DRAFT ANALYSIS OF BROWNFIELD CLEANUP ALTERNATIVES (ABCA)

ANALYSIS OF BROWNFIELD CLEANUP ALTERNATIVES

575 Concord Avenue (Former True Temper Factory)
St. Johnsbury, Caledonia County, Vermont, 05819

Prepared for:

Northeastern Vermont Development Agency
36 Eastern Avenue, Suite 1
St. Johnsbury, Vermont 05819

Prepared by:

Montrose Environmental Services, Inc
100 S. Clinton Ave, Suite 2330
Rochester, New York 14604

January 2026

MONTROSE
ENVIRONMENTAL

PAGE INTENTIONALLY LEFT BLANK

Table of Contents

List of Tables

List of Figures

List of Acronyms and Abbreviations

ABCA	Analysis of Brownfield Cleanup Alternatives
ACM	Asbestos Containing Material
AQRA	Aquatic Resources Assessment
ARA	Archaeological Resources Assessment
BaP	Benzo(a)pyrene
BER	Business Environmental Risks
CAA	Clean Air Act
CAMP	Community Air Monitoring Program
CAP	Corrective Action Plan
CFR	Code of Federal Regulations
CPAI	Clay Point Associates, Inc.
C&D	Construction and Demolition
DNAPL	Dense Non-Aqueous Phase Liquid
ESA	Environmental Site Assessment
ft AMSL	Feet Above Mean Sea Level
ft bgs	Feet Below Ground Surface
FY	Fiscal Year
GES	Groundwater Enforcement Standards
GPS	Global Positioning System
HASP	Health and Safety Plan
HI	Hazard Index
HREC	Historical Recognized Environmental Conditions
HUD	Department of Housing and Urban Development
IDW	Investigation Derived Waste
ICP	Institutional Control Plan
LBP	lead-based paint
LNAPL	Light Non-Aqueous Phase Liquid
mg/L	milligrams per liter
MTBE	Methyl tert-butyl ether
NESHAP	National Emission Standard for Hazardous Air Pollutants
NVDA	Northeastern Vermont Development Association
OHWM	Ordinary High-Water Mark
OM&M	Operation, Monitoring and Maintenance Plan
OSHA	Occupational Safety and Health Administration
PCB	Polychlorinated Biphenyl
PFAS	Per- and Polyfluoroalkyl Substances
PRB	Permeable Reactive Barriers
PVEC	Petroleum Vapor Encroachment Condition
QEP	Qualified Environmental Professional
RBM	Regulated Building Material

REC	Recognized Environmental Conditions
ROW	Right-of-way
SGMP	Soil and Groundwater Management Plan
SMP	Site Management Plan
SQA	Site-Specific Quality Assurance Project Plan Addendum
SSDS	Sub-Slab Depressurization System
TSCA	Toxic Substances Control Act
TEQ	Toxic Equivalency
TCLP	Toxicity Characteristic Leachate Procedure
US	United States
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
UVM CAP	University of Vermont Consulting Archaeological Program
VGES	Vermont Groundwater Enforcement Standards
VSS	Vermont Soil Standards
VTDEC	Vermont Department of Environmental Conservation
VTDOH	Vermont Department of Health

1 INTRODUCTION AND BACKGROUND

This Analysis of Brownfield Cleanup Alternatives (ABCA) has been prepared by Montrose Environmental Solutions, Inc. (Montrose) on behalf of the Town of St. Johnsbury (the "Town") and the Northeastern Vermont Development Agency (NVDA) for the demolition of the structures at, and environmental remediation of, the Former True Temper Factory Site located at 575 Concord Avenue, in St. Johnsbury, Vermont (the "Site"). A map depicting the general location of the Site is attached as **Figure 1** and details of the Site are shown on **Figure 2**.

This ABCA was prepared in part to meet the requirements for submittal by the NVDA of an application for a United States Environmental Protection Agency (USEPA) Brownfields Cleanup Grant as part of the USEPA's Fiscal Year (FY) 2026 Brownfield Cleanup Grant Competition.

The Site is developed with a vacant one-story 29,324± square-foot interconnected former industrial complex previously used for the manufacturing of wood dowels / handles for farming tools. The complex footprint represents approximately 8.75% of the total Site area and the original construction of the complex dates to approximately 1940. The complex was condemned in September 2024 with over 70% of the complex roofing partially or fully collapsed, and a compromised structure. The Moose River is north adjacent to the Site and a delineated wetland occupies the northwestern portion of the Site. Previous environmental investigations have documented substantial anthropogenic fill material (including ash, cinders, metal, brick, concrete, wood, and glassware) of varying degrees throughout the high ground southern area of the Site.

An updated Conceptual Site Model (CSM) was developed as a result of the Supplemental Phase II Environmental Site Assessment (ESA). A wide variety of anthropogenic fill was encountered including ash, cinders, metal, brick, concrete, wood, and glassware. The anthropogenic fill was found to extend from ground surface to depths ranging up to 30 feet below ground surface (ft bgs), with the majority of fill was observed to depths of 7-18 ft bgs. Shallower anthropogenic fill (less than 10 ft) was observed in the central and southern portions of the Site. Debris, including municipal solid waste observed protruding along the embankment and was not observed at depths within the embankment test pits. The extent of other potential debris within the embankment could not be fully delineated at the time of this investigation due to wetland permit approval and location of test pits within the wetland buffer zone.

Ash intermixed with soil was observed within the embankment. Historical fill, as defined in IRule § 35-201(24) (Vermont Department of Environmental Conservation (VTDEC), 2024), was also encountered throughout the Site. Many locations contained this historical fill and/or re-worked native soil consisting of silt, gravel, and cobbles. Underlying the fill and/or re-worked native soil, gray-blue uniform silt with some plasticity was generally encountered and assumed to be native soil. Several fill/soil samples collected as part of this investigation indicated concentrations of common naturally occurring background metals of cobalt, iron, and manganese in exceedance of resident Vermont Soil Standards (VSS) across the Site. Two (2) samples collected from fill with observed petroleum/solvent odors and wood components (REC2-SB103-S and REC2-TP102-D) had detections of lead above the applicable VSS. Arsenic was detected above the urban background VSS (16 mg/kg) on the southwestern corner of the on-Site structure near drum location D1 at REC1-SB107 (23.9 mg/kg) with a soil sample depth of 6-8 ft bgs. A minor polychlorinated biphenyl (PCB) exceedance was detected at REC11-TP102 (0.42 mg/kg) on the western end of the embankments where green/blue paint was observed on concrete buried debris/blocks. This detection is well below the hazardous threshold of 50 mg/kg for PCBs. Benzo(a)pyrene (BaP) and/or the total calculated

toxic equivalency (TEQ) of carcinogenic polycyclic aromatic hydrocarbons (cPAHs) were detected above the applicable VSSs in multiple locations. Naphthalene was detected in one (1) location (REC2-SB108-S collected from 3-5 ft bgs above the applicable VSS.

The water table elevation across the Site ranged from approximately 575.02 feet above mean sea level (ft AMSL) (REC5-MW1) to 596.71 ft AMSL (REC6-10-MW5), or approximately 2.93 to 20.36 ft bgs throughout the Site. Total Per- and Polyfluoroalkyl Substances (PFAS) was detected in monitoring well REC1-MW105 above Vermont Groundwater Enforcement Standards (VGES) and was also detected below VGES at REC1-MW1, REC1-MW103, REC1-MW104, REC1-MW106, and REC1-MW1 which are located upgradient and downgradient of REC1-MW105. Methyl tert-butyl ether (MTBE) was detected in monitoring wells REC2-MW105 and REC6-10-MW2 above VGES. Given the groundwater flow direction, no known on-Site source, and based on historical Site operations, it is suspected that PFAS is from off-Site source(s). Manganese, a common naturally occurring background metal, was detected in exceedance of VGES at six (6) wells across the Site.

The Town is currently purchasing and acquiring the Site from the current owner. The Town will then convey ownership of the property to the NVDA who will be acting as the interim Site owner during remediation. The NVDA will be conveyed title of the property in January 2026.

The goal of the project is to complete a controlled demolition of the condemned on-Site structures, due to the presence of regulated building materials (RBMs), prior to Site remediation to preclude these materials from becoming airborne and creating an environmental risk to demolition workers and the public. Site environmental remediation is required to address the impacted soils, groundwater, fill, and debris to allow for Site re-development into residential housing not to be owner occupied, with a potential for mixed use residential and commercial properties.

Three (3) cleanup alternatives are evaluated based on their anticipated 1) effectiveness, 2) implementability, and 3) cost.

1.1 Site Location

The Site is vacant, comprised of approximately 7.68-acres of land zoned for commercial use and split by a currently inactive railroad right-of-way (ROW). The Site is located on a parcel on Concord Avenue, east of the downtown area of St. Johnsbury, and is surrounded by commercial businesses, existing residential areas, and the Moose River. The Site location, combined with the high ground area outside of the on-Site wetland, make it an ideal location for future development of housing.

The location of the Former True Temper Site, including general boundaries, is shown on **Figure 1** and the Site details are shown on **Figure 2**.

1.2 Physical Setting

1.2.1 Topography

The Site is located in the “St. Johnsbury VT” 7.5m quadrangle; elevations generally range between 565 and 614-ft AMSL. Site topography is relatively level in the area of the on-Site structures and across the southern half of the Site, then abruptly decreases in elevation due to an embankment towards the Moose River. Elevation dips by

approximately 40-ft from the top of the embankment north towards the Moose River. An on-Site wetland is located to the north and west of the toe of the embankment (see **Figure 2**).

Based on review of the Federal Emergency Management Agency's (FEMA) National Flood Insurance Program Flood Hazard Boundary Mapping Flood Maps | FEMA.gov, the Site is located where no digital data is available. A 1990 Site Survey conducted by Truline Land Surveyors of St. Johnsbury, Vermont, identified a 100-year flood limit within the on-Site wetlands. This flood limit does not appear to encroach upon the developable high ground land of the Site.

1.2.2 Soils

Based on previous investigations as detailed in **Section 1.5**, the Site is characterized with re-worked native soil consisting of silt, gravel, and cobbles. A wide variety of anthropogenic fill was encountered including ash, cinders, metal, brick, concrete, wood, and glassware. The anthropogenic fill was found to extend from ground surface to depths ranging up to 30 ft bgs, with the majority of fill observed from 7-18 ft bgs. Shallower anthropogenic fill (less than 10 ft) was observed in the central and southern portions of the Site. Underlying the fill and/or re-worked native soil, gray-blue uniform silt with some plasticity was generally encountered and assumed to be native soil. Bedrock composition has not been encountered in Site investigations. According to Phase I ESAs completed for the Site, the Site is located within the rhythmically graded member of the Connecticut Valley Trough (Gile Mountain Formation) characterized by light to medium-gray, fine-grained micaceous quartzite to dark-gray muscovite-quartz-biotite carbonaceous phyllite or schist in beds 10 to 25 cm thick and dark-gray micaceous phyllite or schist containing beds of micaceous quartzite.

1.2.3 Groundwater

Groundwater elevations are expressed in ft AMSL and Light or Dense Non-Aqueous Phase Liquids (LNAPL or DNAPL) were not detected during Site groundwater sampling events. The water table elevation across the Site ranged from approximately 575.02 ft AMSL to 596.71 ft AMSL, or approximately 2.93 to 20.36 ft bgs throughout the Site, in July of 2025. The groundwater contour map indicates that groundwater is highest on the southeast side of the Site and flows to the northwest towards the on-Site wetlands and the Moose River beyond.

1.2.4 Surface Water

Surface water has been previously documented within the on-Site wetland, discharging to the Moose River. Due to dry summer conditions, surface water ponds were not observed throughout the wetland, although dry pond beds were observed. A culvert and stream run along the western boundary of the Site and discharges into the Moose River.

1.2.5 Wetland Surface Soils

Soils within the previously identified wetland areas from the proposed locations were investigated. While no standing water or saturated surface soils were observed during the time of this investigation due to dry weather, it was evident that the area had previously contained water. Due to the absence of standing water, the samples were re-classified as surface soil samples for the purpose of this report and compared to VSS.

1.3 Site History

The developed portion of the Site is comprised of an approximately 29,324 square-foot vacant single story interconnected former industrial complex previously used for the manufacturing of wood dowels / handles for farming tools and the original construction of the complex dates to approximately 1940. The currently undeveloped portion of the Site was historically used for Site manufacturing operations from approximately the late 1800s, including the storage of wood on the western half of the Site. On-Site operations and manufacturing continued until circa 1989.

