



**US Army Corps  
of Engineers®**  
New York District

**FINAL  
MAIN SITE - SOILS OPERABLE UNIT  
PROPOSED PLAN  
COLONIE FUSRAP SITE  
COLONIE, NEW YORK**

**U.S. ARMY CORPS OF ENGINEERS  
NEW YORK DISTRICT**

**SEPTEMBER 2014**

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## Acronyms and Abbreviations

<b>AEC</b>	Atomic Energy Commission
<b>AM</b>	Action Memorandum
<b>ARAR</b>	Applicable or Relevant and Appropriate Requirement
<b>CERCLA</b>	Comprehensive Environmental Response, Compensation, and Liability Act
<b>CFR</b>	Code of Federal Regulations
<b>COCs</b>	Chemicals of Concern
<b>COPCs</b>	Chemicals of Potential Concern
<b>CSM</b>	Conceptual Site Model
<b>DOE</b>	U.S. Department of Energy
<b>EE/CA</b>	Engineering Evaluation/Cost Analysis
<b>EPA</b>	U.S. Environmental Protection Agency
<b>FSS</b>	Final Status Survey
<b>FUSRAP</b>	Formerly Utilized Sites Remedial Action Program
<b>LUCs</b>	Land Use Controls
<b>MARSSIM</b>	Multi-Agency Radiation Survey and Site Investigation Manual
<b>mg/kg</b>	milligram per kilogram
<b>mrem/yr</b>	millirem per year
<b>MSL</b>	Mean Sea Level
<b>NCP</b>	National Oil and Hazardous Substances Pollution Contingency Plan
<b>NiMo</b>	Niagara Mohawk
<b>NL</b>	National Lead
<b>NRC</b>	Nuclear Regulatory Commission
<b>NYSDEC</b>	New York State Department of Environmental Conservation
<b>NYSDOH</b>	New York State Department of Health
<b>PRAR</b>	Post Remedial Action Report
<b>pCi/g</b>	picocuries per gram
<b>RBC</b>	Risk Based Concentration
<b>ROD</b>	Record of Decision
<b><sup>232</sup>Th</b>	Thorium-232
<b><sup>238</sup>U</b>	Uranium-238
<b>USACE</b>	U.S. Army Corps of Engineers
<b>USC</b>	United States Code
<b>VOC</b>	Volatile Organic Compound
<b>VP</b>	Vicinity Property

## Glossary of Terms

**Acceptable Risk Range:** Under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) / the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), “For known or suspected carcinogens, acceptable exposure levels are generally concentration levels that represent an excess upper bound lifetime cancer risk to an individual of between  $10^{-4}$  and  $10^{-6}$  using information on the relationship between dose and response. The  $10^{-6}$  risk level shall be used as the point of departure for determining remediation goals for alternatives when ARARs are not available or are not sufficiently protective because of the presence of multiple contaminants at a site or multiple pathways of exposure.”

**Applicable or Relevant and Appropriate Requirements (ARARs):** *Applicable requirements* mean those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. Only those state standards that are identified by a state in a timely manner and that are more stringent than federal requirements may be applicable.

*Relevant and appropriate requirements* mean those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that, while not “applicable” to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site. Only those state standards that are identified in a timely manner and are more stringent than federal requirements may be relevant and appropriate.

**Class 1 Survey Unit:** A land area designed for Class 1 final status survey. Such areas have the highest potential for contamination. **Class 2 Survey Unit:** A land area designed for Class 2 final status survey. Such areas have a potential for radioactive contamination but are not expected to exceed the cleanup criteria.

**Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA):** A federal law concerning response to sites contaminated with hazardous substances, pollutants, and contaminants. This law is commonly referred to as the “Superfund” statute.

**Conceptual Site Model:** A basic description of what is known about the site including how the contaminants enter the environment, move through the environment, and the routes of exposure. The model provides a framework for assessing risk and developing remedial strategies.

**Chemical of Potential Concern (COPC):** Site-related chemical that has been identified in a risk assessment as having potential to cause risk to human health and the environment.

**Engineering Evaluation and Cost Analysis (EE/CA):** An EE/CA is prepared for all non-time-critical removal actions as required by the NCP. The goals of the EE/CA are to identify the extent of a hazard, to identify the objectives of the removal action, and to analyze the various alternatives that may be used to satisfy these objectives for cost, effectiveness, and implementability.

**Exposure Pathways:** The way in which a person may come into contact with a hazardous substance, whether it is chemical, biological, or some other harmful substance. There are three

exposure pathways: inhalation, ingestion, or direct contact.

**Final Status Survey (FSS):** Measurements and sampling to describe the radiological conditions of a site, following completion of decontamination activities or response actions (if any) in preparation for release.

