FOCUSED FEASIBILITY STUDY/ALTERNATIVES ANALYSIS

School/Community Use Areas (OU3)

Study Area
Corning, NY

NYSDEC Project ID 851046

March 23, 2017

Prepared for:

Corning Incorporated
Corning, New York

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Certifications

I, Michael H. Corbin, certify that I am currently a New York State registered professional engineer and that this Focused Feasibility Study/Alternatives Analysis for Residential Areas (OU1, OU2, and OU5) was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10) and that all activities were performed in full accordance with the DER-approved work plan and any DER-approved modifications.

Executed on the 23rd day of March 2017

Weston Solutions, Inc.

Technical Director

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LIST OF ACRONYMS

ARAR	Applicable or Relevant and Appropriate Requirements
CAMP	Community Air Monitoring Plan
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cfs	cubic feet per second
COPC	constituents of potential concern
cy	cubic yards
DER	Division of Environmental Remediation
DOT	Department of Transportation
DUSR	Data Usability Summary Report
ESA	Endangered Species Act
E&S	Erosion and Sedimentation
FEMA	Federal Emergency Management Agency
FFS/AA	Focused Feasibility Study/Alternatives Analysis
ft amsl	feet above mean sea level
ft bgs	feet below ground surface
GHG	greenhouse gases
HAZWOPER	Hazardous Waste Operations and Emergency Response
IRM	Interim Remedial Measures
in bgs	inches below ground surface
NPV	Net Present Value
NYCRR	New York Codes, Rules and Regulations
NYSDEC	New York State Department of Environmental Conservation
NYSDOT	New York State Department of Transportation
OM&M	Operations, Maintenance and Monitoring
OSHA	Occupational Safety and Health Administration
OU	Operable Unit
PC	public-conservation zoning
R1	low-density residential zoning
RAO	Remedial Action Objectives
RCRA	Resource Conservation and Recovery Act

LIST OF ACRONYMS (Continued)

SCG	Standards, Criteria and Guidance
SCO	soil cleanup objectives
SMP	Site Management Plan
SPDES	State Pollutant Discharge Elimination System
TBC	to be considered
TCLP	Toxicity Characteristic Leaching Procedure
TOGS	Technical Operational Guidance Series
USGS	U.S. Geological Survey
US EPA	U.S. Environmental Protection Agency
WESTON®	Weston Solutions, Inc.

EXECUTIVE SUMMARY

This Focused Feasibility Study/Alternatives Analysis (FFS/AA) has been prepared by Weston Solutions, Inc. (WESTON®) on behalf of Corning Incorporated to evaluate remedial alternatives for the School/Community Use Areas (OU3) contained within the Study Area located in the City of Corning, New York. The FFS/AA has been prepared in accordance with the New York State Department of Environmental Conservation (NYSDEC) Division of Environmental Remediation Technical Guidance for Site Investigation and Remediation (DER-10; May 2010) and the New York Codes, Rules and Regulations (NYCRR) Part 375 Environmental Remediation Programs (6 NYCRR 375; effective December 14, 2006).

BACKGROUND

From 2014 through 2016, soil and groundwater characterization activities were performed in OU3 under an Order on Consent and Administrative Settlement between Corning Incorporated and NYSDEC dated June 27, 2014 (June 2014 Order on Consent). The characterization activities in OU3 have identified discrete areas of soil and discrete layers of fill material containing ash, brick and/or glass with constituents at concentrations greater than the NYSDEC Soil Cleanup Objectives (SCOs). Based on sampling activities performed to date, the constituents of potential concern (COPCs) in the Study Area are arsenic, cadmium and lead. Analytical results from two groundwater sampling events indicate that the COPCs were not detected in groundwater at concentrations greater than the New York State Division of Water Technical and Operational Guidance Series (TOGS) standards. This indicates that groundwater in the Study Area has not been impacted by the layers of fill material containing ash, brick, and/or glass or the constituents detected in soils at concentrations greater than SCOs.

The following materials (collectively referred to as the "Subject Material") are the subject of the remediation:

- Soil with constituents at concentrations greater than the SCOs; and

- Layers of fill material containing ash, brick and/or glass[1] with constituents at concentrations greater than the SCOs.

The properties in OU3 are primarily education facilities and athletic fields, and the primary potential exposure pathways to Subject Material are incidental ingestion, inhalation and dermal contact. Thus, this FFS/AA focuses on remedial technologies of limited excavation and removal of Subject Material with a cover system, an approach which is in accordance with DER-10 and NYCRR Part 375.

PREVIOUS ACTIVITIES AND INTERIM REMEDIAL MEASURES (IRMS) IN OU3

Corning-Painted Post School District (School District) Property

Corning-Painted Post School District Construction Project – From 2010 through 2014, work was performed by the School District on the Corning-Painted Post School District property including, but not limited to, an expansion to the high school building, construction of new asphalt roadways and parking areas, construction of concrete sidewalks, and construction of natural turf athletic fields in the eastern portion of the property. The School District represented to NYSDEC that it built the newly constructed natural turf athletic fields by rough grading the area, installing a geotextile demarcation layer over the existing soils and placing a minimum of 1 foot cover soil with seed over the demarcation layer.

IRMs - Two areas were identified at the Corning-Painted Post School District property during characterization sampling activities performed by WESTON on behalf of Corning Incorporated pursuant to NYSDEC-approved Work Plans (WESTON, 2014a; WESTON, 2015) where constituents were detected at concentrations greater than the NYSDEC restricted residential SCOs in the top 1 foot of soil. All other areas with analytical results greater than the NYSDEC restricted residential SCOs were collected within the footprint of the newly constructed natural turf athletic fields under the demarcation layer discussed above. NYSDEC has indicated that no further action

[1] A "layer of fill material containing ash, brick, and/or glass" is defined as non-native material containing ash, brick, and/or glass with a thickness of greater than 1 inch.

is required by Corning Incorporated for Subject Material located beneath the existing natural turf athletic fields.

Corning Incorporated submitted an IRM Work Plan (WESTON, 2016a) pursuant to the June 2014 Order on Consent, which was approved by NYSDEC following public comment in a letter from Kelly Cloyd dated January 26, 2017 (NYSDEC, 2017a). Pursuant to the NYSDEC-approved IRM Work Plan, Corning Incorporated will conduct IRM activities that will include excavation and removal of one foot of Subject Material from the two identified areas. A demarcation layer will be placed in the excavation areas at the base of the excavation between the existing soils and the imported backfill material. The disturbed areas will be re-vegetated.

NYSDEC will require the Corning-Painted Post School District to record an institutional control in the form of an Environmental Easement restricting use of the Corning-Painted Post School District property to Restricted Residential Uses and requiring compliance with an NYSDEC-approved Site Management Plan (SMP).

Corning Christian Academy Property

IRMs - One area was identified at the Corning Christian Academy property during characterization sampling activities performed by WESTON on behalf of Corning Incorporated pursuant to NYSDEC-approved Work Plans (WESTON, 2014a; WESTON, 2014b; WESTON, 2015) where constituents were detected at concentrations greater than the NYSDEC restricted residential SCOs in the top two feet of soil. Corning Incorporated submitted an IRM Work Plan (WESTON, 2016b) pursuant to the June 2014 Order on Consent, which was approved by NYSDEC following public comment in a letter from Kelly Cloyd dated January 26, 2017 (NYSDEC, 2017b). Pursuant to the NYSDEC-approved IRM Work Plan, Corning Incorporated will conduct IRM activities that will include excavation and removal of two feet of Subject Material from the identified area. A demarcation layer will be placed in the excavation area at the base of the excavation between the existing soils and the imported backfill material. The disturbed area will be re-vegetated.

NYSDEC will require the Corning Christian Academy to record an institutional control in the form of an Environmental Easement restricting use of the Corning Christian Academy property to Restricted Residential Uses and requiring compliance with an NYSDEC-approved SMP.

City of Corning Memorial Stadium Property

Corning-Painted Post School District Construction Project - From 2012 through 2014, work was performed by the School District on the City of Corning Memorial Stadium property including, but not limited to, the construction of new asphalt roadways and parking areas and the construction of concrete sidewalks.

Corning-Painted Post School District Turf Replacement Project - IRM activities were conducted by the School District during the summer of 2015 under a NYSDEC-approved Work Plan dated June 8, 2015 and Consent Order signed July 1, 2015 as part of the City of Corning Memorial Stadium turf replacement project (Turf Replacement Project). This work was described in correspondences dated June 29, 2015 to Benjamin Conlon (NYSDEC) from the City of Corning, the Corning-Painted Post School District and Corning Incorporated.

IRMs - Three areas were identified during characterization sampling activities performed by WESTON on behalf of Corning Incorporated pursuant to NYSDEC-approved Work Plans (WESTON, 2014a; WESTON, 2015) where constituents were detected at concentrations greater than the NYSDEC restricted residential SCOs in the top two feet of soil. Corning Incorporated submitted an IRM Work Plan (WESTON, 2016c) pursuant to the June 2014 Order on Consent, which was approved by NYSDEC following public comment in a letter from Kelly Cloyd dated January 26, 2017 (NYSDEC, 2017c). Pursuant to the NYSDEC-approved IRM Work Plan, Corning Incorporated will conduct IRM activities that will include excavation and removal of two feet of Subject Material from the three identified areas. A demarcation layer will be placed in the excavation areas at the base of the excavation between the existing soils and the imported backfill material. The disturbed areas will be re-vegetated.

NYSDEC will require the City of Corning (as owner of the City of Corning Memorial Stadium property) to record an institutional control in the form of an Environmental Easement restricting use of the City of Corning Memorial Stadium property to Restricted Residential Uses and requiring compliance with an NYSDEC-approved SMP.

REMEDIAL ACTION OBJECTIVES (RAOS)

The RAOs developed for this FFS/AA include the following:

1. Prevent human incidental ingestion and dermal contact with Subject Material.

2. Prevent human inhalation of Subject Material that may be disturbed and suspended in air as particles.

3. Achieve SCOs, as required by NYSDEC Part 375, throughout OU3.

REMEDIAL ALTERNATIVES

A screening of remedial technologies was performed to identify and evaluate possible remedial technologies and to assess their feasibility for addressing the Subject Material in OU3. As a result of this screening, the remedial technologies retained and evaluated in this FFS/AA include variations of limited excavation with a cover system. The remedial alternatives that were developed for evaluation include:

- **Alternative 1 – No Further Action**
  In this alternative, no further action would be conducted. The previous activities that have been implemented and IRMs that will be implemented under NYSDEC-approved Work Plans are taken into account to determine that no further action would be conducted.

- **Alternative 2 – Excavate Up to 15 Feet and Backfill**
  In this alternative, Subject Material would be excavated to a depth of up to 15 ft bgs and disposed off-site at a permitted facility. The soil cover in the recently constructed school and public use facilities would be excavated. A 15-foot excavation could eliminate the need for an SMP or an environmental easement or deed restriction in accordance with DER-10 [DER-10 1.12 (b)]. Excavated soils from above a demarcation layer (i.e., clean soil) and imported soil backfill material would be placed in the excavation to grade and the area would be re-vegetated or restored to its previous use (e.g., natural turf field, baseball field, parking lot, etc.). For inaccessible subsurface Subject Material located less than 15 ft bgs, this alternative includes institutional controls to prevent exposure to the Subject Material.

The remedial alternatives were evaluated based on the following criteria:

- Overall Protection of Human Health and the Environment
- Conformance with Standards, Criteria, and Guidance (SCGs) and Applicable or Relevant and Appropriate Requirements (ARARs)

- Long-term Effectiveness and Permanence
- Reduction of Toxicity, Mobility, or Volume of Contamination through Treatment
- Short-Term Impact and Effectiveness
- Implementability
- Cost Effectiveness
- Land Use
- Green Remediation Practices Criterion
- State and Community Acceptance

The comparison of alternatives is presented in Table 7-1 of this report.

RECOMMENDED ALTERNATIVE

The recommended alternative is Alternative 1: No Further Action. This alternative meets overall protectiveness for school/community use with the least amount of disruption to the community, and the smallest environmental footprint. Prevention of the potential human exposure pathways (i.e., incidental ingestion, inhalation and dermal contact) is achieved by the activities completed under the Corning-Painted Post School District Construction Project and Turf Replacement Project, the activities planned to be completed under the NYSDEC-approved IRMs, the institutional control of an Environmental Easement on each property in OU3, and compliance with an NYSDEC-approved SMP.

Deeper excavation is possible, but impracticable, and would not provide any significant additional benefit with respect to overall health or environmental protectiveness. Deeper excavation would result in more potential exposure during implementation, would cause more disruption to the community for a longer period of time, would impose a larger environmental footprint, and would require more complex construction when slope stabilization and shoring is needed around structures and subsurface utilities. Based on the impracticability of total removal, deeper excavation would similarly result in more residual materials and the need for institutional controls. Deeper excavation would not be cost-effective for the little, if any, additional benefit provided.

1. INTRODUCTION

The Study Area is located in the City of Corning, New York as illustrated on Figure 1-1, and, in general, is bounded by the Chemung River to the south; Post Creek and Interstate 86 to the east and north; and the Guthrie Medical Center, the City of Corning Fire Department, and Centerway to the west. The Study Area is separated into five operable units (OUs) based on location and land use, to assist in advancing properties through the remedial process. The five OUs in the Study Area are identified as follows: Residential Area (OU1), Residential Area at the Eastern End of Corning Boulevard (OU2), School/Community Use Areas (OU3), Flood Control Areas (OU4) and Residential Expansion Area (OU5). The Study Area and OUs are depicted on Figure 1-2.

This Focused Feasibility Study/Alternatives Analysis (FFS/AA) has been prepared by Weston Solutions, Inc. (WESTON®) on behalf of Corning Incorporated to evaluate remedial alternatives for the School/Community Use Areas (OU3) contained within the Study Area. The FFS/AA has been prepared in accordance with the New York State Department of Environmental Conservation (NYSDEC) Division of Environmental Remediation Technical Guidance for Site Investigation and Remediation (DER-10; May 2010) and the New York Codes, Rules and Regulations (NYCRR) Part 375 Environmental Remediation Programs (6 NYCRR 375; effective December 14, 2006).

From 2014 through 2016, WESTON performed characterization activities in OU3 under an Order on Consent and Administrative Settlement (Order on Consent) with the NYSDEC dated June 27, 2014 (June 2014 Order on Consent). The characterization activities were performed in OU3 under the Study Area Characterization Work Plan dated June 2014, Study Area Work Plan Addendum 1 (Work Plan Addendum 1), and Study Area Work Plan Addendum 3 (Work Plan Addendum 3) (WESTON, 2014a; WESTON, 2014b; WESTON, 2015). Collectively, the June 2014 Study Area Characterization Work Plan and its Addenda, as modified, amended and approved by NYSDEC, are referenced herein as the Study Area Work Plan.

1.1 PURPOSE OF A FOCUSED FEASIBILITY STUDY/ALTERNATIVES ANALYSIS

This FFS/AA has been prepared to evaluate remedial alternatives for OU3. Based on the results of characterization activities performed to date, environmental impacts in OU3 are limited to only

certain media (discrete areas of soil and identified layers of fill material containing ash, brick and/or glass) and potential remedies are limited by property use. Limited excavation and removal with a cover system are remedial technologies that are applicable to the media and property use in OU3. Other technologies for remediating metals in soils (such as fixation, chemical extraction, soil washing, in-situ thermal treatment or vitrification, and bioremediation/ phytoremediation) are eliminated through screening, and deemed to be not applicable or impractical, either because they fail to reduce metal concentrations, processing would be highly disruptive with uncertain effectiveness for some constituents, potential for safety concerns or damage to proximate structures, or as inapplicable for the potential exposure pathways. Thus this FFS/AA focuses on remedial technologies of limited excavation with a cover system, an approach which is in accordance with DER-10 and NYCRR Part 375.

Good cause exists, pursuant to 6 NYCRR 375-1.8(f)(2)(i)(b and c), for allowing concentrations of constituents greater than NYSDEC Soil Cleanup Objectives (NYSDEC SCOs; NYCRR Subpart 375-6) to remain at depths that are not readily accessible within OU3. The key considerations for the development and evaluation of the focused remedial technologies of limited excavation and removal with a cover system for OU3 include the following:

- **Site Conditions** – OU3 consists of three School/Community Use properties; the Corning Christian Academy property, the City of Corning Memorial Stadium property, and the Corning-Painted Post School District property. Pursuant to 6 NYCRR 375-1.8(f)(9), the NYSDEC has determined that there is reasonable certainty that the current land use within this operable unit will remain the intended and reasonably anticipated future land use. This determination is further supported by the long-term residential character of the neighborhood; current use and historical development patterns; applicable zoning laws and maps; the City of Corning Master Plan; and the nature of OU3 being bounded by major roadways and the Chemung River.

- **Environmental Media**
    - Soil and layers of fill material containing ash, brick and/or glass[1] are the only environmental media in OU3 containing constituents of potential concern (COPCs) at concentrations greater than the NYSDEC SCOs.
        - Layers of fill material containing ash, brick, and/or glass have been observed in OU3 and were the subject of the investigation.
        - Samples collected in OU3 are screened against the restricted-residential SCOs.
        - The following materials (collectively referred to as the "Subject Material") are the subject of the remediation:
            - Soil with constituents at concentrations greater than the SCOs; and
            - Layers of fill material containing ash, brick and/or glass with constituents at concentrations greater than the SCOs.
    - Analytical results from two groundwater sampling events in the Study Area indicate that groundwater has not been impacted by the layers of fill material containing ash, brick, and/or glass. Arsenic, cadmium, and lead were not detected in groundwater at concentrations greater than New York State Division of Water Technical and Operational Guidance Series (TOGS) standards.
- **COPCs** – The COPCs for the Study Area are arsenic, cadmium, and lead. Based on sampling conducted to date, arsenic, cadmium, and lead are the primary constituents detected in Subject Material (discussed further in Section 3) and are the focus for the alternatives evaluation for OU3 presented in Section 6.
- **Exposure Pathways –** Based on Study Area conditions (e.g., media and COPCs) the primary potential exposure pathways in OU3 are incidental ingestion, inhalation and dermal contact. The aforementioned remedial technologies will prevent potential exposure to the Subject Material.
- **Technical Feasibility –** Pursuant to 6 NYCRR 375-1.8(f)(2)(i)(c), conformity to SCOs at all depths sampled within OU3 is technically impracticable because total excavation of all Subject Material to achieve pre-disposal conditions would result in complete destruction or removal of some areas such as: athletic fields, turf field and track, tennis courts; and

[1] A "layer of fill material containing ash, brick, and/or glass" is defined as non-native material containing ash, brick, and/or glass with a thickness of greater than 1 inch.

require the removal of mature trees. Total excavation of all Subject Material would also alter the character of the neighborhood without fully achieving complete contaminant removal due to necessary sloping of excavation sidewalls to avoid the risk of subsidence near adjacent roadways and structures.