1.4 Site Assessment History

Numerous Site assessments have been completed at the Site. The following Site assessments are summarized in further detail in the Montrose Phase II ESA report (Montrose, 2024b), Supplemental Phase II ESA Site-Specific Quality Assurance Project Plan Addendum (Site-Specific Quality Assurance (SQA); Montrose, 2025a), and the Supplemental Phase II ESA report (Montrose, 2025c).

1.4.1 Environmental Site Assessments

Previous Phase I, II, and III ESAs were conducted by The Johnson Company, Inc. and documented in a report dated February 1990 (The Johnson Company, 1990). The assessments revealed the following conclusions and recommendations:

- These investigations identified MTBE and acetone in groundwater at concentrations exceeding VGES.
- The findings resulted in the listing of the Site on Vermont's Hazardous Sites List and the Johnson Company concluded that while several compounds had been detected, it had not resulted in significant environmental degradation and VTDEC determined at the time that Site management activities were complete.

A Phase I ESA was completed for the Site by Stantec and documented in a report dated October 7, 2022 (Stantec, 2022). Stantec performed the Phase I ESA in conformance with the scope and limitations of ASTM Standard E1527-13. The assessment revealed the following Recognized Environmental Conditions (RECs), Historical RECs (HRECs), and Business Environmental Risks (BERs):

- **REC #1/Potential Vapor Encroachment Condition (PVEC) #1 – Observed On-Site Petroleum and Hazardous Substance Storage:** Approximately 70, 55-gallon drums were observed on the Site. The presence of drums and other containers storing various hazardous substances and petroleum products in at least eight (8) locations, combined with observed releases from one (1) or more drums, was considered to be a REC and a petroleum vapor encroachment condition (PVEC).
- **REC #2 – Evidence of On-Site Filling:** The evidence of widespread fill materials of unknown origin to depths up to 16-ft, combined with the presence of observed waste materials within at least some areas of fill, has the potential to have resulted in impacts to soil and groundwater at the Site.
- **REC #3 – Adjacent Junkyard with Debris Encroachment – 34 Ely Street:** On aerial photographs dated 1979 through 2006, and during the 2022 Site visit, debris from what appears to be a junkyard on the east adjacent property is visibly encroaching on the northeastern corner of the Site. The metal debris included automobile parts, appliances, multiple 55-gallon drums, other metal storage containers, and an old gasoline pump. The presence of a historical junkyard on the adjacent property, with some areas of debris

having encroached on the Site, has the potential to have resulted in impacts to soil and groundwater at the Site.

- **REC #4 – Former On-Site Rail Spur and Adjacent Railroad Right-of-Way:** A non-operational railroad line is located adjacent the Site's southern boundary between Lot #1 and Lot #2. From 1900 until at least 1983, this railroad line operated by the Maine Central Railroad Company. The long-term presence and operation of a railroad line adjacent to the Site as well as railroad siding within the Site limits has the potential to have resulted in contaminant releases to soil on the Site.
- **REC #5 – Evidence of On-Site Disposal of Boiler Ash:** Historical information obtained from the 1990 ESA indicated the boiler house was primarily fueled by wood; however, the former use of coal and/or motor oil cannot be eliminated based on currently available information. The long-term operation of the boiler and the known or suspected materials that were incinerated therein (wood fuel, potential coal fuel, and potential waste oil), combined with the apparent extensive on-Site disposal of ash from the boiler has the potential to have resulted in impacts to soil and groundwater at the Site.
- **REC #6/PVEC #2 – Upgradient Former Bulk Fuel Storage Depot – 535 Concord Avenue:** This upgradient property is shown on historical Sanborn® fire insurance maps dated 1943-1964 as being a bulk fuel depot with six (6) to 11 petroleum aboveground storage tanks (ASTs). Based on the proximity to the Site and estimated hydraulically upgradient location, this former facility has the potential to have impacted the Site.
- **REC #7/PVEC #3 – Upgradient Former Gas Station/Auto Repair Facility – 599 Portland Street:** This upgradient property is documented as a gas/service station in historical records dated from 1943-1966 and continued in use as an auto repair facility through at least 2000.
- **REC #8/PVEC #4 – Upgradient Former Dry Cleaner and Filling Station – 642-648 Portland Street:** This upgradient property was subject to a wide range of commercial and industrial uses, including a carriage works, blacksmith shop, paint shop, woodworking shop, auto storage garage, junk yard, drycleaner, auto parts store, and filling station. Use as a filling station extended from at least 1943-1964 and included the presence of at least two (2) gasoline underground storage tanks (USTs). Records reviewed in the October 2022 Phase I ESA documented use as a dry cleaner from at least 1989-1995.
- **REC #9/PVEC #5 – Upgradient Former Gas Station – 667 Portland Street:** Historical maps dated 1919 through 1958 show the presence of up to three (3) gasoline USTs at this property and/or label it as a filling station.
- **REC #10/PVEC #6 – Upgradient Former Gas/Service Station – 709 Portland Street:** This property is shown on a historical map dated 1943 as being an auto sales and service facility with two (2) gasoline tanks. Environmental records document the removal of three (3) petroleum USTs in 2013 (2000-gallon gasoline UST, 4,000-gallon gasoline UST, and a 550-gallon heating oil UST).
- **HREC #1 –PCE in Soil:** As documented in the February 1990 ESA, tetrachloroethylene (PCE) was detected in Site soils below current applicable cleanup standards at TP-1.
- **BER #1 - Historical On-Site Industrial Activities:** The types of businesses and industrial processes performed at the Site (primarily the manufacturing of wooden tool handles through a process that included storage of timber, wetting of timber with water, milling of handles, use of a kiln to dry the handles, and storage of handles) are not commonly associated with having significant potential for on-Site releases of petroleum and/or hazardous substances. However, industrial use of the Site potentially dates back more

than 140 years to 1880 when the subject property was reportedly acquired by the Eli Hoe and Fork Company.

- **BER #2 – Regulated Building Materials (RBMs):** Based on the reported date of construction of the buildings at the Site (circa 1940), it is likely that asbestos containing materials (ACM), lead-based paint (LBP), and other hazardous building materials were used in construction or maintenance of the buildings. These materials require a RBM survey to be completed in conjunction with future renovation or demolition of the buildings.

Montrose implemented a Phase II ESA from January to May 2024 and submitted a Phase II ESA report dated October 1, 2024, to VTDEC (Montrose, 2024a). The assessment revealed the following conclusions and recommendations:

- These investigations identified elevated metals and semi-volatile organic compounds (SVOCs) above VSS within Site soils and elevated volatile organic compounds (VOC), PFAS, and metals in Site groundwater above VGES. VOCs were not detected in Site soils. A wide variety of anthropogenic fill was encountered including ash, cinders, metal, brick, concrete, wood, and glassware.
- Completion of structural assessments by a Professional Engineer licensed in the State of Vermont of the collapsing buildings including evaluating structural conditions of the brick smokestack and adjoining boiler room for potential reuse as part of the Site's redevelopment.
- Demolition, removal, and off-Site disposal at a permitted landfill of the buildings and demolition debris in accordance with applicable regulations given the presence of RBMs.
- Obtain a permit to allow intrusive work on the fill embankment, located within the wetland buffer.
- Following completion of the above activities, it was recommended a Supplemental Investigation be performed.
- During the property boundary survey, non-contiguous Lot #2 located south of the former railroad was identified as part of the Site. Lot #2 was identified as an easement to Lenahan who owns an adjacent automotive repair facility. Given the proximity of this Site to the automotive repair facility and easement to that facility, there is potential for impacts to be present on this lot. It was recommended that it be assessed through the installation of one (1) soil boring and groundwater monitoring well with the collection and laboratory analyses of soil and groundwater samples.
- Results from surface soil (0-1.5 ft bgs) samples collected across the Site were evaluated using the method 2 cumulative risk assessment (CRA). The CRA found exceedances of the hazard index (HI) in 14 of the 15 surface soil samples collected across the Site. Given these findings, it was recommended that during redevelopment, surface soil across the Site be capped in accordance with VTDEC's IRule or removed and the top 18" be backfilled with clean fill in order to protect future Site occupants.

Montrose completed a Phase I ESA for the Site and submitted a report dated June 2025 (Montrose, 2025b). Montrose performed the Phase I ESA in conformance with the scope and limitations of ASTM Standard E1527-21. The assessment revealed the following RECs, and BERs:

- **REC #1 – Observed On-Site Petroleum and Hazardous Substance Storage:** Drums located within the interior of the building footprint, a basement, and other potential and unidentified interior conditions could not be assessed given the buildings' structural conditions. The vertical and horizontal extent of BaP and naphthalene impacts in the vicinity of drum D5 remains a data gap.

- **REC #2 – Historical On-Site Filling:** A wide variety of anthropogenic fill was encountered during the 2024 Phase II ESA throughout the Site including ash, white ash (potentially chrysotile which is a form of asbestos), coal/charcoal/coal slag, metal, brick, concrete, and wood. The vertical and horizontal delineation of on-Site fill remains a data gap.
- **REC #3 - Adjacent Junkyard and Historical Debris Encroachment:** Potential groundwater impacts remain a data gap due to the inability to sample a groundwater monitoring well along the subject property boundary with the dump site.
- **REC #4 – Evidence of On-Site Disposal of Boiler Ash:** The 2024 Phase II ESA investigated and observed ash, but significant impacts were not found. The vertical and horizontal delineation of the observed ash remains a data gap.
- **REC #5 – Off-Site Properties with Historical Potential Contamination:** Nearby parcels were identified as potential off-Site sources of groundwater impacts due to historical Site uses. The 2024 Phase II ESA investigated the potential impacts from these sites. Due to the addition of Lot #2 to the subject property, the Supplemental Phase II ESA SQA work plan prepared for field mobilization, will investigate potential off-Site contamination in Lot #2. Off-Site parcels identified as potential contamination sources are listed in the Phase I report (Montrose, 2025b).
- **BER #1 – Regulated Building Material:** Due to the confirmed presence of RBMs and the condemned building status, the planned future demolition of the building will require a controlled demolition in accordance with Vermont regulations.
- **BER #2 – Former On-Site Rail Spurs and Adjacent Historical Railroad Right-of-Way:** The 2024 Phase II ESA investigated potential impacts from the historical railroad ROW and railroad spur and concluded that impacts were not identified but future redevelopment should include the removal and proper disposal of railroad ties if found.

Montrose implemented a Supplemental Phase II ESA in July 2025 and submitted a Phase II ESA report dated December 2025, (Montrose, 2025c) to VTDEC. The Supplemental Phase II Report is currently being reviewed by VTDEC. The assessment revealed the following conclusions and recommendations:

- These investigations identified elevated metals and SVOCs above VSS within Site soils and elevated VOC, PFAS, and metals in Site groundwater above VGES. VOCs were not detected in Site soils. A wide variety of anthropogenic fill was encountered including ash, cinders, metal, brick, concrete, wood, and glassware.
- Controlled (Asbestos) Demolition of the condemned on-Site structures in accordance with applicable regulations given the presence of RBMs, and the removal and off-Site disposal of the structure building material and footers at a permitted landfill. This includes excavation and off-Site disposal of 6-inches of surface soil around their perimeters to remove potential fugitive asbestos materials resulting from the historical uncontrolled collapse and portions of the exposed debris.
- Obtain a Vermont Individual Wetland Permit to clear and grub vegetation, remove exposed debris and complete restoration along the on-Site embankments located within the wetland buffer. The restoration would include covering the areas of exposed ash with 6-inches of topsoil and hydroseed.
- To mitigate exposure to the single PCB soil exceedance and widespread metals/SVOC soil impacts above the Residential and Urban VSS at variable depths across the Site, an engineered, VTDEC approved soil cap would be installed comprised of 14-inches of clean imported soil, plus 4-inches of topsoil and hydroseed

over the developable area not covered by proposed building footprints, roadways, parking lots, sidewalks, or landscaping.

- As part of the new development, no basements are proposed, and the new housing units would consist of slab-on-grade construction. It is recommended that future residential buildings include a passive sub-slab depressurization system (SSDS) with the capability to be upgraded to an active system. The SSDS will be monitored periodically to ensure complete building footprint depressurization and to monitor if the system state (passive or active) requires modification.
- Residual soil and groundwater impacts will remain, therefore as part of Site redevelopment, an Institutional Control Plan (ICP) will be required to identify restrictions to ensure protection of human health and the environment. The ICP will include a description of residual impacts, restrictions, controls, and the means to ensure the effective controls remain in-place, including a notice to Land Records and a deed restriction to limit the use of on-Site groundwater. In addition, a Soil and Groundwater Management Plan (SGMP) and an Operation, Monitoring and Maintenance Plan (OM&M) will be required for the SSDSs and the engineered cover systems.
- Prior to future Site redevelopment, Montrose proposed to develop a Corrective Action Plan (CAP) as detailed in IRule § 35-606 (VTDEC, 2024), and include the above proposed remedial measures, for review and approval by VTDEC.