**Multi-Agency Radiation Site Survey and Investigation Manual (MARSSIM):** provides detailed guidance for planning, implementing, and evaluating radiological surveys conducted to demonstrate compliance with a dose- or risk-based regulation. It was jointly developed by the Departments of Defense and Energy, the Environmental Protection Agency, and the Nuclear Regulatory Commission.

**Proposed Plan:** In the first step in the remedy selection process, the lead agency identifies the alternative that best meets the requirements in CERCLA/NCP and presents that alternative to the public in a proposed plan. The purpose of the proposed plan is to supplement the RI/FS and provide the public with a reasonable opportunity to comment on the preferred alternative for remedial action, as well as alternative plans under consideration, and to participate in the selection of remedial action at a site.

**Record of Decision:** A public document that announces the decision of which remedial action has been selected, explains the reasoning for that decision, and responds to comments submitted during the public comment period.

**Remedial Action:** Those actions consistent with permanent remedy taken instead of or in addition to removal actions in the event of a release or threatened release of a hazardous substance into the environment, to prevent or minimize the release of hazardous substances so that they do not migrate to cause substantial danger to present or future public health, welfare or the environment. The term includes, but is not limited to, such actions at the location of the release as storage; confinement; perimeter protection using dikes, trenches, or ditches; clay cover; neutralization; cleanup of released hazardous substances and associated contaminated materials; recycling or reuse; diversion; destruction; segregation of reactive wastes; dredging or excavations; repair or replacement of leaking containers; collection of leachate and runoff; on-site treatment or incineration; provision of alternative water supplies; and any monitoring reasonably required to assure that such actions protect the public health, welfare, and the environment. The term includes the costs of permanent relocation of residents and businesses and community facilities where the President determines that, alone or in combination with other measures, such relocation is more cost-effective and environmentally preferable to the transportation, storage, treatment, destruction, or secure disposition off-site of hazardous substances, or may otherwise be necessary to protect the public health or welfare. The term includes off-site transport and off-site storage, treatment, destruction, or secure disposition of hazardous substances and associated contaminated materials.

**Removal Action:** The cleanup or removal of released hazardous substances from the environment. Such actions may be taken in the event of the threat of release of hazardous substances into the environment, such actions as may be necessary to monitor, assess, and evaluate the release or threat of release of hazardous substances, the disposal of removed material, or the taking of such other actions as may be necessary to prevent, minimize, or mitigate damage to the public health or welfare or to the environment, which may otherwise result from a release or threat of release. The term includes, in addition, without being limited to, security fencing or other measures to limit access, provision of alternative water supplies,

temporary evacuation and housing of threatened individuals not otherwise provided for, action taken under section 9604(b), and any emergency assistance which may be provided under the *Disaster Relief and Emergency Assistance Act* [42 USC § 5121 et seq.] The requirements for removal actions are addressed in 40 CFR §§ 300.410 and 300.415. The three types of removals are emergency, time-critical, and non time-critical removals.

**Vertical sheet piling:** a row of interlocking, vertical pile segments driven to form an essentially straight wall.

**Volatile Organic Compounds:** organic chemicals that have a high vapor pressure at ordinary, room-temperature conditions. They include both man-made and naturally occurring chemical compounds.



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**PROPOSED PLAN FOR  
COLONIE FUSRAP SITE – MAIN SITE SOILS  
COLONIE, NY**

*This Proposed Plan was prepared pursuant to Section 117(a) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). This Proposed Plan explains the history of the Colonie FUSRAP site, as well as the type and extent of Hazardous and Toxic Waste (HTW)-impacted soil found at the site. The U.S. Army Corps of Engineers (USACE) performs, and has been performing, its response activities throughout the Colonie FUSRAP site in accordance with the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), 42 U.S.C. § 9601 et seq. and its implementing regulations, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 C.F.R. Part 300.*

*This Proposed Plan is based on historical information, site characterization, analytical data and determination of potential risk to human health, which is contained in the Final Colonie FUSRAP Site Main Site Soils Remedial Investigation Summary Report (USACE, 2013) (RI Report), and the conclusions and recommendations presented in that report. To date, the CERCLA response action at the Main Site has been a “removal action,” in which site soils were removed to comply with cleanup goals that were previously determined (USACE, 2013). Pursuant to CERCLA, USACE is transitioning from a “removal action” to a “remedial action” for the Main Site. Ultimately, this process will result in a Record of Decision (the latter document is executed after the FS, a Proposed Plan, and a public comment period).*

*The primary purpose of this Proposed Plan is to summarize the four remedial alternatives evaluated for the Main Site Soils and to identify the alternative preferred by the U.S. Army Corps of Engineers. Consistent with Section 117(a) of CERCLA, USACE and the New York State Department of Environmental Conservation (NYSDEC) encourage the public to participate in the discussion of remedial alternatives for the Main Site Soils. Public comment is invited on all of the alternatives identified in this Proposed Plan. Information on how to participate in this decision-making process is presented at the end of this plan.*

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## 1.0 INTRODUCTION

The U.S. Army Corps of Engineers (USACE) - New York District is conducting the environmental restoration of the Formerly Utilized Sites Remedial Action Program (FUSRAP) Colonie site (consisting of the Main Site and vicinity properties [VPs]). The USACE - Baltimore District is providing technical support to the New York District for the Main Site and VP soils remediation phase of the project, which includes the development of this *Proposed Plan*.

