November 30, 2021

New York State Department of Environmental Conservation
Division of Environmental Remediation – Region 7
615 Erie Boulevard West
Syracuse, New York 13204-2400
Attn: Mr. Michael Belveg

RE: Revised Supplemental Alternatives Analysis Report
Former Coyne Textile Facility
CHA Project No.: 059294.001
NYSDEC Site No.: C734144

Dear Mr. Belveg,

On behalf of Ranalli/Taylor St., LLC (Ranalli/Taylor St.), please find an enclosed copy of the Revised Supplemental Alternatives Analysis Report for the Former Coyne Textile Facility located at 140 Cortland Avenue in the City of Syracuse, New York. The document has been revised to reflect the comments provided in the New York State Department of Environmental Conservation's (NYSDEC's) comment letter dated November 24, 2021 which includes comments from the New York State Department of Health (NYSDOH). The NYSDEC/NYSDOH comments and CHA responses/report amendments are summarized below:

Comment 1: Section 3.2, Remedial Goals – It is stated in this section that "However, the actual goal of the remediation is to reduce or eliminate human exposure to the extent practical in a timely manner." This sentence should be revised as it is somewhat misleading. While addressing exposure is definitely a primary objective of remediation, it is not the "actual goal" as stated. The remedy is to address potential or current impacts to both public health and the environment, as indicated in the approved Decision Document (DD).

Response 1*: The sentence in question has been removed. Replacing the sentence is a reference to a statement directly from the DD which states "the remedy shall eliminate or mitigate all <u>significant</u> threats to public health and the environment presented by the contamination identified at the site through the proper application of scientific and engineering principles.*

Comment 2: Section 3.4, Evaluation and Screening of Remedial Technologies – The redevelopment work completed along the Clinton Street portion of the site, within the current BCP boundary, was not done under an approved workplan and thus it was done at the volunteers own risk. Remedial technologies that were ruled out solely due to the Clinton Street redevelopment and the preference not to reconstruct infrastructure elements in that area should be added back in and evaluated accordingly.

Response 2: *Based on the comment above, additional details have been provided within the comment section of the applicable remedial technologies. The reference to redevelopment has been removed in most instances and is no longer the sole reason for rejecting any of the technologies. Edits have been made to:*

- *Ex-Situ Treatment, Physiochemical for Groundwater (Granular activated carbon, air stripping, ion exchange, oxidation)*

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- *In-Situ Treatment, Physiochemical for Groundwater (air sparging)*

Comment 3: Table 2, Technology Screening – When discussing soil within this table (and other locations in the SAAR), the terms "cap" and "cover" are used interchangeably. However, cap and cover are two different remedial technologies and should not be used interchangeably. Please update the document to reflect that the site will have a cover system in place.

Response 3: *References to a cap have been removed from the document. The use of cover (e.g. concrete, asphalt, and/or 1-foot of imported soil) have been used in its place.*

Comment 4: Section 3.4.2 Risk and Hazard Management – It is stated that "Once manufacturing operations begin, Site access will be further restricted with key card access. Therefore, restricting access to the Site could be considered a permanent remedy for managing any remaining contamination at the Site."

- Will key card access be required to access all of the site within the BCP boundary or just the buildings and/or parking lots and will the site be 100% fenced in? If there are any areas of the site that will not require key card access, then this statement should be removed or modified accordingly.
- This type of restriction would not be considered "managing any remaining contamination" but instead would be managing exposure to any remaining contamination. Please update accordingly.

Response 4:

- *The entire JMA Campus will be fenced in with key card access.*
- *The sentence has been updated to state, "…restricting access to the Site, along with the other elements of the remedial action program set forth in the Decision Document, is considered a permanent remedy for managing exposure to remaining contamination at the Site".*

Comment 5: Section 4.4.1, Description of Alternative 2 – This section does not provide any alternatives for soil or soil vapor. Please update the section to include an alternative for these media.

Response 5: *A reference to Section 4.2 has been added to this section. Section 4.2 states, "The following technology, action, or status will be consistent across all alternatives, and therefore, is not discussed in detail for each alternative:*

- *The implementation of a passive (or active) mitigation system for soil vapors on an as-needed basis, given that there are no existing buildings and redevelopment does not include buildings on the Site. This is further addressed in the SMP.*
- *Concrete, asphalt and/or a one-foot-thick layer of imported, clean material (e.g. topsoil) placed above a demarcation barrier, will provide a physical barrier to any potential remaining contamination in the existing Site soils.*

Comment 6: Section 4.5.1, Description of Alternative 3 – This section does not provide any alternatives for soil or soil vapor. Please update the section to include an alternative for these media.

Response 6: *A reference to Section 4.2 has been added to this section. Section 4.2 states, "The following technology, action, or status will be consistent across all alternatives, and therefore, is not discussed in detail for each alternative:*

- *The implementation of a passive (or active) mitigation system for soil vapors on an as-needed basis, given that there are no existing buildings and redevelopment does not include buildings on the Site. This is further addressed in the SMP.*

- *Concrete, asphalt and/or a one-foot-thick layer of imported, clean material (e.g. topsoil) placed above a demarcation barrier, will provide a physical barrier to any potential remaining contamination in the existing Site soils.*

Comment 7: Table 4, Groundwater Treatment with ISCO, Cost – There is nothing requiring that "long-term groundwater monitoring would likely be required on a quarterly basis for a minimum of 10 years." While quarterly groundwater monitoring will be required for the first couple of years there is no set length of time quarterly groundwater monitoring will be required. The sampling frequency can be reduced (or increased) at any time based on the data and effectiveness of the remedy. Please update accordingly.

Response 7: *Table 4, Groundwater Treatment with ISCO – the cost section has been updated to state that long-term groundwater monitoring would likely be required in addition to this cost ($75,000 for the bench test and injections), as determined by NYSDEC and NYSDOH. Quarterly sampling is estimated at approximately $10,000 per year.*

Comment 8: Section 5.1, Recommended Alternative

- This section should be reworked to be consistent with the DD. Remove language discrediting ISCO and explain that it will be conducted, if necessary, under the SMP and that a work plan will be provided.
- While site redevelopment is important, it does not override the need of remediation for the protection of public health and the environment. Based on existing data, contaminant migration, and previous discussions, MNA, on its own, is not supported. Therefore, the NYSDEC and NYSDOH do not agree with the proposed Recommended Alternative of MNA.
    - If MNA is chosen as the selected alternative, it must provide a contingency if MNA is not working. Within the NYSDEC Draft Site Management plan Comment Letter, it was stated "Post remedial groundwater data continues to be elevated and additional remedial measures may be needed beyond MNA." This should be reflected within the chosen alternative. Please update accordingly.

Response 8: *CHA has removed the last three sentences of the first paragraph and has added the following to the second paragraph, "CHA recommends the selection of Alternative 2, Monitored Natural Attenuation of the groundwater at the Site with the caveat that additional remedial measures may be considered and/or required depending on the data and data trends collected during quarterly groundwater monitoring events post-issuance of the COC."*

- *The contingency has been provided within this paragraph and a reference to a work plan has also been included. The following statement has been made and is consistent with the language in the SMP, "Continuing to monitor the remaining contaminant levels through a groundwater monitoring program specified within the SMP is the recommended alternative and consists of quarterly monitoring events followed by an evaluation of data and trends to determine if MNA is effective or if additional remedial action may be warranted. A work plan will be provided to NYSDEC and NYSDOH for such remedial action at that time."*

If you have any questions, please do not hesitate to contact me at (315) 257-7154.

Sincerely,

Samantha J. Miller

Samantha J. Miller, PE
Project Engineer IV

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CHA

Supplemental Alternatives Analysis Report

South Clinton Street Roadway
Syracuse, New York 13202

Site No. C734144

CHA Project Number: 059294.001

Prepared for:

JMA Wireless d/b/a GEC Consulting
168 Brampton Road
Syracuse, New York 13205

Prepared by:

CHA

300 South State Street, Suite 600
Syracuse, New York 13202
Phone: (315) 471-3920

November 2021

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CERTIFICATION

I, Scott M. Smith, certify that I am currently a NYS registered professional engineer and that this Supplemental Alternatives Analysis Report was prepared in accordance with all applicable statutes and regulations and in substantial conformance with DER Technical Guidance for Site Investigation and Remediation (DER-10).

I certify that all information and statements in this certification form are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law. I, the undersigned, of CHA Consulting, Inc. have been designated by the Site owner to sign this certification for the Site.

For CHA Consulting, Inc.:

(Professional Seal)

Scott M. Smith, P.E.
Printed Name of Certifying Engineer

Signature of Certifying Engineer

November 30, 2021
Date of Certification

083885
NYS Professional Engineer Registration Number

CHA Consulting, Inc.
Company

Associate Vice President
Title

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

LIST OF ACRONYMS & ABBREVIATIONS

AAR	Alternatives Analysis Report
AMSL	Above Mean Sea Level
BCA	Brownfield Cleanup Agreement
BCP	Brownfield Cleanup Program
BGS	Below Ground Surface
CCOC	Catholic Charities of Onondaga County
CHA	CHA Consulting, Inc.
COC	Contaminants of Concern
CVOC	Chlorinated Volatile Organic Compound
DCE	1,2 - Dichloroethane
DER-10	Division of Remediation Program Policy 10
EE	Environmental Easement
GAC	Granular Activated Carbon
ISCO	In-Situ Chemical Oxidation
ISCR	In-Situ Chemical Reduction
LDR	Land Disposal Restriction
MNA	Monitored Natural Attenuation
NYCRR	New York Codes, Rules, and Regulations
NYSDEC	New York State Department of Environmental Conservation
PCB	Polychlorinated Biphenyl
PCE	Tetrachloroethylene
PRB	Permeable Reactive Barrier
RAOs	Remedial Action Objectives
RI	Remedial Investigation
SAAR	Supplemental Alternatives Analysis Report
SCGs	Standards, Criteria and Guidance
SCOs	Soil Cleanup Objectives
SMP	Site Management Plan
SRI	Supplemental Remedial Investigation
SVE	Soil Vapor Extraction
SVOC	Semivolatile Organic Compound
TCE	Trichloroethene
TMP	Tax Map Parcel
TOGS	Technical and Operational Guidance Series
USDA	United States Department of Agriculture
UV	Ultraviolet
VOC	Volatile Organic Compound
ZVI	Zero-Valent Iron

1.0 INTRODUCTION

The Former Coyne Textile Facility is located at 140 Cortland Avenue in Syracuse, New York (Figure 1). The Site owner, Ranalli/Taylor St. LLC entered into a Brownfield Cleanup Agreement (BCA), as a Volunteer in September 2017 with the New York State Department of Environmental Conservation (NYSDEC) to remediate the Site under the Brownfield Cleanup Program (BCP) Site No. C734144. At that time the property consisted of three tax map parcels (TMP's) as shown on Figure 2. Since that time, three amendments were filed in 2021 with the NYSDEC and subsequently approved. The first amendment added seven entities to the agreement; JMA Tech Properties Holdings, LLC, JMA Tech Properties, LLC, JMA Tech LLC, XRN LLC, JMA Edge Services LLC, Prevail NY LLC, and CELLH LLC. The second amendment expanded the property boundary to include 0.65 acres of the South Clinton Street roadway into the BCA. The third amendment corrected the overall acreage of property within the BCA per the property survey that was completed. A figure showing the Site location and boundaries of this properties within the BCA is provided as Figure 3.

1.1 PURPOSE OF THE REPORT

The purpose of this Supplemental Alternatives Analysis Report (SAAR) is to develop and evaluate the remedial alternative(s) which will best address the Site-specific environmental conditions at the South Clinton Street portion of the property which was added as part of BCP Amendment No. 2. The 0.65-acres of the Clinton Street roadway will be referred to as "the Site" within this SAAR. The Site is immediately adjacent to the west side of former Coyne Textile building and is considered hydrologically downgradient of the remedial activities previously completed on that property in accordance with the Remedial Design Report prepared by CHA Consulting, Inc. (CHA) dated July 17, 2020 and approved by NYSDEC July 27, 2020.

This SAAR is intended to be a supplement to the previously prepared Alternatives Analysis Report (AAR) that was approved by the NYSDEC upon issuance of the Decision Document on July 7, 2020 and is included for reference in Appendix A.

This report establishes remedial goals and action objectives for the Site, screens several remedial alternatives for the treatment of soil, soil vapor and groundwater, and provides an analysis of a select number of alternatives based on the following ten criteria, as defined in NYSDEC Division of Environmental Remediation Program Policy 10 (DER-10):

1. Protection of Human Health and the Environment
2. Compliance with Standards, Criteria and Guidance (SCGs)
3. Long-term Effectiveness and Permanence
4. Reduction in Toxicity, Mobility and Volume
5. Short-Term Effectiveness
6. Implementability
7. Cost Effectiveness

8. Land Use
9. Community Acceptance
10. Green Remediation and Sustainability

1.2 REPORT ORGANIZATION

This AAR is divided into six (6) major sections, including:

Section 1: Provides an introduction of the project along and the purpose of the report.

Section 2: Provides the Site background and summary of previous investigations.

Section 3: Identifies the remedial goals and objectives for this project.

Section 4: Identifies each remedial alternative and provides a description and analysis of each.

Section 5: Identifies the recommended remedial alternative.

Section 6: Provides an estimated schedule for the completion of the project.

2.0 SITE BACKGROUND

2.1 SITE DESCRIPTION

The Site is a 0.65-acre section of South Clinton Street roadway that has been abandoned by the City of Syracuse as of May 2021. The Site is being redeveloped as part of the JMA Tech Campus that encompasses the former Coyne Textile facility to the east and former Syracuse Stamp to the west. The Site is also bounded by Tallman Street to the south, and 400-feet of the former Clinton Street to the north. Site redevelopment will consist of a concrete sidewalk, asphalt, and greenspace.

2.1.1 Site Topography

The Site is generally flat and had previously been utilized as City street with sidewalks on both sides for several decades. The elevation of the Site is approximately 390.1 feet above mean sea level (AMSL), which was raised approximately one-foot as part of the redevelopment construction to reduce floodplain concerns.