1.4.2 Regulated Building Materials Surveys

The RBM survey was conducted by Clay Point Associates, Inc (CPAI) on May 14 and 15, 2024 (CPAI, 2024a, 2024b, 2024c). The survey included an asbestos inspection, collection of paint chip samples for Toxicity Characteristic Leaching Procedure (TCLP) lead analysis, and PCB building material inspection.

- Confirmed ACM included mortar, window glazing, roofing materials, cement pipe and cement flashing.
- One of the composite TCLP lead samples collected from the existing collapsed building debris was detected above the hazardous threshold of 5 milligrams per liter (mg/L). This area was further characterized and described below.
- One paint sample collected for PCB analysis had detectable concentrations of PCBs (40.5 mg/kg). Further characterization of this paint and concrete substrate was recommended by CPAI.

A supplemental RBM survey was conducted by CPAI on November 15, 2024 (CPAI, 2024d). The survey included the collection of three (3) composite TCLP Lead samples of representative building materials comprising of the future waste stream to be generated during planned demolition of the on-Site structures. The lead hazardous threshold is 5 mg/L, a concentration in exceedance of the threshold is considered lead hazardous waste. Samples 16152-TCLP4 (31.9 mg/L) and 16152-TCLP5 (7.27 mg/L) were in exceedance of the lead hazardous threshold. As such, it is assumed that the southern half of the compromised east building will be transported and disposed as lead hazardous waste.

1.4.3 Structural Assessment

On September 11, 2024, Engineering Ventures conducted a structural assessment of the on-Site building conditions and delivered a report to Montrose dated September 13, 2024. The findings are detailed below:

- Interior access was limited due to some of the structures being fully or partially collapsed.

- The interior of standing structures was observed to show serious signs of deterioration.
- Engineering Ventures deemed the remaining standing structures as not safe to work in and should be demolished prior to any work being completed within the footprint of the buildings.

1.4.4 Resources Assessments

Montrose performed an Aquatic Resources Assessment (AQRA; Montrose, 2023a) on October 23, 2023, to assist with the development of the 2024 Phase II ESA scope of work. It is noted that this survey, performed in late October, was constrained by project schedule goals when many of the herbaceous species lacked diagnostic features and when many trees had lost their leaves, making vegetation identification more challenging.

The intent of the assessment was to identify wetland areas and buffers for avoidance during the 2024 Phase II ESA. It is noted that an aquatic resource (preliminary jurisdictional or jurisdictional) delineation for submittal to the United States Army Corps of Engineers (USACE) was not prepared under this scope of work.

- During the AQRA, the parcel was searched for evidence of wetland indicators such as hydrophytic vegetation, ponding, or saturated conditions. Evidence of the ordinary high-water mark (OHWM) as indicated by the presence of bed/banks, scour lines, change in vegetative cover, changes in soil texture, presence of leaf litter and debris deposits was mapped along channels and ponds. The OHWM was used to determine the extents of potential non-wetland wastes.
- The locations of wetlands boundaries and OHWM were mapped using the ESRI, Inc. Field Maps application on a mobile tablet device. Global positioning system (GPS) data were imported into ArcGIS software for developing aquatic resources. Georeferenced high-resolution aerial photographs and elevation data were also used to interpret boundaries of potential wastes and wetlands in conjunction with on-Site data.
- The AQRA identified surface water features including a perennial stream, two (2) intermittent streams, two (2) ditches, one (1) ponded area, and wetland areas. A total of approximately 0.9-acres of surface water wetlands were mapped within the parcel.

Stone Environmental conducted a Site visit with a representative from VTDEC on May 13, 2025, to delineate wetland areas at the Site. Wetland delineation boundaries from the 2023 AQRA conducted by Montrose were revised. The wetland was classified as a Class II wetland and included a 50-foot wetland buffer.

An Archaeological Resources Assessment (ARA) was conducted to obtain clearance from the Vermont Department of Historical Preservation (University of Vermont Consulting Archaeological Program [UVM CAP], 2025). Below is the conclusion and recommendation from the ARA:

- Based on the results of the ARA, the UVM CAP recommends a Phase I Site Identification Survey be conducted within the archaeologically sensitive areas to be affected by ground disturbance activities planned within the Area of Potential Effects (APE). This work will be done to determine the presence/absence of precontact era Native American and/or historic sites prior to project construction. The central, southwest, and eastern segments of the APE are not archaeologically sensitive and no further archaeological research is recommended for these areas. Because the location of the APE segments are along the Moose River and within the on-Site wetland, and that no remediation or redevelopment is planned for these areas, there is no additional research or work required related to this ARA for preferred Alternative 2; but would be required prior to remediation of the wetlands as identified in Alternative 3.

2 PROJECT GOAL AND RE-USE PLAN

The purpose of this ABCA is to outline the demolition of structures and environmental cleanup alternatives for the Site and to inform selection of an alternative that will best advance the Town's and NVDA's goal of redeveloping the area as part of the revitalization of the Town of St. Johnsbury, Vermont. The current planned use for the Site is to demolish the existing condemned structures, conduct environmental remediation, and redevelop the Site into residential housing not to be owner occupied, with a potential for mixed use residential and commercial properties. It is noted that due to the condemned status of the on-Site structures, it is anticipated to undergo a controlled demolition without prior RBM abatement.

USEPA brownfield cleanup funding will be used for the Site's demolition, environmental remediation, and re-development to support the Town's and NVDA's goal for the development of underutilized parcels into housing which would result in an array of economic benefits including local demolition and construction jobs, an increase in property values, and quality of life for residents.

3 APPLICABLE REGULATIONS AND CLEANUP STANDARDS

3.1 Cleanup Oversite Responsibility

The agreed upon interim owner of the Site, the NVDA, is responsible for any environmental cleanup, including that which is related to the demolition of buildings at the Site in accordance with applicable laws and regulations.

3.2 Cleanup Standards for Major Contaminants

3.2.1 Cleanup Standards for Major Contaminants in Soil

Soil results are being compared to VSS, Investigation and Remediation of Contaminated Properties Rule, February 24, 2024, §35-APX-A1 - Soil Standards (VTDEC, 2024).

3.2.2 Cleanup Standards for Major Contaminants in Groundwater

Groundwater results are being compared to VTDEC Chapter 12 of the Environmental Protection Rules: Groundwater Protection Rule and Strategy, dated July 6, 2019, Appendix 1, Table 1: Groundwater Enforcement Standards (GES), Vermont Action Levels, and Preventative Action Levels (VTDEC, 2019).

3.3 Laws and Regulations Applicable to the Cleanup

For the purposes of evaluating cleanup alternatives in the ABCA, it is assumed that the goals for redevelopment will include demolition and complete removal of existing structures; removal of waste and debris from the embankment; excavation and off-Site disposal of impacted soils that cannot be managed on-Site; installation of a surface soil cap outside of future Site redevelopment buildings/driveways/parking/sidewalks and landscaped areas; along with institutional and engineering controls, demonstrating the concentrations of hazardous constituents do not exceed VTDEC applicable cleanup standards for the Site's intended re-use.

Federal and State applicable laws and regulations for ACMs, lead, PCBs, and other hazardous materials associated with building demolition; as well as contaminated soil and groundwater cleanup at the Site include the following.

3.3.1 Asbestos Laws and Regulations

Asbestos is regulated by the USEPA National Emission Standard for Hazardous Air Pollutants (NESHAP), the Toxic Substances Control Act (TSCA), the Clean Air Act (CAA), and Vermont Department of Health (VDOH), Division of Environmental Health, Vermont Regulations for Asbestos Control, Vermont Statutes Annotated (V.S.A.) Title 18. Chapter 26.

To protect construction workers, all asbestos abatement work must be performed in accordance with US Occupational Safety and Health Administration (OSHA) asbestos regulations as promulgated in Title 29 of the Code of Federal Regulations (CFR), Section 1926.1101. An asbestos notification must be sent to VTDOH 10-working days prior to starting the Work.

3.3.2 Lead Laws and Regulations

The United States Department of Housing and Urban Development (HUD) promulgates the rules for evaluating and controlling lead-based paint hazards commonly referred to as Title X (ten). Although HUD Title X specifically focuses on residential housing and child-occupied facilities, the evaluation framework promulgated by HUD for lead paint evaluation is the generally accepted guideline for performing paint surveys/inspections.

Further, to protect construction workers, lead-related work must be performed in accordance with Vermont (VT) Lead Safe Work Practices per Chapter 6 – Vermont Regulations for Lead Control, VTDOH, July 1, 2024, and the US OSHA lead regulations as promulgated in 29 CFR, Sections 1926.62.

3.3.3 Wetland Laws and Regulations

VTDEC has outlined requirements for work within regulated wetland areas per Vermont Code Regulation 12 004 056 - Vermont Wetland Rules, VTDEC, Updated February 12, 2023. These regulations are enforced to protect ecological and water resources and regulate activities within wetland boundaries and associated buffer zones. These regulations also include provisions for permits, compliance, and enforcement to ensure that activities do not negatively impact wetlands or their functions.

Work must be performed in conformance with Vermont's wetland laws and regulations. In addition, the Contractor must obtain a Wetland Permit to perform work within the wetland areas or buffer zones.

3.3.4 Other Hazardous Materials

USEPA regulations specify requirements for managing the following hazardous materials: PCBs, batteries, pesticides, mercury-containing equipment, lamps, household hazardous waste, and conditionally exempt small quantity generator waste. In addition to the USEPA universal waste regulations, the following Federal regulations may also include, but are not limited to the following:

1. Applicable Federal OSHA regulations.
2. Title 40, Code of Federal Regulations, Part 61 Subpart M – NESHAP.
3. Title 40, Code of Federal Regulations, Part 260 – Hazardous Waste Management System.
4. Title 40, Code of Federal Regulations, Part 261 - Identification and Listing of Hazardous Waste.
5. Title 40, Code of Federal Regulations, Part 262 - Standards Applicable to Generators of Hazardous Waste.
6. Title 40, Code of Federal Regulations, Part 264 - Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities.
7. Title 40, Code of Federal Regulations, Part 265 - Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities.
8. Title 40, Code of Federal Regulations, Part 273 -Standards for Universal Waste Management.
9. Title 40, Code of Federal Regulations, Part 268 - Land Disposal Restrictions.
10. Title 40, Code of Federal Regulations, Part 761 - Polychlorinated Biphenyls Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions.
11. Title 49, Code of Federal Regulations, Parts 100-199 - Transportation of Hazardous Materials.

4 EVALUATION OF CLEANUP ALTERNATIVES

4.1 General Cleanup Considerations

Following is a discussion of some key redevelopment, Site attributes, and other considerations relevant to selection and evaluation of cleanup alternatives for the Site.

1. The baseline "No Action" alternative is required to be considered as one of the alternatives.
2. The NVDA and the Town have been planning for future use of the Site for residential housing and potential mixed-use commercial/residential use. Alternatives will be evaluated based on their impact to facilitate the proposed redevelopment.
3. The Site structures have been condemned and are unsafe to enter; thereby demolition via controlled demolition with asbestos managed in-place. Otherwise, to allow abatement of asbestos prior to demolition, the buildings would need to be structurally supported to allow workers to enter safely.
4. The southern and middle sections of the Site's compromised east building exhibited a hazardous TCLP concentration of lead > 5.0 mg/L. As such, it is assumed that half of the compromised east building will be transported and disposed as lead hazardous waste with additional impacts from friable and non-friable asbestos. An estimated 250 tons was used in the Opinion of Probable Cost for Alternatives 2 and 3.
5. Complete demolition of all structures is required.
6. Workers performing intrusive activities at the Site must be certified by VTDOH to carry out asbestos removal/abatement and conform to USEPA laws related to asbestos and the potential danger from handling asbestos during abatement.
7. It is assumed that waste from the Site, if removed for disposal, will be taken to the Casella's Coventry landfill for non-hazardous waste and Waste Management Emelle in Alabama for hazardous waste.
8. Due to the deteriorated nature of existing Site structures, friable asbestos within these structures is likely to have impacted adjacent surface soils. As such, the alternatives will include remediation of surface soils to 0.5 feet bgs within 25 feet from building footprints.
9. With Site groundwater exhibiting elevated VOC concentrations, there is potential for future vapor intrusion concerns in new constructions, therefore SSDS installation is included in the alternatives. SSDS design is not included in this analysis report but will need to be fully developed prior to redevelopment.
10. The Site embankment is located within wetland buffer zones. Work within wetland areas and buffer zones will require a VTDEC Wetland Permit.
11. No records are available to indicate the vertical extent of debris along the Site embankment. It is assumed that complete removal of debris along the embankment would require removal to 3 feet bgs.
12. The vertical extent of impacts has not been delineated in Site soils and will require soil verification samples to evaluate complete removal of impacted soils.
13. Due to the relatively low exceedances in Site groundwater (significantly less than an order of magnitude greater than applicable VGES), passive remedial technologies were considered.