The Colonie Main Site was owned and operated by National Lead (NL) Industries from 1937 to 1984. Authority for remediating the site was assigned to the U.S. Department of Energy (DOE) by Congress through the *Energy and Water Development Appropriations Act* of 1984. In October 1997, authority for executing FUSRAP remediation activities was transferred from DOE to USACE by further Congressional action. The DOE Office of Legacy Management is the current owner of record for the Main Site.

USACE is utilizing the administrative, procedural, and regulatory provisions of the *Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)*, 42 United States Code (U.S.C.) Section (§) 9601, et seq. and the *National Oil and Hazardous Substances Pollution Contingency Plan (NCP)*, 40 C.F.R. Part 300, to guide the remediation process at the Colonie FUSRAP Site.

### 1.1 Purpose of Proposed Plan

This *Proposed Plan* describes the recommended response action for the Colonie Main Site, and presents the supporting rationale for this action. The Main Site characteristics, preferred remedy, and previous removal actions summarized herein are described in additional detail in the following documents:

- *Action Memorandum (AM): October 10, 2001, Revising Department of Energy Action Memorandum, dated February 14, 1997: Soil Removal at the Colonie Site*, (USACE, 2001a);
- *Final Post-Removal Remedial Action Report, Colonie FUSRAP Site, Formerly Utilized Site Remedial Action Program Colonie New York* (PRAP, Shaw, 2010);
- *Final Colonie FUSRAP Site Main Site Soils Remedial Investigation Summary Report* (USACE, 2013).

This *Proposed Plan* will: 1) inform the public of USACE's proposed soils remedy for the Main Site and 2) solicit public comment pertaining to the proposed remedy.

During removal actions at the Main site, the USACE identified 10 discrete soil locations that had constituent concentrations above cleanup criteria and that were inaccessible due to their proximity to various obstructions (i.e., active rail lines, utility power poles, fire hydrant, etc.). These locations were then further examined during the remedial investigation (USACE, 2013). Of the 10 areas, only 3 were shown to exhibit unacceptable risk to future residents (USACE, 2013). The individual locations and corresponding depths of remaining constituent concentrations are discussed in Section 2.3.1. Land Use Controls (LUCs) will ensure protectiveness currently and in the future should current land use change. Therefore, the preferred remedy for soils at the Main Site is LUCs. Five-year reviews for the Main Site soils

will be conducted in compliance with CERCLA §121(c) and the NCP § 300.430(f)(4)(ii) to periodically assess the protectiveness of the remedy. The Department of Energy (DOE) Office of Legacy Management will conduct the five-year reviews. The first five-year review will be completed no less often than five years after initiation of the selected remedial action. (e.g., if the remedy requires on-site construction activities, then the review will be completed within 5 years from initiation of those activities).

LUCs can be physical, administrative or legal mechanisms used to protect public health and the environment from residual contamination and are designed to restrict land use and onsite activities in order to limit potential future exposure. For the Main Site, LUCs (in the form of environmental easements) will be placed on those discrete areas where residual concentrations of metals pose an unacceptable risk. The environmental easements will provide a means of protection based on both current and future land use by placing restrictions on the excavation of soil.

## **1.2 Public Participation**

USACE is the lead agency for this CERCLA response action. The New York State Department of Environmental Conservation (NYSDEC) is the lead regulatory agency for the Site, and provides oversight and regulatory support. USACE also coordinates with the New York State Department of Health (NYSDOH) and the Albany County Department of Health.

USACE is requesting public input on its preferred remedy for soil locations that pose an unacceptable risk at the Main Site. After the public comment period has ended, USACE will review and respond to all comments received within the specified comment period. USACE will then select the remedy for the Colonie Soils Main Site and document the decision in the ROD. Additional information on the public comment period is presented at the end of this plan.

## 2.0 SITE BACKGROUND

The Colonie FUSRAP Site is composed of the 11.2 acre Main Site and 56 VPs. The Main Site is located at 1130 Central Avenue (New York State Route 5) in the Town of Colonie, Albany County, New York (Figure 1). Background information regarding the Main Site is presented in the *AM* (USACE, 2001a) and other supporting documents. A summary is provided below.