2.1.2 Site Geology

According to the United States Department of Agriculture (USDA) Web Soil Survey, the soil beneath the Site is indicative of Urban Land, which is soil material having a non-agricultural, manmade surface layer that has been produced by mixing and filling in urban and suburban areas. Surficial geology consists mostly of lacustrine silts and clays. Bedrock at the Site is mapped by the USGS as the Syracuse formation, which consists of dolostone, shale, gypsum, and salts.

Field observations and soil boring logs consistent with those described in the RI, confirmed the presence of urban fill to a depth of approximately 8 to 10 feet below ground surface (bgs) on the Site. Generally, silts and clays are present beneath the urban fill to a depth of approximately 13 to 15 feet bgs. Alternative lacustrine silts and clays, then sands and gravel, were encountered beneath the fill material to the end of each boring. At least two silt and clay layers, one below the urban fill and one at varying depths, but approximately 26 to 30 feet bgs, may act as confining layers to impede the vertical transport of groundwater and contamination.

2.1.3 Site Hydrogeology

Generally, the Site slope indicates groundwater flows in a westerly direction towards Onondaga Creek, located approximately 0.2 miles to the west of the Site.

Based on groundwater elevations measured in December 2020, the depth to groundwater at the Site is typically less than 15 feet bgs.

2.2 PREVIOUS REPORTS AND INVESTIGATIONS

In addition, the Remedial Investigation (RI) performed in 2018 on the broader BCP property, CHA conducted a subsurface investigation specifically focusing on the Site in December 2020. In summary the Supplemental Remedial Investigation (SRI) focused on soil and groundwater given that the future Site redevelopment does not include any human-occupied facilities and that portion of property. Additionally, buildings and occupied spaces located hydrologically downgradient of the Site have been demolished as part of the JMA Tech Campus, except for the former Catholic Charities of Onondaga County (CCOC). However, this structure is anticipated to be demolished in the Spring of 2022, once they have been able to relocate.

Primary contaminants of concern (COC) for the Site are volatile organic compounds (VOCs), or more specifically, chlorinated volatile organic compounds (CVOCs). The soil and groundwater results from the SIR are summarized in tables on Figure 4. The results shown on this figure are compounds detected in exceedance of the Unrestricted Use soil cleanup objectives (SCOs) provided in Title 6 of the New York Codes, Rules and Regulations (NYCRR) Part 375, and the criteria set forth in the Technical and Operational Guidance Series 1.1.1 for Class GA groundwater.

As shown on the figure, CVOCs were detected in exceedance of the unrestricted SCO in one (1) of the eight (8) soil samples collected. Other parameters, including semivolatile organic compounds (SVOCs), and polychlorinated biphenyls (PCBs) were not detected, and metals were detected at low levels in three (3) of the soil samples. Additionally, groundwater samples collected from five sample locations indicate the presence of elevated CVOCs in four (4) sample locations.

2.3 EXPOSURE ASSESSMENT

2.3.1 Contaminants of Concern

As discussed previously, the primary COC for the Site include CVOCs in the soil and groundwater. A soil vapor assessment for the Site was not performed given that redevelopment and downgradient properties do not include occupied spaces, with the exception of the CCOC building which will be demolished as part of the future redevelopment plans.

2.3.2 Exposure Pathways and Routes of Exposure

According to the soil and groundwater data collected during the SRI, the following table summarizes potential routes of exposure:

Table 1. Exposure Pathways and Routes of Exposure

Environmental Media & Exposure Route	Human Exposure Assessment
Direct contact with surface soils	The Site was previously asphalt paved. Therefore, there was no surface soil on the Site.
Direct contact with subsurface soils	There is the potential to encounter VOC and metals contamination during ground-intrusive activities at the Site. Sensitive populations may be workers at the Site during investigation and remediation activities, and workers during future construction or redevelopment activities.

Environmental Media & Exposure Route	Human Exposure Assessment
Ingestion of Groundwater	Existing groundwater monitoring wells are not used for drinking water. There are no buildings on Site, and therefore, no potential for consumption of impacted groundwater. There are no known domestic water supply wells in the area. The Site and surrounding areas are service a municipal water system.
Direct contact with groundwater	There is the potential to come into contact with VOC, SVOC and metal contaminated groundwater if future intrusive work extends to the saturated zone. Sensitive populations may be workers at the Site during investigation and remediation activities and workers during future construction activities.
Inhalation of air	There are no buildings currently on the Site and future Site redevelopment plans consist of concrete, asphalt, and greenspace. Future testing and/or mitigative measures that could be required if redevelopment changes will be described within the Site Management Plan (SMP) and is governed by Environmental Easement (EE).

3.0 REMEDIAL GOALS AND OBJECTIVES

3.1 REMEDIAL ACTION OBJECTIVES

The remedial action objectives (RAOs) for the Site are medium-specific objectives that are established for the protection of human health and the environment. RAOs are typically narrative statements that identify the contaminants and environmental media of concern, the potential exposure pathways to be addressed by remedial actions relative to the exposed populations and environmental receptors to be protected, as well as the acceptable contaminant concentrations/remediation goals for each environmental medium. The RAOs for this Site are the same as those for the remainder of the property within the BCA, previously described in the AAR and approved of in the DD in July 2020 (Appendix A).

3.2 REMEDIAL GOALS

Similar to the rest of the BCP property, the appropriate SCOs for soil remediation for the Site will be the Part 375 Commercial SCOs, which is consistent with the zoning of the property, the proposed reuse of the Site and the anticipated future institutional controls that will be placed on the Site. Similarly, the SCGs for groundwater will be the NYSDEC's Technical and Operational Guidance Series (TOGS) 1.1.1 ambient water quality standards and guidance values for Class GA groundwaters.

It should be noted that some of the remedial alternatives evaluated may take several years before reaching the applicable remedial goals. As stated in the DD, "the remedy shall eliminate or mitigate all <u>significant</u> threats to public health and the environment presented by the contamination identified at the site through the proper application of scientific and engineering principles". The primary source for soil and groundwater contamination was identified as part of the work previously conducted beneath the former Coyne Textile building. The Site is considered hydrologically downgradient of that source.

The remedial goals focus on CVOCs, namely tetrachloroethylene (PCE) and its breakdown compounds trichloroethene (TCE), 1,2-dichloroethenbe (DCE), and vinyl chloride, in soil vapor, subsurface soil, and groundwater. The maximum remediation target depth is estimated at 25 feet below the surface where the first confining layer was observed during the SRI.

3.3 GENERAL RESPONSE ACTIONS

After establishing the remedial goals objectives for the Site, several general response actions were evaluated based upon the ability of the response to address the remedial objectives. These actions are intended to mitigate potential exposure to the COCs, control the migration of the COCs on-Site, and remediate the COCs to the extent practical. The purpose of establishing general response actions is to begin to evaluate basic methods of protecting human health and the environment, such as treatment and containment, or removal of Site contaminants. The general response actions may then be combined to form alternatives, such as treating grossly-contaminated material (if necessary) and providing barriers, containment, or post-treatment monitoring of any remaining contaminants. The following list summarizes the general response actions that have been considered for the soil, groundwater, and soil vapor intrusion impacts at the Site, each of which are described in more detail in the following subsections:

1. No Action
2. Risk and Hazard Management
3. Natural Attenuation
4. Ex-Situ Treatment
5. In-Situ Treatment
6. Removal and Disposal

3.3.1 No Action

The no action response action/alternative is considered to be the baseline alternative that will provide the basis for comparison for other response actions and resultant remedial alternatives. Under this scenario, all ongoing activities associated with remediation of the Site would cease and no future cleanup would be completed. The only way that the Site contaminants would be addressed would be through the natural processes of biodegradation, dispersion, adsorption, dilution, and volatilization.

3.3.2 Risk and Hazard Management

Risk and hazard management responses typically include institutional, administrative, and ventilation controls, as well as ecological resource surveys to reduce or eliminate exposure risks associated with the on-Site contamination. Although risk and hazard management may be acceptable as the sole remedy for sites that pose minimal risk to human health and the environment, these actions are more commonly used in conjunction with other actions, such as monitoring or limited active responses.

3.3.3 Natural Attenuation

Natural attenuation is defined as a remedial method that reduces the mass and concentration of contaminants in the environment without human intervention. However, unlike a "take no action" approach to cleanup, this approach requires long-term monitoring of the Site conditions to confirm whether the contaminants are being degraded at reasonable rates to verify protection of human health and the environment. Site data should clearly indicate whether concentrations of groundwater contaminants are being adequately reduced without active remediation. If not, more aggressive remedial technologies may be necessary. Natural attenuation occurs through a variety of physical, chemical, and/or biological processes, including:

- Biodegradation
- Adsorption
- Volatilization
- Evapotranspiration
- Dispersion

- Dilution
- Chemical or biological stabilization
- Destruction of contaminants

One of the most important components of natural attenuation is biodegradation, which typically involves the transformation of a compound to a less toxic substance(s) by subsurface microorganisms through biotic reactions. Because natural attenuation typically allows contaminants to migrate further than active remedial measures, it is also important to determine whether individual or sensitive environmental receptors may be affected by the release.

3.3.4 Extraction with Ex-situ Treatment

Extraction involves the removal of subsurface contaminates in soil and groundwater for treatment aboveground. The goal of ex-situ treatment is to separate, destroy, or convert contaminants in extracted soil, groundwater, and/or vapor. However, if treatment only separates the contaminants for the impacted media, the contaminants will still require proper disposal. Ex-situ treatment typically requires shorter periods of time to complete the cleanup of a site than in-situ treatment, but extraction of the contaminants typically costs more than in-situ techniques. One potential component of extraction with ex-situ treatment is the excavation of subsurface soils.

The main advantage to excavating soils is that there is typically a higher degree of certainty about the uniformity of treatment because of the ability to homogenize, screen, and continuously mix the soils prior to treatment. The soils can then be treated using a variety of techniques, including biological methods (e.g. biopiles, composting, land farming), physiochemical processes (e.g. dehalogenation, soil washing, solidification), or thermal treatments (e.g. thermal desorption, incineration).

Groundwater may be extracted by pumping groundwater from a series of wells or collection trenches. The groundwater can then be treated by a variety of methods including sorption to granular activated carbon (GAC), air stripping, ion exchange, oxidation, constructed wetlands, etc. Gaseous vapors extracted from the subsurface, such as those removed using a dual-phase or soil-vapor extraction (SVE) system, can be treated using GAC sorption, thermal oxidation, ultraviolet (UV) oxidation, etc. After treatment is complete, the soil can be returned to the excavation and the treated groundwater can be discharged to a sanitary sewer system where permitted, discharged to surface water, or reinjected beneath the subsurface.

3.3.5 In-Situ Treatment

In-situ treatment techniques involve the destruction or conversion of contaminants in subsurface soils, bedrock, and groundwater to less toxic compounds without removal. There are a variety of biological, chemical, and physical techniques available for in-place treatment of chlorinated solvent-impacted soils. While the costs associated with in-situ techniques are often less than those associated with ex-situ techniques, in-situ methods typically require longer periods of time to reach the remedial objectives established. In addition, it is more difficult to determine whether contaminants have been destroyed using in-situ treatment methods.

Bioremediation treatment techniques involve the use of microorganisms to grow and utilize the contaminants as a food source and thereby convert the contaminants to less toxic substances. Although natural microorganisms exist in the subsurface and can often break down the subsurface contaminants, such as in the case of sites where natural attenuation is the selected remedy, the microorganisms often require stimulation or creation of favorable environment to have a significant role in site cleanup. In some instances, biodegradation of contaminants is also enhanced by the addition of microorganisms that are specifically adapted to degrade a particular contaminant (i.e. bioaugmentation) or by supplementing the naturally occurring microorganisms with nutrients to stimulate their growth rates. Bioremediation techniques include natural attenuation, enhanced bioremediation (with or without bioaugmentation), phytoremediation, and bioventing.

In-situ chemical treatment techniques rely on the injection of a chemical(s) to degrade, immobilize, desorb/flush out contaminants, including techniques such as chemical oxidation, soil flushing using treatment reagents, polymerization, precipitation, etc. An example of a physical in-situ treatment method is air sparging, where air is injected into the saturated zone of a contamination plume to remove contaminants through volatilization and perhaps enhance biodegradation of contaminants by increasing the concentrations of dissolved oxygen in the groundwater. A passive reactive barrier (PRB), also referred to as a "treatment wall," may involve both physical and chemical treatment techniques. When a funnel and gate type PRB is utilized, the groundwater is intercepted by an impermeable or low-permeability wall and directed through a man-made wall of reactive media for chemical treatment.

3.3.6 Removal and Disposal

Source removal involves excavation of the contaminated soil, rock, debris, etc. and transportation of the material to a permitted off-site treatment and/or disposal facility. Although on-Site disposal in contained systems (e.g. a lined containment unit) is sometimes considered, it is typically not favorable for sites where redevelopment is planned. Depending upon the objective of the removal, either partial or total waste removal may be necessary to prevent further releases into the environment. There are many issues that must be considered if source removal and disposal are considered, including consideration of odors, fugitive dust emissions, depth and composition of the material being excavated, transportation methods, the transportation of the material through populated areas, pretreatment, waste characterization as dictated by land disposal restrictions (LDRs), temporary storage of the waste on-Site, etc.

3.4 EVALUATION AND SCREENING OF REMEDIAL TECHNOLOGIES

As previously discussed, the primary contaminants of concern include chlorinated solvents. Table 2, below, provides a summary of the technology process options considered for managing the contamination at the Site. While technology processes were evaluated for each of the previously identified general response actions, the tables are not intended to include screening of every available remedial technology. The process options were evaluated based upon their expected effectiveness and implementability, given the Site-specific conditions. If a technology was considered to be an effective remedy and implementable, the technology was retained for further evaluation.

The Site and adjacent areas are part of the multi-million-dollar redevelopment of the property as the JMA Tech Campus. Redevelopment of this area will be mostly completed by the end of 2021. Therefore, remedial technologies were evaluated based on an understanding that redevelopment has occurred and that the campus will be utilized for manufacturing in the near future. Although the Site is anticipated to be used as a sidewalk and greenspace, it is important to keep in mind that personnel working within the manufacturing facility will utilize this area.