4.2 Cleanup Alternatives Considered

Based on the general cleanup considerations presented in Section 4.1, the following three (3) remedial alternatives were considered.

- Alternative 1: No Action.

- Alternative 2: Controlled Demolition with Off-Site Disposal of Hazardous Waste, Embankment Surface Remediation, Limited Impacted Soils Excavation and Off-Site Disposal, and Installation of Surface Soil Cap.
- Alternative 3: Controlled Demolition with Off-Site Disposal of Hazardous Waste, Complete Embankment Remediation, Complete Impacted Soils Excavation and Off-Site Disposal, Wetland Remediation and Restoration, and Impacted Groundwater Remediation.

4.2.1 Alternative 1 – No Action

The "no action" scenario is required by the USEPA ABCA process. No action (e.g., not demolishing the structures and removing the hazardous waste, removing waste and debris, and remediating soil and groundwater at the Site) is the baseline against which all other alternatives will be measured.

4.2.2 Alternative 2 – Controlled Demolition with Off-Site Disposal of Hazardous Waste, Embankment Surface Remediation, Limited Impacted Soils Excavation and Off-Site Disposal, and Installation of Surface Soil Cap

Controlled demolition must be performed by appropriately licensed abatement contractor with a written notification to VTDOH of planned removal activities at least 10 working days prior to the commencement of asbestos removal/abatement activities. This section includes installation of erosion and sediment controls (i.e., structural barriers, silt soxx, silt fence, etc.), utility terminations, universal wastes, and orphan drum removal. Prior to demolition, dewatering is anticipated in the basement of existing structures to remove standing water, followed by treatment via bag filter with granular activated carbon and discharge to sewer. Additional dewatering may be required during demolition and impacted soils remediation to keep excavations dry. Controlled demolition will be performed using wet methods to control friable asbestos containing fugitive dust emissions. Waste resulting from controlled demolition will be transported and disposed as Bulk Load ACM except for building materials exhibiting a lead TCLP > 5.0 mg/L which must be handled and disposed as hazardous lead impacted waste. Lead abatement includes excavation, loading, transportation, and disposal of lead impacted construction and demolition (C&D) debris from the compromised east building. Based on the sampling results described in **Section 1.4.2**, it is estimated that the southern half of the compromised east building will be disposed as hazardous waste totaling approximately 250 tons. All hazardous waste will be transported and disposed at Waste Management RCRA/TSCA Facility in Emelle, Alabama. Upon completion of demolition, all structures will be backfilled with clean structural fill and graded, followed by topsoil and hydroseed. Imported soil fill shall be analyzed for applicable VTDEC criteria for unrestricted use.

In order to perform intrusive work within the wetland buffer areas including the Site embankment, a Vermont Wetland Individual Permit must be obtained from VTDEC. Surface remediation of the embankment includes first clearing of all trees and brush necessary to access exposed surface debris. The embankment is approximately 641 feet in length extending approximately 30 feet from the southern leading edge. Exposed debris will be removed to 1-foot bgs, assumed to be non-hazardous, and will be disposed at Casella's Coventry Landfill. An estimated 801 tons of debris are anticipated for excavation, transportation, and disposal. Restoration of the embankment includes utilizing existing soils to cover exposed ash and uniformly slope the embankment followed by the placement of four inches of topsoil. The slope will then be stabilized using jute-mat and hydroseed.

Limited excavation and off-Site disposal of impacted soils will be completed in three (3) phases. The first phase includes removal of ACM impacted surface soils 25 feet around the perimeter of building footprints to a depth of

0.5 ft bgs. ACM impacted soils will be transported to Casella's Coventry Landfill for disposal. The second and third phases are included as a contingency to manage impacted soil "hot spots" that cannot be managed in place. The second phase of soil remediation includes the removal of existing soil to access underlying grossly contaminated soils. These soils are assumed to meet VSS resident standards and will be staged for later use as backfill. The third phase also includes a contingency (two-150 cubic yard areas) for any grossly contaminated areas that may be identified during removal of Site soils which cannot be managed on-Site, if any.

This alternative would consist of placing a surface soil cap throughout the re-developable high ground area of the Site to eliminate/minimize exposure and direct contact, while leaving the existing waste and soil contamination in-place (i.e., engineering controls). Alternative 2 also includes institutional controls to restrict Site use and Site groundwater use. Clean soil fill will be imported to construct the surface soil cap over the Site excluding currently developed areas (i.e., building footprints), with 14-inches of clean soil placed and compacted, followed by 4-inches of clean imported topsoil and hydroseed.

Construction duration is estimated to be 85 working days.

Remediation is expected to be completed in Year 1 and the developer is anticipated to complete redevelopment in Year 2. Institutional and engineering controls will be implemented through the remainder of the life of the grant funding (Years 3 and 4). Institutional controls for the Site include a deed restriction to restrict Site groundwater use and to prevent modification of engineering controls. Engineering controls at the Site will include a surface soil cap to prevent exposure to underlying impacted soils, and the installation of SSDS in all new structures to mitigate potential VOC impacts. Both the cap/cover system and SSDS require annual inspections and reporting to be completed as part of this alternative. Additional reporting includes a Site Management Plan (SMP), VTDEC Final Report, and USEPA Final Grant Performance Report.

Additional Qualified Environmental Professional (QEP) services will include Remedial Design, CAP, Generation of Contract Documents, Bidding Support and Award, Review of Contractor's Demolition Plan and Health and Safety Plan (HASP), Asbestos Project Monitoring, Air Monitoring, Community Air Monitoring Program (CAMP), Data Validation, Grant Management Services, Annual Inspection, and Reporting.

Wetland soils remediation and restoration, groundwater remediation, and SSDS design are not included in the Opinion of Probable Cost for Alternative 2 (see **Table 1**).

4.2.3 Alternative 3 – Controlled Demolition and Off-Site Disposal of Hazardous Waste, Complete Embankment Remediation, Complete Impacted Soils Excavation and Off-Site Disposal, Wetland Remediation and Restoration, and Impacted Groundwater Remediation

In addition to the same activities included in Alternative 2, Alternative 3 considers the additional cleanup activities including complete excavation and disposal of impacted soil above Residential VSS, remediation of impacted groundwater above VGES, complete removal of all debris in the embankment, wetland remediation, and restoration.

Embankment remediation will include the complete removal of all debris estimated to 3 ft bgs. An estimated 3,200 tons of debris are anticipated for excavation, transportation, and disposal. Restoration of the embankment includes the importation and placement of 6-inches of topsoil. The slope will then be stabilized using jute-mat and hydroseed.

Remediation of impacted soils will be completed in three (3) phases. The first phase will be performed as described in Alternative 2. The second phase of soil remediation includes the removal of the top two feet of existing soil to access underlying impacted soils above VSS. An estimated 4,000 cubic yards of existing Site soils are anticipated for staging and future use as backfill during Site restoration. The third phase includes a complete removal of impacted soils exhibiting contaminant concentration above VSS Resident concentrations. An estimated 31,500 tons of impacted non-hazardous soil is anticipated for disposal at Casella's Coventry Landfill. Soil verification samples will be collected to evaluate the complete removal of impacted soils. Following complete removal of impacted soils, staged clean soil will be used to backfill excavated areas. Imported fill will be required to restore the Site to existing grades. An estimated 26,500 tons of additional clean imported fill is anticipated.

Historic "settling" pond and "concrete sediment" pond were identified in the wetland area totaling approximately 10,000 square feet. To perform intrusive work within the wetland areas including the pond areas, a Vermont Wetland Individual Permit must be obtained from VTDEC. Based on the results of the ARA, the UVM CAP recommended a Phase I Site Identification Survey be conducted within the archaeologically sensitive areas to be affected by ground disturbance activities planned within the APE. This would be required prior to remediation of the wetlands in Alternative 3. Remediation of the ponds includes excavation, loading, transportation, and disposal of impacted non-hazardous soils removed to 2 ft bgs and disposed at Casella's Coventry Landfill. Verification soil samples will be collected to evaluate removal of impacted soils above VSS. A total of 1,500 tons of impacted soils are anticipated for removal followed by the importation and placement of 750 cubic yards of imported native hydric soils suitable for restoration of the pond areas.

It appears MTBE and PFAS impacts are from off-Site sources and relatively low (less than an order of magnitude greater than VGES). As such, permeable reactive barriers (PRBs), a passive technology, will be installed near the Site southern and eastern property lines to treat the plume as it enters the Site over time. Reactive media selected for this alternative includes granular activated carbon for PFAS, aerogel for MTBE impacts, and green sand with a magnesium oxide catalytic layer or other zeolites for manganese impacts. Three (3) areas at the Site are anticipated for installation of PRBs totaling 440 linear feet of engineered barrier. Upon completion of the PRB installation, periodic sampling will be performed for contaminants of concern to evaluate the effectiveness of the approach. Sampling events are anticipated to be quarterly for the first five (5) years of groundwater monitoring, and annually thereafter for the following 15 years (20 years total). As presented in **Table 2**, only two (2) years (Years 3 and 4 of the life of the Cleanup Grant) are included. Sampling event costs for the following 18 years would be carried by the future owner.

Construction duration is estimated to be 160 working days.

Institutional and engineering controls (i.e., deed restriction and SSDS) will be implemented for the 20-year duration of remediation. Upon completion of remediation, the deed restriction will be removed and SSDS capped. Maintenance and repair of wells, analytical costs, disposal of investigation derived waste (IDW), final decommissioning of wells, and SSDS design are not included in the Opinion of Probable Cost and would be carried by the future owner.

4.3 Effectiveness, Implementability, and Cost for Cleanup Alternatives

To assist in the evaluation and recommendation of a preferred remedial alternative for the Site, this section presents an evaluation of the effectiveness, implementability, and Opinions of Probable Cost estimates for each remedial alternative.

4.3.1 Effectiveness

Effectiveness has both short-term and long-term components. The short-term effectiveness of a remedial alternative is evaluated relative to its effect on human health and the environment during the implementation of the remedial action. Potential risks to community, potential impacts on workers, the effectiveness and reliability of protective measures, potential environmental impact of the remedial action, and the effectiveness/reliability of the mitigation measures during implementation, etc. are some of the factors frequently considered.

Long-term effectiveness and permanence of a remedial alternative are evaluated with respect to the following factors: magnitude of residual risk to human health and environment from the untreated or residual waste at the completion of remedial activities; an assessment of type, degree, and adequacy of long-term management (engineering controls, monitoring, maintenance, etc.) required for untreated or residual waste; an assessment of the long-term reliability of long-term management to provide continued protection from the untreated/residual waste; and the potential need for replacement of the remedy and continuing need for repairs to maintain the performance of the remedy.

The overall effectiveness of the three (3) remedial alternatives were evaluated in this section based on their ability to:

1. Support redevelopment plans for the Site, which includes permanently addressing the presence of waste and contaminated soil/groundwater, and construction of the proposed residential buildings, utilities, parking lots, roads, and landscaped areas to revitalize the underutilized Site.
2. Protect future construction workers, employees, visitors and, residents from risks associated with exposure to RBM waste and contaminated soil/groundwater.
3. Be “flexible and adaptable” such that adjustments can be made during implementation of certain elements of the cleanup approach if necessary to remain within budget, and/or to accommodate unanticipated liabilities (such as previously undocumented embankment waste and contaminated soil) if encountered during initial remedial activities.
4. Minimize potential exposure of resident areas to contaminants or hazards during implementation (through fugitive dust emissions, vehicle emissions, etc.).

4.3.1.1 Alternative 1 – No Action

This alternative would be ineffective and unacceptable for continued brownfield redevelopment for the Site for the following reasons:

- It is likely to be considered unacceptable to the community because residents, visitors, nearby workers, and construction workers could unknowingly be placed at risk in the future. No action provides neither a remedy nor elimination of the exposure for projection of public health.