This *Proposed Plan* only addresses the Main Site soils. USACE addressed remedial action decisions for the Site groundwater in the *Colonie FUSRAP Site Record of Decision, Colonie Site Groundwater* (USACE, 2010).

### 2.1 Site Description

The Main Site consists of 11.2 acres in Colonie, New York (population: 80,000). As shown in Figure 2, the Main Site is bounded by a heavily wooded lot on the west (7 Railroad Ave), CSX (formerly Conrail) rail tracks on the southwest and south, active commercial properties on the east and northeast, New York State Route 5 (Central Avenue) on the north, and a Niagara Mohawk (NiMo) electrical substation on the northwest. The Main Site was historically used for industrial operations and is currently vacant land. The surrounding area consists of residential and commercial properties. Maximum topographic relief across the Main Site is about 15 feet, with the highest point on the property being approximately 235 feet above mean sea level (MSL). The land slopes gently from the northwest to the south-southeast.

An unnamed tributary of Patroon Creek, (a portion of which is within an underground culvert), crosses the Main Site from the west to the south and east, ultimately discharging into Patroon Creek south of the property. The unnamed tributary drains an area of approximately 300 acres in the Town of Colonie. During the early 1900s, a dam was constructed on the tributary to form Patroon Lake.

Patroon Creek is a perennial stream that drains an area of approximately 13 square miles in Colonie and Albany. The drainage basin is mostly urban with commercial and residential properties. The creek is approximately seven miles long, from its headwaters to its discharge into the Hudson River.

### 2.2 Site History

Industrial operations at the Main Site began in 1923, when a facility was built for manufacturing wood products and toys. In 1927, the facility was converted to a brass foundry for manufacturing railroad components. In 1937, NL purchased the facility for conducting electroplating operations. Chemicals used in the plating operations included various acids, bases, metals, and degreasing solvents. NL also bought an adjacent lot that contained a portion of Patroon Lake.

Prior to 1941, NL began filling Patroon Lake with used casting sand (Sand casting, also known as sand molded casting, is a metal casting process characterized by using sand as the mold material). The lake was subsequently used for additional waste disposal through 1961. Based on a review of historical surveys, aerial photographs, and results of previous investigations, one burial area (Patroon Lake area) and chemical contamination of surfaces within the processing building were identified as the most likely sources of organic contamination at the Main Site.

From 1958 through 1984, NL carried out a number of processes using radioactive materials consisting primarily of depleted uranium but also of thorium and enriched uranium. In 1958, the nuclear division of NL began producing items manufactured from uranium and thorium under a license issued by the Atomic Energy Commission (AEC). The plant handled enriched uranium from 1960 to 1972, and, during that time, NL held several contracts to manufacture fuel from enriched uranium for use in experimental nuclear reactors.

A New York Supreme Court shut down the NL plant in 1984 due to environmental concerns, and ownership of the Main Site was transferred to DOE. From 1984 to the fall 1997, DOE investigated the Main Site and VPs and initiated the restoration process. During this timeframe, DOE addressed 53 VPs and demolished all NL buildings. In 1997, USACE assumed control of the Colonie FUSRAP Site and jurisdiction over cleanup of the Main Site and three remaining VPs. By the end of 2007, USACE had completed the removal of contaminated soils at the Main Site and the remaining three VPs.

### 2.3 Previous Removal Actions for Main Site Soils

The USACE has completed the excavation and off-site disposal of soils from the Main Site. A total of 135,244 cubic yards of soil was excavated from the Main Site (including the Town of Colonie VP). Main Site excavation activities were completed in January 2007 (URS, 2008).

Soil removal activities at the Main Site and the adjacent Town of Colonie VP were completed by USACE in accordance with its 2001 *AM* (USACE, 2001a). Removal activities were first initiated by USACE in 1999 and were based upon the results of a 1995 Engineering Evaluation/Cost Analysis (EE/CA) report and the original DOE Action Memorandum (DOE, 1997). The EE/CA and the DOE AM document the selected Alternative 3B, Moderate Excavation and Cap and Cover. Due to subsequent uncertainties regarding implementability, physical constraints of the site, and local community resistance, USACE re-evaluated the alternative when it assumed FUSRAP jurisdiction over the Main Site from DOE. Subsequently, USACE revised the 2001 *AM* in order to document the selection of Alternative 2B, Large-Scale Excavation and Disposal (rather than Alternative 3B). The 2001 *AM* for the Main Site (USACE, 2001a) also provided revised cleanup criteria for metals (arsenic, copper and lead) and radiological constituents (uranium-238 [<sup>238</sup>U] and thorium-232 [<sup>232</sup>Th]). Table 1 (as documented in the 2001 *AM*) presents the final selected cleanup criteria for the Main Site soils. A detailed discussion on how these cleanup criteria were established is presented in Section 5.3.