Table 2. Technology Screening

General Response Action	Remedial Technology	Media	Technology Process Options	Effectiveness	Implementability	Status	Comments
No Action	None	All	Natural decay, biodegradation, dispersion, adsorption, volatilization	Natural processes including degradation, dispersion, dilution, adsorption, volatilization, etc., would provide the only source of contaminant removal. Limited effectiveness. Not considered sufficiently protective of human health and the environment.	Implementable. No additional action necessary.	Retain	Retained as a baseline to compare other remedial alternatives. Additionally retained for soil vapor given that there are no existing buildings and future redevelopment includes concrete sidewalk, asphalt, and greenspace.
Risk & Hazard Management	Institutional & Administrative Controls	All	Land use restrictions, fencing and signs, security guards	Protects human health. Provides no protection to environment unless used in conjunction with other remedies.	Implementable. Fencing to be installed surrounding the Site. Land use restrictions are compatible with City of Syracuse zoning. Environmental Easements may require legal consultation.	Retain	Will likely be implemented to some degree with all alternatives unless contaminant levels are reduced below Unrestricted SCOs.
	Ventilation Controls	Vapor	Building Sub-Slab Depressurization System for on-Site structures	Reduces human exposure to VOCs inside buildings. No significant mass removal or protection of environment.	Implementable. Additional testing may be required to determine if an active or passive system are necessary.	Retain	There are no on-Site buildings currently or within the project redevelopment plans. Should be addressed as part of the SMP and EE.
Natural Attenuation	Biological	Subsurface Groundwater	Biodegradation, dispersion, dilution, adsorption, volatilization	Limited effectiveness. Not considered sufficiently protective of human health and the environment for managing grossly-contaminated soils and free product. Elevated contaminant levels remain at Site; however, the releases are expected to have occurred 20+ years ago.	Implementable. Install permanent groundwater monitoring wells for long-term monitoring requirements.	Retain	Considered for remaining contamination after grossly- contaminated soils are treated or removed but not as sole remedy. Monitoring points may be off Site boundaries.
Ex-Situ Treatment	Biological	Subsurface Soil	Biopiles, composting, land farming	Requires excavation and transport of contaminated soil. Moderately effective with -halogenated VOCs.	Difficult to implement due to space availability on-Site and utilities within the roadway. Soil storage requires space for the duration of treatment. Enclosure of the treatment area would be required for strong odors emitted during handling of soils based upon past work at the Site.	Reject	Excavation of soils in and around utilities is extremely costly and difficult, and in some cases may be impractical. The JMA Tech Campus is anticipated to begin operation in 2022, excavation on the Site may be dangerous to personnel in the vicinity. Additionally, soil results indicate low levels of CVOC contamination (above unrestricted but orders of magnitude below commercial SCOs, which is the remedial goal)

General Response Action	Remedial Technology	Media	Technology Process Options	Effectiveness	Implementability	Status	Comments
Ex-Situ Treatment (continued)	Physiochemical	Subsurface Soil	Thermal desorption, incineration	Highly effective, but less cost effective for halogenated VOCs. Significant mass removal.	Difficult to implement due to excavation and transport of soil to treatment system for processing and limited space to stockpile soil on-Site.	Reject	Not a viable option due to excavation requirements and space limitations. Additionally, soil results indicate low levels of CVOC contamination in one location (above unrestricted but orders of magnitude below commercial SCOs, which is the remedial goal).
		Subsurface Soil	Oxidation	Limited effectiveness for Site COCs in soil. Not considered sufficient protection of human health.	Difficult to implement to due excavation and transport of soil to treatment system for processing and limited space to stockpile soil on-Site.	Reject	
	Physiochemical	Groundwater	Granular Activated Carbon, air stripping, ion exchange, oxidation	Effective for treating Site COCs.	Implementable depending on the concentration of contaminants.	Reject	It is likely that groundwater concentrations exceed effective treatment using this technology. Also, increasing volatilization of Site COCs is not compatible with Site redevelopment and continued occupied use.
	Biological	Groundwater	Constructed Wetlands	Limited effectiveness for treating Site COCs. Not considered sufficient protection of human health.	Difficult to implement due to space requirements as well as time required to ensure stabilization of appropriate ecosystems.	Reject	Below average effectiveness at treating COCs. Not a viable option due to space limitations.
In-Situ Treatment	Physicochemical	Subsurface Soil	Soil Vapor Extraction	Effective for treating Site COCs.	Implementable depending on moisture content and permeability of subsurface soil.	Reject	Subsurface conditions are high in moisture, reducing the effectiveness of this treatment technology. Additionally, soil results indicate low levels of CVOC contamination in one location (above unrestricted but orders of magnitude below commercial SCOs, which is the remedial goal)
	Biological	Subsurface Soil	Enhanced Aerobic/Anaerobic Biodegradation	Effective for subsurface areas with aerobic/anaerobic conditions.	Implementable. Difficult to control and predict effectiveness due to variability of subsurface.	Reject	Below average effectiveness at treating COCs.
	Physiochemical	Groundwater	Dual Phase Extraction	Effective for treating VOCs.	Implementable and good for heterogeneous subsurface conditions.	Reject	Generally used for light non-aqueous phase liquids. Site COCs are dense non-aqueous phase liquids.
		Groundwater	Thermal desorption	Heater wells and soil vapor extraction wells necessary. Highly effective for treating Site COCs.	Implementable depending on moisture content and permeability of subsurface soil.	Reject	Subsurface conditions are high in moisture, reducing the effectiveness of this treatment technology.

General Response Action	Remedial Technology	Media	Technology Process Options	Effectiveness	Implementability	Status	Comments
In-Situ Treatment (continued)	Physiochemical (continued)	Groundwater	Air Sparging	Effective for treating Site COCs.	Difficult to implement based on Site activities, however utilities within the roadway will impact effectiveness.	Reject	Subsurface conditions likely provide a nonuniform application. Difficult to implement based on the number of utility corridors within the roadway both historically and currently.
		Groundwater	Reduction	Effective for treating Site COCs.	Implementable. Hot spots can be targeted.	Retain	COCs are readily subject to chemical reduction methods.
		Groundwater	Oxidation	Effective for treating Site COCs.	Implementable. Hot spots can be targeted.	Retain	COCs are readily subject to chemical oxidation methods.
	Biological	Groundwater	Enhanced Aerobic/Anaerobic Biodegradation	Level of effectiveness depended on COCs and the application.	Implementable. Difficult to control and predict due to variability of subsurface. Indigenous bacteria species unknown. Bioaugmentation may be required.	Reject	Difficult to predict Site-specific effectiveness. Application(s) are not compatible with Site redevelopment.
Containment	Surface Cover	Soil	Asphalt/Concrete/Soil Cover	Minimizes surface exposure to contaminants. Reduces infiltration.	Implementable. Concrete sidewalk, asphalt and greenspace are planned as part of the Site redevelopment. Demarcation from on-Site soils necessary.	Retain	Due to proposed Site redevelopment, much of the surface will be covered with concrete, asphalt, or will consist of a minimum of one-foot imported topsoil and vegetation.
	Physical Barriers	Groundwater	Slurry Wall, Watertight sheeting	Effective at eliminating movement of groundwater to uncontaminated areas.	Implementable, but only contains and does not treat the groundwater.	Reject	Ineffective if used without groundwater pump and treat system to minimize mounding of groundwater behind barrier. Slurry walls may degrade over time.
Removal & Disposal	Excavation	Soil	Off-site disposal	Highly effective if all contaminated soil is accessible.	Difficult to implement but will effectively meet Track 1 cleanup standards.	Reject	In order to protect the structural integrity of the new building, significant shoring along the east side of the Site would be required with this alternative. Additionally, soil results indicate low levels of CVOC contamination (above unrestricted but orders of magnitude below commercial SCOs, which is the remedial goal)

3.4.1 No Action

Given that contaminated soil and groundwater were identified at the Site, taking no action at the Site will not be considered, but will be included in the detailed analysis as a baseline alternative for comparison of other alternatives. This alternative has been included in keeping with the conditions of the National Contingency Plan to serve as a baseline comparison in reference to other alternatives considered in the SAAR.

3.4.2 Risk and Hazard Management

One possible consideration for controlling human exposure to the Site contaminants is restricting access to the Site. The property and Site are currently secured by a chain-link fence perimeter with restricted gate access, and security. Once manufacturing operations begin, Site access to entire JMA Campus will be further restricted with key card access. Therefore, restricting access to the Site, along with the other elements of the remedial action program set forth in the Decision Document, is considered a permanent remedy for managing exposure to remaining contamination at the Site.

The need for soil vapor mitigation, via an active or passive system is considered negligible given that there are no existing and no future plans for buildings on the Site. It may be necessary to install a mitigative system on the Site if the future Site use changes, and criteria for this evaluation should be presented within the SMP.

While institutional controls will not be utilized as the principal remedy for the property given the elevated levels of soil and groundwater contamination at the Site, ICs will be used in conjunction with remedial actions to reduce human exposure and impacts to the environment. ICs that may be used include retaining access restrictions to the Site, development of health and safety procedures to implement during future ground-intrusive construction activities, and restrictions on the use of the groundwater beneath the Site as a drinking water source.

3.4.3 Natural Attenuation

The source of the groundwater contamination was identified underneath the former Coyne Textile facility, immediately upgradient of the Site. The source area was remediated through soil excavation, in-situ soil mixing with a zero-valent iron (ZVI) slurry, and in-situ groundwater re-circulation with a sodium permanganate injection. In comparison, data from the Site indicates that contamination is below not only the pre-remediated levels observed on the former Coyne Textile property but also data collected in 2015 during an investigation completed by GZA GeoEnvironmental (summarized in the AAR). Therefore, the natural attenuation mechanisms (e.g. biodegradation, dilution, dispersion, etc.) would be considered sufficient to reduce the concentrations of the remaining contamination as well as the threat posed to human health and the environment. Further, as part of the analysis in the AAR and as specifically listed in the DD, *"Groundwater contamination remaining after active remediation has been completed or has been performed to the extent practicable, as determined by the Department, will be addressed with monitored natural attenuation (MNA)."*

3.4.4 In-Situ Treatment

There are several types of in-situ treatment technologies for both, soil and groundwater. Technologies such as enhanced biodegradation, chemical oxidation, soil vapor extraction and solidification were assessed for soil treatment. Technologies such as enhanced bioremediation, air sparging and chemical oxidation were assessed for groundwater treatment. Treatment technologies consistent with that in the AAR were evaluated for the Site and consist of biodegradation, in-situ chemical oxidation (ISCO) and in-situ chemical reduction (ISCR).

3.4.5 Containment

Soil cover technologies are available to minimize the surface exposure of the contaminants at the Site. Although installation of a cover would not reduce the contaminant mass, covers are useful for controlling human exposure to the contaminants while certain types of remedies are being implemented. Installing a cover across the Site is useful for controlling the exposure to remaining contaminants, especially if natural attenuation or enhanced biodegradation are selected to treat the remaining contaminants. If cover systems are only utilized for preventing exposure to remaining containments, it is likely that the asphalt/concrete surfaces associated with parking areas, walkways and structures/buildings will be sufficiently protective. Low permeability soil cover with a thickness of one foot will be sufficiently protective in vegetated areas across the Site.

4.0 ANALYSIS OF ALTERNATIVES

Each remedial alternative that is developed and evaluated is required to conform to one of the four (4) cleanup tracks as defined in 6 NYCRR Part 375-3.8. This Site will meet the cleanup track identified in the DD, Track 4, summarized below:

- Track 4 – Restricted use with Site-specific SCOs
  - Site specific SCOs may be identified as either, SCOs as defined in 6 NYCRR Part 375-6, SCOs as defined in 6 NYCRR Part 375-6.9, or may be proposed to the Department provided that they are protective of public health and the environment.
  - The remedial program may include the use of long-term institutional or engineering controls to address all media.
  - Exposed surface soils will be addressed based on the property use type (i.e. residential, commercial, or industrial), as identified in 6 NYCRR Part 375-3.8.

Although there are no Site-specific or modified SCOs that have been established for the Site at this time, given that there is contamination, though limited, exceeding unrestricted SCOs in the 0 to 15-foot soil interval the following alternatives have been evaluated for their effectiveness in meeting a Track 4 cleanup.

4.1 ASSESSMENT OF ALTERNATIVE CRITERIA

Each alternative was evaluated using the ten criteria listed below, as required in DER-10 and consistent with the AAR;

1. Overall Protectiveness of the Public Health and the Environment
2. Standards, Criteria and Guidance (SCG)
3. Long-term Effectiveness and Permanence
4. Reduction of Toxicity, Mobility or Volume
5. Short-term Impact and Effectiveness
6. Implementability
7. Cost Effectiveness
8. Land Use
9. Community Acceptance
10. Green Remediation and Sustainability

4.2 DEVELOPMENT OF ALTERNATIVES

The following alternatives analysis primarily focuses on chlorinated solvent remediation in the groundwater. The following technology, action, or status will be consistent across all alternatives, and therefore, is not discussed in detail for each alternative:

- Institutional controls including Site use restrictions to Commercial use development and a permanent environmental easement on the property.
- The implementation of a passive (or active) mitigation system for soil vapors on an as-needed basis, given that there are no existing buildings and redevelopment does not include buildings on the Site. This is further addressed in the SMP.
- Concrete, asphalt and/or a one-foot-thick layer of imported, clean material (e.g. topsoil) placed above a demarcation barrier, will provide a physical barrier to any potential remaining contamination in the existing Site soils.

Each of the following alternatives, specific to groundwater, has the potential to meet the desired cleanup track. A more detailed analysis of each is provided in the following sections.

- Alternative 1: No Action
- Alternative 2: Track 4 – Monitored Natural Attenuation
- Alternative 3: Track 4 – In-Situ Chemical Injections via Oxidation

4.3 ALTERNATIVE 1 – NO ACTION

4.3.1 Description of Alternative 1

The "No Action" alternative was retained as a basis for comparison of other remedial alternatives. However, this alternative will not be selected as the Site remedy because of the levels of contamination identified in the groundwater.