- **Short-Term Health Risks –** Pursuant to 6 NYCRR 375-1.8(f)(2)(i)(b), remediation/ excavation to achieve conformity to SCOs at all depths within OU3 would result in increased traffic and dust, release a greater amount of constituents to air and pose a greater risk to public health than residual constituents would pose if allowed to remain at depth and under a cover system.

- **Green Remediation –** Pursuant to DER-31, the smallest volume of soil to be excavated and backfilled results in the least amount of disturbance, the fewest hours of equipment use, the least number of vehicles, the smallest volume of landfill capacity required, the smallest amount of mature tree removal, as well as the smallest volume of clean backfill being brought in, thus minimizing greenhouse gas emissions and hydrocarbon use without materially reducing the protection of human health and the environment. Excavation to achieve conformity to SCOs at all depths within OU3 would significantly increase the carbon footprint as compared to the focused remedial technologies of limited removal with a cover system without a commensurate health or environmental benefit.

Due to the above considerations, the remedial alternatives evaluated herein include a no further action alternative and an excavation with backfill alternative. As discussed in Section 5 of this FFS/AA, other technologies are not feasible for addressing the Subject Material in OU3.

1.2 ORGANIZATION OF THIS DOCUMENT

This FFS/AA is organized into the following sections:

- **Section 1 – Introduction.** This section contains an introduction to the Study Area, as well as the focus of the FFS/AA.

- **Section 2 – Study Area Description and History.** This section contains a description of the Study Area and the OUs that comprise it, a general history of the Study Area, and a summary of the Study Area environmental setting including land use, topography and drainage, geology, and hydrogeology, and ecological setting.

- **Section 3 – Summary of Remedial Investigations.** This section contains a summary of the remedial investigations that have been performed in OU3 to date and findings.

- **Section 4 – Remedial Objectives and Goals.** This section contains identification of the COPCs for the Study Area; an evaluation of the Standards, Criteria, and Guidance (SCGs) that apply to the remedial activities that will be conducted; and considering the COPCs and SCGs, presents the remedial action objectives (RAOs) for remediation activities conducted in OU3.

- **Section 5 – Screening of Technologies and Development of Remedial Alternatives.** This section contains a brief description of the technologies that were screened out as inapplicable and those that were retained and developed for further evaluation. The remedial alternatives that were developed for implementation in OU3 are the No Further Action Alternative and an excavation with backfill alternative.

- **Section 6 – Evaluation of Remedial Alternatives.** This section contains an evaluation of the developed alternatives based the following criteria:

    - Overall protection of human health and the environment;
    - Conformance with SCGs;
    - Long-term effectiveness and permanence;
    - Reduction of toxicity, mobility, and volume of contamination through treatment;
    - Short-term impact and effectiveness;
    - Implementability;
    - Cost effectiveness;
    - Land use; and
    - Green remediation practices.

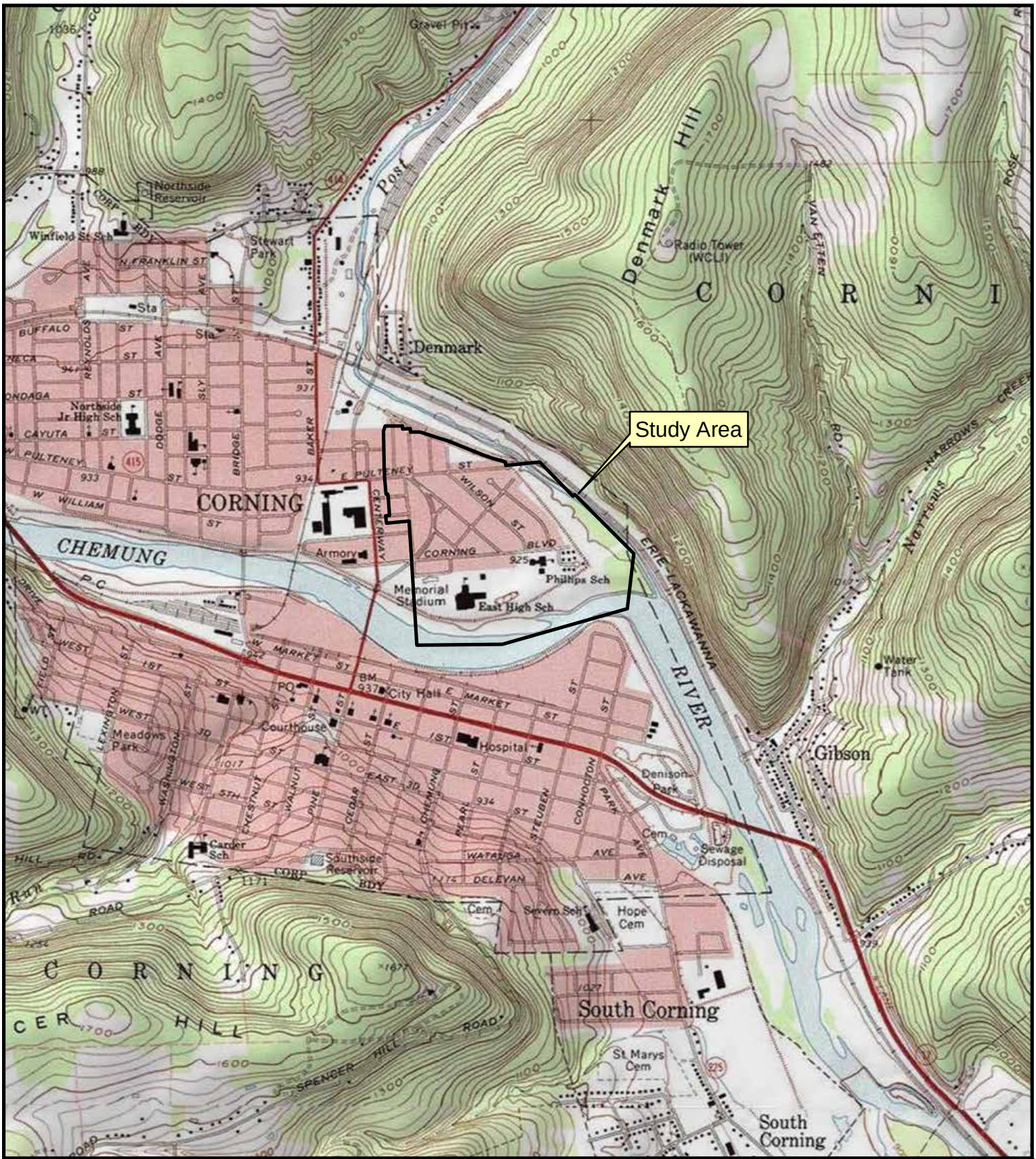
- **Section 7 – Comparison of Alternatives.** This section contains a comparative summary of the retained remedial alternatives with respect to the evaluation criteria.

- **Section 8 – Recommended Alternative.** This section provides the recommended alternative for implementation in OU3 and a summary of the basis for selection.

- **Section 9 – References.**

Tables and figures are provided at the end of each section for ease of review.

SECTION 1 FIGURES

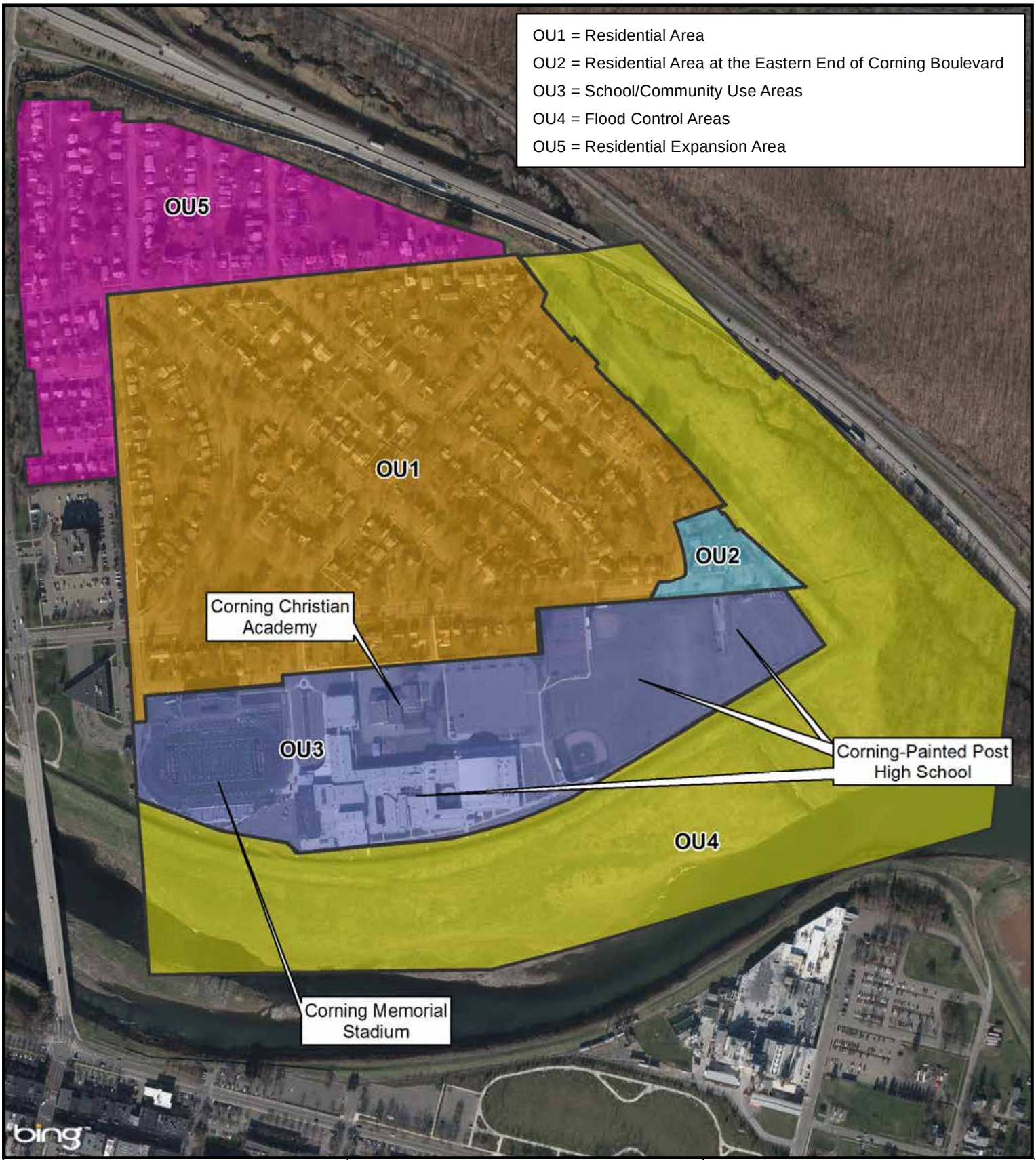


USGS 7.5 Minute Quadrangle Corning NY, 1971

Figure 1-1
Location of Study Area

Corning, NY

Document Name: Site_Location.MXD



Legend

Operable Units

- OU1
- OU2
- OU3
- OU4
- OU5

N
W E
S

0 250 500 Feet

Base Imagery:Robinson Aerial Imagery, Dec 2015
Coordinate System: NAD 1983 State Plane
New York Central Feet
Datum: NAD83. Units: Feet

Figure 1-2
Study Area Operable Units

Corning, NY

Document Name: Study_Area_OU.MXD

2. STUDY AREA DESCRIPTION AND HISTORY

2.1 STUDY AREA LOCATION AND DESCRIPTION

The Study Area is located in the City of Corning, New York as illustrated on Figure 1-1. In general, it is bounded by the Chemung River to the south; Post Creek and Interstate 86 to the east and north; and the Guthrie Medical Center, the City of Corning Fire Department, and Centerway to the west. The Study Area is separated into five OUs, which are depicted in Figure 1-2:

- OU1 – Residential Area (includes 212 residential properties)
- OU2 – Residential Area at the Eastern End of Corning Boulevard (includes five residential properties)
- OU3 – School/Community Use Areas (includes the Corning-Painted Post School District, Corning Christian Academy and City of Corning Memorial Stadium properties)
- OU4 – Flood Control Areas
- OU5 – Residential Expansion Area (includes 109 residential properties).

This FFS/AA report has been prepared for OU3.

2.2 STUDY AREA HISTORY

The City of Corning has a long history of manufacturing, particularly in brick and glassmaking. Historical references indicate that, in the late 1800s and early 1900s, one of the largest brick manufacturers and more than sixty glass manufacturers were located in the City of Corning (Dimitroff, 2001) (Sinclaire & Spillman, 1997) including Corning Incorporated which was formerly known as Corning Glass Works. During that time frame, coal was the primary fuel source in the Corning, New York area, and most of the local industries and municipalities used coal to heat their furnaces. In the early 1900s, when natural gas was introduced to the region, some industries converted their fuel sources to natural gas.

Between 1949 and at least 1968, the City of Corning operated a municipal incinerator that created significant volumes of ash. Historical City Council meeting minutes indicate that the City applied ash and cinders to roadways within the City to control ice during the winter months during, at least, the mid-1950s (City of Corning, 1936; 1941; 1958; 1959). These records also indicate that when land within the Study Area (now comprising OU3) was being considered for redevelopment as a school in the late 1950s, the City of Corning stated that it would require “a considerable amount

of work and expense involved in filling and grading to render the track suitable for recreational and educational purposes." (City of Corning, 1950). Ultimately a school, which opened in 1962, was constructed on this portion of the Study Area.

Several times during the City of Corning's history, the Chemung River overflowed its banks. This resulted in construction and improvement of flood control structures within the Study Area on multiple occasions, including in the mid-1940s and again after Hurricane Agnes in the mid-1970s, according to NYSDEC and U.S. Army Corps of Engineers records (USACE, 1941; USACE, 1973). Such construction efforts would have likely required the import of significant volumes of material of uncertain origin, the removal or relocation of material deemed unsuitable as foundation for earthworks, the creation and filling of borrow areas from which soils suitable for construction were obtained, as well as other potential grading and filling activities. These activities occurred within and surrounding the perimeters of the Study Area, including along the Chemung River, along Post Creek, and along what is now Interstate 86 (USACE, 1941; USACE, 1973).

The land use within OU3 has developed over time from farmland into an area of schools and athletic fields. In general, 1938 through 1964 aerial photographs indicate potential disturbance areas in limited areas south of Corning Boulevard. In the 1968 aerial photographs, structures are observed south of Corning Boulevard in the area of the former Kent Phillips Elementary School (i.e., the area of present-day Corning-Paint Post High School athletic fields) and the Corning-Painted Post High School. During development activities, fill material was commonly used as sub-grade material for construction, to fill in low-lying areas and as an aid to drainage.

Through a title search of property deeds, it was found that part of the Study Area[1] encompasses lands previously owned by Corning Homes, Inc. (a residential developer not affiliated with Corning Incorporated). The deeds for these properties contained a condition that allowed Corning Glass Works (not a party to the transaction) to maintain structures, buildings and "ash dumps as now located" on the properties. Despite reviewing available historical maps, aerial photographs, documents and public records, Corning Incorporated has not, to date, located any maps or records

[1] This portion includes OU1, OU2, OU3 and OU4, but excludes OU5 (the Residential Expansion Area).

that depict the location, if any, of potential "ash dumps" as referenced in the deeds (i.e., that may have existed as of 1920).

In 2012, during a capital improvement project at the Corning-Painted Post High School located in OU3 within the southern portion of the Study Area, fill material that the Corning-Painted Post School District (School District) described as containing ash, brick, and glass, was encountered in the subsurface soils. During the capital improvement project, the School District's consultant tested excavated material to determine appropriate disposal methods. A review of a summary of the analytical results for these samples, prepared by the School District's consultant for NYSDEC, indicates over 200 samples were collected and analyzed for various constituents. The majority of the constituents were either not detected or were reported at concentrations less than SCOs. The primary constituents which exceeded the SCOs in the excavated materials were lead, cadmium, and arsenic.

In this FFS/AA document, the term "fill" is used in several contexts. First, the term is used to refer to sub-grade construction material such as that found at the high school property and other material containing brick, ash, and/or glass (i.e., "fill material containing ash, brick and/or glass"). The term is also used to describe cover or backfill such as top soil and clay or sand that is brought in to support lawn and garden growth. The term "backfill" and/or "cover" will be used in this FFS/AA to describe materials that may be returned to an excavation or brought in from an external source to distinguish such materials from other references to previously existing fill material.

2.3 ENVIRONMENTAL SETTING

2.3.1 Land use

The Study Area consists of approximately 201 acres of land located on the eastern side of the City of Corning, New York along the northern bank of the Chemung River, northwest of the confluence with Post Creek (see Figure 1-1). The Study Area includes the Corning-Painted Post School District property; the Corning Christian Academy property; the City of Corning Memorial Stadium property; a residential area consisting of 326 individual properties; and flood control areas along the Chemung River and Post Creek. The properties within the Study Area are zoned as either public-conservation (PC) or low-density residential (R1) by the City of Corning as illustrated on Figure 2-1. The land area zoned PC is generally concentrated south of Corning Boulevard and in

the flood control areas near the Chemung River and Post Creek. No industrial/commercial facilities are known to be located within the Study Area at present.