- This approach does not provide mitigation of known human carcinogens to potential human receptors (adult and child).
- The continued presence of ACM plus lead at hazardous levels (Lead TCLP >5.0 mg/L) in the Site structures would continue to pose a long-term health risk to the public and to workers entering or working around the building.
- The condemned nature of the on-Site structures would continue to pose a threat to the surrounding community.
- Waste and debris present at the Site poses a health risk to the surrounding community and future users of the Site. No action provides no protections for the public. As the structures are exposed to weather conditions such as wind and precipitation, there is potential for fugitive dust and leaching from impacted waste/debris into Site groundwater.
- Exposed ash throughout the Site presents a health risk to future Site users and the surrounding community. With a no action alternative, exposed ash would continue to impact Site soil and groundwater and presents a direct route of exposure to future Site users.

This alternative would not meet the project goal and re-use plan.

4.3.1.2 Alternative 2 – Controlled Demolition, Embankment Remediation, Impacted Soils Remediation, Installation of Surface Soil Cap, and Off-Site Disposal of Hazardous Waste

Alternative 2 considers that residual soil and groundwater contamination will remain below the Site, overlain with an 18-inch surface soil cap and grass vegetation, for elimination/mitigation of exposure and direct contact. This alternative includes the controlled demolition of the condemned on-Site structures to allow for the definitive and direct physical elimination of RMB contaminants that provide a public risk. The RBMs will be permanently removed including the lead impacted building materials above hazardous levels, which will be taken off-Site to an appropriate landfill. Exposed debris along the embankment will be removed and disposed as non-hazardous waste. Existing soils will be utilized to grade the slope. Topsoil will be imported to cover exposed ash along the embankment followed by jute-mat for stabilization and hydroseed. This alternative also includes removal of any grossly contaminated areas that may be observed during remediation that cannot be managed on-Site. For these areas, if any, the top two feet of unimpacted soil will be excavated and staged for later use as backfill. The grossly contaminated area(s) will then be excavated and disposed. Staged clean soil will be used to backfill excavation followed by imported structural fill in compliance with VTDEC clean fill requirements.

With residual contamination to remain on-Site, the approach requires post-remedy institutional or land use controls for the property by deed restriction to restrict Site use, follow-up annual inspections/reporting, and maintenance under an ICR, SMP, and OM&M. Engineering controls include surface soil cap and SSDS installation in future buildings. Removal of all RBMs and installation of the surface soil cap reduces the potential for environmental contamination exposure due to climate change conditions (damage from storms). This alternative would allow for the planned residential housing, utilities, parking lots, roads, and landscaped areas to be achievable. Unless the subsurface material is disturbed, this alternative will protect future construction workers, employees, visitors, and residents from risks associated with exposure to the waste and contaminated soil/groundwater.

4.3.1.3 Alternative 3 – Controlled Demolition with Off-Site Disposal of Hazardous Waste, Complete Embankment Remediation, Complete Impacted Soils Excavation and Off-Site Disposal, Wetland Remediation and Restoration, and Impacted Groundwater Remediation

Alternative 3 requires the complete removal and off-Site disposal of the on-Site waste, structures, impacted soil and in-situ remediation of groundwater and eliminates future environmental concerns. This approach is technically effective as a definitive and direct physical elimination of the contaminants available to public exposures.

4.3.2 Implementability

Implementability refers to the technical and administrative feasibility of implementing an alternative, and the various materials and services required during its implementation. Examples of such factors for implementation of an alternative include the following: ability to construct, operate and monitor; time required to obtain necessary permits and approval; availability of equipment, material, contractor, etc. The implementability of the three (3) remedial alternatives is evaluated below.

4.3.2.1 Alternative 1 – No Action

This alternative is implementable as it requires no action. However, the condemned on-Site structures would still pose a hazard to those entering the buildings and RBMs including lead above hazardous levels could continue to be released to ambient air and nearby surface soil. The Site buildings would be expected to degrade further providing ongoing physical exposure concerns to nearby residents, workers, and visitors. Impacted soils identified in Site fill, exposed waste and debris in the embankment, and exposed ash would remain and pose a health risk to Site users and potentially affect adjacent properties. Impacted groundwater would be allowed to continue to flow beneath the Site into adjacent regulated wetland areas.

4.3.2.2 Alternative 2 – Controlled Demolition, Embankment Remediation, Impacted Soils Remediation, Installation of Surface Soil Cap, and Off-Site Disposal of Hazardous Waste

Alternative 2 offers a less complex approach to remediation and presents no obvious complications for implementation. Remedial design and a CAP would need to be prepared to guide the remedial action. Standard excavation equipment (excavator, bulldozer, dump trucks, etc.) could be utilized for the controlled demolition of the on-Site structure and other remedial actions proposed. This alternative allows RBMs to be removed by a licensed abatement contractor by controlled demolition and off-Site disposal. Intrusive activity would consist of the removal of building footers and slab, removal of near-surface waste and debris along the embankment, surface soils surrounding the on-Site structures, and spot excavation of contaminated subsurface soil. All other work activities (placement of surface soil cover cap, topsoil, hydroseeding, etc.) are to be completed at the surface of the Site. New building construction will require the installation of an SSDS (engineering control) to mitigate potential vapor intrusion. Institutional controls (i.e., deed restriction, SMP, etc.) will be required. The most difficult implementation aspect for Alternative 2 is the long-term inspections and maintenance to ensure engineering controls remain adequate for the residual soil and groundwater impacts.

4.3.2.3 Alternative 3 – Controlled Demolition with Off-Site Disposal of Hazardous Waste, Complete Embankment Remediation, Complete Impacted Soils Excavation and Off-Site Disposal, Wetland Remediation and Restoration, and Impacted Groundwater Remediation

Alternative 3 is technically achievable although it would require significantly more labor and time, greater complexity of fill removal and waste transportation, groundwater remediation, and remediation within and restoration of the on-Site wetland. Large portions of the Site would require mass excavation and on-Site groundwater contamination would require remediation by specialized techniques (PRBs). New buildings will require the installation of an SSDS (engineering control) to mitigate potential vapor intrusion for the duration of remediation. Institutional controls (i.e., deed restriction, SGMP, etc.) will still be required for the duration of remediation. Upon completion of remediation, these controls may be removed. Alternative 3's greatest advantage regarding implementation is that all impacted soils and debris would be removed thereby no soil cap or cover would be required, and upon the completion of groundwater remediation (estimated 20 years), the SSDS and institutional controls can be removed.

4.3.3 Opinions of Probable Cost

Opinions of Probable Cost estimates presented in this section are based on: a) select quotes obtained from qualified contractors and vendors accustomed to working in St. Johnsbury, Vermont; b) unit costs for mobilization, personnel, equipment, demolition, and hauling; and c) QEP oversight, laboratory analytical and reporting related costs estimated by Montrose based on previous project experience. Detailed cost estimates to provide further context on Alternatives 2 and 3 are provided in **Tables 1** and **2** as noted below.

4.3.3.1 Alternative 1 – No Action

There is no direct cost for this alternative. However, it is likely that Site security will be needed to keep unauthorized personnel from accessing the Site structures. Additionally, it is possible weather could degrade the buildings creating a release of RBM contamination to nearby properties, reduce property value, and increase cleanup costs. The condemned buildings would continue to deteriorate and potentially collapse further. Additionally, impacted groundwater and contaminants mobile in Site soils would be allowed to migrate into the northern adjacent regulated wetland areas, potentially impacting previously unimpacted areas.

4.3.3.2 Alternative 2 – Controlled Demolition, Embankment Remediation, Impacted Soils Remediation, Installation of Surface Soil Cap, and Off-Site Disposal of Hazardous Waste

As shown on **Table 1**, the Opinion of Probable Cost to complete Alternative 2 is: $3,783,346.

Post remedial monitoring and maintenance of the engineered surface soil cap and future ground intrusive construction, as directed by a SGMP, to ensure continued mitigation of residual environmental impacts would remain a cost. Engineering and institutional controls have been included in Alternative 2 for the life of the grant funding (four (4) years). It is assumed remediation will be completed in Year 1, developer to complete redevelopment in Year 2, followed by implementing engineering and institutional controls in years 3 and 4.

4.3.3.3 Alternative 3 – Controlled Demolition with Off-Site Disposal of Hazardous Waste, Complete Embankment Remediation, Complete Impacted Soils Excavation and Off-Site Disposal, Wetland Remediation and Restoration, and Impacted Groundwater Remediation

As shown in **Table 2**, the Opinion of Probable Cost to complete Alternative 3 is: $17,594,403.

Site restoration would consist of importing clean backfill, placement of topsoil, and hydroseeding. Since impacted soil would be completely removed, there is no cost associated with a surface soil cap. However, engineering controls in the form of an SSDS in new building construction requiring annual inspection, sampling, and reporting will be implemented. Additionally, institutional controls in the form of a deed restriction will be required for the duration of groundwater remediation. Costs associated with annual groundwater monitoring for years 3 and 4 of Cleanup Grant funding have been included.

4.3.4 Changing Climate Conditions

The USEPA requires each ABCA consider the resilience of the remedial options to address potential adverse impacts caused by extreme weather events and changing climate conditions. The alternatives are generally equal regarding extreme weather and changing climate conditions. Alternative 3 will require mass Site excavation, potentially causing the Site to be more vulnerable to damage, potential contaminant off-Site surface runoff from extreme weather events such as flooding, and Site erosion. A 1990 Site Survey conducted by Truline Land Surveyors of St. Johnsbury, Vermont, identified a 100-year flood limit within the on-Site wetlands. This flood limit does not appear to encroach upon the developable elevated land of the Site. The on-Site wetland is expected to mitigate flooding risk and there is no planned development along the river, therefore there is low susceptibility of river flooding to affect the developable Site areas.

4.4 Recommended Remedial Action Alternatives

The evaluation of Alternative 1 (No Action) demonstrates that this alternative does not meet the remedial objectives of demolishing and remediating the Site for redevelopment. The evaluation of Alternative 2 (Controlled Demolition, Embankment Remediation, Impacted Soils Remediation, Installation of Surface Soil Cap, and Off-Site Disposal of Hazardous Waste) demonstrates that this alternative supports and is consistent with the project goals and reuse plans, eliminates toxic exposure to workers, visitors, and residents, and reduces continued urban blight. For the Site, Alternative 3 (Controlled Demolition, Embankment Remediation, Wetland Remediation, Impacted Soils Remediation, Impacted Groundwater Remediation, and Off-Site Disposal of Hazardous Waste) is not practical due to anticipated costs of mass excavations, off-Site waste disposal, and groundwater treatment. Due to the absence of a surface soil cap throughout the Site and the complete removal of on-Site waste, Alternative 3 minimizes long-term obligations (except for SSDS inspections and annual groundwater monitoring). Therefore, the recommended cleanup alternative is Alternative 2. This includes controlled demolition of the condemned on-Site structures and installation of a surface soil cap of developable areas. Alternative 2 represents the lowest Opinion of Probable Cost and satisfies the project goals and reuse plans.

5 REFERENCES

CPAI. 2024a. Report of TCLP Sample Collection/Analysis (Lead). Former True Temper Facility, 575 Concord Avenue, St. Johnsbury, Vermont. June 2024.

CPAI. 2024b. Initial Screening for Polychlorinated Biphenyls (PCBs) in Building Materials. Former True Temper Facility, 575 Concord Avenue, St. Johnsbury, Vermont. June 2024.

CPAI. 2024c. Inspection for Asbestos Containing Materials. Former True Temper Facility, 575 Concord Avenue, St. Johnsbury, Vermont. June 2024.

CPAI. 2024d. Report of TCLP Sample Collection/Analysis Activity #2 (Lead). Former True Temper Facility, 575 Concord Avenue, St. Johnsbury, Vermont. December 2024.

Montrose. 2023a. Aquatic Resources Assessment. Northeastern Vermont Development Association. St. Johnsbury, Vermont. November 2023.

Montrose. 2024a. Phase II Environmental Site Assessment Work Plan / Site-Specific Quality Assurance Project Plan Addendum. Northeastern Vermont Development Association. St. Johnsbury, Vermont. February 2024.

Montrose. 2024b. Phase II Environmental Site Assessment. Northeastern Vermont Development Association. St. Johnsbury, Vermont. December 2024.

Montrose. 2025a. Site-Specific Quality Assurance Project Plan Addendum (Supplemental Site Investigation Work Plan). Town of St. Johnsbury. St. Johnsbury, Vermont. May 2025.

Montrose. 2025b. Phase I Environmental Site Assessment Report. Town of St. Johnsbury. St. Johnsbury, Vermont. June 2025.

Montrose. 2025c. Supplemental Phase II Environmental Site Assessment Report. Town of St. Johnsbury. St. Johnsbury, Vermont. December 2025.