4.4 ALTERNATIVE 2 – MONITORED NATURAL ATTENUATION

4.4.1 Description of Alternative 2

In addition to the soil and soil vapor technologies addressed in Section 4.2, the following alternative addresses impacted groundwater for the Site. Natural attenuation relies on natural processes to decrease or attenuate concentrations of contaminants in groundwater. Chlorinated solvents such as PCE favor reductive dehalogenation and under the right physiochemical conditions will breakdown into TCE, DCE, and vinyl chloride before becoming a non-toxic substance such as ethene.

MNA works best where the source of contamination has been removed. The source of the contamination at the BCP property has been identified as underneath the former Coyne Textile building and was remediated in the summer and fall of 2020, as previously described in Section 3.4.3. Under this alternative Site COCs would be monitored on a quarterly basis and a trend analysis performed.

4.4.2 Assessment of Alternative 2

The following table provides a summary of the detailed assessment for treatment of the COCs utilizing MNA.

Table 3. Monitored Natural Attenuation

Criterion	Discussion
Protection of Human Health & the Environment	*Advantages:* • No additional active remediation. • Quarterly evaluation/assessment of in-situ conditions. • Allows the natural degradation process to take place. • Reduces potential for cross-media transfer of contaminants commonly associated with ex-situ treatment and reduced risk of human exposure to contaminated media *Disadvantages:* • No active remediation • Off site migration may continue
Compliance with SCGs	Will ultimately meet SCGs after natural degradation processes have completed and will be monitored on a quarterly basis.
Long-Term Effectiveness & Permanence	*Advantages:* • Target COCs degrade through reductive dehalogenation to non-toxic ethene. *Disadvantages:* • Takes time to reach complete degradation.
Reduction in Toxicity, Mobility, & Volume	*Advantages:* • Permanent reduction in toxicity, mobility, and volume of COCs. *Disadvantages:* • Takes time to meet complete reduction.
Short-Term Effectiveness	Does not have immediate short-term effectiveness as there is no active remediation. However, from data collected to date, the natural degradation process is already occurring, as evidenced by decreasing PCE results and increasing concentration of breakdown products.
Implementability	Can be implemented via monitoring of existing wells within the Site and does not require additional intrusive activities through the recently redeveloped property (i.e. concrete surface).
Cost	Groundwater monitoring on a quarterly basis is estimated at approximately $20,000 per year. Laboratory analysis would include VOCs, alkalinity, metals, chloride, and nitrate. Parameters such as dissolved oxygen, pH, oxidation-reduction potential, and conductivity would be measured in the field using direct read instruments.
Land Use	Meets current and future Site land use restrictions as a commercial property.
Community Acceptance	Approved previously as part of DD.

Criterion	Discussion
Green Remediation and Sustainability	Will require quarterly trips to the Site and laboratory, but does not include active remediation that would require additional fossil fuel consumption that may occur through the use of equipment such as a generator, heavy machinery, etc.

4.5 ALTERNATIVE 3 – TREATMENT WITH ISCO AND/OR ISCR [TRACK 4]

4.5.1 Description of Alternative 3

In addition to the soil and soil vapor technologies addressed in Section 4.2, the following alternative addresses impacted groundwater for the Site.

Unlike the previous alternatives, Alternative 3 focuses on the in-situ treatment of groundwater across the Site as levels of COCs are present above TOGS 1.1.1. Under Alternative 3, ISCO treatment is proposed to address the remaining groundwater contamination on the Site. Using this strategy, contaminated groundwater will be amended with oxidizing reagents injected directly into the subsurface through groundwater wells.

4.5.2 Assessment of Alternative 3

The following tables provide a summary of the detailed assessment for treatment of groundwater with ISCO.

Table 4. Groundwater Treatment with ISCO

Criterion	Discussion
Protection of Human Health & the Environment	*Advantages:* • Takes a relatively short period of time to achieve cleanup goals that will provide protection of human health and the environment. • Limited secondary waste generated after remedial activities are complete. *Disadvantages:* • Alternative may not address all dissolved contaminants and some remaining contaminants not directly target by the oxidant application may continue to migrate off-site or require additional rounds of treatment.
Compliance with SCGs	*Advantages:* • ISCO can rapidly break down the target COCs in groundwater *Disadvantages:* • May not remediate COCs to TOGS 1.1.1 criteria in one application. At which point either additional application(s) or MNA would likely be required.

Criterion	Discussion
Long-Term Effectiveness & Permanence	*Advantages:* • High certainty of effective treatment. Level of certainty increases with target treatment area definition/oxidant distribution/contact with contaminants/accurate oxidant dosing. • ISCO has been shown to only temporarily inhibit microbial activity and will increase as geochemical conditions return to normal. *Disadvantages:* • Long-term monitoring and groundwater restrictions may still be required.
Reduction in Toxicity, Mobility, & Volume	*Advantages:* • Volume of contaminants at the Site would be reduced in a short time frame. *Disadvantages:* • More than one application may be required to achieve the desired COC mass reduction. • Direct injection may require higher oxidant dosing. • Can be difficult to hydraulically control.
Short-Term Effectiveness	*Advantages:* • Limited direct public exposure to COCs. *Disadvantages:* • Handling of chemical additives is necessary for treatment of groundwater. • Requires active remediation via days of injecting chemicals during ongoing Site redevelopment and potentially manufacturing processes at the JMA Tech Campus.
Implementability	*Advantages:* • May be able to utilize existing on-site wells to direct inject. *Disadvantages:* • The roadway is filled with various utilities, both new/operational and old/abandoned. Injecting can be not only costly but extremely dangerous given that each of these utility trenches has the potential to be a migratory pathway for any material injected. • Less compacted soil found within the roadway, such as utility/pipe bedding, leads back toward the newly constructed manufacturing building. If chemicals are injected, there is the potential that it could daylight under the brand new building and into active manufacturing areas.
Land Use	Meets current and future Site land use restrictions as a commercial property.
Community Acceptance	Approved previously as part of DD.
Cost	• Assuming only one application of ISCO the cost would be approximately \$75,000 to perform a bench test and appropriate injections. • Long-term groundwater monitoring would likely be required in addition to this cost, as determined by the NYSDEC and NYSDOH. Quarterly sampling is estimated at approximately \$10,000 per year.
Green Remediation and Sustainability	Potentially a significant reduction in contaminated mass; however, will require transport of chemicals from facilities.

5.0 RECOMMENDATIONS

5.1 RECOMMENDED ALTERNATIVE

There are many pros and cons to each alternative. It is important to evaluate each of these with respect to the ongoing Site and JMA Tech Campus redevelopment project. Both alternatives meet each of the DER-10 comparison criteria as previously described and discussed in the sections above. In summary, although MNA does not include an active remediation strategy and does take time, it is less intrusive, will meet SCGs, is implementable, and will be effective long-term. Alternatively, ISCO will provide a short-term effectiveness but will not be as implementable based on the current Site redevelopment and will be more costly.

CHA recommends the selection of Alternative 2, Monitored Natural Attenuation of the groundwater at the Site with the caveat that additional remedial measures may be considered and/or required depending on the data and data trends collected during quarterly groundwater monitoring events post-issuance of the COC. The source of the groundwater contamination was identified and remediated as part of work that was previously conducted immediately upgradient of the Site on the original BCP property. Contaminant levels that currently exist in the groundwater are indicative of natural breakdown already occurring on the Site. Continuing to monitor the remaining contaminant levels through a groundwater monitoring program specified within the SMP is the recommended alternative and consists of quarterly monitoring events followed by an evaluation to determine if MNA is effective or if additional remedial action may be warranted. A work plan will be provided to NYSDEC and NYSDOH for such remedial action at that time. Additionally, remaining soil contamination would be managed by the installation of a cover (e.g. concrete, asphalt, and/or 1-foot imported soil). Soil vapor intrusion would be addressed as part of future Site redevelopment that consists of any continuously human-occupied structure and guidance and is provided within the SMP. However, no such structures are currently planned for the Site.

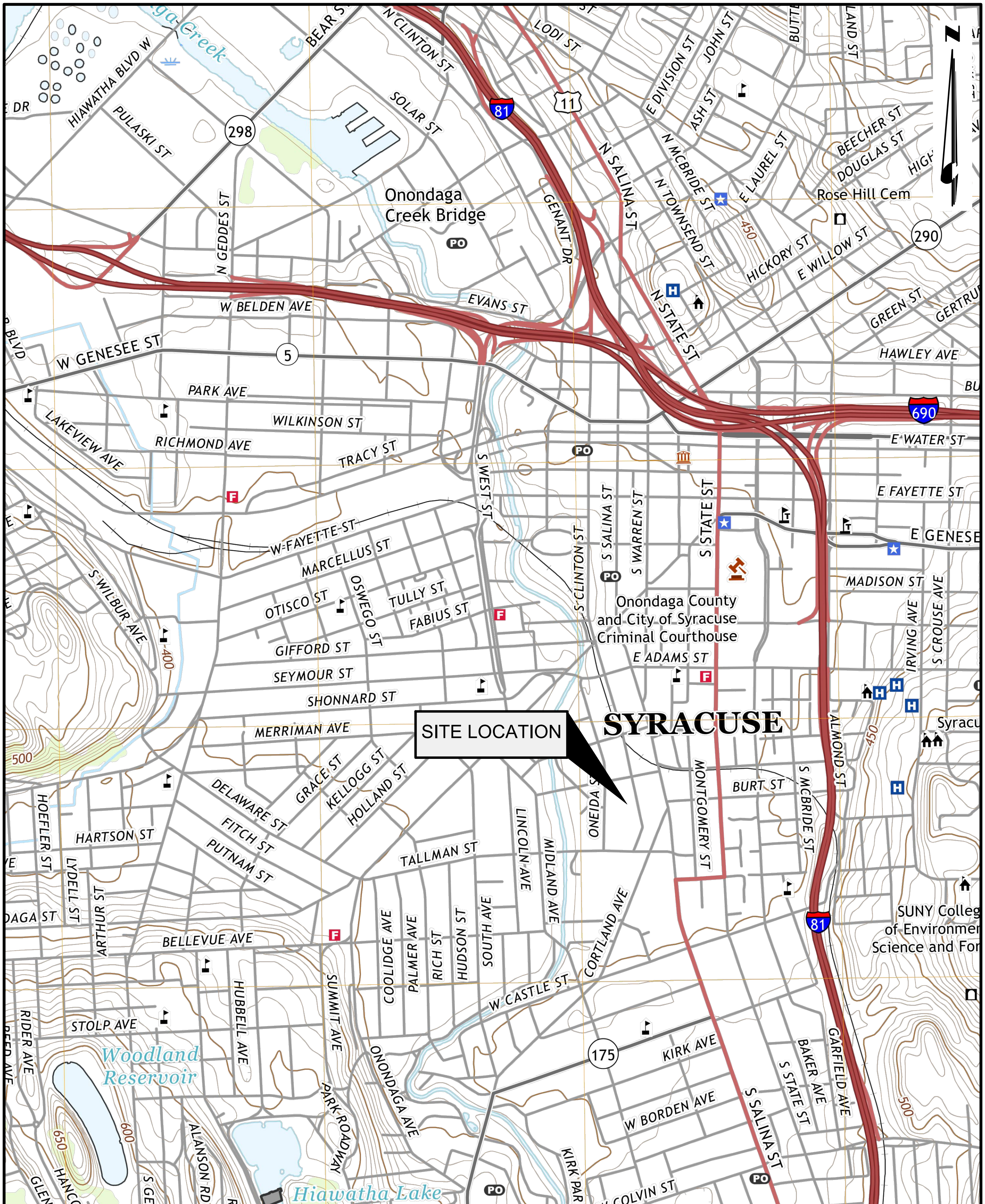
6.0 SCHEDULE

The following table provides an estimated schedule for completion of the BCP project. It is important to note that redevelopment activities are scheduled to be complete in the Fall of 2021.

