	0.00		59.21	$177.62	False
33010202	Per Diem (per person)	3.00	DAY	0.00	0.00		144.00	$432.00	False
33040921	Senior UXO Supervisor (SUXOS)	8.00	HR	0.00	70.07		0.00	$560.59	False
33040923	UXO Project Manager	8.00	HR	0.00	102.13		0.00	$817.05	False
33040925	UXO Staff Engineer	8.00	HR	0.00	65.36		0.00	$522.85	False
33041101	Airfare	3.00	LS	0.00	0.00		0.00	$0.00	False
Technology:	MEC Sifting								
33041302	Munitions Response Workplan (Moderate Complexity)	1.00	EA	88.80	12,559.85		0.00	$12,648.65	False
33041305	Explosive Safety Submission (Moderate Complexity)	1.00	EA	177.60	22,461.37		0.00	$22,638.97	False
33240101	Other Direct Costs	1.00	LS	500.00	0.00		0.00	$500.00	False

Total Element Cost: $38,327.71

Element: Site Preparation

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33010202	Per Diem (per person)	6.00	DAY	0.00	0.00		144.00	$864.00	False
33040268	Schonstedt GA-52Cx Weekly Rental	6.00	WK	0.00	0.00		94.18	$565.10	False
33040933	UXO Technician I	30.00	HR	0.00	36.84		0.00	$1,105.23	False
33040934	UXO Technician II	20.00	HR	0.00	44.38		0.00	$887.56	False
33040935	UXO Technician III (UXO Supervisor)	10.00	HR	0.00	52.43		0.00	$524.25	False

Total Element Cost: $3,946.14

Element: Excavation

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
17030279	4 CY, Crawler-mounted, Hydraulic Excavator	27,426.67	CY	0.00	0.73		0.00	$45,665.41	False
Technology:	MEC Sifting								
33010114	Mobilization Equipment (Soils)	1.00	LS	0.00	1,566.74		0.00	$3,099.32	False
33040518	UXO Vehicle Modification - Acrylic Glass Sheets 3" Thick	26.00	SF	263.07	28.40		0.00	$7,578.35	False
33040519	UXO Vehicle Modification - Steel Plates 3/4" Thick	122.00	SF	44.96	0.00		0.00	$5,484.51	False
33040520	UXO Vehicle Modification - Welding Steel Plates 3/4" Thick	70.00	LF	3.22	49.75		0.00	$4,065.26	False

Total Element Cost: $65,892.85

Element: Sifting

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
17030285	12 CY, Dump Truck	360.00	HR	0.00	55.96		0.00	$34,685.28	False
17030427	Sand Bags	1,000.00	EA	0.46	0.00		0.00	$455.10	False
17030436	0.75 CY Wheel Loader	360.00	HR	0.00	84.39		0.00	$42,089.87	False
33010202	Per Diem (per person)	252.00	DAY	0.00	0.00		144.00	$36,288.00	False
33020315	Ambient air monitor, monthly rental	10.00	MO	0.00	0.00		277.50	$2,775.00	False
33040518	UXO Vehicle Modification - Acrylic Glass Sheets 3" Thick	32.00	SF	263.07	28.40		0.00	$9,327.20	False
33040651	4 X 4 Truck- Rental/Lease	5.00	DAY	0.00	0.00		0.00	$954.60	False
33040662	Trommel Screener	2.00	MO	0.00	0.00		0.00	$973.25	False
33040693	Manual Clean Suspended Electromagnet	2.00	MO	0.00	0.00		1,995.79	$3,991.58	False
33040933	UXO Technician I	160.00	HR	0.00	36.84		0.00	$5,894.54	False
33040934	UXO Technician II	80.00	HR	0.00	44.38		0.00	$3,550.22	False
Technology:	MEC Sifting								
33040935	UXO Technician III (UXO Supervisor)	40.00	HR	0.00	52.43		0.00	$2,097.01	False
33188605	Adjustable Height Radial Stacker Conveyor	36.00	DAY	0.00	0.00		0.00	$390.01	False
33188606	Feeder Conveyor, 50' long with 7 CY Hopper	36.00	DAY	0.00	0.00		0.00	$4,034.36	False
33240101	Other Direct Costs	2.00	LS	7,236.55	0.00		0.00	$14,473.10	False

Total Element Cost: $161,979.13

Element: Backfill

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
17030423	Unclassified Fill, 6" Lifts, Off-Site, Includes Delivery, Spreading, and Compaction	27,427.00	CY	20.78	0.93		0.01	$620,448.12	False
17040101	Cleaning Up, site debris clean up and removal	3.40	ACR	0.00	446.46		0.00	$1,695.92	False
18050101	Area Preparation, 67% Level & 33% Slope	3.40	ACR	0.00	16.93		0.00	$132.09	False
18050302	Topsoil, 6" Lifts, On-Site	807.00	CY	0.00	2.36		0.01	$3,654.74	False
18050401	Seeding, 67% Level & 33% Slope, Hydroseeding	3.40	ACR	1,716.48	714.15		0.00	$9,766.73	False
18050408	Fertilizer, Hydro Spread	3.40	ACR	954.94	67.69		0.00	$3,633.12	False
33010115	Demobilize Equipment (Soils)	1.00	LS	0.00	1,566.74		0.00	$3,099.32	False

Total Element Cost: $642,430.04

Technology: MEC Sifting

Element: Site Management

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33010202	Per Diem (per person)	320.00	DAY	0.00	0.00		144.00	$46,080.00	False
33040921	Senior UXO Supervisor (SUXOS)	570.00	HR	0.00	70.07		0.00	$39,942.35	False
33040923	UXO Project Manager	570.00	HR	0.00	102.13		0.00	$58,214.73	False
33040930	UXO QC Specialist	570.00	HR	0.00	62.35		0.00	$35,538.76	False
33040931	UXO Safety Officer	570.00	HR	0.00	62.72		0.00	$35,747.55	False

Total Element Cost: $215,523.39

Element: Stakeholder Involvement

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33040923	UXO Project Manager	12.00	HR	0.00	102.13		0.00	$1,225.57	False
33040935	UXO Technician III (UXO Supervisor)	12.00	HR	0.00	52.43		0.00	$629.10	False
33041305	Explosive Safety Submission (Moderate Complexity)	1.00	EA	177.60	22,461.37		0.00	$22,638.97	False
33041314	Site Specific Final Report (Moderate Complexity)	1.00	EA	177.60	15,555.03		0.00	$15,732.63	False

Total Element Cost: $40,226.28
Total 1st Year Tech Cost: $1,168,325.54

Technology 5B MEC Sifting

Element: Excavation

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override

Technology: MEC Sifting

17030279	4 CY, Crawler-mounted, Hydraulic Excavator	27,426.67	CY	0.00	0.73		0.00	$45,665.41	False
33040518	UXO Vehicle Modification - Acrylic Glass Sheets 3" Thick	26.00	SF	263.07	28.40		0.00	$7,578.35	False
33040519	UXO Vehicle Modification - Steel Plates 3/4" Thick	122.00	SF	44.96	0.00		0.00	$5,484.51	False
33040520	UXO Vehicle Modification - Welding Steel Plates 3/4" Thick	70.00	LF	3.22	49.75		0.00	$4,065.26	False

Total Element Cost: $62,793.53

Element: Sifting

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
17030285	12 CY, Dump Truck	360.00	HR	0.00	55.96		0.00	$34,685.28	False
17030427	Sand Bags	1,000.00	EA	0.46	0.00		0.00	$455.10	False
17030436	0.75 CY Wheel Loader	360.00	HR	0.00	84.39		0.00	$42,089.87	False
33010202	Per Diem (per person)	252.00	DAY	0.00	0.00		144.00	$36,288.00	False
33040518	UXO Vehicle Modification - Acrylic Glass Sheets 3" Thick	32.00	SF	263.07	28.40		0.00	$9,327.20	False
33040651	4 X 4 Truck- Rental/Lease	5.00	DAY	0.00	0.00		0.00	$954.60	False
33040662	Trommel Screener	2.00	MO	0.00	0.00		0.00	$973.25	False
33040693	Manual Clean Suspended Electromagnet	2.00	MO	0.00	0.00		1,995.79	$3,991.58	False
33040933	UXO Technician I	160.00	HR	0.00	36.84		0.00	$5,894.54	False
33040934	UXO Technician II	80.00	HR	0.00	44.38		0.00	$3,550.22	False
33040935	UXO Technician III (UXO	40.00	HR	0.00	52.43		0.00	$2,097.01	False
Technology:	MEC Sifting								
33040935	UXO Technician III (UXO	40.00	HR	0.00	52.43		0.00	$2,097.01	False
33188605	Adjustable Height Radial Stacker Conveyor	36.00	DAY	0.00	0.00		0.00	$390.01	False
33188606	Feeder Conveyor, 50' long with 7 CY Hopper	36.00	DAY	0.00	0.00		0.00	$4,034.36	False
33240101	Other Direct Costs	2.00	LS	7,236.55	0.00		0.00	$14,473.10	False

Total Element Cost: $159,204.13

Element: Backfill

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
17030423	Unclassified Fill, 6" Lifts, Off-Site, Includes Delivery, Spreading, and Compaction	27,427.00	CY	20.78	0.93		0.01	$620,448.12	False
33010115	Demobilize Equipment (Soils)	1.00	LS	0.00	1,566.74		0.00	$3,099.32	False

Total Element Cost: $623,547.44

Element: Site Management

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33010202	Per Diem (per person)	316.00	DAY	0.00	0.00		144.00	$45,504.00	False
33040921	Senior UXO Supervisor (SUXOS)	560.00	HR	0.00	70.07		0.00	$39,241.61	False
33040923	UXO Project Manager	560.00	HR	0.00	102.13		0.00	$57,193.42	False
33040930	UXO QC Specialist	560.00	HR	0.00	62.35		0.00	$34,915.27	False

Technology: MEC Sifting

33040931	UXO Safety Officer	560.00	HR	0.00	62.72	0.00		$35,120.40	False

Total Element Cost: $211,974.70
Total 1st Year Tech Cost: $1,057,519.79

Technology 5C MEC Sifting

Element: Excavation

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
17030279	4 CY, Crawler-mounted, Hydraulic Excavator	13,713.33	CY	0.00	0.73		0.00	$22,832.69	False
33040518	UXO Vehicle Modification - Acrylic Glass Sheets 3" Thick	26.00	SF	263.07	28.40		0.00	$7,578.35	False
33040519	UXO Vehicle Modification - Steel Plates 3/4" Thick	122.00	SF	44.96	0.00		0.00	$5,484.51	False
33040520	UXO Vehicle Modification - Welding Steel Plates 3/4" Thick	70.00	LF	3.22	49.75		0.00	$4,065.26	False

Total Element Cost: $39,960.82

Element: Sifting

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
17030285	12 CY, Dump Truck	180.00	HR	0.00	55.96		0.00	$17,342.64	False
17030427	Sand Bags	1,000.00	EA	0.46	0.00		0.00	$455.10	False
Technology:	MEC Sifting								
17030436	0.75 CY Wheel Loader	180.00	HR	0.00	84.39		0.00	$21,044.93	False
33010202	Per Diem (per person)	126.00	DAY	0.00	0.00		144.00	$18,144.00	False
33040518	UXO Vehicle Modification - Acrylic Glass Sheets 3" Thick	32.00	SF	263.07	28.40		0.00	$9,327.20	False
33040651	4 X 4 Truck- Rental/Lease	3.00	DAY	0.00	0.00		0.00	$572.76	False
33040662	Trommel Screener	1.00	MO	0.00	0.00		0.00	$486.62	False
33040693	Manual Clean Suspended Electromagnet	1.00	MO	0.00	0.00		1,995.79	$1,995.79	False
33040933	UXO Technician I	80.00	HR	0.00	36.84		0.00	$2,947.27	False
33040934	UXO Technician II	40.00	HR	0.00	44.38		0.00	$1,775.11	False
33040935	UXO Technician III (UXO Supervisor)	20.00	HR	0.00	52.43		0.00	$1,048.51	False
33188605	Adjustable Height Radial Stacker Conveyor	18.00	DAY	0.00	0.00		0.00	$195.00	False
33188606	Feeder Conveyor, 50' long with 7 CY Hopper	18.00	DAY	0.00	0.00		0.00	$2,017.18	False
33240101	Other Direct Costs	2.00	LS	3,867.61	0.00		0.00	$7,735.21	False

Total Element Cost: $85,087.33

Element: Backfill

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
17030423	Unclassified Fill, 6" Lifts, Off-Site, Includes Delivery, Spreading, and Compaction	13,714.00	CY	20.78	0.93		0.01	$310,235.37	False
33010115	Demobilize Equipment (Soils)	1.00	LS	0.00	1,566.74		0.00	$3,099.32	False

Total Element Cost: $313,334.69

Element: Site Management

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33010202	Per Diem (per person)	160.00	DAY	0.00	0.00		144.00	$23,040.00	False
33040921	Senior UXO Supervisor (SUXOS)	280.00	HR	0.00	70.07		0.00	$19,620.80	False
33040923	UXO Project Manager	280.00	HR	0.00	102.13		0.00	$28,596.71	False
33040930	UXO QC Specialist	280.00	HR	0.00	62.35		0.00	$17,457.64	False
33040931	UXO Safety Officer	280.00	HR	0.00	62.72		0.00	$17,560.20	False

Total Element Cost: $106,275.35
Total 1st Year Tech Cost: $544,658.19

Technology 6A Off-site Transportation and Waste Disposal

Element:

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33020302	Portable organic vapor analyzer, monthly rental	6.00	MO	0.00	0.00		949.05	$5,694.30	False
33021618	Testing, purgeable organics (624, 8260)	158.00	EA	0.00	0.00		155.40	$24,553.20	False
33021619	Testing, semi-volatile organics (625, 8270)	2,579.00	EA	0.00	0.00		299.70	$772,926.31	False
33021620	Testing, TAL metals (6010/7000s)	2,579.00	EA	0.00	0.00		189.26	$488,088.65	False

Technology:	Off-site Transportation and Waste Disposal							
33021702	TCLP (RCRA) (EPA 1311), Soil Analysis	76.00	EA	0.00	0.00	75.92	$5,770.22	False
33021717	Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Analysis	2,579.00	EA	0.00	0.00	108.50	$279,827.95	False
33190102	Bulk Solid Waste Loading Into Disposal Vehicle or Bulk Disposal Container	22,700.00	BCY	1.15	1.29	0.00	$64,719.42	False
33190205	Transport Bulk Solid Hazardous Waste, Maximum 20 CY (per Mile)	502,805.00	MI	0.00	0.00	2.05	$1,032,510.08	False
33190317	Waste Stream Evaluation Fee, Not Including 50% Rebate on 1st Shipment	1.00	EA	0.00	0.00	57.22	$57.22	False
33190807	32 Ft. Dump Truck, 6 Mil Liner, disposable	1,135.00	EA	31.19	0.00	0.00	$35,401.79	False
33197263	Commercial RCRA landfills, bulk waste, solid, based on 2,000 lb/CY	22,700.00	TON	0.00	0.00	80.32	$1,823,254.94	False
33220112	Field Technician	860.00	HR	0.00	44.93	0.00	$38,638.02	False

Total Element Cost: $4,571,442.10
Total 1st Year Tech Cost: $4,571,442.10

Technology 6B Off-site Transportation and Waste Disposal

Element:

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
Technology:	Off-site Transportation and Waste Disposal								
33190102	Bulk Solid Waste Loading Into Disposal Vehicle or Bulk Disposal Container	46,000.00	BCY	1.15	1.29		0.00	$131,149.48	False
33190205	Transport Bulk Solid Hazardous Waste, Maximum 20 CY (per Mile)	23,000.00	MI	0.00	0.00		2.05	$47,230.50	False
33190317	Waste Stream Evaluation Fee, Not Including 50% Rebate on 1st Shipment	1.00	EA	0.00	0.00		57.22	$57.22	False
33190807	32 Ft. Dump Truck, 6 Mil Liner, disposable	2,300.00	EA	31.19	0.00		0.00	$71,739.30	False
33197270	Landfill Nonhazardous Solid Bulk Waste by CY	46,000.00	CY	0.00	0.00		34.33	$1,579,285.82	False

Total Element Cost: $1,829,462.32
Total 1st Year Tech Cost: $1,829,462.32

Technology 7: Well Abandonment

Element:

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33010101	Mobilize/DeMobilize Drilling Rig & Crew	1.00	LS	0.00	1,526.06		0.00	$2,540.60	False
33190402	DOT steel drums, 55 gal., open only, 17H	11.00	EA	69.74	0.00		0.00	$767.15	False
33220112	Field Technician	40.00	HR	0.00	44.93		0.00	$1,797.12	False
33231104	Hollow Stem Auger, 11" Dia	210.00	LF	0.00	20.72		0.00	$12,081.74	False

Technology:	Well Abandonment								
33231104	Hollow Stem Auger, 11" Dia	210.00	LF	0.00	20.72		0.00	$12,081.74	False
33231178	Move Rig/Equipment Around Site	1.00	EA	100.20	219.37		0.00	$465.42	False
33231820	Grout Continuous Borehole	73.00	CF	39.41	0.00		0.00	$2,876.57	False

Total Element Cost: $20,528.60
Total 1st Year Tech Cost: $20,528.60

Technology 8: Pre-Design Investigation

Element: Subsurface Soil

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33020401	Disposable Materials per Sample	6,036.00	EA	8.62	0.00		0.00	$52,058.69	False
33020402	Decontamination Materials per Sample	6,036.00	EA	19.70	0.00		0.00	$118,924.29	False
33020667	Direct Push Rig, Truck Mounted, Non Hydraulic, Includes Labor, Sampling, Decontamination	200.00	DAY	0.00	0.00		1,665.00	$333,000.00	False
33020668	Mobilize Direct Push Rig and Crew	11.00	DAY	0.00	0.00		1,665.00	$18,315.00	False
33020669	Demobilize Direct Push Rig and Crew	11.00	EA	1,665.00	0.00		0.00	$18,315.00	False
33021783	PCBs in Soil (Method SW8082)	6,036.00	EA	0.00	0.00		111.00	$669,996.01	False
33220102	Project Manager	200.00	HR	0.00	94.36		0.00	$18,872.71	False
33220112	Field Technician	2,000.00	HR	0.00	44.93		0.00	$89,855.85	False

Total Element Cost: $1,319,337.56

Element: Site Characterization

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33010104	Sample collection, vehicle mileage charge, car or van	40.00	MI	0.00	0.00		0.30	$11.99	False
33220102	Project Manager	2.00	HR	0.00	94.36		0.00	$188.73	False
33220103	Office Manager	5.00	HR	0.00	78.07		0.00	$390.33	False
33220106	Staff Engineer	60.00	HR	0.00	82.40		0.00	$4,943.83	False
33220109	Staff Scientist	23.00	HR	0.00	70.35		0.00	$1,618.04	False
33220111	Certified Industrial Hygienist	3.00	HR	0.00	85.48		0.00	$256.45	False
33220112	Field Technician	20.00	HR	0.00	44.93		0.00	$898.56	False
33220114	Word Processing/Clerical	4.00	HR	0.00	44.25		0.00	$177.00	False
33220115	Draftsman/CADD	9.00	HR	0.00	51.57		0.00	$464.17	False

Total Element Cost:	$8,949.10
Total 1st Year Tech Cost:	$1,328,286.66

Total Phase Element Cost **$10,697,008.99**

Phase Cost Over Time Report

Alternative 3: Full Removal of Fill to Unrestricted Use SCOs (Self-Implementing)

Software:

RACER Version: RACER® Version 11.5.99.0
Database Location: C:\Users\Administrator\Documents\RACER 11.5\Racer_Backup_6_3_2022.mdb

Folder:

Folder Name: Gibson Scrapyard

Project:

ID: 851058
Name: Gibson Scrapyard
Category: None

Location
State / Country: NEW YORK
City: CORNING

Location Modifier	Default	User	Reason for changes
	1.110	1.110	

Options
Database: System Costs
Cost Database Date: 2019
Report Option: Calendar

Description Feasibility Study-Remedial Action Alternatives

Site:

ID: 851058

Phase Cost Over Time Report

ID: 851058
Name: Gibson Scrapyard
Type: None

Media/Waste Type

Primary: Soil
Secondary: Ordnance (not residual)

Contaminant

Primary: PCBs
Secondary: Volatile Organic Compounds (VOCs)

Phase Names

Pre-Study	
Study	
Design	**Safety Level:** E
Removal/Interim Action	**Safety Level:** D
Remedial Action	**Safety Level:** D
Operations & Maintenance	**Safety Level:** D
Long Term Monitoring	**Safety Level:** D
Site Closeout	**Safety Level:** D

In the RACER Preferences the default value for the Safety Level is established. This sets the default value for the safety level for each technology model based on the type of work being completed. Note: RACER Technologies that safety level is not appropriate to change from the default are hard-coded to estimate costs without a safety level productivity factor, which is Safety Level E

Documentation

Description: Costing for various alternatives for Gibson Scrapyard Feasibility Study
Support Team: Megan Miller, Liane DeSantis, Kathryn Katzer
References: Remedial Investigation, Feasibility Study

Estimator Information

Estimator Name: Angela McGinty
Estimator Title: Engineer
Agency/Org./Office: EA Engineering, Science, and Technology, Inc., PBC

Phase Cost Over Time Report

Agency/Org./Office: EA Engineering, Science, and Technology, Inc., PBC
Business Address: 1311 Continental Drive
Suite K
Abingdon, MD 21009
Telephone Number: 4106707182
Email Address: amcginty@eaest.com

Estimate Prepared Date: 04/12/2022
Estimator Signature: _____ **Date:** _____

Reviewer Information

Reviewer Name: Megan Miller
Reviewer Title: Engineer
Agency/Org./Office: EA Science and Technology
Business Address: 269 W. Jefferson Street
Syracuse, NY 13202
Telephone Number: 315-565-6557
Email Address: mmiller@eaest.com

Date Reviewed: 04/12/2022
Reviewer Signature: _____ **Date:** _____

Phase Cost Over Time Report

Technology Name	Technology	2023	2024	2025	2026	2027	2028
Pre-Design Investigation	1	$1,353,287	$0	$0	$0	$0	$0
Clear and Grub	2	$7,698	$0	$0	$0	$0	$0
Fencing and Bridge	2	$91,321	$0	$0	$0	$0	$0
Five-Year Review	2	$0	$0	$0	$0	$0	$14,216
Site Management	2	$63,550	$0	$0	$0	$0	$0
Well Abandonment	2	$20,529	$0	$0	$0	$0	$0
Off-site Transportation and Waste Disposal	3	$4,571,442	$0	$0	$0	$0	$0
Off-site Transportation and Waste Disposal	3	$1,829,462	$0	$0	$0	$0	$0
MEC Sifting	4	$1,168,326	$0	$0	$0	$0	$0
MEC Sifting	4	$1,057,520	$0	$0	$0	$0	$0
MEC Sifting	4	$544,658	$0	$0	$0	$0	$0
Total Phase Cost		$10,682,793	$0	$0	$0	$0	$14,216

Phase Cost Over Time Report

Technology Name	Technology	2029	2030	2031	2032	2033	2034
Pre-Design Investigation	1	$0	$0	$0	$0	$0	$0
Clear and Grub	2	$0	$0	$0	$0	$0	$0
Fencing and Bridge	2	$0	$0	$0	$0	$0	$0
Five-Year Review	2	$0	$0	$0	$0	$14,216	$0
Site Management	2	$0	$0	$0	$0	$0	$0
Well Abandonment	2	$0	$0	$0	$0	$0	$0
Off-site Transportation and Waste Disposal	3	$0	$0	$0	$0	$0	$0
Off-site Transportation and Waste Disposal	3	$0	$0	$0	$0	$0	$0
MEC Sifting	4	$0	$0	$0	$0	$0	$0
MEC Sifting	4	$0	$0	$0	$0	$0	$0
MEC Sifting	4	$0	$0	$0	$0	$0	$0
Total Phase Cost		$0	$0	$0	$0	$14,216	$0

Phase Cost Over Time Report

Technology Name	Technology	2035	2036	2037	2038	2039	2040
Pre-Design Investigation	1	$0	$0	$0	$0	$0	$0
Clear and Grub	2	$0	$0	$0	$0	$0	$0
Fencing and Bridge	2	$0	$0	$0	$0	$0	$0
Five-Year Review	2	$0	$0	$0	###	$0	$0
Site Management	2	$0	$0	$0	$0	$0	$0
Well Abandonment	2	$0	$0	$0	$0	$0	$0
Off-site Transportation and Waste Disposal	3	$0	$0	$0	$0	$0	$0
Off-site Transportation and Waste Disposal	3	$0	$0	$0	$0	$0	$0
MEC Sifting	4	$0	$0	$0	$0	$0	$0
MEC Sifting	4	$0	$0	$0	$0	$0	$0
MEC Sifting	4	$0	$0	$0	$0	$0	$0
Total Phase Cost		$0	$0	$0	###	$0	$0

Phase Cost Over Time Report

Technology Name	Technology	2041	2042	2043	2044	2045	2046
Pre-Design Investigation	1	$0	$0	$0	$0	$0	$0
Clear and Grub	2	$0	$0	$0	$0	$0	$0
Fencing and Bridge	2	$0	$0	$0	$0	$0	$0
Five-Year Review	2	$0	$0	$14,216	$0	$0	$0
Site Management	2	$0	$0	$0	$0	$0	$0
Well Abandonment	2	$0	$0	$0	$0	$0	$0
Off-site Transportation and Waste Disposal	3	$0	$0	$0	$0	$0	$0
Off-site Transportation and Waste Disposal	3	$0	$0	$0	$0	$0	$0
MEC Sifting	4	$0	$0	$0	$0	$0	$0
MEC Sifting	4	$0	$0	$0	$0	$0	$0
MEC Sifting	4	$0	$0	$0	$0	$0	$0
Total Phase Cost		$0	$0	$14,216	$0	$0	$0

Phase Cost Over Time Report

Technology Name	Technology	2047	2048	2049	2050	2051	2052
Pre-Design Investigation	1	$0	$0	$0	$0	$0	$0
Clear and Grub	2	$0	$0	$0	$0	$0	$0
Fencing and Bridge	2	$0	$0	$0	$0	$0	$0
Five-Year Review	2	$0	$14,216	$0	$0	$0	$0
Site Management	2	$0	$0	$0	$0	$0	$0
Well Abandonment	2	$0	$0	$0	$0	$0	$0
Off-site Transportation and Waste Disposal	3	$0	$0	$0	$0	$0	$0
Off-site Transportation and Waste Disposal	3	$0	$0	$0	$0	$0	$0
MEC Sifting	4	$0	$0	$0	$0	$0	$0
MEC Sifting	4	$0	$0	$0	$0	$0	$0
MEC Sifting	4	$0	$0	$0	$0	$0	$0
Total Phase Cost		$0	$14,216	$0	$0	$0	$0

Phase Cost Over Time Report

Technology Name	Technology	2053	Total				
Pre-Design Investigation	1	$0	$1,353,287				
Clear and Grub	2	$0	$7,698				
Fencing and Bridge	2	$0	$91,321				
Five-Year Review	2	$14,216	$85,297				
Site Management	2	$0	$63,550				
Well Abandonment	2	$0	$20,529				
Off-site Transportation and Waste Disposal	3	$0	$4,571,442				
Off-site Transportation and Waste Disposal	3	$0	$1,829,462				
MEC Sifting	4	$0	$1,168,326				
MEC Sifting	4	$0	$1,057,520				
MEC Sifting	4	$0	$544,658				
Total Phase Cost		$14,216	$10,793,090	$0	$0	$0	$0

Phase Technology Cost Detail Report

Alternative 4: Partial Removal of Fill with 40 CFR Part 761 Cap - Remove all soil exceeding 100 ppm PCBs from commercial parcels, all soil exceeding 10 ppm PCBs for residential parcel; Full Cap (Self-Implementing)

Software:

RACER Version: RACER® Version 11.5.99.0
Database Location: C:\Users\Administrator\Documents\RACER 11.5\Racer_Backup_6_3_2022.mdb

Folder:

Folder Name: Gibson Scrapyard

Project:

ID: 851058
Name: Gibson Scrapyard
Category: None

Location
State / Country: NEW YORK
City: CORNING

Location Modifier	Default	User	Reason for changes
	1.110	1.110	

Options
Database: System Costs
Cost Database Date: 2019
Report Option: Calendar

Description Feasibility Study-Remedial Action Alternatives

Site:

ID: 851058
Name: Gibson Scrapyard
Type: None

Media/Waste Type
Primary: Soil
Secondary: Ordnance (not residual)

Contaminant
Primary: PCBs
Secondary: Volatile Organic Compounds (VOCs)

Phase Names

Pre-Study	
Study	
Design	**Safety Level:** E
Removal/Interim Action	**Safety Level:** D
Remedial Action	**Safety Level:** D
Operations & Maintenance	**Safety Level:** D
Long Term Monitoring	**Safety Level:** D
Site Closeout	**Safety Level:** D

In the RACER Preferences the default value for the Safety Level is established. This sets the default value for the safety level for each technology model based on the type of work being completed. Note: RACER Technologies that safety level is not appropriate to change from the default are hard-coded to estimate costs without a safety level productivity factor, which is Safety Level E.

Documentation
Description: Costing for various alternatives for Gibson Scrapyard Feasibility Study
Support Team: Megan Miller, Liane DeSantis, Kathryn Katzer
References: Remedial Investigation, Feasibility Study

Estimator Information

Estimator Information

Estimator Name: Angela McGinty
Estimator Title: Engineer
Agency/Org./Office: EA Engineering, Science, and Technology, Inc., PBC
Business Address: 1311 Continental Drive
Suite K
Abingdon, MD 21009
Telephone Number: 4106707182
Email Address: amcginty@eaest.com
Estimate Prepared Date: 04/12/2022
Estimator Signature: _____ **Date:** _____

Reviewer Information

Reviewer Name: Megan Miller
Reviewer Title: Engineer
Agency/Org./Office: EA Science and Technology
Business Address: 269 W. Jefferson Street
Syracuse, NY 13202
Telephone Number: 315-565-6557
Email Address: mmiller@eaest.com
Date Reviewed: 04/12/2022
Reviewer Signature: _____ **Date:** _____

Phase Documentation:

Phase Type: Remedial Action
Phase Name: Alternative 4-Partial Removal, Off-Site Disposal, and 40 CFR Part 761 Cap
Description: Partial removal, MEC sifting, and off-site disposal; 40 CFR Part 761 Cap; chain link fence, gate, and signs; inspections and reports; 5-year Reveiws
Approach: Ex Situ
Start Date: April, 2023
Labor Rate Group: System Labor Rate
Analysis Rate Group: System Analysis Rate
Phase Markup Template: System Defaults

Technology Markups	Markup	% Prime	% Sub.
Clear and Grub	Yes	100	0
Site Management	Yes	100	0
Fencing	Yes	100	0
Five-Year Review	Yes	100	0
MEC Sifting	Yes	100	0
Capping	Yes	100	0
MEC Sifting	Yes	100	0
Off-site Transportation and Waste Disposal	Yes	100	0
Well Abandonment	Yes	100	0
Remedial Investigation	Yes	100	0
Off-site Transportation and Waste Disposal	Yes	100	0

Total Marked-up Cost: $5,382,227.26

Technologies:

Technology 1: Site Management

Element: Planning Docs

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33220102	Project Manager	37.00	HR	0.00	77.38		0.00	$2,862.99	False
33220105	Project Engineer	90.00	HR	0.00	80.00		0.00	$7,200.11	False
33220106	Staff Engineer	165.00	HR	0.00	67.57		0.00	$11,148.34	False
33220110	QA/QC Officer	28.00	HR	0.00	52.96		0.00	$1,482.83	False
33220114	Word Processing/Clerical	150.00	HR	0.00	36.29		0.00	$5,442.89	False
33220115	Draftsman/CADD	68.00	HR	0.00	42.29		0.00	$2,875.79	False
33220503	Attorney, Partner, Real Estate	22.00	HR	0.00	154.53		0.00	$3,399.75	False
33240101	Other Direct Costs	1.00	LS	860.32	0.00		0.00	$860.32	False

Total Element Cost: $35,273.01

Element: Planning Meetings

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33010202	Per Diem (per person)	2.00	DAY	0.00	0.00		144.00	$288.00	False
Technology:	Site Management								
33220102	Project Manager	40.00	HR	0.00	77.38		0.00	$3,095.12	False
33220114	Word Processing/Clerical	32.00	HR	0.00	36.29		0.00	$1,161.15	False
33220115	Draftsman/CADD	16.00	HR	0.00	42.29		0.00	$676.66	False
33240101	Other Direct Costs	1.00	LS	123.32	0.00		0.00	$123.32	False

Total Element Cost: $5,344.25

Element: Implementation

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
18010412	Construction Signs	90.00	SF	27.75	0.00		0.00	$2,497.50	False
33240101	Other Direct Costs	1.00	LS	100.00	0.00		0.00	$100.00	True

Total Element Cost: $2,597.50

Element: Monitoring & Enforcement

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33010104	Sample collection, vehicle mileage charge, car or van	400.00	MI	0.00	0.00		0.30	$119.88	False
33029901	Magnetometer	1.00	DAY	0.00	0.00		104.34	$104.34	False
33040934	UXO Technician II	8.00	HR	0.00	44.38		0.00	$355.02	False
33220102	Project Manager	60.00	HR	0.00	94.36		0.00	$5,661.81	False
33220106	Staff Engineer	120.00	HR	0.00	82.40		0.00	$9,887.66	False
33220110	QA/QC Officer	4.00	HR	0.00	52.96		0.00	$211.83	False

Technology: Site Management

33220112	Field Technician	8.00	HR	0.00	44.93	0.00	$359.42	False
33220114	Word Processing/Clerical	39.00	HR	0.00	44.25	0.00	$1,725.79	False
33220115	Draftsman/CADD	16.00	HR	0.00	42.29	0.00	$676.66	False
33220119	Health and Safety Officer	4.00	HR	0.00	69.23	0.00	$276.90	False
33240101	Other Direct Costs	1.00	LS	706.25	0.00	0.00	$706.25	False

Total Element Cost: $20,085.58

Element: Modification/Termination

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33220102	Project Manager	2.00	HR	0.00	77.38	0.00		$154.76	False
33220110	QA/QC Officer	1.00	HR	0.00	52.96	0.00		$52.96	False
33220114	Word Processing/Clerical	1.00	HR	0.00	36.29	0.00		$36.29	False
33240101	Other Direct Costs	1.00	LS	6.10	0.00	0.00		$6.10	False

Total Element Cost: $250.10
Total 1st Year Tech Cost: $63,550.44

Technology 2: Fencing and Bridge

Element:

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
Technology:	Fencing and Bridge								
18040108	7' Galvanized Chain-link Fence	1,400.00	LF	9.50	10.00		0.00	$28,341.18	True
18040171	Fence, chain link industrial, double swing gates, 8' high, 20' opening, includes excavation, posts & hardware in concrete	1.00	OPN	777.00	1,419.08		0.00	$2,451.82	False
see note*	Modular Steel Bridge, 40' x 16', delivered; 4 laborers 2 days installation	1	EACH	50,000	5,440		0.00	$55,440.00	
18050206	Erosion control, silt fence, polypropylene, 3' high, includes 7.5' posts	1,400.00	LF	1.11	0.49		0.00	$2,236.24	False
33010202	Per Diem (per person)	3.00	DAY	0.00	0.00		144.00	$432.00	False
33220105	Project Engineer	24.00	HR	0.00	80.00		0.00	$1,920.03	False
33430201	Miscellaneous Minor Field Installation	1.00	LS	0.00	0.00		0.00	$500.00	True

Total Element Cost: $91,321.28
Total 1st Year Tech Cost: $91,321.28

*Cost obtained from Paragon Bridgeworks

Technology 3: Five-Year Review

Element: Document Review

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost		Extended Cost	Cost Override
33220102	Project Manager	12.00	HR	0.00	94.36		0.00		$1,132.36	False
33220105	Project Engineer	15.00	HR	0.00	80.00		0.00		$1,200.02	False
33220108	Project Scientist	11.00	HR	0.00	87.11		0.00		$958.19	False
33220109	Staff Scientist	23.00	HR	0.00	70.35		0.00		$1,618.04	False
					Total Element Cost:			$4,908.61		

Element: Report

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost		Extended Cost	Cost Override
33220102	Project Manager	12.00	HR	0.00	94.36		0.00		$1,132.36	False
33220105	Project Engineer	31.00	HR	0.00	80.00		0.00		$2,480.04	False
33220108	Project Scientist	25.00	HR	0.00	87.11		0.00		$2,177.70	False
33220109	Staff Scientist	50.00	HR	0.00	70.35		0.00		$3,517.48	False
					Total Element Cost:			$9,307.58		
					Total 1st Year Tech Cost:			$14,216.19		

Technology 4A: MEC Sifting

Element: Site Visit

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost		Extended Cost	Cost Override
33010104	Sample collection, vehicle mileage charge, car or van	100.00	MI	0.00	0.00		0.30		$29.97	False
33010108	Sedan, Automobile, Rental	3.00	DAY	0.00	0.00		59.21		$177.62	False
33010202	Per Diem (per person)	3.00	DAY	0.00	0.00		144.00		$432.00	False
33040921	Senior UXO Supervisor (SUXOS)	8.00	HR	0.00	70.07		0.00		$560.59	False
33040923	UXO Project Manager	8.00	HR	0.00	102.13		0.00		$817.05	False
33040925	UXO Staff Engineer	8.00	HR	0.00	65.36		0.00		$522.85	False
33041101	Airfare	3.00	LS	0.00	0.00		0.00		$0.00	False
Technology:	MEC Sifting									
33041302	Munitions Response Workplan (Moderate Complexity)	1.00	EA	88.80	12,559.85		0.00		$12,648.65	False
33041305	Explosive Safety Submission (Moderate Complexity)	1.00	EA	177.60	22,461.37		0.00		$22,638.97	False
33240101	Other Direct Costs	1.00	LS	500.00	0.00		0.00		$500.00	False
					Total Element Cost:			$38,327.71		

Element: Site Preparation

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33010202	Per Diem (per person)	6.00	DAY	0.00	0.00		144.00	$864.00	False
33040268	Schonstedt GA-52Cx Weekly Rental	6.00	WK	0.00	0.00		94.18	$565.10	False
33040933	UXO Technician I	30.00	HR	0.00	36.84		0.00	$1,105.23	False
33040934	UXO Technician II	20.00	HR	0.00	44.38		0.00	$887.56	False
33040935	UXO Technician III (UXO Supervisor)	10.00	HR	0.00	52.43		0.00	$524.25	False

Total Element Cost: $3,946.14

Element: Excavation

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
17030279	4 CY, Crawler-mounted, Hydraulic Excavator	4,033.33	CY	0.00	0.73		0.00	$6,715.49	False
Technology:	MEC Sifting								
33010114	Mobilization Equipment (Soils)	1.00	LS	0.00	1,566.74		0.00	$3,099.32	False
33040518	UXO Vehicle Modification - Acrylic Glass Sheets 3" Thick	26.00	SF	263.07	28.40		0.00	$7,578.35	False
33040519	UXO Vehicle Modification - Steel Plates 3/4" Thick	122.00	SF	44.96	0.00		0.00	$5,484.51	False
33040520	UXO Vehicle Modification - Welding Steel Plates 3/4" Thick	70.00	LF	3.22	49.75		0.00	$4,065.26	False