OU3 consists of approximately 34.1 acres of land including the Corning-Painted Post School District, the Corning Christian Academy, and the City of Corning Memorial Stadium properties. All three properties are primarily used for educational and athletic purposes. Property classifications for the individual properties that compromise OU3 are presented in Table 2-1, and illustrated on Figure 2-2.

Corning Christian Academy Property

The Corning Christian Academy property is an approximately 2.6 acre parcel. The land is owned by the Corning Christian Academy and is zoned low density residential (R1). The Corning Christian Academy property is primarily used for educational purposes. The surface area for the Corning Christian Academy property is covered by the Corning Christian Academy buildings, a variety of impervious surfaces (e.g., concrete sidewalks, asphalt roadways and asphalt parking areas), and areas of pervious surfaces (e.g., grass covered areas, mulch-covered playground, etc.).

City of Corning Memorial Stadium

The City of Corning Memorial Stadium property is located on an approximately 10.5 acre parcel owned by the City of Corning, which is zoned Public-Conservation (PC). Approximately 6.9 acres of the parcel is leased by the Corning-Painted Post School District for use as athletic fields (referred to as the City of Corning Memorial Stadium property). The surface area for the City of Corning Memorial Stadium property is covered by several structures, a synthetic turf field, a variety of impervious surfaces (e.g., a rubberized track, concrete sidewalks, roads and parking areas), and permeable surfaces (e.g., grassy areas, stone rip rap areas and gravel areas). Small portions of the property are covered by mowed lawn. The City of Corning Memorial Stadium property is primarily used for athletic and educational purposes (e.g. sport events, marching band, physical education classes and ceremonial activities).

Corning-Painted Post School District Property

The Corning-Painted Post School District Property consists of three parcels of continuous land covering approximately 24.6 acres. All three parcels are owned by the Corning-Painted Post School District. According to City of Corning zoning information, all three parcels are zoned Public-Conservation (PC) and classified as a School. The property is primarily used for educational and athletic purposes. The surface area for the property is covered by the Corning-Painted Post High School buildings, a variety of impervious surfaces (e.g., rubberized tennis courts, concrete sidewalks, asphalt roadways and asphalt parking areas), and a large area of pervious surfaces (e.g., grass covered areas, athletic fields, etc.).

2.3.2 Topography and Drainage

The Study Area is relatively flat with a slight gradient to the south and east. The Corning, New York 1976 U.S. Geological Service (USGS) 7.5-minute topographic quadrangle map indicates that the Study Area is approximately 929 feet above mean sea level (ft amsl). Within a one mile radius of the Study Area, the ground surface elevation ranges from 915 ft amsl to 1,459 ft amsl, with two steep elevation changes, one located to the north and one to the east.

Surface water within the Study Area generally flows south/southeast toward the Chemung River. Storm water is believed to be conveyed to the river through one or more storm drains located in the southeast corner of the Study Area. While the flows of Post Creek and the Chemung River have changed over time and have been altered for flood control, drainage and development purposes, surface flow in these waterways has generally been south/southeast. Surface water from the confluence of Post Creek and the Chemung River flows southward to where it ultimately joins the Susquehanna River. Due to the proximity of the Chemung River and Post Creek, OU4 is located within both the Federal Emergency Management Agency (FEMA) 100-year and 500-year flood zones (FEMA, 2002).

The Chemung River flows along the southern portion of the Study Area and has a drainage area of approximately 2,006 square miles. Measured daily flows range from a minimum of 310 cubic feet per second (cfs) to 15,200 cfs, with median and mean flows of 1,100 and 2,130 cfs, based on 37 years of records (USGS, 2017). The Chemung River is designated as Class C water in the New

York State classification system (USGS, 2014). Class C waters indicate the water is best used for supporting fisheries and suitable for non-contact activities.

The much smaller, second order Post Creek along the eastern edge of the Study Area also has a Class C designation in the vicinity of the Study Area. The riparian zone immediately adjacent to Post Creek is wooded.

2.3.3 Geology

The Study Area is located in the Chemung River valley, and contains predominately sand and gravel deposits of glaciofluvial origin and more recent alluvial deposits. The river valley deposits are on the order of 100 feet thick in the vicinity of the Study Area. These river valley deposits are underlain by low permeability shale/siltstone bedrock (Miller, 1982). In the vicinity of the Study Area, a low permeability, lacustrine silt and clay layer (approximately 10 feet thick) is present about 30 feet below ground surface (ft bgs) (Miller, 1982).

2.3.4 Hydrogeology

The saturated portions of the Chemung River valley deposits are recharged principally by infiltration of precipitation. This valley-filled glacial/alluvial aquifer is generally unconfined (i.e., the water table forms the upper boundary of the aquifer) and saturated approximately to the level of nearby rivers (such as the Chemung River) (Olcot, 1995). In the higher topographic portions of the Study Area, the depth to the water table is expected to be on the order of 20 to 25 ft bgs; however, groundwater levels may be deeper where supply wells actively extract groundwater from the valley aquifer. Groundwater in the valley aquifer generally flows toward and discharges to nearby rivers/creeks; however, groundwater flow directions can be locally altered by supply well withdrawals from the valley aquifer.

2.3.5 Ecological Setting

Much of the Study Area is composed of a terrestrial cultural ecological community created and maintained by human activities. It has been modified by human influence to such a degree that the physical conformation of the substrate and the biological composition of the resident ecological community is substantially different from the character of the substrate or community as it existed prior to human influence.

SECTION 2 FIGURES

Legend

Study Area

Zoning

Public-Conservation

R1 - Low Density

NOTES:
Base Imagery:Robinson Aerial Imagery, Dec 2015
Coordinate System: NAD 1983 State Plane New York Central Feet
Datum: NAD83. Units: Feet

Study Area
Corning, NY

WESTON SOLUTIONS

Figure 2-1
Property Zoning

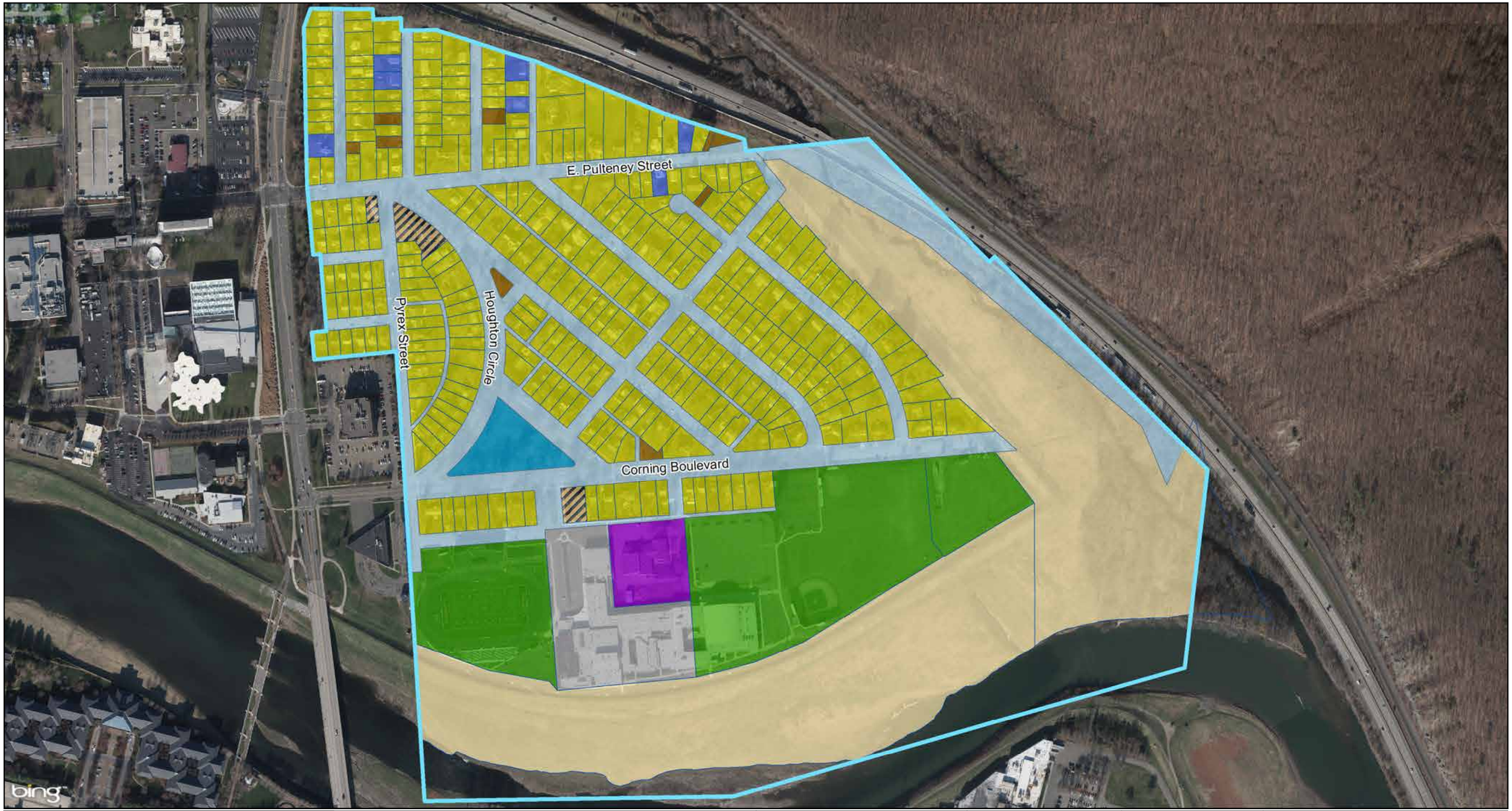
N

0 400 800 Feet

0 80 160 240 Meters

Document Name: Zoning.MXD

03/23/2017



Legend

Study Area

Property Classification

- 210 - Single Family Residence
- 220 - Multi Family Residence
- 311 - Residential - Vacant Land
- 411 - Apartment
- 591 - Playground
- 592 - Athletic Field
- 612 - School
- 615 - Educational Facility
- 622 - Fire/Police
- 821 - Flood Control
- Road/City of Corning Rights -of -Way

NOTES:
Base Imagery:Robinson Aerial Imagery, Dec 2015
Coordinate System: NAD 1983 State Plane New York Central Feet
Datum: NAD83. Units: Feet

Study Area
Corning, NY

N

0 400 800 Feet

0 75 150 225 Meters

Figure 2-2
Property Classification

Document Name: Property_Classification.MXD

03/23/2017

SECTION 2 TABLE

Table 2-1
Property Information for OU3
Study Area, Corning, New York

Area	Parcel ID	Address	Zoning	Property Classification
CCA	318.05-01-066.000	11 Aisne St	R1	Educational Facility
CMS	318.05-01-068.000	202 Cantigny St (Stadium)	PC	Athletic Field
CPP	318.05-01-065.000	120 Corning Blvd	PC	School
	318.05-01-054.000	126 Corning Blvd (Ball Park)	PC	Athletic Field
	318.05-01-067.000	201 Cantigny St	PC	School

Notes:
--- = Not available
OU3 - Operable Unit 3 (School/Community Use Areas)
CCA - Corning Christian Academy Property
CMS - Corning Memorial Stadium Property
CPP - Corming Painted Post School District Property
R1 - low density zoning
PC - public/conservation zoning

3. SUMMARY OF REMEDIAL INVESTIGATION, CONSTRUCTION ACTIVITIES, AND IRMS

3.1 CHARACTERIZATION ACTIVITIES

Commencing in June 2014, WESTON performed characterization activities in OU3 pursuant to the NYSDEC-approved Study Area Characterization Work Plan and its addenda. The objectives of the Study Area characterization activities were to assess the nature and extent of layers of fill material containing ash, brick and/or glass that were encountered within the Study Area, and to collect data necessary for understanding the current conditions and associated potential exposure pathways.

Characterization activities in OU3 are substantially complete. Validated analytical data for samples collected in OU3 has been submitted to NYSDEC by WESTON in Data Usability Summary Reports (DUSRs) throughout the characterization program.

To date, 261 soil samples, including surface soil and soil boring samples, have been collected in OU3, the majority of which are less than the SCOs. Laboratory analytical results for compounds detected at concentrations greater than the SCOs are summarized in Table 3-1, Table 3-2 and Table 3-3 for the Corning Christian Academy; the City of Corning Memorial Stadium; and the Corning-Painted Post School District properties, respectively. For samples with analytical results greater than SCOs, arsenic, cadmium, and lead were the constituents detected most frequently and are the COPCs in the Study Area. Other constituents as shown in Table 3-1 through Table 3-3 have been detected at concentrations greater than SCOs in a limited number of samples.

Surface soil samples were collected from 0 to 2 inches below ground surface (in bgs). A total of 134 surface soil samples have been collected in OU3: 30 at the Corning Christian Academy property; 46 at the City of Corning Memorial Stadium property; and 58 at the Corning-Painted Post School District property. Laboratory analytical results for 118 of the 134 surface soil samples were less than or equal to SCOs for all constituents evaluated. Laboratory analytical data for 16 of the surface soil samples were greater than SCOs for at least one of the constituents evaluated (one surface soil sample at Corning Christian Academy, nine surface soil samples at City of Corning Memorial Stadium property and six surface soil samples at Corning-Painted Post School District property).

To date, a total of 48 soil borings have been advanced in OU3 to investigate sub-surface soil conditions: nine at Corning Christian Academy property; 13 at City of Corning Memorial Stadium property; and 26 at Corning-Painted Post School District property. All soil borings were logged, and the presence of a layer of fill material containing ash, brick and/or glass was documented where encountered. Laboratory analytical results for 89 of the 127 soil boring samples were less than or equal to SCOs for all constituents evaluated. Laboratory analytical results for 38 of the soil boring samples were greater than SCOs for at least one constituent (nine soil boring samples at Corning Christian Academy property, nine soil boring samples at City of Corning Memorial Stadium property and 20 soil boring samples at Corning-Painted Post School District property).

The findings of the soil boring investigations within Corning Christian Academy, City of Corning Memorial Stadium, and Corning-Painted Post School District properties in OU3 as related to the presence or absence of a layer of fill material containing ash, brick and/or glass are summarized in Table 3-4, Table 3-5, and Table 3-6, respectively. These tables categorize the soil borings by presence of a layer of fill material containing ash, brick and/or glass, as well as the depth at which analytical results were greater than SCOs.

In 16 of the 48 soil borings advanced in OU3 to date, there was no layer of fill material containing ash, brick and/or glass. Of the remaining 32 soil borings, a layer of fill material containing ash, brick and/or glass was encountered at the following depth intervals:

Corning Christian Academy

- From 0 to 2 ft bgs and greater than 2 ft bgs in 2 soil borings; and
- Greater than 2 ft bgs only in 3 soil borings.

City of Corning Memorial Stadium

- From 0 to 2 ft bgs in 3 soil borings;
- From 0 to 2 ft bgs and greater than 2 ft bgs in 2 soil borings; and
- Greater than 2 ft bgs only in 4 soil borings.

Corning-Painted Post High School

- From 0 to 2 ft bgs in 1 soil boring;
- From 0 to 2 ft bgs and greater than 2 ft bgs in 3 soil borings; and
- Greater than 2 ft bgs only in 14 soil borings.

Two rounds of groundwater samples were collected from the network of seven groundwater monitoring wells installed in the Study Area and from one existing irrigation well located on the Corning-Painted Post School District property. Arsenic, cadmium, and lead, the constituents most frequently detected in the soils and fill material containing ash, brick, and/or glass in the Study Area at concentrations greater than the SCOs, were not detected in groundwater at concentrations greater than New York State Division of Water TOGS standards. This indicates that groundwater in the Study Area has not been impacted by layers of fill material containing ash, brick, and/or glass.

3.2 CORNING-PAINTED POST SCHOOL DISTRICT CONSTRUCTION PROJECT

As a part of the Corning-Painted Post School District construction activities, extensive work was performed by the School District between 2012 and 2014 at the Corning-Painted Post School District and City of Corning Memorial Stadium properties. This work included, but was not limited to, an expansion to the high school building, the construction of new asphalt roadways and parking areas, the construction of concrete sidewalks, and the construction of natural turf athletic fields in the eastern portion of the Corning-Painted Post School District property (referred to herein as the newly constructed athletic fields). The School District represented to NYSDEC that it built the newly constructed natural turf athletic fields by rough grading the area, installing a geotextile demarcation layer over the existing soils and placing a minimum of 1 foot cover soil with seed over the demarcation layer.

3.3 CITY OF CORNING MEMORIAL STADIUM

The synthetic turf in the City of Corning Memorial Stadium was deemed by the School District to be unsuitable for continued athletic play and replacement of the old turf was proposed and approved by the School District in the fall of 2014 (CPPSD, 2014). The School District's consultant (Haley & Aldrich) prepared an Interim Remedial Measures (IRM) Work Plan for the turf replacement project, dated June 8, 2015, which was included as Appendix B to an Order on

Consent and Administrative Settlement (Index No. A8-0859-15-07) between NYSDEC and the School District, executed on July 1, 2015. The District's IRM activities were conducted as part of the City of Corning Memorial Stadium turf project (Turf Replacement Project) during the summer of 2015.

In relation to the District's IRM activities, the City of Corning and the Corning-Painted Post School District submitted letters dated June 29, 2015, to NYSDEC committing that each would undertake the following future actions:

- The City of Corning (as owner of the City of Corning Memorial Stadium property) would impose an institutional control in the form of an Environmental Easement restricting use of the Corning Memorial Stadium property to Restricted Residential Uses and requiring compliance with a NYSDEC-approved Site Management Plan (SMP). (City of Corning, 2015).
- The School District would implement a Work Plan (consisting of a Work Plan submitted on June 8, 2015 and an amendment dated June 15, 2015) to undertake the Turf Project as defined in the Work Plan at the City of Corning Memorial Stadium and would commit to work with the City of Corning and Corning Incorporated to develop and implement the SMP pursuant to an Environmental Easement to be filed. (CPPSD, 2015).