Table 5. Project Schedule

Description	Estimated Start	Estimated Finish
NYSDEC Review & Approval of SAAR	Mid-November 2021	December 3, 2021
NYSDEC Review & Approval of FER	October 2021	November 2021
NYSDEC Review & Approval of SMP	September 2021	November 2021
NYSDEC Issuance of COC	Mid-December 2021	December 2021

FIGURES



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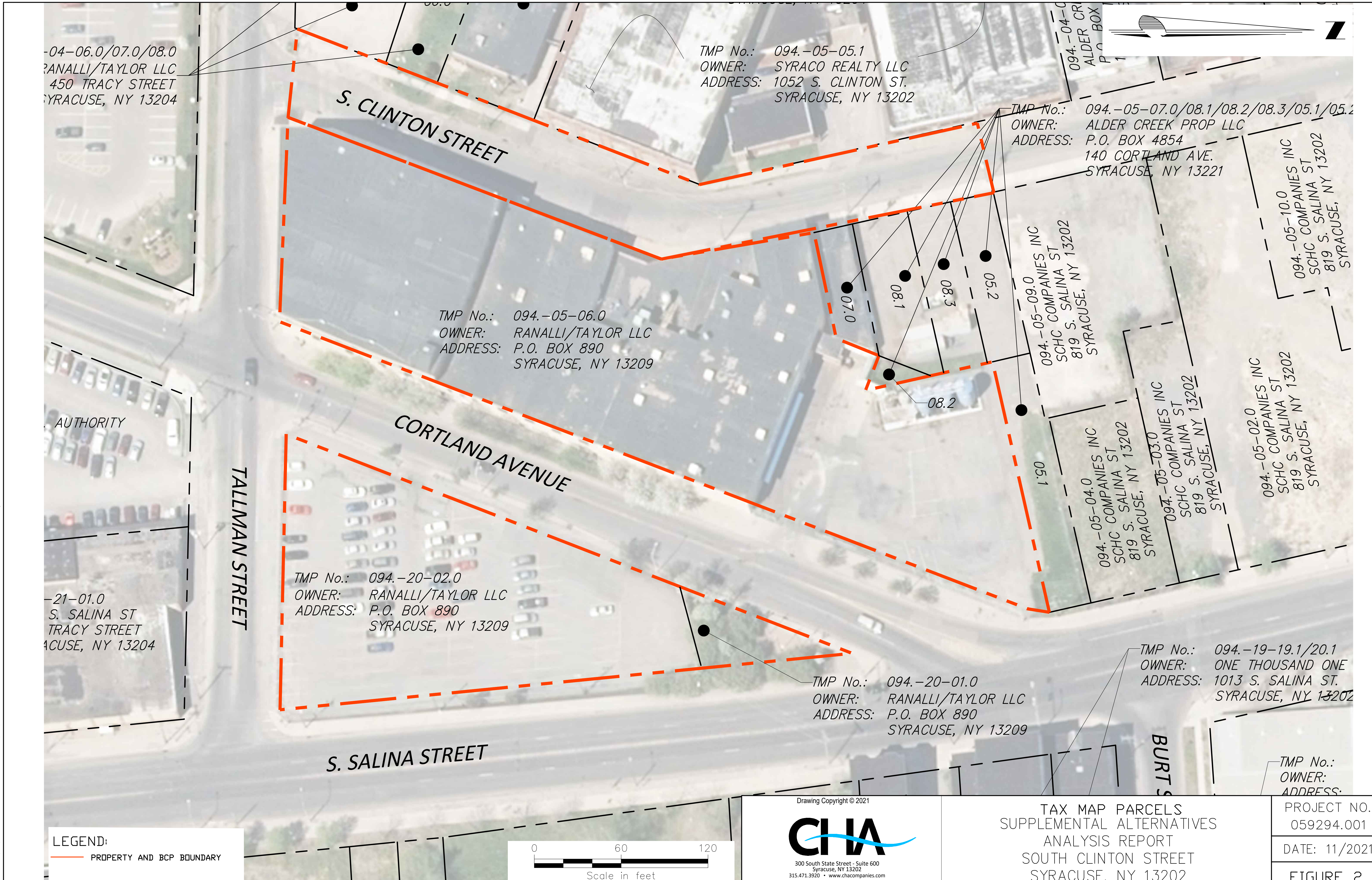
SITE LOCATION MAP

SUPPLEMENTAL ALTERNATIVES ANALYSIS REPORT
SOUTH CLINTON STREET
SYRACUSE, NEW YORK

PROJECT NO. 059294.001

DATE: 11/2021

FIGURE 1



LEGEND:
PROPERTY AND BCP BOUNDARY

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TAX MAP PARCELS
SUPPLEMENTAL ALTERNATIVES
ANALYSIS REPORT
SOUTH CLINTON STREET
SYRACUSE, NY 13202

PROJECT NO.
059294.001

DATE: 11/2021

FIGURE 2

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LEGEND:

FORMER COYNE TEXTILE BCP - ORIGINAL LIMITS

SOUTH CLINTON STREET RIGHT OF WAY ADDED TO BCP

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BROWNFIELD CLEANUP PROGRAM LIMITS

SUPPLEMENTAL ALTERNATIVES ANALYSIS
SOUTH CLINTON STREET
SYRACUSE, NEW YORK

PROJECT NO. 059294.001

DATE: 11/2021

FIGURE 3

File: V:\PROJECTS\ANY\K5\059294.001\CADD_ACAD\ENVP\SAAR FIGURES.DWG
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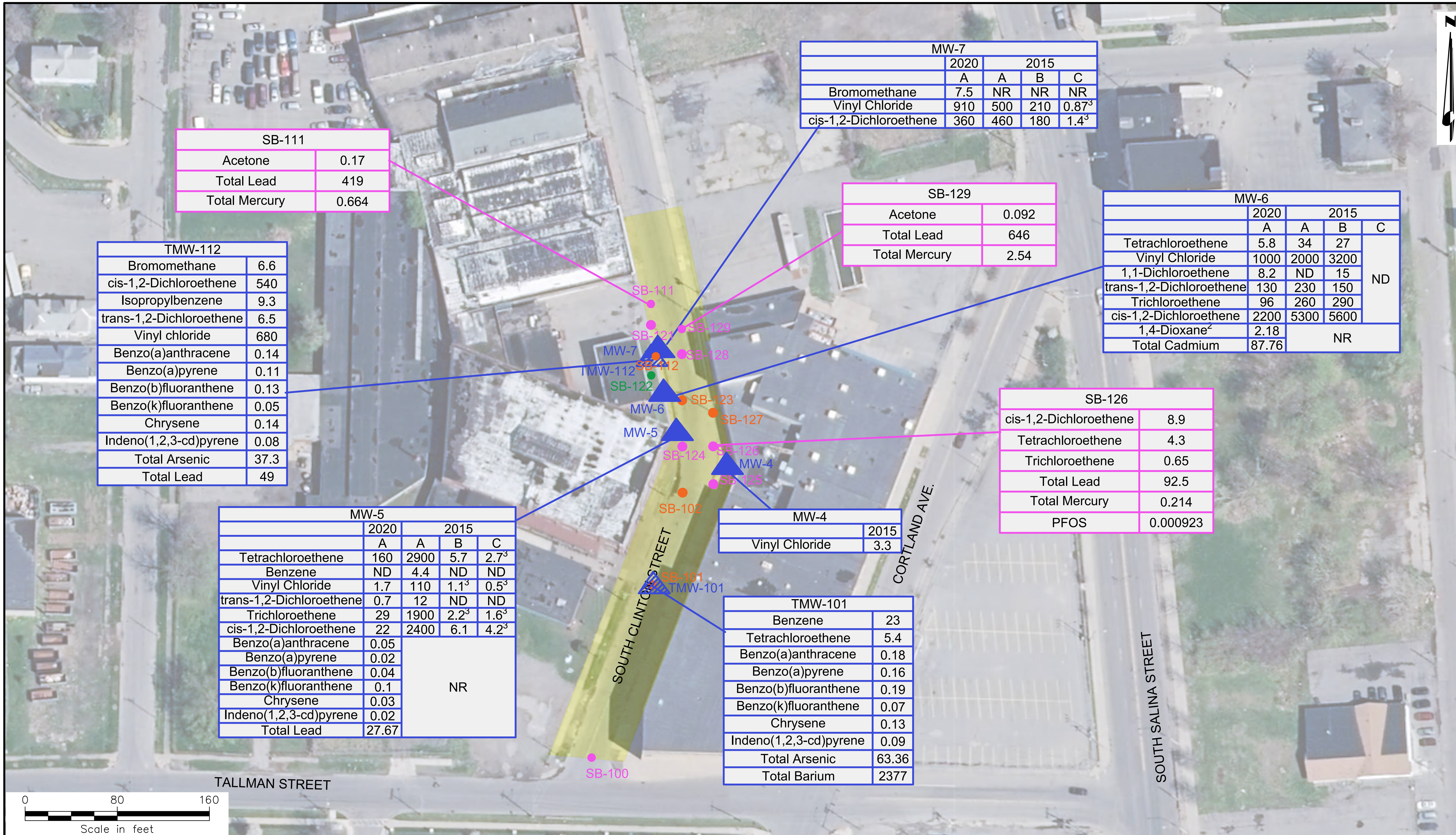

SB-111	
Acetone	0.17
Total Lead	419
Total Mercury	0.664

MW-7				
	2020	2015		
	A	A	B	C
Bromomethane	7.5	NR	NR	NR
Vinyl Chloride	910	500	210	0.87[3]
cis-1,2-Dichloroethene	360	460	180	1.4[3]

SB-129	
Acetone	0.092
Total Lead	646
Total Mercury	2.54

MW-6				
	2020	2015		
	A	A	B	C
Tetrachloroethene	5.8	34	27	ND
Vinyl Chloride	1000	2000	3200	
1,1-Dichloroethene	8.2	ND	15	
trans-1,2-Dichloroethene	130	230	150	
Trichloroethene	96	260	290	
cis-1,2-Dichloroethene	2200	5300	5600	
1,4-Dioxane[2]	2.18	NR		
Total Cadmium	87.76			

TMW-112	
Bromomethane	6.6
cis-1,2-Dichloroethene	540
Isopropylbenzene	9.3
trans-1,2-Dichloroethene	6.5
Vinyl chloride	680
Benzo(a)anthracene	0.14
Benzo(a)pyrene	0.11
Benzo(b)fluoranthene	0.13
Benzo(k)fluoranthene	0.05
Chrysene	0.14
Indeno(1,2,3-cd)pyrene	0.08
Total Arsenic	37.3
Total Lead	49

SB-126	
cis-1,2-Dichloroethene	8.9
Tetrachloroethene	4.3
Trichloroethene	0.65
Total Lead	92.5
Total Mercury	0.214
PFOS	0.000923

MW-5				
	2020	2015		
	A	A	B	C
Tetrachloroethene	160	2900	5.7	2.7[3]
Benzene	ND	4.4	ND	ND
Vinyl Chloride	1.7	110	1.1[3]	0.5[3]
trans-1,2-Dichloroethene	0.7	12	ND	ND
Trichloroethene	29	1900	2.2[3]	1.6[3]
cis-1,2-Dichloroethene	22	2400	6.1	4.2[3]
Benzo(a)anthracene	0.05	NR		
Benzo(a)pyrene	0.02			
Benzo(b)fluoranthene	0.04			
Benzo(k)fluoranthene	0.1			
Chrysene	0.03			
Indeno(1,2,3-cd)pyrene	0.02			
Total Lead	27.67			

MW-4	
	2015
Vinyl Chloride	3.3

TMW-101	
Benzene	23
Tetrachloroethene	5.4
Benzo(a)anthracene	0.18
Benzo(a)pyrene	0.16
Benzo(b)fluoranthene	0.19
Benzo(k)fluoranthene	0.07
Chrysene	0.13
Indeno(1,2,3-cd)pyrene	0.09
Total Arsenic	63.36
Total Barium	2377

GROUNDWATER MONITORING WELL LOCATION
TEMP. GROUNDWATER MONITORING WELL LOCATION
SOIL BORING AND SAMPLE LOCATION
SOIL BORING LOCATION
SOIL BORING LOCATION ADJACENT TO BCP
SOIL RESULTS DISPLAYED IN mg/kg (ppm)
ND – PARAMETER NOT DETECTED
NR – PARAMETER NOT REPORTED

GROUNDWATER RESULTS DISPLAYED IN µg/l (ppb)
SOIL PARAMETERS SHOWN EXCEED 6 NYCRR PART 375 UNRESTRICTED SCOs
PARAMETERS SHOWN EXCEED TOGS 1.1.1 AMBIENT GROUNDWATER QUALITY CRITERIA FOR CLASS GA WATERS
1 – GUIDANCE VALUES OBTAINED FROM THE NYSDEC OCT. 2020 GUIDANCE
2 – GUIDANCE VALUE FROM NYSDOH SECTION 225 FOR DRINKING WATER
3 – VALUE DOES NOT EXCEED TOGS 1.1.1

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SOIL & GROUNDWATER SAMPLE LOCATIONS
SUPPLEMENTAL ALTERNATIVES ANALYSIS REPORT
SOUTH CLINTON STREET
SYRACUSE, NEW YORK

PROJECT NO. 059294.001
DATE: 11/2021
FIGURE 4

APPENDIX A

Decision Document (July 2020)

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Environmental Remediation, Remedial Bureau D
625 Broadway, 12th Floor, Albany, NY 12233-7013
P: (518) 402-9676 I F: (518) 402-9773
www.dec.ny.gov

July 7, 2020

Dino Peios
JMA Tech Properties, LLC
PO Box 678
Liverpool, NY 13088

Re: Former Coyne Textile
Site ID No. C734144
Syracuse, Onondaga County, NY
Alternatives Analysis Report & Decision Document

Dear Mr. Peios:

The New York State Department of Environmental Conservation (DEC) and the New York State Department of Health (NYSDOH) have reviewed the Alternative Analysis Report (ARR) for the Former Coyne Textile site dated March 2020 and prepared by CHA Consulting, Inc. on behalf of Ranalli/Taylor St., LLC. The AAR is hereby approved. Please ensure that a copy of the approved AAR is placed in the document repository(ies). The draft plan should be removed.

Enclosed is a copy of DEC's Decision Document for the site. The remedy is to be implemented in accordance with this Decision Document. Please ensure that a copy of the Decision Document is placed in the document repository(ies).

Please contact the Department's Project Manager, Michael Belveg, at 315-426-7446 or Michael.belveg@dec.ny.gov at your earliest convenience to discuss next steps. Please recall the DEC requires seven day's notice prior to the start of field work.

Sincerely,

Susan L. Edwards

Susan Edwards
Director
Remedial Bureau D
Division of Environmental Remediation

Enclosure

ec w/attachments:
Michael Ryan, DEC
Susan Edwards, DEC
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DECISION DOCUMENT

Former Coyne Textile
Brownfield Cleanup Program
Syracuse, Onondaga County
Site No. C734144
July 2020

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

DECLARATION STATEMENT - DECISION DOCUMENT

Former Coyne Textile
Brownfield Cleanup Program
Syracuse, Onondaga County
Site No. C734144
July 2020

Statement of Purpose and Basis

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

This decision is based on the Administrative Record of the New York State Department of Environmental Conservation (the Department) for the Former Coyne Textile site and the public's input to the proposed remedy presented by the Department.

Description of Selected Remedy

The elements of the selected remedy, as shown in Figure 3 are as follows:

1. Remedial Design

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

• Considering the environmental impacts of treatment technologies and remedy stewardship over the long term;
• Reducing direct and indirect greenhouse gases and other emissions;
• Increasing energy efficiency and minimizing use of non-renewable energy;
• Conserving and efficiently managing resources and materials;
waste, increasing recycling and increasing reuse of materials which would otherwise be considered a waste;
• Maximizing habitat value and creating habitat when possible;
• Fostering green and healthy communities and working landscapes which balance ecological, economic and social goals;
• Integrating the remedy with the end use where possible and encouraging green and sustainable re-development; and

• Additionally, to incorporate green remediation principles and techniques to the extent feasible in the future development at this site, any future on-site buildings will include, at a minimum, a 20-mil vapor barrier/waterproofing membrane on the foundation to improve energy efficiency as an element of construction.