Total Element Cost: $26,942.94

Element: Sifting

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
17030285	12 CY, Dump Truck	60.00	HR	0.00	55.96		0.00	$5,780.88	False
17030427	Sand Bags	1,000.00	EA	0.46	0.00		0.00	$455.10	False
17030436	0.75 CY Wheel Loader	60.00	HR	0.00	84.39		0.00	$7,014.98	False
33010202	Per Diem (per person)	42.00	DAY	0.00	0.00		144.00	$6,048.00	False
33020315	Ambient air monitor, monthly rental	1.00	MO	0.00	0.00		277.50	$277.50	False
33040518	UXO Vehicle Modification - Acrylic Glass Sheets 3" Thick	32.00	SF	263.07	28.40		0.00	$9,327.20	False
33040651	4 X 4 Truck- Rental/Lease	1.00	DAY	0.00	0.00		0.00	$190.92	False
33040662	Trommel Screener	1.00	MO	0.00	0.00		0.00	$486.62	False
33040693	Manual Clean Suspended Electromagnet	1.00	MO	0.00	0.00		1,995.79	$1,995.79	False
33040933	UXO Technician I	40.00	HR	0.00	36.84		0.00	$1,473.64	False
33040934	UXO Technician II	20.00	HR	0.00	44.38		0.00	$887.56	False

Technology: MEC Sifting

33040935	UXO Technician III (UXO Supervisor)	10.00	HR	0.00	52.43	0.00	$524.25	False
33188605	Adjustable Height Radial Stacker Conveyor	6.00	DAY	0.00	0.00	0.00	$65.00	False
33188606	Feeder Conveyor, 50' long with 7 CY Hopper	6.00	DAY	0.00	0.00	0.00	$672.39	False
33240101	Other Direct Costs	2.00	LS	1,746.12	0.00	0.00	$3,492.23	False

Total Element Cost: $38,692.06

Element: Backfill

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
17030423	Unclassified Fill, 6" Lifts, Off-Site, Includes Delivery, Spreading, and Compaction	4,034.00	CY	20.78	0.93		0.01	$91,256.34	False
17040101	Cleaning Up, site debris clean up and removal	3.40	ACR	0.00	446.46		0.00	$1,695.92	False
18050101	Area Preparation, 67% Level & 33% Slope	3.40	ACR	0.00	16.93		0.00	$132.09	False
33010115	Demobilize Equipment (Soils)	1.00	LS	0.00	1,566.74		0.00	$3,099.32	False

Total Element Cost: $96,183.67

Element: Site Management

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
Technology:	MEC Sifting								
33010202	Per Diem (per person)	56.00	DAY	0.00	0.00		144.00	$8,064.00	False
33040921	Senior UXO Supervisor (SUXOS)	100.00	HR	0.00	70.07		0.00	$7,007.43	False
33040923	UXO Project Manager	100.00	HR	0.00	102.13		0.00	$10,213.11	False
33040930	UXO QC Specialist	100.00	HR	0.00	62.35		0.00	$6,234.87	False
33040931	UXO Safety Officer	100.00	HR	0.00	62.72		0.00	$6,271.50	False

Total Element Cost: $37,790.91

Element: Stakeholder Involvement

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33040923	UXO Project Manager	12.00	HR	0.00	102.13		0.00	$1,225.57	False
33040935	UXO Technician III (UXO Supervisor)	12.00	HR	0.00	52.43		0.00	$629.10	False
33041305	Explosive Safety Submission (Moderate Complexity)	1.00	EA	177.60	22,461.37		0.00	$22,638.97	False
33041314	Site Specific Final Report (Moderate Complexity)	1.00	EA	177.60	15,555.03		0.00	$15,732.63	False

Total Element Cost: $40,226.28
Total 1st Year Tech Cost: $282,109.71

Technology 4B: MEC Sifting

Element: Excavation

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
17030279	4 CY, Crawler-mounted, Hydraulic Excavator	3,065.33	CY	0.00	0.73		0.00	$5,103.77	False
33040518	UXO Vehicle Modification - Acrylic Glass Sheets 3" Thick	26.00	SF	263.07	28.40		0.00	$7,578.35	False
33040519	UXO Vehicle Modification - Steel Plates 3/4" Thick	122.00	SF	44.96	0.00		0.00	$5,484.51	False
33040520	UXO Vehicle Modification - Welding Steel Plates 3/4" Thick	70.00	LF	3.22	49.75		0.00	$4,065.26	False

Total Element Cost: $22,231.90

Element: Sifting

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
17030285	12 CY, Dump Truck	40.00	HR	0.00	55.96		0.00	$3,853.92	False
17030427	Sand Bags	1,000.00	EA	0.46	0.00		0.00	$455.10	False
17030436	0.75 CY Wheel Loader	40.00	HR	0.00	84.39		0.00	$4,676.65	False
33010202	Per Diem (per person)	28.00	DAY	0.00	0.00		144.00	$4,032.00	False
33040518	UXO Vehicle Modification - Acrylic Glass Sheets 3" Thick	32.00	SF	263.07	28.40		0.00	$9,327.20	False
33040651	4 X 4 Truck- Rental/Lease	1.00	DAY	0.00	0.00		0.00	$190.92	False
33040662	Trommel Screener	1.00	MO	0.00	0.00		0.00	$486.62	False
33040693	Manual Clean Suspended Electromagnet	1.00	MO	0.00	0.00		1,995.79	$1,995.79	False
33040933	UXO Technician I	40.00	HR	0.00	36.84		0.00	$1,473.64	False
33040934	UXO Technician II	20.00	HR	0.00	44.38		0.00	$887.56	False
33040935	UXO Technician III (UXO Supervisor)	10.00	HR	0.00	52.43		0.00	$524.25	False
33188605	Adjustable Height Radial Stacker Conveyor	4.00	DAY	0.00	0.00		0.00	$43.33	False
33188606	Feeder Conveyor, 50' long with 7 CY Hopper	4.00	DAY	0.00	0.00		0.00	$448.26	False
33240101	Other Direct Costs	2.00	LS	1,419.76	0.00		0.00	$2,839.52	False

Total Element Cost: $31,234.77

Element: Backfill

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
17030423	Unclassified Fill, 6" Lifts, Off-Site, Includes Delivery, Spreading, and Compaction	3,066.00	CY	20.78	0.93		0.01	$69,358.44	False
33010115	Demobilize Equipment (Soils)	1.00	LS	0.00	1,566.74		0.00	$3,099.32	False

Total Element Cost: $72,457.76

Element: Site Management

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33010202	Per Diem (per person)	40.00	DAY	0.00	0.00		144.00	$5,760.00	False
33040921	Senior UXO Supervisor (SUXOS)	70.00	HR	0.00	70.07		0.00	$4,905.20	False
33040923	UXO Project Manager	70.00	HR	0.00	102.13		0.00	$7,149.18	False
33040930	UXO QC Specialist	70.00	HR	0.00	62.35		0.00	$4,364.41	False
33040931	UXO Safety Officer	70.00	HR	0.00	62.72		0.00	$4,390.05	False

Total Element Cost: $26,568.84
Total 1st Year Tech Cost: $152,493.26

Technology 5: Capping

Element:

Technology: Capping

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
17030615	Geosynthetic soil stabilization, geotextile fabric, non-woven, 120 lb. tensile strength, includes scarifying and compaction	18,706.00	SY	0.99	0.31		0.00	$24,303.61	False
18050301	Loam or topsoil, imported topsoil, 6" deep, furnish and place	3,542.82	LCY	30.53	6.05		0.00	$136,345.62	False
18050402	Seeding, Vegetative Cover	3.51	ACR	3,522.70	511.10		0.00	$14,948.48	False
see note**	Clay, Low Permeability, Delivery, Placement, Compaction	6,613.26	CY	35.00	2.67		0.00	$259,614.81	False

Total Element Cost: $435,212.53
Total 1st Year Tech Cost: $435,212.53

**Clay supply and delivery quote from local supplier; placement RS Means 312323156010; compaction RS Means 312323236000

Technology 6A: Off-site Transportation and Waste Disposal

Technology: Off-site Transportation and Waste Disposal

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33020302	Portable organic vapor analyzer, monthly rental	1.00	MO	0.00	0.00		949.05	$949.05	False
33021618	Testing, purgeable organics (624, 8260)	24.00	EA	0.00	0.00		155.40	$3,729.60	False
33021619	Testing, semi-volatile organics (625, 8270)	415.00	EA	0.00	0.00		299.70	$124,375.50	False
33021620	Testing, TAL metals (6010/7000s)	415.00	EA	0.00	0.00		189.26	$78,540.83	False
33021702	TCLP (RCRA) (EPA 1311), Soil Analysis	9.00	EA	0.00	0.00		75.92	$683.32	False
33021717	Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Analysis	415.00	EA	0.00	0.00		108.50	$45,028.54	False
33190102	Bulk Solid Waste Loading Into Disposal Vehicle or Bulk Disposal Container	5,100.00	BCY	1.15	1.29		0.00	$14,540.49	False
33190205	Transport Bulk Solid Hazardous Waste, Maximum 20 CY (per Mile)	112,965.00	MI	0.00	0.00		2.05	$231,973.63	False
33190317	Waste Stream Evaluation Fee, Not Including 50% Rebate on 1st Shipment	1.00	EA	0.00	0.00		57.22	$57.22	False
33190807	32 Ft. Dump Truck, 6 Mil Liner, disposable	255.00	EA	31.19	0.00		0.00	$7,953.71	False
33197263	Commercial RCRA landfills, bulk waste, solid, based on 2,000 lb/CY	5,100.00	TON	0.00	0.00		80.32	$409,629.97	False
33220112	Field Technician	150.00	HR	0.00	44.93		0.00	$6,739.19	False

Total Element Cost: $924,201.03
Total 1st Year Tech Cost: $924,201.03

Technology 6B: Off-site Transportation and Waste Disposal

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33190102	Bulk Solid Waste Loading Into Disposal Vehicle or Bulk Disposal Container	2,000.00	BCY	1.15	1.29		0.00	$5,702.15	False
33190205	Transport Bulk Solid Hazardous Waste, Maximum 20 CY (per Mile)	1,000.00	MI	0.00	0.00		2.05	$2,053.50	False
33190317	Waste Stream Evaluation Fee, Not Including 50% Rebate on 1st Shipment	1.00	EA	0.00	0.00		57.22	$57.22	False
33190807	32 Ft. Dump Truck, 6 Mil Liner, disposable	100.00	EA	31.19	0.00		0.00	$3,119.10	False
33197270	Landfill Nonhazardous Solid Bulk Waste by CY	2,000.00	CY	0.00	0.00		34.33	$68,664.60	False

Total Element Cost: $79,596.57

Technology 7: Well Abandonment

Element:

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33010101	Mobilize/DeMobilize Drilling Rig & Crew	1.00	LS	0.00	1,526.06		0.00	$2,540.60	False
33190402	DOT steel drums, 55 gal., open only, 17H	11.00	EA	69.74	0.00		0.00	$767.15	False
33220112	Field Technician	40.00	HR	0.00	44.93		0.00	$1,797.12	False
33231104	Hollow Stem Auger, 11" Dia Borehole, Depth > 100 ft	210.00	LF	0.00	20.72		0.00	$12,081.74	False
33231178	Move Rig/Equipment Around Site	1.00	EA	100.20	219.37		0.00	$465.42	False
33231820	Grout Continuous Borehole	73.00	CF	39.41	0.00		0.00	$2,876.57	False

Total Element Cost: $20,528.60
Total 1st Year Tech Cost: $20,528.60

Technology 8: Pre-Design Investigation

Element: Subsurface Soil

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
Technology:	Remedial Investigation								
33020401	Disposable Materials per Sample	6,036.00	EA	8.62	0.00		0.00	$52,058.69	False
33020402	Decontamination Materials per Sample	6,036.00	EA	19.70	0.00		0.00	$118,924.29	False
33020667	Direct Push Rig, Truck Mounted, Non Hydraulic, Includes Labor, Sampling, Decontamination	200.00	DAY	0.00	0.00		1,665.00	$333,000.00	False
33020668	Mobilize Direct Push Rig and Crew	11.00	DAY	0.00	0.00		1,665.00	$18,315.00	False
33020669	Demobilize Direct Push Rig and Crew	11.00	EA	1,665.00	0.00		0.00	$18,315.00	False
33021783	PCBs in Soil (Method SW8082)	6,036.00	EA	0.00	0.00		111.00	$669,996.01	False
33220102	Project Manager	200.00	HR	0.00	94.36		0.00	$18,872.71	False
33220112	Field Technician	2,000.00	HR	0.00	44.93		0.00	$89,855.85	False

Total Element Cost: $1,319,337.56

Element: Site Characterization

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33010104	Sample collection, vehicle mileage charge, car or van	40.00	MI	0.00	0.00		0.30	$11.99	False
33220102	Project Manager	2.00	HR	0.00	94.36		0.00	$188.73	False
33220103	Office Manager	5.00	HR	0.00	78.07		0.00	$390.33	False
33220106	Staff Engineer	60.00	HR	0.00	82.40		0.00	$4,943.83	False
33220109	Staff Scientist	23.00	HR	0.00	70.35		0.00	$1,618.04	False
33220111	Certified Industrial Hygienist	3.00	HR	0.00	85.48		0.00	$256.45	False
33220112	Field Technician	20.00	HR	0.00	44.93		0.00	$898.56	False

Technology: Remedial Investigation

33220114	Word Processing/Clerical	4.00	HR	0.00	44.25		0.00	$177.00	False
33220115	Draftsman/CADD	9.00	HR	0.00	51.57		0.00	$464.17	False
	Hydrologic Analysis	25,000	EA	0.00			0.00	$25,000	

Total Element Cost: $33,949.10
Total 1st Year Tech Cost: $1,353,286.66

Technology 9: Clear and Grub

Element:

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
17010102	Selective clearing, brush, medium clearing, with dozer and brush rake, excludes removal offsite	1.00	ACR	0.00	131.75		0.00	$242.04	False
17010211	Site clearing trees, with 335 H.P. dozer, to 12" diameter	75.00	EA	0.00	5.50		0.00	$1,057.38	False
17010212	Site clearing trees, with 335 H.P. dozer, to 24" diameter	25.00	EA	0.00	8.23		0.00	$528.21	False
17010315	Grub stumps, with 335 H.P. dozer, to 12" diameter	75.00	EA	0.00	3.29		0.00	$707.91	False
17010316	Grub stumps, with 335 H.P. dozer, to 24" diameter	25.00	EA	0.00	32.93		0.00	$2,359.88	False
17010402	Chipping brush, medium brush	1.00	ACR	0.00	1,662.32		0.00	$2,125.09	False
17010501	Grub and stack, 140 H.P. dozer	121.00	CY	0.00	3.29		0.00	$677.38	False

Total Element Cost: $7,697.89
Total 1st Year Tech Cost: $7,697.89

Total Phase Element Cost **$3,424,214.16**

Phase Cost Over Time Report

Alternative 4: Partial Removal of Fill with 40 CFR Part 761 Cap - Remove all soil exceeding 100 ppm PCBs from commercial parcels, all soil exceeding 10 ppm PCBs for residential parcel; Full Cap (Self-Implementing)

Software:

RACER Version: RACER® Version 11.5.99.0
Database Location: C:\Users\Administrator\Documents\RACER 11.5\Racer Backup 6 3 2022.mdb

Folder:

Folder Name: Gibson Scrapyard

Project:

ID: 851058
Name: Gibson Scrapyard
Category: None

Location
State / Country: NEW YORK
City: CORNING

Location Modifier	Default	User	Reason for changes
	1.110	1.110	

Options
Database: System Costs
Cost Database Date: 2019
Report Option: Calendar

Description Feasibility Study-Remedial Action Alternatives

Site:

ID: 851058

Phase Cost Over Time Report

ID: 851058
Name: Gibson Scrapyard
Type: None

Media/Waste Type

Primary: Soil
Secondary: Ordnance (not residual)

Contaminant

Primary: PCBs
Secondary: Volatile Organic Compounds (VOCs)

Phase Names

Pre-Study	
Study	
Design	**Safety Level:** E
Removal/Interim Action	**Safety Level:** D
Remedial Action	**Safety Level:** D
Operations & Maintenance	**Safety Level:** D
Long Term Monitoring	**Safety Level:** D
Site Closeout	**Safety Level:** D

In the RACER Preferences the default value for the Safety Level is established. This sets the default value for the safety level for each technology model based on the type of work being completed. Note: RACER Technologies that safety level is not appropriate to change from the default are hard-coded to estimate costs without a safety level productivity factor, which is Safety Level E.

Documentation

Description: Costing for various alternatives for Gibson Scrapyard Feasibility Study.
Support Team: Megan Miller, Liane DeSantis, Kathryn Katzer
References: Remedial Investigation, Feasibility Study

Estimator Information

Estimator Name: Angela McGinty
Estimator Title: Engineer
Agency/Org./Office: EA Engineering, Science, and Technology, Inc., PBC

Phase Cost Over Time Report

Agency/Org./Office: EA Engineering, Science, and Technology, Inc., PBC
Business Address: 1311 Continental Drive
Suite K
Abingdon, MD 21009
Telephone Number: 4106707182
Email Address: amcginty@eaest.com

Estimate Prepared Date: 04/12/2022
Estimator Signature: _____ **Date:** _____

Reviewer Information

Reviewer Name: Megan Miller
Reviewer Title: Engineer
Agency/Org./Office: EA Science and Technology
Business Address: 269 W. Jefferson Street
Syracuse, NY 13202
Telephone Number: 315-565-6557
Email Address: mmiller@eaest.com

Date Reviewed: 04/12/2022
Reviewer Signature: _____ **Date:** _____

Phase Cost Over Time Report

Technology Name	Technology	2023	2024	2025	2026	2027	2028
Capping	2	$435,213	$0	$0	$0	$0	$0
Clear and Grub	2	$7,698	$0	$0	$0	$0	$0
Fencing and Bridge	2	$91,321	$0	$0	$0	$0	$0
Five-Year Review	2	$0	$0	$0	$0	$0	$14,216
Off-site Transportation and Waste Disposal	2	$924,201	$0	$0	$0	$0	$0
Pre-Design Investigation	2	$1,353,287	$0	$0	$0	$0	$0
Site Management	2	$63,550	$0	$20,086	$0	$20,086	$0
Well Abandonment	2	$20,529	$0	$0	$0	$0	$0
MEC Sifting	3	$282,110	$0	$0	$0	$0	$0
MEC Sifting	3	$152,493	$0	$0	$0	$0	$0
Off-site Transportation and Waste Disposal	3	$79,597	$0	$0	$0	$0	$0
Total Phase Cost		$3,409,998	$0	$20,086	$0	$20,086	$14,216

Phase Cost Over Time Report

Technology Name	Technology	2029	2030	2031	2032	2033	2034
Capping	2	$0	$0	$0	$0	$0	$0
Clear and Grub	2	$0	$0	$0	$0	$0	$0
Fencing and Bridge	2	$0	$0	$0	$0	$0	$0
Five-Year Review	2	$0	$0	$0	$0	$14,216	$0
Off-site Transportation and Waste Disposal	2	$0	$0	$0	$0	$0	$0
Pre-Design Investigation	2	$0	$0	$0	$0	$0	$0
Site Management	2	$20,086	$0	$20,086	$0	$20,086	$0
Well Abandonment	2	$0	$0	$0	$0	$0	$0
MEC Sifting	3	$0	$0	$0	$0	$0	$0
MEC Sifting	3	$0	$0	$0	$0	$0	$0
Off-site Transportation and Waste Disposal	3	$0	$0	$0	$0	$0	$0
Total Phase Cost		$20,086	$0	$20,086	$0	$34,302	$0

Phase Cost Over Time Report

Technology Name	Technology	2035	2036	2037	2038	2039	2040
Capping	2	$0	$0	$0	$0	$0	$0
Clear and Grub	2	$0	$0	$0	$0	$0	$0
Fencing and Bridge	2	$0	$0	$0	$0	$0	$0
Five-Year Review	2	$0	$0	$0	$14,216	$0	$0
Off-site Transportation and Waste Disposal	2	$0	$0	$0	$0	$0	$0
Pre-Design Investigation	2	$0	$0	$0	$0	$0	$0
Site Management	2	$20,086	$0	$20,086	$0	$20,086	$0
Well Abandonment	2	$0	$0	$0	$0	$0	$0
MEC Sifting	3	$0	$0	$0	$0	$0	$0
MEC Sifting	3	$0	$0	$0	$0	$0	$0
Off-site Transportation and Waste Disposal	3	$0	$0	$0	$0	$0	$0
Total Phase Cost		$20,086	$0	$20,086	$14,216	$20,086	$0

Phase Cost Over Time Report

Technology Name	Technology	2041	2042	2043	2044	2045	2046
Capping	2	$0	$0	$0	$0	$0	$0
Clear and Grub	2	$0	$0	$0	$0	$0	$0
Fencing and Bridge	2	$0	$0	$0	$0	$0	$0
Five-Year Review	2	$0	$0	$14,216	$0	$0	$0
Off-site Transportation and Waste Disposal	2	$0	$0	$0	$0	$0	$0
Pre-Design Investigation	2	$0	$0	$0	$0	$0	$0
Site Management	2	$20,086	$0	$20,086	$0	$20,086	$0
Well Abandonment	2	$0	$0	$0	$0	$0	$0
MEC Sifting	3	$0	$0	$0	$0	$0	$0
MEC Sifting	3	$0	$0	$0	$0	$0	$0
Off-site Transportation and Waste Disposal	3	$0	$0	$0	$0	$0	$0
Total Phase Cost		$20,086	$0	$34,302	$0	$20,086	$0

Phase Cost Over Time Report

Technology Name	Technology	2047	2048	2049	2050	2051	2052
Capping	2	$0	$0	$0	$0	$0	$0
Clear and Grub	2	$0	$0	$0	$0	$0	$0
Fencing and Bridge	2	$0	$0	$0	$0	$0	$0
Five-Year Review	2	$0	$14,216	$0	$0	$0	$0
Off-site Transportation and Waste Disposal	2	$0	$0	$0	$0	$0	$0
Pre-Design Investigation	2	$0	$0	$0	$0	$0	$0
Site Management	2	$20,086	$0	$20,086	$0	$20,086	$0
Well Abandonment	2	$0	$0	$0	$0	$0	$0
MEC Sifting	3	$0	$0	$0	$0	$0	$0
MEC Sifting	3	$0	$0	$0	$0	$0	$0
Off-site Transportation and Waste Disposal	3	$0	$0	$0	$0	$0	$0
Total Phase Cost		$20,086	$14,216	$20,086	$0	$20,086	$0

Phase Cost Over Time Report

Technology Name	Technology	2053	Total				
Capping	2	$0	$435,213				
Clear and Grub	2	$0	$7,698				
Fencing and Bridge	2	$0	$91,321				
Five-Year Review	2	$14,216	$85,297				
Off-site Transportation and Waste Disposal	2	$0	$924,201				
Pre-Design Investigation	2	$0	$1,353,287				
Site Management	2	$0	$344,749				
Well Abandonment	2	$0	$20,529				
MEC Sifting	3	$0	$282,110				
MEC Sifting	3	$0	$152,493				
Off-site Transportation and Waste Disposal	3	$0	$79,597				
Total Phase Cost		$14,216	$3,776,493	$0	$0	$0	$0

Phase Technology Cost Detail Report

Alternative 5: Partial Removal of Fill with 6 NYCRR Part 375 Soil Cover - Remove all soil exceeding 100 ppm PCBs from commercial parcels, all soil exceeding 10 ppm PCBs for residential parcel; Full Soil Cover (Self Implementing)

Software:

RACER Version: RACER® Version 11.5.99.0
Database Location: C:\Users\Administrator\Documents\RACER 11.5\Racer_Backup_6_3_2022.mdb

Folder:

Folder Name: Gibson Scrapyard

Project:

ID: 851058
Name: Gibson Scrapyard
Category: None

Location

State / Country: NEW YORK
City: CORNING

Location Modifier	Default	User	Reason for changes
	1.110	1.110	

Options

Database: System Costs
Cost Database Date: 2019
Report Option: Calendar

Description Feasibility Study-Remedial Action Alternatives

Site:

ID: 851058
Name: Gibson Scrapyard
Type: None

Media/Waste Type

Primary: Soil
Secondary: Ordnance (not residual)

Contaminant

Primary: PCBs
Secondary: Volatile Organic Compounds (VOCs)

Phase Names

Pre-Study
Study
Design **Safety Level:** E
Removal/Interim Action **Safety Level:** D
Remedial Action **Safety Level:** D
Operations & Maintenance **Safety Level:** D
Long Term Monitoring **Safety Level:** D
Site Closeout **Safety Level:** D

In the RACER Preferences the default value for the Safety Level is established. This sets the default value for the safety level for each technology model based on the type of work being completed. Note: RACER Technologies that safety level is not appropriate to change from the default are hard-coded to estimate costs without a safety level productivity factor, which is Safety Level E.

Documentation

Description: Costing for various alternatives for Gibson Scrapyard Feasibility Study.
Support Team: Megan Miller, Liane DeSantis, Kathryn Katzer
References: Remedial Investigation, Feasibility Study

Estimator Information

Estimator Information

Estimator Name: Angela McGinty
Estimator Title: Engineer
Agency/Org./Office: EA Engineering, Science, and Technology, Inc., PBC
Business Address: 1311 Continental Drive
Suite K
Abingdon, MD 21009
Telephone Number: 4106707182
Email Address: amcginty@eaest.com
Estimate Prepared Date: 04/12/2022
Estimator Signature: _____ **Date:** _____

Reviewer Information

Reviewer Name: Megan Miller
Reviewer Title: Engineer
Agency/Org./Office: EA Science and Technology
Business Address: 269 W. Jefferson Street
Syracuse, NY 13202
Telephone Number: 315-565-6557
Email Address: mmiller@eaest.com
Date Reviewed: 04/12/2022
Reviewer Signature: _____ **Date:** _____

Phase Documentation:

Phase Type: Remedial Action
Phase Name: Alternative 5-Partial Removal, Off-Site Disposal, and Full 6 NYCRR Part 375 Soil Cover
Description: Partial removal, MEC sifting, and off-site disposal; Full 6 NYCRR Part 375 Soil Cover; chain link fence, gate, and signs; inspections and reports; 5-year Reveiws
Approach: Ex Situ
Start Date: April, 2023
Labor Rate Group: System Labor Rate
Analysis Rate Group: System Analysis Rate
Phase Markup Template: System Defaults

Technology Markups	Markup	% Prime	% Sub.
Site Management	Yes	100	0
Fencing	Yes	100	0
Five-Year Review	Yes	100	0
Clear and Grub	Yes	100	0
MEC Sifting	Yes	100	0
Capping	Yes	100	0
MEC Sifting	Yes	100	0
Off-site Transportation and Waste Disposal	Yes	100	0
Well Abandonment	Yes	100	0
Remedial Investigation	Yes	100	0
Off-site Transportation and Waste Disposal	Yes	100	0

Total Marked-up Cost: $5,376,928.98

Technologies:

Technology 1: Site Management

Element: Planning Docs

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33220102	Project Manager	37.00	HR	0.00	77.38		0.00	$2,862.99	False
33220105	Project Engineer	90.00	HR	0.00	80.00		0.00	$7,200.11	False
33220106	Staff Engineer	165.00	HR	0.00	67.57		0.00	$11,148.34	False
33220110	QA/QC Officer	28.00	HR	0.00	52.96		0.00	$1,482.83	False
33220114	Word Processing/Clerical	150.00	HR	0.00	36.29		0.00	$5,442.89	False
33220115	Draftsman/CADD	68.00	HR	0.00	42.29		0.00	$2,875.79	False
33220503	Attorney, Partner, Real Estate	22.00	HR	0.00	154.53		0.00	$3,399.75	False
33240101	Other Direct Costs	1.00	LS	860.32	0.00		0.00	$860.32	False

Total Element Cost: $35,273.01

Element: Planning Meetings

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33010202	Per Diem (per person)	2.00	DAY	0.00	0.00		144.00	$288.00	False

Technology: Site Management

33220102	Project Manager	40.00	HR	0.00	77.38	0.00	$3,095.12	False
33220114	Word Processing/Clerical	32.00	HR	0.00	36.29	0.00	$1,161.15	False
33220115	Draftsman/CADD	16.00	HR	0.00	42.29	0.00	$676.66	False
33240101	Other Direct Costs	1.00	LS	123.32	0.00	0.00	$123.32	False

Total Element Cost: $5,344.25

Element: Implementation

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
18010412	Construction Signs	90.00	SF	27.75	0.00		0.00	$2,497.50	False
33240101	Other Direct Costs	1.00	LS	100.00	0.00		0.00	$100.00	True

Total Element Cost: $2,597.50

Element: Monitoring & Enforcement

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33010104	Sample collection, vehicle mileage charge, car or van	400.00	MI	0.00	0.00		0.30	$119.88	False
33029901	Magnetometer	1.00	DAY	0.00	0.00		104.34	$104.34	False
33040934	UXO Technician II	8.00	HR	0.00	44.38		0.00	$355.02	False
33220102	Project Manager	60.00	HR	0.00	94.36		0.00	$5,661.81	False
33220106	Staff Engineer	120.00	HR	0.00	82.40		0.00	$9,887.66	False
33220110	QA/QC Officer	4.00	HR	0.00	52.96		0.00	$211.83	False

Technology: Site Management

33220112	Field Technician	8.00	HR	0.00	44.93	0.00	$359.42	False
33220114	Word Processing/Clerical	39.00	HR	0.00	44.25	0.00	$1,725.79	False
33220115	Draftsman/CADD	16.00	HR	0.00	42.29	0.00	$676.66	False
33220119	Health and Safety Officer	4.00	HR	0.00	69.23	0.00	$276.90	False
33240101	Other Direct Costs	1.00	LS	706.25	0.00	0.00	$706.25	False

Total Element Cost: $20,085.58

Element: Modification/Termination

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33220102	Project Manager	2.00	HR	0.00	77.38		0.00	$154.76	False
33220110	QA/QC Officer	1.00	HR	0.00	52.96		0.00	$52.96	False
33220114	Word Processing/Clerical	1.00	HR	0.00	36.29		0.00	$36.29	False
33240101	Other Direct Costs	1.00	LS	6.10	0.00		0.00	$6.10	False

Total Element Cost: $250.10

Total 1st Year Tech Cost: $63,550.44

Technology 2: Fencing and Bridge

Element:

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
Technology:	Fencing and Bridge								
18040108	7' Galvanized Chain-link Fence	1,400.00	LF	9.50	10.00		0.00	$28,341.18	True
18040171	Fence, chain link industrial, double swing gates, 8' high, 20' opening, includes excavation, posts & hardware in concrete	1.00	OPN	777.00	1,419.08		0.00	$2,451.82	False
see note*	Modular Steel Bridge, 40' x 16', delivered; 4 laborers 2 days installation	1	EACH	50,000	5,440		0.00	$55,440.00	
18050206	Erosion control, silt fence, polypropylene, 3' high, includes 7.5' posts	1,400.00	LF	1.11	0.49		0.00	$2,236.24	False
33010202	Per Diem (per person)	3.00	DAY	0.00	0.00		144.00	$432.00	False
33220105	Project Engineer	24.00	HR	0.00	80.00		0.00	$1,920.03	False
33430201	Miscellaneous Minor Field Installation	1.00	LS	0.00	0.00		0.00	$500.00	True

Total Element Cost: $91,321.28
Total 1st Year Tech Cost: $91,321.28

*Cost obtained from Paragon Bridgeworks

Technology 3: Five-Year Review

Element: Document Review

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33220102	Project Manager	12.00	HR	0.00	94.36		0.00	$1,132.36	False
33220105	Project Engineer	15.00	HR	0.00	80.00		0.00	$1,200.02	False
33220108	Project Scientist	11.00	HR	0.00	87.11		0.00	$958.19	False
33220109	Staff Scientist	23.00	HR	0.00	70.35		0.00	$1,618.04	False

Total Element Cost: $4,908.61

Element: Report

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33220102	Project Manager	12.00	HR	0.00	94.36		0.00	$1,132.36	False
33220105	Project Engineer	31.00	HR	0.00	80.00		0.00	$2,480.04	False
33220108	Project Scientist	25.00	HR	0.00	87.11		0.00	$2,177.70	False
33220109	Staff Scientist	50.00	HR	0.00	70.35		0.00	$3,517.48	False

Total Element Cost: $9,307.58
Total 1st Year Tech Cost: $14,216.19

Technology 4A: MEC Sifting

Element: Site Visit

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33010104	Sample collection, vehicle mileage charge, car or van	100.00	MI	0.00	0.00		0.30	$29.97	False
33010108	Sedan, Automobile, Rental	3.00	DAY	0.00	0.00		59.21	$177.62	False
33010202	Per Diem (per person)	3.00	DAY	0.00	0.00		144.00	$432.00	False
33040921	Senior UXO Supervisor (SUXOS)	8.00	HR	0.00	70.07		0.00	$560.59	False
33040923	UXO Project Manager	8.00	HR	0.00	102.13		0.00	$817.05	False
33040925	UXO Staff Engineer	8.00	HR	0.00	65.36		0.00	$522.85	False
33041101	Airfare	3.00	LS	0.00	0.00		0.00	$0.00	False
Technology:	MEC Sifting								
33041302	Munitions Response Workplan (Moderate Complexity)	1.00	EA	88.80	12,559.85		0.00	$12,648.65	False
33041305	Explosive Safety Submission (Moderate Complexity)	1.00	EA	177.60	22,461.37		0.00	$22,638.97	False
33240101	Other Direct Costs	1.00	LS	500.00	0.00		0.00	$500.00	False

Total Element Cost: $38,327.71

Element: Site Preparation

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33010202	Per Diem (per person)	6.00	DAY	0.00	0.00		144.00	$864.00	False
33040268	Schonstedt GA-52Cx Weekly Rental	6.00	WK	0.00	0.00		94.18	$565.10	False
33040933	UXO Technician I	30.00	HR	0.00	36.84		0.00	$1,105.23	False
33040934	UXO Technician II	20.00	HR	0.00	44.38		0.00	$887.56	False
33040935	UXO Technician III (UXO Supervisor)	10.00	HR	0.00	52.43		0.00	$524.25	False

Total Element Cost: $3,946.14

Element: Excavation

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
17030279	4 CY, Crawler-mounted, Hydraulic Excavator	4,033.33	CY	0.00	0.73		0.00	$6,715.49	False

Technology: MEC Sifting

33010114	Mobilization Equipment (Soils)	1.00	LS	0.00	1,566.74		0.00	$3,099.32	False
33040518	UXO Vehicle Modification - Acrylic Glass Sheets 3" Thick	26.00	SF	263.07	28.40		0.00	$7,578.35	False
33040519	UXO Vehicle Modification - Steel Plates 3/4" Thick	122.00	SF	44.96	0.00		0.00	$5,484.51	False
33040520	UXO Vehicle Modification - Welding Steel Plates 3/4" Thick	70.00	LF	3.22	49.75		0.00	$4,065.26	False

Total Element Cost: $26,942.94

Element: Sifting

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
17030285	12 CY, Dump Truck	60.00	HR	0.00	55.96		0.00	$5,780.88	False
17030427	Sand Bags	1,000.00	EA	0.46	0.00		0.00	$455.10	False
17030436	0.75 CY Wheel Loader	60.00	HR	0.00	84.39		0.00	$7,014.98	False
33010202	Per Diem (per person)	42.00	DAY	0.00	0.00		144.00	$6,048.00	False
33020315	Ambient air monitor, monthly rental	1.00	MO	0.00	0.00		277.50	$277.50	False
33040518	UXO Vehicle Modification - Acrylic Glass Sheets 3" Thick	32.00	SF	263.07	28.40		0.00	$9,327.20	False
33040651	4 X 4 Truck- Rental/Lease	1.00	DAY	0.00	0.00		0.00	$190.92	False
33040662	Trommel Screener	1.00	MO	0.00	0.00		0.00	$486.62	False
33040693	Manual Clean Suspended Electromagnet	1.00	MO	0.00	0.00		1,995.79	$1,995.79	False
33040933	UXO Technician I	40.00	HR	0.00	36.84		0.00	$1,473.64	False
33040934	UXO Technician II	20.00	HR	0.00	44.38		0.00	$887.56	False

Technology: MEC Sifting

33040935	UXO Technician III (UXO Supervisor)	10.00	HR	0.00	52.43		0.00	$524.25	False
33188605	Adjustable Height Radial Stacker Conveyor	6.00	DAY	0.00	0.00		0.00	$65.00	False
33188606	Feeder Conveyor, 50' long with 7 CY Hopper	6.00	DAY	0.00	0.00		0.00	$672.39	False
33240101	Other Direct Costs	2.00	LS	1,746.12	0.00		0.00	$3,492.23	False

Total Element Cost: $38,692.06

Element: Backfill

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
17030423	Unclassified Fill, 6" Lifts, Off-Site, Includes Delivery, Spreading, and Compaction	4,034.00	CY	20.78	0.93		0.01	$91,256.34	False
17040101	Cleaning Up, site debris clean up and removal	3.40	ACR	0.00	446.46		0.00	$1,695.92	False
18050101	Area Preparation, 67% Level & 33% Slope	3.40	ACR	0.00	16.93		0.00	$132.09	False
33010115	Demobilize Equipment (Soils)	1.00	LS	0.00	1,566.74		0.00	$3,099.32	False

Total Element Cost: $96,183.67

Element: Site Management

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override

Technology: MEC Sifting

33010202	Per Diem (per person)	56.00	DAY	0.00	0.00		144.00	$8,064.00	False
33040921	Senior UXO Supervisor (SUXOS)	100.00	HR	0.00	70.07		0.00	$7,007.43	False
33040923	UXO Project Manager	100.00	HR	0.00	102.13		0.00	$10,213.11	False
33040930	UXO QC Specialist	100.00	HR	0.00	62.35		0.00	$6,234.87	False
33040931	UXO Safety Officer	100.00	HR	0.00	62.72		0.00	$6,271.50	False

Total Element Cost: $37,790.91

Element: Stakeholder Involvement

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33040923	UXO Project Manager	12.00	HR	0.00	102.13		0.00	$1,225.57	False
33040935	UXO Technician III (UXO Supervisor)	12.00	HR	0.00	52.43		0.00	$629.10	False
33041305	Explosive Safety Submission (Moderate Complexity)	1.00	EA	177.60	22,461.37		0.00	$22,638.97	False
33041314	Site Specific Final Report (Moderate Complexity)	1.00	EA	177.60	15,555.03		0.00	$15,732.63	False