3.4 INTERIM REMEDIAL MEASURES

Based on the characterization activities and previous work performed by the School District (see Sections 3.2 and 3.3), several areas were identified at the properties in OU3 where constituents were detected at concentrations greater than the NYSDEC restricted residential SCOs in the top 1 foot of soil at the Corning-Painted Post School District property and top 2 feet of soil at the City of Corning Memorial Stadium and Corning Christian Academy properties. Corning Incorporated will conduct IRM activities at these areas in accordance with NYSDEC-approved IRM Work Plans (WESTON, 2016a; WESTON, 2016b; WESTON, 2016c). The IRM work is described in Section 6.1 of this FFS/AA. Institutional controls in the form of Environmental Easements will be prepared restricting the use of the properties to Restricted Residential and requiring compliance with an NYSDEC-approved SMP.

SECTION 3 TABLES

Table 3-1

Summary of Detected Analytical Results - OU3 - Corning Christian Academy [1]
Study Area, Corning, New York

	Screening Levels[2]	Minimum Analytical Result	Maximum Analytical Result	Total # Samples	Total # Non-Detects	Total # Samples with Detected Concentrations	Total # Samples above the Screening Level[4]
Toxicity Characteristic Leaching Procedure (TCLP) Metals, mg/L							
Lead, TCLP [3]	5	0.0030 U	12.1	31	6	25	2
Total Metals, mg/Kg							
Arsenic, Total	16	0.43 U	63.3	59	1	58	10
Barium, Total	400	16.6	410	31	0	31	2
Cadmium, Total	4.3	0.032 U	7.7	59	4	55	3
Lead, Total	400	0.26 U	914	59	1	58	4
Mercury, Total	0.81	0.0090 U	2.0	25	3	22	1

Notes:

[1] Table includes compounds detected at concentrations greater than applicable screening levels in one or more sample.

[2] TCLP samples are screened against the TCLP Regulatory Screening Levels contained in 40 Code of Federal Regulations, Section 2.6.1-Toxicity Characteristic. Non-TCLP samples are screened against NYSDEC Subpart 375-6 Remedial Program Restricted-Residential SCOs.

[3] USEPA TCLP method is used to determine the appropriate disposal method under current NYSDEC and USEPA regulations.

[4] Total Number of Samples above the Screening Level includes only detected concentrations above the screening level.

NYSDEC = New York State Department of Environmental Control

USEPA = United States Environmental Protection Agency

SCO = soil cleanup objective

TCLP = Toxicity Characteristic Leaching Procedure

OU = Operable Unit

mg/L = milligram per liter

µg/Kg = microgram per kilogram

mg/Kg = milligram per kilogram

U = The analyte was analyzed for, but was not detected above the level of the detection quantitation limit shown.

Table 3-2

Summary of Detected Analytical Results - OU3 - City of Corning Memorial Stadium [1]
Study Area, Corning, New York

	Screening Levels[2]	Minimum Analytical Result	Maximum Analytical Result	Total # Samples	Total # Non-Detects	Total # Samples with Detected Concentrations	Total # Samples above the Screening Level[4]
Toxicity Characteristic Leaching Procedure (TCLP) Metals, mg/L							
Cadmium, TCLP [3]	1	0.00050 U	1.1 J+	30	9	21	1
Lead, TCLP [3]	5	0.0030 J	46	30	7	23	4
Total Metals, mg/Kg							
Arsenic, Total	16	4.1	157	77	0	77	16
Cadmium, Total	4.3	0.031 U	21.6	77	4	73	6
Lead, Total	400	7.8	5870	77	0	77	15
Semi-Volatile Organic Compounds (SVOCs), ug/Kg							
Benz(a)anthracene	1000	6.1 U	8700 J	31	14	17	3
Benzo(a)pyrene	1000	4.7 U	16000 J	31	15	16	3
Benzo(b)fluoranthene	1000	3.8 U	20000	31	13	18	3
Benzo(k)fluoranthene	3900	2.2 U	14000 J	31	15	16	2
Chrysene	3900	2.0 U	11000 J	31	16	15	2
Dibenz(a,h)anthracene	330	2.3 UJ	3500 UJ	31	22	9	4
Hexachlorobenzene	1200	8.9 UJ	2700 U	31	31	0	2
Indeno(1,2,3-cd)pyrene	500	5.4 UJ	11000 J	31	15	16	3
Pentachlorophenol, SVOC	6700	61 UJ	20000 U	31	31	0	2

Notes:

[1] Table includes compounds detected at concentrations greater than applicable screening levels in one or more sample.

[2] TCLP samples are screened against the TCLP Regulatory Screening Levels contained in 40 Code of Federal Regulations, Section 2.6.1-Toxicity Characteristic. Non-TCLP Samples are screened against NYSDEC Subpart 375-6 Remedial Program Restricted-Residential SCOs.

[3] USEPA TCLP method is used to determine the appropriate disposal method under current NYSDEC and USEPA regulations.

[4] Total Number of Samples above the Screening Level includes only detected concentrations above the screening level.

NYSDEC = New York State Department of Environmental Control

USEPA = United States Environmental Protection Agency

SCO = soil cleanup objective

TCLP = Toxicity Characteristic Leaching Procedure

OU = Operable Unit

mg/L = milligram per liter

µg/Kg = microgram per kilogram

mg/Kg = milligram per kilogram

U = The analyte was analyzed for, but was not detected above the level of the detection quantitation limit shown.

UJ = The analyte was analyzed for but not detected. The quantitation limit is approximate and may be inaccurate or imprecise.

J+ = The result is an estimated quantity, but the result may be biased high because certain quality control criteria were not met.

J = The positive result reported is estimated either because the result is less than the limit of quantitation (LOQ) or because certain quality control criteria were not met.

Table 3-3

Summary of Detected Analytical Results-OU3
Corning-Painted Post School District [1]
Study Area, Corning, New York

	Screening Levels[2]	Minimum Analytical Result	Maximum Analytical Result	Total # Samples	Total # Non-Detects	Total # Samples with Detected Concentrations	Total # Samples above the Screening Level[4]
Toxicity Characteristic Leaching Procedure (TCLP) Metals, mg/L							
Lead, TCLP [3]	5	0.0030 U	16	26	4	22	3
Total Metals, mg/Kg							
Arsenic, Total	16	4.0	530 J	106	0	106	18
Barium, Total	400	62	3000	26	0	26	2
Cadmium, Total	4.3	0.031 U	420	106	9	97	14
Copper, Total	270	9.5	280	26	0	26	1
Lead, Total	400	8.1	4900	106	0	106	15
Semi-Volatile Organic Compounds (SVOCs), ug/Kg							
Benz(a)anthracene	1000	3.1 U	120000	36	18	18	4
Benzo(a)pyrene	1000	4.3 U	120000	36	14	22	4
Benzo(b)fluoranthene	1000	3.5 U	180000	36	14	22	5
Benzo(k)fluoranthene	3900	2.0 U	89000	36	18	18	2
Chrysene	3900	1.8 U	110000	36	17	19	3
Dibenz(a,h)anthracene	330	2.1 U	21000	36	18	18	5
Fluoranthene	100000	2.6 U	210000	36	10	26	1
Hexachlorobenzene	1200	8.9 U	2800 U	36	36	0	1
Indeno(1,2,3-cd)pyrene	500	4.9 U	84000	36	14	22	5
Pentachlorophenol, SVOC	6700	61 U	21000 U	36	36	0	1
Phenanthrene	100000	3.7 U	180000	36	18	18	1
Pyrene	100000	1.2 U	160000	36	12	24	1
Volatile Organic Compounds (VOCs), ug/Kg							
Benzene	4800	0.20 U	6100	12	10	2	1

Notes:

[1] Table includes compounds detected at concentrations greater than applicable screening levels in one or more sample.

[2] TCLP samples are screened against the TCLP Regulatory Screening Levels contained in 40 Code of Federal Regulations, Section 2.6.1-Toxicity Characteristic. Non-TCLP Samples are screened against NYSDEC Subpart 375-6 Remedial Program Restricted-Residential SCOs.

[3] USEPA TCLP method is used to determine the appropriate disposal method under current NYSDEC and USEPA regulations.

[4] Total Number of Samples above the Screening Level includes only detected concentrations above the screening level.

NYSDEC = New York State Department of Environmental Control

USEPA = United States Environmental Protection Agency

SCO = soil cleanup objective

TCLP = Toxicity Characteristic Leaching Procedure

OU = Operable Unit

mg/L = milligram per liter

µg/Kg = microgram per kilogram

mg/Kg = milligram per kilogram

U = The analyte was analyzed for, but was not detected above the level of the detection quantitation limit shown.

UJ = The analyte was analyzed for but not detected. The quantitation limit is approximate and may be inaccurate or imprecise.

J+ = The result is an estimated quantity, but the result may be biased high because certain quality control criteria were not met.

J = The positive result reported is estimated either because the result is less than the limit of quantitation (LOQ) or because certain quality control criteria were not met.

Table 3-4

Soil Boring Summary - OU3 - Corning Christian Academy Study Area, Corning, NY

Sample Results	Observations			
	No Layer of fill material containing ash, brick and/or glass observed	Layer of fill material containing ash, brick and/or glass observed		
		0-2 ft bgs Only	0-2 ft bgs and > 2 ft bgs	> 2 ft bgs Only
Number of Soil Borings with All Soil Samples < SCOs[1]	4	0	1	0
Number of Soil Borings with One or More Soil Samples >SCOs in 0-2 ft bgs Only[1]	0	0	0	0
Number of Soil Borings with One or More Soil Sample >SCOs in 0-2 ft bgs and > 2 ft bgs[1]	0	0	1	2
Number of Soil Borings with One or More Soil Sample >SCOs in >2 ft bgs Only[1]	0	0	0	1
Totals	**4**	**0**	**2**	**3**
		5		

Notes:

OU3 - Operable Unit 3 (School/Community Use Areas)

CCA - Corning Christian Academy Property

[1] Samples collected in OU3 soil borings compared to restricted residential SCOs.

ft bgs - feet below ground surface

SCOs - New York State Department of Environmental Conservation (NYSDEC) soil cleanup objectives

Table 3-5

Soil Boring Summary - OU3 - City of Corning Memorial Stadium Study Area, Corning, NY

Sample Results	Observations			
	No Layer of fill material containing ash, brick and/or glass observed	Layer of fill material containing ash, brick and/or glass observed		
		0-2 ft bgs Only	0-2 ft bgs and > 2 ft bgs	> 2 ft bgs Only
Number of Soil Borings with All Soil Samples < SCOs[1]	4	2	0	1
Number of Soil Borings with One or More Soil Samples >SCOs in 0-2 ft bgs Only[1]	0	1	0	0
Number of Soil Borings with One or More Soil Sample >SCOs in 0-2 ft bgs and > 2 ft bgs[1]	0	0	2	0
Number of Soil Borings with One or More Soil Sample >SCOs in >2 ft bgs Only[1]	0	0	0	3
Totals	**4**	**3**	**2**	**4**
		9		

Notes:

OU3 - Operable Unit 3 (School/Community Use Areas)

CMS - Corning Memorial Stadium Property

[1] Samples collected in OU3 soil borings compared to restricted residential SCOs.

ft bgs - feet below ground surface

SCOs - New York State Department of Environmental Conservation (NYSDEC) soil cleanup objectives

Table 3-6

Soil Boring Summary - OU3 - Corning-Painted Post School District Study Area, Corning, NY

Sample Results	Observations			
	No Layer of fill material containing ash, brick and/or glass observed	Layer of fill material containing ash, brick and/or glass observed		
		0-2 ft bgs Only	0-2 ft bgs and > 2 ft bgs	> 2 ft bgs Only
Number of Soil Borings with All Soil Samples < SCOs[1]	8	1	1	3
Number of Soil Borings with One or More Soil Samples >SCOs in 0-2 ft bgs Only[1]	0	0	0	0
Number of Soil Borings with One or More Soil Sample >SCOs in 0-2 ft bgs and > 2 ft bgs[1]	0	0	2	0
Number of Soil Borings with One or More Soil Sample >SCOs in >2 ft bgs Only[1]	0	0	0	11
Totals	**8**	**1**	**3**	**14**
		18		

Notes:

OU3 - Operable Unit 3 (School/Community Use Areas)

CPP - Corning Painted Post School District Property

[1] Samples collected in OU3 soil borings compared to restricted residential SCOs.

ft bgs - feet below ground surface

SCOs - New York State Department of Environmental Conservation (NYSDEC) soil cleanup objectives

4. REMEDIAL OBJECTIVES AND GOALS

Remedial action objectives (RAOs) are established for remedial alternatives in the FFS/AA to ensure that remedial activities meet the threshold criteria of providing overall protection of human health and the environment. Effective RAOs address the potential exposure and migration pathways for Subject Material in the Study Area. Additionally, in accordance with the United States Environmental Protection Agency (US EPA) and State guidance, development of RAOs for OU3 includes consideration of Standards, Criteria and Guidance (SCGs).

4.1 CONSTITUENTS OF POTENTIAL CONCERN (COPCS)

The COPCs for OU3 are arsenic, cadmium, and lead.

4.2 STANDARDS, CRITERIA, AND GUIDANCE (SCGS) AND APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS)

Remedial actions in OU3 should meet New York State SCGs as well as Federal Applicable or Relevant and Appropriate Requirements (ARARs). In accordance with 6 NYCRR Part 375-1.8(f) remedial actions will 1) "*conform to standards and criteria that are generally applicable, consistently applied, and officially promulgated, that are either directly applicable, or that are not directly applicable but are relevant and appropriate, unless good cause exists why conformity should be dispensed with*" and 2) "*consider applicable Department guidance*." NYSDEC's DER-10 Technical Guidance for Site Investigation and Remedial defines SGSs as "*Mean standards and criteria that are generally applicable, consistently applied and officially promulgated, that are either directly applicable, or that are not directly applicable but are relevant and appropriate, unless good cause exists why conformity should be dispensed with, and with consideration being given to guidance determined, after the exercise of scientific and engineering judgement, to be applicable. This term incorporates both the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) concept of "applicable or relevant and appropriate requirements*" *(ARARs) and the EPA's "to be considered" (TBC) category of non-enforceable criteria or guidance"* [DER-10 Section 1.3(b)71].

According to the US EPA (1988), ARARS are defined as follows:

- ***"Applicable requirements** are those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria or limitations promulgated under federal or state law that specifically address a hazardous substance, pollutant, contaminant, remedial action, location or other circumstances at a site.*"

- ***"Relevant and appropriate requirements** are those cleanup standards, standards of control or other substantive environmental protection requirements, criteria or limitation promulgated under federal or state law that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location or other circumstance at a site, address problems or situations sufficiently similar to those encountered at the site.*"

ARARs are divided into the following categories:

- **Chemical-specific requirements** are health or risk-based concentration limits or ranges in various environmental media for specific hazardous substances, pollutants or contaminants. These limits may take the form of cleanup levels or discharge levels.
- **Location-specific requirements** are restrictions on activities that are based on the characteristics of a site or its immediate environment. An example would be the restrictions on wetlands development.
- **Action-specific requirements** are controls or restrictions on particular types of activities in related areas such as hazardous waste management or wastewater treatment.

Identification of primary chemical-specific, location specific, and action-specific ARARs for OU3 is summarized in Table 4-1.

4.3 REMEDIAL ACTION OBJECTIVES

Considering the COPCs, the evaluation of SCGs, and input provided by NYSDEC, the RAOs developed for this FFS/AA include the following:

1. Prevent human incidental ingestion and dermal contact with Subject Material.
2. Prevent human inhalation of Subject Material that may be disturbed and suspended in air as particles.
3. Achieve SCOs, as required by NYSDEC Part 375, throughout OU3.

For the above-listed RAOs, the following is noted:

- With respect to RAO1 and RAO2:

    - The primary potential exposure pathways to these constituents at concentrations greater than the SCOs are incidental ingestion, inhalation and dermal contact. A majority of the surface area in OU3 is maintained lawns with sod or impervious surface (including but not limited to asphalt roadways, synthetic turf field, concrete walkways, school/community buildings, etc.)

- With respect to RAO3:

    - Achieving SCOs throughout the lateral and vertical extent of OU3 would necessitate removal of soils to depths that are technically impracticable due to the existing physical features of OU3 and would not achieve materially greater protection of potential human exposure with respect to RAO1 and RAO2.