Stantec. 2022. Phase I Environmental Site Assessment. Northeastern Vermont Development Association. St. Johnsbury, Vermont. October 2022.

The Johnson Company. 1990. Old True-Temper Mill Site ENVIRONMENTAL SITE ASSESSMENT. Pratt and Reed Inc. St. Johnsbury, Vermont. February 1990.

University of Vermont Consulting Archaeological Program. 2025. Archaeological Resources Assessment for the St. Johnsbury True Temper Factory. Town of St. Johnsbury. St. Johnsbury, Vermont. July 2025.

Vermont Department of Environmental Conservation (VTDEC). 2019. Groundwater Protection Rule and Strategy. Environmental Protection Rules Chapter 12, State of Vermont. July 2019.

Vermont Department of Environmental Conservation (VTDEC). 2024. Investigation and Remediation of Contaminated Properties Rule (IRule). Environmental Protection Rules Chapter 35, State of Vermont. February 2024.

TABLES

TABLE 1
OPINION OF PROBABLE COST
ALTERNATIVE 2 - REMEDIAL DESIGN AND PRELIMINARY ACTIVITIES, DEWATERING AND DEMOLITION, EMBANKMENT REMEDIATION, VTOSHA COMPLIANCE, IMPACTED SOILS REMEDIATION, AND SURFACE SOIL CAP
Draft Analysis of Brownfield Cleanup Alternatives
Former True Temper Factory, 575 Concord Avenue, St. Johnsbury, Vermont

Task/Item	Description	Unit	Estimated Quantity	Unit Cost	Extended Cost	Notes
Task 1.0 Remedial Design and Preliminary Activities						
Subcontracted Services						
Demolition Plan Preparation	Contractor's Demolition Plan of Existing Structures	Lump Sum	1	$7,500	$7,500	Project Experience
Health and Safety Plan (HASP)	Contractor's Health and Safety Plan	Lump Sum	1	$2,500	$2,500	Project Experience
Permits and Notifications	All Required Permits and Notifications (VTDOH, VTDEC, VTDOL)	Lump Sum	1	$2,500	$2,500	Project Experience
Mobilization/Demobilization	Contractor Mobilization/Demobilization	Lump Sum	1	$70,000	$70,000	Project Experience
Utility Location/Abandonment	Locate and Abandon All Utilities	Lump Sum	1	$10,000	$10,000	Project Experience
Temporary Facilities	Temp Office Trailer, Toilet, Fencing, Signage & Safety Equipment	Lump Sum	1	$20,000	$20,000	Project Experience
Wetland Permit	VT Wetland Permit	sq ft	16,025	$0.25	$4,006	VT Wetlands Permit, 16,025 sf approximate for Embankment Remediation
Monitoring Well Decommissioning	Decommission All Monitoring Wells	Well	19	$700	$13,300	Project Experience
				Sub Total	**$129,806**	
Task 2.0 Qualified Environmental Professional Services						
Remedial Design	Environmental Consultant's Remedial Design Plan	Lump Sum	1	$20,000	$20,000	Project Experience
Corrective Action Plan	Environmental Consultant's Corrective Action Plan	Lump Sum	1	$35,000	$35,000	Project Experience
Contract Documents, Pre-Bid Meeting, Bidding Support, Contract Award	Contract Documents, Pre-Bid Meeting, Bidding Support, Contract Award	Lump Sum	1	$50,000	$50,000	Project Experience
Review of Contractor's Demolition Plan and HASP	Review of Contractor's Demolition Plan and HASP	Lump Sum	1	$3,000	$3,000	Project Experience
Montrose Staff Professional III	Montrose Staff Professional III	Hour	854	$120	$102,480	Project Experience
Montrose Project Professional II	Montrose Project Professional II	Hour	886	$140	$124,040	Project Experience
Montrose Senior Professional I	Montrose Senior Professional I	Hour	189	$170	$32,130	Project Experience
Montrose Senior Principal Oversight and Management	Montrose Senior Principal Oversight and Management	Hour	305	$250	$76,250	Project Experience
Asbestos Project Monitor Oversight	Asbestos Project Monitoring - Includes ACM Reporting, Testing, Inspection, and Reporting (Assume 6 weeks)	Lump Sum	1	$55,000	$55,000	Project Experience
Air Monitoring (CAMP)	Community Air Monitoring Plan	Month	4.1	$16,002	$65,608	Project Experience
PPE	PPE - Gloves, wipes, etc.	day	85	$100	$8,500	Project Experience
Travel	Assume 15 round trips for Staff/Project Professional and Senior Principal	hours	240	$140	$33,600	Project Experience (16 hours/personnel/trip)
Car Rental/Gas	Rental Car (/Day Rate)	Day	136	$70	$9,520	Project Experience
Meals (Travel)	Meals - Travel Rate	Meal	16	$51.00	$816	Project Experience
Per Diem	2 personnel on-Site full time	day	134	$188.00	$25,192	Hotel and Food ($110 + tax, $68 Meals)
Per Diem (Senior Principal)	Senior Principal (6 Site Visits)	day	12	$188.00	$2,256	Hotel and Food ($110 + tax, $68 Meals)
Waste Characterization Sampling	Allowance	Lump Sum	1	$20,000	$20,000	Allowance
Grant Management & Reporting	Senior Professional Rate	Hour	180	$200	$36,000	Project Experience
Community Engagement Support	Community Engagement	Hour	50	$200	$10,000	Project Experience
Federal Cross-Cutter Compliance	Section 106, Section 7, DBA, etc.	Hour	200	$200	$40,000	Project Experience
Data Validation	Data Validation Services	Lump Sum	1	$8,000	$8,000	Project Experience
VTDEC Final Report & Site Management Plan	VTDEC Final Report	Lump Sum	1	$67,480	$67,480	Project Experience
USEPA Final Grant Performance Report	USEPA Final Grant Performance Report	Lump Sum	1	$6,500	$6,500	Project Experience
Institutional Controls	Establishment of Institutional Controls and Filing of Deed Restriction (Life of Grant - 4 years)	Lump Sum	1	$1,000	$1,000	Project Experience
Engineering Controls (Assumes Completion of Remediation in Year 1 and Developer to Complete Site Redevelopment in Year 2, Engineering Controls in Years 3 and 4)	Install and Startup of SSDS systems in New Buildings (Years 3 and 4 of Grant)	Lump Sum	1	$240,000	$240,000	Project Experience
	SSDS Operation, Monitoring, and Maintenance (OM&M) (Years 3 and 4 of Grant)	Event	2	$10,000	$20,000	Project Experience
	Annual Inspection of SSDS, Sampling, Reporting (Years 3 and 4 of Grant)	Event	2	$5,000	$10,000	Project Experience
	Site Management Plan (SMP)	Lump Sum	1	$10,000	$10,000	Project Experience
	Annual Inspection and Reporting of Cap/Cover System (Years 3 and 4 of Grant)	Event	2	$5,000	$10,000	Project Experience
				Sub Total	**$1,122,372**	
Task 3.0 Dewatering and Controlled Demolition with Off-Site Disposal of Hazardous Waste (Assume 30 Working Days)						
Subcontracted Services						
Basement Dewatering - Pumping, Containerization, On-Site Treatment via Bag Filter and Granular Activated Carbon and Discharge to Sewer	Remove Standing Water from Basement , Treat, and Discharge	Gallon	5000	$5	$25,000	Contractor Budgetary Estimate
Erosion and Sediment Controls, Utility Terminations, Universal Wastes, and Orphan Drum Removal (10 Maximum)	Items not included in Contractor Budgetary Estimate	Lump Sum	1	$30,000	$30,000	Project Experience
Building Demolition (As Bulk Load Asbestos) - 10 Working Day Notification to VTDOH, Removal of All Floor Slabs, Foundations, and Basement Floor, Assumes all concrete Disposal as clean C+D	Demolition, Load Out, and Site Restoration	Lump Sum	1	$842,642	$842,642	Contractor Budgetary Estimate
Backfill - Import of Clean Structural Backfill and Grading						
Topsoil & Hydroseed						
Excavation and Loading of Lead Hazardous Debris	Removal of all C&D as lead impacted hazardous waste from compromised east building southernmost section (still standing) and small middle section (partially collapsed)	CY	300	$35	$10,500	Project Experience
T&D of Lead Hazardous Waste	Removal of all C&D as lead impacted hazardous waste from compromised east building southernmost section (still standing) and small middle section (partially collapsed)	Ton	250	$1,000	$250,000	Waste Disposal Company Budgetary Estimate
				Sub Total	**$1,158,142**	

TABLE 1
OPINION OF PROBABLE COST
ALTERNATIVE 2 - REMEDIAL DESIGN AND PRELIMINARY ACTIVITIES, DEWATERING AND DEMOLITION, EMBANKMENT REMEDIATION, VTOSHA COMPLIANCE, IMPACTED SOILS REMEDIATION, AND SURFACE SOIL CAP
Draft Analysis of Brownfield Cleanup Alternatives
Former True Temper Factory, 575 Concord Avenue, St. Johnsbury, Vermont

Task/Item	Description	Unit	Estimated Quantity	Unit Cost	Extended Cost	Notes
Task 4.0 Embankment Surface Remediation (Assume 20 Working Days)						
Subcontracted Services						
Embankment Clearing	Clear All Trees and Brush to Access Debris	Acre	1	$6,695	$6,695	Contractor Budgetary Estimate
Exposed Debris Removal (1 feet bgs)	Remove Exposed Debris from Face of Embankment To An Assumed Depth of 1 foot	CY	534	$33	$17,622	Contractor Budgetary Estimate
T&D of Miscellaneous Wastes and Debris From Embankment	T&D of Assumed Non-Hazardous Waste to Casella's Coventry Landfill	Ton	801	$250	$200,250	Contractor Budgetary Estimate
Embankment Grading - Utilize Existing Soils to Grade and Uniformly Slope Bank	Utilize Existing Soils to Grade and Uniformly Slope Bank and 25 feet South of Leading Edge	sq ft	35,283	$0.50	$17,642	Contractor Budgetary Estimate
Topsoil	Import and Place Topsoil (4")	Ton	259	$73.00	$18,907	Contractor Budgetary Estimate
Slope Stabilization - Jute-Mat	Install Following Grading	sq ft	35,283	$0.60	$21,170	Contractor Budgetary Estimate
Hydroseed	Apply on Top of Jute-Mat	Acre	1	$7,800	$7,800	Contractor Budgetary Estimate
				Sub Total	**$290,085**	
Task 5.0 VTOSHA Compliance						
Subcontracted Services						
Lead Abatement (Contingency)	Allowance	Lump Sum	1	$10,000	$10,000	Project Experience
				Sub Total	**$10,000**	
Task 6.0 Limited Impacted Soils Remediation (Assume 15 Working Days)						
Subcontracted Services						
ACM in Surface Soil						
Excavation and Loading of Impacted Soils - Remove to a depth of 0.5 feet bgs	Excavate to a depth of 0-0.5 feet bgs	CY	463	$35	$16,205	Contractor Budgetary Estimate
T&D of Impacted Soils	T&D of Assumed Non-Hazardous Waste to Casella's Coventry Landfill	Ton	695	$250	$173,750	Contractor Budgetary Estimate
Importation, Placement, and Compaction of Clean Imported Fill (Run of Bank Gravel)	Imported fill to backfill excavations	Ton	695	$45	$31,275	Contractor Budgetary Estimate
VOC, SVOC, and Metals Impacted Soils That Cannot Be Managed On-Site						
Excavation of Non-Impacted Soils (Assumes 2 feet of clean soil above impacted soil)	Remove two feet of clean soil to access underlying impacted soils	CY	300	$35	$10,500	Contingency: Assumes two, 150 cy areas, Locations Across the Site
Excavation and Loading of Impacted Soils - Remove to a depth of 0.5 feet bgs	Remove impacted soils that cannot be managed on-Site	CY	300	$35	$10,500	
T&D of Impacted Soils	T&D of Assumed Non-Hazardous Waste to Casella's Coventry Landfill	Ton	450	$250	$112,500	
Placement of Staged Non-Impacted Soils	Place and compact previously removed and staged soils	CY	300	$20	$6,000	
Importation, Placement, and Compaction of Clean Imported Fill (Run of Bank Gravel)	Imported fill to backfill excavations	Ton	225	$45	$10,125	
				Sub Total	**$370,855**	
Task 7.0 Surface Soil Cap (18 inches)(Assume 20 Working Days)						
Subcontracted Services						
Import, Place, and Compact 14-inches of Clean Soil	Import , Place, and Compact, Surface Cap	Ton	3,604	$45	$162,180	Contractor Budgetary Estimate
Import and Place 4-inches of Clean Topsoil	Import and Place Topsoil (4") Surface Cap	Ton	746	$73	$54,458	Contractor Budgetary Estimate
Placement of Hydroseed	Apply on Top of Jute-Mat	Acre	1.5	$7,800	$11,700	Contractor Budgetary Estimate
				Sub Total	**$228,338**	

Project Total	**$3,439,405**
Contingency (10%)	$3,783,346
Alternative 2 Opinion of Probable Cost	$3,783,346

Assumptions:
1. Alternative 2 assumes 85 working days.
2. Does not include groundwater remediation. If needed, assumed groundwater MTBE impacts can be managed through the use of engineering controls (sub-slab depressurization systems in proposed buildings) and deed restriction (no use of groundwater)
3. Remediation of PFAS or other emerging contaminants' soil or groundwater impacts is not included. Assume the low groundwater concentration detected (<10 ppt) can be managed through Monitored Natural Attenuation (MNA) via annual groundwater monitoring/sampling.
4. Applicable taxes are not included.
5. Final project costs are contingent upon the following:
- Detailed design development and final design (both environmental and proposed redevelopment site designs)
- USEPA and VTDEC agency approvals
- Labor, Material and Contractor bids at the time of bidding
- Selected Contractor's construction schedule.