Total Element Cost: $40,226.28

Total 1st Year Tech Cost: $282,109.71

Technology 5: Capping

Technology: Capping

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
17030423	Unclassified Fill, 6" Lifts, Off-Site, Includes Delivery, Spreading, and Compaction	3,220.75	CY	20.78	1.14		0.01	$73,518.26	False
17030615	Geosynthetic soil stabilization, geotextile fabric, non-woven, 120 lb. tensile strength, includes scarifying and compaction	18,706.00	SY	0.99	0.31		0.00	$24,303.61	False
18050301	Loam or topsoil, imported topsoil, 6" deep, furnish and place	3,542.82	LCY	30.53	6.05		0.00	$136,345.62	False
18050402	Seeding, Vegetative Cover	3.51	ACR	3,522.70	511.10		0.00	$14,948.48	False

Total Element Cost: $249,115.97
Total 1st Year Tech Cost: $249,115.97

Technology 4B: MEC Sifting

Element: Excavation

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
17030279	4 CY, Crawler-mounted, Hydraulic Excavator	3,065.33	CY	0.00	0.73		0.00	$5,103.77	False
33040518	UXO Vehicle Modification - Acrylic Glass Sheets 3" Thick	26.00	SF	263.07	28.40		0.00	$7,578.35	False
33040519	UXO Vehicle Modification - Steel Plates 3/4" Thick	122.00	SF	44.96	0.00		0.00	$5,484.51	False

Technology: MEC Sifting

33040520	UXO Vehicle Modification - Welding Steel Plates 3/4" Thick	70.00	LF	3.22	49.75		0.00	$4,065.26	False

Total Element Cost: $22,231.90

Element: Sifting

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost		Extended Cost	Cost Override
17030285	12 CY, Dump Truck	40.00	HR	0.00	55.96		0.00		$3,853.92	False
17030427	Sand Bags	1,000.00	EA	0.46	0.00		0.00		$455.10	False
17030436	0.75 CY Wheel Loader	40.00	HR	0.00	84.39		0.00		$4,676.65	False
33010202	Per Diem (per person)	28.00	DAY	0.00	0.00		144.00		$4,032.00	False
33040518	UXO Vehicle Modification - Acrylic Glass Sheets 3" Thick	32.00	SF	263.07	28.40		0.00		$9,327.20	False
33040651	4 X 4 Truck- Rental/Lease	1.00	DAY	0.00	0.00		0.00		$190.92	False
33040662	Trommel Screener	1.00	MO	0.00	0.00		0.00		$486.62	False
33040693	Manual Clean Suspended Electromagnet	1.00	MO	0.00	0.00		1,995.79		$1,995.79	False
33040933	UXO Technician I	40.00	HR	0.00	36.84		0.00		$1,473.64	False
33040934	UXO Technician II	20.00	HR	0.00	44.38		0.00		$887.56	False
33040935	UXO Technician III (UXO Supervisor)	10.00	HR	0.00	52.43		0.00		$524.25	False
33188605	Adjustable Height Radial Stacker Conveyor	4.00	DAY	0.00	0.00		0.00		$43.33	False
33188606	Feeder Conveyor, 50' long with 7 CY Hopper	4.00	DAY	0.00	0.00		0.00		$448.26	False
33240101	Other Direct Costs	2.00	LS	1,419.76	0.00		0.00		$2,839.52	False
				Total Element Cost:				$31,234.77		

Element: Backfill

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost		Extended Cost	Cost Override
17030423	Unclassified Fill, 6" Lifts, Off-Site, Includes Delivery, Spreading, and Compaction	3,066.00	CY	20.78	0.93		0.01		$69,358.44	False
33010115	Demobilize Equipment (Soils)	1.00	LS	0.00	1,566.74		0.00		$3,099.32	False
				Total Element Cost:				$72,457.76		

Element: Site Management

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost		Extended Cost	Cost Override
33010202	Per Diem (per person)	40.00	DAY	0.00	0.00		144.00		$5,760.00	False
33040921	Senior UXO Supervisor (SUXOS)	70.00	HR	0.00	70.07		0.00		$4,905.20	False
33040923	UXO Project Manager	70.00	HR	0.00	102.13		0.00		$7,149.18	False
33040930	UXO QC Specialist	70.00	HR	0.00	62.35		0.00		$4,364.41	False
33040931	UXO Safety Officer	70.00	HR	0.00	62.72		0.00		$4,390.05	False
				Total Element Cost:				$26,568.84		
				Total 1st Year Tech Cost:				$152,493.26		

Technology 6A: Off-site Transportation and Waste Disposal

Technology: Off-site Transportation and Waste Disposal

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33020302	Portable organic vapor analyzer, monthly rental	1.00	MO	0.00	0.00		949.05	$949.05	False
33021618	Testing, purgeable organics (624, 8260)	24.00	EA	0.00	0.00		155.40	$3,729.60	False
33021619	Testing, semi-volatile organics (625, 8270)	415.00	EA	0.00	0.00		299.70	$124,375.50	False
33021620	Testing, TAL metals (6010/7000s)	415.00	EA	0.00	0.00		189.26	$78,540.83	False
33021702	TCLP (RCRA) (EPA 1311), Soil Analysis	9.00	EA	0.00	0.00		75.92	$683.32	False
33021717	Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Analysis	415.00	EA	0.00	0.00		108.50	$45,028.54	False
33190102	Bulk Solid Waste Loading Into Disposal Vehicle or Bulk Disposal Container	5,100.00	BCY	1.15	1.29		0.00	$14,540.49	False
33190205	Transport Bulk Solid Hazardous Waste, Maximum 20 CY (per Mile)	112,965.00	MI	0.00	0.00		2.05	$231,973.63	False
33190317	Waste Stream Evaluation Fee, Not Including 50% Rebate on 1st Shipment	1.00	EA	0.00	0.00		57.22	$57.22	False
33190807	32 Ft. Dump Truck, 6 Mil Liner, disposable	255.00	EA	31.19	0.00		0.00	$7,953.71	False
33197263	Commercial RCRA landfills, bulk waste, solid, based on 2,000 lb/CY	5,100.00	TON	0.00	0.00		80.32	$409,629.97	False
33220112	Field Technician	150.00	HR	0.00	44.93		0.00	$6,739.19	False

Total Element Cost: $924,201.03
Total 1st Year Tech Cost: $924,201.03

Technology 6B: Off-site Transportation and Waste Disposal

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33190102	Bulk Solid Waste Loading Into Disposal Vehicle or Bulk Disposal Container	2,000.00	BCY	1.15	1.29		0.00	$5,702.15	False
33190205	Transport Bulk Solid Hazardous Waste, Maximum 20 CY (per Mile)	1,000.00	MI	0.00	0.00		2.05	$2,053.50	False
33190317	Waste Stream Evaluation Fee, Not Including 50% Rebate on 1st Shipment	1.00	EA	0.00	0.00		57.22	$57.22	False
33190807	32 Ft. Dump Truck, 6 Mil Liner, disposable	100.00	EA	31.19	0.00		0.00	$3,119.10	False
33197270	Landfill Nonhazardous Solid Bulk Waste by CY	2,000.00	CY	0.00	0.00		34.33	$68,664.60	False

Total Element Cost: $79,596.57
Total 1st Year Tech Cost: $79,596.57

Technology 7: Well Abandonment

Element:

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33010101	Mobilize/DeMobilize Drilling Rig & Crew	1.00	LS	0.00	1,526.06		0.00	$2,540.60	False
33190402	DOT steel drums, 55 gal., open only, 17H	11.00	EA	69.74	0.00		0.00	$767.15	False
33220112	Field Technician	40.00	HR	0.00	44.93		0.00	$1,797.12	False
33231104	Hollow Stem Auger, 11" Dia Borehole, Depth > 100 ft	210.00	LF	0.00	20.72		0.00	$12,081.74	False
33231178	Move Rig/Equipment Around Site	1.00	EA	100.20	219.37		0.00	$465.42	False
33231820	Grout Continuous Borehole	73.00	CF	39.41	0.00		0.00	$2,876.57	False

Total Element Cost: $20,528.60
Total 1st Year Tech Cost: $20,528.60

Technology 8: Pre-Design Investigation

Element: Subsurface Soil

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
Technology:	Remedial Investigation								
33020401	Disposable Materials per Sample	6,036.00	EA	8.62	0.00		0.00	$52,058.69	False
33020402	Decontamination Materials per Sample	6,036.00	EA	19.70	0.00		0.00	$118,924.29	False
33020667	Direct Push Rig, Truck Mounted, Non Hydraulic, Includes Labor, Sampling, Decontamination	200.00	DAY	0.00	0.00		1,665.00	$333,000.00	False
33020668	Mobilize Direct Push Rig and Crew	11.00	DAY	0.00	0.00		1,665.00	$18,315.00	False
33020669	Demobilize Direct Push Rig and Crew	11.00	EA	1,665.00	0.00		0.00	$18,315.00	False
33021783	PCBs in Soil (Method SW8082)	6,036.00	EA	0.00	0.00		111.00	$669,996.01	False
33220102	Project Manager	200.00	HR	0.00	94.36		0.00	$18,872.71	False
33220112	Field Technician	2,000.00	HR	0.00	44.93		0.00	$89,855.85	False

Total Element Cost: $1,319,337.56

Element: Site Characterization

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33010104	Sample collection, vehicle mileage charge, car or van	40.00	MI	0.00	0.00		0.30	$11.99	False
33220102	Project Manager	2.00	HR	0.00	94.36		0.00	$188.73	False
33220103	Office Manager	5.00	HR	0.00	78.07		0.00	$390.33	False
33220106	Staff Engineer	60.00	HR	0.00	82.40		0.00	$4,943.83	False
33220109	Staff Scientist	23.00	HR	0.00	70.35		0.00	$1,618.04	False
33220111	Certified Industrial Hygienist	3.00	HR	0.00	85.48		0.00	$256.45	False
33220112	Field Technician	20.00	HR	0.00	44.93		0.00	$898.56	False

Technology: Remedial Investigation

33220114	Word Processing/Clerical	4.00	HR	0.00	44.25		0.00	$177.00	False
33220115	Draftsman/CADD	9.00	HR	0.00	51.57		0.00	$464.17	False
	Hydrologic Analysis	25,000	EA	0.00			0.00	$25,000	

Total Element Cost: $33,949.10
Total 1st Year Tech Cost: $1,353,286.66

Technology 9: Clear and Grub

Element:

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
17010102	Selective clearing, brush, medium clearing, with dozer and brush rake, excludes removal offsite	1.00	ACR	0.00	131.75		0.00	$242.04	False
17010211	Site clearing trees, with 335 H.P. dozer, to 12" diameter	75.00	EA	0.00	5.50		0.00	$1,057.38	False
17010212	Site clearing trees, with 335 H.P. dozer, to 24" diameter	25.00	EA	0.00	8.23		0.00	$528.21	False
17010315	Grub stumps, with 335 H.P. dozer, to 12" diameter	75.00	EA	0.00	3.29		0.00	$707.91	False
17010316	Grub stumps, with 335 H.P. dozer, to 24" diameter	25.00	EA	0.00	32.93		0.00	$2,359.88	False
17010402	Chipping brush, medium brush	1.00	ACR	0.00	1,662.32		0.00	$2,125.09	False
17010501	Grub and stack, 140 H.P. dozer	121.00	CY	0.00	3.29		0.00	$677.38	False

Total Element Cost: $7,697.89
Total 1st Year Tech Cost: $7,697.89

Total Phase Element Cost **$3,238,117.60**

Phase Cost Over Time Report

Alternative 5: Partial Removal of Fill with 6 NYCRR Part 375 Soil Cover - Remove all soil exceeding 100 ppm PCBs from commercial parcels, all soil exceeding 10 ppm PCBs fo residential parcel; Full Soil Cover (Self-Implementing)

Software:

RACER Version: RACER® Version 11.5.99.0
Database Location: C:\Users\Administrator\Documents\RACER 11.5\Racer_Backup_6_3_2022.mdb

Folder:

Folder Name: Gibson Scrapyard

Project:

ID: 851058
Name: Gibson Scrapyard
Category: None

Location
State / Country: NEW YORK
City: CORNING

Location Modifier	Default	User	Reason for changes
	1.110	1.110	

Options
Database: System Costs
Cost Database Date: 2019
Report Option: Calendar

Description Feasibility Study-Remedial Action Alternatives

Site:

ID: 851058

Phase Cost Over Time Report

ID: 851058
Name: Gibson Scrapyard
Type: None

Media/Waste Type
Primary: Soil
Secondary: Ordnance (not residual)

Contaminant
Primary: PCBs
Secondary: Volatile Organic Compounds (VOCs)

Phase Names

Pre-Study	
Study	
Design	**Safety Level:** E
Removal/Interim Action	**Safety Level:** D
Remedial Action	**Safety Level:** D
Operations & Maintenance	**Safety Level:** D
Long Term Monitoring	**Safety Level:** D
Site Closeout	**Safety Level:** D

In the RACER Preferences the default value for the Safety Level is established. This sets the default value for the safety level for each technology model based on the type of work being completed. Note: RACER Technologies that safety level is not appropriate to change from the default are hard-coded to estimate costs without a safety level productivity factor, which is Safety Level E

Documentation
Description: Costing for various alternatives for Gibson Scrapyard Feasibility Study
Support Team: Megan Miller, Liane DeSantis, Kathryn Katzer
References: Remedial Investigation, Feasibility Study

Estimator Information
Estimator Name: Angela McGinty
Estimator Title: Engineer
Agency/Org./Office: EA Engineering, Science, and Technology, Inc., PBC

Phase Cost Over Time Report

Agency/Org./Office: EA Engineering, Science, and Technology, Inc., PBC
Business Address: 1311 Continental Drive
Suite K
Abingdon, MD 21009
Telephone Number: 4106707182
Email Address: amcginty@eaest.com
Estimate Prepared Date: 04/12/2022
Estimator Signature: _____ **Date:** _____

Reviewer Information
Reviewer Name: Megan Miller
Reviewer Title: Engineer
Agency/Org./Office: EA Science and Technology
Business Address: 269 W. Jefferson Street
Syracuse, NY 13202
Telephone Number: 315-565-6557
Email Address: mmiller@eaest.com
Date Reviewed: 04/12/2022
Reviewer Signature: _____ **Date:** _____

Phase Cost Over Time Report

Technology Name	Technology	2023	2024	2025	2026	2027	2028
Capping	2	$249,116	$0	$0	$0	$0	$0
Clear and Grub	2	$7,698	$0	$0	$0	$0	$0
Fencing and Bridge	2	$91,321	$0	$0	$0	$0	$0
Five-Year Review	2	$0	$0	$0	$0	$0	$14,216
Off-site Transportation and Waste Disposal	2	$924,201	$0	$0	$0	$0	$0
Pre-Design Investigation	2	$1,353,287	$0	$0	$0	$0	$0
Site Management	2	$63,550	$0	$20,086	$0	$20,086	$0
Well Abandonment	2	$20,529	$0	$0	$0	$0	$0
MEC Sifting	3	$282,110	$0	$0	$0	$0	$0
MEC Sifting	3	$152,493	$0	$0	$0	$0	$0
Off-site Transportation and Waste Disposal	3	$79,597	$0	$0	$0	$0	$0
Total Phase Cost		$3,223,901	$0	$20,086	$0	$20,086	$14,216

Phase Cost Over Time Report

Technology Name	Technology	2029	2030	2031	2032	2033	2034
Capping	2	$0	$0	$0	$0	$0	$0
Clear and Grub	2	$0	$0	$0	$0	$0	$0
Fencing and Bridge	2	$0	$0	$0	$0	$0	$0
Five-Year Review	2	$0	$0	$0	$0	$14,216	$0
Off-site Transportation and Waste Disposal	2	$0	$0	$0	$0	$0	$0
Pre-Design Investigation	2	$0	$0	$0	$0	$0	$0
Site Management	2	$20,086	$0	$20,086	$0	$20,086	$0
Well Abandonment	2	$0	$0	$0	$0	$0	$0
MEC Sifting	3	$0	$0	$0	$0	$0	$0
MEC Sifting	3	$0	$0	$0	$0	$0	$0
Off-site Transportation and Waste Disposal	3	$0	$0	$0	$0	$0	$0
Total Phase Cost		$20,086	$0	$20,086	$0	$34,302	$0

Phase Cost Over Time Report

Technology Name	Technology	2035	2036	2037	2038	2039	2040
Capping	2	$0	$0	$0	$0	$0	$0
Clear and Grub	2	$0	$0	$0	$0	$0	$0
Fencing and Bridge	2	$0	$0	$0	$0	$0	$0
Five-Year Review	2	$0	$0	$0	$14,216	$0	$0
Off-site Transportation and Waste Disposal	2	$0	$0	$0	$0	$0	$0
Pre-Design Investigation	2	$0	$0	$0	$0	$0	$0
Site Management	2	$20,086	$0	$20,086	$0	$20,086	$0
Well Abandonment	2	$0	$0	$0	$0	$0	$0
MEC Sifting	3	$0	$0	$0	$0	$0	$0
MEC Sifting	3	$0	$0	$0	$0	$0	$0
Off-site Transportation and Waste Disposal	3	$0	$0	$0	$0	$0	$0
Total Phase Cost		$20,086	$0	$20,086	$14,216	$20,086	$0

Phase Cost Over Time Report

Technology Name	Technology	2041	2042	2043	2044	2045	2046
Capping	2	$0	$0	$0	$0	$0	$0
Clear and Grub	2	$0	$0	$0	$0	$0	$0
Fencing and Bridge	2	$0	$0	$0	$0	$0	$0
Five-Year Review	2	$0	$0	$14,216	$0	$0	$0
Off-site Transportation and Waste Disposal	2	$0	$0	$0	$0	$0	$0
Pre-Design Investigation	2	$0	$0	$0	$0	$0	$0
Site Management	2	$20,086	$0	$20,086	$0	$20,086	$0
Well Abandonment	2	$0	$0	$0	$0	$0	$0
MEC Sifting	3	$0	$0	$0	$0	$0	$0
MEC Sifting	3	$0	$0	$0	$0	$0	$0
Off-site Transportation and Waste Disposal	3	$0	$0	$0	$0	$0	$0
Total Phase Cost		$20,086	$0	$34,302	$0	$20,086	$0

Phase Cost Over Time Report

Technology Name	Technology	2047	2048	2049	2050	2051	2052
Capping	2	$0	$0	$0	$0	$0	$0
Clear and Grub	2	$0	$0	$0	$0	$0	$0
Fencing and Bridge	2	$0	$0	$0	$0	$0	$0
Five-Year Review	2	$0	$14,216	$0	$0	$0	$0
Off-site Transportation and Waste Disposal	2	$0	$0	$0	$0	$0	$0
Pre-Design Investigation	2	$0	$0	$0	$0	$0	$0
Site Management	2	$20,086	$0	$20,086	$0	$20,086	$0
Well Abandonment	2	$0	$0	$0	$0	$0	$0
MEC Sifting	3	$0	$0	$0	$0	$0	$0
MEC Sifting	3	$0	$0	$0	$0	$0	$0
Off-site Transportation and Waste Disposal	3	$0	$0	$0	$0	$0	$0
Total Phase Cost		$20,086	$14,216	$20,086	$0	$20,086	$0

Phase Cost Over Time Report

Technology Name	Technology	2053	Total
Capping	2	$0	$249,116
Clear and Grub	2	$0	$7,698
Fencing and Bridge	2	$0	$91,321
Five-Year Review	2	$14,216	$85,297
Off-site Transportation and Waste Disposal	2	$0	$924,201
Pre-Design Investigation	2	$0	$1,353,287
Site Management	2	$0	$344,749
Well Abandonment	2	$0	$20,529
MEC Sifting	3	$0	$282,110
MEC Sifting	3	$0	$152,493
Off-site Transportation and Waste Disposal	3	$0	$79,597
Total Phase Cost		$14,216	$3,590,397

Phase Technology Cost Detail Report

Alternative 6: No Removal with 40 CFR Part 761 Cap (Risk-Based)

Software:

RACER Version: RACER® Version 11.5.99.0
Database Location: C:\Users\Administrator\Documents\RACER 11.5\Racer_Backup_6_3_2022.mdb

Folder:

Folder Name: Gibson Scrapyard

Project:

ID: 851058
Name: Gibson Scrapyard
Category: None

Location
State / Country: NEW YORK
City: CORNING

Location Modifier	Default	User	Reason for changes
	1.110	1.110	

Options
Database: System Costs
Cost Database Date: 2019
Report Option: Calendar

Description Feasibility Study-Remedial Action Alternatives

Site:

ID: 851058
Name: Gibson Scrapyard
Type: None

Media/Waste Type

Primary: Soil
Secondary: Ordnance (not residual)

Contaminant

Primary: PCBs
Secondary: Volatile Organic Compounds (VOCs)

Phase Names

Pre-Study	
Study	
Design	**Safety Level:** E
Removal/Interim Action	**Safety Level:** D
Remedial Action	**Safety Level:** D
Operations & Maintenance	**Safety Level:** D
Long Term Monitoring	**Safety Level:** D
Site Closeout	**Safety Level:** D

In the RACER Preferences the default value for the Safety Level is established. This sets the default value for the safety level for each technology model based on the type of work being completed. Note: RACER Technologies that safety level is not appropriate to change from the default are hard-coded to estimate costs without a safety level productivity factor, which is Safety Level E.

Documentation

Description: Costing for various alternatives for Gibson Scrapyard Feasibility Study.
Support Team: Megan Miller, Liane DeSantis, Kathryn Katzer
References: Remedial Investigation, Feasibility Study

Estimator Information

Estimator Name: Angela McGinty
Estimator Title: Engineer
Agency/Org./Office: EA Engineering, Science, and Technology, Inc., PBC
Business Address: 1311 Continental Drive
Suite K
Abingdon, MD 21009
Telephone Number: 4106707182
Email Address: amcginty@eaest.com

Estimate Prepared Date: 04/12/2022
Estimator Signature: _____ **Date:** _____

Reviewer Information

Reviewer Name: Megan Miller
Reviewer Title: Engineer
Agency/Org./Office: EA Science and Technology
Business Address: 269 W. Jefferson Street
Syracuse, NY 13202
Telephone Number: 315-565-6557
Email Address: mmiller@eaest.com

Date Reviewed: 04/12/2022
Reviewer Signature: _____ **Date:** _____

Phase Documentation:

Phase Type: Remedial Action
Phase Name: Alternative 6-No Removal with 40 CFR Part 761 Cap
Description: 40 CFR Part 761 Cap; chain link fence, gate, and signs; inspections and reports; 5-year Reveiws
Approach: Ex Situ
Start Date: April, 2023
Labor Rate Group: System Labor Rate
Analysis Rate Group: System Analysis Rate
Phase Markup Template: System Defaults

Technology Markups	Markup	% Prime	% Sub.
Site Management	Yes	100	0
Fencing	Yes	100	0
Five-Year Review	Yes	100	0
MEC Sifting	Yes	100	0
Capping	Yes	100	0
Well Abandonment	Yes	100	0
Clear and Grub	Yes	100	0

Total Marked-up Cost: $1,890,115.78

Technologies:

Technology 1: Site Management

Element: Planning Docs

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33220102	Project Manager	37.00	HR	0.00	77.38		0.00	$2,862.99	False
33220105	Project Engineer	90.00	HR	0.00	80.00		0.00	$7,200.11	False
33220106	Staff Engineer	165.00	HR	0.00	67.57		0.00	$11,148.34	False
33220110	QA/QC Officer	28.00	HR	0.00	52.96		0.00	$1,482.83	False
33220114	Word Processing/Clerical	150.00	HR	0.00	36.29		0.00	$5,442.89	False
33220115	Draftsman/CADD	68.00	HR	0.00	42.29		0.00	$2,875.79	False
33220503	Attorney, Partner, Real Estate	22.00	HR	0.00	154.53		0.00	$3,399.75	False
33240101	Other Direct Costs	1.00	LS	860.32	0.00		0.00	$860.32	False
	Hydrologic Analysis	25,000	EA	0.00			0.00	$25,000	

Total Element Cost: $60,273.01

Element: Planning Meetings

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33010202	Per Diem (per person)	2.00	DAY	0.00	0.00		144.00	$288.00	False
33220102	Project Manager	40.00	HR	0.00	77.38		0.00	$3,095.12	False
33220114	Word Processing/Clerical	32.00	HR	0.00	36.29		0.00	$1,161.15	False
33220115	Draftsman/CADD	16.00	HR	0.00	42.29		0.00	$676.66	False
33240101	Other Direct Costs	1.00	LS	123.32	0.00		0.00	$123.32	False

Total Element Cost: $5,344.25

Element: Implementation

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
18010412	Construction Signs	90.00	SF	27.75	0.00		0.00	$2,497.50	False
33240101	Other Direct Costs	1.00	LS	100.00	0.00		0.00	$100.00	True

Total Element Cost: $2,597.50

Element: Monitoring & Enforcement

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33010104	Sample collection, vehicle mileage charge, car or van	400.00	MI	0.00	0.00		0.30	$119.88	False
33029901	Magnetometer	1.00	DAY	0.00	0.00		104.34	$104.34	False
33040934	UXO Technician II	8.00	HR	0.00	44.38		0.00	$355.02	False
33220102	Project Manager	60.00	HR	0.00	94.36		0.00	$5,661.81	False
33220106	Staff Engineer	120.00	HR	0.00	82.40		0.00	$9,887.66	False
33220110	QA/QC Officer	4.00	HR	0.00	52.96		0.00	$211.83	False
33220112	Field Technician	8.00	HR	0.00	44.93		0.00	$359.42	False
33220114	Word Processing/Clerical	39.00	HR	0.00	44.25		0.00	$1,725.79	False
33220115	Draftsman/CADD	16.00	HR	0.00	42.29		0.00	$676.66	False
33220119	Health and Safety Officer	4.00	HR	0.00	69.23		0.00	$276.90	False
33240101	Other Direct Costs	1.00	LS	706.25	0.00		0.00	$706.25	False

Total Element Cost: $20,085.58

Technology: Site Management

Element: Modification/Termination

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33220102	Project Manager	2.00	HR	0.00	77.38		0.00	$154.76	False
33220110	QA/QC Officer	1.00	HR	0.00	52.96		0.00	$52.96	False
33220114	Word Processing/Clerical	1.00	HR	0.00	36.29		0.00	$36.29	False
33240101	Other Direct Costs	1.00	LS	6.10	0.00		0.00	$6.10	False

Total Element Cost: $250.10
Total 1st Year Tech Cost: $88,550.44

Technology 2: Fencing and Bridge

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
18040108	7' Galvanized Chain-link Fence	1,400.00	LF	9.50	10.00		0.00	$28,341.18	True
18040171	Fence, chain link industrial, double swing gates, 8' high, 20' opening, includes excavation, posts & hardware in concrete	1.00	OPN	777.00	1,419.08		0.00	$2,451.82	False
see note*	Modular Steel Bridge, 40' x 16', delivered; 4 laborers 2 days installation	1	EACH	50,000	5,440		0.00	$55,440.00	
18050206	Erosion control, silt fence, polypropylene, 3' high, includes 7.5' posts	1,400.00	LF	1.11	0.49		0.00	$2,236.24	False
33010202	Per Diem (per person)	3.00	DAY	0.00	0.00		144.00	$432.00	False
33220105	Project Engineer	24.00	HR	0.00	80.00		0.00	$1,920.03	False

Technology: Fencing

33430201	Miscellaneous Minor Field Installation	1.00	LS	0.00	0.00		0.00	$500.00	True

Total Element Cost: $91,321.28
Total 1st Year Tech Cost: $91,321.28

Technology 3: Five-Year Review

Element: Document Review

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33220102	Project Manager	12.00	HR	0.00	94.36		0.00	$1,132.36	False
33220105	Project Engineer	15.00	HR	0.00	80.00		0.00	$1,200.02	False
33220108	Project Scientist	11.00	HR	0.00	87.11		0.00	$958.19	False
33220109	Staff Scientist	23.00	HR	0.00	70.35		0.00	$1,618.04	False

Total Element Cost: $4,908.61

Element: Report

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33220102	Project Manager	12.00	HR	0.00	94.36		0.00	$1,132.36	False
33220105	Project Engineer	31.00	HR	0.00	80.00		0.00	$2,480.04	False
33220108	Project Scientist	25.00	HR	0.00	87.11		0.00	$2,177.70	False
33220109	Staff Scientist	50.00	HR	0.00	70.35		0.00	$3,517.48	False

Total Element Cost: $9,307.58
Total 1st Year Tech Cost: $14,216.19

Technology 4: MEC Sifting

Element: Site Visit

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33010104	Sample collection, vehicle mileage charge, car or van	100.00	MI	0.00	0.00		0.30	$29.97	False
33010108	Sedan, Automobile, Rental	3.00	DAY	0.00	0.00		59.21	$177.62	False
33010202	Per Diem (per person)	3.00	DAY	0.00	0.00		144.00	$432.00	False
33040921	Senior UXO Supervisor (SUXOS)	8.00	HR	0.00	70.07		0.00	$560.59	False
33040923	UXO Project Manager	8.00	HR	0.00	102.13		0.00	$817.05	False
33040925	UXO Staff Engineer	8.00	HR	0.00	65.36		0.00	$522.85	False
33041101	Airfare	3.00	LS	0.00	0.00		0.00	$0.00	False
33041302	Munitions Response Workplan (Moderate Complexity)	1.00	EA	88.80	12,559.85		0.00	$12,648.65	False
33041305	Explosive Safety Submission (Moderate Complexity)	1.00	EA	177.60	22,461.37		0.00	$22,638.97	False
33240101	Other Direct Costs	1.00	LS	500.00	0.00		0.00	$500.00	False

Total Element Cost: $38,327.71

Technology: MEC Sifting

Element: Site Preparation

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33010202	Per Diem (per person)	6.00	DAY	0.00	0.00		144.00	$864.00	False
33040268	Schonstedt GA-52Cx Weekly Rental	6.00	WK	0.00	0.00		94.18	$565.10	False
33040933	UXO Technician I	30.00	HR	0.00	36.84		0.00	$1,105.23	False
33040934	UXO Technician II	20.00	HR	0.00	44.38		0.00	$887.56	False
33040935	UXO Technician III (UXO Supervisor)	10.00	HR	0.00	52.43		0.00	$524.25	False

Total Element Cost: $3,946.14

Element: Excavation

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33010114	Mobilization Equipment (Soils)	1.00	LS	0.00	1,566.74		0.00	$3,099.32	False

Total Element Cost: $3,099.32

Element: Backfill

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
17040101	Cleaning Up, site debris clean up and removal	3.40	ACR	0.00	446.46		0.00	$1,695.92	False

Technology: MEC Sifting

18050101	Area Preparation, 67% Level & 33% Slope	3.40	ACR	0.00	16.93		0.00	$132.09	False
33010115	Demobilize Equipment (Soils)	1.00	LS	0.00	1,566.74		0.00	$3,099.32	False

Total Element Cost: $4,927.33

Element: Site Management

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33010202	Per Diem (per person)	80.00	DAY	0.00	0.00		144.00	$11,520.00	False
33040921	Senior UXO Supervisor (SUXOS)	140.00	HR	0.00	70.07		0.00	$9,810.40	False
33040923	UXO Project Manager	140.00	HR	0.00	102.13		0.00	$14,298.35	False
33040930	UXO QC Specialist	140.00	HR	0.00	62.35		0.00	$8,728.82	False
33040931	UXO Safety Officer	140.00	HR	0.00	62.72		0.00	$8,780.10	False

Total Element Cost: $53,137.67

Element: Stakeholder Involvement

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33040923	UXO Project Manager	12.00	HR	0.00	102.13		0.00	$1,225.57	False
33040935	UXO Technician III (UXO Supervisor)	12.00	HR	0.00	52.43		0.00	$629.10	False
33041305	Explosive Safety Submission (Moderate Complexity)	1.00	EA	177.60	22,461.37		0.00	$22,638.97	False
33041314	Site Specific Final Report	1.00	EA	177.60	15,555.03		0.00	$15,732.63	False

Technology: MEC Sifting

33041314	Site Specific Final Report	1.00	EA	177.60	15,555.03		0.00	$15,732.63	False

Total Element Cost: $40,226.28
Total 1st Year Tech Cost: $143,664.45

Technology 5: Capping

Element:

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
17030615	Geosynthetic soil stabilization, geotextile fabric, non-woven, 120 lb. tensile strength, includes scarifying and compaction	18,706.00	SY	0.99	0.31		0.00	$24,303.61	False
18050301	Loam or topsoil, imported topsoil, 6" deep, furnish and place	3,542.82	LCY	30.53	6.05		0.00	$136,345.62	False
18050402	Seeding, Vegetative Cover	3.51	ACR	3,522.70	511.10		0.00	$14,948.48	False
see note**	Clay, Low Permeability, 6"Lifts, Off-Site	6,613.26	CY	35.00	2.67		0.00	$259,614.81	True

**Clay supply and delivery quote from local supplier; placement RS Means 312323156010; compaction RS Means 312323236000

Total Element Cost: $435,212.53
Total 1st Year Tech Cost: $435,212.53

Technology 6: Well Abandonment

Element:

Technology: Well Abandonment

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
33010101	Mobilize/DeMobilize Drilling Rig & Crew	1.00	LS	0.00	1,526.06		0.00	$2,540.60	False
33190402	DOT steel drums, 55 gal., open only, 17H	11.00	EA	69.74	0.00		0.00	$767.15	False
33220112	Field Technician	40.00	HR	0.00	44.93		0.00	$1,797.12	False
33231104	Hollow Stem Auger, 11" Dia Borehole, Depth > 100 ft	210.00	LF	0.00	20.72		0.00	$12,081.74	False
33231178	Move Rig/Equipment Around Site	1.00	EA	100.20	219.37		0.00	$465.42	False
33231820	Grout Continuous Borehole	73.00	CF	39.41	0.00		0.00	$2,876.57	False

Total Element Cost: $20,528.60
Total 1st Year Tech Cost: $20,528.60

Technology 7: Clear and Grub

Element:

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Sub Bid Cost	Extended Cost	Cost Override
17010102	Selective clearing, brush, medium clearing, with dozer and brush rake, excludes removal offsite	1.00	ACR	0.00	131.75		0.00	$242.04	False
17010211	Site clearing trees, with 335 H.P. dozer, to 12" diameter	75.00	EA	0.00	5.50		0.00	$1,057.38	False
17010212	Site clearing trees, with 335 H.P.	25.00	EA	0.00	8.23		0.00	$528.21	False

Technology: Clear and Grub

17010212	Site clearing trees, with 335 H.P.	25.00	EA	0.00	8.23		0.00	$528.21	False
17010315	Grub stumps, with 335 H.P. dozer, to 12" diameter	75.00	EA	0.00	3.29		0.00	$707.91	False
17010316	Grub stumps, with 335 H.P. dozer, to 24" diameter	25.00	EA	0.00	32.93		0.00	$2,359.88	False
17010402	Chipping brush, medium brush	1.00	ACR	0.00	1,662.32		0.00	$2,125.09	False
17010501	Grub and stack, 140 H.P. dozer	121.00	CY	0.00	3.29		0.00	$677.38	False

Total Element Cost: $7,697.89
Total 1st Year Tech Cost: $7,697.89

Total Phase Element Cost **$801,191.38**

Phase Cost Over Time Report

Software:

RACER Version: RACER® Version 11.5.99.0
Database Location: C:\Users\Administrator\Documents\RACER 11.5\Racer_Backup_6_3_2022.mdb

Folder:

Folder Name: Gibson Scrapyard

Project:

ID: 851058
Name: Gibson Scrapyard
Category: None

Location
State / Country: NEW YORK
City: CORNING

Location Modifier	Default	User	Reason for changes
	1.110	1.110	

Options
Database: System Costs
Cost Database Date: 2019
Report Option: Calendar

Description Feasibility Study-Remedial Action Alternatives

Site:

ID: 851058

Phase Cost Over Time Report

ID: 851058
Name: Gibson Scrapyard
Type: None

Media/Waste Type
Primary: Soil
Secondary: Ordnance (not residual)

Contaminant
Primary: PCBs
Secondary: Volatile Organic Compounds (VOCs)

Phase Names

Pre-Study	
Study	
Design	**Safety Level:** E
Removal/Interim Action	**Safety Level:** D
Remedial Action	**Safety Level:** D
Operations & Maintenance	**Safety Level:** D
Long Term Monitoring	**Safety Level:** D
Site Closeout	**Safety Level:** D

In the RACER Preferences the default value for the Safety Level is established. This sets the default value for the safety level for each technology model based on the type of work being completed. Note: RACER Technologies that safety level is not appropriate to change from the default are hard-coded to estimate costs without a safety level productivity factor, which is Safety Level E

Documentation
Description: Costing for various alternatives for Gibson Scrapyard Feasibility Study
Support Team: Megan Miller, Liane DeSantis, Kathryn Katzer
References: Remedial Investigation, Feasibility Study

Estimator Information
Estimator Name: Angela McGinty
Estimator Title: Engineer
Agency/Org./Office: EA Engineering, Science, and Technology, Inc., PBC

Phase Cost Over Time Report

Agency/Org./Office: EA Engineering, Science, and Technology, Inc., PBC
Business Address: 1311 Continental Drive
Suite K
Abingdon, MD 21009
Telephone Number: 4106707182
Email Address: amcginty@eaest.com
Estimate Prepared Date: 04/12/2022
Estimator Signature: _____ **Date:** _____

Reviewer Information
Reviewer Name: Megan Miller
Reviewer Title: Engineer
Agency/Org./Office: EA Science and Technology
Business Address: 269 W. Jefferson Street
Syracuse, NY 13202
Telephone Number: 315-565-6557
Email Address: mmiller@eaest.com
Date Reviewed: 04/12/2022
Reviewer Signature: _____ **Date:** _____

Phase Cost Over Time Report

Technology Name	Technology	2023	2024	2025	2026	2027	2028
Capping	2	$425,213	$0	$0	$0	$0	$0
Clear and Grub	2	$7,698	$0	$0	$0	$0	$0
Fencing and Bridge	2	$91,321	$0	$0	$0	$0	$0
Five-Year Review	2	$0	$0	$0	$0	$0	$14,216
Site Management	2	$88,550	$0	$20,086	$0	$20,086	$0
Well Abandonment	2	$20,529	$0	$0	$0	$0	$0
MEC Sifting	3	$143,664	$0	$0	$0	$0	$0
Total Phase Cost		$786,975	$0	$20,086	$0	$20,086	$14,216

Phase Cost Over Time Report

Technology Name	Technology	2029	2030	2031	2032	2033	2034
Capping	2	$0	$0	$0	$0	$0	$0
Clear and Grub	2	$0	$0	$0	$0	$0	$0
Fencing and Bridge	2	$0	$0	$0	$0	$0	$0
Five-Year Review	2	$0	$0	$0	$0	$14,216	$0
Site Management	2	$20,086	$0	$20,086	$0	$20,086	$0
Well Abandonment	2	$0	$0	$0	$0	$0	$0
MEC Sifting	3	$0	$0	$0	$0	$0	$0
Total Phase Cost		$20,086	$0	$20,086	$0	$34,302	$0