SECTION 4 TABLE

Table 4-1: Summary of SCGs and ARARs
Focused Feasibility Study/ Alternatives Analysis
OU3
Study Area, Corning, New York

Potential ARAR	Description	Study Area-specific information	Applicable or Relevant and Appropriate?
Chemical-Specific ARARs			
Resource Conservation and Recovery Act (RCRA) Toxicity Characteristic Leaching Procedure (TCLP) [40 CFR Part 261]	Federal regulations for disposal of hazardous waste.	If the Subject Material from the Study Area is excavated, a waste is generated. TCLP extracts from some samples collected in the Study Area indicate that some constituents have been detected in the extracts at concentrations greater than TCLP criteria. Excavated material from the Study Area will be profiled to determine the disposal requirements.	TCLP criteria is applicable to the Study Area Subject Material when excavated and a waste is generated for disposal. Classification of the excavated material as a hazardous or nonhazardous waste is based on TCLP results of the waste profile for representative samples collected from the excavated material The material in place would not become a waste until it is excavated and removed.
New York State Soil Cleanup Objectives (SCOs) [6 NYCRR Part 375-6.8(b)	New York State guidance soil cleanup objectives. Samples collected in OU3 are screened against NYSDEC restricted-residential SCOs.	SCOs are applicable based on the use of properties within OU3. Analytical sampling to date indicates the presence of some constituents at concentrations greater than SCOs.	SCOs are applicable to OU3 based on the current and anticipated future use of the properties. If future use of properties change, the appropriate SCOs would apply.
New York State Commissioner Policy on Soil Cleanup Guidance (CP-Soil)	Commissioner policy is to be used in conjunction with applicable New York State guidance for restricted use soil cleanup objectives.	Residential CP-51 standards may apply based on the use of properties within OU3.	Per communication with NYSDEC, certain CP-51 criteria do not apply to the Study Area. The constituents included in CP-51 are not COPCs within the Study Area.
Location-Specific ARARs			
Protection of Wetlands Executive Order No. 1190 in furtherance of the National Environmental Policy Act of 1969, as amended (42 USC 4321 et seq.)	Activities performed in a wetlands area are required to take actions to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of the wetlands.	No wetlands are known to exist within OU3.	Not applicable, relevant or appropriate. This requirement is only applicable if it is determined that Study Area activities impact a wetland.
Floodplain Management Executive Order No. 11988 in furtherance of the National Environmental Policy Act of 1969, as amended (42 USC 4321 et seq.)	Action to avoid to the extent possible the long and short-term adverse impacts associated with the occupancy and modification of floodplains.	The subject portions of the Study Area (OU3) are not located within a 100-year floodplain.	Not applicable or relevant. The proposed activities in OU3 are conducted in areas outside of and protected by the USACOE engineered berm and flood control area.
Archeological and Historic Preservation Act (54 USC 312501-312508)	Provides for the preservation of historical and archeological data which might otherwise be destroyed or irreparably lost due to a Federal action.	The subject portions of the Study Area (OU3) could possibly contain archeological artifacts in the subsurface. No historic properties, landmarks, or monuments are known to be within this area.	Not applicable since the removal will not be a federal action. May be relevant and appropriate if significant historic archeological artifacts are encountered during excavation activities in the OU3 areas.
Action-Specific ARARs			
Endangered Species Act (ESA) 50 CFR 402.04 and 50 CFR 402.01	Actions must not threaten the continued existence of a listed species. Actions must not destroy a critical habitat.	No known listed species have been identified in the subject portions of the Study Area or immediate area. Actions proposed in this FFS/AA in the remedial action alternatives are not expected to disturb or affect a critical habitat or listed species.	Not applicable or relevant.
New York State Fish, Wildlife and Marine Standards: 6 NYCRR Part 182 (Endangered & Threatened Species of Fish & Wildlife), 6 NYCRR Part 608 (Use and Protection of Waters); 6 NYCRR Pert 663 (Freshwater Permit Requirements), 6 NYCRR 664 (Freshwater Wetland Maps and Classifications)	Actions must not threaten the continued existence of a listed species. Actions must not destroy a critical habitat.	No known listed species have been identified in the subject portions of the Study Area or immediate area. Actions proposed in this FFS/AA in the remedial action alternatives are not expected to disturb or affect a critical habitat or listed species.	Not applicable or relevant.

Table 4-1: Summary of SCGs and ARARs (continued)
Focused Feasibility Study/ Alternatives Analysis
OU3
Study Area, Corning, New York

Potential ARAR	Description	Study Area-specific information	Applicable or Relevant and Appropriate?
Action-Specific ARARs (continued)			
U.S. EPA Hazardous Waste Management Regulations (40 CFR 260-264)	These regulations contain requirements for treatment, storage, and disposal of hazardous waste at Resource Conservation and Recovery Act (RCRA) facilities. Includes regulations for generators and transporters of hazardous waste.	A small portion of the excavated material may be classified as hazardous waste based on TCLP results.	Applicable during storage, handling and staging activities if hazardous waste is generated during implementation of remedial actions. Storage of RCRA material should not exceed 90 days.
Occupational Health and Safety Administration (OSHA) construction (29 CFR 1926) and general industry standards (29 CFR 1910)	These regulations contain requirements for workers involved in construction and general operations.	Remedial activities in the Study Area involve construction equipment and potentially, some hazardous waste.	Applicable. If hazardous waste is generated during implementation of a remedial activities, workers must have Hazardous Waste Operation and Emergency Response (HAZWOPER) training. Also applicable to construction activities such as excavation and backfilling.
U.S. Department of Transportation rules contained in 49 CFR and for general transportation requirements and 49 CFR Parts 172 - 179 for the transport of hazardous materials, 6 NYCRR Part 364 (Waste Transporters), 370 (Hazardous Waste Management System: General), 371 (Identification and Listing of Hazardous Waste), 372 (Hazardous Waste Manifest System and Related Standards for Generators, Transported and Facilities)	These regulations contain general transportation requirements and requirements for transporting hazardous waste, including but no limited to packaging, labeling and manifesting.	Remediation activities involve the transportation of excavated material over roadways by haul trucks to disposal facilities. Some of the excavated material may be classified as hazardous waste.	Applicable.
Environmental Remediation Programs (6 NYCRR Part 375)	These regulations contain requirements for environmental remediation programs.	Work performed in the Study Area to date and anticipated in the future is considered environmental remediation.	Applicable. Work performed in the Study Area to date and anticipated in the future is under the oversight of the NYSDEC and is being performed under the applicable regulations.
Land Disposal Restrictions (6 NYCRR Part 376)	These regulations contain requirements and restrictions for land disposal in New York State.	Materials subject to land disposal requirements could be generated during the implementation of the remedial alternatives.	These regulations are applicable if hazardous waste is generated during remediation activities.
NYSDEC State Pollutant Discharge Elimination System (SPDES) Permit Program	General Permit for Stormwater Discharges from Construction Activity	Construction activities within the Study Area may require a NYSDEC SPDES permit for construction activities.	Applicable. These regulations are applicable depending upon the planned activities and disturbance area.
New York State 6 NYCRR Part 200 (General Provisions), 6 NYCRR Part 201 (Permits and Registrations), 6 NYCRR Part 211 (General Prohibitions) 6 NYCRR Part 257 (Air Quality Standards)	These regulations contain requirements for air emissions.	The COPCs are not volatile compounds. However, Subject Material may be disturbed during remediation activities that could be inhaled if airborne dust or soil particles are generated.	Not relevant or applicable. Dust suppression and air monitoring are implemented during construction activities in accordance with OSHA requirements, the Health & Safety Plan and the Community Air Monitoring Plan (CAMP).

Notes:
SCGs - Standards, Criteria, and Guidance
ARARs - Applicable or Relevant and Appropriate Requirements
OU3 - Operable Unit 3 (School/Community Use Areas)

5. SCREENING OF TECHNOLOGIES AND DEVELOPMENT OF ALTERNATIVES

It is important to note that IRMs will be implemented at the School/Community Use Areas in accordance with NYSDEC-approved IRM work plans (dated November 2016 and approved January 26, 2017) for the Corning-Painted Post School District, the Corning Christian Academy, and the City of Corning Memorial Stadium properties. It is appropriate for the NYSDEC-approved IRMs to be considered as part of the recommended alternative. However, for the purpose of conducting the screening of technologies, the technologies were evaluated and screened independent of the IRMs as presented in Section 5.1.

5.1 SCREENING OF REMEDIAL TECHNOLOGIES

WESTON performed a remedial technology screening to identify and evaluate possible remedial technologies to assess their effectiveness and feasibility for application to OU3, and to identify whether any such technologies had limitations which prevented or restricted their possible application in OU3. In addition to excavation and removal alternatives retained for further discussion below, this screening process included an evaluation of capping/covering, fixation, soil washing, chemical extraction, in-situ thermal treatment/vitrification and bioremediation/phytoremediation. The following is a brief description of each evaluated remedial technology and reasons why it was or was not retained for this FFS/AA.

1. Capping/Covering: This technology involves placement of clean soil over a permeable geotextile or installation of another physical barrier or covering (such as a flexible membrane liner) over the Subject Material. Due to absence of impacts to groundwater a membrane liner is not needed. A cover system can feasibly be placed over all areas to be remediated, but doing so does not remove affected materials. This approach was retained, as discussed below, in combination with excavation where necessary, as a means to provide a barrier over deeper Subject Material.

2. Fixation/Stabilization: This technology involves the addition of a reactive material (such as cement or fly ash) to restrict the solubility or mobility of constituents in the matrix by encapsulating or trapping the mobile constituents. Fixation or stabilization can be done in-situ or ex-situ, but does not remove the constituents or reduce their concentrations except by dilution. Typically, this technology is used for inorganic materials; but because groundwater sample results indicate the potential migration of COPCs is not a concern, this technology was not retained for further evaluation.

3. Soil Washing: Soil washing is an ex-situ process involving removal of the Subject Material, removal of oversized material, washing the remaining soil (with water and sometimes surfactants), then dewatering and returning the washed soil back into the excavation area. Typically this is best applied to coarse soils with small amounts of fines, and is not suitable to materials containing significant amounts of fine sand, silt or clay, such as found in OU3. Processing in OU3 would involve staging of multiple large pieces of equipment, washing agents, and wastewater streams including water, sediment and sludge. This technology affords no benefits over the retained technologies.

4. Chemical Extraction: This technology involves excavation, extraction and treatment in a tank, and returning the treated soils to the excavation area. This is similar to soil washing but washing occurs in a tank or separator with an organic solvent or acid to extract inorganics and metals (and the solvent or acid is regenerated and reused). This technology concentrates on separation of fine particles (clay and silt) in the soil matrix where constituents tend to bind, and is best applied to coarse soils with small amounts of fines, unlike the soils within OU3. This technology includes all of the disadvantages of soil washing and has uncertain effectiveness, so it was not retained as a technology for further consideration.

5. Thermal Treatment/Vitrification: This technology involves the in-situ heating of soils to volatilize and remove organic constituents, or, in the case of vitrification, heating the soils to the point that it fuses and vitrifies (i.e., turns to molten glass creating a solid mass that immobilizes the constituents). There are various methods of generating the heat needed for either approach. The thermal treatment technology is not typically implemented for metals and inorganics, since they do not have the ability to volatilize in significant amounts, and are not thermally destroyed. Hence thermal treatment will not reduce the metals concentrations, but just encapsulates them in a vitrified matrix. Therefore, this technology was deemed not applicable or appropriate for implementation within OU3.

6. Bioremediation/Phytoremediation: This technology uses plants to remove contaminants from soils through uptake of nutrients and accumulation of inorganics into the plant's biomass, and then harvesting the plants and disposing them off-site at a permitted facility. Property owners would have to maintain specific types of vegetation which may not be compatible with their current or preferred landscaping. The limited uptake of the COPCs, the short growing season, the large number of plants required and the requirement for harvesting and replanting are drawbacks for use of this technology within OU3. Therefore, this technology was deemed not applicable or appropriate for implementation within OU3.

As a result of this screening process, the retained remedial technologies are limited excavation and removal with a soil cover, as discussed in greater detail below.

5.2 DEVELOPMENT OF ALTERNATIVES

The development of alternatives is focused on the remedial technologies of limited excavation and removal with a cover system as the primary means to address the Subject Material. As indicated in Section 1.1 and discussed above, considering the conditions of OU3 (e.g., soil and layers of fill material containing ash, brick, and/or glass are the only environmental media that need to be addressed, and the primary exposure pathways are incidental ingestion, inhalation and dermal contact), other methods or technologies are not feasible for addressing the Subject Material.

5.2.1 Alternative 1: No Further Action

In this alternative, no further action would be conducted. The previous activities that have been implemented and IRMs that will be implemented under NYSDEC-approved IRM Work Plans to address Subject Material are taken into account to determine that no further action would be conducted. Additional detail for this alternative is provided in Section 6.1.

5.2.2 Alternative 2: Excavate up to 15 Feet and Backfill

In this alternative, Subject Material would be excavated to a depth of up to 15 ft bgs and disposed off-site at a permitted facility. The soil cover in the recently constructed school and public use facilities would be excavated. A 15-foot excavation could eliminate the need for an SMP or an environmental easement or deed restriction in accordance with DER-10 [DER-10 1.12 (b)], except for the inaccessible Subject Material. Soils excavated from above a demarcation layer (i.e., clean soil) and imported soil backfill material would be placed in the excavation to grade and the area would be re-vegetated or restored to its previous use (e.g., turf field, baseball field, parking lot, etc.). For inaccessible subsurface Subject Material located less than 15 ft bgs, this alternative includes institutional controls to prevent exposure to the Subject Material. Additional detail for this alternative is provided in Section 6.2.

6. ALTERNATIVES ANALYSIS

This section presents an analysis of the alternatives identified in Section 5 to address the Subject Material in OU3. The alternatives are evaluated on the following criteria set forth in 6 NYCRR 375-1.8(f) and DER-10.

Threshold Criteria

Overall protection of human health and the environment and conformance to SCGs and ARARs are threshold requirements that each alternative must meet in order to be eligible for selection.

- **Overall Protection of Human Health and the Environment** – This criterion involves an assessment of whether a remedy provides adequate protection of human health and the environment. The remedy contains a description of how risks posed through each exposure pathway are eliminated, reduced, or controlled. The selected remedy must meet this criterion.

- **Conformance with SCGs and ARARs** – This criterion involves an assessment of whether a remedy conforms to promulgated standards and criteria that are directly applicable or that are relevant and appropriate. The remedy also must take into consideration guidance as appropriate. The selected remedy must meet this criterion unless good cause exists if any of the following are present:

    - The proposed action is only a part of a complete program or project that will, as a whole, conform to such standard or criterion upon completion;

    - Conformity to such a standard or criterion will result in greater risk to the public health and the environment than alternatives;

    - Conformity to such a standard or criterion is technically impracticable from an engineering or scientific perspective; or

    - The program or project will attain a level of performance that is equivalent to that required by the standard or criterion through use of another method or approach.

Primary Balancing Criteria

- **Long-term Effectiveness and Permanence** – This criterion involves an assessment of the long-term effectiveness and permanence of an alternative or remedy after implementation.

- **Reduction of Toxicity, Mobility, or Volume of Contamination through Treatment** – This criterion involves an assessment of the ability of an alternative or remedy to reduce toxicity, mobility and volume of constituents at concentrations greater than the SCOs.

Preference is given to remedies that permanently or significantly reduce the toxicity, mobility and volume of constituents at concentrations greater than the SCOs at the site.

- **Short-Term Impact and Effectiveness** – This criterion involves an assessment of the potential short-term adverse environmental impacts and human exposures during construction and/or implementation of an alternative or remedy.

- **Implementability** – This criterion involves an assessment of the technical and administrative feasibility of implementing an alternative or remedy.

- **Cost Effectiveness** – This criterion involves an assessment of the overall cost effectiveness of an alternative or remedy. A remedy is cost effective if its costs are proportional to its overall effectiveness.

- **Land Use** – This criterion involves an assessment of the current, intended and reasonably anticipated future use of the site and its surroundings, as it relates to the alternative or remedy, when unrestricted levels are not achieved.

Green Remediation Practices Criterion

The green remediation practices criterion requires each alternative to be evaluated for consistency with USEPA's and NYSDEC's Green Remediation (DER-31) concepts and strategies which consider the environmental consequences of remedial actions including energy requirements, air emissions, material consumption, resource consumption, and waste generation. The criterion provides a goal of using the best management practices (e.g., clean diesel technology, waste minimization, resource conservation, reduction of greenhouse gases (GHGs) and other air emissions, ecological and soil preservation) to reduce demands on the environment ("footprint"). However, it is important to note that green remediation concepts are not used to preclude appropriate and necessary cleanup of environmental contamination. These policies are intended to pro-actively apply sustainable methods to remediate efficiently, cost-effectively, and with reduced environmental impacts while still protecting public health and the environment and striving to achieve established cleanup goals.

NYSDEC's Program Policy, DER-31 (Green Remediation) states that alternatives with the following characteristics will likely be the greenest:

- Fewer short-term and long-term ancillary impacts to the environment;
- Fewer GHG emissions;
- Smaller environmental footprint;
- Achieves the remedial action objectives more sustainably;
- Allows for the greenest reuse;
- Achieves a complete and permanent cleanup; and
- Permanently and significantly reduces the toxicity, mobility or volume of contamination.

Modifying Criteria

- **State and Community Acceptance** – This criterion will be considered during remedy selection by NYSDEC after public comment has been received for the alternatives.

6.1 ALTERNATIVE 1: NO FURTHER ACTION

6.1.1 Description

In this alternative, no further action is conducted to address Subject Material in OU3. The previous activities that have been implemented and IRMs that will be implemented under NYSDEC-approved IRM Work Plans to address Subject Material at each of the properties in OU3 are taken into account to determine that no further action will be conducted. The previous activities that have been implemented and IRMs that will be implemented are described below.

Corning-Painted Post School District Property

Corning-Painted Post School District Construction Project – As a part of School District construction activities, extensive work has been performed by the School District at the Corning-Painted Post School District property from 2012 through 2014 including, but not limited to, an expansion to the high school building, construction of new asphalt roadways and parking areas, construction of concrete sidewalks, and construction of natural turf athletic fields in the eastern portion of the property (referred to herein as the newly constructed athletic fields). The School District represented to NYSDEC that it built the newly constructed natural turf athletic fields by rough grading the area, installing a geotextile demarcation layer over the existing soils and placing a minimum of 1 foot cover soil with seed over the demarcation layer. The expansion of the building as well as the newly constructed parking lot, roadway and sidewalk areas and natural turf fields are depicted on Figure 6-1.

IRMs - Two areas were identified at the Corning-Painted Post School District property during characterization sampling activities performed by WESTON on behalf of Corning Incorporated pursuant to NYSDEC-approved Work Plans (WESTON, 2014a; WESTON 2015) where constituents were detected at concentrations greater than the NYSDEC restricted residential SCOs in the top 1 foot of soil (i.e., 0 to 1 ft bgs). These areas are (1) along the northern edge of the tennis courts extending along Corning Boulevard, between the property line and the newly constructed

athletic fields, to the entrance of the parking lot in the east side of the newly constructed athletic fields (in the vicinity of CPPSB018 and CPPSS013) and (2) in the grass covered area east of the City of Corning Memorial Stadium property in the vicinity of a sample on the City of Corning Memorial Stadium property where analytical results were detected at concentrations greater than the NYSDEC restricted residential SCOs extending to sample CPPSS006. In addition, the grass covered area along the western edge of the tennis courts is an area immediately adjacent to a residential property where cadmium was detected at concentrations less than the NYSDEC restricted residential SCO, but greater than the NYSDEC residential SCO in the 2 in to 2 ft bgs sample in shallow soil sample CPPSS014 and in the 0 to 2 ft bgs sample in soil boring CPPSB020. These areas are illustrated in Figure 6-2.