In the 2001 *AM* for soil removal USACE identified three Applicable or Relevant and Appropriate Requirements (ARARs) to be satisfied by the removal action.

The chemical-specific ARAR (10 Code of Federal Regulations (C.F.R.) § 20.1402) provided the basis for the cleanup criteria of 35 picocuries per gram (pCi/g) <sup>238</sup>U and 2.8 pCi/g <sup>232</sup>Th. The remaining ARARs were specific to treatment standards for hazardous waste and permitting requirements under the State Pollutant Discharge Elimination System.

The risk-based cleanup criteria for metals were as follows: 7.4 milligrams per kilogram (mg/kg) arsenic; 1,912 mg/kg copper; and 450 mg/kg lead.

In accordance with the cleanup criteria specified in the 2001 *AM*, which are presented in Table 2, USACE removed all radioactively-contaminated soils exceeding cleanup criteria regardless of depth, and excavated all metals-contaminated soils exceeding cleanup criteria to a maximum

depth of nine feet below the ground. Final soil removal depths for metals ranged from one foot to 9 feet below the ground, however radiological contamination was removed at depths up to 15 feet. USACE also removed soil where volatile organic compound (VOC) sources were encountered. These excavations generally extended to a maximum of five feet below the groundwater surface.

By the end of 2005, soil excavation was largely completed for the western and central portions of the Main Site and Town of Colonie VP. This work included soil removal in the previously landfilled former Patroon Lake area. Through August 2006, USACE conducted removal activities for each soil excavation unit to meet required cleanup criteria. Once USACE determined that a soil excavation unit was clean, the area was backfilled with certified clean fill material and restored (i.e., graded and seeded). Due to the anticipated depth of radiologically-contaminated soils in the eastern portion of the Main Site and to ensure the structural integrity of the active CSX rail line, vertical sheet piling was installed to depths of as much as 50 feet below ground surface.

Once soil removal was completed, the requirements specified in the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) (Nuclear Regulatory Commission [NRC] 2000) were applied to conduct a Final Status Survey (FSS) for the Main Site. The FSS is a detailed systematic sampling approach designed to obtain sufficient sample information to demonstrate that residual radioactivity is below the cleanup criteria for each survey unit. USACE designated the entire Main Site as a Class 1 survey unit area. Class 1 areas are considered contaminated and, therefore, require the highest degree of survey effort. USACE then performed a FSS at each of the 27 individual Class 1 units (Figure 3) as a means of demonstrating compliance with the soil cleanup criteria.

The individual metals results were also compared to the appropriate cleanup criteria. In those cases where elevated individual sample results were above the criteria, the sample result was averaged with the adjacent two samples to determine if the average was above or below the cleanup criteria. If the average of the three samples was less than the cleanup criteria, the NYSDEC would request no further action in that portion of the unit (Shaw, 2010).

Residual soil concentrations for  $^{238}\text{U}$  and  $^{232}\text{Th}$  satisfied the ARAR-based cleanup criteria of 35 pCi/g and 2.8 pCi/g, respectively, for current and future use of the property. All average residual concentrations for individual metal constituents also satisfied the risk-based cleanup criteria from zero to nine feet below ground. Four individual soil sample results from locations up to nine feet below ground exceeded the metals cleanup criteria as follows:

- Survey Unit 104 (1.82 foot depth) – arsenic 85.4 mg/kg (cleanup criteria 7.4 mg/kg)
- Survey Unit 109 (2.4 foot depth) – arsenic 10.5 mg/kg
- Survey Unit 124 (5.3 foot depth) – copper 2,450 mg/kg (cleanup criteria 1,912 mg/kg) and lead 734 mg/kg (cleanup criteria 450 mg/kg)
- North Lawn (3.9 foot depth) - copper 4,340 mg/kg and lead 3,370 mg/kg

As presented in the *PRAR* (Shaw, 2010), the sample concentrations exceeding cleanup criteria were averaged with the two adjacent soil concentrations, and the resulting average concentrations were demonstrated to be below the cleanup criteria. Because these discrete locations were not accessible for removal (i.e., they were located adjacent to active rail lines or

utility power poles), NYSDEC requested the implementation of Land Use Controls, in the form of an environmental easement designed to restrict the excavation of soil. A data summary of the points requiring Land Use Controls based on the Survey Units that presented an unacceptable risk (as presented in the Remedial Investigation (USACE, 2013)<sup>1</sup> is presented in Table 3.

While soil removal was based on radiological and metals cleanup criteria, the bulk of the residual VOC contamination in the western portion of the Main Site was also removed (URS, 2008). During soil excavation activities, USACE removed empty drums from the former landfill area along with the surrounding contaminated soils. Radiological- and metal-contaminated soils were removed to depths of up to 15 feet below ground. Excavation activities on the eastern portion of the Main Site also resulted in the removal of VOC source areas. A secondary benefit of the soil excavation and removal of residual VOC source material was a significant reduction in VOC concentrations in the underlying groundwater.