Phase Cost Over Time Report

Technology Name	Technology	2035	2036	2037	2038	2039	2040
Capping	2	$0	$0	$0	$0	$0	$0
Clear and Grub	2	$0	$0	$0	$0	$0	$0
Fencing and Bridge	2	$0	$0	$0	$0	$0	$0
Five-Year Review	2	$0	$0	$0	$14,216	$0	$0
Site Management	2	$20,086	$0	$20,086	$0	$20,086	$0
Well Abandonment	2	$0	$0	$0	$0	$0	$0
MEC Sifting	3	$0	$0	$0	$0	$0	$0
Total Phase Cost		$20,086	$0	$20,086	$14,216	$20,086	$0

Phase Cost Over Time Report

Technology Name	Technology	2041	2042	2043	2044	2045	2046
Capping	2	$0	$0	$0	$0	$0	$0
Clear and Grub	2	$0	$0	$0	$0	$0	$0
Fencing and Bridge	2	$0	$0	$0	$0	$0	$0
Five-Year Review	2	$0	$0	$14,216	$0	$0	$0
Site Management	2	$20,086	$0	$20,086	$0	$20,086	$0
Well Abandonment	2	$0	$0	$0	$0	$0	$0
MEC Sifting	3	$0	$0	$0	$0	$0	$0
Total Phase Cost		$20,086	$0	$34,302	$0	$20,086	$0

Phase Cost Over Time Report

Technology Name	Technology	2047	2048	2049	2050	2051	2052
Capping	2	$0	$0	$0	$0	$0	$0
Clear and Grub	2	$0	$0	$0	$0	$0	$0
Fencing and Bridge	2	$0	$0	$0	$0	$0	$0
Five-Year Review	2	$0	$14,216	$0	$0	$0	$0
Site Management	2	$20,086	$0	$20,086	$0	$20,086	$0
Well Abandonment	2	$0	$0	$0	$0	$0	$0
MEC Sifting	3	$0	$0	$0	$0	$0	$0
Total Phase Cost		$20,086	$14,216	$20,086	$0	$20,086	$0

Phase Cost Over Time Report

Technology Name	Technology	2053	Total				
Capping	2	$0	$435,213				
Clear and Grub	2	$0	$7,698				
Fencing and Bridge	2	$0	$91,321				
Five-Year Review	2	$14,216	$85,297				
Site Management	2	$0	$369,749				
Well Abandonment	2	$0	$20,529				
MEC Sifting	3	$0	$143,664				
Total Phase Cost		$14,216	$1,153,470	$0	$0	$0	$0

Phase Cost Over Time Report

Alternative 7: No Removal with 6 NYCRR Part 375 Soil Cover (Risk-Based)

Software:

RACER Version: RACER® Version 11.5.99.0
Database Location: C:\Users\Administrator\Documents\RACER 11.5\Racer_Backup_6_3_2022.mdb

Folder:

Folder Name: Gibson Scrapyard

Project:

ID: 851058
Name: Gibson Scrapyard
Category: None

Location
State / Country: NEW YORK
City: CORNING

Location Modifier	Default	User	Reason for changes
	1.110	1.110	

Options
Database: System Costs
Cost Database Date: 2019
Report Option: Calendar

Description Feasibility Study-Remedial Action Alternatives

Site:

ID: 851058

Phase Cost Over Time Report

ID: 851058
Name: Gibson Scrapyard
Type: None

Media/Waste Type
Primary: Soil
Secondary: Ordnance (not residual)

Contaminant
Primary: PCBs
Secondary: Volatile Organic Compounds (VOCs)

Phase Names

Pre-Study	
Study	
Design	**Safety Level:** E
Removal/Interim Action	**Safety Level:** D
Remedial Action	**Safety Level:** D
Operations & Maintenance	**Safety Level:** D
Long Term Monitoring	**Safety Level:** D
Site Closeout	**Safety Level:** D

In the RACER Preferences the default value for the Safety Level is established. This sets the default value for the safety level for each technology model based on the type of work being completed. Note: RACER Technologies that safety level is not appropriate to change from the default are hard-coded to estimate costs without a safety level productivity factor, which is Safety Level E

Documentation
Description: Costing for various alternatives for Gibson Scrapyard Feasibility Study
Support Team: Megan Miller, Liane DeSantis, Kathryn Katzer
References: Remedial Investigation, Feasibility Study

Estimator Information
Estimator Name: Angela McGinty
Estimator Title: Engineer
Agency/Org./Office: EA Engineering, Science, and Technology, Inc., PBC

Phase Cost Over Time Report

Agency/Org./Office: EA Engineering, Science, and Technology, Inc., PBC
Business Address: 1311 Continental Drive
Suite K
Abingdon, MD 21009
Telephone Number: 4106707182
Email Address: amcginty@eaest.com
Estimate Prepared Date: 04/12/2022
Estimator Signature: _____ **Date:** _____

Reviewer Information
Reviewer Name: Megan Miller
Reviewer Title: Engineer
Agency/Org./Office: EA Science and Technology
Business Address: 269 W. Jefferson Street
Syracuse, NY 13202
Telephone Number: 315-565-6557
Email Address: mmiller@eaest.com
Date Reviewed: 04/12/2022
Reviewer Signature: _____ **Date:** _____

Phase Cost Over Time Report

Technology Name	Technology	2023	2024	2025	2026	2027	2028
Capping	1	$249,116	$0	$0	$0	$0	$0
Fencing and Bridge	1	$91,321	$0	$0	$0	$0	$0
Five-Year Review	1	$0	$0	$0	$0	$0	$14,216
Site Management	1	$88,550	$0	$20,086	$0	$20,086	$0
Well Abandonment	1	$20,529	$0	$0	$0	$0	$0
Clear and Grub	2	$7,698	$0	$0	$0	$0	$0
MEC Sifting	2	$143,664	$0	$0	$0	$0	$0
Total Phase Cost		$600,879	$0	$20,086	$0	$20,086	$14,216

Phase Cost Over Time Report

Technology Name	Technology	2029	2030	2031	2032	2033	2034
Capping	1	$0	$0	$0	$0	$0	$0
Fencing and Bridge	1	$0	$0	$0	$0	$0	$0
Five-Year Review	1	$0	$0	$0	$0	$14,216	$0
Site Management	1	$20,086	$0	$20,086	$0	$20,086	$0
Well Abandonment	1	$0	$0	$0	$0	$0	$0
Clear and Grub	2	$0	$0	$0	$0	$0	$0
MEC Sifting	2	$0	$0	$0	$0	$0	$0
Total Phase Cost		$20,086	$0	$20,086	$0	$34,302	$0

Phase Cost Over Time Report

Technology Name	Technology	2035	2036	2037	2038	2039	2040
Capping	1	$0	$0	$0	$0	$0	$0
Fencing and Bridge	1	$0	$0	$0	$0	$0	$0
Five-Year Review	1	$0	$0	$0	$14,216	$0	$0
Site Management	1	$20,086	$0	$20,086	$0	$20,086	$0
Well Abandonment	1	$0	$0	$0	$0	$0	$0
Clear and Grub	2	$0	$0	$0	$0	$0	$0
MEC Sifting	2	$0	$0	$0	$0	$0	$0
Total Phase Cost		$20,086	$0	$20,086	$14,216	$20,086	$0

Phase Cost Over Time Report

Technology Name	Technology	2041	2042	2043	2044	2045	2046
Capping	1	$0	$0	$0	$0	$0	$0
Fencing and Bridge	1	$0	$0	$0	$0	$0	$0
Five-Year Review	1	$0	$0	$14,216	$0	$0	$0
Site Management	1	$20,086	$0	$20,086	$0	$20,086	$0
Well Abandonment	1	$0	$0	$0	$0	$0	$0
Clear and Grub	2	$0	$0	$0	$0	$0	$0
MEC Sifting	2	$0	$0	$0	$0	$0	$0
Total Phase Cost		$20,086	$0	$34,302	$0	$20,086	$0

Phase Cost Over Time Report

Technology Name	Technology	2047	2048	2049	2050	2051	2052
Capping	1	$0	$0	$0	$0	$0	$0
Fencing and Bridge	1	$0	$0	$0	$0	$0	$0
Five-Year Review	1	$0	$14,216	$0	$0	$0	$0
Site Management	1	$20,086	$0	$20,086	$0	$20,086	$0
Well Abandonment	1	$0	$0	$0	$0	$0	$0
Clear and Grub	2	$0	$0	$0	$0	$0	$0
MEC Sifting	2	$0	$0	$0	$0	$0	$0
Total Phase Cost		$20,086	$14,216	$20,086	$0	$20,086	$0

Phase Cost Over Time Report

Technology Name	Technology	2053	Total				
Capping	1	$0	$249,116				
Fencing and Bridge	1	$0	$91,321				
Five-Year Review	1	$14,216	$85,297				
Site Management	1	$0	$369,749				
Well Abandonment	1	$0	$20,529				
Clear and Grub	2	$0	$7,698				
MEC Sifting	2	$0	$143,664				
Total Phase Cost		$14,216	$967,374	$0	$0	$0	$0

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Appendix B

Methods for Climate Change Vulnerability Assessments for Hazardous Waste Site (Feasibility Study Stage)

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1. INTRODUCTION

This Appendix provides a detailed description of the methods used to conduct a climate change vulnerability assessment and develop the recommendations that are provided in Section 7.3 of the Feasibility Study Report. Potential climate impacts were identified based on possible vulnerabilities specific to the Gibson Scrapyard site and the proposed remedial alternatives to address site contamination. This appendix also provides an overview of the data sources that were used in the climate change vulnerability assessment.

Climate change projections current as of 2019 were used in the assessment. Due to the ever-growing and constantly refined body of knowledge and data regarding climate change, it may be appropriate to revisit this assessment of climate vulnerabilities for this site as additional data regarding climate change projections becomes available.

2. CLIMATE CHANGE IN THE CONTEXT OF REMEDIAL ACTION SITES

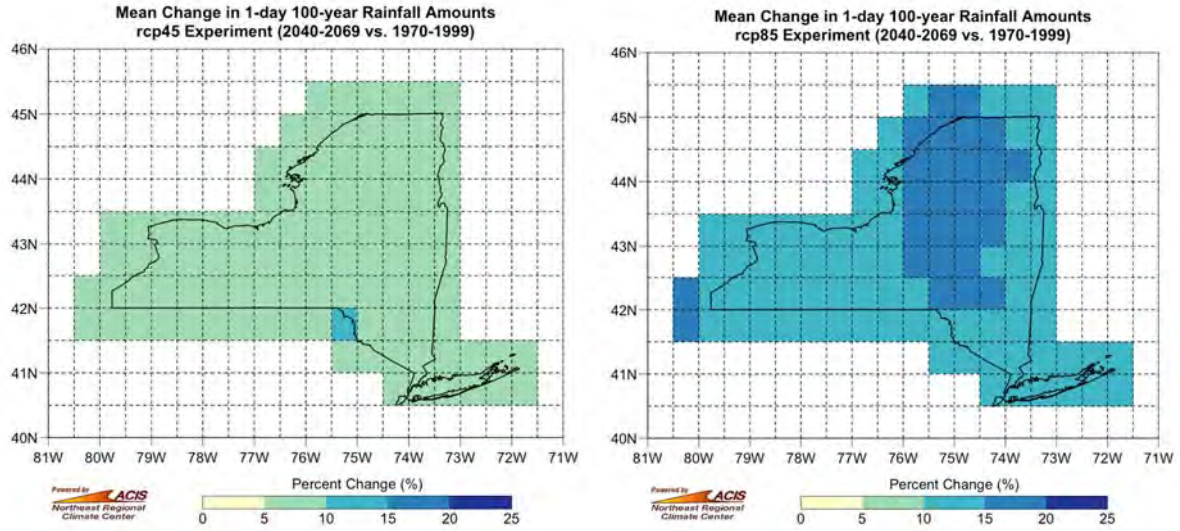
2.1 CLIMATE CHANGE PROJECTIONS

Climate change impacts have already been observed in the state of New York, including increases in temperature, precipitation, and sea level (Horton et al. 2014). Climate change modeling predicts current climate change trends will continue.

Climate change projections are based on both global climate models and representative concentration pathways (RCPs). A global climate model is a mathematical representation of the Earth's climate, which uses atmospheric greenhouse gases and aerosols, as well as land use changes, to simulate physical exchanges between the ocean, atmosphere, land, and ice (Rosenzweig and Solecki 2019). RCPs are varying trends of greenhouse gases, aerosols, and land use changes included as inputs to global climate models. Two RCPs are commonly used to develop projections: (1) RCP 4.5, defined as an intermediate scenario reflecting no change in climate and fossil fuel policies; and (2) RCP 8.5, defined as a high-emissions or worst-case scenario.

Precipitation—Since 1900, average precipitation in New York State has increased each year. From 1958 to 2010, the amount of precipitation in the northeastern United States falling in heavy events (over 1 inch of precipitation in a day) increased by more than 70 percent. During this timeframe, winter precipitation increased while summer precipitation decreased. Modeling of future conditions predicts both precipitation quantities and variability will continue to increase.

The amount of rain falling during the current 100-year rainfall event is projected to increase by 5 to 20 percent, depending on location within the State of New York by 2040–2069, according to both the high and low projections (**Figure 1**) (Northeast Regional Climate Center 2015).



Source: Northeast Regional Climate Center 2015

(a)

(b)

Figure 1. Mean Change in 1-Day 100-Year Rainfall Amounts, 1970–1999 versus 2040–2069, for the (a) Low Emission Scenario (RCP 4.5) and (b) High Emission Scenario (RCP 8.5).

Heavy rainfall events may be cause for greater concern, as short, intense events exceed infiltration capacities and result in increased flooding. Sites with steep slopes may be at greater risk from these events, as steep slopes will see higher runoff velocities while modest topographical relief typically mitigates runoff velocities. Decreases in precipitation during summer months may reduce annual recharge to groundwater.

Drought—Quantitative information for projected drought impacts is not currently available. Historically, New York has been subject to seasonal drought. Decreases in precipitation during summer months discussed above may lead to drought conditions.

Temperature—Since 1970, the average state temperature has risen 2.4 degrees Fahrenheit (F) overall annually and 4.4 degrees F for the winter months. Temperature has increased in all regions of New York, equating to about a 0.25 degrees F increase each decade. Modeling shows that temperatures are anticipated to continue to increase. Summers are expected to intensify with extreme heat and heat waves, while winters are expected to become milder. A review of the information regarding projected climate impacts is provided below.

Storms—Increased temperatures and resulting changes to the water cycle may result in more frequent and severe weather events, such as the occurrence of the 1 percent annual chance (also known as 100-year) storm event. Severe storms similar to Hurricane Sandy in 2012 are likely to occur more often as warmer oceans may contribute to a northerly track of severe storms. Warmer ocean water will also lead to increased water vapor in the atmosphere, which can translate into more powerful hurricanes, and an extended hurricane season.

***Wind*—**Quantitative information for projected wind impacts is not currently available. It is not known how the number of tropical cyclones will change in the North Atlantic Basin, but it is likely that intense hurricanes and associated extreme winds will increase (Horton et al. 2014).

***Sea Level Rise*—**An increase in coastal impacts will primarily be driven by: (1) sea level rise (SLR) from climate change, and (2) storm surge from more significant coastal storm events. The greatest potential climate impact at coastal sites is likely to be an increase in sea level. Areas where the existing topography is overlapped by the predicted future sea level elevation are expected to be impacted. Some areas not permanently inundated by SLR could experience increased nuisance flooding during tidal cycles.

Since 1900, average coastal sea levels in New York have risen more than a foot, at a rate of 1.2 inches per decade (Horton et al. 2014). The rate of rise in New York is almost twice the global rate over the same period. This is due to several local factors, including post-glacial rebound causing the east coast to fall in elevation. Modeling predicts the median projection of SLR in Region 4 (New York City and Long Island) from baseline conditions to the year 2050 to be 1.3 feet. Increases in sea level from climate change are predicted to result in a "new normal;" and therefore, are anticipated to result in relatively permanent flooding, except for tides. According to the high-emissions projections, sea level could rise 2.5 feet above the current elevation by the year 2050 (Horton et al. 2014).

Flooding—The frequency and severity of flood events in the northeastern United States will likely be affected by both SLR and changes in precipitation patterns.

- ***Inland Flooding***—Flooding due to more frequent intense storm events has the potential to cause erosion of fill materials, especially on steep slopes and along streambanks, contribute to more frequent nuisance flooding due to the prevalence of supersaturated soils; increase the elevation of the water table; and reduce water quality by increasing the runoff of pollutants.

- ***Flooding from Coastal Storm Events*—**Important considerations for design of resiliency measures include both the water elevation of storm surge and the velocity, which the surge will move inland. Storm surge moves onshore at the forward velocity of the storm. In the case of a hurricane, this can be highly variable but is often between 10–15 miles per hour.

2.2 TYPICAL CLIMATE CHANGE IMPACTS AT REMEDIAL ACTION SITES

At sites with legacy contamination and ongoing remedial efforts, climate change and extreme weather events can potentially impact the effectiveness of site remediation design and can also impact contaminant toxicity, exposure, organism sensitivity, fate and transport, and long-term operations, management, and stewardship of remediation sites. EA has developed a list of site climate-related sensitivities and vulnerabilities typical to post-remediation action sites was based on information from Maco et al. (2018) and the Environmental Protection Agency (EPA) (2015), as well as knowledge from senior technical experts at EA. This list is provided in Table B-1. This information was used to evaluate the sensitivity of the Gibson Scrapyard site to climate change impacts at a screening level.

3. CLIMATE CHANGE VULNERABILITY ASSESSMENT AT GIBSON SCRAPYARD

3.1 INITIAL SITE-LEVEL SCREENING ASSESSMENT

Climate change site risk factors (site risk factors) were assessed using available site documentation, publicly available data sets, and web-based tools curated by partnerships of governmental agencies and non-governmental organizations, as discussed in Section 2 of this Appendix.

Assessment of Climate Change Vulnerability Site Risk Factors
A summary of methods used to assess the Climate Change Vulnerability Site Risk Factors at the Gibson Scrapyard Site is provided below. A table of possible climate change impacts on remediation activities, a description of each, and the data (and data sources) used to assess the site risk factors are provided in Table B-2.

Site Characterization and Qualitative Site Risk Factors
Available documentation was reviewed to identify site vulnerabilities to climate change. These vulnerabilities included characteristics of the proposed remedial actions, existing infrastructure located on or adjacent to the site, or other current site conditions. Approximately half of the climate change site risk factors were assessed based on site documentation. Numerical data for these factors are not available; therefore, these were assessed for presence or absence of risk. Climate change risks that are present on site were marked "Yes," and climate change risks that are not present were marked, "No." Other responses were given where data are incomplete, or where "Yes" and "No" were inadequate to describe the risk on site.

Climate Change Projection Data for Quantitative Site Risk Factors
Climate change projection data are available statewide for precipitation, temperature, and SLR, and these data are incorporated into the assessment. Data from climate change projections make up approximately half of the climate change site risk factors.

Projection data for a high emissions scenario in the 2090s obtained from the New York Climate Change Science Clearinghouse (2022) New York Climate Change Mapping Tool (https://www.nyclimatescience.org/) were used for precipitation and temperature site risk factors. Although projections for the 2050s are commonly discussed in climate change literature and frequently used as a planning horizon, this assessment used projections for the 2090s because projections for this period provide an overview of the likely worst-case scenario over the design life of the project. However, it should be noted that as projections extend further into the future, projection data becomes less accurate. Although, this period is also far enough out to provide time to address possible impacts. The New York Climate Change Mapping provides statewide projections data for precipitation and extreme temperatures, at the county level.

SLR risk was assessed using an undated "bathtub" model that provides an inundation map that changes as the water level increases compared to the current high tide line. These data are provided in map form as the Coastal Risk Screening Tool (https://coastal.climatecentral.org/) developed by Climate Central (2021). Higher values for SLR depths indicate lower risk because they indicate the amount by which sea level would have to increase in order to impact the site.

3.2 DETAILED CLIMATE VULNERABILITY ASSESSMENT OF PROPOSED REMEDIAL ALTERNATIVES

Remedial Alternative Vulnerability Assessment

An analysis was performed to evaluate the sensitivity of each proposed remedial alternative to various climate risks, and apply specific criteria to assess the severity of the risk to each Alternative from each climate risk factor. A remedial alternative is considered more sensitive to a given climate change risk factor if the risk factor would prevent the remedial alternative from achieving the RAOs. Additionally, criteria developed for six major climate risk factors (temperature, precipitation/flooding, drought, wind, storm surge, sea level rise) were used to approximate the level of climate change exposure at the site and estimate the sensitivity of the proposed remedy to each climate risk factor. Where projection data are available for these risk factors, projections through the end of the century were used in order to assess the worst-case scenarios for each remedial alternative through the end of the century, with the understanding that these remedial alternatives will remain in place for decades. A description of the methods used for this assessment is detailed in Appendix B, and the results of the climate vulnerability assessment (presented as a matrix) are provided in **Table 7-8** of the main document.

The matrix can act as a decision-support tool that informs the criteria outlined in Section 7.2, as climate change risks will impact long-term effectiveness and permanence of the remedy; the ability of the remedy to reduce toxicity, mobility, or volume of contamination; short-term impacts and effectiveness; and cost-effectiveness. As the potential for a climate risk factor to impact the site increases, an X is placed along the x-axis in the matrix (increasing as the X moves from left to right along the x-axis), and as a remedial alternative's sensitivity to a climate factor increases, the X is placed along the y-axis (increasing vertically along the y-axis). By assessing both of these factors, an X is placed in one of nine boxes, assessing both climate risk exposure and remedy (Alternative) sensitivity to that factor. The boxes in the matrix are color coded according to the level of risk that results from the combination of these two assessments as a visual aid. The color categories are defined as follows:

- Red indicates remedy sensitivity is high and risk due to climate change is high.
- Orange indicates remedy sensitivity is high and risk due to climate change is moderate or remedy sensitivity is moderate and risk due to climate change is high.
- Yellow indicates remedy sensitivity is high and risk due to climate change is low or remedy sensitivity is moderate and risk due to climate change is moderate, or remedy sensitivity is low and risk due to climate change is high.
- Light green indicates remedy sensitivity is low and risk due to climate change is moderate or remedy sensitivity is moderate and risk due to climate change is low.
- Green indicates remedy sensitivity is low and risk due to climate change is low.

4. SUMMARY

This document summarizes methods that can be used to anticipate climate change impacts on potential remedial actions at hazardous waste sites during the feasibility study stage. The results of this analysis (discussed in Section 7.3 of the main document) provide additional information that can be used to inform the selection, design, and maintenance of remedial alternatives and maximize long-term climate resiliency at a remedial action site. It is important to note that the analysis and recommendations are based on the best historical and projected climate data available at the time of the analysis, and climate science is an area of ongoing research. It may be appropriate and/or necessary to revisit recommendations and remedial/maintenance decisions at hazardous waste sites as more accurate climate projections become available, in order to best achieve the goals of protecting human health and safety.

5. REFERENCES

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Tables

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Tables

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Table B-1. Possible Climate Change Impacts on Remediation Activities

Climate Impact	Secondary Effect	Relevant Remediation Effect
Altered precipitation pattern	Wetter: flooding, more intense storms, more runoff, erosion	• Mobilization of contaminants (e.g., from vadose zone to groundwater) → Higher contaminant concentration/export, overpowering significant degradation rate in groundwater zone could remove natural protective barriers or cause infill subsidence in low-lying areas • Dilution → Lower contaminant concentration/export • Increase in waste, debris, or urban or agricultural runoff entering containment/treatment zone • Increased turbidity of surface water in treatment zone • Damage to site integrity, cover systems • Reduced access to system components • Water damage to exposed machinery, equipment, vehicles, and vessels
	Mobilization of sediment	• Clean sediments transported on top of contaminated sediments
	Drier: drought	• Damage to site integrity (e.g., cap cracking) • Damage to cap through deeper-than-normal growth of plant roots to reach groundwater if periodically or permanently lowered • Oxidation of soils • Increased volatility • Less dilution → Higher contaminant concentration/export • Reduced mobilization → Higher contaminant persistence (higher contaminant concentration/export) • Insufficient water for remediation; overuse of groundwater • Possible enhanced natural attenuation, expedited contaminant removal
	Altered salinity	• Altered degradation rates (physical, microbial)
Sea level rise	Erosion	• Damage to site integrity
	Site inundation	• Increased mobilization of contaminants, possible dilution, or compromised site with mixing or loss of contaminated materials, increased bioavailability of contaminants
	Mobilization of sediment	• Clean sediments transported on top of contaminated sediments
	Surface water elevations increase	• Changing footprint of floodplains, river boundaries, and coastal shoreline encroachment → Impact on regulations (e.g., dredging, cleanup levels, negotiation of water levels, monitoring)
Extreme weather	Scour (wind/wave action; surface water flow velocity and/or turbulence)	• Damage to site integrity, cover systems • Increased turbidity of surface water in treatment zone • Reduced access to system components
	High wind	• Damage to machinery, equipment, tall structures • Damage to or toppling of trees → Damage to site integrity, cover systems • Increased turbidity of surface water in treatment zone • Power or fuel source interruption at site
	Flooding	• Possible dilution (lower contaminant concentration/export), or compromised site with mixing or loss of contaminated materials, damage to cover systems • See altered precipitation pattern: wetter, above

Table B-1. Possible Climate Change Impacts on Remediation Activities

Climate Impact	Secondary Effect	Relevant Remediation Effect
	Extreme heat	• Increased volatility → Mobilization of contaminants from site through soil and air • Changes in use of site by wildlife (e.g., increased burrowing; over-browsing of vegetation, increased or decreased wildlife traffic or use of site) • Melting permafrost → Mobilization of contaminants from site through water, soil, and air
	Freezing conditions	• Damage to cover systems and in situ stabilization systems
Extreme weather: fire	Increased use of fire retardants	• Spread of contaminants
	Damage to site infrastructure	• Loss of function of remediation systems
Decreasing pH of surface water, soil and sediment	Altered transformation or degradation	• Increased availability, mobilization, toxicity • Increased sensitivity of species due to pH stress • Altered transformation rates
Increasing temperature	Altered transformation or degradation	• Increased or decreased toxicity
	Decreased dissolved oxygen/anoxic conditions	• Altered transformation, decreased species resilience
	Increased species heat stress and associated conditions	• Increased sensitivity to contaminants • Increases in burrowing activity
Human impact and responses	Vulnerable communities commonly comprised of low socioeconomic and minority populations	• Cardiopulmonary illness; food, water, and vector-borne diseases • Loss of homes, drinking water, and livelihoods • Mental health consequences and stress

Source: Maco et al. 2018; EPA 2015

Table B-2. Screening-Level Climate Vulnerability Analysis Framework

Climate Impact	Climate Change Site Risk Factor	Explanation of Site Risk Factor	Data Source	Data Format
Precipitation	Baseline total annual precipitation	Current total annual precipitation amounts provide context for projected changes in annual precipitation.	County-level data from web map at https://www.nyclimatescience.org/map	Numerical entry
	Projected change in total annual precipitation (high emissions scenario, 2090s, inches)	The amount by which total annual precipitation is expected to increase or decrease by the 2090s.	County-level data from web map at https://www.nyclimatescience.org/map	Numerical entry
	Projected total annual precipitation (high emissions scenario, 2090s, inches)	The total annual precipitation amount in the 2090.	County-level data from web map at https://www.nyclimatescience.org/map	Numerical entry
	Baseline number of days with precipitation greater than 1 inch	The current number of days per year in which a location receives more than an inch of rain per day. This baseline value provides context for projected changes in the number of days with rainfall greater than one inch predicted for the 2090s. The number of days with more than one inch of rainfall can be used as an indicator of the frequency of extreme rainfall.	County-level data from web map at https://www.nyclimatescience.org/map	Numerical entry
	Projected change in number of days with precipitation greater than 1 inch (high emissions scenario, 2090s)	The change in number of days with extreme rainfall over one inch that is expected to occur by the 2090s.	County-level data from web map at https://www.nyclimatescience.org/map	Numerical entry
	Projected total number of days with precipitation greater than 1 inch (high emissions scenario, 2090s)	The total number of days expected to experience more than one inch of rainfall (i.e., extreme rainfall) by the 2090s.	County-level data from web map at https://www.nyclimatescience.org/map	Numerical entry

Table B-2. Screening-Level Climate Vulnerability Analysis Framework

Climate Impact	Climate Change Site Risk Factor	Explanation of Site Risk Factor	Data Source	Data Format
Drought	Site subject to seasonal or multi-year drought?	Multi-year drought may cause severe impacts to remedial activities, as vegetation and other site elements may not have a chance to recover from damage by drought. Seasonal drought may impact site elements, but impacts may be more limited as site elements may have time to recover from shorter dry periods.	Regional knowledge	Drop-down list: • Seasonal • Multi-year • None
Wind	Design wind speed/wind zone	The design wind speed for structures in the area based on the 2021 International Building Code. Provides an indicator of extreme wind speeds in the area.	Map on page 13 of the following document: https://www.fema.gov/sites/default/files/documents/fema_international-building-code_10152021.pdf Map at https://www.nist.gov/image/windzonemapjpg	Drop-down list: • 130 miles per hour • 160 miles per hour • 200 miles per hour • 250 miles per hour, or located in a Special Wind Region or Hurricane Susceptible Region
	On-site structures susceptible to high winds? (e.g., cranes, structures on buildings, stacks)	Tall structures are at greater risk due to more intense storms and higher wind speeds than short structures.	Review of Site Documentation	Drop-down list: • Yes • No • Data unavailable
	Large trees (greater than 4 inches in diameter) on site?	Large trees are vulnerable to higher winds speeds and can compromise a landfill cap or other earthworks if uprooted from the surface.	Review of Site Documentation	Drop-down list: • Yes • No • Data unavailable

Table B-2. Screening-Level Climate Vulnerability Analysis Framework

Climate Impact	Climate Change Site Risk Factor	Explanation of Site Risk Factor	Data Source	Data Format
Temperature	Baseline annual number of days above 90 degrees Fahrenheit (F)	The current number of days per year in which the maximum temperature exceeds 90 degrees F, based on historical data. This baseline value provides context for projected changes in the number of days above 90 degrees F predicted for the 2090s. The number of days above 90 degrees F can be used as an indicator of the frequency of days with extreme heat.	County-level data from web map at https://www.nyclimatescience.org/map	Numerical entry
	Projected change in annual number of days above 90 degrees F (high emissions scenario, 2090s)	The change in number of days with maximum temperatures over 90 degrees F that is expected to occur by the 2090s.	County-level data from web map at https://www.nyclimatescience.org/map	Numerical entry
	Projected total annual number of days above 90 degrees F (high emissions scenario, 2090s)	The total number of days in which the maximum temperature is expected to exceed 90 degrees F by the 2090s.	County-level data from web map at https://www.nyclimatescience.org/map	Numerical entry
	Baseline maximum summer temperature, degrees F	The average maximum summer temperature based on historical data. This is an indicator of extreme heat levels for the area.	County-level data from web map at https://www.nyclimatescience.org/map	Numerical entry
	Projected change in maximum summer temperature (degrees F, high emissions scenario, 2090s)	The change in number the maximum summer temperature that is expected to occur by the 2090s.	County-level data from web map at https://www.nyclimatescience.org/map	Numerical entry

Table B-2. Screening-Level Climate Vulnerability Analysis Framework

Climate Impact	Climate Change Site Risk Factor	Explanation of Site Risk Factor	Data Source	Data Format
Temperature	Projected maximum summer temperature (degrees F, high emissions scenario, 2090s)	The average maximum summer temperature expected for the county in the 2090s.	County-level data from web map at https://www.nyclimatescience.org/map	Numerical entry
	Baseline annual number of days below 32 degrees F	The number of days with minimum temperatures below 32 degrees F based on historical data. May be used as an indicator of extreme cold and the potential for freeze-thaw action in soils.	County-level data from web map at https://www.nyclimatescience.org/map	Numerical entry
	Projected change in annual number of days below 32 degrees F (high emissions scenario, 2090s)	The change in number of days with minimum temperatures below 32 degrees F that is expected to occur by the 2090s.	County-level data from web map at https://www.nyclimatescience.org/map	Numerical entry
	Projected total annual number of days below 32 degrees F (high emissions scenario, 2090s)	The total number of days with minimum temperatures expected to fall below 32 degrees F by the 2090s.	County-level data from web map at https://www.nyclimatescience.org/map	Numerical entry
	Baseline maximum winter temperature, degrees F	The average maximum winter temperature based on historical data. May be used as an indicator of extreme cold and the potential for freeze-thaw action in soils.	County-level data from web map at https://www.nyclimatescience.org/map	Numerical entry

Table B-2. Screening-Level Climate Vulnerability Analysis Framework

Climate Impact	Climate Change Site Risk Factor	Explanation of Site Risk Factor	Data Source	Data Format
Temperature	Projected change in maximum winter temperature (degrees F, high emissions scenario, 2090s)	The change in number the maximum winter temperature that is expected to occur by the 2090s.	County-level data from web map at https://www.nyclimatescience.org/map	Numerical entry
	Projected maximum winter temperature (degrees F, high emissions scenario, 2090s)	The average maximum winter temperature expected for the county in the 2090s.	County-level data from web map at https://www.nyclimatescience.org/map	Numerical entry
	Baseline Minimum Winter Temperature, °F	The average minimum winter temperature based on historical data. May be used as an indicator of extreme cold and the potential for freeze-thaw action in soils.	County-level data from web map at https://www.nyclimatescience.org/map	Numerical entry
	Projected change in minimum winter temperature (degrees F, high emissions scenario, 2090s)	The change in number the minimum winter temperature that is expected to occur by the 2090s.	County-level data from web map at https://www.nyclimatescience.org/map	Numerical entry
	Projected minimum winter temperature (degrees F, high emissions scenario, 2090s)	The average minimum winter temperature expected for the county in the 2090s.	County-level data from web map at https://www.nyclimatescience.org/map	Numerical entry

Table B-2. Screening-Level Climate Vulnerability Analysis Framework

Climate Impact	Climate Change Site Risk Factor	Explanation of Site Risk Factor	Data Source	Data Format
General	Previous weather/climate impacts at site	Previous weather impacts may reveal ongoing site vulnerabilities where risk may increase with climate change.	Review of Site Documentation	Summary of known impacts to site from normal or extreme weather events or from climate change (e.g., compromised cap due to erosion; damage from hurricanes)
Storm Surge/Sea Level Rise (SLR)	Coastal location	Sites in a coastal location are likely to face greater risks from climate change due to greater exposure to wave action, storm surge, SLR, coastal storms, and other marine factors.	Review of Site Documentation	Drop-down list: • Yes • No • Data unavailable
	Sea level rise elevation at which flooding is expected to occur	The degree of SLR required to inundate a site can help indicate the level of associated risk to the site and the time available before SLR impacts occur (when compared to current and project rates of SLR). Sites that will be inundated at lesser degrees of SLR (e.g., 1-5 feet) are likely to face greater risks sooner than higher sites that would need to experience 10 feet or more of SLR before they flood.	Web map at https://coastal.climatecentral.org/	Drop-down list: • Less than 1 foot • 1 foot • 2 feet • 3 feet • 4 feet • 5 feet • 6 feet • 7 feet • 8 feet • 9 feet • 10 feet or more • 20 feet or more • 30 feet or more • NA

Table B-2. Screening-Level Climate Vulnerability Analysis Framework

Climate Impact	Climate Change Site Risk Factor	Explanation of Site Risk Factor	Data Source	Data Format
Flooding	Site located in a mapped floodplain/flood hazard area?	Indicates whether the site is located in a floodplain or flood hazard area recognized by FEMA.	Review of site location on web map at https://hazards-fema.maps.arcgis.com/apps/webappviewer/index.html?id=8b0adb51996444d4879338b5529aa9cd or flood insurance rate maps.	Drop-down list: • Yes • No • No, but Site is located in a river corridor and/or in proximity to a mapped flood hazard zone • Site unmapped/data unavailable
	Site protected from flooding by levees, floodwall, heavily channelized stream/canal, or pumping?	Indicates whether the site is artificially protected from flooding by flood protection infrastructure and therefore dependent on maintenance of that infrastructure. Increased risk to flood protection infrastructure from climate change and/or lack of long-term maintenance may increase risk to the site.	Review of site documentation	Drop-down list: • Yes • No • Data unavailable
	Site adjacent to navigable waterways?	Failure of containment at the site may result in impacts to navigational waterways, impacting commercial, industrial, or safety operations.	Review of site documentation	Drop-down list: • Yes • No • Data unavailable
	Shallow groundwater at site?	At sites where groundwater is already shallow, flooding impacts may increase the risk to remedial sites both above and below the ground surface.	Review of site documentation	Drop-down list: • Yes • No • Data unavailable
	Site subsurface geology composed of limestone or similar?	Bedrock such as limestone may dissolve more quickly in areas impacted by more frequent flooding, causing sinkholes to develop and compromising the integrity of any remedial measures.	Review of site documentation	Drop-down list: • Yes • No • Data unavailable

Table B-2. Screening-Level Climate Vulnerability Analysis Framework

Climate Impact	Climate Change Site Risk Factor	Explanation of Site Risk Factor	Data Source	Data Format
Erosion	Steep grades on site?	Steep slopes are more likely to experience erosion than shallow-gradient sites. If precipitation and/or flooding increase, caps and other earthworks at post-remedial action sites may be compromised by erosion.	Review of site documentation	Drop-down list: • Yes • No • Data unavailable

Table B-3. Remedy Vulnerability Assessment Decision Criteria

Long-Term Remedy Component	Hazard	Description of Remedy Component Concerns due to Climate Change	Criteria
Soil/Soil Vapor Remediation			
Landfill Covers/Soil Covers/Constructed Wetlands	Temperature	Maintaining landfill cover vegetation/ increased subsidence of cover. Increased freeze/thaw cycles can increase frost heave in subsoil or soil fracturing and increase infiltration of cap depending on material design. Loss of cover integrity can lead to mobilization of contaminants.	*Climate Exposure* *Low:* locations with (or projected to have) mean annual air temperatures below 32 degrees (F) or air-freezing indexes greater than 4,500°F-days (see ASCE 32) *Medium:* locations with (or projected to have) mean annual air temperatures above 32 degrees (F) or air-freezing indexes less than 4,500°F-days (see ASCE 32), but materials deemed to have low potential for freeze thaw *High:* locations with (or projected to have) mean annual air temperatures above 32 degrees (F) or air-freezing indexes less than 4,500°F-days (see ASCE 32), and materials deemed to have high potential for freeze thaw
			Remedy Sensitivity *Low:* Degraded cap integrity has minimal or no impact on RAO *Medium:* Degraded cap integrity has moderate impact on RAO *High:* Degraded cap integrity has high impact on RAO
	Precipitation-based flooding	Erosion, scour, or other damage to cover integrity resulting in mobilization of contaminants.	*Climate Exposure* *Low:* Site outside current or projected 500-year floodplain *Medium:* Site within current or projected 500-yr floodplain but outside 100-yr floodplain *High:* Site within current or projected 100-yr floodplain
			Remedy Sensitivity *Low:* Degraded cap integrity has minimal or no impact on RAO *Medium:* Degraded cap integrity has moderate impact on RAO *High:* Degraded cap integrity has high impact on RAO
	Drought	Failure of vegetation on soil cover leading to erosion of cover and loss of cover integrity, resulting in mobilization of contaminants.	Climate Exposure *Low:* Areas which have no history of multi-year drought *Medium:* Areas that are experiencing decreasing annual rainfall and increasing annual air temperatures *High:* Areas with history of multi-year drought
			Remedy Sensitivity *Low:* Degraded cap integrity has minimal or no impact on RAO *Medium:* Degraded cap integrity has moderate impact on RAO *High:* Degraded cap integrity has high impact on RAO