All other areas with analytical results greater than the NYSDEC restricted residential SCOs were collected within the footprint of the newly constructed natural turf athletic fields under the demarcation layer discussed above. NYSDEC has indicated that no further action is required by Corning Incorporated for Subject Material located beneath the existing natural turf athletic fields.

Corning Incorporated submitted an IRM Work Plan (WESTON, 2016a) pursuant to the June 2014 Order on Consent, which was approved by NYSDEC following public comment in a letter from Kelly Cloyd dated January 26, 2017 (NYSDEC, 2017a). Corning Incorporated will conduct IRM activities at the Corning-Painted Post School District property pursuant to the NYSDEC-approved Work Plan. One foot of soil will be excavated and removed from the two areas identified on Figure 6-2 (“IRM limits of excavation”). A NYSDEC-approved demarcation layer will be placed in the excavation areas at the base of the excavation between the existing soils and the imported backfill material. The disturbed areas will be re-vegetated.

Following completion of the IRM activities, NYSDEC will require the Corning-Painted Post School District to record an institutional control in the form of an Environmental Easement restricting use of the Corning-Painted Post School District property to Restricted Residential Uses and requiring compliance with a NYSDEC-approved SMP prepared by Corning Incorporated. The SMP provides procedures for the management of remaining residual constituents at depths greater than 1 ft bgs or otherwise inaccessible for excavation at the time of IRM implementation.

Corning Christian Academy Property

IRMs - One area was identified at the Corning Christian Academy during characterization sampling activities performed by WESTON on behalf of Corning Incorporated pursuant to NYSDEC-approved Work Plans (WESTON, 2014a; WESTON, 2014b; WESTON 2015) where constituents were detected at concentrations greater than the NYSDEC restricted residential SCOs (see Figure 6-3). This area is located south of the Corning Christian Academy school building entrance. This area encompasses the five soil borings and one surface soil sample with concentrations greater than NYSDEC restricted residential SCOs. This area is bounded by the Corning Christian Academy on the north and west sides, by soil boring location CCASB007 to the south and soil boring location CCASB009 to the east. All other samples collected on the Corning Christian Academy Property were less than the NYSDEC restricted residential SCOs.

Corning Incorporated submitted an IRM Work Plan (WESTON, 2016b) pursuant to the June 2014 Order on Consent, which was approved by NYSDEC following public comment in a letter from Kelly Cloyd dated January 26, 2017 (NYSDEC, 2017b). Corning Incorporated will conduct IRM activities at the Corning Christian Academy property pursuant to the NYSDEC-approved Work Plan. Two feet of Subject Material will be excavated and removed from the area identified on Figure 6-3 ("IRM limits of excavation"). A NYSDEC-approved demarcation layer will be placed in the excavation areas at the base of the excavation between the existing soils and the imported backfill material. The disturbed areas will be re-vegetated.

Following completion of the IRM activities, NYSDEC will require the Corning Christian Academy to record an institutional control in the form of an Environmental Easement restricting use of the Corning Christian Academy property to Restricted Residential Uses and requiring compliance with a NYSDEC-approved SMP prepared by Corning Incorporated. The SMP provides procedures for the management of remaining residual constituents at depths greater than 2 ft bgs or otherwise inaccessible for excavation at the time of IRM implementation.

City of Corning Memorial Stadium Property

Corning-Painted Post School District Construction Project - From 2012 through 2014, Work was performed by the School District on the City of Corning Memorial Stadium property including,

but not limited to, the construction of new asphalt roadways and parking areas and the construction of concrete sidewalks. The newly constructed parking lot, roadway and sidewalk areas are shown on Figure 6-4.

Corning-Painted Post School District Turf Replacement Project - IRM activities were conducted by the School District under NYSDEC-approved Work Plan dated June 8, 2015 and Consent Order signed July 1, 2015 as part of the City of Corning Memorial Stadium turf replacement project (Turf Replacement Project) during the summer of 2015. This work was described in correspondences dated June 29, 2015 to Benjamin Conlon (NYSDEC) from the City of Corning, the Corning-Painted Post School District (City of Corning, 2015; Corning-Painted Post School District, 2015).

IRMs - Three areas were identified at the City of Corning Memorial Stadium property during characterization sampling activities performed by WESTON on behalf of Corning Incorporated pursuant to NYSDEC-approved Work Plans (WESTON, 2014a; WESTON 2015) where constituents were detected at concentrations greater than the NYSDEC restricted residential SCOs in the top two feet of soil (i.e., 0 to 2 ft bgs). These areas are along the eastern edge of the track in the vicinity of sample CMSSS012, in the grassy area in the southwest corner of the City of Corning Memorial Stadium property in the vicinity of sample CMSSS013, and along the western edge of the track in the vicinity of soil boring CMSSB002. All other areas with analytical results greater than the NYSDEC restricted residential SCOs were collected under the cover system discussed above. NYSDEC has indicated that no further action is required by Corning Incorporated for Subject Material located beneath the cover system existing at the City of Corning Memorial Stadium property.

Corning Incorporated submitted an IRM Work Plan (WESTON, 2016c) pursuant to the June 2014 Order on Consent, which was approved by NYSDEC following public comment in a letter from Kelly Cloyd dated January 26, 2017 (NYSDEC, 2017c). Corning Incorporated will conduct IRM activities at the City of Corning Memorial Stadium property pursuant to the NYSDEC-approved Work Plan. Two feet of Subject Material will be excavated and removed from the areas identified on Figure 6-5 (“IRM limits of excavation”). A NYSDEC-approved demarcation layer will be placed in the excavation areas at the base of the excavation between the existing soil and the imported backfill material. The disturbed areas will be re-vegetated.

6.1.2 Overall Protectiveness of Human Health and the Environment

This alternative is protective of human health and the environment for school and community use. It prevents human exposure to Subject Material by means of a cover system and institutional controls. The removal of Subject Material through previous activities and IRMs from the top one to two feet of soil reduces potential health risks in OU3, especially considering that potential for exposure to Subject Material at depth would occur only in conjunction with disruption to the cover system (e.g., utility work, repairs, etc.). As a result, exposure would be negligible compared to that for surface material. Removal of Subject Material beyond 1 or 2 ft bgs would not achieve a meaningful additional reduction in health risks. Therefore, no further removal would occur in this alternative. Over the long-term, the SMP and environmental easements that will be recorded are the institutional controls to address residual constituents at concentrations greater than SCOs. Environmental easements for the OU3 properties will require compliance with a NYSDEC-approved SMP. The SMP will provide procedures for the management of residual constituents at concentrations greater than SCOs, should excavation occur in the future.

Under the SMP, each property owner will be provided a map indicating the locations where residual constituents at concentrations greater than SCOs remain. These areas include a subsurface demarcation layer, which is a visual indicator that the material below the demarcation layer is subject to the requirements of the SMP. The map notes will refer to the SMP for requirements and procedures for excavation that apply to areas where residual Subject Materials remain.

6.1.3 Conformance with SCGs and ARARs

The 2-foot thick soil cover meets the SCOs (6 NYCRR Part 375-6.8(b)) and the DER-10 Technical Guidance for soil cover (DER-10 4.1(f)2) for residential or restricted residential use and the 1-foot thick or more cover meets the SCOs (6 NYCRR Part 375-6.8(b)) and the DER-10 Technical Guidance for soil cover (DER-10 4.1(f)2) for commercial or industrial land use. NYSDEC provided approval of the *High School Athletic Field Construction Completion Report* dated November 2015 and the *Memorial Stadium Construction Completion Report* dated November 2015 in two letters to the School District, both dated January 8, 2016 (NYSDEC, 2016a; NYSDEC, 2016b).

Exposure to deeper Subject Materials (i.e., below 1 or 2 ft bgs) is prevented by the clean soil cover, artificial turf, or asphalt/pavement. Adherence to the SMP and Environmental Easements are the institutional controls for management of the remaining Subject Materials.

6.1.4 Long-Term Effectiveness and Permanence

Under the IRM program, Subject Material from the ground surface up to 1 or 2 ft bgs will be permanently removed from the properties in the IRM areas. The one to two foot soil cover, artificial turf, or asphalt/pavement provides a permanent barrier to prevent potential exposure to any residual subsurface Subject Material, and the integrity of the cover system will be maintained through the implementation of the SMP. The SMP provides direction for future potential construction activities that involve excavations below the cover system or into the Subject Material, and information notification requirements as well as planned inspections and necessary repair activities to maintain the integrity of the cover system.

6.1.5 Reduction of Toxicity, Mobility, or Volume of Contamination through Treatment

Under the IRM program, the volume of Subject Material from the ground surface up to 1 or 2 ft bgs will be permanently reduced in the IRM areas. The approximate total volume of Subject Material to be excavated under the IRM program from OU3 is approximately 850 cubic yards (cy). No further reduction would occur in this alternative.

The COPCs, i.e., arsenic, cadmium, and lead, which were detected in Subject Material at concentrations greater than SCOs, were not detected in groundwater at concentrations greater than New York State Division of Water TOGS standards. Thus, these COPCs are not mobile within the Study Area in the dissolved phase. Release of COPCs to air from particle resuspension and release of COPCs via dust or erosion is limited by maintenance of the cover system.

The soil cover, turf, or asphalt/pavement provides physical protection of underlying residual Subject Material by covering and restricting disturbance and, therefore, mobility of these materials.

6.1.6 Short-Term Impact and Effectiveness

Since there is no construction activity conducted in this alternative, there is no significant impact to the environment and human exposure in the short-term.

6.1.7 Implementability

No further action can be readily implemented. Since the IRM Work Plans have been approved by NYSDEC following public comment, they can be readily implemented. Additionally, an SMP will be approved and Environmental Easements will be recorded.

6.1.8 Cost Effectiveness

There is no cost associated with this alternative.

6.1.9 Land Use

The historic and current land use for OU3 is school/community use. The zoning for the Corning-Painted Post School District property and the City of Corning Memorial Stadium property is public conservation and the zoning for the Corning Christian Academy property is light residential. It is anticipated that school/community use will remain the same in the future and is consistent with current zoning for each property in OU3. The no further action alternative is consistent with this continued land use due to the previous implementation of IRMs and Subject Material not being present in surface soil.

6.1.10 Green Remediation Practices

DER-31 specifies that the green remediation policy is not intended to encourage, and does not justify, implementation of a "no action" or lesser remedy when a more comprehensive remedy is called for, appropriate, and feasible. However, in Alternative 1 – No Further Action, prior activities and NYSDEC-approved IRMs are taken into account, but no further activities will be conducted. Thus, this alternative includes: no fuel consumption, preservation of existing vegetative soil cover, no generation of greenhouse gases, no run-off or erosion, no waste generation, no truck traffic, no generation of dust and noise, and conservation of landfill resources.

6.2 ALTERNATIVE 2: EXCAVATE UP TO 15 FEET AND BACKFILL

6.2.1 Description

In this alternative, Subject Material in OU3 would be excavated to a depth of up to 15 ft bgs and disposed at an off-site permitted facility. Fifteen feet bgs is the depth at which there would be no requirement for institutional controls in accordance with DER-10 [DER-10 1.12 (b)1.iii]. No

excavation would be conducted in areas covered by building footprints and paved roadways. At the discretion of NYSDEC, isolated samples with concentrations greater than SCOs may be left in place because the disturbance caused by the excavation to remove the materials would likely outweigh the benefit of removal. In some cases, the NYSDEC may consider no removal around mature trees or other property features at the request of the property owner.

A detailed property-specific plan would be prepared to define the limits and extent of excavation for each property. The excavation plan would identify trees/vegetation, impervious covers and/or other property features to be protected and preserved as well as those to be removed. Removal would be accomplished through the use of conventional earth moving equipment such as an excavator, backhoe, front-end loader, skid steer loader and/or other construction equipment, however smaller equipment (e.g., small to mid-size excavator and a skid steer loader) may be used as needed, depending on the location of the excavation relative to existing property structures and roadways. Sloping and shoring may be needed in areas of deeper excavation to maintain the safety of the excavation per OSHA and to protect adjacent roadways and structures/buildings. This could result in residual constituents at concentrations greater than SCOs being left in place to protect roadways and structures/ buildings. The depth of excavation would be controlled via GPS, elevation through survey and/or field measurements.

Excavation activities would be performed in a controlled manner to minimize the exposed earthen areas and the effect on soil erosion and collection of precipitation in the excavation. Shovels, rakes and other hand tools would be used as needed to maximize removal of material around existing property structures, foundations and utilities.

Staging of excavated material would be conducted in a controlled manner such as (1) on a prepared pad lined with plastic sheeting (i.e., visqueen), bermed and tarped to provide containment and protection from precipitation, or (2) via direct load out to roll-off containers. Wherever possible, excavated material would be directly loaded into trucks or roll off containers for hauling to an appropriate facility or staging area.

Excavation activities would be performed in a manner such that erosion is adequately controlled and soil and sediments are not allowed to move into or onto any watercourse, adjacent properties, roadways, parking areas, walkways or storm and sanitary sewers. In most of the areas, excavation

would be conducted in a below grade manner which would minimize uncontrolled run-off. Staging/stockpiling areas would be bermed and covered/tarped. Water that collects in an excavation area would be allowed to infiltrate to the maximum extent practical. Although excavation would proceed in a manner to minimize water management, excess water may still have to be removed by pumping prior to backfill. Erosion and sedimentation (E&S) control measures would be implemented as needed, and inspected weekly and after each major storm event during the excavation activities. Maintenance and repair of the E&S control measures will be performed on an as needed basis.

Actions, such as water mist or other suitable method, would be undertaken during excavation and hauling activities during dry weather conditions to manage dust generation. Best construction practices would be used to minimize the tracking of soil onto neighborhood streets and/or highways.

Based on analytical results to date, the excavated material is expected to be profiled as nonhazardous waste and disposed at a permitted solid waste facility. However, it is possible that, based on analytical results, a small portion of the excavated material may be profiled as a hazardous waste. Such material would be transported in accordance with the hazardous waste regulations contained in 40 CFR 260 to 264 by RCRA-licensed haulers and disposed at a RCRA-permitted Subtitle C hazardous waste facility.

The excavated areas would be backfilled with structural fill and graded to the natural surrounding topographic contours or pre-determined elevations. Disturbed areas would be covered with a minimum of 6 inches of vegetative support soil (e.g., top soil, amended soil). Following placement of the vegetative support soil, sod or a natural seed blanket would be installed at the ground surface. Property-specific features that are necessary to be removed during excavation, such as the City of Corning Memorial Stadium turf field, track and southern bleachers, the Corning-Painted Post School District athletic fields and tennis courts, sheds or similar support facilities, trees, and limited areas of pavement would be restored to the extent practicable in accordance with the detailed property-specific plans to be provided for each property at which excavation will occur.

For any residual Subject Material, this alternative includes reliance upon an Environmental Easement and an SMP administered by Corning Incorporated. The Environmental Easement

would require compliance with a NYSDEC-approved SMP, which would provide procedures for the management of Subject Material that are inaccessible for excavation at the time of remediation, and thus not removed. This could include soils under structures such as buildings, parking lots, or around trees or vegetation and under sloped sidewalls of the excavation.

6.2.2 Overall Protectiveness of Human Health and the Environment

This alternative meets overall protectiveness of human health and the environment for residential use. It eliminates existing or potential human exposure to Subject Material through removal, soil cover, and institutional control. If accessible, Subject Material would be removed to 15 ft bgs. The removed material is replaced with clean structural fill and vegetative support soil with sod or a natural seed blanket, or replacement of a previous property-specific features such as the City of Corning Memorial Stadium turf field and track and the Corning-Painted Post School District athletic fields and tennis courts. Therefore, potential human exposure to Subject Material would be eliminated under the current conditions of use and configuration of existing structures.

Over the long-term, the Environmental Easement coupled with an SMP is the institutional control to address residual Subject Material. The SMP provides procedures for the management of Subject Material that were inaccessible for excavation at the time of remediation, should excavation occur at a property in the future. Under the remediation program, each property owner in OU3 will be required to adhere to the SMP. A map will be provided to each owner indicating the locations where Subject Material remain on their property. The map notes will refer to the SMP for requirements and procedures for excavation that will extend into the areas where Subject Material remains.

6.2.3 Standards, Criteria, and Guidance (SCGs) and ARARs

Removal of Subject Material from the surface to 15 ft bgs would meet the Part 375 requirements (6 NYCRR Part 375-6.8(b)). Since the depth of excavation is up to 15 ft bgs, there is no need for a demarcation layer to identify underlying residuals. Thus, with respect to soil cover thickness, this alternative exceeds the requirements under DER-10 Technical Guidance for soil cover (DER-10 4.1(f)2) for residential or restricted residential use.

Under this alternative, there may be areas where Subject Material is inaccessible at depth due to slope stability concerns, limited room for larger equipment to excavate to the deeper depths, property owner requirements, existing underground utilities or other subsurface obstruction, etc. Adherence to the Environmental Easement and area-wide SMP would be the institutional control to address the residual Subject Material that remain to depths of 15 ft bgs.

Excavation activities would be conducted in compliance with OSHA regulations for excavations (29 CFR 1926 Subpart P (Excavations)) and applicable Federal and local codes. Management of excavated material would comply with applicable waste regulations. Transportation of excavated materials to the disposal facility would be conducted in accordance with U.S. DOT (49 CFR) and New York State Department of Transportation (NYSDOT) regulations.