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<sup>1</sup> Note that Survey Unit 109 is excluded from Table 3 as arsenic within this exposure unit does not pose an unacceptable risk even though there is one data point with arsenic concentration greater than the cleanup goal as presented in the Action Memorandum (USACE, 2001a).



### 3.0 SITE CHARACTERISTICS

The Main Site and the Town of Colonie VP currently consists of vacant land with infrastructure features, roads, underground piping, fencing, nearby railroad tracks and utility poles (Figure 2). The presence of these features created inaccessible areas of residual soil contamination.

As documented in the Post Remedial Action Report for the Colonie Main Site (Shaw, 2010)], residual soil concentrations for  $^{238}\text{U}$  and  $^{232}\text{Th}$  meet the cleanup criteria for unrestricted use, even though currently the property is considered industrial use. Residual concentrations for individual metals meet the risk-based cleanup criteria to a specified depth of nine feet below ground with the exception of 10 areas that were inaccessible as detailed below.

Ten locations remain that are inaccessible for remediation and contain soil concentrations of arsenic, copper and/or lead above risk-based cleanup criteria (Figure 3). However, only three of those locations were found to present an unacceptable risk to reasonably anticipated potential future residents exposed to site soils in three of the exposure units: 104, 124, and the North Lawn. Of these three areas, exposure units 124 and the North Lawn were driven by risks due to lead. Arsenic was responsible for the risk posed to future receptors in exposure unit 104. The depths of this contamination range from 1.82 feet to 5.3 feet below the ground surface. Only these areas of the site require further response action – specifically a remedial action – under CERCLA.

#### **4.0 SCOPE AND ROLE OF THE REMEDIAL ACTION**

The scope of the soil removal action initiated by USACE was to remove surface and subsurface soils located on the Main Site that contained radiological and metals concentrations above cleanup criteria. The role of the removal action was to ensure that the ARARs and cleanup criteria identified in the 2001 *AM* document were met; that radiological and metals concentrations remaining in the soils are protective of human health and the environment; and that the property could be released for beneficial reuse. As a result of these removal actions, the Main Site ARARs have been met with respect to the accessible areas. Cleanup criteria have been achieved for soils at depths up to nine feet below ground except for ten isolated locations where soils were inaccessible for removal. These soils could not be removed because of the presence of obstructions (i.e. - active railroad tracks, utility power poles, fire hydrants, etc.). The removal of soils from the Main Site has also eliminated a potential source of contamination to groundwater.

With respect to the inaccessible areas, we have determined (see Remedial Investigation / Feasibility Study) that there is an unacceptable risk to reasonably anticipated future users with respect to three of the inaccessible areas: exposure units: 104, 124, and the North Lawn. Therefore, a response action under CERCLA – specifically a remedial action – is necessary.

## 5.0 SUMMARY OF SITE RISKS

A human health risk assessment (HHRA) was performed to address residual metals contaminants in accordance with U.S. Environmental Protection Agency (EPA) guidance. Details regarding the Human Health Risk Assessment may be found in the Colonie FUSRAP Remedial Investigation Summary Report (USACE 2013). A baseline ecological risk assessment was not performed as all contaminated soil samples were at depths in the soil considered to be unavailable to ecological receptors. For this reason there was no ecological risk assessment presented in the Remedial Investigation report.

Under the current land use, which consists of unused open space, there is no exposure to contaminated soils. During the removal action, soils that exceeded the cleanup levels up were excavated. This was followed by fence-to-fence removal of at least six inches of soil. All excavated soils were replaced with clean fill, which limits exposure to contaminated soils. There were however, several discrete areas onsite that could not be accessed for various reasons (see Section 2.3).

The likely future land use at the Site is considered to be urban residential. The Town's master plan indicates future commercial use for the Central Avenue strip, coupled with the fact that residential property currently borders the Site on two sides; this supports the likely future land use. Projected future use will result in concentrated mixed use development with high population characteristics of an urban residential scheme.

The Human Health Risk Assessment considered exposures to subsurface soils by future residents and future workers at the Site. The future resident scenario included both adults and children, future construction workers were assumed to be adults. Non-cancer hazards were evaluated separately for both child and adult future residents. Cancer risks were evaluated using an age-adjusted approach for a resident that assumes the resident lives on the site for 70 years, 6 years as a child and the remainder as an adult. The Human Health Risk Assessment assumed that soils may be brought to the surface during construction activities to a depth of 9 feet i.e. excavation of foundations, footers and general grading and be available for daily contact. It conservatively assumed that no mixing would occur between subsurface soils above cleanup levels and the clean fill that overlays it.