Table B-3. Remedy Vulnerability Assessment Decision Criteria

Long-Term Remedy Component	Hazard	Description of Remedy Component Concerns due to Climate Change	Criteria
Landfill Covers/Soil Covers/Constructed Wetlands	Wind	Wind damage to trees or structures on cover, resulting in loss of cover integrity, resulting in mobilization of contaminants.	Climate Exposure *Low:* Located in area subject to a design wind speed of 130 mph *Medium:* Located in area subject to a design wind speed of 160 mph *High:* Located in an area subject to a design wind speed of 200 mph or more, or located in a Hurricane-Susceptible Region or Special Wind Region
			Remedy Sensitivity *Low:* Degraded cap integrity has minimal or no impact on RAO *Medium:* Degraded cap integrity has moderate impact on RAO *High:* Degraded cap integrity has high impact on RAO
	Storm surge/sea level rise	Erosion or saturation of cover, result in loss of cover integrity and mobilization of contaminants.	Climate Exposure *Low:* Inland site or site outside current or projected coastal 500-year floodplain *Medium:* Site within current or projected coastal 500-yr floodplain but outside 100-yr floodplain *High:* Site within current or projected 100-yr floodplain
			Remedy Sensitivity *Low:* Degraded cap integrity has minimal or no impact on RAO *Medium:* Degraded cap integrity has moderate impact on RAO *High:* Degraded cap integrity has high impact on RAO
	Wildfires	Loss of vegetative cover and cracking of soil cover from intense heat, leading to loss of cover integrity and mobilization of contaminants.	Climate Exposure *Low:* Areas lacking high fuel density (land cover other than mature forests, scrublands, or grasslands), or possessing limited history of seasonal drought *Medium:* Areas with or adjacent to high fuel density (including mature forests, scrubland, or grasslands) and increasing tendency for seasonal drought *High:* Areas with or adjacent to high fuel density (including mature forests, scrubland, or grasslands) and history of muti-year drought
			Remedy Sensitivity *Low:* Degraded cap integrity has minimal or no impact on RAO *Medium:* Degraded cap integrity has moderate impact on RAO *High:* Degraded cap integrity has high impact on RAO

Appendix C

SiteWise Analysis Data

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Alternative 2: No Action & Site Management

This worksheet allows the user to define material production, transportation, equipment use, and residual handling variables for the remedial alternative
Yellow cells require the user to choose an input from a drop down menu
White cells require the user to type in a value

BASELINE INFORMATION

COMPONENT 1 DURATION AND COST	Entire Site
Input duration of the component (unit time)	1
Input component cost per unit time ($)	

MATERIAL PRODUCTION

WELL MATERIALS	Well Type 1	Well Type 2	Well Type 3	Well Type 4	Well Type 5	Well Type 6	Well Type 7	Well Type 8	Well Type 9	Well Type 10	Well Type 11	Well Type 12
Input number of wells												
Input depth of wells (ft)												
Choose specific casing material schedule from drop down menu	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC
Choose well diameter (in) from drop down menu	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8
Input total quantity of Sand (kg)												
Input total quantity of Gravel (kg)												
Input total quantity of Bentonite (kg)												
Input total quantity of Typical Cement (kg)												
Input total quantity of General Concrete (kg)												
Input total quantity of Steel (kg)												

TREATMENT CHEMICALS & MATERIALS	Treatment 1	Treatment 2	Treatment 3	Treatment 4	Treatment 5	Treatment 6	Treatment 7	Treatment 8	Treatment 9	Treatment 10	Treatment 11	Treatment 12
Input number of injection points												
Choose material type from drop down menu	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide
Input amount of material injected at each point (pounds dry mass)												
Input number of injections per injection point												

TREATMENT MEDIA	Treatment 1	Treatment 2	Treatment 3	Treatment 4	Treatment 5	Treatment 6	Treatment 7	Treatment 8	Treatment 9	Treatment 10	Treatment 11	Treatment 12
Input weight of media used (lbs)												
Choose media type from drop down menu	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC

CONSTRUCTION MATERIALS	Material 1	Material 2	Material 3	Material 4	Material 5	Material 6	Material 7	Material 8	Material 9	Material 10	Material 11	Material 12
Choose material type from drop down menu	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner
Input area of material (ft2)												
Input depth of material (ft)												

WELL DECOMMISSIONING	Well Type 1	Well Type 2	Well Type 3	Well Type 4	Well Type 5	Well Type 6	Well Type 7	Well Type 8	Well Type 9	Well Type 10	Well Type 11	Well Type 12
Input number of wells												
Input depth of wells (ft)												
Input well diameter (in)												
Choose material from drop down menu	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil

SILT CURTAIN MATERIALS	Curtain 1	Curtain 2	Curtain 3	Curtain 4	Curtain 5	Curtain 6	Curtain 7	Curtain 8	Curtain 9	Curtain 10	Curtain 11	Curtain 12
Input length or perimeter of silt curtain (ft)												
Input depth of silt curtain (ft)												

BULK MATERIAL QUANTITIES	Material 1	Material 2	Material 3	Material 4	Material 5	Material 6	Material 7	Material 8	Material 9	Material 10	Material 11	Material 12
Choose material from drop down menu	Acetic Acid	Acetic Acid	Acetic Acid	Acetic Acid	Acetic Acid	Acetic Acid	Acetic Acid	Acetic Acid	Acetic Acid	Acetic Acid	Acetic Acid	Acetic Acid
Choose units of material quantity from drop down menu	pounds	pounds	pounds	pounds	pounds	pounds	pounds	pounds	pounds	pounds	pounds	pounds
Input material quantity												

TRANSPORTATION

PERSONNEL TRANSPORTATION - ROAD	EA Oversight	UXO Technician (Fence Install)	Temporary Bridge Install	Construction Crew (Fence Install)	Fence & Swing Gate Delivery	Mob/Demob Inspection Crew	Inspection & Repairs	Trip 8	Trip 9	Trip 10	Trip 11	Trip 12
Will DIESEL-run vehicles be retrofitted with a particulate reduction technology?	No	No	No	No	No	No	No	No	No	No	No	No
Choose vehicle type from drop down menu*	SUVs	SUVs	Heavy Duty	Heavy Duty	Heavy Duty	SUVs	SUVs	Cars	Cars	Cars	Cars	Cars
Choose fuel used from drop down menu	Gasoline	Gasoline	Diesel	Diesel	Diesel	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Input distance traveled per trip (miles)	200	440	1300	10	40	200	200					
Input number of trips taken	1	1	1	1	1	1	15					
Input number of travelers	1	1	2	3	1	1	1					
Input estimated vehicular fuel economy (mi/gal) (Input only if known for the vehicle selected, otherwise a default will be used by the tool)	30	30	10	10	10	30	30					

*For vehicle type 'Other' please enter values in Table 2b in the Look Up Table tab.

PERSONNEL TRANSPORTATION - AIR	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6	Trip 7	Trip 8	Trip 9	Trip 10	Trip 11	Trip 12
Input distance traveled (miles)												
Input number of travelers												
Input number of flights taken												

PERSONNEL TRANSPORTATION - RAIL	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6	Trip 7	Trip 8	Trip 9	Trip 10	Trip 11	Trip 12
	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail
Input distance traveled (miles)												

COMPONENT 1 DURATION AND COST	Entire Site

EQUIPMENT TRANSPORTATION - SHARED LOAD ROAD	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6	Trip 7	Trip 8	Trip 9	Trip 10	Trip 11	Trip 12
Input distance traveled (miles)												
Input weight of equipment transported (tons)												

EQUIPMENT TRANSPORTATION - AIR	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6	Trip 7	Trip 8	Trip 9	Trip 10	Trip 11	Trip 12
Input distance traveled (miles)												
Input weight of equipment transported (tons)												

EQUIPMENT TRANSPORTATION - RAIL	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6	Trip 7	Trip 8	Trip 9	Trip 10	Trip 11	Trip 12
Input distance traveled (miles)												
Input weight of load (tons)												

EQUIPMENT TRANSPORTATION - WATER	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6	Trip 7	Trip 8	Trip 9	Trip 10	Trip 11	Trip 12
Input distance traveled (mile)												
Input weight of load (tons)												

EQUIPMENT USE

EARTHWORK	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6	Equipment 7	Equipment 8	Equipment 9	Equipment 10	Equipment 11	Equipment 12
Choose earthwork equipment type from drop down menu	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input volume of material to be removed (yd3)												
Will DIESEL-run equipment be retrofitted with a particulate reduction technology?	No	No	No	No	No	No	No	No	No	No	No	No

DRILLING	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Event 11	Event 12
Input number of drilling locations												
Choose drilling method from drop down menu	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push
Input time spent drilling at each location (hr)												
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel

TRENCHING	Trencher 1	Trencher 2	Trencher 3	Trencher 4	Trencher 5	Trencher 6	Trencher 7	Trencher 8	Trencher 9	Trencher 10	Trencher 11	Trencher 12

Choose fuel type from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Choose horsepower range from drop down menu	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3
Input operating hours (hr)												

SEDIMENT DREDGING	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6	Equipment 7	Equipment 8	Equipment 9	Equipment 10	Equipment 11	Equipment 12
Choose dredge equipment type from drop down menu	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical
Choose dredge fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input volume of material to be dredged (yd3)												
Choose dredge equipment size	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY
Suggested dredge equipment size	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY
Input number of dredge tenders (default already present, user override possible)	1	1	1	1	1	1	1	1	1	1	1	1
Choose dredge tender fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input operating time for dredge tenders (hr) (default calculated value, user override possible)	0	0	0	0	0	0	0	0	0	0	0	0
Input number of scow tenders (default already present, user override possible)	2	2	2	2	2	2	2	2	2	2	2	2
Choose scow tender fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input operating time for scow tenders (hr) (default calculated value, user override possible)	0	0	0	0	0	0	0	0	0	0	0	0
Choose size of research vessel from drop down menu	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)
Choose research vessel fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input number of research vessels (default already present, user override possible)	1	1	1	1	1	1	1	1	1	1	1	1
Input operating time for research vessels (hr) (default calculated value, user override possible)	0	0	0	0	0	0	0	0	0	0	0	0
Will DIESEL-run equipment be retrofitted with a particulate reduction technology?	No	No	No	No	No	No	No	No	No	No	No	No

SEDIMENT MANAGEMENT (STAGING AND DRYING)	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6	Equipment 7	Equipment 8	Equipment 9	Equipment 10	Equipment 11	Equipment 12
Choose earthwork equipment type from drop down menu	Crawler Crane	Crawler Crane	Crawler Crane	Crawler Crane	Crawler Crane	Crawler Crane	Crawler Crane	Crawler Crane	Crawler Crane	Crawler Crane	Crawler Crane	Crawler Crane
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input volume of material to be removed (yd3)												
Is volume input that of saturated sediment?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Will the sediment be dry when this work is performed?	No	No	No	No	No	No	No	No	No	No	No	No
Will DIESEL-run equipment be retrofitted with a particulate reduction technology?	No	No	No	No	No	No	No	No	No	No	No	No

SEDIMENT CAPPING	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6	Equipment 7	Equipment 8	Equipment 9	Equipment 10	Equipment 11	Equipment 12
Choose capping method from drop down menu	Surface Release	Surface Release	Surface Release	Surface Release	Surface Release	Surface Release	Surface Release	Surface Release	Surface Release	Surface Release	Surface Release	Surface Release
Choose capping equipment fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input volume of capping material to be placed (yd3)												
Choose capping equipment size/type	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge
Suggested capping equipment size/type	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge
Input number of dredge tenders (hr) (default already present, user override possible)	1	1	1	1	1	1	1	1	1	1	1	1
Choose tender fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input operating time for dredge tenders (hr) (default calculated value, user override possible)	0	0	0	0	0	0	0	0	0	0	0	0
Input number of scow tenders (default already present, user override possible)	0	0	0	0	0	0	0	0	0	0	0	0
Choose scow tender fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input operating time for scow tenders (hr) (default calculated value, user override possible)	0	0	0	0	0	0	0	0	0	0	0	0
Choose size of research vessel from drop down menu	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)
Choose research vessel fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input number of research vessels (default already present, user override possible)	1	1	1	1	1	1	1	1	1	1	1	1
Input operating time for research vessels (hr) (default calculated value, user override possible)	0	0	0	0	0	0	0	0	0	0	0	0
Will DIESEL-run equipment be retrofitted with a particulate reduction technology?	No	No	No	No	No	No	No	No	No	No	No	No

WATERCRAFT OPERATION	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6	Equipment 7	Equipment 8	Equipment 9	Equipment 10	Equipment 11	Equipment 12
Choose size of research vessel from drop down menu	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)
Choose research vessel fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input number of vessels												
Input operating time (hours)												
Will DIESEL-run equipment be retrofitted with a particulate reduction technology?	No	No	No	No	No	No	No	No	No	No	No	No

For each pump, select only one of the three methods to calculate energy and GHG emissions
Enter "0" for all user input values for unused pump columns or unused methods

PUMP OPERATION	Pump 1	Pump 2	Pump 3	Pump 4	Pump 5	Pump 6	Pump 7	Pump 8	Pump 9	Pump 10	Pump 11	Pump 12
Choose method from drop down	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1
Method 1 - ELECTRICAL USAGE IS KNOWN												
Input pump electrical usage (KWh)	0	0	0	0	0	0	0	0	0	0	0	0
Method 2 - PUMP HEAD IS KNOWN												
Input flow rate (gpm)	0	0	0	0	0	0	0	0	0	0	0	0
Input total head (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Input number of pumps operating	0	0	0	0	0	0	0	0	0	0	0	0
Input operating time for each pump (hrs)	0	0	0	0	0	0	0	0	0	0	0	0
Pump efficiency (default already present, user override possible)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Pump motor efficiency (default already present, user override possible)	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Input specific gravity (default already present, user override possible)	1	1	1	1	1	1	1	1	1	1	1	1
Method 3 - NAME PLATE SPECIFICATIONS ARE KNOWN												
Input pump horsepower (hp)	0	0	0	0	0	0	0	0	0	0	0	0
Input number of pumps operating	0	0	0	0	0	0	0	0	0	0	0	0
Input operating time for each pump (hrs)	0	0	0	0	0	0	0	0	0	0	0	0
Percent of max speed for pump motor (Optional input for variable speed motor)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Pump load if max motor speed draws full nameplate horsepower	1	1	1	1	1	1	1	1	1	1	1	1
Input pump load (default already present, user override possible, consider above value)	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Pump motor efficiency (default already present, user override possible)	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Region												
Electricity Region	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY

DIESEL AND GASOLINE PUMPS	Pump 1	Pump 2	Pump 3	Pump 4	Pump 5	Pump 6	Pump 7	Pump 8	Pump 9	Pump 10	Pump 11	Pump 12
Choose fuel type from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Choose horsepower range from drop down menu	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1
Equipment operating hours (hrs)												
Input estimated fuel consumption rate (gal/hr) (Input only if known for the pump selected, otherwise a default will be used by the tool)												

For each type of equipment, select only one of the methods to calculate energy and GHG emissions
Enter "0" for all user input values for unused equipment columns or unused methods

BLOWER, COMPRESSOR, MIXER, AND OTHER EQUIPMENT	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6	Equipment 7	Equipment 8	Equipment 9	Equipment 10	Equipment 11	Equipment 12
Choose type of equipment from drop down	Blower	Blower	Blower	Blower	Blower	Blower	Blower	Blower	Blower	Blower	Blower	Blower
Choose method from drop down	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1
Method 1 - NAME PLATE SPECIFICATIONS ARE KNOWN												
Input equipment horsepower (hp)	0	0	0	0	0	0	0	0	0	0	0	0
Input number of equipments operating	0	0	0	0	0	0	0	0	0	0	0	0
Input operating time for each equipment (hrs)	0	0	0	0	0	0	0	0	0	0	0	0
Percent of max speed for motor (Optional input for variable speed motor)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Equipment load if max motor speed draws full nameplate horsepower	1	1	1	1	1	1	1	1	1	1	1	1
Input equipment load (default already present, user override possible, consider above value)	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Equipment motor efficiency (default already present, user override possible)	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Method 2 - ELECTRICAL USAGE IS KNOWN												
Input equipment electrical usage, if known (kWh)	0	0	0	0	0	0	0	0	0	0	0	0
Region												
Electricity Region	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY

GENERATORS	Generator 1	Generator 2	Generator 3	Generator 4	Generator 5	Generator 6	Generator 7	Generator 8	Generator 9	Generator 10	Generator 11	Generator 12
Choose fuel type from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Choose horsepower range from drop down menu	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1
Input operating hours (hr)												

AGRICULTURAL EQUIPMENT	Tillage Tractor 1	Tillage Tractor 2	Tillage Tractor 3	Tillage Tractor 4	Tillage Tractor 5	Tillage Tractor 6	Tillage Tractor 7	Tillage Tractor 8	Tillage Tractor 9	Tillage Tractor 10	Tillage Tractor 11	Tillage Tractor 12
Choose fuel type from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Input area to till (acre)												
Choose soil condition from drop down menu	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil
Choose soil type from drop down menu	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil
Input time available (work days)												
Input depth of tillage (in)												

CAPPING EQUIPMENT	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6	Equipment 7	Equipment 8	Equipment 9	Equipment 10	Equipment 11	Equipment 12
Choose stabilization equipment type from drop down menu	Roller	Roller	Roller	Roller	Roller	Roller	Roller	Roller	Roller	Roller	Roller	Roller
Choose fuel type from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Input area (ft2)												
Input time available (work days)												

MIXING EQUIPMENT	Mixer 1	Mixer 2	Mixer 3	Mixer 4	Mixer 5	Mixer 6	Mixer 7	Mixer 8	Mixer 9	Mixer 10	Mixer 11	Mixer 12
Choose fuel type from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Choose horsepower range from drop down menu	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3
Input volume (yd3)												
Input production rate (yd3/hr)												
Input estimated fuel consumption rate (gal/hr) (Input only if known for the mixer selected, otherwise a default will be used by the tool)												

INTERNAL COMBUSTION ENGINES	Engine 1	Engine 2	Engine 3	Engine 4	Engine 5	Engine 6	Engine 7	Engine 8	Engine 9	Engine 10	Engine 11	Engine 12
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input fuel consumption rate (gal/hr or scf/hr)												
Input operating hours (hr)												

OTHER FUELED EQUIPMENT	Fuel 1	Fuel 2	Fuel 3	Fuel 4	Fuel 5	Fuel 6	Fuel 7	Fuel 8	Fuel 9	Fuel 10	Fuel 11	Fuel 12
Choose fuel type from drop down menu	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas
Input volume (scf for Natural gas, gallons for all others)												

DIESEL EQUIPMENT OPERATION (PER HOUR BASIS)	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6	Equipment 7	Equipment 8	Equipment 9	Equipment 10	Equipment 11	Equipment 12
Choose equipment type from drop down menu	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer
Choose equipment size for Dozer (HP)	65	65	65	65	65	65	65	65	65	65	65	65
Choose equipment size for Loader (HP)	65	65	65	65	65	65	65	65	65	65	65	65
Choose equipment size for Excavator (HP)	150	150	150	150	150	150	150	150	150	150	150	150
Choose equipment size for Scraper (HP)	330	330	330	330	330	330	330	330	330	330	330	330
Choose equipment size for Crawler Crane	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY
Choose equipment size for Tillage Tractor (HP)	16	16	16	16	16	16	16	16	16	16	16	16
Choose equipment size for Paver (HP)	25	25	25	25	25	25	25	25	25	25	25	25
Choose equipment size for Roller (HP)	6	6	6	6	6	6	6	6	6	6	6	6
Choose equipment size for Trencher (HP range)	6 to 11	7 to 11	8 to 11	9 to 11	10 to 11	11 to 11	12 to 11	13 to 11	14 to 11	15 to 11	16 to 11	17 to 11
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input operating hours (hr)												
Will DIESEL-run equipment be retrofitted with a particulate reduction technology?	No	No	No	No	No	No	No	No	No	No	No	No

OPERATOR LABOR	EA Oversight	UXO Technician (Fence Install)	Temporary Bridge Install	Construction Crew (Fence Install)	Mob/Demob Inspection Crew	Inspection & Repairs	Occupation 7	Occupation 8	Occupation 9	Occupation 10	Occupation 11	Occupation 12
Choose occupation from drop-down menu	Scientific and technical services	Scientific and technical services	Construction laborers	Construction laborers	Scientific and technical services	Scientific and technical services	Construction laborers	Construction laborers	Construction laborers	Construction laborers	Construction laborers	Construction laborers
Input total time worked onsite (hours)	24.0	24.0	16.0	24.0	8.0	120.0						

LABORATORY ANALYSIS	Analysis 1	Analysis 2	Analysis 3	Analysis 4	Analysis 5	Analysis 6	Analysis 7	Analysis 8	Analysis 9	Analysis 10	Analysis 11	Analysis 12
Input dollars spent on laboratory analysis ($)												

OTHER KNOWN ONSITE ACTIVITIES	Entire Site
Input energy usage (MMBTU)	
Water consumption (gallon)	
Input CO2 emission (metric ton)	
Input N2O emission (metric ton CO2 e)	
Input CH4 emission (metric ton CO2 e)	
Input NOx emission (metric ton)	
Input SOx emission (metric ton)	
Input PM10 emission (metric ton)	
Input fatality risk	
Input injury risk	

RESIDUAL HANDLING

RESIDUE DISPOSAL/RECYCLING	Soil Residue	Residual Water	Material Residue	Other Residuals	Other Residuals	Other Residuals	Other Residuals	Other Residuals	Other Residuals	Other Residuals	Other Residuals	Other Residuals
Will DIESEL-run vehicles be retrofitted with a particulate reduction technology?	No	No	No	No	No	No	No	No	No	No	No	No
Input weight of the waste transported to landfill or recycling per trip (tons)												
Choose fuel used from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Input total number of trips												
Input number of miles per trip												

LANDFILL OPERATIONS	Operation 1	Operation 2	Operation 3	Operation 4	Operation 5	Operation 6	Operation 6	Operation 6	Operation 6	Operation 6	Operation 6	Operation 6
Choose landfill type for waste disposal	Non-Hazardous	Non-Hazardous	Non-Hazardous	Non-Hazardous	Non-Hazardous	Non-Hazardous	Non-Hazardous	Non-Hazardous	Non-Hazardous	Non-Hazardous	Non-Hazardous	Non-Hazardous
Input amount of waste disposed in landfill (tons)												
Input landfill methane emissions (metric tons CH4)												
Region												
Electricity Region	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY

THERMAL/CATALYTIC OXIDIZERS*	Oxidizer 1	Oxidizer 2	Oxidizer 3	Oxidizer 4	Oxidizer 5	Oxidizer 6	Oxidizer 6	Oxidizer 6	Oxidizer 6	Oxidizer 6	Oxidizer 6	Oxidizer 6
Choose oxidizer type from drop down menu	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer
Choose fuel type from drop down menu	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas
Input waste gas flow rate (scfm)												
Input time running (hours)												
Input waste gas inlet temperature (F)												
Input contaminant concentration (ppmV)												

*(Electric blowers are included in the analysis)

RESOURCE CONSUMPTION

WATER CONSUMPTION	Treatment System 1	Treatment System 2	Treatment System 3	Treatment System 4	Treatment System 5	Treatment System 6	Treatment System 6	Treatment System 6	Treatment System 6	Treatment System 6	Treatment System 6	Treatment System 6
Input total water consumed from potable water treatment facility (gal)												
Input total water disposed to wastewater treatment facility (gal)												

ONSITE LAND AND WATER RESOURCE CONSUMPTION	Entire Site 1	Entire Site 2	Entire Site 3	Entire Site 4	Entire Site 5	Entire Site 6	Entire Site 6	Entire Site 6	Entire Site 6	Entire Site 6	Entire Site 6	Entire Site 6
Input volume of topsoil brought to site (cubic yards)												
Input volume of groundwater or surface water lost (gal)												

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Alternative 3: Full Removal & Off Site Disposal

This worksheet allows the user to define material production, transportation, equipment use, and residual handling variables for the remedial alternative
Yellow cells: require the user to choose an input from a drop down menu
White cells: require the user to type in a value

BASELINE INFORMATION

COMPONENT 2 DURATION AND COST	Entire Site
Input duration of the component (unit time)	1
Input component cost per unit time ($)	

MATERIAL PRODUCTION

WELL MATERIALS	Well Type 1	Well Type 2	Well Type 3	Well Type 4	Well Type 5	Well Type 6	Well Type 7	Well Type 8	Well Type 9	Well Type 10	Well Type 11	Well Type 12
Input number of wells												
Input depth of wells (ft)												
Choose specific casing material schedule from drop down menu	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC
Choose well diameter (in) from drop down menu	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8
Input total quantity of Sand (kg)												
Input total quantity of Gravel (kg)												
Input total quantity of Bentonite (kg)												
Input total quantity of Typical Cement (kg)												
Input total quantity of General Concrete (kg)												
Input total quantity of Steel (kg)												

TREATMENT CHEMICALS & MATERIALS	Treatment 1	Treatment 2	Treatment 3	Treatment 4	Treatment 5	Treatment 6	Treatment 7	Treatment 8	Treatment 9	Treatment 10	Treatment 11	Treatment 12
Input number of injection points												
Choose material type from drop down menu	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide
Input amount of material injected at each point (pounds dry mass)												
Input number of injections per injection point												

TREATMENT MEDIA	Treatment 1	Treatment 2	Treatment 3	Treatment 4	Treatment 5	Treatment 6	Treatment 7	Treatment 8	Treatment 9	Treatment 10	Treatment 11	Treatment 12
Input weight of media used (lbs)												
Choose media type from drop down menu	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC

CONSTRUCTION MATERIALS	Material 1	Material 2	Material 3	Material 4	Material 5	Material 6	Material 7	Material 8	Material 9	Material 10	Material 11	Material 12
Choose material type from drop down menu	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner
Input area of material (ft2)												
Input depth of material (ft)												

WELL DECOMMISSIONING	Well Decommissioning	Well Type 2	Well Type 3	Well Type 4	Well Type 5	Well Type 6	Well Type 7	Well Type 8	Well Type 9	Well Type 10	Well Type 11	Well Type 12
Input number of wells	4											
Input depth of wells (ft)	210											
Input well diameter (in)	2.0											
Choose material from drop down menu	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil

SILT CURTAIN MATERIALS	Curtain 1	Curtain 2	Curtain 3	Curtain 4	Curtain 5	Curtain 6	Curtain 7	Curtain 8	Curtain 9	Curtain 10	Curtain 11	Curtain 12
Input length or perimeter of silt curtain (ft)												
Input depth of silt curtain (ft)												

BULK MATERIAL QUANTITIES	Backfill Materials	Topsoil	Seed & Fertilize	Material 4	Material 5	Material 6	Material 7	Material 8	Material 9	Material 10	Material 11	Material 12
Choose material from drop down menu	Soil	Soil	Fertilizer	Acetic Acid	Acetic Acid	Acetic Acid	Acetic Acid	Acetic Acid	Acetic Acid	Acetic Acid	Acetic Acid	Acetic Acid
Choose units of material quantity from drop down menu	cubic feet	cubic feet	cubic feet	pounds	pounds	pounds	pounds	pounds	pounds	pounds	pounds	pounds
Input material quantity	1,827,711	21,789	7,290									

TRANSPORTATION

PERSONNEL TRANSPORTATION - ROAD	Contractor	EA Oversight	UXO Technician	Temporary Bridge Install	Tree Removal	Pre-Design Investigation Samples	Backfill, Topsoil, Seed & Fertilizer Delivery	Fence & Swing Gate Delivery	Mob/Demob Inspection Crew	Inspection & Repairs	Trip 11	Trip 12
Will DIESEL-run vehicles be retrofitted with a particulate reduction technology?	No	No	No	No	No	No	No	No	No	No	No	No
Choose vehicle type from drop down menu*	Heavy Duty	Heavy Duty	SUVs	Heavy Duty	Light truck	SUVs	Cars	Heavy Duty	SUVs	SUVs	Cars	Cars
Choose fuel used from drop down menu	Diesel	Diesel	Gasoline	Diesel	Gasoline	Gasoline	Gasoline	Diesel	Gasoline	Gasoline	Gasoline	Gasoline
Input distance traveled per trip (miles)	300	200	440	1300	10	200	10	40	200	200		
Input number of trips taken	18	18	18	1	2	13	3211	1	1	15		
Input number of travelers	3	1	1	2	2	2	1	1	1	1		
Input estimated vehicular fuel economy (mi/gal) (Input only if known for the vehicle selected; otherwise a default will be used by the tool)	10	30	30	10	10	30	10	10	30	30		

*For vehicle type 'Other' please enter values in Table 2b in the Look Up Table tab.

PERSONNEL TRANSPORTATION - AIR	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6	Trip 7	Trip 8	Trip 9	Trip 10	Trip 11	Trip 12
Input distance traveled (miles)												
Input number of travelers												
Input number of flights taken												

PERSONNEL TRANSPORTATION - RAIL	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6	Trip 7	Trip 8	Trip 9	Trip 10	Trip 11	Trip 12
Choose vehicle type from drop down menu	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail
Input distance traveled (miles)												
Input number of trips taken												
Input number of travelers												

EQUIPMENT TRANSPORTATION - DEDICATED LOAD ROAD	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6	Trip 7	Trip 8	Trip 9	Trip 10	Trip 11	Trip 12
Will DIESEL-run vehicles be retrofitted with a particulate reduction technology?	No	No	No	No	No	No	No	No	No	No	No	No
Choose fuel used from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Account for an empty return trip?	No	No	No	No	No	No	No	No	No	No	No	No
Input one-way distance traveled (miles) with a given load. If applicable, respect for an empty return trip will be accounted for (no additional input is needed).												
Input weight of equipment transported per truck load (tons)												

EQUIPMENT TRANSPORTATION - SHARED LOAD ROAD	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6	Trip 7	Trip 8	Trip 9	Trip 10	Trip 11	Trip 12
Input distance traveled (miles)												
Input weight of equipment transported (tons)												

EQUIPMENT TRANSPORTATION - AIR	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6	Trip 7	Trip 8	Trip 9	Trip 10	Trip 11	Trip 12
Input distance traveled (miles)												
Input weight of equipment transported (tons)												

EQUIPMENT TRANSPORTATION - RAIL	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6	Trip 7	Trip 8	Trip 9	Trip 10	Trip 11	Trip 12
Input distance traveled (miles)												
Input weight of load (tons)												

EQUIPMENT TRANSPORTATION - WATER	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6	Trip 7	Trip 8	Trip 9	Trip 10	Trip 11	Trip 12
Input distance traveled (mile)												
Input weight of load (tons)												

EQUIPMENT USE

EARTHWORK	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6	Equipment 7	Equipment 8	Equipment 9	Equipment 10	Equipment 11	Equipment 12
Choose earthwork equipment type from drop down menu	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input volume of material to be removed (yd3)												
Will DIESEL-run equipment be retrofitted with a particulate reduction technology?	No	No	No	No	No	No	No	No	No	No	No	No

DRILLING	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Event 11	Event 12
Input number of drilling locations												
Choose drilling method from drop down menu	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push
Input time spent drilling at each location (hr)												
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel

TRENCHING	Trencher 1	Trencher 2	Trencher 3	Trencher 4	Trencher 5	Trencher 6	Trencher 7	Trencher 8	Trencher 9	Trencher 10	Trencher 11	Trencher 12
Choose fuel type from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Choose horsepower range from drop down menu	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3
Input operating hours (hr)												

SEDIMENT DREDGING	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6	Equipment 7	Equipment 8	Equipment 9	Equipment 10	Equipment 11	Equipment 12
Choose dredge equipment type from drop down menu	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical
Choose dredge fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input volume of material to be dredged (yd3)												
Choose dredge equipment size	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY
Suggested dredge equipment size	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY
Input number of dredge tenders (default already present, user override possible)	1	1	1	1	1	1	1	1	1	1	1	1
Choose dredge tender fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input operating time for dredge tenders (hr) (default calculated value, user override possible)	0	0	0	0	0	0	0	0	0	0	0	0
Input number of scow tenders (default already present, user override possible)	2	2	2	2	2	2	2	2	2	2	2	2
Choose scow tender fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input operating time for scow tenders (hr) (default calculated value, user override possible)	0	0	0	0	0	0	0	0	0	0	0	0
Choose size of research vessel from drop down menu	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)
Choose research vessel fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input number of research vessels (default already present, user override possible)	1	1	1	1	1	1	1	1	1	1	1	1
Input operating time for research vessels (hr) (default calculated value, user override possible)	0	0	0	0	0	0	0	0	0	0	0	0
Will DIESEL-run equipment be retrofitted with a particulate reduction technology?	No	No	No	No	No	No	No	No	No	No	No	No

SEDIMENT MANAGEMENT (STAGING AND DRYING)	Excavation	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6	Equipment 7	Equipment 8	Equipment 9	Equipment 10	Equipment 11	Equipment 12
Choose earthwork equipment type from drop down menu	Excavator	Crawler Crane	Crawler Crane	Crawler Crane	Crawler Crane	Crawler Crane	Crawler Crane	Crawler Crane	Crawler Crane	Crawler Crane	Crawler Crane	Crawler Crane
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input volume of material to be removed (yd3)	68,500											
Is volume input that of saturated sediment?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Will the sediment be dry when this work is performed?	Yes	No	No	No	No	No	No	No	No	No	No	No
Will DIESEL-run equipment be retrofitted with a particulate reduction technology?	No	No	No	No	No	No	No	No	No	No	No	No

SEDIMENT CAPPING	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6	Equipment 7	Equipment 8	Equipment 9	Equipment 10	Equipment 11	Equipment 12
Choose capping method from drop down menu	Surface Release	Surface Release	Surface Release	Surface Release	Surface Release	Surface Release	Surface Release	Surface Release	Surface Release	Surface Release	Surface Release	Surface Release
Choose capping equipment fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input volume of capping material to be placed (yd3)												
Choose capping equipment size/type	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge
Suggested capping equipment size/type	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge
Input number of dredge tenders (default already present, user override possible)	1	1	1	1	1	1	1	1	1	1	1	1
Choose tender fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel

Input operating time for dredge tenders (hr) (default calculated value, user override possible)	0	0	0	0	0	0	0	0	0	0	0	0
Input number of scow tenders (default already present, user override possible)	0	0	0	0	0	0	0	0	0	0	0	0
Choose scow tender fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input operating time for scow tenders (hr) (default calculated value, user override possible)	0	0	0	0	0	0	0	0	0	0	0	0
Choose size of research vessel from drop down menu	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)
Choose research vessel fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input number of research vessels (default already present, user override possible)	1	1	1	1	1	1	1	1	1	1	1	1
Input operating time for research vessels (hr) (default calculated value, user override possible)	0	0	0	0	0	0	0	0	0	0	0	0
Will DIESEL-run equipment be retrofitted with a particulate reduction technology?	No	No	No	No	No	No	No	No	No	No	No	No

WATERCRAFT OPERATION	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6	Equipment 7	Equipment 8	Equipment 9	Equipment 10	Equipment 11	Equipment 12
Choose size of research vessel from drop down menu	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)
Choose research vessel fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input number of vessels												
Input operating time (hours)												
Will DIESEL-run equipment be retrofitted with a particulate reduction technology?	No	No	No	No	No	No	No	No	No	No	No	No

For each pump, select only one of the three methods to calculate energy and GHG emissions
Enter "0" for all user input values for unused pump columns or unused methods

PUMPS	Pump 1	Pump 2	Pump 3	Pump 4	Pump 5	Pump 6	Pump 7	Pump 8	Pump 9	Pump 10	Pump 11	Pump 12
Choose method from drop down	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1
Method 1 - ELECTRICAL USAGE IS KNOWN												
Input pump electrical usage (KWh)	0	0	0	0	0	0	0	0	0	0	0	0
Method 2 - PUMP HEAD IS KNOWN												
Input flow rate (gpm)	0	0	0	0	0	0	0	0	0	0	0	0
Input total head (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Input number of pumps operating	0	0	0	0	0	0	0	0	0	0	0	0
Input operating time for each pump (hrs)	0	0	0	0	0	0	0	0	0	0	0	0
Pump efficiency (default already present, user override possible)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Pump motor efficiency (default already present, user override possible)	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Input specific gravity (default already present, user override possible)	1	1	1	1	1	1	1	1	1	1	1	1
Method 3 - NAME PLATE SPECIFICATIONS ARE KNOWN												
Input pump horsepower (hp)	0	0	0	0	0	0	0	0	0	0	0	0
Input number of pumps operating	0	0	0	0	0	0	0	0	0	0	0	0
Input operating time for each pump (hrs)	0	0	0	0	0	0	0	0	0	0	0	0
Percent of max speed for pump motor (Optional input for variable speed motor)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Pump load if max motor speed draws full nameplate horsepower	1	1	1	1	1	1	1	1	1	1	1	1
Input pump load (default already present, user override possible, consider above value)	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Pump motor efficiency (default already present, user override possible)	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Region												
Electricity Region	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY

DIESEL AND GASOLINE PUMPS	Pump 1	Pump 2	Pump 3	Pump 4	Pump 5	Pump 6	Pump 7	Pump 8	Pump 9	Pump 10	Pump 11	Pump 12
Choose fuel type from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Choose horsepower range from drop down menu	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1
Equipment operating hours (hrs)												
Input estimated fuel consumption rate (gal/hr) (Input only if known for the pump selected, otherwise a default will be used by the tool)												

For each type of equipment, select only one of the methods to calculate energy and GHG emissions
Enter "0" for all user input values for unused equipment columns or unused methods

BLOWER, COMPRESSOR, MIXER AND OTHER EQUIPMENT	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6	Equipment 7	Equipment 8	Equipment 9	Equipment 10	Equipment 11	Equipment 12
Choose type of equipment from drop down	Blower	Blower	Blower	Blower	Blower	Blower	Blower	Blower	Blower	Blower	Blower	Blower
Choose method from drop down	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1
Method 1 - NAME PLATE SPECIFICATIONS ARE KNOWN												
Input equipment horsepower (hp)	0	0	0	0	0	0	0	0	0	0	0	0
Input number of equipments operating	0	0	0	0	0	0	0	0	0	0	0	0
Input operating time for each equipment (hrs)	0	0	0	0	0	0	0	0	0	0	0	0
Percent of max speed for motor (Optional input for variable speed motor)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Equipment load if max motor speed draws full nameplate horsepower	1	1	1	1	1	1	1	1	1	1	1	1
Input equipment load (default already present, user override possible, consider above value)	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Equipment motor efficiency (default already present, user override possible)	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Method 2 - ELECTRICAL USAGE IS KNOWN												
Input equipment electrical usage, if known (KWh)	0	0	0	0	0	0	0	0	0	0	0	0
Region												
Electricity Region	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY

GENERATORS	Generator 1	Generator 2	Generator 3	Generator 4	Generator 5	Generator 6	Generator 7	Generator 8	Generator 9	Generator 10	Generator 11	Generator 12
Choose fuel type from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Choose horsepower range from drop down menu	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1
Input operating hours (hr)												

AGRICULTURAL EQUIPMENT	Tillage Tractor 1	Tillage Tractor 2	Tillage Tractor 3	Tillage Tractor 4	Tillage Tractor 5	Tillage Tractor 6	Tillage Tractor 7	Tillage Tractor 8	Tillage Tractor 9	Tillage Tractor 10	Tillage Tractor 11	Tillage Tractor 12
Choose fuel type from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Input area to till (acre)												
Choose soil condition from drop down menu	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil
Choose soil type from drop down menu	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil
Input time available (work days)												
Input depth of tillage (in)												

CAPPING EQUIPMENT	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6	Equipment 7	Equipment 8	Equipment 9	Equipment 10	Equipment 11	Equipment 12
Choose stabilization equipment type from drop down menu	Roller	Roller	Roller	Roller	Roller	Roller	Roller	Roller	Roller	Roller	Roller	Roller
Choose fuel type from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Input area (ft2)												
Input time available (work days)												

MIXING EQUIPMENT	Mixer 1	Mixer 2	Mixer 3	Mixer 4	Mixer 5	Mixer 6	Mixer 7	Mixer 8	Mixer 9	Mixer 10	Mixer 11	Mixer 12
Choose fuel type from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Choose horsepower range from drop down menu	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3
Input volume (yd3)												
Input production rate (yd3/hr)												
Input estimated fuel consumption rate (gal/hr) (Input only if known for the mixer selected, otherwise a default will be used by the tool)												

INTERNAL COMBUSTION ENGINES	Engine 1	Engine 2	Engine 3	Engine 4	Engine 5	Engine 6	Engine 7	Engine 8	Engine 9	Engine 10	Engine 11	Engine 12
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input fuel consumption rate (gal/hr or ac/hr)												
Input operating hours (hr)												

OTHER FUELED EQUIPMENT	Fuel 1	Fuel 2	Fuel 3	Fuel 4	Fuel 5	Fuel 6	Fuel 7	Fuel 8	Fuel 9	Fuel 10	Fuel 11	Fuel 12
Choose fuel type from drop down menu	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas
Input volume (scf for Natural gas, gallons for all others)												

DIESEL EQUIPMENT OPERATION (PER HOUR BASIS)	Excavation/ Backfill	Excavation/Backfill	Equipment 3	Equipment 4	Equipment 5	Equipment 6	Equipment 7	Equipment 8	Equipment 9	Equipment 10	Equipment 11	Equipment 12
Choose equipment type from drop down menu	Excavator	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer
Choose equipment size for Dozer (HP)	65	65	65	65	65	65	65	65	65	65	65	65
Choose equipment size for Loader (HP)	65	65	65	65	65	65	65	65	65	65	65	65
Choose equipment size for Excavator (HP)	150	150	150	150	150	150	150	150	150	150	150	150
Choose equipment size for Scraper (HP)	330	330	330	330	330	330	330	330	330	330	330	330
Choose equipment size for Crawler Crane	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY
Choose equipment size for Tillage Tractor (HP)	16	16	16	16	16	16	16	16	16	16	16	16
Choose equipment size for Paver (HP)	25	25	25	25	25	25	25	25	25	25	25	25
Choose equipment size for Roller (HP)	6	6	6	6	6	6	6	6	6	6	6	6
Choose equipment size for Trencher (HP range)	6 to 11	7 to 11	8 to 13	9 to 11	10 to 11	11 to 11	12 to 11	13 to 11	14 to 11	15 to 11	16 to 11	17 to 11
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input operating hours (hr)	9120	9120										
Will DIESEL-run equipment be retrofitted with a particulate reduction technology?	No	No	No	No	No	No	No	No	No	No	No	No

OPERATOR LABOR	Contractor	EA Oversight	UXO Technician	Temporary Bridge Install	Tree Removal	Pre-Design Investigation Samples	Mob/Demob Inspection Crew	Inspection & Repairs	Occupation 9	Occupation 10	Occupation 11	Occupation 12
Choose occupation from drop-down menu	Construction laborers	Scientific and technical services	Construction laborers	Construction laborers	Construction laborers	Scientific and technical services	Scientific and technical services	Scientific and technical services	Construction laborers	Construction laborers	Construction laborers	Construction laborers
Input total time worked onsite (hours)	9120.0	3040.0	3040.0	16.0	32.0	1920.0	8.0	120.0				

LABORATORY ANALYSIS	Pre-Design Investigation Samples	Waste Characterization Samples (VOCs, SVOCs, Metals, PCBs, Pesticides, TCLP)	Confirmation Sampling	Analysis 4	Analysis 5	Analysis 6	Analysis 7	Analysis 8	Analysis 9	Analysis 10	Analysis 11	Analysis 12
Input dollars spent on laboratory analysis ($)	384,000.00	46,620.00	159,250.00									

OTHER KNOWN ONSITE ACTIVITIES	Entire Site
Input energy usage (MMBTU)	
Water consumption (gallon)	
Input CO2 emission (metric ton)	
Input N2O emission (metric ton CO2 e)	
Input CH4 emission (metric ton CO2 e)	
Input NOx emission (metric ton)	
Input SOx emission (metric ton)	
Input PM10 emission (metric ton)	
Input fatality risk	
Input injury risk	

RESIDUAL HANDLING

RESIDUE DISPOSAL/RECYCLING	Non-Haz Disposal	Haz Disposal	Material Residue	Other Residuals	Other Residuals	Other Residuals	Other Residuals	Other Residuals	Other Residuals	Other Residuals	Other Residuals	Other Residuals
Will DIESEL-run vehicles be retrofitted with a particulate reduction technology?	No	No	No	No	No	No	No	No	No	No	No	No
Input weight of the waste transported to landfill or recycling per trip (tons)	30.0	30.0										
Choose fuel used from drop down menu	Diesel	Diesel	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Input total number of trips	2454.0	1212.0										
Input number of miles per trip	100.0	500.0										

LANDFILL OPERATIONS	Non-Haz Disposal	Haz Disposal	Operation 3	Operation 4	Operation 5	Operation 6	Operation 6	Operation 6	Operation 6	Operation 6	Operation 6	Operation 6
Choose landfill type for waste disposal	Non-Hazardous	Non-Hazardous	Non-Hazardous	Non-Hazardous	Non-Hazardous	Non-Hazardous	Non-Hazardous	Non-Hazardous	Non-Hazardous	Non-Hazardous	Non-Hazardous	Non-Hazardous
Input amount of waste disposed in landfill (tons)	73600.0	36320.0										
Input landfill methane emissions (metric tons CH4)												
Region												

Electricity Region	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY

THERMAL/CATALYTIC OXIDIZERS	Oxidizer 1	Oxidizer 2	Oxidizer 3	Oxidizer 4	Oxidizer 5	Oxidizer 6	Oxidizer 6	Oxidizer 6	Oxidizer 6	Oxidizer 6	Oxidizer 6	Oxidizer 6
Choose oxidizer type from drop down menu	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer
Choose fuel type from drop down menu	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas
Input waste gas flow rate (scfm)												
Input time running (hours)												
Input waste gas inlet temperature (F)												
Input contaminant concentration (ppmV)												

*(Electric blowers are included in the analysis)

RESOURCE CONSUMPTION

WATER CONSUMPTION	Treatment System 1	Treatment System 2	Treatment System 3	Treatment System 4	Treatment System 5	Treatment System 6	Treatment System 6	Treatment System 6	Treatment System 6	Treatment System 6	Treatment System 6	Treatment System 6
Input total water consumed from potable water treatment facility (gal)												
Input total water disposed to wastewater treatment facility (gal)												

ONSITE LAND AND WATER RESOURCE CONSUMPTION	Entire Site 1	Entire Site 2	Entire Site 3	Entire Site 4	Entire Site 5	Entire Site 6	Entire Site 6	Entire Site 6	Entire Site 6	Entire Site 6	Entire Site 6	Entire Site 6
Input volume of topsoil brought to site (cubic yards)												
Input volume of groundwater or surface water lost (gal)												

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Alternative 4: Partial Removal of Fill with Full 40 CFR Part 761 Cap (Self-Implementing)

This worksheet allows the user to define material production, transportation, equipment use, and residual handling variables for the remedial alternative
Yellow cells: require the user to choose an input from a drop down menu
White cells: require the user to type in a value

BASELINE INFORMATION

COMPONENT 3 DURATION AND COST	Entire Site
Input duration of the component (unit time)	1
Input component cost per unit time ($)	

MATERIAL PRODUCTION

WELL MATERIALS	Well Type 1	Well Type 2	Well Type 3	Well Type 4	Well Type 5	Well Type 6	Well Type 7	Well Type 8	Well Type 9	Well Type 10	Well Type 11	Well Type 12
Input number of wells												
Input depth of wells (ft)												
Choose specific casing material schedule from drop down menu	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC
Choose well diameter (in) from drop down menu	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8
Input total quantity of Sand (kg)												
Input total quantity of Gravel (kg)												
Input total quantity of Bentonite (kg)												
Input total quantity of Typical Cement (kg)												
Input total quantity of General Concrete (kg)												
Input total quantity of Steel (kg)												

TREATMENT CHEMICALS & MATERIALS	Treatment 1	Treatment 2	Treatment 3	Treatment 4	Treatment 5	Treatment 6	Treatment 7	Treatment 8	Treatment 9	Treatment 10	Treatment 11	Treatment 12
Input number of injection points												
Choose material type from drop down menu	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide
Input amount of material injected at each point (pounds dry mass)												
Input number of injections per injection point												

TREATMENT MEDIA	Treatment 1	Treatment 2	Treatment 3	Treatment 4	Treatment 5	Treatment 6	Treatment 7	Treatment 8	Treatment 9	Treatment 10	Treatment 11	Treatment 12
Input weight of media used (lbs)												
Choose media type from drop down menu	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC

CONSTRUCTION MATERIALS	Material 1	Material 2	Material 3	Material 4	Material 5	Material 6	Material 7	Material 8	Material 9	Material 10	Material 11	Material 12
Choose material type from drop down menu	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner
Input area of material (ft2)												
Input depth of material (ft)												

WELL DECOMMISSIONING	Well Decommissioning	Well Type 2	Well Type 3	Well Type 4	Well Type 5	Well Type 6	Well Type 7	Well Type 8	Well Type 9	Well Type 10	Well Type 11	Well Type 12
Input number of wells	6											
Input depth of wells (ft)	210											
Input well diameter (in)	2.0											
Choose material from drop down menu	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil

SILT CURTAIN MATERIALS	Curtain 1	Curtain 2	Curtain 3	Curtain 4	Curtain 5	Curtain 6	Curtain 7	Curtain 8	Curtain 9	Curtain 10	Curtain 11	Curtain 12
Input length or perimeter of silt curtain (ft)												
Input depth of silt curtain (ft)												

BULK MATERIAL QUANTITIES	Backfill Materials	Topsoil	Seed & Fertilize	40 CFR Part 761 Cap	Material 5	Material 6	Material 7	Material 8	Material 9	Material 10	Material 11	Material 12
Choose material from drop down menu	Soil	Soil	Fertilizer	Soil	Acetic Acid	Acetic Acid	Acetic Acid	Acetic Acid	Acetic Acid	Acetic Acid	Diesel	Acetic Acid
Choose units of material quantity from drop down menu	cubic feet	cubic feet	cubic feet	cubic feet	pounds	pounds	pounds	pounds	pounds	pounds	pounds	pounds
Input material quantity	117,639	74,061	24,705	123,444								

TRANSPORTATION

PERSONNEL TRANSPORTATION - ROAD	Contractor	EA Oversight	UXO Technician	Temporary Bridge Install	Tree Removal	Pre-Design Investigation Samples	Backfill, Topsoil, Seed & Fertilizer Delivery	Fence & Swing Gate Delivery	Mob/Demob Inspection Crew	Inspection & Repairs	Cap Material Delivery	Trip 12
Will DIESEL-run vehicles be retrofitted with a particulate reduction technology?	No	No	No	No	No	No	No	No	No	No	No	No
Choose vehicle type from drop down menu*	Heavy Duty	Heavy Duty	SUVs	Heavy Duty	Light truck	SUVs	Cars	Heavy Duty	SUVs	SUVs	Heavy Duty	Cars
Choose fuel used from drop down menu	Diesel	Diesel	Gasoline	Diesel	Gasoline	Gasoline	Gasoline	Diesel	Diesel	Gasoline	Diesel	Gasoline
Input distance traveled per trip (miles)	300	200	440	1300	10	200	10	40	200	200	10	
Input number of trips taken	2	2	2	1	2	13	375	1	1	15	214	
Input number of travelers	3	1	2	2	2	2	1	1	1	1	1	
Input estimated vehicular fuel economy (mi/gal) (Input only if known for the vehicle selected; otherwise a default will be used by the tool)	10	30	30	10	10	30	10	10	30	30	10	

*For vehicle type 'Other' please enter values in Table 2b in the Look Up Table tab.

PERSONNEL TRANSPORTATION - AIR	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6	Trip 7	Trip 8	Trip 9	Trip 10	Trip 11	Trip 12
Input distance traveled (miles)												
Input number of travelers												
Input number of flights taken												

PERSONNEL TRANSPORTATION - RAIL	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6	Trip 7	Trip 8	Trip 9	Trip 10	Trip 11	Trip 12
Choose vehicle type from drop down menu	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail
Input distance traveled (miles)												
Input number of trips taken												
Input number of travelers												

EQUIPMENT TRANSPORTATION - DEDICATED LOAD ROAD	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6	Trip 7	Trip 8	Trip 9	Trip 10	Trip 11	Trip 12
Will DIESEL-run vehicles be retrofitted with a particulate reduction technology?	No	No	No	No	No	No	No	No	No	No	No	No
Choose fuel used from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Account for an empty return trip?	No	No	No	No	No	No	No	No	No	No	No	No
Input one-way distance traveled (miles) with a given load. If applicable, inspect for an empty return trip will be accounted for (no additional input is needed).												
Input weight of equipment transported per truck load (tons)												

EQUIPMENT TRANSPORTATION - SHARED LOAD ROAD	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6	Trip 7	Trip 8	Trip 9	Trip 10	Trip 11	Trip 12
Input distance traveled (miles)												
Input weight of equipment transported (tons)												

EQUIPMENT TRANSPORTATION - AIR	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6	Trip 7	Trip 8	Trip 9	Trip 10	Trip 11	Trip 12
Input distance traveled (miles)												
Input weight of equipment transported (tons)												

EQUIPMENT TRANSPORTATION - RAIL	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6	Trip 7	Trip 8	Trip 9	Trip 10	Trip 11	Trip 12
Input distance traveled (miles)												
Input weight of load (tons)												

EQUIPMENT TRANSPORTATION - WATER	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6	Trip 7	Trip 8	Trip 9	Trip 10	Trip 11	Trip 12
Input distance traveled (mile)												
Input weight of load (tons)												

EQUIPMENT USE

EARTHWORK	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6	Equipment 7	Equipment 8	Equipment 9	Equipment 10	Equipment 11	Equipment 12
Choose earthwork equipment type from drop down menu	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input volume of material to be removed (yd3)												
Will DIESEL-run equipment be retrofitted with a particulate reduction technology?	No	No	No	No	No	No	No	No	No	No	No	No

DRILLING	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Event 11	Event 12
Input number of drilling locations												
Choose drilling method from drop down menu	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push
Input time spent drilling at each location (hr)												
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel

TRENCHING	Trencher 1	Trencher 2	Trencher 3	Trencher 4	Trencher 5	Trencher 6	Trencher 7	Trencher 8	Trencher 9	Trencher 10	Trencher 11	Trencher 12
Choose fuel type from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Choose horsepower range from drop down menu	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3
Input operating hours (hr)												

SEDIMENT DREDGING	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6	Equipment 7	Equipment 8	Equipment 9	Equipment 10	Equipment 11	Equipment 12
Choose dredge equipment type from drop down menu	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical
Choose dredge fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input volume of material to be dredged (yd3)												
Choose dredge equipment size	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY
Suggested dredge equipment size	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY
Input number of dredge tenders (default already present, user override possible)	1	1	1	1	1	1	1	1	1	1	1	1
Choose dredge tender fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input operating time for dredge tenders (hr) (default calculated value, user override possible)	0	0	0	0	0	0	0	0	0	0	0	0
Input number of scow tenders (default already present, user override possible)	2	2	2	2	2	2	2	2	2	2	2	2
Choose scow tender fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input operating time for scow tenders (hr) (default calculated value, user override possible)	0	0	0	0	0	0	0	0	0	0	0	0
Choose size of research vessel from drop down menu	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)
Choose research vessel fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input number of research vessels (default already present, user override possible)	1	1	1	1	1	1	1	1	1	1	1	1
Input operating time for research vessels (hr) (default calculated value, user override possible)	0	0	0	0	0	0	0	0	0	0	0	0
Will DIESEL-run equipment be retrofitted with a particulate reduction technology?	No	No	No	No	No	No	No	No	No	No	No	No

SEDIMENT MANAGEMENT (STAGING AND DRYING)	Excavation	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6	Equipment 7	Equipment 8	Equipment 9	Equipment 10	Equipment 11	Equipment 12
Choose earthwork equipment type from drop down menu	Excavator	Crawler Crane	Crawler Crane	Crawler Crane	Crawler Crane	Crawler Crane	Crawler Crane	Crawler Crane	Crawler Crane	Crawler Crane	Crawler Crane	Crawler Crane
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input volume of material to be removed (yd3)	7,100											
Is volume input that of saturated sediment?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Will the sediment be dry when this work is performed?	No	No	No	No	No	No	No	No	No	No	No	No
Will DIESEL-run equipment be retrofitted with a particulate reduction technology?	No	No	No	No	No	No	No	No	No	No	No	No

SEDIMENT CAPPING	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6	Equipment 7	Equipment 8	Equipment 9	Equipment 10	Equipment 11	Equipment 12
Choose capping method from drop down menu	Surface Release	Surface Release	Surface Release	Surface Release	Surface Release	Surface Release	Surface Release	Surface Release	Surface Release	Surface Release	Surface Release	Surface Release
Choose capping equipment fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input volume of capping material to be placed (yd3)												
Choose capping equipment size/type	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge
Suggested capping equipment size/type	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge
Input number of dredge tenders (default already present, user override possible)	1	1	1	1	1	1	1	1	1	1	1	1
Choose tender fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel

Input operating time for dredge tenders (hr) (default calculated value, user override possible)	0	0	0	0	0	0	0	0	0	0	0	0
Input number of scow tenders (default already present, user override possible)	0	0	0	0	0	0	0	0	0	0	0	0
Choose scow tender fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input operating time for scow tenders (hr) (default calculated value, user override possible)	0	0	0	0	0	0	0	0	0	0	0	0
Choose size of research vessel from drop down menu	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)
Choose research vessel fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input number of research vessels (default already present, user override possible)	1	1	1	1	1	1	1	1	1	1	1	1
Input operating time for research vessels (hr) (default calculated value, user override possible	0	0	0	0	0	0	0	0	0	0	0	0
Will DIESEL-run equipment be retrofitted with a particulate reduction technology?	No	No	No	No	No	No	No	No	No	No	No	No

WATERCRAFT OPERATION	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6	Equipment 7	Equipment 8	Equipment 9	Equipment 10	Equipment 11	Equipment 12
Choose size of research vessel from drop down menu	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)
Choose research vessel fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input number of vessels												
Input operating time (hours)												
Will DIESEL-run equipment be retrofitted with a particulate reduction technology?	No	No	No	No	No	No	No	No	No	No	No	No

For each pump, select only one of the three methods to calculate energy and GHG emissions
Enter "0" for all user input values for unused pump columns or unused methods

PUMPS (STATIC)	Pump 1	Pump 2	Pump 3	Pump 4	Pump 5	Pump 6	Pump 7	Pump 8	Pump 9	Pump 10	Pump 11	Pump 12
Choose method from drop down	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1
Method 1 - ELECTRICAL USAGE IS KNOWN												
Input pump electrical usage (KWh)	0	0	0	0	0	0	0	0	0	0	0	0
Method 2 - PUMP HEAD IS KNOWN												
Input flow rate (gpm)	0	0	0	0	0	0	0	0	0	0	0	0
Input total head (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Input number of pumps operating	0	0	0	0	0	0	0	0	0	0	0	0
Input operating time for each pump (hrs)	0	0	0	0	0	0	0	0	0	0	0	0
Pump efficiency (default already present, user override possible)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Pump motor efficiency (default already present, user override possible)	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Input specific gravity (default already present, user override possible)	1	1	1	1	1	1	1	1	1	1	1	1
Method 3 - NAME PLATE SPECIFICATIONS ARE KNOWN												
Input pump horsepower (hp)	0	0	0	0	0	0	0	0	0	0	0	0
Input number of pumps operating	0	0	0	0	0	0	0	0	0	0	0	0
Input operating time for each pump (hrs)	0	0	0	0	0	0	0	0	0	0	0	0
Percent of max speed for pump motor (Optional input for variable speed motor)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Pump load if max motor speed draws full nameplate horsepower	1	1	1	1	1	1	1	1	1	1	1	1
Input pump load (default already present, user override possible, consider above value)	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Pump motor efficiency (default already present, user override possible)	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Region												
Electricity Region	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY

DIESEL AND GASOLINE PUMPS	Pump 1	Pump 2	Pump 3	Pump 4	Pump 5	Pump 6	Pump 7	Pump 8	Pump 9	Pump 10	Pump 11	Pump 12
Choose fuel type from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Choose horsepower range from drop down menu	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1
Equipment operating hours (hrs)												
Input estimated fuel consumption rate (gal/hr) (Input only if known for the pump selected, otherwise a default will be used by the tool)												

For each type of equipment, select only one of the methods to calculate energy and GHG emissions
Enter "0" for all user input values for unused equipment columns or unused methods

BLOWER, COMPRESSOR, MIXER AND OTHER EQUIPMENT	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6	Equipment 7	Equipment 8	Equipment 9	Equipment 10	Equipment 11	Equipment 12
Choose type of equipment from drop down	Blower	Blower	Blower	Blower	Blower	Blower	Blower	Blower	Blower	Blower	Blower	Blower
Choose method from drop down	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1
Method 1 - NAME PLATE SPECIFICATIONS ARE KNOWN												
Input equipment horsepower (hp)	0	0	0	0	0	0	0	0	0	0	0	0
Input number of equipments operating	0	0	0	0	0	0	0	0	0	0	0	0
Input operating time for each equipment (hrs)	0	0	0	0	0	0	0	0	0	0	0	0
Percent of max speed for motor (Optional input for variable speed motor)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Equipment load if max motor speed draws full nameplate horsepower	1	1	1	1	1	1	1	1	1	1	1	1
Input equipment load (default already present, user override possible, consider above value)	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Equipment motor efficiency (default already present, user override possible)	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Method 2 - ELECTRICAL USAGE IS KNOWN												
Input equipment electrical usage, if known (KWh)	0	0	0	0	0	0	0	0	0	0	0	0
Region												
Electricity Region	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY

GENERATORS	Generator 1	Generator 2	Generator 3	Generator 4	Generator 5	Generator 6	Generator 7	Generator 8	Generator 9	Generator 10	Generator 11	Generator 12
Choose fuel type from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Choose horsepower range from drop down menu	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1
Input operating hours (hr)												

AGRICULTURAL EQUIPMENT	Tillage Tractor 1	Tillage Tractor 2	Tillage Tractor 3	Tillage Tractor 4	Tillage Tractor 5	Tillage Tractor 6	Tillage Tractor 7	Tillage Tractor 8	Tillage Tractor 9	Tillage Tractor 10	Tillage Tractor 11	Tillage Tractor 12
Choose fuel type from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Input area to till (acre)												
Choose soil condition from drop down menu	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil
Choose soil type from drop down menu	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil
Input time available (work days)												
Input depth of tillage (in)												

CAPPING EQUIPMENT	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6	Equipment 7	Equipment 8	Equipment 9	Equipment 10	Equipment 11	Equipment 12
Choose stabilization equipment type from drop down menu	Roller	Roller	Roller	Roller	Roller	Roller	Roller	Roller	Roller	Roller	Roller	Roller
Choose fuel type from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Input area (ft2)												
Input time available (work days)												

MIXING EQUIPMENT	Mixer 1	Mixer 2	Mixer 3	Mixer 4	Mixer 5	Mixer 6	Mixer 7	Mixer 8	Mixer 9	Mixer 10	Mixer 11	Mixer 12
Choose fuel type from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Choose horsepower range from drop down menu	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3
Input volume (yd3)												
Input production rate (yd3/hr)												
Input estimated fuel consumption rate (gal/hr) (Input only if known for the mixer selected, otherwise a default will be used by the tool)												

INTERNAL COMBUSTION ENGINES	Engine 1	Engine 2	Engine 3	Engine 4	Engine 5	Engine 6	Engine 7	Engine 8	Engine 9	Engine 10	Engine 11	Engine 12
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input fuel consumption rate (gal/hr or scf/hr)												
Input operating hours (hr)												

OTHER FUELED EQUIPMENT	Fuel 1	Fuel 2	Fuel 3	Fuel 4	Fuel 5	Fuel 6	Fuel 7	Fuel 8	Fuel 9	Fuel 10	Fuel 11	Fuel 12
Choose fuel type from drop down menu	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas
Input volume (scf for Natural gas, gallons for all others)												

DIESEL EQUIPMENT OPERATION (PER HOUR BASIS)	Excavation/ Earthwork/Backfill	Excavation/Earthwork/Backfill	Equipment 3	Equipment 4	Equipment 5	Equipment 6	Equipment 7	Equipment 8	Equipment 9	Equipment 10	Equipment 11	Equipment 12
Choose equipment type from drop down menu	Excavator	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer
Choose equipment size for Dozer (HP)	65	65	65	65	65	65	65	65	65	65	65	65
Choose equipment size for Loader (HP)	65	65	65	65	65	65	65	65	65	65	65	65
Choose equipment size for Excavator (HP)	150	150	150	150	150	150	150	150	150	150	150	150
Choose equipment size for Scraper (HP)	330	330	330	330	330	330	330	330	330	330	330	330
Choose equipment size for Crawler Crane	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY
Choose equipment size for Tillage Tractor (HP)	16	16	16	16	16	16	16	16	16	16	16	16
Choose equipment size for Paver (HP)	25	25	25	25	25	25	25	25	25	25	25	25
Choose equipment size for Roller (HP)	6	6	6	6	6	6	6	6	6	6	6	6
Choose equipment size for Trencher (HP range)	6 to 11	7 to 11	8 to 11	9 to 11	10 to 11	11 to 11	12 to 11	13 to 11	14 to 11	15 to 11	16 to 11	17 to 11
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input operating hours (hr)	960	960										
Will DIESEL-run equipment be retrofitted with a particulate reduction technology?	No	No	No	No	No	No	No	No	No	No	No	No

OPERATOR LABOR	Contractor	EA Oversight	UXO Technician	Temporary Bridge Install	Tree Removal	Pre-Design Investigation Samples	Mob/Demob Inspection Crew	Inspection & Repairs	Occupation 9	Occupation 10	Occupation 11	Occupation 12
Choose occupation from drop-down menu	Construction laborers	Scientific and technical services	Scientific and technical services	Construction laborers	Construction laborers	Construction laborers	Scientific and technical services	Other occupation	Construction laborers	Construction laborers	Construction laborers	Construction laborers
Input total time worked onsite (hours)	960.0	320.0	320.0	16.0	32.0	1920.0	8.0	120.0				

LABORATORY ANALYSIS	Pre-Design Investigation Samples	Waste Characterization Samples (VOCs, SVOCs, Metals, PCBs, Pesticides, TCLP)	Confirmation Sampling	Analysis 4	Analysis 5	Analysis 6	Analysis 7	Analysis 8	Analysis 9	Analysis 10	Analysis 11	Analysis 12
Input dollars spent on laboratory analysis ($)	394,560.00	5,750.00	25,830.00									

OTHER KNOWN ONSITE ACTIVITIES	Entire Site
Input energy usage (MMBTU)	
Water consumption (gallon)	
Input CO2 emission (metric ton)	
Input N2O emission (metric ton CO2 e)	
Input CH4 emission (metric ton CO2 e)	
Input NOx emission (metric ton)	
Input SOx emission (metric ton)	
Input PM10 emission (metric ton)	
Input fatality risk	
Input injury risk	

RESIDUAL HANDLING

ONSITE DISPOSAL/RECYCLING	Haz Disposal	Munitions	Material Residue	Other Residuals	Other Residuals	Other Residuals	Other Residuals	Other Residuals	Other Residuals	Other Residuals	Other Residuals	Other Residuals
Will DIESEL-run vehicles be retrofitted with a particulate reduction technology?	No	No	No	No	No	No	No	No	No	No	No	No
Input weight of the waste transported to landfill or recycling per trip (tons)	30.0	30.0										
Choose fuel used from drop down menu	Diesel	Diesel	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Input total number of trips	272.0	17.0										
Input number of miles per trip	500.0	1320.0										

LANDFILL OPERATIONS	Haz Disposal	Munitions	Operation 3	Operation 4	Operation 5	Operation 6	Operation 6	Operation 6	Operation 6	Operation 6	Operation 6	Operation 6
Choose landfill type for waste disposal	Non-Hazardous	Non-Hazardous	Non-Hazardous	Non-Hazardous	Non-Hazardous	Non-Hazardous	Non-Hazardous	Non-Hazardous	Non-Hazardous	Non-Hazardous	Non-Hazardous	Non-Hazardous
Input amount of waste disposed in landfill (tons)	8160.0	488.0										
Input landfill methane emissions (metric tons CH4)												
Region												
Electricity Region	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY

THERMAL/CATALYTIC OXIDIZERS*	Oxidizer 1	Oxidizer 2	Oxidizer 3	Oxidizer 4	Oxidizer 5	Oxidizer 6	Oxidizer 6	Oxidizer 6	Oxidizer 6	Oxidizer 6	Oxidizer 6	Oxidizer 6
Choose oxidizer type from drop down menu	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer
Choose fuel type from drop down menu	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas
Input waste gas flow rate (scfm)												
Input time running (hours)												
Input waste gas inlet temperature (F)												
Input contaminant concentration (ppmV)												

*(Electric blowers are included in the analysis)

RESOURCE CONSUMPTION

WATER CONSUMPTION	Treatment System 1	Treatment System 2	Treatment System 3	Treatment System 4	Treatment System 5	Treatment System 6	Treatment System 6	Treatment System 6	Treatment System 6	Treatment System 6	Treatment System 6	Treatment System 6
Input total water consumed from potable water treatment facility (gal)												
Input total water disposed to wastewater treatment facility (gal)												

ONSITE LAND AND WATER RESOURCE CONSUMPTION	Entire Site 1	Entire Site 2	Entire Site 3	Entire Site 4	Entire Site 5	Entire Site 6	Entire Site 6	Entire Site 6	Entire Site 6	Entire Site 6	Entire Site 6	Entire Site 6
Input volume of topsoil brought to site (cubic yards)												
Input volume of groundwater or surface water lost (gal)												

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Alternative 5: Partial Removal of Fill with Full 6 NYCRR Part 374 Soil Cover (Self-Implementing)

This worksheet allows the user to define material production, transportation, equipment use, and residual handling variables for the remedial alternativ
Yellow cells require the user to choose an input from a drop down menu
White cells require the user to type in a value

BASELINE INFORMATION

COMPONENT 4 DURATION AND COST	Entire Site
Input duration of the component (unit time)	1
Input component cost per unit time ($)	

MATERIAL PRODUCTION

WELL MATERIALS	Well Type 1	Well Type 2	Well Type 3	Well Type 4	Well Type 5	Well Type 6	Well Type 7	Well Type 8	Well Type 9	Well Type 10	Well Type 11	Well Type 12
Input number of wells												
Input depth of wells (ft)												
Choose specific casing material schedule from drop down menu	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC
Choose well diameter (in) from drop down menu	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8
Input total quantity of Sand (kg)												
Input total quantity of Gravel (kg)												
Input total quantity of Bentonite (kg)												
Input total quantity of Typical Cement (kg)												
Input total quantity of General Concrete (kg)												
Input total quantity of Steel (kg)												

TREATMENT CHEMICALS & MATERIALS	Treatment 1	Treatment 2	Treatment 3	Treatment 4	Treatment 5	Treatment 6	Treatment 7	Treatment 8	Treatment 9	Treatment 10	Treatment 11	Treatment 12
Input number of injection points												
Choose material type from drop down menu	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide
Input amount of material injected at each point (pounds dry mass)												
Input number of injections per injection point												

TREATMENT MEDIA	Treatment 1	Treatment 2	Treatment 3	Treatment 4	Treatment 5	Treatment 6	Treatment 7	Treatment 8	Treatment 9	Treatment 10	Treatment 11	Treatment 12
Input weight of media used (lbs)												
Choose media type from drop down menu	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC

CONSTRUCTION MATERIALS	Material 1	Material 2	Material 3	Material 4	Material 5	Material 6	Material 7	Material 8	Material 9	Material 10	Material 11	Material 12
Choose material type from drop down menu	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner
Input area of material (ft2)												
Input depth of material (ft)												

WELL DECOMMISSIONING	Well Decommissioning	Well Type 2	Well Type 3	Well Type 4	Well Type 5	Well Type 6	Well Type 7	Well Type 8	Well Type 9	Well Type 10	Well Type 11	Well Type 12
Input number of wells	6											
Input depth of wells (ft)	210											
Input well diameter (in)	2.0											
Choose material from drop down menu	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil

SILT CURTAIN MATERIALS	Curtain 1	Curtain 2	Curtain 3	Curtain 4	Curtain 5	Curtain 6	Curtain 7	Curtain 8	Curtain 9	Curtain 10	Curtain 11	Curtain 12
Input length or perimeter of silt curtain (ft)												
Input depth of silt curtain (ft)												

BULK MATERIAL QUANTITIES	Backfill Materials	Topsoil	Seed & Fertilize	6 NYCRR Part 375 Soil Cover	Material 5	Material 6	Material 7	Material 8	Material 9	Material 10	Material 11	Material 12
Choose material from drop down menu	Soil	Soil	Fertilizer	Soil	Acetic Acid	Acetic Acid	Acetic Acid	Acetic Acid	Acetic Acid	Acetic Acid	Acetic Acid	Acetic Acid
Choose units of material quantity from drop down menu	cubic feet	cubic feet	cubic feet	cubic feet	pounds	pounds	pounds	pounds	pounds	pounds	pounds	pounds
Input material quantity	117,639	74,061	24,705	80,151								

TRANSPORTATION

PERSONNEL TRANSPORTATION - ROAD	Contractor	EA Oversight	UXO Technician	Temporary Bridge Install	Tree Removal	Pre-Design Investigation Samples	Backfill, Topsoil, Seed & Fertilizer Delivery	Fence & Swing Gate Delivery	Mob/Demob Inspection Crew	Inspection & Repairs	Cap Material Delivery	Trip 12
Will DIESEL-run vehicles be retrofitted with a particulate reduction technology?	No	No	No	No	No	No	No	No	No	No	No	No
Choose vehicle type from drop down menu*	Heavy Duty	Heavy Duty	SUVs	Heavy Duty	Light truck	SUVs	Cars	Heavy Duty	SUVs	SUVs	Heavy Duty	Cars
Choose fuel used from drop down menu	Diesel	Diesel	Gasoline	Diesel	Gasoline	Gasoline	Gasoline	Diesel	Gasoline	Gasoline	Diesel	Gasoline
Input distance traveled per trip (miles)	300	200	440	1300	10	200	10	40	200	200	10	
Input number of trips taken	2	2	2	1	2	13	375	1	1	15	140	
Input number of travelers	3	1	1	2	2	2	1	1	1	1	1	
Input estimated vehicular fuel economy (mi/gal) (input only if known for the vehicle selected, otherwise a default will be used by the tool)	10	30	30	10	10	30	10	10	30	30	10	

*For vehicle type 'Other' please enter values in Table 2b in the Look Up Table tab.