6.2.4 Long-term Effectiveness and Permanence

Subject Material from the ground surface to 15 ft bgs would be permanently removed where practicable. Clean backfill provides a permanent barrier to prevent exposure to any inaccessible Subject Material that remains at depth. The SMP would provide direction for future potential construction activities that might disturb residual Subject Material which could not be removed. If all the Subject Material is accessible to 15 ft bgs and can be removed, then an SMP is not necessary.

The long-term effectiveness of this Alternative is comparable to Alternative 1 since the potential exposure pathway is blocked.

6.2.5 Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment

Implementation of this alternative would reduce permanently the volume of Subject Material from the ground surface to 15 ft bgs. The approximate total volume of Subject Material excavated in this alternative for OU3 is 557,400 cy.

The COPCs, i.e., arsenic, cadmium, and lead, which were detected in Subject Material, were not detected in groundwater at concentrations greater than New York State Division of Water TOGS standards. Thus, these COPCs are not mobile at the Study Area in the dissolved phase. Mobility via dust or erosion is eliminated by the clean, backfilled soils and revegetated cover or the restored property features (e.g., turf field and track, athletic fields, and tennis courts).

There may be some Subject Material remaining after implementation of this alternative, but such material would be either not accessible, or located at depth, and would be covered with 2 feet or more of clean backfill. Thus the potential for disturbance is limited.

6.2.6 Short-term Impact and Effectiveness

Due to the nature of excavation and volume of material moved, the following is noted for Alternative 2 in comparison to Alternative 1:

- The excavation in Alternative 2 means potential for dust generation and exposure.
- The excavation of material in Alternative 2 would result in truck traffic, exhaust fumes, and noise.

Short-term exposure during excavation and backfill activities would be monitored and controlled in accordance with a Community Air Monitoring Plan (CAMP). Excavation activities would be conducted in a controlled manner to minimize the exposed earthen areas and the effect on soil erosion. The excavated material would be staged in a controlled manner such as (1) on a prepared pad lined with plastic sheeting (i.e., visqueen), bermed and tarped to provide containment and protection from precipitation or (2) via direct load out in roll-off containers. Wherever, possible, excavated material would be directly loaded onto trucks or into roll-off containers for hauling to an appropriate disposal facility or staging area.

Temporary construction of E&S control measures (e.g., silt fences, erosion eels) would be installed as needed, adjusted during the course of the work, and removed when the area is stabilized after completion of the work. Excavation activities would be conducted in a manner such that erosion is controlled via temporary measures and soil and sediments are not allowed to move into any watercourse, adjacent properties, roadways, parking areas, walkways or storm and sanitary sewers. In most of the areas, excavation will be conducted in a below grade manner which will minimize uncontrolled run-off. Staging/stockpiling areas will be bermed and covered/tarped. Water that collects in an excavation will be allowed to infiltrate to the maximum extent practical. Although excavation will proceed in a manner to minimize water management, excess water may still have to be removed by pumping prior to backfill. The temporary measures to control runoff will remain in place until backfill is completed and the surface is restored.

Backfilling would occur soon after excavation activities are completed to minimize the time that excavations remain open. As such, excavation and disturbance may be suspended in the winter months since properties could not be successfully restored with sod/grass and stabilized.

Construction health and safety perimeters would be established around the project work areas (i.e., exclusion zone) to prevent unauthorized entry. The perimeter would be established through use of temporary barriers, fencing and/or signage to prevent access to the area during excavation and backfilling activities. The perimeter would remain in place until backfilling of the excavation is completed.

Traffic and noise associated with haul trucks and work crews would occur during implementation of this alternative. Traffic routing, sidewalks, school bus stops may be temporally re-routed or relocated. Due to the construction schedule, many of these construction activities, earthmoving and truck traffic would occur while the schools are in session. This would require temporary re-routing of traffic, student activities, and student traffic/walking to avoid restricted areas. There could be a temporary loss of utility service if buried utilities need to be temporarily suspended to allow for excavation. The property owners would be notified of planned excavation activities and location within the Study Area in advance of the start of activities.

6.2.7 Implementability

This alternative can be implemented with conventional excavation equipment such as an excavator, backhoe, front-end loader, skid steer loader and/or other construction equipment. Due to a potential excavation depth of 15 ft bgs, shoring, sloping or benching would be required around some structures and buried utilities so that the excavation stays open and so that undermining the structures does not occur.

Implementation of Alternative 2 also requires the removal of the City of Corning Memorial Stadium turf field, track and southern bleachers, the Corning-Painted Post School District athletic fields and tennis courts, sheds or similar support facilities, as well as sidewalks, walkways, fences, or other structures and trees and shrubbery to access the Subject Material from the ground surface to 15 ft bgs. These features would be restored to the extent practicable at the completion of

excavation and backfilling. Sod or seed blanket or equivalent would be placed over the areas not covered by restored structures.

In some instances, certain selected mature trees may not be removed (e.g., at the property owner's or other entity's request) and there is a setback from the dripline of the trees for excavation of soil. The required setback for tree viability would be determined by a qualified horticulturalist or arborist, who also can assist in determining the appropriate cover under the tree canopy extending from the dripline to the tree trunk.

The estimated construction time for implementation of Alternative 2 in OU3 is estimated to take 1 to 2 years.

6.2.8 Cost Effectiveness

The cost estimate tables for Alternative 2 are provided in Appendix A. For cost estimating purposes, the following information regarding Alternative 2 is noted:

Construction Items

- It is assumed that 557,400 cy of Subject Material from the ground surface up to 15 ft bgs would be excavated for off-site disposal.
- For cost estimating purposes, it is assumed that 80% of the excavated material would be disposed as nonhazardous waste and 20% is disposed as hazardous waste.

Annual Operations, Maintenance and Monitoring (OM&M) Items

- Annual OM&M costs include costs for inspection, reporting and management of residual Subject Material.
- For cost estimating purposes, it is assumed that annual OM&M will be conducted for 30 years.
- An Annual Performance Report would be prepared and submitted to NYSDEC for 30 years.

Estimated Cost

- Construction cost: $ 262,600,000
- Annual OM&M cost: Years 1 – 30, $ 36,000

- Total Net Present Value (NPV) (assuming a 30-year life and a 5% discount rate): $ 263,200,000

Alternative 2 is not considered cost effective because:

1. Compared to Alternative 1, Alternative 2 provides no additional long-term effectiveness and permanence that is commensurate with the additional cost.

2. While Alternative 2 reduces the volume of Subject Material from the ground surface to 15 ft bgs, the additional volume is located at depths of greater than 1 to 2 ft bgs, which typically would be accessed only during an extensive construction project or subsurface utility work. Under Alternative 1, such Subject Material, when encountered, is appropriately addressed by the Environmental Easement and SMP.

3. Due to the volume removed with the 15 feet depth of excavation, the short-term impact to the community and the environment would be potentially significant. The large removal volume means additional time for remedial activities, truck traffic, and potential disruption of normal community and school activities. The deep excavation depth requires large equipment, complex design to include shoring or sloping, and potentially, water management.

4. The recently installed City of Corning Memorial Stadium turf and track and the Corning-Painted Post School District natural turf athletic fields and tennis courts would be removed and replaced.

In summary, no additional increase in long-term effectiveness would be provided by Alternative 2 over Alternative 1 and would result in potential short-term impacts during implementation activities. Thus the significant cost of Alternative 2 compared to Alternative 1 is not warranted.

6.2.9 Land Use

The historic and current land use for OU3 is school/community use. The zoning for the Corning-Painted Post School District property and the City of Corning Memorial Stadium property is public conservation and the zoning for the Corning Christian Academy property is light residential. It is anticipated that school/community use will remain the same in the future and is consistent with current zoning for each property in OU3.

6.2.10 Green Remediation Practices

Implementation of Alternative 2 would result in the movement of a large volume of clean material and Subject Material. The vehicle operations associated with this alternative would consume fuel and would produce engine exhaust, including greenhouse gases. The excavated materials would require disposal at licensed facilities and consumption of landfill space. Analytical results indicate that the COPCs are not migrating from the Subject Material downward to the groundwater. Therefore, removal of most or all of the Subject Material is not necessary for protection of human health and the environment and doing so may unnecessarily consume resources.

Implementation of the IRM will provide the required protection from human exposure. With implementation of Alternative 1, no further action would be conducted. When compared to Alternative 1, implementation of Alternative 2 imposes a significantly larger environmental footprint as indicated below:

- Alternative 2 involves generation of approximately 557,400 cy of material and Alternative 1 involves generation of no more material for disposal at an off-site facility.
- The removal volume and depth of excavation in Alternative 2 would mean more time to implement and potential for human exposure.
- The removal volume in Alternative 2 would result in trucks consuming fuel, generating emissions, and wearing/tearing of infrastructure and local roads. In terms of 20-ton haul trucks, that means 83,610 truck trips versus no truck trips in Alternative 1.
- The removal volume in Alternative 2 would result in additional consumption of disposal facility space.
- The removal volume in Alternative 2 would result in mature trees and vegetation being removed.

SECTION 6 FIGURES

Legend

Corning-Painted Post School District Property

NOTES:
Base Imagery:Robinson Aerial Imagery, Dec 2015
Coordinate System: NAD 1983 State Plane New York Central Feet
Datum: NAD83. Units: Feet

Study Area
Corning NY

N

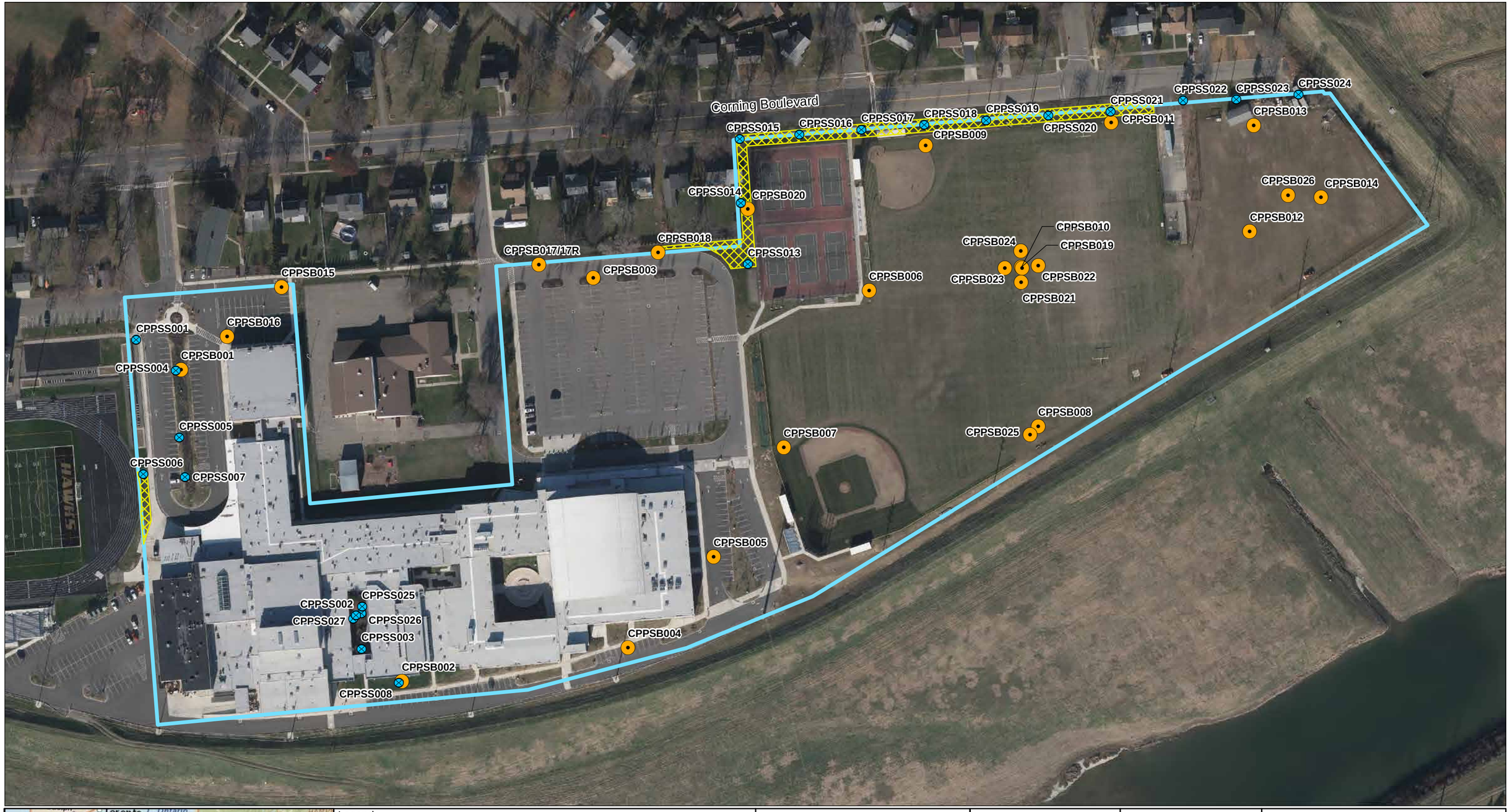
0 150 300 Feet

0 30 60 90 Meters

Figure 6-1
Corning-Painted Post School District Property Features

Document Name: Features.MXD

03/23/2017



Legend

- Corning-Painted Post School District Property
- IRM Limits of Excavation
- Surface Soil Sampling Locations
- Soil Borings

NOTES:
Base Imagery: Robinson Aerial Imagery, Dec 2015
Coordinate System: NAD 1983 State Plane New York Central Feet
Datum: NAD83. Units: Feet

Study Area
Corning NY

WESTON SOLUTIONS

Figure 6-2
IRM Limits of Excavation
Corning-Painted Post
School District Property

N

0 150 300 Feet

0 30 60 90 Meters

Document Name: IRM_Areas_CPP.MXD

03/23/2017

CCASB001
CCASS001
CCASS002
CCASS003
CCASS004
CCASB008
CCASB003
CCASB005
CCASS005
CCASB009
CCASB006
CCASB004
CCASS006
CCASB007
CCASS007
CCASS008
CCASB002
CCASS009
CCASS016
CCASS015
CCASS013
CCASS011
CCASS012
CCASS019
CCASS014
CCASS010
CCASS018
CCASS017

Legend

- Corning Christian Academy Property
- IRM Limits of Excavation
- Verify Existing Cover
- Surface Soil Sampling Locations
- Soil Borings

NOTES:
Base Imagery:Robinson Aerial Imagery, Dec 2015
Coordinate System: NAD 1983 State Plane New York Central Feet
Datum: NAD83. Units: Feet

Study Area
Corning NY

WESTON SOLUTIONS

Figure 6-3
IRM Limits of Excavation
Corning Christian Academy Property

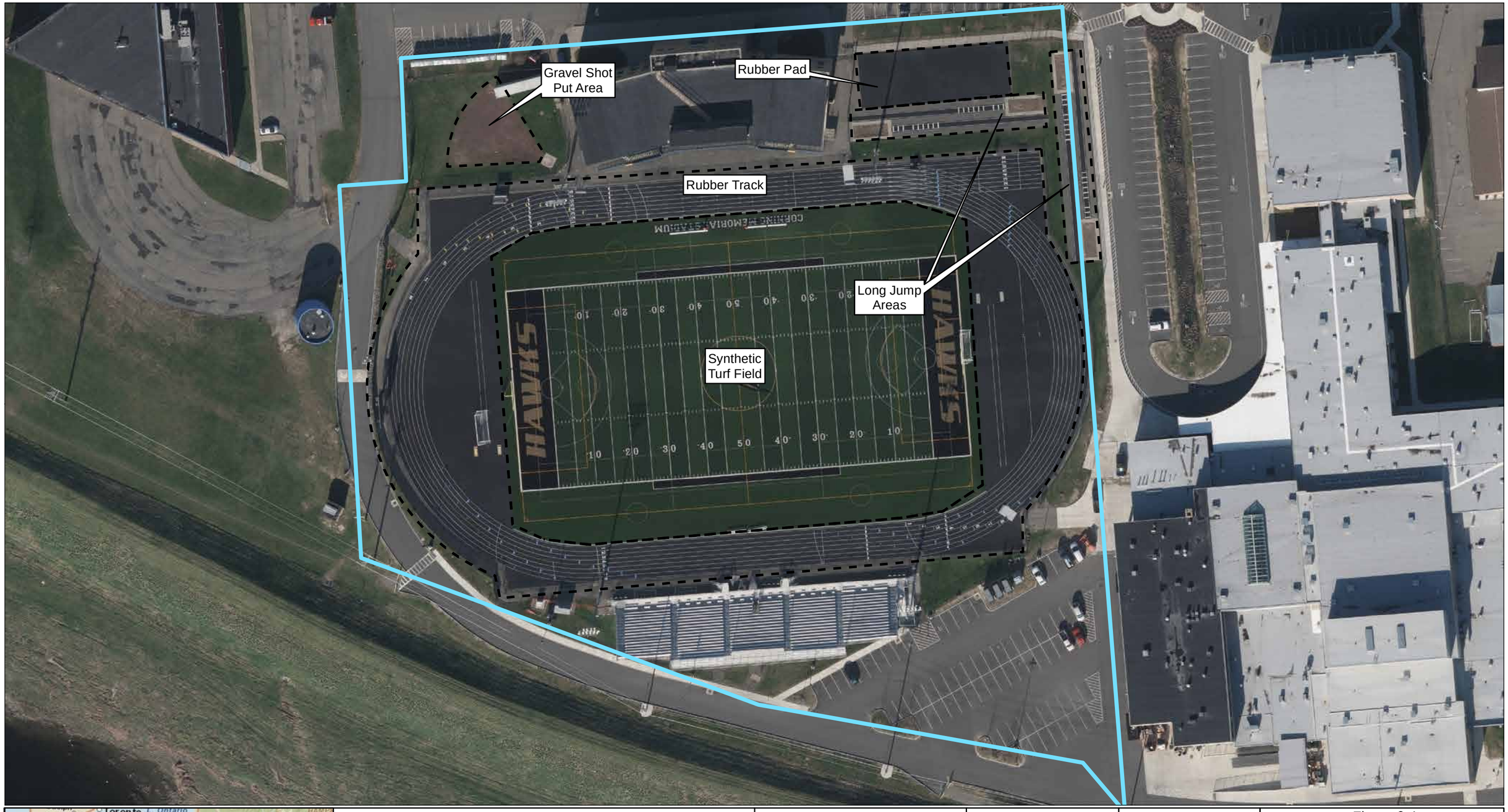
N

0 75 150 Feet

0 10 20 30 Meters

Source File: CCA_IRM_Area.MXD

03/23/2017



Legend

City of Corning Memorial Stadium Property

NOTES:
Base Imagery:Robinson Aerial Imagery, Dec 2015
Coordinate System: NAD 1983 State Plane New York Central Feet
Datum: NAD83. Units: Feet