For purposes of the Human Health Risk Assessment, exposure was assumed to take place in survey units that contained a soil sample with levels of contaminants of potential concern (COPCs) above cleanup goals, or were identified for additional sampling for delineation purposes in 2013. Survey units that met this criteria for possible future exposure were the following: 104, 109, 124, and the North Lawn.

The non-radionuclides that were chosen for site soils as contaminants of potential concern were lead, arsenic and copper (USACE 2001a). Since levels of these metals remained onsite above cleanup goals after the removal action they remain contaminants of potential concern and were evaluated in the Human Health Risk Assessment. As a result of the removal action, radionuclide concentrations at all Site locations are less than the removal action cleanup goals and VOC concentrations meet New York State guidance. Radionuclide and VOC contaminants are no longer considered to be contaminants of potential concern in Site soils and were not evaluated in the Human Health Risk Assessment.

The total hazard index for the future child resident exceeds one only for exposure unit 104; the major contributor to hazard is arsenic. The use of a blood lead model developed by EPA and presented in the risk assessment showed that lead may cause a problem to resident children at exposure units 124 and the North Lawn if the soils now at depth were somehow brought to the surface in the future to become available to contact. Cancer risks for future residents at three of the exposure units were within the EPA acceptable cancer risk range of one in ten thousand to one in one million ( $1E-04$  to  $1E-06$ ) excess cancer risk. Exposure unit 104 cancer risk of  $1E-04$  falls at the upper end of the range. Chemicals of concern (COCs) are lead and arsenic. Table 1-1 summarizes risk and hazard at the Site exposure units for future residential use and site workers.

In summary, it is the arsenic in site subsurface soils at exposure unit 104 and the lead in subsurface soils at exposure units 124 and North Lawn that are driving the need to address these risks. It is the lead agency's judgment that the Preferred Alternative identified in this Proposed Plan, or one of the other active measures considered in the Proposed Plan, is necessary to protect public health from actual or threatened releases of pollutants or contaminants at the areas of the site referred to as: Exposure Units 104, Exposure Unit 124, and the North Lawn.

## 6.0 REMEDIAL ACTION OBJECTIVES

The proposed response action is expected to meet the remedial action objective (RAO) for soil and to be the final CERCLA response action under the FUSRAP program for the Site. The Remedial Action Objectives for this site include:

- Prevent direct contact with soil having arsenic concentrations in excess of an arithmetically determined mean background concentration of 7.4 mg/kg.
- Prevent direct contact with soil having lead concentrations exceeding 450 mg/kg, which would result in unacceptable risks; lead blood levels above 10 ug/dL.

General response actions are actions that must be taken to satisfy the remedial action objectives for the site. These are developed for soils to include containment, treatment, excavation or other actions. Volumes or areas of soil are identified for which the general response actions might be applicable. The actions consider the requirements for protectiveness, as identified in the remedial action objectives and the chemical and physical characterization of the site.

## 7.0 SUMMARY OF REMEDIAL ALTERNATIVES

This section presents a summary of the remedial action alternatives developed for the Colonie Main Site in order to meet the RAOs.

Defined alternatives are evaluated against the short and long-term aspects of three broad criteria: effectiveness, implementability, and cost. Remaining alternatives are evaluated against EPA's nine criteria to address CERCLA requirements (see Section 8). The purpose of the screening evaluation at this stage is to reduce the number of alternatives that will undergo the more thorough and detailed analyses in the next section (Section 8) and are therefore, a broader, more general screening.

The remedial alternatives were screened against the following broad criteria which are defined as follows:

### **Effectiveness**

This criterion is evaluated with respect to effectiveness in protecting human health and the environment, and providing reduction in toxicity, mobility and volume. The short-term components (construction and implementation period) and long-term components (effective period after the remedial action is complete) are also evaluated.

### **Implementability**

This criterion is evaluated as a measure of both the technical and administrative feasibility of constructing, operating and maintaining a remedial alternative. Technical feasibility is the ability to construct, reliably operate and maintain (as required) an alternative, while administrative feasibility refers to the ability to obtain approvals from regulatory agencies, and the availability of required goods and services.

### **Cost**

The cost of each alternative is also evaluated. USACE's Remedial Action Cost Engineering and Requirements software (RACER<sup>TM</sup>), version 10.4, was used to estimate alternative costs.

## 7.1 Description of Remedy Components

USACE identified four remedial alternatives for the Colonie Main Site:

- Alternative 1: No Further Action
- Alternative 2: Land Use Controls
- Alternative 3: Soil Excavation and Off-Site Disposal
- Alternative 4: Soil Excavation, Solidification, On-Site Disposal, and Land Use Controls

### *7.1.1 Alternative 1: No Further Action*

The No Further Action alternative is considered in accordance with the NCP, 40 CFR 300.430(e)(6). The no further action alternative would involve leaving the property in its current condition. This alternative provides a comparative baseline against which other alternatives can be evaluated. Under this alternative, no remedial action will be taken, and any identified contaminants are left "as is," without the implementation of any containment, removal, treatment, or other protective actions. The land use controls in place at the Site are (access

restrictions). Under the No Further Action alternative, the land use controls would not be maintained.