PERSONNEL TRANSPORTATION - BOAT	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6	Trip 7	Trip 8	Trip 9	Trip 10	Trip 11	Trip 12
Input distance traveled (miles)												
Input number of travelers												
Input number of flights taken												

PERSONNEL TRANSPORTATION - RAIL	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6	Trip 7	Trip 8	Trip 9	Trip 10	Trip 11	Trip 12
Choose vehicle type from drop down menu	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail
Input distance traveled (miles)												
Input number of trips taken												
Input number of travelers												

EQUIPMENT TRANSPORTATION - DEDICATED LOAD ROAD	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6	Trip 7	Trip 8	Trip 9	Trip 10	Trip 11	Trip 12
Will DIESEL-run vehicles be retrofitted with a particulate reduction technology?	No	No	No	No	No	No	No	No	No	No	No	No
Choose fuel used from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Account for an empty return trip?	No	No	No	No	No	No	No	No	No	No	No	No
Input one-way distance traveled (miles) with a given load. If applicable, impact for an empty return trip will be accounted for (no additional input is needed).												
Input weight of equipment transported per truck load (tons)												

EQUIPMENT TRANSPORTATION - SHARED LOAD ROAD	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6	Trip 7	Trip 8	Trip 9	Trip 10	Trip 11	Trip 12
Input distance traveled (miles)												
Input weight of equipment transported (tons)												

EQUIPMENT TRANSPORTATION - AIR	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6	Trip 7	Trip 8	Trip 9	Trip 10	Trip 11	Trip 12
Input distance traveled (miles)												
Input weight of equipment transported (tons)												

EQUIPMENT TRANSPORTATION - RAIL	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6	Trip 7	Trip 8	Trip 9	Trip 10	Trip 11	Trip 12
Input distance traveled (miles)												
Input weight of load (tons)												

EQUIPMENT TRANSPORTATION - WATER	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6	Trip 7	Trip 8	Trip 9	Trip 10	Trip 11	Trip 12
Input distance traveled (mile)												
Input weight of load (tons)												

EQUIPMENT USE

EARTHWORK	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6	Equipment 7	Equipment 8	Equipment 9	Equipment 10	Equipment 11	Equipment 12
Choose earthwork equipment type from drop down menu	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input volume of material to be removed (yd3)												
Will DIESEL-run equipment be retrofitted with a particulate reduction technology?	No	No	No	No	No	No	No	No	No	No	No	No

DRILLING	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Event 11	Event 12
Input number of drilling locations												
Choose drilling method from drop down menu	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push
Input time spent drilling at each location (hr)												
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel

TRENCHING	Trencher 1	Trencher 2	Trencher 3	Trencher 4	Trencher 5	Trencher 6	Trencher 7	Trencher 8	Trencher 9	Trencher 10	Trencher 11	Trencher 12
Choose fuel type from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Choose horsepower range from drop down menu	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3
Input operating hours (hr)												

SEDIMENT DREDGING	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6	Equipment 7	Equipment 8	Equipment 9	Equipment 10	Equipment 11	Equipment 12
Choose dredge equipment type from drop down menu	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical
Choose dredge fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input volume of material to be dredged (yd3)												
Choose dredge equipment size	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY
Suggested dredge equipment size	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY
Input number of dredge tenders (default already present, user override possible)	1	1	1	1	1	1	1	1	1	1	1	1
Choose dredge tender fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input operating time for dredge tenders (hr) (default calculated value, user override possible)	0	0	0	0	0	0	0	0	0	0	0	0
Input number of scow tenders (default already present, user override possible)	2	2	2	2	2	2	2	2	2	2	2	2
Choose scow tender fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input operating time for scow tenders (hr) (default calculated value, user override possible)	0	0	0	0	0	0	0	0	0	0	0	0
Choose size of research vessel from drop down menu	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)
Choose research vessel fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input number of research vessels (default already present, user override possible)	1	1	1	1	1	1	1	1	1	1	1	1
Input operating time for research vessels (hr) (default calculated value, user override possible)	0	0	0	0	0	0	0	0	0	0	0	0
Will DIESEL-run equipment be retrofitted with a particulate reduction technology?	No	No	No	No	No	No	No	No	No	No	No	No

SEDIMENT MANAGEMENT (STAGING AND DRYING)	Excavation	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6	Equipment 7	Equipment 8	Equipment 9	Equipment 10	Equipment 11	Equipment 12
Choose earthwork equipment type from drop down menu	Excavator	Crawler Crane	Crawler Crane	Crawler Crane	Crawler Crane	Crawler Crane	Crawler Crane	Crawler Crane	Crawler Crane	Crawler Crane	Crawler Crane	Crawler Crane
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input volume of material to be removed (yd3)	7,100											
Is volume input that of saturated sediment?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Will the sediment be dry when this work is performed?	Yes	No	No	No	No	No	No	No	No	No	No	No
Will DIESEL-run equipment be retrofitted with a particulate reduction technology?	No	No	No	No	No	No	No	No	No	No	No	No

SEDIMENT CAPPING	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6	Equipment 7	Equipment 8	Equipment 9	Equipment 10	Equipment 11	Equipment 12
Choose capping method from drop down menu	Surface Release	Surface Release	Surface Release	Surface Release	Surface Release	Surface Release	Surface Release	Surface Release	Surface Release	Surface Release	Surface Release	Surface Release
Choose capping equipment fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input volume of capping material to be placed (yd3)												
Choose capping equipment size/type	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge
Suggested capping equipment size/type	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge
Input number of dredge tenders (default already present, user override possible)	1	1	1	1	1	1	1	1	1	1	1	1
Choose tender fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input operating time for dredge tenders (hr) (default calculated value, user override possible)	0	0	0	0	0	0	0	0	0	0	0	0
Input number of scow tenders (default already present, user override possible)	0	0	0	0	0	0	0	0	0	0	0	0
Choose scow tender fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input operating time for scow tenders (hr) (default calculated value, user override possible)	0	0	0	0	0	0	0	0	0	0	0	0
Choose size of research vessel from drop down menu	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)
Choose research vessel fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input number of research vessels (default already present, user override possible)	1	1	1	1	1	1	1	1	1	1	1	1
Input operating time for research vessels (hr) (default calculated value, user override possible)	0	0	0	0	0	0	0	0	0	0	0	0
Will DIESEL-run equipment be retrofitted with a particulate reduction technology?	No	No	No	No	No	No	No	No	No	No	No	No

WATERCRAFT OPERATION	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6	Equipment 7	Equipment 8	Equipment 9	Equipment 10	Equipment 11	Equipment 12
Choose size of research vessel from drop down menu	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)
Choose research vessel fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input number of vessels												
Input operating time (hours)												
Will DIESEL-run equipment be retrofitted with a particulate reduction technology?	No	No	No	No	No	No	No	No	No	No	No	No

For each pump, select only one of the three methods to calculate energy and GHG emissions
Enter "0" for all user input values for unused pump columns or unused methods

PUMP OPERATION	Pump 1	Pump 2	Pump 3	Pump 4	Pump 5	Pump 6	Pump 7	Pump 8	Pump 9	Pump 10	Pump 11	Pump 12
Choose method from drop down	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1
Method 1 - ELECTRICAL USAGE IS KNOWN												
Input pump electrical usage (KWh)	0	0	0	0	0	0	0	0	0	0	0	0
Method 2 - PUMP HEAD IS KNOWN												
Input flow rate (gpm)	0	0	0	0	0	0	0	0	0	0	0	0
Input total head (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Input number of pumps operating	0	0	0	0	0	0	0	0	0	0	0	0
Input operating time for each pump (hrs)	0	0	0	0	0	0	0	0	0	0	0	0
Pump efficiency (default already present, user override possible)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Pump motor efficiency (default already present, user override possible)	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Input specific gravity (default already present, user override possible)	1	1	1	1	1	1	1	1	1	1	1	1
Method 3 - NAME PLATE SPECIFICATIONS ARE KNOWN												
Input pump horsepower (hp)	0	0	0	0	0	0	0	0	0	0	0	0
Input number of pumps operating	0	0	0	0	0	0	0	0	0	0	0	0
Input operating time for each pump (hrs)	0	0	0	0	0	0	0	0	0	0	0	0
Percent of max speed for pump motor (Optional input for variable speed motor)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Pump load if max motor speed draws full nameplate horsepower	1	1	1	1	1	1	1	1	1	1	1	1
Input pump load (default already present, user override possible, consider above value)	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Pump motor efficiency (default already present, user override possible)	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Region												
Electricity Region	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY

DIESEL AND GASOLINE PUMPS	Pump 1	Pump 2	Pump 3	Pump 4	Pump 5	Pump 6	Pump 7	Pump 8	Pump 9	Pump 10	Pump 11	Pump 12
Choose fuel type from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Choose horsepower range from drop down menu	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1
Equipment operating hours (hrs)												
Input estimated fuel consumption rate (gal/hr) (Input only if known for the pump selected, otherwise a default will be used by the tool)												

For each type of equipment, select only one of the methods to calculate energy and GHG emissions
Enter "0" for all user input values for unused equipment columns or unused methods

BLOWER, COMPRESSOR, MIXER, AND OTHER EQUIPMENT	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6	Equipment 7	Equipment 8	Equipment 9	Equipment 10	Equipment 11	Equipment 12
Choose type of equipment from drop down	Blower	Blower	Blower	Blower	Blower	Blower	Blower	Blower	Blower	Blower	Blower	Blower
Choose method from drop down	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1
Method 1 - NAME PLATE SPECIFICATIONS ARE KNOWN												
Input equipment horsepower (hp)	0	0	0	0	0	0	0	0	0	0	0	0
Input number of equipments operating	0	0	0	0	0	0	0	0	0	0	0	0
Input operating time for each equipment (hrs)	0	0	0	0	0	0	0	0	0	0	0	0
Percent of max speed for motor (Optional input for variable speed motor)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Equipment load if max motor speed draws full nameplate horsepower	1	1	1	1	1	1	1	1	1	1	1	1
Input equipment load (default already present, user override possible, consider above value)	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Equipment motor efficiency (default already present, user override possible)	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Method 2 - ELECTRICAL USAGE IS KNOWN												
Input equipment electrical usage, if known (kWh)	0	0	0	0	0	0	0	0	0	0	0	0
Region												
Electricity Region	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY

GENERATORS	Generator 1	Generator 2	Generator 3	Generator 4	Generator 5	Generator 6	Generator 7	Generator 8	Generator 9	Generator 10	Generator 11	Generator 12
Choose fuel type from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Choose horsepower range from drop down menu	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1
Input operating hours (hr)												

AGRICULTURAL EQUIPMENT	Tillage Tractor 1	Tillage Tractor 2	Tillage Tractor 3	Tillage Tractor 4	Tillage Tractor 5	Tillage Tractor 6	Tillage Tractor 7	Tillage Tractor 8	Tillage Tractor 9	Tillage Tractor 10	Tillage Tractor 11	Tillage Tractor 12
Choose fuel type from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Input area to till (acre)												
Choose soil condition from drop down menu	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil
Choose soil type from drop down menu	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil
Input time available (work days)												
Input depth of tillage (in)												

CAPPING EQUIPMENT	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6	Equipment 7	Equipment 8	Equipment 9	Equipment 10	Equipment 11	Equipment 12
Choose stabilization equipment type from drop down menu	Roller	Roller	Roller	Roller	Roller	Roller	Roller	Roller	Roller	Roller	Roller	Roller
Choose fuel type from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Input area (ft2)												
Input time available (work days)												

MIXING EQUIPMENT	Mixer 1	Mixer 2	Mixer 3	Mixer 4	Mixer 5	Mixer 6	Mixer 7	Mixer 8	Mixer 9	Mixer 10	Mixer 11	Mixer 12
Choose fuel type from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Choose horsepower range from drop down menu	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3
Input volume (yd3)												
Input production rate (yd3/hr)												
Input estimated fuel consumption rate (gal/hr) (Input only if known for the mixer selected, otherwise a default will be used by the tool)												

INTERNAL COMBUSTION ENGINES	Engine 1	Engine 2	Engine 3	Engine 4	Engine 5	Engine 6	Engine 7	Engine 8	Engine 9	Engine 10	Engine 11	Engine 12
Chose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input fuel consumption rate (gal/hr or scf/hr)												
Input operating hours (hr)												

OTHER FUELED EQUIPMENT	Fuel 1	Fuel 2	Fuel 3	Fuel 4	Fuel 5	Fuel 6	Fuel 7	Fuel 8	Fuel 9	Fuel 10	Fuel 11	Fuel 12
Choose fuel type from drop down menu	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas
Input volume (scf for Natural gas, gallons for all others)												

DIESEL EQUIPMENT OPERATION (PER HOUR BASIS)	Excavation/ Earthwork/Backfill	Excavation/Earthwork/Backfill	Equipment 3	Equipment 4	Equipment 5	Equipment 6	Equipment 7	Equipment 8	Equipment 9	Equipment 10	Equipment 11	Equipment 12
Choose equipment type from drop down menu	Excavator	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer
Choose equipment size for Dozer (HP)	65	65	65	65	65	65	65	65	65	65	65	65
Choose equipment size for Loader (HP)	65	65	65	65	65	65	65	65	65	65	65	65
Choose equipment size for Excavator (HP)	150	150	150	150	150	150	150	150	150	150	150	150
Choose equipment size for Scraper (HP)	330	330	330	330	330	330	330	330	330	330	330	330
Choose equipment size for Crawler Crane	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY
Choose equipment size for Tillage Tractor (HP)	16	16	16	16	16	16	16	16	16	16	16	16
Choose equipment size for Paver (HP)	25	25	25	25	25	25	25	25	25	25	25	25
Choose equipment size for Roller (HP)	6	6	6	6	6	6	6	6	6	6	6	6
Choose equipment size for Trencher (HP range)	6 to 11	7 to 11	8 to 11	9 to 11	10 to 11	11 to 11	12 to 11	13 to 11	14 to 11	15 to 11	16 to 11	17 to 11
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input operating hours (hr)	960	960										
Will DIESEL-run equipment be retrofitted with a particulate reduction technology?	No	No	No	No	No	No	No	No	No	No	No	No

OPERATOR LABOR	Contractor	EA Oversight	UXO Technician	Temporary Bridge Install	Tree Removal	Pre-Design Investigation Samples	Mob/Demob Inspection Crew	Inspection & Repairs	Occupation 9	Occupation 10	Occupation 11	Occupation 12
Choose occupation from drop-down menu	Construction laborers	Scientific and technical services	Scientific and technical services	Construction laborers	Construction laborers	Construction laborers	Scientific and technical services	Other occupation	Construction laborers	Construction laborers	Construction laborers	Construction laborers
Input total time worked onsite (hours)	960.0	320.0	320.0	16.0	32.0	1920.0	8.0	120.0				

LABORATORY ANALYSIS	Pre-Design Investigation Samples	Waste Characterization Samples (VOCs, SVOCs, Metals, PCBs, Pesticides, TCLP)	Confirmation Sampling	Analysis 4	Analysis 5	Analysis 6	Analysis 7	Analysis 8	Analysis 9	Analysis 10	Analysis 11	Analysis 12
Input dollars spent on laboratory analysis ($)	384,090.00	5,750.00	25,830.00									

OTHER KNOWN ONSITE ACTIVITIES	Entire Site
Input energy usage (MMBTU)	
Water consumption (gallon)	
Input CO2 emission (metric ton)	
Input N2O emission (metric ton CO2 e)	
Input CH4 emission (metric ton CO2 e)	
Input NOx emission (metric ton)	
Input SOx emission (metric ton)	
Input PM10 emission (metric ton)	
Input fatality risk	
Input injury risk	

RESIDUAL HANDLING

RESIDUE DISPOSAL/RECYCLING	Haz Disposal	Munitions	Material Residue	Other Residuals	Other Residuals	Other Residuals	Other Residuals	Other Residuals	Other Residuals	Other Residuals	Other Residuals	Other Residuals
Will DIESEL-run vehicles be retrofitted with a particulate reduction technology?	No	No	No	No	No	No	No	No	No	No	No	No
Input weight of the waste transported to landfill or recycling per trip (tons)	30.0	30.0										
Choose fuel used from drop down menu	Diesel	Diesel	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Input total number of trips	272.0	17.0										
Input number of miles per trip	500.0	1320.0										

LANDFILL OPERATIONS	Operation 1	Operation 2	Operation 3	Operation 4	Operation 5	Operation 6	Operation 6	Operation 6	Operation 6	Operation 6	Operation 6	Operation 6
Choose landfill type for waste disposal	Non-Hazardous	Non-Hazardous	Non-Hazardous	Non-Hazardous	Non-Hazardous	Non-Hazardous	Non-Hazardous	Non-Hazardous	Non-Hazardous	Non-Hazardous	Non-Hazardous	Non-Hazardous
Input amount of waste disposed in landfill (tons)	8160.0	488.0										
Input landfill methane emissions (metric tons CH4)												
Region												
Electricity Region	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY

THERMAL/CATALYTIC OXIDIZERS*	Oxidizer 1	Oxidizer 2	Oxidizer 3	Oxidizer 4	Oxidizer 5	Oxidizer 6	Oxidizer 6	Oxidizer 6	Oxidizer 6	Oxidizer 6	Oxidizer 6	Oxidizer 6
Choose oxidizer type from drop down menu	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer
Choose fuel type from drop down menu	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas
Input waste gas flow rate (scfm)												
Input time running (hours)												
Input waste gas inlet temperature (F)												
Input contaminant concentration (ppmV)												

*(Electric blowers are included in the analysis)

RESOURCE CONSUMPTION

WATER CONSUMPTION	Treatment System 1	Treatment System 2	Treatment System 3	Treatment System 4	Treatment System 5	Treatment System 6	Treatment System 6	Treatment System 6	Treatment System 6	Treatment System 6	Treatment System 6	Treatment System 6
Input total water consumed from potable water treatment facility (gal)												
Input total water disposed to wastewater treatment facility (gal)												

ONSITE LAND AND WATER RESOURCE CONSUMPTION	Entire Site 1	Entire Site 2	Entire Site 3	Entire Site 4	Entire Site 5	Entire Site 6	Entire Site 6	Entire Site 6	Entire Site 6	Entire Site 6	Entire Site 6	Entire Site 6
Input volume of topsoil brought to site (cubic yards)												
Input volume of groundwater or surface water lost (gal)												

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Alternative 6 : No Removal with 40 CFR Part 761 Cap (Risk-Based)

This worksheet allows the user to define material production, transportation, equipment use, and residual handling variables for the remedial alternative
Yellow cells require the user to choose an input from a drop down menu
White cells require the user to type in a value

BASELINE INFORMATION

COMPONENT 1 DURATION AND COST	Entire Site
Input duration of the component (unit time)	1
Input component cost per unit time ($)	

MATERIAL PRODUCTION

WELL MATERIALS	Well Type 1	Well Type 2	Well Type 3	Well Type 4	Well Type 5	Well Type 6	Well Type 7	Well Type 8	Well Type 9	Well Type 10	Well Type 11	Well Type 12
Input number of wells												
Input depth of wells (ft)												
Choose specific casing material schedule from drop down menu	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC
Choose well diameter (in) from drop down menu	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8
Input total quantity of Sand (kg)												
Input total quantity of Gravel (kg)												
Input total quantity of Bentonite (kg)												
Input total quantity of Typical Cement (kg)												
Input total quantity of General Concrete (kg)												
Input total quantity of Steel (kg)												

TREATMENT CHEMICALS & MATERIALS	Treatment 1	Treatment 2	Treatment 3	Treatment 4	Treatment 5	Treatment 6	Treatment 7	Treatment 8	Treatment 9	Treatment 10	Treatment 11	Treatment 12
Input number of injection points												
Choose material type from drop down menu	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide
Input amount of material injected at each point (pounds dry mass)												
Input number of injections per injection point												

TREATMENT MEDIA	Treatment 1	Treatment 2	Treatment 3	Treatment 4	Treatment 5	Treatment 6	Treatment 7	Treatment 8	Treatment 9	Treatment 10	Treatment 11	Treatment 12
Input weight of media used (lbs)												
Choose media type from drop down menu	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC

CONSTRUCTION MATERIALS	Material 1	Material 2	Material 3	Material 4	Material 5	Material 6	Material 7	Material 8	Material 9	Material 10	Material 11	Material 12
Choose material type from drop down menu	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner
Input area of material (ft2)												
Input depth of material (ft)												

WELL DECOMMISSIONING	Well Decommissioning	Well Type 2	Well Type 3	Well Type 4	Well Type 5	Well Type 6	Well Type 7	Well Type 8	Well Type 9	Well Type 10	Well Type 11	Well Type 12
Input number of wells	6											
Input depth of wells (ft)	210											
Input well diameter (in)	2.0											
Choose material from drop down menu	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil

SILT CURTAIN MATERIALS	Curtain 1	Curtain 2	Curtain 3	Curtain 4	Curtain 5	Curtain 6	Curtain 7	Curtain 8	Curtain 9	Curtain 10	Curtain 11	Curtain 12
Input length or perimeter of silt curtain (ft)												
Input depth of silt curtain (ft)												

BULK MATERIAL QUANTITIES	Topsoil	Seed & Fertilize	40 CFR Part 761 Cap	Material 4	Material 5	Material 6	Material 7	Material 8	Material 9	Material 10	Material 11	Material 12
Choose material from drop down menu	Soil	Fertilizer	Soil	Acetic Acid	Acetic Acid	Acetic Acid	Acetic Acid	Acetic Acid	Acetic Acid	Acetic Acid	Acetic Acid	Acetic Acid
Choose units of material quantity from drop down menu	cubic feet	cubic feet	cubic feet	pounds	pounds	pounds	pounds	pounds	pounds	pounds	pounds	pounds
Input material quantity	74,061	24,705	123,444									

TRANSPORTATION

PERSONNEL TRANSPORTATION - ROAD	Contractor	EA Oversight	UXO Technician	Temporary Bridge Install	Tree Removal	Pre-Design Investigation Samples	Backfill, Topsoil, Seed & Fertilizer Delivery	Fence & Swing Gate Delivery	Mob/Demob Inspection Crew	Inspection & Repairs	Cap Material Delivery	Trip 12
Will DIESEL-run vehicles be retrofitted with a particulate reduction technology?	No	No	No	No	No	No	No	No	No	No	No	No
Choose vehicle type from drop down menu*	Cars	Heavy Duty	SUVs	Light truck	Heavy Duty	Heavy Duty	Heavy Duty	SUVs	SUVs	Cars	Heavy Duty	Cars
Choose fuel used from drop down menu	Gasoline	Diesel	Gasoline	Gasoline	Diesel	Diesel	Diesel	Gasoline	Gasoline	Gasoline	Diesel	Gasoline
Input distance traveled per trip (miles)	300	200	440	1300	10	200	10	40	200	200	10	
Input number of trips taken	3	3	3	1	2	13	171	1	1	15	214	
Input number of travelers	3	1	1	2	2	2	1	1	1	1	1	
Input estimated vehicular fuel economy (mi/gal) (input only if known for the vehicle selected, otherwise a default will be used by the tool)	10	30	30	10	10	30	10	10	30	30	10	
*For vehicle type 'Other' please enter values in Table 2b in the Look Up Table tab.												

PERSONNEL TRANSPORTATION - AIR	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6	Trip 7	Trip 8	Trip 9	Trip 10	Trip 11	Trip 12
Input distance traveled (miles)												
Input number of travelers												
Input number of flights taken												

PERSONNEL TRANSPORTATION - RAIL	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6	Trip 7	Trip 8	Trip 9	Trip 10	Trip 11	Trip 12
Choose vehicle type from drop down menu	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail
Input distance traveled (miles)												
Input number of trips taken												
Input number of travelers												

EQUIPMENT TRANSPORTATION - DEDICATED LOAD ROAD	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6	Trip 7	Trip 8	Trip 9	Trip 10	Trip 11	Trip 12
Will DIESEL-run vehicles be retrofitted with a particulate reduction technology?	No	No	No	No	No	No	No	No	No	No	No	No
Choose fuel used from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Account for an empty return trip?	No	No	No	No	No	No	No	No	No	No	No	No
Input one-way distance traveled (miles) with a given load. If applicable, impact for an empty return trip will be accounted for (no additional input is needed).												
Input weight of equipment transported per truck load (tons)												

EQUIPMENT TRANSPORTATION - SHARED LOAD ROAD	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6	Trip 7	Trip 8	Trip 9	Trip 10	Trip 11	Trip 12
Input distance traveled (miles)												
Input weight of equipment transported (tons)												

EQUIPMENT TRANSPORTATION - AIR	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6	Trip 7	Trip 8	Trip 9	Trip 10	Trip 11	Trip 12
Input distance traveled (miles)												
Input weight of equipment transported (tons)												

EQUIPMENT TRANSPORTATION - RAIL	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6	Trip 7	Trip 8	Trip 9	Trip 10	Trip 11	Trip 12
Input distance traveled (miles)												
Input weight of load (tons)												

EQUIPMENT TRANSPORTATION - WATER	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6	Trip 7	Trip 8	Trip 9	Trip 10	Trip 11	Trip 12
Input distance traveled (mile)												
Input weight of load (tons)												

EQUIPMENT USE

EARTHWORK	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6	Equipment 7	Equipment 8	Equipment 9	Equipment 10	Equipment 11	Equipment 12
Choose earthwork equipment type from drop down menu	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input volume of material to be removed (yd3)												
Will DIESEL-run equipment be retrofitted with a particulate reduction technology?	No	No	No	No	No	No	No	No	No	No	No	No

DRILLING	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Event 11	Event 12
Input number of drilling locations												
Choose drilling method from drop down menu	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push
Input time spent drilling at each location (hr)												
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel

TRENCHING	Trencher 1	Trencher 2	Trencher 3	Trencher 4	Trencher 5	Trencher 6	Trencher 7	Trencher 8	Trencher 9	Trencher 10	Trencher 11	Trencher 12
Choose fuel type from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Choose horsepower range from drop down menu	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3
Input operating hours (hr)												

SEDIMENT DREDGING	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6	Equipment 7	Equipment 8	Equipment 9	Equipment 10	Equipment 11	Equipment 12
Choose dredge equipment type from drop down menu	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical
Choose dredge fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input volume of material to be dredged (yd3)												
Choose dredge equipment size	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY
Suggested dredge equipment size	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY
Input number of dredge tenders (default already present, user override possible)	1	1	1	1	1	1	1	1	1	1	1	1
Choose dredge tender fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input operating time for dredge tenders (hr) (default calculated value, user override possible)	0	0	0	0	0	0	0	0	0	0	0	0
Input number of scow tenders (default already present, user override possible)	2	2	2	2	2	2	2	2	2	2	2	2
Choose scow tender fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input operating time for scow tenders (hr) (default calculated value, user override possible)	0	0	0	0	0	0	0	0	0	0	0	0
Choose size of research vessel from drop down menu	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)

Choose research vessel fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input number of research vessels (default already present, user override possible)	1	1	1	1	1	1	1	1	1	1	1	1
Input operating time for research vessels (hr) (default calculated value, user override possi	0	0	0	0	0	0	0	0	0	0	0	0
Will DIESEL-run equipment be retrofitted with a particulate reduction technology?	No	No	No	No	No	No	No	No	No	No	No	No

SEDIMENT MANAGEMENT (STAGING AND DRYING)	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6	Equipment 7	Equipment 8	Equipment 9	Equipment 10	Equipment 11	Equipment 12
Choose earthwork equipment type from drop down menu	Crawler Crane	Crawler Crane	Crawler Crane	Crawler Crane	Crawler Crane	Crawler Crane	Crawler Crane	Crawler Crane	Crawler Crane	Crawler Crane	Crawler Crane	Crawler Crane
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input volume of material to be removed (yd3)												
Is volume input that of saturated sediment?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Will the sediment be dry when this work is performed?	No	No	No	No	No	No	No	No	No	No	No	No
Will DIESEL-run equipment be retrofitted with a particulate reduction technology?	No	No	No	No	No	No	No	No	No	No	No	No

SEDIMENT CAPPING	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6	Equipment 7	Equipment 8	Equipment 9	Equipment 10	Equipment 11	Equipment 12
Choose capping method from drop down menu	Surface Release	Surface Release	Surface Release	Surface Release	Surface Release	Surface Release	Surface Release	Surface Release	Surface Release	Surface Release	Surface Release	Surface Release
Choose capping equipment fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input volume of capping material to be placed (yd3)												
Choose capping equipment size/type	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge
Suggested capping equipment size/type	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge
Input number of dredge tenders (hr) (default already present, user override possible)	1	1	1	1	1	1	1	1	1	1	1	1
Choose tender fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input operating time for dredge tenders (hr) (default calculated value, user override possible)	0	0	0	0	0	0	0	0	0	0	0	0
Input number of scow tenders (default already present, user override possible)	0	0	0	0	0	0	0	0	0	0	0	0
Choose scow tender fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input operating time for scow tenders (hr) (default calculated value, user override possible)	0	0	0	0	0	0	0	0	0	0	0	0
Choose size of research vessel from drop down menu	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)
Choose research vessel fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input number of research vessels (default already present, user override possible)	1	1	1	1	1	1	1	1	1	1	1	1
Input operating time for research vessels (hr) (default calculated value, user override possi	0	0	0	0	0	0	0	0	0	0	0	0
Will DIESEL-run equipment be retrofitted with a particulate reduction technology?	No	No	No	No	No	No	No	No	No	No	No	No

WATERCRAFT OPERATION	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6	Equipment 7	Equipment 8	Equipment 9	Equipment 10	Equipment 11	Equipment 12
Choose size of research vessel from drop down menu	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)
Choose research vessel fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input number of vessels												
Input operating time (hours)												
Will DIESEL-run equipment be retrofitted with a particulate reduction technology?	No	No	No	No	No	No	No	No	No	No	No	No

For each pump, select only one of the three methods to calculate energy and GHG emissions
Enter "0" for all user input values for unused pump columns or unused methods

PUMP OPERATION	Pump 1	Pump 2	Pump 3	Pump 4	Pump 5	Pump 6	Pump 7	Pump 8	Pump 9	Pump 10	Pump 11	Pump 12
Choose method from drop down	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1
Method 1 - ELECTRICAL USAGE IS KNOWN												
Input pump electrical usage (KWh)	0	0	0	0	0	0	0	0	0	0	0	0
Method 2 - PUMP HEAD IS KNOWN												
Input flow rate (gpm)	0	0	0	0	0	0	0	0	0	0	0	0
Input total head (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Input number of pumps operating	0	0	0	0	0	0	0	0	0	0	0	0
Input operating time for each pump (hrs)	0	0	0	0	0	0	0	0	0	0	0	0
Pump efficiency (default already present, user override possible)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Pump motor efficiency (default already present, user override possible)	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Input specific gravity (default already present, user override possible)	1	1	1	1	1	1	1	1	1	1	1	1
Method 3 - NAME PLATE SPECIFICATIONS ARE KNOWN												
Input pump horsepower (hp)	0	0	0	0	0	0	0	0	0	0	0	0
Input number of pumps operating	0	0	0	0	0	0	0	0	0	0	0	0
Input operating time for each pump (hrs)	0	0	0	0	0	0	0	0	0	0	0	0
Percent of max speed for pump motor (Optional input for variable speed motor)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Pump load if max motor speed draws full nameplate horsepower	1	1	1	1	1	1	1	1	1	1	1	1
Input pump load (default already present, user override possible, consider above value)	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Pump motor efficiency (default already present, user override possible)	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Region												
Electricity Region	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY

DIESEL AND GASOLINE PUMPS	Pump 1	Pump 2	Pump 3	Pump 4	Pump 5	Pump 6	Pump 7	Pump 8	Pump 9	Pump 10	Pump 11	Pump 12
Choose fuel type from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Choose horsepower range from drop down menu	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1
Equipment operating hours (hrs)												
Input estimated fuel consumption rate (gal/hr) (input only if known for the pump selected, otherwise a default will be used by the tool)												

For each type of equipment, select only one of the methods to calculate energy and GHG emissions
Enter "0" for all user input values for unused equipment columns or unused methods

BLOWER, COMPRESSOR, MIXER, AND OTHER EQUIPMENT	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6	Equipment 7	Equipment 8	Equipment 9	Equipment 10	Equipment 11	Equipment 12
Choose type of equipment from drop down	Blower	Blower	Blower	Blower	Blower	Blower	Blower	Blower	Blower	Blower	Blower	Blower
Choose method from drop down	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1
Method 1 - NAME PLATE SPECIFICATIONS ARE KNOWN												
Input equipment horsepower (hp)	0	0	0	0	0	0	0	0	0	0	0	0
Input number of equipments operating	0	0	0	0	0	0	0	0	0	0	0	0
Input operating time for each equipment (hrs)	0	0	0	0	0	0	0	0	0	0	0	0
Percent of max speed for motor (Optional input for variable speed motor)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Equipment load if max motor speed draws full nameplate horsepower	1	1	1	1	1	1	1	1	1	1	1	1
Input equipment load (default already present, user override possible, consider above value)	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Equipment motor efficiency (default already present, user override possible)	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Method 2 - ELECTRICAL USAGE IS KNOWN												
Input equipment electrical usage, if known (kWh)	0	0	0	0	0	0	0	0	0	0	0	0
Region												
Electricity Region	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY

GENERATORS	Generator 1	Generator 2	Generator 3	Generator 4	Generator 5	Generator 6	Generator 7	Generator 8	Generator 9	Generator 10	Generator 11	Generator 12
Choose fuel type from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Choose horsepower range from drop down menu	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1
Input operating hours (hr)												

AGRICULTURAL EQUIPMENT	Tillage Tractor 1	Tillage Tractor 2	Tillage Tractor 3	Tillage Tractor 4	Tillage Tractor 5	Tillage Tractor 6	Tillage Tractor 7	Tillage Tractor 8	Tillage Tractor 9	Tillage Tractor 10	Tillage Tractor 11	Tillage Tractor 12
Choose fuel type from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Input area to till (acre)												
Choose soil condition from drop down menu	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil
Choose soil type from drop down menu	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil
Input time available (work days)												
Input depth of tillage (in)												

CAPPING EQUIPMENT	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6	Equipment 7	Equipment 8	Equipment 9	Equipment 10	Equipment 11	Equipment 12
Choose stabilization equipment type from drop down menu	Roller	Roller	Roller	Roller	Roller	Roller	Roller	Roller	Roller	Roller	Roller	Roller
Choose fuel type from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Input area (ft2)												
Input time available (work days)												

MIXING EQUIPMENT	Mixer 1	Mixer 2	Mixer 3	Mixer 4	Mixer 5	Mixer 6	Mixer 7	Mixer 8	Mixer 9	Mixer 10	Mixer 11	Mixer 12
Choose fuel type from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Choose horsepower range from drop down menu	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3
Input volume (yd3)												
Input production rate (yd3/hr)												
Input estimated fuel consumption rate (gal/hr) (input only if known for the mixer selected, otherwise a default will be used by the tool)												

INTERNAL COMBUSTION ENGINES	Engine 1	Engine 2	Engine 3	Engine 4	Engine 5	Engine 6	Engine 7	Engine 8	Engine 9	Engine 10	Engine 11	Engine 12
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input fuel consumption rate (gal/hr or scf/hr)												
Input operating hours (hr)												

OTHER FUELED EQUIPMENT	Fuel 1	Fuel 2	Fuel 3	Fuel 4	Fuel 5	Fuel 6	Fuel 7	Fuel 8	Fuel 9	Fuel 10	Fuel 11	Fuel 12
Choose fuel type from drop down menu	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas
Input volume (scf for Natural gas, gallons for all others)												

DIESEL EQUIPMENT OPERATION (PER HOUR BASIS)	Earthwork/Cap	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6	Equipment 7	Equipment 8	Equipment 9	Equipment 10	Equipment 11	Equipment 12
Choose equipment type from drop down menu	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer
Choose equipment size for Dozer (HP)	65	65	65	65	65	65	65	65	65	65	65	65
Choose equipment size for Loader (HP)	65	65	65	65	65	65	65	65	65	65	65	65
Choose equipment size for Excavator (HP)	150	150	150	150	150	150	150	150	150	150	150	150
Choose equipment size for Scraper (HP)	330	330	330	330	330	330	330	330	330	330	330	330
Choose equipment size for Crawler Crane	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY
Choose equipment size for Tillage Tractor (HP)	16	16	16	16	16	16	16	16	16	16	16	16
Choose equipment size for Paver (HP)	25	25	25	25	25	25	25	25	25	25	25	25
Choose equipment size for Roller (HP)	6	6	6	6	6	6	6	6	6	6	6	6

Choose equipment size for Trencher (HP range)	6 to 11	7 to 11	8 to 11	9 to 11	10 to 11	11 to 11	12 to 11	13 to 11	14 to 11	15 to 11	16 to 11	17 to 11
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input operating hours (hr)	1200											
Will DIESEL-run equipment be retrofitted with a particulate reduction technology?	No	No	No	No	No	No	No	No	No	No	No	No

OPERATOR LABOR	Contractor	EA Oversight	UXO Technician	Temporary Bridge Install	Tree Removal	Pre-Design Investigation Samples	Mob/Demob Inspection Crew	Inspection & Repairs	Occupation 9	Occupation 10	Occupation 11	Occupation 12
Choose occupation from drop-down menu	Construction laborers	Scientific and technical services	Scientific and technical services	Construction laborers	Construction laborers	Construction laborers	Scientific and technical services	Other occupation	Construction laborers	Construction laborers	Construction laborers	Construction laborers
Input total time worked onsite (hours)	1200.0	400.0	400.0	16.0	32.0	1920.0	8.0	120.0				

LABORATORY ANALYSIS	Analysis 1	Analysis 2	Analysis 3	Analysis 4	Analysis 5	Analysis 6	Analysis 7	Analysis 8	Analysis 9	Analysis 10	Analysis 11	Analysis 12
Input dollars spent on laboratory analysis ($												

OTHER KNOWN ONSITE ACTIVITIES	Entire Site
Input energy usage (MMBTU)	
Water consumption (gallon)	
Input CO2 emission (metric ton)	
Input N2O emission (metric ton CO2 e)	
Input CH4 emission (metric ton CO2 e)	
Input NOx emission (metric ton)	
Input SOx emission (metric ton)	
Input PM10 emission (metric ton)	
Input fatality risk	
Input injury risk	

RESIDUAL HANDLING

RESIDUE DISPOSAL/RECYCLING	Soil Residue	Residual Water	Material Residue	Other Residuals	Other Residuals	Other Residuals	Other Residuals	Other Residuals	Other Residuals	Other Residuals	Other Residuals	Other Residuals
Will DIESEL-run vehicles be retrofitted with a particulate reduction technology?	No	No	No	No	No	No	No	No	No	No	No	No
Input weight of the waste transported to landfill or recycling per trip (tons												
Choose fuel used from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Input total number of trips												
Input number of miles per trip												

LANDFILL OPERATIONS	Operation 1	Operation 2	Operation 3	Operation 4	Operation 5	Operation 6	Operation 6	Operation 6	Operation 6	Operation 6	Operation 6	Operation 6
Choose landfill type for waste disposal	Non-Hazardous	Non-Hazardous	Non-Hazardous	Non-Hazardous	Non-Hazardous	Non-Hazardous	Non-Hazardous	Non-Hazardous	Non-Hazardous	Non-Hazardous	Non-Hazardous	Non-Hazardous
Input amount of waste disposed in landfill (tons)												
Input landfill methane emissions (metric tons CH4)												
Region												
Electricity Region	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY

THERMAL/CATALYTIC OXIDIZERS*	Oxidizer 1	Oxidizer 2	Oxidizer 3	Oxidizer 4	Oxidizer 5	Oxidizer 6	Oxidizer 6	Oxidizer 6	Oxidizer 6	Oxidizer 6	Oxidizer 6	Oxidizer 6
Choose oxidizer type from drop down menu	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer
Choose fuel type from drop down menu	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas
Input waste gas flow rate (scfm)												
Input time running (hours)												
Input waste gas inlet temperature (F)												
Input contaminant concentration (ppmV)												

*(Electric blowers are included in the analysis)

RESOURCE CONSUMPTION

WATER CONSUMPTION	Treatment System 1	Treatment System 2	Treatment System 3	Treatment System 4	Treatment System 5	Treatment System 6	Treatment System 6	Treatment System 6	Treatment System 6	Treatment System 6	Treatment System 6	Treatment System 6
Input total water consumed from potable water treatment facility (gal)												
Input total water disposed to wastewater treatment facility (gal)												

ONSITE LAND AND WATER RESOURCE CONSUMPTION	Entire Site 1	Entire Site 2	Entire Site 3	Entire Site 4	Entire Site 5	Entire Site 6	Entire Site 6	Entire Site 6	Entire Site 6	Entire Site 6	Entire Site 6	Entire Site 6
Input volume of topsoil brought to site (cubic yards)												
Input volume of groundwater or surface water lost (gal)												

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Alternative 7 : No Removal with 6 NYCRR Part 375 Soil Cover (Risk-Based)

This worksheet allows the user to define material production, transportation, equipment use, and residual handling variables for the remedial alternative
Yellow cells require the user to choose an input from a drop down menu
White cells require the user to type in a value

BASELINE INFORMATION

COMPONENT 2 DURATION AND COST	Entire Site
Input duration of the component (unit time)	1
Input component cost per unit time ($)	

MATERIAL PRODUCTION

WELL MATERIALS	Well Type 1	Well Type 2	Well Type 3	Well Type 4	Well Type 5	Well Type 6	Well Type 7	Well Type 8	Well Type 9	Well Type 10	Well Type 11	Well Type 12
Input number of wells												
Input depth of wells (ft)												
Choose specific casing material schedule from drop down menu	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC	Sch 40 PVC
Choose well diameter (in) from drop down menu	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8
Input total quantity of Sand (kg)												
Input total quantity of Gravel (kg)												
Input total quantity of Bentonite (kg)												
Input total quantity of Typical Cement (kg)												
Input total quantity of General Concrete (kg)												
Input total quantity of Steel (kg)												

TREATMENT CHEMICALS & MATERIALS	Treatment 1	Treatment 2	Treatment 3	Treatment 4	Treatment 5	Treatment 6	Treatment 7	Treatment 8	Treatment 9	Treatment 10	Treatment 11	Treatment 12
Input number of injection points												
Choose material type from drop down menu	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide
Input amount of material injected at each point (pounds dry mass)												
Input number of injections per injection point												

TREATMENT MEDIA	Treatment 1	Treatment 2	Treatment 3	Treatment 4	Treatment 5	Treatment 6	Treatment 7	Treatment 8	Treatment 9	Treatment 10	Treatment 11	Treatment 12
Input weight of media used (lbs)												
Choose media type from drop down menu	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC	Virgin GAC

CONSTRUCTION MATERIALS	Material 1	Material 2	Material 3	Material 4	Material 5	Material 6	Material 7	Material 8	Material 9	Material 10	Material 11	Material 12
Choose material type from drop down menu	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner	HDPE Liner
Input area of material (ft2)												
Input depth of material (ft)												

WELL DECOMMISSIONING	Well Decommissioning	Well Type 2	Well Type 3	Well Type 4	Well Type 5	Well Type 6	Well Type 7	Well Type 8	Well Type 9	Well Type 10	Well Type 11	Well Type 12
Input number of wells	6											
Input depth of wells (ft)	210											
Input well diameter (in)	2.0											
Choose material from drop down menu	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil

SILT CURTAIN MATERIALS	Curtain 1	Curtain 2	Curtain 3	Curtain 4	Curtain 5	Curtain 6	Curtain 7	Curtain 8	Curtain 9	Curtain 10	Curtain 11	Curtain 12
Input length or perimeter of silt curtain (ft)												
Input depth of silt curtain (ft)												

BULK MATERIAL QUANTITIES	Backfill Materials	Topsoil	Seed & Fertilize	6 NYCRR Part 375 Soil Cover	Material 5	Material 6	Material 7	Material 8	Material 9	Material 10	Material 11	Material 12
Choose material from drop down menu	Soil	Soil	Fertilizer	Soil	Acetic Acid	Acetic Acid	Acetic Acid	Acetic Acid	Acetic Acid	Acetic Acid	Acetic Acid	Acetic Acid
Choose units of material quantity from drop down menu	cubic feet	cubic feet	cubic feet	cubic feet	pounds	pounds	pounds	pounds	pounds	pounds	pounds	pounds
Input material quantity	117,639	74,061	24,705	80,151								

TRANSPORTATION

PERSONNEL TRANSPORTATION - ROAD	Contractor	EA Oversight	UXO Technician	Temporary Bridge Install	Tree Removal	Pre-Design Investigation Samples	Backfill, Topsoil, Seed & Fertilizer Delivery	Fence & Swing Gate Delivery	Mob/Demob Inspection Crew	Inspection & Repairs	Cap Material Delivery	Trip 12
Will DIESEL-run vehicles be retrofitted with a particulate reduction technology?	No	No	No	No	No	No	No	No	No	No	No	No
Choose vehicle type from drop down menu*	Cars	Heavy Duty	SUVs	Light truck	Heavy Duty	Heavy Duty	Heavy Duty	SUVs	SUVs	Cars	Heavy Duty	Cars
Choose fuel used from drop down menu	Gasoline	Diesel	Gasoline	Gasoline	Diesel	Diesel	Diesel	Gasoline	Gasoline	Gasoline	Diesel	Gasoline
Input distance traveled per trip (miles)	300	200	440	1300	10	200	10	40	200	200	10	
Input number of trips taken	3	3	3	1	2	13	171	1	1	15	140	
Input number of travelers	3	1	1	2	2	2	1	1	1	1	1	
Input estimated vehicular fuel economy (mi/gal) (Input only if known for the vehicle selected, otherwise a default will be used by the tool)	10	30	30	10	10	30	10	10	30	30	10	
*For vehicle type 'Other' please enter values in Table 2b in the Look Up Table tab.												