TABLE 2
OPINION OF PROBABLE COST
ALTERNATIVE 3 - REMEDIAL DESIGN AND PRELIMINARY ACTIVITIES, DEWATERING AND DEMOLITION, EMBANKMENT REMEDIATION, VTOSHA COMPLIANCE, IMPACTED SOILS REMEDIATION, IMPACTED GROUNDWATER REMEDIATION, AND WETLAND REMEDIATION
Draft Analysis of Brownfield Cleanup Alternatives
Former True Temper Factory, 575 Concord Avenue, St. Johnsbury, Vermont

Task/Item	Description	Unit	Estimated Quantity	Unit Cost	Extended Cost	Notes
Task 1.0 Remedial Design and Preliminary Activities						
Subcontracted Services						
Demolition Plan Preparation	Contractor's Demolition Plan of Existing Structures	Lump Sum	1	$7,500	$7,500	Project Experience
Health and Safety Plan (HASP)	Contractor's Health and Safety Plan	Lump Sum	1	$2,500	$2,500	Project Experience
Permits and Notifications	All Required Permits and Notifications (VTDOH, VTDEC, VTDOL)	Lump Sum	1	$2,500	$2,500	Project Experience
Initial Mobilization/Demobilization	Contractor Mobilization/Demobilization	Lump Sum	1	$70,000	$70,000	Project Experience
Utility Location/Abandonment	Locate and Abandon All Utilities	Lump Sum	1	$20,000	$20,000	Project Experience
Temp Office Trailer, Toilet, Fencing, Signage & Safety Equipment	Temp Office Trailer, Toilet, Fencing, Signage & Safety Equipment	Lump Sum	1	$40,000	$40,000	Project Experience
Wetland Permit	VT Wetland Individual Permit (Wetland)	sq ft	10,000	$0.75	$7,500	VT Wetlands Permit, 26,025 sf approx. for Embankment and Settlement Pond Remediation
	VT Wetland Individual Permit (Buffer)	sq ft	16,025	$0.25	$4,006	
Area of Potential Affect (Archeological Study)	Allowance	Lump Sum	1	$25,000.00	$25,000	Project Experience
Monitoring Well Decommissioning	Abandon All Wells Except For: REC2-MW-3, REC6-10-MW-2, REC6-10-MW-3, REC2-MW104, REC1-MW106, REC1-MW105, REC3-MW1, and REC2-MW105 to remain	Well	11	$700	$7,700	Project Experience
				Sub Total	**$186,706**	
Task 2.0 Qualified Environmental Professional Services						
Remedial Design	Environmental Consultant's Remedial Design Plan	Lump Sum	1	$22,000	$22,000	Project Experience
Corrective Action Plan	Environmental Consultant's Corrective Action Plan	Lump Sum	1	$38,500	$38,500	Project Experience
Contract Documents, Pre-Bid Meeting, Bidding Support, Contract Award	Contract Documents, Pre-Bid Meeting, Bidding Support, Contract Award	Lump Sum	1	$55,000	$55,000	Project Experience
Review of Contractor's Demolition Plan and HASP	Review of Contractor's Demolition Plan and HASP	Lump Sum	1	$3,300	$3,300	Project Experience
Montrose Staff Professional III	Montrose Staff Professional III	Hour	1,767	$120	$212,040	Project Experience
Montrose Project Professional II	Montrose Project Professional II	Hour	1,828	$140	$255,892	Project Experience
Montrose Senior Professional I	Montrose Senior Professional I	Hour	359	$170	$61,047	Project Experience
Montrose Senior Principal Oversight and Management	Montrose Senior Principal Oversight and Management	Hour	580	$250	$144,875	Project Experience
Asbestos Project Monitor Oversight	Asbestos Project Monitoring - Includes ACM Reporting, Testing, Inspection, and Reporting (Assume 6 weeks)	Lump Sum	1	$55,000	$55,000	Includes VT ACM Report
Air Monitoring (CAMP)	Community Air Monitoring Plan	Month	9.5	$16,002	$152,019	Project Experience
PPE	PPE - Gloves, wipes, etc.	day	200	$100	$20,000	Project Experience
Travel	Assume 15 round trips for Staff/Project Professional and Senior Principal	hours	456	$140	$63,840	Project Experience (16 hours/personnel/trip)
Meals (Travel)	Meals - Travel Rate	day	30	$51.00	$1,530	Project Experience
Per Diem	1 personnel on-Site full time	day	293	$188.00	$55,084	Hotel and Food ($110 + tax, $68 Meals)
Per Diem (Senior Principal)	Senior Principal (6 Site Visits)	day	23	$188.00	$4,324	Hotel and Food ($110 + tax, $68 Meals)
Grant Management & Reporting	Senior Professional Rate	Hour	180	$200	$36,000	Project Experience
Community Engagement Support	Community Engagement	Hour	50	$200	$10,000	Project Experience
Federal Cross-Cutter Compliance	Section 106, Section 7, DBA, etc.	Hour	200	$200	$40,000	Project Experience
Data Validation	Data Validation Services	Lump Sum	1	$15,000	$15,000	Project Experience
VTDEC Final Report	VTDEC Final Report	Lump Sum	1	$85,500	$85,500	Project Experience
USEPA Final Grant Performance Report	USEPA Final Grant Performance Report	Lump Sum	1	$12,350	$12,350	Project Experience
Soil Verification Sampling	Excavation Endpoint Sampling	Lump Sum	1	$38,500	$38,500	Allowance
Waste Characterization Sampling	Sample of waste materials to meet disposal facility requirements	Lump Sum	1	$20,000	$10,000	Allowance
Institutional Controls	Establishment of Institutional Controls and Filing of Deed Restriction	Lump Sum	1	$1,000	$1,000	Project Experience
Engineering Controls (Assumes Completion of Remediation in Year 1, Developer to Complete Site Redevelopment in Year 2, and Engineering Controls in Years 3 and 4)	Install and Startup of SSDS systems in New Buildings	Lump Sum	1	$240,000	$240,000	Project Experience
	SSDS Operation, Monitoring, and Maintenance (OM&M)	Event	2	$5,000	$10,000	Project Experience
	Annual Inspection of SSDS, Sampling, Reporting	Event	2	$5,000	$10,000	Project Experience
	Site Management Plan (SMP)	Lump Sum	1	$10,000	$10,000	Project Experience
				Sub Total	**$2,036,214**	
Task 3.0 Dewatering and Controlled Demolition with Off-Site Disposal of Hazardous Waste (Assume 30 Working Days)						
Subcontracted Services						
Basement Dewatering - Pumping, Containerization, On-Site Treatment via Bag Filter and Granular Activated Carbon and Discharge to Sewer	Remove Standing Water from Basement , Treat, and Discharge	Gallon	5,000	$5	$25,000	Contractor Budgetary Estimate
Erosion and Sediment Controls, Utility Terminations, Universal Wastes, and Orphan Drum Removal (10 Maximum)	Items not included in Contractor Budgetary Estimate	Lump Sum	1	$30,000	$30,000	Project Experience
Building Demolition (As Bulk Load Asbestos) - 10 Working Day Notification to VTDOH, Removal of All Floor Slabs, Foundations, and Basement Floor, Assumes all concrete Disposal as clean C+D	Demolition, Load Out, and Site Restoration	Lump Sum	1	$842,642	$842,642	Contractor Budgetary Estimate
Backfill - Import of Clean Structural Backfill and Grading						
Topsoil & Hydroseed						
Excavation and Loading of Lead Hazardous Debris	Removal of all C&D as lead impacted hazardous waste from compromised east building southernmost section (still standing) and small middle section (partially collapsed)	CY	300	$35	$10,500	Project Experience
T&D of Lead Hazardous Waste	Removal of all C&D as lead impacted hazardous waste from compromised east building southernmost section (still standing) and small middle section (partially collapsed)	Ton	250	$1,000.00	$250,000	Waste Disposal Company Budgetary Estimate
				Sub Total	**$1,158,142**	

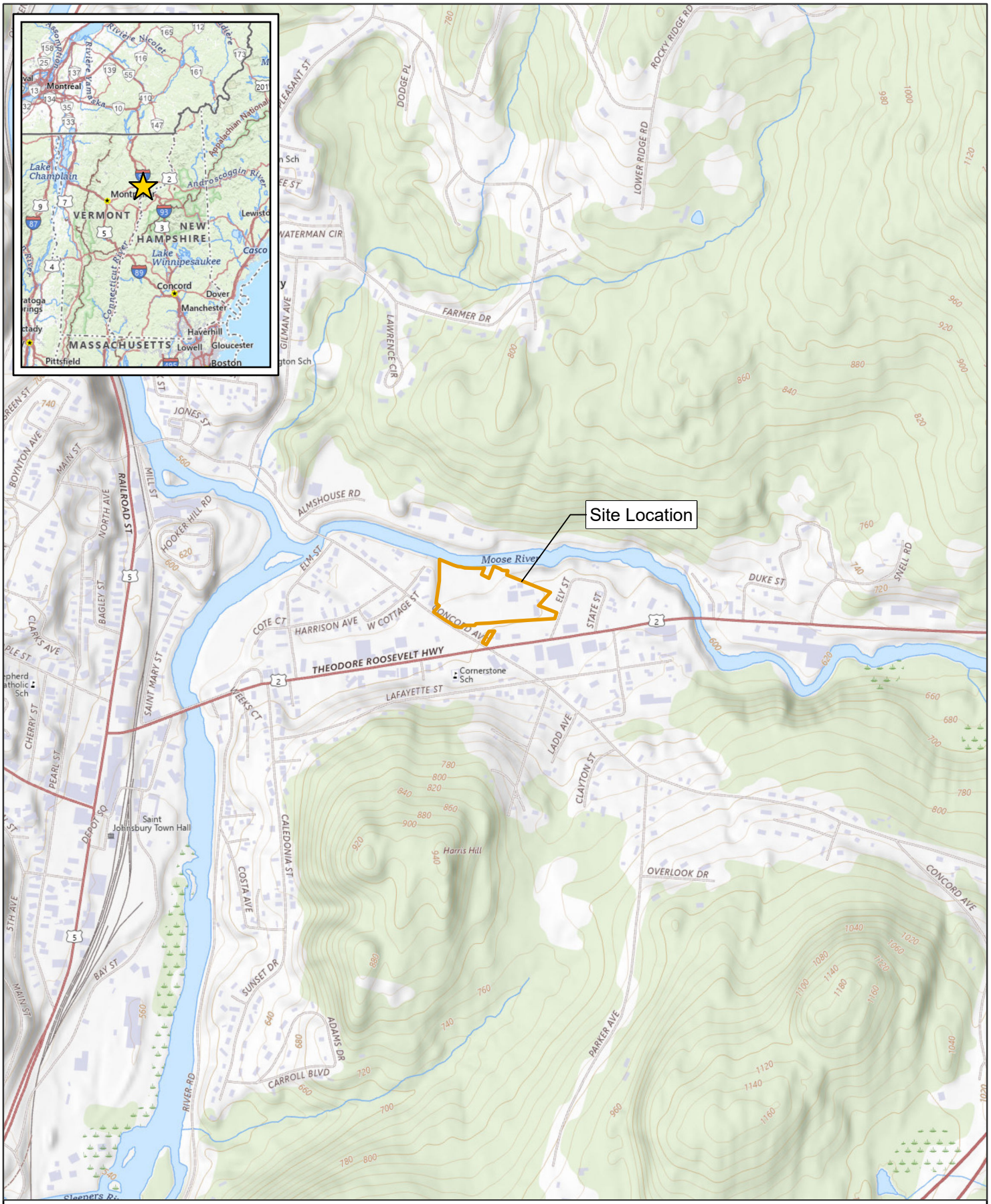
TABLE 2
OPINION OF PROBABLE COST
ALTERNATIVE 3 - REMEDIAL DESIGN AND PRELIMINARY ACTIVITIES, DEWATERING AND DEMOLITION, EMBANKMENT REMEDIATION, VTOSHA COMPLIANCE, IMPACTED SOILS REMEDIATION, IMPACTED GROUNDWATER REMEDIATION, AND WETLAND REMEDIATION
Draft Analysis of Brownfield Cleanup Alternatives
Former True Temper Factory, 575 Concord Avenue, St. Johnsbury, Vermont