2. Excavation

Part of the existing on-site building will be demolished and materials which can't be beneficially reused on site will be taken off-site for proper disposal in order to implement the remedy.

Excavation to groundwater (approximately 10 feet) and off-site disposal of contaminant source areas, including:

• Grossly contaminated soil, as defined in 6 NYCRR Part 375-1.2(u);
• Soils in the source area which exceed the protection of groundwater soil cleanup objectives (PGWSCOs), as defined by 6 NYCRR Part 375-6.8 for those contaminants found in site groundwater above standards; and
• Soils that create a nuisance condition, as defined in Commissioner Policy CP-51 Section G.

Excavation and removal of any additional underground storage tanks (USTs) that may be found, fuel dispensers, underground piping or other structures associated with a source of contamination.

3. Backfill

On-site soil which does not exceed the above excavation criteria or commercial use SCOs for any constituent may be used anywhere beneath the cover system, including below the water table, to backfill the excavation or re-grade the site.

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

The site will be re-graded to accommodate installation of a cover system as described in remedy element 4.

4. Cover System

A site cover currently exists in areas not occupied by buildings and will be maintained to allow for commercial use of the site. Any site redevelopment will maintain the existing site cover or be replaced with an alternate cover. The site cover may include paved surface parking areas, sidewalks or soil where the upper one foot of exposed surface soil meets the applicable soil cleanup objectives (SCOs) for commercial use. A demarcation layer will be needed in any areas where fill will need to be brought in. Any fill material brought to the site will meet the requirements for the identified site use as set forth in 6NYCRR part 375-6.7(d).

5. Soil Mixing / In-Situ Reduction

In-situ reduction of contaminated soil will be implemented in an approximately 6,000 square foot area located in the northwestern portion of the building, as indicated on Figure 3, in the source area of VOC groundwater contamination. The treatment zone will extend from the top of the groundwater table, at approximately 9 feet below grade to approximately 16 feet below grade. The contaminated soil will be mixed in place with zero valent iron (ZVI) using an excavator or augers. During mixing, VOCs may be released, and the capture of any released VOCs will be assessed during design.

6. Groundwater Remedies

Monitoring

Monitoring for contaminants of concern will be required up-gradient, down-gradient, and within the treatment zone of the source area and the plume.

Groundwater Extraction & Treatment

Groundwater extraction and treatment will be implemented to treat contaminants in groundwater and to ensure contaminated groundwater does not migrate off-site. The groundwater extraction system will be designed and installed so that the capture zone is sufficient to cover the areal and vertical extent of the plume within the site boundary and intercept the groundwater contaminant plume to stop further migration. The extraction system will create a depression of the water table so that contaminated groundwater is directed toward the extraction wells within the plume area. Groundwater will be extracted from the area of the groundwater contaminant plume shown on Figure 3 using a submersible pump placed in one or more extraction wells. Further details of the extraction system will be determined during the remedial design. The extraction system will be designed to minimize the drawdown of the water table in order to reduce smearing of non-aqueous phase liquid in the area of drawdown.

Prior to the full implementation of this technology, studies will be conducted to define design parameters, including extraction well spacing.

The extracted groundwater will be treated using Ex-situ Chemical Oxidation (ESCO).

Ex-Situ Chemical Oxidation or Reduction

Ex-situ chemical oxidation (ESCO) and reinjection will be implemented to treat contaminants in groundwater. A chemical oxidant will be mixed into the extracted groundwater to destroy the contaminants. Groundwater recirculation in combination with oxidant addition would be performed in the central portion of the plume indicated on Figure 3. Groundwater would be removed through extraction wells, amended with oxidizing reagents, and reinjected into the subsurface through a series of injection wells once it has met TOGS 1.1.1 ambient water quality standards for Class GA waters.

As part of design and prior to the full implementation of this technology, laboratory and on-site pilot scale studies will be conducted to refine design parameters.

Monitored Natural Attenuation

Groundwater contamination remaining after active remediation has been completed or has been performed to the extent practicable, as determined by the Department will be addressed with monitored natural attenuation (MNA). Groundwater will be monitored for site related contamination and also for MNA indicators which will provide an understanding of the (biological activity) breaking down the contamination. Reports of the attenuation will be provided at yearly intervals, and active remediation will be proposed if it appears that natural processes alone will not address the contamination. The contingent remedial action will be In-Situ Chemical Oxidation, unless information available at the time indicates this is not the appropriate remedial action.

7. Treatment Remedy Shutdown

The operation of the treatment components of the remedy will continue until the remedial objectives have been achieved, or until the Department determines that continued operation is technically impracticable or not feasible.

8. Vapor Mitigation

Any on-site buildings will be required to have an active sub-slab depressurization system, or other acceptable measures, to mitigate the migration of vapors into the building from soil and/or groundwater.

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

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

10. Site Management Plan

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

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

Institutional Controls: The Environmental Easement discussed in Remedial Element 9 above.

Engineering Controls: The soil cover discussed in Remedial Element 4, the groundwater extractions and treatment system in Remedial Element 6 and the sub-slab depressurization system(s) discussed in Remedial Element 8 above.

This plan includes, but may not be limited to:

- An Excavation Plan which details the provisions for management of future excavations in areas of remaining contamination;
- A provision for demolition of on-site buildings if and when they become unsafe or inactive or vacant;
- Descriptions of the provisions of the environmental easement including any land use, and groundwater use restrictions;
- A provision that should a building foundation or building slab be removed in the future, a cover system consistent with that described in remedial element 4 above will be placed in any areas where the upper one foot of exposed surface soil exceeds the applicable soil cleanup objectives (SCOs)
- Provisions for the management and inspection of the identified engineering controls;
- Maintaining site access controls and Department notification; and
- The steps necessary for the periodic reviews and certification of the institutional and/or engineering controls.

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

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

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

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

Declaration

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

July 6, 2020
Date

Susan L. Edwards
Susan Edwards, Director
Remedial Bureau D

DECISION DOCUMENT

Former Coyne Textile
Syracuse, Onondaga County
Site No. C734144
July 2020

SECTION 1: <u>SUMMARY AND PURPOSE</u>

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

The New York State Brownfield Cleanup Program (BCP) is a voluntary program. The goal of the BCP is to enhance private-sector cleanups of brownfields and to reduce development pressure on "greenfields." A brownfield site is real property, the redevelopment or reuse of which may be complicated by the presence or potential presence of a contaminant.

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

SECTION 2: <u>CITIZEN PARTICIPATION</u>

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

DECInfo Locator - Web Application
https://www.dec.ny.gov/data/DecDocs/C734144/

Onondaga County Public Library
447 South Salina Street
Syracuse, NY 13202
Phone: (315) -435-1900

Receive Site Citizen Participation Information by Email

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

SECTION 3: SITE DESCRIPTION AND HISTORY

Location: The site is located at 140 Cortland Avenue in the City of Syracuse and consists of two non-contiguous site areas. The former and currently vacant main laundry facility and offices are known as 140 Cortland Avenue and consist of one parcel of land totaling approximately 1.75 acres. The other site area is known as 1002-1022 South Salina Street/Cortland Avenue and 1024-1040 South Salina Street/Tallman Street, and constitute two parcels totaling approximately 1.70 acres. The site limits are generally bounded by commercial buildings to the north, South Salina Street to the east, Tallman Street to the south and South Clinton Street to the west. The site is currently inactive/unoccupied and zoned for commercial use.

Site Features: 140 Cortland Ave. consists of the currently vacant former laundering facility and offices, sidewalks and limited vegetation. The building is a concrete block building with a slab-on-grade foundation. The other area consists of a small park and a fenced in asphalt parking lot.

Current Zoning and Land Use: The site is currently inactive and is zoned for commercial use. The general area surrounding the site is highly developed and consists of commercial and industrial facilities. Several rows of multifamily houses are located northwest of the site.

Past Use of the Site: For more than 100 years, the site was used for industrial purposes, including a machine shop and rug manufacturing before Coyne Textile Services began operation in 1938. As an industrial dry-cleaning facility, the site utilized tetrachloroethene (PCE) and Stoddard solvent (a non-chlorinated solvent) until 2000. Several property owners had structures on what is now the employee parking lot, dating back to 1892 when the location was a brick and mortar building that housed a stone cutting facility. Syracuse Transit Corporation had a bus storage and repair building on the parcel beginning in 1951. From 1989 until acquisition by the current owner, the parcel was used for employee parking and a small greenspace.

Coyne Textile Services filed for bankruptcy and ceased operations in late 2015. Ranalli/Taylor St. LLC purchased the property in 2016 and entered a Brownfield Cleanup Agreement (BCA) in September 2017.

Site Geology and Hydrogeology: The site has an approximate elevation of 390 feet above mean sea level and is relatively flat. The surrounding areas to the east and west have a relatively steep topographic gradient, which slopes downward to Onondaga Creek. Site soils are tight and consist of Urban Land with the bedrock anticipated to be of Paleozoic era, stratified sequence. The bedrock geology underlying the site is the Syracuse Formation, which consists of dolostone, shale, gypsum, and salts. The exact depth of the bedrock is unknown at the site, but it is known to be at a depth greater than 80 feet bgs.

The estimated depth to groundwater is less than 15 feet below ground surface. The groundwater in the area appears to be brackish saline. Groundwater at the site is assumed to flow to the northwest toward Onondaga Creek. However, localized flow directions in the area of the site may vary as a result of underground utilities or other heterogeneous subsurface conditions. Onondaga Creek is located approximately 600 feet west of the site, which flows in a northerly direction towards Onondaga Lake.

A site location map is attached as Figure 1 and a site boundary map is attached as Figure 2.

SECTION 4: LAND USE AND PHYSICAL SETTING

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

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

SECTION 5: ENFORCEMENT STATUS

The Applicant under the Brownfield Cleanup Agreement is a Volunteer. The Volunteer does not have an obligation to address off-site contamination. The Department has determined that this site poses a significant threat to human health and the environment and there are off-site impacts that require remedial activities; accordingly, enforcement actions related to the off-site are necessary and a search for potential responsible parties is being performed.

The Department entered a Brownfield Cleanup Agreement with Ranalli/Taylor St., LLC for the Former Coyne Textile site on July 13, 2015 (Index No. C734144-06-15). The agreement governs the submission and implementation of work plans for the site investigation, remediation and operation, maintenance and monitoring.

SECTION 6: SITE CONTAMINATION

6.1: Summary of the Remedial Investigation

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

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

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

The analytical data collected on this site includes data for:

- ambient (outdoor) air
- groundwater
- soil
- soil vapor
- indoor air
- sub-slab vapor

6.1.1: Standards, Criteria, and Guidance (SCGs)

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

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

6.1.2: RI Results

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

tetrachloroethene (PCE)
benzene
isopropylbenzene
vinyl chloride
cis-1,2-dichloroethene
trans-1,2-dichloroethene
trichloroethene (TCE)
xylene (mixed)

iron
magnesium
sodium

The contaminants of concern exceed the applicable SCGs for:

- groundwater
- soil
- soil vapor intrusion
- indoor air

6.2: <u>Interim Remedial Measures</u>

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

The following IRMs have or will be completed at this site based on conditions observed during the RI.

<u>Source Removal IRM</u>

In June of 2019, an excavation program was undertaken to remove three underground storage tanks (USTs) and associated contaminated soils at the site. The excavation took place in the northwestern portion of the building in the former UST area. See green hashed area on Figure 3. The excavations went to a depth of approximately 9 feet below ground surface (bgs). The excavation ceased at that depth in order to prevent compromising the structural integrity of the building via undermining.

In addition to the tanks, approximately 354 tons of contaminated soil was removed from the site. A demarcation layer was placed along the limits of the excavation area and clean fill meeting the requirements of 6 NYCRR Part 375-6.7(d) was brought in to replace the excavated soil. More details of the work completed under this IRM are within the Construction Completion Report (CCR) submitted to the Department in October 2019.

<u>Office Area Vapor Intrusion IRM</u>

In June of 2019, the Department received an IRM proposal to address soil vapor intrusion within the office area of the building. This IRM called for a sub-slab depressurization system (SSDS) to be installed within the office portion of the building. The IRM work plan was approved by the Department on June 25, 2019. Due to an anticipated structural change of the office building, the IRM remedial work was put in hold. This IRM will be completed during the remedial action work.

6.3: <u>Summary of Environmental Assessment</u>

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

Nature and Extent of Contamination: Soil and groundwater were analyzed for volatile organic compounds (VOCs), semi-volatile compounds (SVOCs), metals, polychlorinated biphenyls (PCBs), and pesticides. Groundwater was also sampled for emerging contaminants (ECs). Soil vapor was analyzed for VOCs. Based upon investigations conducted to date, the primary contaminants of concern appear to be VOCs and metals with minor detections of ECs, PCBs, and SVOCs.

Soil

Surface Soils:
Only one VOC, acetone, was detected in the surface soil sample at a concentration of 0.427 parts per million (ppm) which exceeds the unrestricted soil cleanup objective (SCO) of 0.05 ppm but is less than the commercial SCO of 500 ppm. SVOCs, PCBs, metals, and pesticides were not detected above their respective unrestricted SCOs.

No off-site surface soil samples were taken during the RI.

Subsurface Soils:
Only one VOC was detected at a concentration exceeding the Part 375 commercial SCO, tetrachloroethene (PCE), at a maximum concentration of 460 ppm compared to the commercial SCO of 150 ppm. This sample was located in the northwest corner of the building. There were several compounds that were also found in groundwater and that exceeded their respective Protection of Groundwater SCOs (PGW SCOs) in soil, including benzene at a maximum of 0.39 ppm, which exceeds the PGW SCO of 0.06 ppm, vinyl chloride at a maximum of 12.3 ppm, which exceeds the PGW SCO of 0.02 ppm, cis-1,2-dichloroethene at a maximum of 424 ppm, which exceeds the PGW SCO of 0.25 ppm, trans-1,2-dichloroethene at a maximum of 3.46 ppm, which exceeds the PGW SCO of 0.19 ppm, 1,1-dichloroethene at a maximum of 1.45 ppm, which exceeds the PGW SCO of 0.33 ppm, tetrachloroethene at a maximum of 460 ppm, which exceeds the PGW SCO of 1.3 ppm, and trichloroethene at a maximum of 38.3 ppm, which exceeds the PGW SCO of 0.47 ppm. There are several other volatile compounds, including 1,2,4 trimethylbenzene at a maximum of 4.31 ppm, 2-butanone (MEK) at a maximum of 0.115 ppm, and acetone at a maximum of 5.9 ppm that were detected above unrestricted SCOs but below the commercial use SCOs.