PERSONNEL TRANSPORTATION - AIR	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6	Trip 7	Trip 8	Trip 9	Trip 10	Trip 11	Trip 12
Input distance traveled (miles)												
Input number of travelers												
Input number of flights taken												

PERSONNEL TRANSPORTATION - RAIL	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6	Trip 7	Trip 8	Trip 9	Trip 10	Trip 11	Trip 12
Choose vehicle type from drop down menu	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail	Intercity rail
Input distance traveled (miles)												
Input number of trips taken												
Input number of travelers												

EQUIPMENT TRANSPORTATION - DEDICATED LOAD ROAD	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6	Trip 7	Trip 8	Trip 9	Trip 10	Trip 11	Trip 12
Will DIESEL-run vehicles be retrofitted with a particulate reduction technology?	No	No	No	No	No	No	No	No	No	No	No	No
Choose fuel used from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Account for an empty return trip?	No	No	No	No	No	No	No	No	No	No	No	No
Input one-way distance traveled (miles) with a given load. If applicable, impact for an empty return trip will be accounted for (no additional input is needed).												
Input weight of equipment transported per truck load (tons)												

EQUIPMENT TRANSPORTATION - SHARED LOAD ROAD	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6	Trip 7	Trip 8	Trip 9	Trip 10	Trip 11	Trip 12
Input distance traveled (miles)												
Input weight of equipment transported (tons)												

EQUIPMENT TRANSPORTATION - AIR	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6	Trip 7	Trip 8	Trip 9	Trip 10	Trip 11	Trip 12
Input distance traveled (miles)												
Input weight of equipment transported (tons)												

EQUIPMENT TRANSPORTATION - RAIL	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6	Trip 7	Trip 8	Trip 9	Trip 10	Trip 11	Trip 12
Input distance traveled (miles)												
Input weight of load (tons)												

EQUIPMENT TRANSPORTATION - WATER	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6	Trip 7	Trip 8	Trip 9	Trip 10	Trip 11	Trip 12
Input distance traveled (mile)												
Input weight of load (tons)												

EQUIPMENT USE

EARTHWORK	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6	Equipment 7	Equipment 8	Equipment 9	Equipment 10	Equipment 11	Equipment 12
Choose earthwork equipment type from drop down menu	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input volume of material to be removed (yd3)												
Will DIESEL-run equipment be retrofitted with a particulate reduction technology?	No	No	No	No	No	No	No	No	No	No	No	No

DRILLING	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Event 11	Event 12
Input number of drilling locations												
Choose drilling method from drop down menu	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push	Direct Push
Input time spent drilling at each location (hr)												
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel

TRENCHING	Trencher 1	Trencher 2	Trencher 3	Trencher 4	Trencher 5	Trencher 6	Trencher 7	Trencher 8	Trencher 9	Trencher 10	Trencher 11	Trencher 12
Choose fuel type from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Choose horsepower range from drop down menu	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3
Input operating hours (hr)												

SEDIMENT DREDGING	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6	Equipment 7	Equipment 8	Equipment 9	Equipment 10	Equipment 11	Equipment 12
Choose dredge equipment type from drop down menu	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical	Mechanical
Choose dredge fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input volume of material to be dredged (yd3)												
Choose dredge equipment size	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY
Suggested dredge equipment size	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY
Input number of dredge tenders (default already present, user override possible)	1	1	1	1	1	1	1	1	1	1	1	1
Choose dredge tender fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input operating time for dredge tenders (hr) (default calculated value, user override possible)	0	0	0	0	0	0	0	0	0	0	0	0
Input number of scow tenders (default already present, user override possible)	2	2	2	2	2	2	2	2	2	2	2	2
Choose scow tender fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input operating time for scow tenders (hr) (default calculated value, user override possible)	0	0	0	0	0	0	0	0	0	0	0	0
Choose size of research vessel from drop down menu	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)

Choose research vessel fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input number of research vessels (default already present, user override possible)	1	1	1	1	1	1	1	1	1	1	1	1
Input operating time for research vessels (hr) (default calculated value, user override poss	0	0	0	0	0	0	0	0	0	0	0	0
Will DIESEL-run equipment be retrofitted with a particulate reduction technology?	No	No	No	No	No	No	No	No	No	No	No	No

SEDIMENT MANAGEMENT (STAGING AND DRYING)	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6	Equipment 7	Equipment 8	Equipment 9	Equipment 10	Equipment 11	Equipment 12
Choose earthwork equipment type from drop down menu	Crawler Crane	Crawler Crane	Crawler Crane	Crawler Crane	Crawler Crane	Crawler Crane	Crawler Crane	Crawler Crane	Crawler Crane	Crawler Crane	Crawler Crane	Crawler Crane
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input volume of material to be removed (yd3)												
Is volume input that of saturated sediment?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Will the sediment be dry when this work is performed?	No	No	No	No	No	No	No	No	No	No	No	No
Will DIESEL-run equipment be retrofitted with a particulate reduction technology?	No	No	No	No	No	No	No	No	No	No	No	No

SEDIMENT CAPPING	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6	Equipment 7	Equipment 8	Equipment 9	Equipment 10	Equipment 11	Equipment 12
Choose capping method from drop down menu	Surface Release	Surface Release	Surface Release	Surface Release	Surface Release	Surface Release	Surface Release	Surface Release	Surface Release	Surface Release	Surface Release	Surface Release
Choose capping equipment fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input volume of capping material to be placed (yd3)												
Choose capping equipment size/type	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge
Suggested capping equipment size/type	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge	Hopper Barge
Input number of dredge tenders (default already present, user override possible)	1	1	1	1	1	1	1	1	1	1	1	1
Choose tender fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input operating time for dredge tenders (hr) (default calculated value, user override possible)	0	0	0	0	0	0	0	0	0	0	0	0
Input number of scow tenders (default already present, user override possible)	0	0	0	0	0	0	0	0	0	0	0	0
Choose scow tender fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input operating time for scow tenders (hr) (default calculated value, user override possible)	0	0	0	0	0	0	0	0	0	0	0	0
Choose size of research vessel from drop down menu	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)
Choose research vessel fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input number of research vessels (default already present, user override possible)	1	1	1	1	1	1	1	1	1	1	1	1
Input operating time for research vessels (hr) (default calculated value, user override poss	0	0	0	0	0	0	0	0	0	0	0	0
Will DIESEL-run equipment be retrofitted with a particulate reduction technology?	No	No	No	No	No	No	No	No	No	No	No	No

WATERCRAFT OPERATION	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6	Equipment 7	Equipment 8	Equipment 9	Equipment 10	Equipment 11	Equipment 12
Choose size of research vessel from drop down menu	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)	Research Vessel (large)
Choose research vessel fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input number of vessels												
Input operating time (hours)												
Will DIESEL-run equipment be retrofitted with a particulate reduction technology?	No	No	No	No	No	No	No	No	No	No	No	No

For each pump, select only one of the three methods to calculate energy and GHG emissions
Enter "0" for all user input values for unused pump columns or unused methods

PUMP OPERATION	Pump 1	Pump 2	Pump 3	Pump 4	Pump 5	Pump 6	Pump 7	Pump 8	Pump 9	Pump 10	Pump 11	Pump 12
Choose method from drop down	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1
Method 1 - ELECTRICAL USAGE IS KNOWN												
Input pump electrical usage (KWh)	0	0	0	0	0	0	0	0	0	0	0	0
Method 2 - PUMP HEAD IS KNOWN												
Input flow rate (gpm)	0	0	0	0	0	0	0	0	0	0	0	0
Input total head (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Input number of pumps operating	0	0	0	0	0	0	0	0	0	0	0	0
Input operating time for each pump (hrs)	0	0	0	0	0	0	0	0	0	0	0	0
Pump efficiency (default already present, user override possible)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Pump motor efficiency (default already present, user override possible)	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Input specific gravity (default already present, user override possible)	1	1	1	1	1	1	1	1	1	1	1	1
Method 3 - NAME PLATE SPECIFICATIONS ARE KNOWN												
Input pump horsepower (hp)	0	0	0	0	0	0	0	0	0	0	0	0
Input number of pumps operating	0	0	0	0	0	0	0	0	0	0	0	0
Input operating time for each pump (hrs)	0	0	0	0	0	0	0	0	0	0	0	0
Percent of max speed for pump motor (Optional input for variable speed motor)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Pump load if max motor speed draws full nameplate horsepower	1	1	1	1	1	1	1	1	1	1	1	1
Input pump load (default already present, user override possible, consider above value)	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Pump motor efficiency (default already present, user override possible)	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Region												
Electricity Region	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY

DIESEL AND GASOLINE PUMPS	Pump 1	Pump 2	Pump 3	Pump 4	Pump 5	Pump 6	Pump 7	Pump 8	Pump 9	Pump 10	Pump 11	Pump 12
Choose fuel type from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Choose horsepower range from drop down menu	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1	2-Stroke: 0 to 1
Equipment operating hours (hrs)												
Input estimated fuel consumption rate (gal/hr) (input only if known for the pump selected, otherwise a default will be used by the tool)												

For each type of equipment, select only one of the methods to calculate energy and GHG emissions
Enter "0" for all user input values for unused equipment columns or unused methods

BLOWER, COMPRESSOR, MIXER, AND OTHER EQUIPMENT	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6	Equipment 7	Equipment 8	Equipment 9	Equipment 10	Equipment 11	Equipment 12
Choose type of equipment from drop down	Blower	Blower	Blower	Blower	Blower	Blower	Blower	Blower	Blower	Blower	Blower	Blower
Choose method from drop down	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1	Method 1
Method 1 - NAME PLATE SPECIFICATIONS ARE KNOWN												
Input equipment horsepower (hp)	0	0	0	0	0	0	0	0	0	0	0	0
Input number of equipments operating	0	0	0	0	0	0	0	0	0	0	0	0
Input operating time for each equipment (hrs)	0	0	0	0	0	0	0	0	0	0	0	0
Percent of max speed for motor (Optional input for variable speed motor)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Equipment load if max motor speed draws full nameplate horsepower	1	1	1	1	1	1	1	1	1	1	1	1
Input equipment load (default already present, user override possible, consider above value)	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Equipment motor efficiency (default already present, user override possible)	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Method 2 - ELECTRICAL USAGE IS KNOWN												
Input equipment electrical usage, if known (kWh)	0	0	0	0	0	0	0	0	0	0	0	0
Region												
Electricity Region	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY

GENERATORS	Generator 1	Generator 2	Generator 3	Generator 4	Generator 5	Generator 6	Generator 7	Generator 8	Generator 9	Generator 10	Generator 11	Generator 12
Choose fuel type from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Choose horsepower range from drop down menu	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1
Input operating hours (hr)												

AGRICULTURAL EQUIPMENT	Tillage Tractor 1	Tillage Tractor 2	Tillage Tractor 3	Tillage Tractor 4	Tillage Tractor 5	Tillage Tractor 6	Tillage Tractor 7	Tillage Tractor 8	Tillage Tractor 9	Tillage Tractor 10	Tillage Tractor 11	Tillage Tractor 12
Choose fuel type from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Input area to till (acre)												
Choose soil condition from drop down menu	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil	Firm untilled soil
Choose soil type from drop down menu	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil	Clay Soil
Input time available (work days)												
Input depth of tillage (in)												

CAPPING EQUIPMENT	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6	Equipment 7	Equipment 8	Equipment 9	Equipment 10	Equipment 11	Equipment 12
Choose stabilization equipment type from drop down menu	Roller	Roller	Roller	Roller	Roller	Roller	Roller	Roller	Roller	Roller	Roller	Roller
Choose fuel type from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Input area (ft2)												
Input time available (work days)												

MIXING EQUIPMENT	Mixer 1	Mixer 2	Mixer 3	Mixer 4	Mixer 5	Mixer 6	Mixer 7	Mixer 8	Mixer 9	Mixer 10	Mixer 11	Mixer 12
Choose fuel type from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Choose horsepower range from drop down menu	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3	1 to 3
Input volume (yd3)												
Input production rate (yd3/hr)												
Input estimated fuel consumption rate (gal/hr) (input only if known for the mixer selected, otherwise a default will be used by the tool)												

INTERNAL COMBUSTION ENGINES	Engine 1	Engine 2	Engine 3	Engine 4	Engine 5	Engine 6	Engine 7	Engine 8	Engine 9	Engine 10	Engine 11	Engine 12
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input fuel consumption rate (gal/hr or scf/hr)												
Input operating hours (hr)												

OTHER FUELED EQUIPMENT	Fuel 1	Fuel 2	Fuel 3	Fuel 4	Fuel 5	Fuel 6	Fuel 7	Fuel 8	Fuel 9	Fuel 10	Fuel 11	Fuel 12
Choose fuel type from drop down menu	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas
Input volume (scf for Natural gas, gallons for all others)												

DIESEL EQUIPMENT OPERATION (PER HOUR BASIS)	Earthwork/Cap	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6	Equipment 7	Equipment 8	Equipment 9	Equipment 10	Equipment 11	Equipment 12
Choose equipment type from drop down menu	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer	Dozer
Choose equipment size for Dozer (HP)	65	65	65	65	65	65	65	65	65	65	65	65
Choose equipment size for Loader (HP)	65	65	65	65	65	65	65	65	65	65	65	65
Choose equipment size for Excavator (HP)	150	150	150	150	150	150	150	150	150	150	150	150
Choose equipment size for Scraper (HP)	330	330	330	330	330	330	330	330	330	330	330	330
Choose equipment size for Crawler Crane	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY	Crawler Crane, 25 ton, 1 CY
Choose equipment size for Tillage Tractor (HP)	16	16	16	16	16	16	16	16	16	16	16	16
Choose equipment size for Paver (HP)	25	25	25	25	25	25	25	25	25	25	25	25
Choose equipment size for Roller (HP)	6	6	6	6	6	6	6	6	6	6	6	6

Choose equipment size for Trencher (HP range)	6 to 11	7 to 11	8 to 11	9 to 11	10 to 11	11 to 11	12 to 11	13 to 11	14 to 11	15 to 11	16 to 11	17 to 11
Choose fuel type from drop down menu	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Input operating hours (hr)	1200											
Will DIESEL-run equipment be retrofitted with a particulate reduction technology?	No	No	No	No	No	No	No	No	No	No	No	No

OPERATOR LABOR	Contractor	EA Oversight	UXO Technician	Temporary Bridge Install	Tree Removal	Pre-Design Investigation Samples	Mob/Demob Inspection Crew	Inspection & Repairs	Occupation 9	Occupation 10	Occupation 11	Occupation 12
Choose occupation from drop-down menu	Construction laborers	Scientific and technical services	Scientific and technical services	Construction laborers	Construction laborers	Construction laborers	Scientific and technical services	Other occupation	Construction laborers	Construction laborers	Construction laborers	Construction laborers
Input total time worked onsite (hours)	1200.0	400.0	400.0	16.0	32.0	1920.0	8.0	120.0				

LABORATORY ANALYSIS	Analysis 1	Analysis 2	Analysis 3	Analysis 4	Analysis 5	Analysis 6	Analysis 7	Analysis 8	Analysis 9	Analysis 10	Analysis 11	Analysis 12
Input dollars spent on laboratory analysis ($												

OTHER KNOWN ONSITE ACTIVITIES	Entire Site
Input energy usage (MMBTU)	
Water consumption (gallon)	
Input CO2 emission (metric ton)	
Input N2O emission (metric ton CO2 e)	
Input CH4 emission (metric ton CO2 e)	
Input NOx emission (metric ton)	
Input SOx emission (metric ton)	
Input PM10 emission (metric ton)	
Input fatality risk	
Input injury risk	

RESIDUAL HANDLING

RESIDUE DISPOSAL/RECYCLING	Soil Residue	Residual Water	Material Residue	Other Residuals	Other Residuals	Other Residuals	Other Residuals	Other Residuals	Other Residuals	Other Residuals	Other Residuals	Other Residuals
Will DIESEL-run vehicles be retrofitted with a particulate reduction technology?	No	No	No	No	No	No	No	No	No	No	No	No
Input weight of the waste transported to landfill or recycling per trip (tons												
Choose fuel used from drop down menu	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Input total number of trips												
Input number of miles per trip												

LANDFILL OPERATIONS	Operation 1	Operation 2	Operation 3	Operation 4	Operation 5	Operation 6	Operation 6	Operation 6	Operation 6	Operation 6	Operation 6	Operation 6
Choose landfill type for waste disposal	Non-Hazardous	Non-Hazardous	Non-Hazardous	Non-Hazardous	Non-Hazardous	Non-Hazardous	Non-Hazardous	Non-Hazardous	Non-Hazardous	Non-Hazardous	Non-Hazardous	Non-Hazardous
Input amount of waste disposed in landfill (tons)												
Input landfill methane emissions (metric tons CH4)												
Region												
Electricity Region	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY

THERMAL/CATALYTIC OXIDIZERS*	Oxidizer 1	Oxidizer 2	Oxidizer 3	Oxidizer 4	Oxidizer 5	Oxidizer 6	Oxidizer 6	Oxidizer 6	Oxidizer 6	Oxidizer 6	Oxidizer 6	Oxidizer 6
Choose oxidizer type from drop down menu	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer	Simple Thermal Oxidizer
Choose fuel type from drop down menu	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas	Natural gas
Input waste gas flow rate (scfm)												
Input time running (hours)												
Input waste gas inlet temperature (F)												
Input contaminant concentration (ppmV)												

*(Electric blowers are included in the analysis)

RESOURCE CONSUMPTION

WATER CONSUMPTION	Treatment System 1	Treatment System 2	Treatment System 3	Treatment System 4	Treatment System 5	Treatment System 6	Treatment System 6	Treatment System 6	Treatment System 6	Treatment System 6	Treatment System 6	Treatment System 6
Input total water consumed from potable water treatment facility (gal)												
Input total water disposed to wastewater treatment facility (gal)												

ONSITE LAND AND WATER RESOURCE CONSUMPTION	Entire Site 1	Entire Site 2	Entire Site 3	Entire Site 4	Entire Site 5	Entire Site 6	Entire Site 6	Entire Site 6	Entire Site 6	Entire Site 6	Entire Site 6	Entire Site 6
Input volume of topsoil brought to site (cubic yards)												
Input volume of groundwater or surface water lost (gal)												

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Output Summary Table

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Phase	Activities	GHG Emissions	Total Energy Used	Water Consumption	Electricity Usage	Onsite NOx Emissions	Onsite SOx Emissions	Onsite PM10 Emissions	Total NOx Emissions	Total SOx Emissions	Total PM10 Emissions	Accident Risk Fatality	Accident Risk Injury
		metric ton	MMBTU	gallons	MWH	metric ton	metric ton	metric ton	metric ton	metric ton	metric ton		
ALT 2: No Action & Site Management	Consumables	0.00	0.0E+00	NA	NA	NA	NA	NA	0.0E+00	0.0E+00	0.0E+00	NA	NA
	Transportation-Personnel	2.82	3.6E+01	NA	NA	NA	NA	NA	8.7E-04	2.6E-05	1.3E-04	5.1E-05	4.1E-03
	Transportation-Equipment	0.00	0.0E+00	NA	NA	NA	NA	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Equipment Use and Misc	0.00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	4.5E-06	1.9E-03
	Residual Handling	0.00	0.0E+00	NA	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sub-Total	2.82	3.61E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.75E-04	2.62E-05	1.27E-04	5.52E-05	5.97E-03
ALT 3: Full Removal & Off-Site Disposal	Consumables	3,426.99	5.7E+04	NA	NA	NA	NA	NA	1.1E+01	1.4E+01	4.6E+00	NA	NA
	Transportation-Personnel	48.82	6.2E+02	NA	NA	NA	NA	NA	1.7E-02	5.7E-04	3.2E-03	5.5E-04	4.5E-02
	Transportation-Equipment	0.00	0.0E+00	NA	NA	NA	NA	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Equipment Use and Misc	788.55	1.4E+04	0.0E+00	0.0E+00	3.0E+00	7.5E-01	3.1E-01	4.7E+00	2.0E+00	4.8E-01	2.2E-03	5.7E-01
	Residual Handling	2,047.52	2.7E+04	NA	NA	0.0E+00	0.0E+00	0.0E+00	6.4E-01	1.1E-02	5.7E-02	6.6E-03	5.3E-01
	Sub-Total	6,311.88	9.80E+04	0.00E+00	0.00E+00	2.96E+00	7.54E-01	3.07E-01	1.67E+01	1.55E+01	5.12E+00	9.38E-03	1.15E+00
ALT 4: Partial Removal & 40 CFR Part 761 Cap (Self-Implementing)	Consumables	4,441.42	5.9E+04	NA	NA	NA	NA	NA	9.6E+00	1.0E+01	1.2E+00	NA	NA
	Transportation-Personnel	11.01	1.4E+02	NA	NA	NA	NA	NA	3.7E-03	1.1E-04	5.9E-04	1.6E-04	1.3E-02
	Transportation-Equipment	0.00	0.0E+00	NA	NA	NA	NA	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Equipment Use and Misc	243.49	3.8E+03	0.0E+00	0.0E+00	3.1E-01	8.0E-02	3.2E-02	1.3E+00	7.8E-01	1.2E-01	3.8E-04	9.9E-02
	Residual Handling	381.03	5.0E+03	NA	NA	0.0E+00	0.0E+00	0.0E+00	1.2E-01	2.1E-03	1.1E-02	1.2E-03	9.9E-02
	Sub-Total	5,076.95	6.76E+04	0.00E+00	0.00E+00	3.13E-01	7.96E-02	3.24E-02	1.10E+01	1.08E+01	1.29E+00	1.77E-03	2.11E-01
ALT 5:Partial Remval & Full 6 NYCRR Part 375 Removal (Self-Implementing)	Consumables	4,389.25	5.8E+04	NA	NA	NA	NA	NA	9.4E+00	9.8E+00	1.1E+00	NA	NA
	Transportation-Personnel	10.24	1.3E+02	NA	NA	NA	NA	NA	3.4E-03	1.1E-04	5.7E-04	1.5E-04	1.2E-02
	Transportation-Equipment	0.00	0.0E+00	NA	NA	NA	NA	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Equipment Use and Misc	243.49	3.8E+03	0.0E+00	0.0E+00	3.1E-01	8.0E-02	3.2E-02	1.3E+00	7.8E-01	1.2E-01	3.8E-04	9.9E-02
	Residual Handling	381.03	5.0E+03	NA	NA	0.0E+00	0.0E+00	0.0E+00	1.2E-01	2.1E-03	1.1E-02	1.2E-03	9.9E-02
	Sub-Total	5,024.02	6.66E+04	0.00E+00	0.00E+00	3.13E-01	7.96E-02	3.24E-02	1.08E+01	1.05E+01	1.19E+00	1.77E-03	2.10E-01
ALT 6: No Removal & 40 CFR Part 761 Cap (Risk-Based)	Consumables	4,299.67	5.6E+04	NA	NA	NA	NA	NA	9.1E+00	9.3E+00	8.8E-01	NA	NA
	Transportation-Personnel	9.27	1.2E+02	NA	NA	NA	NA	NA	3.2E-03	8.3E-05	4.2E-04	1.5E-04	1.2E-02
	Transportation-Equipment	0.00	0.0E+00	NA	NA	NA	NA	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Equipment Use and Misc	22.63	5.2E+02	0.0E+00	0.0E+00	1.2E-01	3.1E-02	1.6E-02	1.5E-01	4.3E-02	1.9E-02	3.6E-04	9.4E-02
	Residual Handling	0.00	0.0E+00	NA	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sub-Total	4,331.58	5.67E+04	0.00E+00	0.00E+00	1.24E-01	3.06E-02	1.57E-02	9.23E+00	9.36E+00	9.02E-01	5.14E-04	1.07E-01
ALT 7: No Removal & 6 NYCRR Part 375 Soil Cover (Risk-Based)	Consumables	4,389.25	5.8E+04	NA	NA	NA	NA	NA	9.4E+00	9.8E+00	1.1E+00	NA	NA
	Transportation-Personnel	8.50	1.1E+02	NA	NA	NA	NA	NA	2.9E-03	7.8E-05	4.0E-04	1.5E-04	1.2E-02
	Transportation-Equipment	0.00	0.0E+00	NA	NA	NA	NA	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Equipment Use and Misc	22.63	5.2E+02	0.0E+00	0.0E+00	1.2E-01	3.1E-02	1.6E-02	1.5E-01	4.3E-02	1.9E-02	3.6E-04	9.4E-02
	Residual Handling	0.00	0.0E+00	NA	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sub-Total	4,420.39	5.84E+04	0.00E+00	0.00E+00	1.24E-01	3.06E-02	1.57E-02	9.58E+00	9.80E+00	1.08E+00	5.09E-04	1.06E-01

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Output Summary Figures

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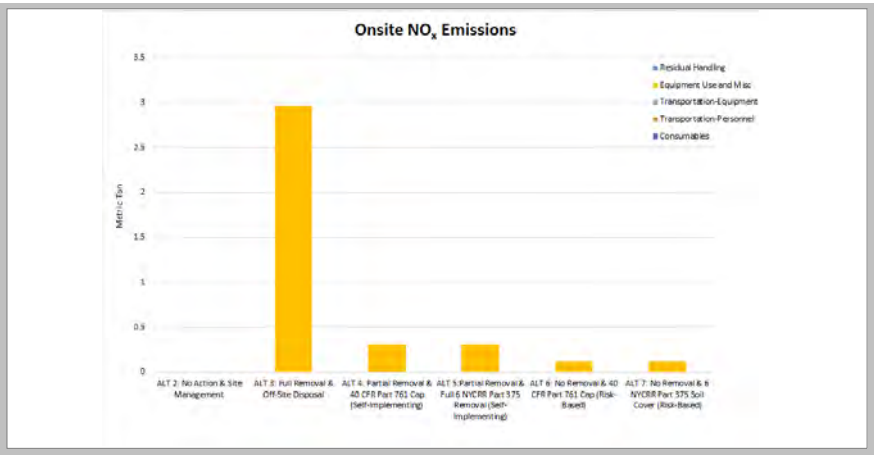
Onsite NOx Emissions
Metric Ton
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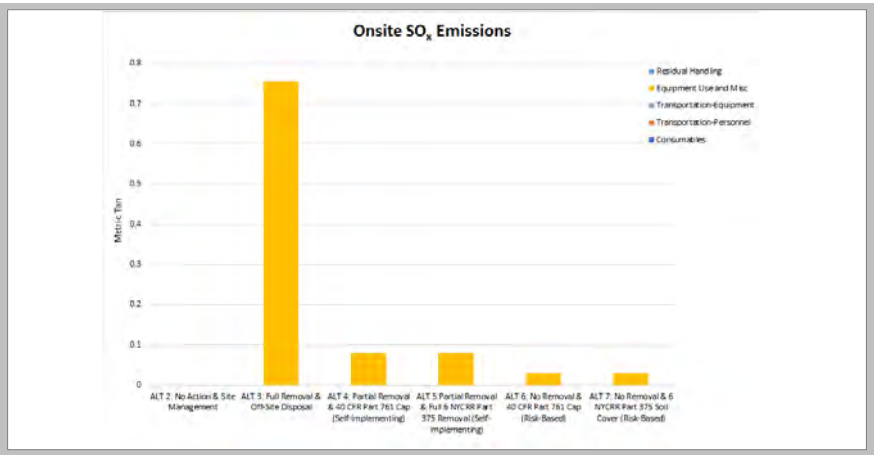
3
2.5
2
1.5
1
0.5
0
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables
ALT 2: No Action & Site Management
ALT 3: Full Removal & Off-Site Disposal
ALT 4: Partial Removal & 40 CFR Part 761 Cap (Self-Implementing)
ALT 5:Partial Removal & Full 6 NYCRR Part 375 Removal (Self-Implementing)
ALT 6: No Removal & 40 CFR Part 761 Cap (Risk-Based)
ALT 7: No Removal & 6 NYCRR Part 375 Soil Cover (Risk-Based)


Onsite SOx Emissions
Metric Ton
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Residual Handling
Equipment Use and Misc
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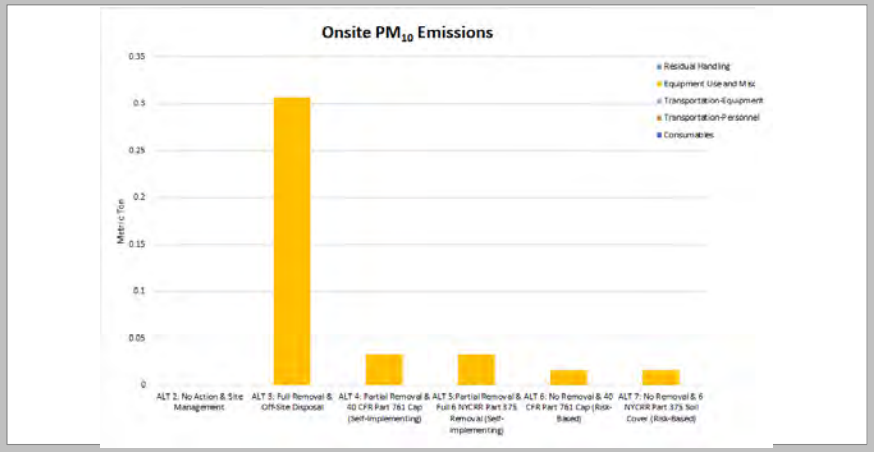
Onsite PM10 Emissions
Metric Ton
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables
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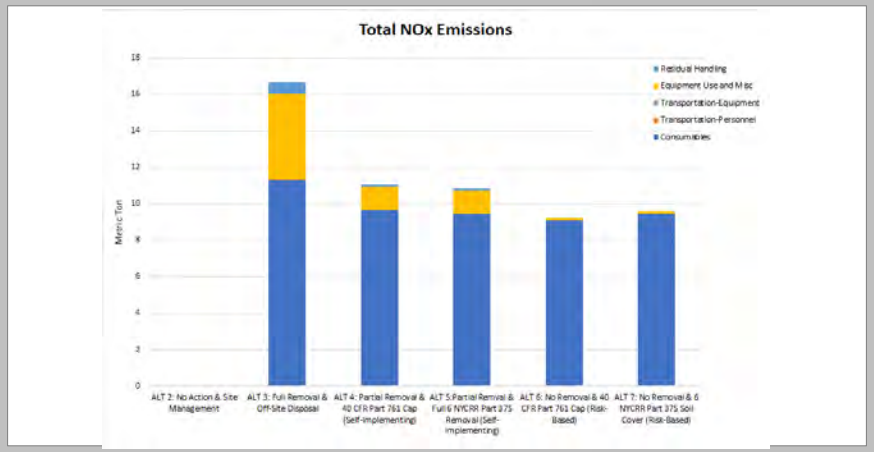
Total NOx Emissions
Metric Ton
18
16
14
12
10
8
6
4
2
0
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables
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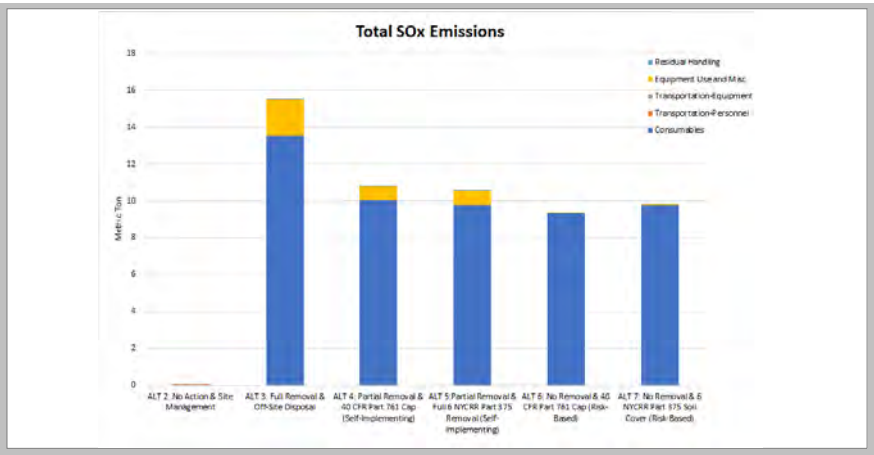
Total SOx Emissions
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables
Metric Ton
0
2
4
6
8
10
12
14
16
18
ALT 2: No Action & Site Management
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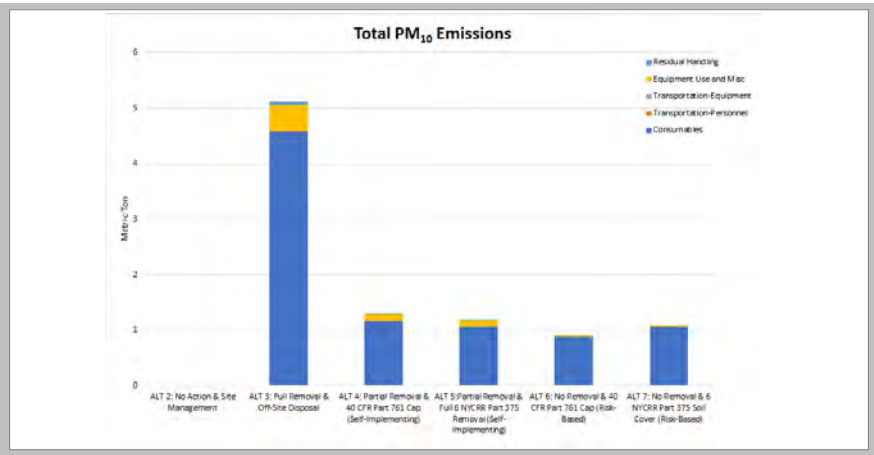
Total PM10 Emissions
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables
Metric Ton
0
1
2
3
4
5
6
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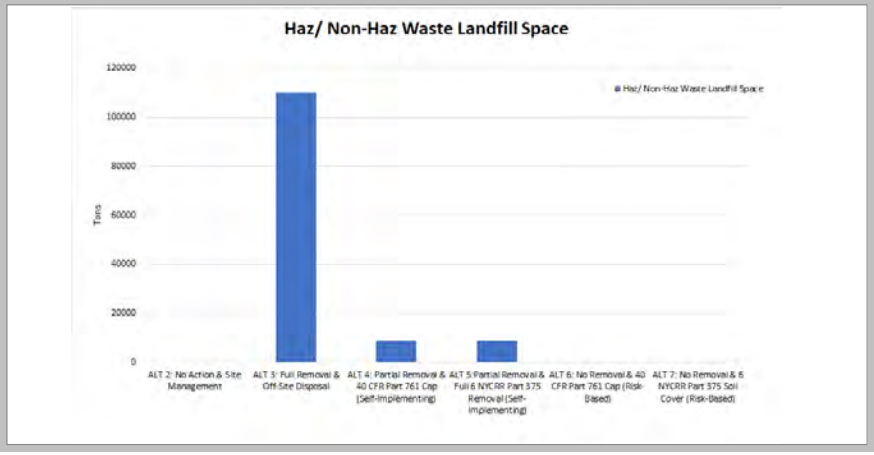
Haz/ Non-Haz Waste Landfill Space
Haz/ Non-Haz Waste Landfill Space
Tons
0
20000
40000
60000
80000
100000
120000
ALT 2: No Action & Site Management
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