Task/Item	Description	Unit	Estimated Quantity	Unit Cost	Extended Cost	Notes
Task 4.0 Complete Embankment Remediation (Assume 20 Working Days)						
Subcontracted Services						
Embankment Clearing	Clear All Trees and Brush to Access Debris	Acre	1	$6,695	$6,695	Contractor Budgetary Estimate
Complete Excavation and Removal of All Debris (3 feet bgs)	Completely Remove Debris from Face of Embankment To An Assumed Depth of 3 foot	CY	2,200	$33	$72,600	Contractor Budgetary Estimate
T&D of Miscellaneous Wastes and Debris From Embankment	T&D of Assumed Non-Hazardous Waste to Casella's Coventry Landfill	Ton	3,200	$250	$800,000	Contractor Budgetary Estimate
Import and Place Clean Topsoil (6-inches) Along Embankment	Apply to Top of Graded Embankment	Ton	350	$73.00	$25,550	Contractor Budgetary Estimate
Slope Stabilization - Jute Mat	Install Following Topsoil Grading	sq ft	35,283	$0.60	$21,170	Contractor Budgetary Estimate
Hydroseed	Apply on Top of Jute-Mat	Acre	Acre	1	$7,800	Contractor Budgetary Estimate
				Sub Total	**$933,815**	
Task 5.0 VTOSHA Compliance						
Subcontracted Services						
Lead Abatement (Contingency)	Allowance	Lump Sum	1	$10,000	$10,000	Project Experience
				Sub Total	**$10,000**	
Task 6.0 Complete Impacted Soils Remediation (Assume 80 Working Days)						
Subcontracted Services						
ACM in Surface Soil (25 feet Around Perimeter of Buildings Post-Demolition) - Assume 5 Working Days						
Excavation and Loading of Impacted Soils - Remove to a depth of 0.5 feet bgs	Excavate to a depth of 0-0.5 feet bgs	CY	463	$35	$16,205	Contractor Budgetary Estimate
T&D of Impacted Soils	T&D of Assumed Non-Hazardous Waste to Casella's Coventry Landfill	Ton	695	$250	$173,750	Contractor Budgetary Estimate
Importation, Placement, and Compaction of Clean Imported Fill (Run of Bank Gravel)	Imported fill to backfill excavations	Ton	695	$45	$31,275	Contractor Budgetary Estimate
Complete Removal of VOC, SVOC, and Metals Impacted Soils Above VSS Resident Standard - Assume 60 Working Days						
Excavation and Staging of Non-Impacted Soils (Assumes 2 feet of clean soil above impacted soil)	Remove two feet of clean soil to access underlying impacted soils	CY	4,000	$33	$132,000	Contractor Budgetary Estimate
Excavation and Loading of Impacted Soils - Complete Removal	Remove impacted soils that cannot be managed on-Site	CY	21,000	$35	$735,000	Contractor Budgetary Estimate
Dewatering - Pumping, Containerization, On-Site Treatment via Bag Filter and Granular Activated Carbon and Discharge to Sewer	Remove Stading Water from Excavations , Treat, and Discharge	Gallon	10,000	$5	$50,000	Contractor Budgetary Estimate
T&D of Impacted Soils	T&D of Assumed Non-Hazardous Waste to Casella's Coventry Landfill	Ton	31,500	$250	$7,875,000	Contractor Budgetary Estimate
Placement of Staged Non-Impacted Soils	Place and compact previously removed and staged soils	CY	4,000	$5	$20,000	Contractor Budgetary Estimate
Importation, Placement, and Compaction of Clean Imported Fill (Run of Bank Gravel)	Imported fill to backfill excavations	Ton	31,500	$45	$1,417,500	Contractor Budgetary Estimate
Wetland Remediation Assume 15 Working Days)						
Removal of Impacted Sediments From Settling Pond Area (Remove to 2 feet bgs)	Complete removal of impacted sediment to two feet bgs	CY	750	$35	$26,250	Project Experience
T&D of Impacted Soils	T&D of impacted soils (non-hazardous)	Ton	1,500	$250	$375,000	Contractor Budgetary Estimate
Importation and Placement of Native Hydric Soil	Backfill to restore settlement pond areas	CY	750	$45	$33,750	Contractor Budgetary Estimate
				Sub Total	**$10,885,730**	
Task 7.0 Impacted Groundwater Remediation (Assume 30 Working Days to Install, 20 Years to Remediate)						
Subcontracted Services						
Excavation and Loading of Soils	Trenching for Permeable Reactive Barrier (Assumes 20 ft depth bgs, 2 ft width, 440 linear feet of PRB)	CY	700	$35	$24,500	Project Experience
T&D of Trenched Soils	T&D of Assumed Non-Hazardous Soil to Casella's Coventry Landfill	Ton	1,400	$250	$350,000	Project Experience
Importation and placement of Reactive Media	Granular Activated Carbon	Ton	90	$1,895	$170,526	Project Experience
	Aerogel	Ton	270	$1,250	$337,500	Project Experience
	Green Sand	Ton	540	$28	$14,850	Project Experience
Groundwater Contaminant Monitoring (8 Wells)	Years 3 and 4 of the Grant Life Cycle Per Section 4.2.2	Event	8	$10,000	$83,636	Future Worth Calculator - Assumes 3% annual inflation (Present Value = $80,000)
				Sub Total	**$981,012**	

Project Total	**$15,994,912**
Contingency (10%)	$17,594,403
Alternative 3 Opinion of Probable Cost	$17,594,403

Assumptions:
1. Alternative 3 assumes 160 working days.
2. Applicable taxes are not included.
3. Final project costs are contingent upon the following:
- Detailed design development and final design (both environmental and proposed redevelopment site designs)
- USEPA and VTDEC agency approvals
- Labor, Material and Contractor bids at the time of bidding
- Selected Contractor's construction schedule.

FIGURES



Note(s):
1. Coordinate System: NAD 1983 StatePlane Vermont FIPS 4400 (US Feet).
2. Source: State of Vermont GIS / ESRI.
3. All locations are approximate.

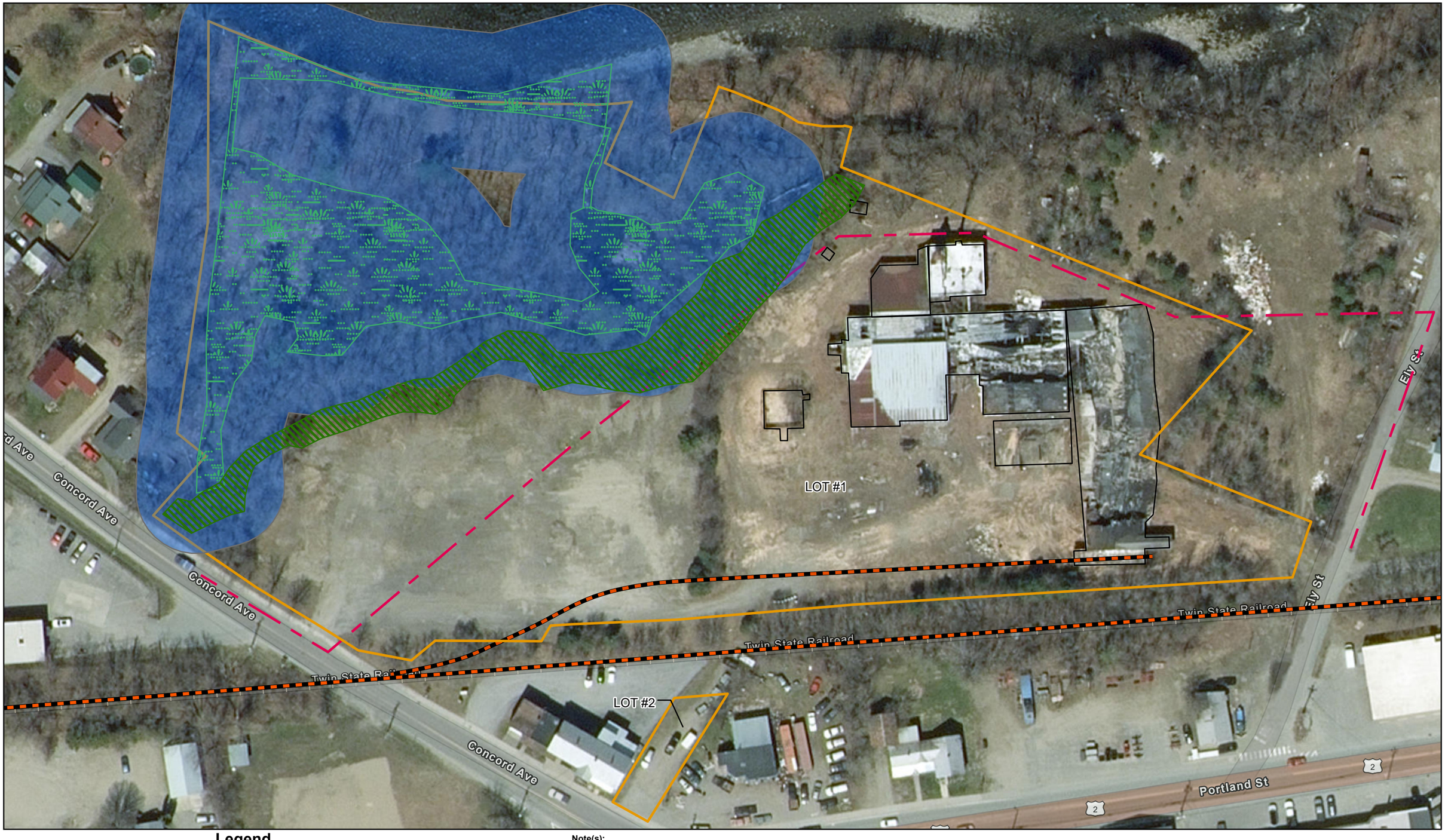
500 250 0 500 1,000 2,000 Feet

Scale: 1:12,000

N

CREATION DATE:	PROJECT NO:	
JANUARY 05, 2026	225517	**FIGURE 1: SITE LOCATION** FORMER TRUE TEMPER SITE
MONTROSE ENVIRONMENTAL	DRAWN BY: RM / APPRV'D BY: KI	**ANALYSIS OF BROWNFIELD CLEANUP ALTERNATIVES** 575 CONCORD AVENUE, ST. JOHNSBURY, VERMONT
	CHEK'D BY: KI / REVISION: 0	

C:\GIS Projects\True Temper ABCA\True.Temper.ABCA\True.Temper.ABCA.aprx



Legend

- Site Boundary
- On-site Structures
- Former On-Site Rail Spur and Adjacent Railroad
- Sewer Line
- Wetlands Delineation
- Wetlands Delineation Buffer
- Embankment

Note(s):

1. Coordinate System: NAD 1983 StatePlane Vermont FIPS 4400 (US Feet).
2. Source: State of Vermont GIS / ESRI.
3. All locations are approximate.

50 25 0 50 100 Feet

Scale: 1:900

N

CREATION DATE:	PROJECT NO:	
JANUARY 05, 2026	225517	**FIGURE 2: SITE PLAN** FORMER TRUE TEMPER SITE
MONTROSE ENVIRONMENTAL	DRAWN BY: RM / APPRV'D BY: KI	
	CHEK'D BY: KI / REVISION: 0	ANALYSIS OF BROWNFIELD CLEANUP ALTERNATIVES 575 CONCORD AVENUE, ST. JOHNSBURY, VERMONT

C:\GIS Projects\True Temper ABCA\True.Temper.ABCA\True.Temper.ABCA.aprx