SVOCs detected at concentrations exceeding their respective unrestricted SCOs, but below commercial SCOs, include benzo(a)anthracene at a maximum of 2.42 ppm, benzo(a)pyrene at a maximum of 2.28 ppm, benzo(b)fluoranthene at a maximum of 3.06 ppm, benzo(k)fluoranthene at a maximum of 1.64 ppm, chrysene at a maximum of 2.42 ppm, and indeno(1,2,3-cd)pyrene at a maximum of 0.79 ppm. No SVOCs were detected at concentrations exceeding the commercial SCOs or the protection of groundwater SCOs.

Pesticides were not detected in any of the subsurface samples.

PCBs, including Aroclor 1242 and Aroclor 1260 were detected at concentrations above their respective unrestricted SCO of 0.1 ppm, but below the commercial SCO. The maximum Total PCBs concentration was 0.74 ppm.

Low concentrations of metals were found across the site. Barium was detected at a concentration of 404 ppm, which exceeds the commercial SCO of 400 ppm. This sample was located near the location of the former folding/product storage area. Lead was detected at a concentration of 776 ppm, which exceeds its respective PGW SCO of 450 ppm. Several other metals were detected above unrestricted SCOs, but below the commercial SCO including copper at a maximum of 114 ppm, nickel at a maximum of 56.2 ppm, zinc at a maximum of 315 ppm, and mercury at a maximum of 1.4 ppm.

No off-site subsurface samples were taken during the RI. However, four off-site soil borings were sampled previously in 2015 for VOCs and SVOCs. These borings were located to the northwest of the site. No VOCs exceeded their commercial SCOs, however several VOCs were found in groundwater and also exceeded their Part 375 PGW SCOs. These include 1,1-dichloroethene at a maximum of 1.0 ppm, which exceeds the PGW SCO of 0.33 ppm, tetrachloroethene at a maximum of 150 ppm, which exceeds the PGW SCO of 1.3 ppm, benzene at a maximum of 0.68 ppm, which exceeds the PGW SCO of 0.06 ppm, vinyl chloride at a maximum of 0.75 ppm, which exceeds the PGW SCO of 0.02 ppm, trans-1,2-dichloroethene at a maximum of 1.0 ppm, which exceeds the PGW SCO of 0.19 ppm, trichloroethene at a maximum of 14 ppm, which exceeds the PGW SCO of 0.47 ppm, and cis-1,2-dichloroethene at a maximum of 4.2 ppm, which exceeds the PGW SCO of 0.25 ppm. There were several SVOCs that exceeded their respective commercial SCOs. These included benz(a)anthracene at a maximum concentration of 20 ppm with an SCO of 5.6 ppm, benzo(a)pyrene at a maximum concentration of 17 ppm with an SCO of 1.0 ppm, benzo(b)fluoranthene at a maximum concentration of 21 ppm with an SCO of 5.6 ppm, dibenz(a,h)anthracene at a maximum concentration of 2.4 ppm with an SCO of 0.56 ppm, and indeno(1,2,3-cd)pyrene at a maximum concentration of 8.8 ppm with an SCO of 5.6 ppm. Off-site impacts will be addressed under site C734144A.

Groundwater

No PCBs or pesticides were detected in the groundwater.

VOCs detected in groundwater above the standard of 5 parts per billion (ppb) include 1,1-dichloroethene at a maximum of 18 ppb, isopropylbenzene (Cumene) at a maximum of 121 ppb, tetrachloroethene at a maximum of 21,400 ppb, trichloroethene at a maximum of 1,980 ppb, xylene (Total) at a maximum of 6.3 ppb with, cis-1,2-dichloroethene at a maximum of 4,550 ppb, and trans-1,2-dichloroethene at a maximum of 27.5 ppb. Other VOCs that were above groundwater standards include benzene at a maximum of 104 ppb with a standard of 1 ppb, and vinyl chloride at a maximum of 1,560 ppb with a standard of 2 ppb. Most of the VOC groundwater impacts were located in the northwest portion of the building, but VOC impacts were detected throughout the site.

Only one SVOC exceeded groundwater standards and that was bis(2-Ethylhexyl)phthalate at a maximum of 11 ppb with a standard of 5 ppb. This was located in the northwest portion of the building.

Metals that exceeded the groundwater standards include barium at a maximum of 2940 ppb with a standard of 1000 ppb, beryllium at a maximum of 7 ppb with a standard of 3 ppb, chromium at a maximum of 55 ppb with a standard of 50 ppb, copper at a maximum of 1,120 ppb with a standard of 200 ppb, lead at a maximum of 27 ppb with a standard of 25 ppb, magnesium at a maximum of 204,000 ppb with a standard of 35000 ppb, and thallium at a maximum of 14.5 ppb with a standard of 0.5 ppb. Metals within the groundwater were detected throughout the whole site.

Emerging contaminants (ECs) detected in the groundwater include numerous per and poly fluorinated alkyl substances (PFAS). The maximum total PFAS found was 3674.8 parts per trillion (ppt), considerably higher than the screening level of 500 ppt. The individual PFAS included: 6:2 fluorotelomer sulfonate (6:2FTS) at a maximum of 33 ppt, perfluorobutanesulfonic acid (PFBS) at a maximum of 14 ppt, perfluorobutanoic acid (PFBA) at a maximum of 330 ppt, perfluorodecanoic acid (PFDA) at a maximum of 2.1 ppt, perfluoroheptanesulfonic Acid (PFHpS) at a maximum of 24 ppt, perfluoroheptanoic acid (PFHpA) at a maximum of 160 ppt, perfluorohexanesulfonic acid (PFHxS) at a maximum of 25 ppt, perfluorohexanoic acid (PFHxA) at a maximum of 350 ppt, perfluorononanoic acid (PFNA) at a maximum of 75 ppt, perfluorooctanesulfonic acid (PFOS) at a maximum of 2,000 ppt exceeding the screening level of 10 ppt, perfluorooctanoic acid (PFOA) at a maximum of 300 ppt exceeding the screening level of 10 ppt, perfluoropentanoic acid (PFPeA) at a maximum of 360 ppt. 1,4-dioxane was found at a maximum of 1.7 ppb exceeding the screening level of 1 ppb. Most of the ECs were detected in the northwest portion of the building.

No off-site wells were sampled during the remedial investigation. However, four off-sites wells were sampled previously in 2015 for VOCs and SVOCs. These wells are located to the northwest of the site. Each of these wells have contaminants that exceed water quality standards and guidance values. The following contaminants were detected above the groundwater standards at one or more of the wells: tetrachloroethene at a maximum of 3100 ppb with a standard of 5 ppb, benzene at a maximum of 4.4 ppb with a standard of 1 ppb, vinyl chloride at a maximum of 3200 ppb with a standard of 2 ppb, trans-1,2-dichloroethene at a maximum of 230 ppb with a standard of 5 ppb, trichloroethene at a maximum of 2000 ppb with a standard of 5 ppb, cis-1,2-dichloroethene at a maximum of 5600 ppb with a standard of 5 ppb, and 1,1-dichloroethene at a maximum of 15 ppb with a standard of 5 ppb. Off-site impacts will be addressed under site C734144A.

Soil Vapor Intrusion

Elevated indoor air and sub-slab soil vapor concentrations needing additional action were detected throughout the building. Compounds detected in the indoor air that need additional action include: tetrachloroethene at a maximum of 50.9 ug/m^3 and trichloroethene at a maximum of 1.1 ug/m^3.

Compounds detected in the sub-slab vapor include: tetrachloroethene at a maximum of 1090 ug/m^3, trichloroethene at a maximum of 106 ug/m^3, 1,1,1-trichloroethane at a maximum of 5.3 ug/m^3, and cis 1,2-dichloroethene at a maximum of 38.4 ug/m^3.

No off-site indoor or sub-slab soil vapor samples were taken during the RI. However, it is possible that there is potential for impacts to indoor air from site contaminants via the soil vapor intrusion pathway in off-site buildings.

6.4: Summary of Human Exposure Pathways

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

People who enter the site may contact contaminants in the soil by walking on it, digging or otherwise disturbing the soil. Contaminated groundwater at the site is not used for drinking or other purposes and the site is served by a public water supply that obtains water from a different source not affected by this contamination. Volatile organic compounds in the subsurface may move into soil vapor (air spaces within the soil), which in turn may move into buildings and affect the indoor air quality. This process, which is similar to the movement of radon gas from the subsurface into the indoor air of buildings is referred to as soil vapor intrusion. Environmental sampling indicates that the potential exists for the inhalation of site contaminants due to soil vapor intrusion off-site and for future on-site buildings.

6.5: Summary of the Remediation Objectives

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

The remedial action objectives for this site are:

Groundwater

RAOs for Public Health Protection

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

RAOs for Environmental Protection

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

Soil

RAOs for Public Health Protection

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

RAOs for Environmental Protection

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

Soil Vapor

RAOs for Public Health Protection

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

SECTION 7: ELEMENTS OF THE SELECTED REMEDY

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

The selected remedy is referred to as the Source Area Treatment, Groundwater Extraction, Treatment and Recirculation and Vapor Intrusion Mitigation remedy.

The elements of the selected remedy, as shown in Figure 3 are as follows:

1. Remedial Design

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

• Considering the environmental impacts of treatment technologies and remedy stewardship over the long term;
• Reducing direct and indirect greenhouse gases and other emissions;
• Increasing energy efficiency and minimizing use of non-renewable energy;
• Conserving and efficiently managing resources and materials;
waste, increasing recycling and increasing reuse of materials which would otherwise be considered a waste;
• Maximizing habitat value and creating habitat when possible;
• Fostering green and healthy communities and working landscapes which balance ecological, economic and social goals;
• Integrating the remedy with the end use where possible and encouraging green and sustainable re-development; and

• Additionally, to incorporate green remediation principles and techniques to the extent feasible in the future development at this site, any future on-site buildings will include, at a minimum, a 20-mil vapor barrier/waterproofing membrane on the foundation to improve energy efficiency as an element of construction.

2. Excavation

Part of the existing on-site building will be demolished and materials which can't be beneficially reused on site will be taken off-site for proper disposal in order to implement the remedy.

Excavation to groundwater (approximately 10 feet) and off-site disposal of contaminant source areas, including:

• Grossly contaminated soil, as defined in 6 NYCRR Part 375-1.2(u);
• Soils in the source area which exceed the protection of groundwater soil cleanup objectives (PGWSCOs), as defined by 6 NYCRR Part 375-6.8 for those contaminants found in site groundwater above standards; and
• Soils that create a nuisance condition, as defined in Commissioner Policy CP-51 Section G.

Excavation and removal of any additional underground storage tanks (USTs) that may be found, fuel dispensers, underground piping or other structures associated with a source of contamination.

3. Backfill

On-site soil which does not exceed the above excavation criteria or commercial use SCOs for any constituent may be used anywhere beneath the cover system, including below the water table, to backfill the excavation or re-grade the site.

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

The site will be re-graded to accommodate installation of a cover system as described in remedy element 4.

4. Cover System

A site cover currently exists in areas not occupied by buildings and will be maintained to allow for commercial use of the site. Any site redevelopment will maintain the existing site cover or be replaced with an alternate cover. The site cover may include paved surface parking areas, sidewalks or soil where the upper one foot of exposed surface soil meets the applicable soil cleanup objectives (SCOs) for commercial use. A demarcation layer will be needed in any areas where fill will need to be brought in. Any fill material brought to the site will meet the requirements for the identified site use as set forth in 6NYCRR part 375-6.7(d).

5. Soil Mixing / In-Situ Reduction

In-situ reduction of contaminated soil will be implemented in an approximately 6,000 square foot area located in the northwestern portion of the building, as indicated on Figure 3, in the source area of VOC groundwater contamination. The treatment zone will extend from the top of the groundwater table, at approximately 9 feet below grade to approximately 16 feet below grade. The contaminated soil will be mixed in place with zero valent iron (ZVI) using an excavator or augers. During mixing, VOCs may be released, and the capture of any released VOCs will be assessed during design.

6. Groundwater Remedies

Monitoring

Monitoring for contaminants of concern will be required up-gradient, down-gradient, and within the treatment zone of the source area and the plume.

Groundwater Extraction & Treatment

Groundwater extraction and treatment will be implemented to treat contaminants in groundwater and to ensure contaminated groundwater does not migrate off-site. The groundwater extraction system will be designed and installed so that the capture zone is sufficient to cover the areal and vertical extent of the plume within the site boundary and intercept the groundwater contaminant plume to stop further migration. The extraction system will create a depression of the water table so that contaminated groundwater is directed toward the extraction wells within the plume area. Groundwater will be extracted from the area of the groundwater contaminant plume shown on Figure 3 using a submersible pump placed in one or more extraction wells. Further details of the extraction system will be determined during the remedial design. The extraction system will be designed to minimize the drawdown of the water table in order to reduce smearing of non-aqueous phase liquid in the area of drawdown.

Prior to the full implementation of this technology, studies will be conducted to define design parameters, including extraction well spacing.

The extracted groundwater will be treated using Ex-situ Chemical Oxidation (ESCO).

Ex-Situ Chemical Oxidation or Reduction

Ex-situ chemical oxidation (ESCO) and reinjection will be implemented to treat contaminants in groundwater. A chemical oxidant will be mixed into the extracted groundwater to destroy the contaminants. Groundwater recirculation in combination with oxidant addition would be performed in the central portion of the plume indicated on Figure 3. Groundwater would be removed through extraction wells, amended with oxidizing reagents, and reinjected into the subsurface through a series of injection wells once it has met TOGS 1.1.1 ambient water quality standards for Class GA waters.