Study Area
Corning NY

WESTON SOLUTIONS

Figure 6-4
City of Corning
Memorial Stadium Property
Features

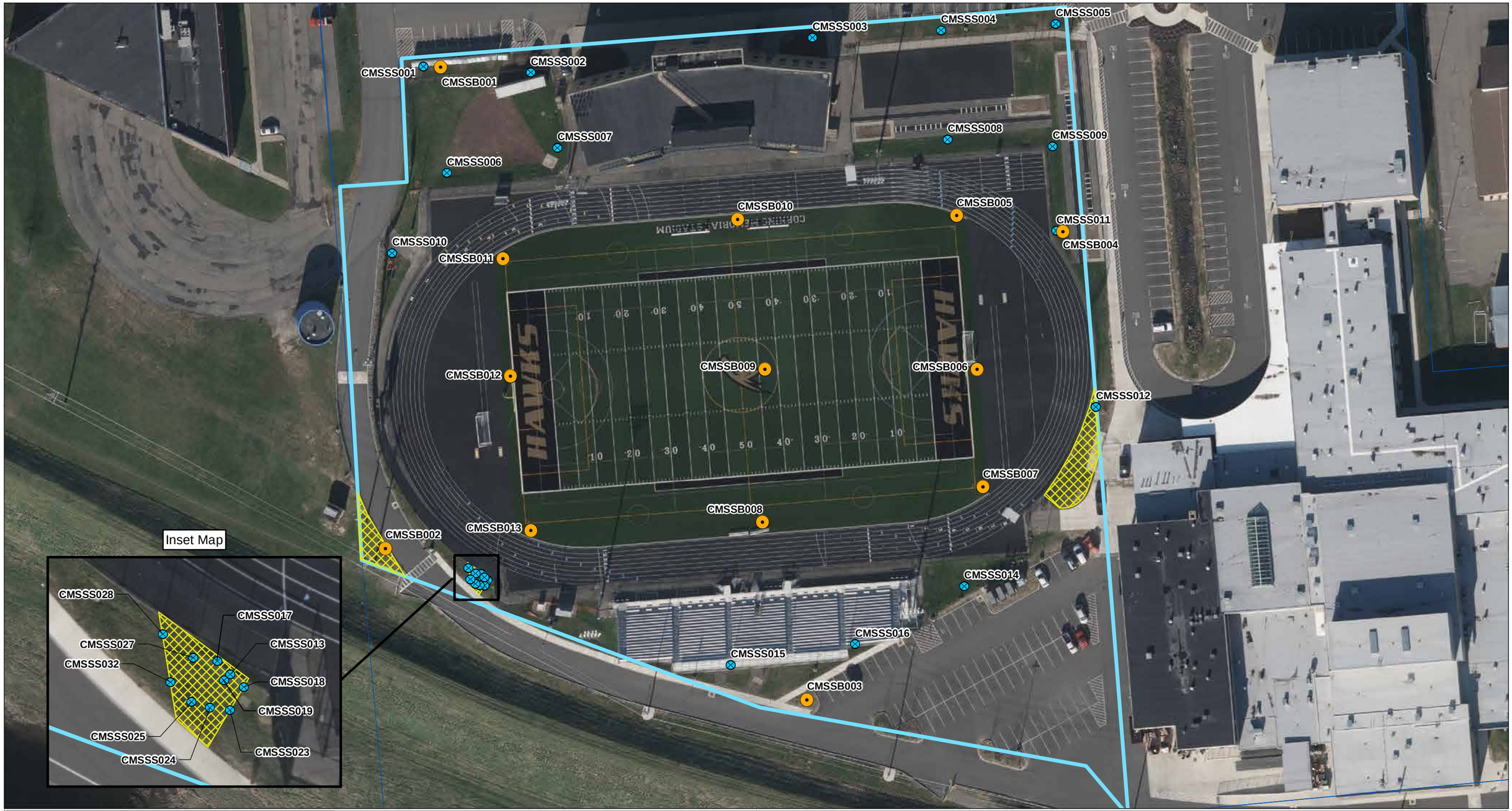
N

0 75 150 Feet

0 10 20 30 Meters

Document Name: Features..MXD

03/23/2017



Legend

- City of Corning Memorial Stadium Property
- Parcels
- IRM Limits of Excavation
- Surface Soil Locations
- Soil Borings

NOTES:
Base Imagery: Robinson Aerial Imagery, Dec 2015
Coordinate System: NAD 1983 State Plane New York Central Feet
Datum: NAD83. Units: Feet

Study Area
Corning NY

WESTON SOLUTIONS

Figure 6-5
IRM Limits of Excavation
City of Corning
Memorial Stadium Property

N

0 75 150 Feet

0 10 20 30 Meters

Document Name: IRM_limits_of_Excav.MXD

03/23/2017

7. COMPARISON OF ALTERNATIVES

This section presents a comparative analysis of the alternatives, in Table 7-1, to identify key tradeoffs with respect to advantages and disadvantages under each of the analysis criteria for the retained remedial technologies discussed in this FFS/AA. The alternatives are ranked (1 or 2) by criteria. The higher number are assigned to the alternative that meets or exceeds the criteria (i.e., a ranking of "1" is assigned to the alternative that may not achieve the criteria). Therefore, the alternative with the highest total score is the favored alternative.

SECTION 7 TABLE

Table 7-1 Comparison of Alternatives
OU3
Study Area, Corning, NY

	Alternative 1: No Further Action	Score	Alternative 3: Excavate up to 15 Feet and Backfill	Score
Overall Protectiveness of Human Health and the Environment Potential Human Exposure Pathways: - Incidental ingestion - Inhalation - Dermal contact	- The previous activities and IRMs, are protective of human health and the environment for school and community use. - Environmental easements and the SMP are the institutional controls that provide procedures for the management of residual constituents at concentrations greater than SCOs. - No further removal of Subject Material is necessary for protection of human health. - Potential for human exposure to Subject Material at depth would occur only in conjunction with disruption to the cover system (e.g., utility work, repairs, etc.). As a result, exposure would be negligible compared to that for surface material.	2	- Meets overall protectiveness for residential use. - Potential human exposure to Subject Material would be eliminated if material is accessible during remediation. - Environmental easements and an SMP are the institutional controls that would provide procedures for the management of Subject Material that is inaccessible.	2
Standards, Criteria, and Guidance (SCGs)	- Soil cover meets NYSDEC SCOs [6 NYCRR Part 375-6.8(b)] for residential use. - The 2-ft cover at the Corning Christian Academy property would meet DER-10 guidance (DER-10 4.1(f)2) for soil cover and demarcation layer for residential use. - The 1-ft or more cover at the Corning-Painted Post School District property and the City of Corning Memorial Stadium property would meet DER-10 guidance (DER-10 4.1(f)2) for soil cover for commercial or industrial use. The NYSDEC provided approval of the *High School Athletic Field Construction Completion Report* dated November 2015 and the *Memorial Stadium Construction Completion Report* dated November 2015 in two letters to the School District, both dated January 8, 2016. - Adherence to the Environmental Easements and the SMP are the institutional controls for management of the remaining Subject Materials at depths greater than 2 ft bgs (or 1 ft bgs at the Corning-Painted Post School District property).	2	- Removal of Subject Material in the top 15 feet (0-15 ft bgs) would meet NYSDEC SCOs [6 NYCRR Part 375-6.8(b)] for residential use. - Would exceed DER-10 guidance (DER-10 4.1(f)2) for soil cover, no demarcation layer needed. - Adherence to the Environmental Easements and area-wide SMP are the institutional controls for management of the Subject Material that remains to depths up to 15 ft bgs - Would comply with applicable waste regulations. - Deep excavation activities would require shoring/sloping to be conducted in compliance with OSHA regulations. - Transportation of excavated materials would be conducted in compliance with U.S. DOT and NYSDOT regulations.	2
Long-term Effectiveness and Permanence	- Under the IRMs, Subject Material from the ground surface up to 1 or 2 ft bgs will be permanently removed from the properties in OU3. - The clean backfill/soil cover, artificial turf, and/or asphalt/pavement provide a permanent barrier to prevent potential exposure to any residual subsurface Subject Material. - The SMP provides direction for future potential construction activities that would involve excavations below the demarcation barrier cover system or into the Subject Material.	2	- Subject Material from the ground surface to 15 ft bgs would be permanently removed from the property, where practicable. - Clean backfill provides a permanent barrier to prevent exposure to any inaccessible Subject Material that remains at depth. - The SMP would provide direction for future potential construction activities that disturb residual Subject Material which remains at depth to 15 ft bgs so that these controls remain permanent and effective.	2
Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment	- Under the IRM program, the volume of Subject Material from the ground surface up to 1 or 2 ft bgs will be permanently reduced in the IRM areas. - The approximate total volume of Subject Material to be excavated under the IRM program for OU3 is approximately 850 cy. - No further reduction would occur. - The COPCs detected in the Subject Material at concentrations greater than SCOs, were not detected in groundwater at concentrations greater than TOGS standards and thus, are not mobile within the Study Area in the dissolved phase. - The soil cover, turf, asphalt/pavement provides physical protection of the underlying residual Subject Material by covering and restricting disturbance and therefore, mobility of these materials.	1	- Would reduce permanently the volume of Subject Material from the ground surface to 15 ft bgs. - The approximate total volume of Subject Material excavated in this alternative for OU3 is 557,400 cy. - The COPCs detected in the Subject Material, were not detected in groundwater at concentrations greater than TOGS standards and thus, are not mobile within the Study Area in the dissolved phase. - There may be some residual Subject Material remaining after implementation of this alternative, but such material would be either not accessible, or located at depth, and would be covered with 2 feet or more of clean backfill.	2

Table 7-1 Comparison of Alternatives
OU3
Study Area, Corning, NY

	Alternative 1: No Further Action	Score	Alternative 3: Excavate up to 15 Feet and Backfill	Score
Short-term Impact and Effectiveness	- Since there is no construction activity conducted in this alternative, aside from those activities associated with the NYSDEC-approved IRMs, there is no significant impact to the environment and human exposure in the short-term.	2	- The excavation in this alternative would result in potential for dust generation and exposure. - The deeper excavation may impact subsurface utilities or require temporary terminations. - The excavation of material in this alternative would result in truck traffic, exhaust fumes, and noise. - Short-term exposure during excavation and backfill activities would be monitored and controlled in accordance with a CAMP. - Traffic and noise associated with haul trucks and work crews would occur during implementation of this alternative. The construction would occur while the schools are in session.	1
Implementability	- No further action can be readily implemented. - Since the IRM Work Plans have been approved by NYSDEC following public comment, they can be readily implemented. - Additionally, an SMP will be approved and an Environmental Easement will be recorded.	2	- Due to a potential excavation depth of 15 ft bgs, shoring, sloping or benching would be required around some structures and buried utilities so that the excavation stays open and so that undermining the structures does not occur. - Requires the removal of the City of Corning Memorial Stadium turf field, track and southern bleachers, the Corning-Painted Post School District athletic fields and tennis courts, sheds or similar support facilities, as well as sidewalks, walkways, fences, or other structures and trees and shrubbery to access the Subject Material from the ground surface to 15 ft bgs. - These features would be restored to the extent practicable at the completion of excavation and backfilling. Sod or seed blanket or equivalent would be placed over the areas not covered by restored structures. - Certain selected mature trees may not be removed (e.g., at the property owner's or other entity's request) and there is a setback from the dripline of the trees for excavation of soil. - The estimated construction time for implementation of Alternative 2 in OU3 is estimated to take 1 to 2 years.	1
Cost effectiveness (NPV)	$0	2	$263,200,000	1

Table 7-1 Comparison of Alternatives
OU3
Study Area, Corning, NY

	Alternative 1: No Further Action	Score	Alternative 3: Excavate up to 15 Feet and Backfill	Score
Land Use	- The historic and current land use for OU3 is school/community use. The zoning for the Corning-Painted Post School District property and the City of Corning Memorial Stadium property is public conservation and the zoning for the Corning Christian Academy property is light residential. - It is anticipated that school/community use will remain the same in the future and is consistent with current zoning for each property in OU3. - The no further action alternative is consistent with this continued land use due to the previous implementation of IRMs and Subject Material not being present in surface soil.	2	- The historic and current land use for OU3 is school/community use. The zoning for the Corning-Painted Post School District Property and the City of Corning Memorial Stadium property is public conservation and the zoning for the Corning Christian Academy property is light residential. - It is anticipated that school/community use will remain the same in the future and is consistent with current zoning for each property in OU3.	2
Subtotal		**16**		**13**
Green Remediation (DER-31)	- No further remedial activities would be conducted in Alternative 1. - Thus, this alternative includes: no fuel consumption, preservation of existing vegetative soil cover, no generation of greenhouse gases, no run-off or erosion, no waste generation, no truck traffic, no generation of dust and noise, and conservation of landfill resources.	2	- Would result in the movement of a large volume of clean material and Subject Material. - Analytical results indicate that the site COPCs are not migrating from the Subject Material downward to the groundwater. Therefore, removal of most or all of the Subject Material is not necessary for protection of human health and the environment and doing so may unnecessarily consume resources. - When compared to Alternative 1, implementation of Alternative 2 imposes a significantly larger environmental footprint as indicated below: • Alternative 2 involves generation of approximately 557,400 cy of material and Alternative 1 involves generation of no more material for disposal at an off-site facility. • The removal volume and depth of excavation in Alternative 2 would mean more time to implement and potential for human exposure. • The removal volume in Alternative 2 would result in trucks consuming fuel, generating emissions, and wearing/tearing of infrastructure and local roads. In terms of 20-ton haul trucks, that means 83,610 truck trips versus no truck trips in Alternative 1. • The removal volume in Alternative 2 would result in additional consumption of disposal facility space. • The removal volume in Alternative 2 would result in mature trees and vegetation being removed.	1
Total		**17**		**14**

8. RECOMMENDED ALTERNATIVE

The recommended alternative is Alternative 1: No Further Action. This alternative meets overall protectiveness for school/community use with the least amount of disruption to the community, and the smallest environmental footprint. Prevention of the potential human exposure pathways (i.e., incidental ingestion, inhalation and dermal contact) is achieved by the activities completed under the Corning-Painted Post School District Construction Project and Turf Replacement Project, NYSDEC-approved IRMs, the institutional control of an Environmental Easement on each property in OU3, and compliance with an NYSDEC-approved SMP.

Deeper excavation is possible, but impracticable, and does not provide any significant additional benefit with respect to overall health or environmental protectiveness. Deeper excavation results in more potential exposure during implementation, causes more disruption to the community for a longer period of time, imposes a larger environmental footprint, and requires more complex construction when slope stabilization and shoring is needed around structures and subsurface utilities. Based on the impracticability of total removal, deeper excavation would similarly result in more residual materials and the need for intuitional controls. Deeper excavation is not cost-effective for the little, if any, additional benefit provided.

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APPENDIX A

PLANNING LEVEL COST ESTIMATE

Planning Level Cost Estimate - OU3
Alternative 2: Excavate up to 15 feet and Install Backfill
Study Area, Corning, New York

				Inplace Volume	
Corning Christian Academy property	3,300	square ft		1,800	cyd
City of Corning Memorial Stadium property	270,000	square ft		150,000	cyd
Corning-Painted Post School District property	730,000	square ft		405,600	cyd
	23	acres	Total:	557,400	cyd
Weight	1.5	tons/cyd	(rounded)	836,100	tons

1. Capital Costs

Sample and Analysis Allowance						$ 200,000
Excavate Soils (includes shoring)	$ 100.00	/cyd	557,400	cyds		$ 55,740,000
Transport and Disposal (Nonhaz)	$ 100.00	/ton	668,880	tons	80%	$ 66,888,000
Transport and Disposal (Haz)	$ 275.00	/ton	167,220	tons	20%	$ 45,985,500
Backfill	$ 45.00	/cyd	557,400	cyds		$ 25,083,000
Restoration Allowance						$ 5,000,000
					Subtotal	*$ 198,896,500*
Construction Management, Project Management, and Reporting					10%	$ 19,889,700
					Subtotal	*$ 218,786,200*
Contingency					20%	$ 43,757,240
					CAPITAL COSTS ROUNDED	**$ 262,600,000**

2. Annual Costs for Inspection, Operations, Maintenance & Monitoring of the Soil Cover

Annual Inspections	$ 15,000	/yr				$ 15,000
Annual Report	$ 15,000	/yr				$ 15,000
					Subtotal	*$ 30,000*
Contingency					20%	$ 6,000
					ANNUAL MONITORING COSTS ROUNDED	**$ 36,000**

Total Net Present Worth	30 years	5% discount rate	**$ 263,200,000**

Notes:
1. Estimate is based on soil borings and analytical data collected to date.
2. Estimate does not include any control measures associated with groundwater or surface water intrusion or remediation.
3. Estimate does not include costs for overexcavation, if required.
4. Estimate does not include costs to remove or shore underground or above ground utilities or structures.
5. Estimate does not include costs for NYSDEC oversight.
6. Estimate does not include cost associated with legal support