As part of design and prior to the full implementation of this technology, laboratory and on-site pilot scale studies will be conducted to refine design parameters.

Monitored Natural Attenuation

Groundwater contamination remaining after active remediation has been completed or has been performed to the extent practicable, as determined by the Department will be addressed with monitored natural attenuation (MNA). Groundwater will be monitored for site related contamination and also for MNA indicators which will provide an understanding of the (biological activity) breaking down the contamination. Reports of the attenuation will be provided at yearly intervals, and active remediation will be proposed if it appears that natural processes alone will not address the contamination. The contingent remedial action will be In-Situ Chemical Oxidation, unless information available at the time indicates this is not the appropriate remedial action.

7. Treatment Remedy Shutdown

The operation of the treatment components of the remedy will continue until the remedial objectives have been achieved, or until the Department determines that continued operation is technically impracticable or not feasible.

8. Vapor Mitigation

Any on-site buildings will be required to have an active sub-slab depressurization system, or other acceptable measures, to mitigate the migration of vapors into the building from soil and/or groundwater.

9. Institutional Control

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

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

10. Site Management Plan

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

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

Institutional Controls: The Environmental Easement discussed in Remedial Element 9 above.

Engineering Controls: The soil cover discussed in Remedial Element 4, the groundwater extractions and treatment system in Remedial Element 6 and the sub-slab depressurization system(s) discussed in Remedial Element 8 above.

This plan includes, but may not be limited to:

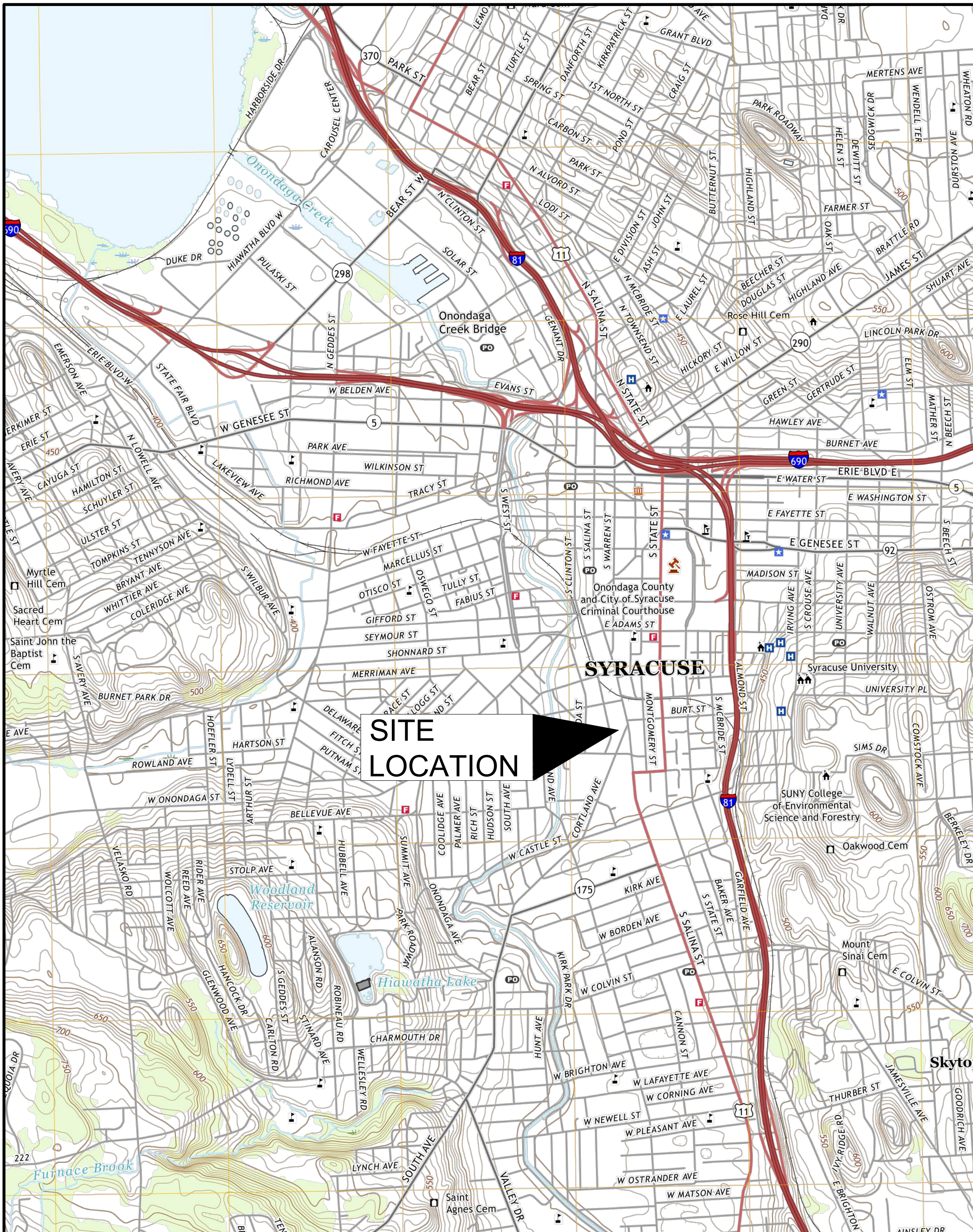
- An Excavation Plan which details the provisions for management of future excavations in areas of remaining contamination;
- A provision for demolition of on-site buildings if and when they become unsafe or inactive or vacant;
- Descriptions of the provisions of the environmental easement including any land use, and groundwater use restrictions;
- A provision that should a building foundation or building slab be removed in the future, a cover system consistent with that described in remedial element 4 above will be placed in any areas where the upper one foot of exposed surface soil exceeds the applicable soil cleanup objectives (SCOs)
- Provisions for the management and inspection of the identified engineering controls;
- Maintaining site access controls and Department notification; and
- The steps necessary for the periodic reviews and certification of the institutional and/or engineering controls.

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

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

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

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



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SITE LOCATION MAP

ALTERNATIVES ANALYSIS REPORT
FORMER COYNE TEXTILE BCP SITE C734144
140 CORTLAND AVE.
SYRACUSE, NEW YORK

PROJECT NO.
059294.001

DATE: 01/2020

FIGURE 1

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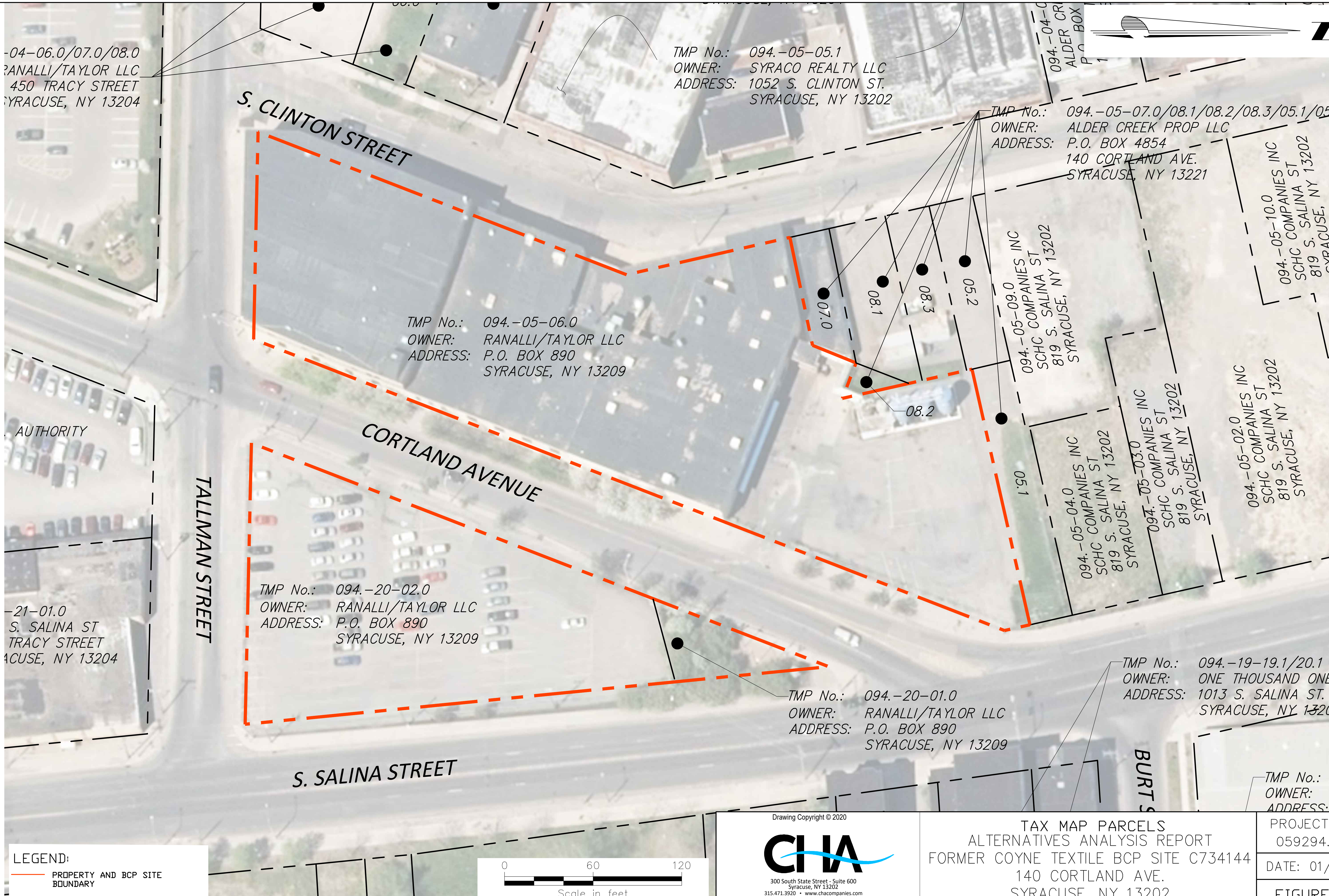

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TAX MAP PARCELS
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SYRACUSE, NY 13202

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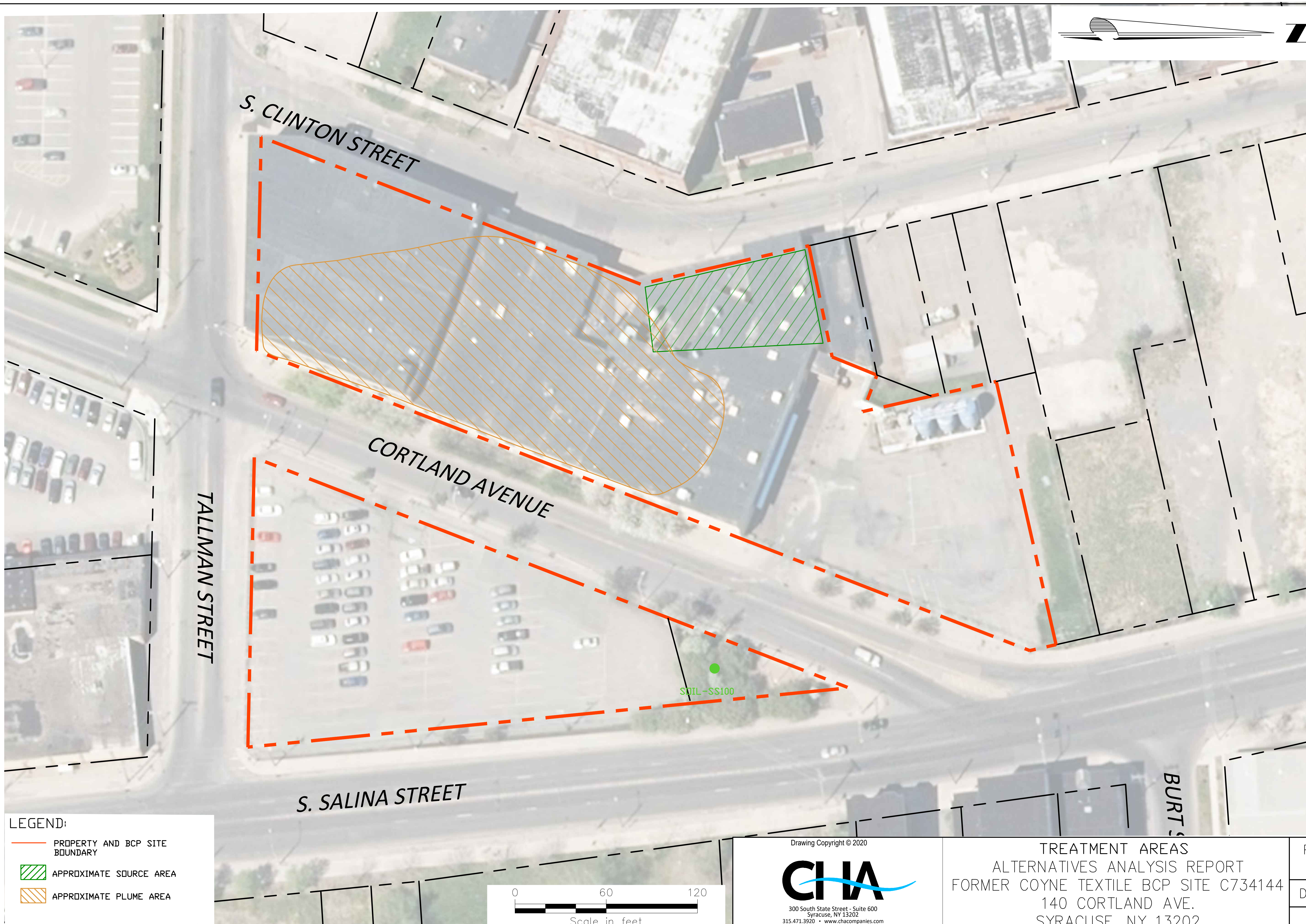
DATE: 01/2020

FIGURE 2



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TREATMENT AREAS
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FIGURE 3

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