The cost of this alternative is \$0.

#### *7.1.2 Alternative 2 (PREFERRED ALTERNATIVE): Land Use Controls*

Alternative 2 is Land Use Controls (LUCs). The land use controls would be in the form of an environmental easement (see below) and would apply only to those portions of the site requiring a remedial action. (As discussed previously, those areas requiring a remedial action are: Exposure Unit Exposure Units 104, Exposure Unit 106, and the North Lawn area.)

The U.S. Government would execute an environmental easement, which will consist of, at a minimum, the prohibition of digging with powered equipment in the areas where residual contamination exists without appropriate measures as detailed in a approved Site Management Plan.

Such an environmental easement would require the owner to be responsible for implementing the Land Use Controls set forth in a Record of Decision, and to periodically certify that such controls are in place. The existing soil cover will remain in the areas of contaminated soil.

Under this alternative, no further cleanup would be taken for the Site; rather protections would be put into place to ensure that contact with contaminated soils would not occur. Since this alternative does not allow for unlimited use and unrestricted exposure (UU/UE), five-year reviews would be required to evaluate whether the remedy continues to be protective of human health and the environment. The total cost for this alternative is estimated to be \$584,978

#### *7.1.3 Alternative 3: Soil Excavation and Off-Site Disposal*

Alternative 3 involves the excavation and removal of contaminated soil to achieve the Remedial Action Objectives. Following excavation, post-remedial sampling would be conducted to ensure the remedy is protective. No land use controls would be required once the contaminated soil is removed. This alternative provides a high level of protectiveness to human health and the environment through removal of contaminated soil resulting in unrestricted residential future use of the property. Contaminated soils would be transported to a RCRA Subtitle C (hazardous waste) or D (solid waste) facility, as appropriate. To estimate transportation costs, it is assumed that an approved disposal facility such as US Ecology in Idaho will be utilized.

##### Excavation

It is important to note that if this material had been readily accessible, it would have been removed during the removal action. The contaminated soils are located in the areas of semi-permanent physical obstructions including high voltage power line support poles and a fire hydrant/water main that limited the Corps ability to remove this material. To remove these soils, electrical power lines that supply the Town of Colonie and a portion of the City of Albany would need to be re-routed. Water lines that support fire suppression needs for the community would be required to be shut down and excavation adjacent to Central Avenue would require partial or complete lane closes. These removal actions would require extensive coordination with local authorities and utility companies as well as long lead time.

Contaminated soils are typically excavated with conventional earth moving equipment, such as backhoes, and excavators. Backhoes with smaller buckets or smaller earth removal equipment can remove contaminated soils from difficult to reach locations next to structures or culverts, or

in proximity to utility lines. Sheet-pile walls or trench boxes would likely be required to stabilize soils near semi-permanent physical obstructions (including high voltage power line support poles and a fire hydrant/water main) as well as to protect workers. Electrical power lines would need to be re-routed and fire suppression water lines would be temporarily shut off. Excavation adjacent to Central Avenue would require partial or complete lane closures.

Excavation would continue until delineated contamination areas are removed. Backfilling and compaction would be conducted behind excavation activities to reduce the time areas of the excavation remain open.

#### Transportation and Disposal

Waste may be transported in bulk or in containers by rail or truck. Some disposal sites have rail access and facilities for offloading rail cars or boxes. For the purpose of evaluation, it will be assumed that rail cars would be used to transport materials out of the state (except for transport to adjacent states), while trucks would be used to transport the materials within close proximity of the Site and into adjacent states for disposal.

Waste shipments would be labelled according to applicable USDOT and USEPA regulations. The transportation of contaminated soil would comply with applicable State and Federal regulations. Designated routes would be traveled and an emergency response program would be developed to address potential accidents.

The characterization data for metals in the potential excavation areas indicates that much, if not all, excavated soil will need to be managed as hazardous waste and will require treatment (stabilization) to meet land disposal restriction (LDR) requirements. Furthermore, while all portions of the site meet the U-238 RAO (35 pCi/gram), characterization data indicate that U-238 concentrations as high as 31 pCi/gram are present in the potential excavation areas. As such, it is considered prudently conservative to assume all soil requiring disposal should be transported to a Subtitle C facility.

The total cost for this alternative is estimated to be \$1,545,793.

*7.1.4 Alternative 4: Soil Excavation, Solidification, On-Site Disposal, and Land-Use Controls*  
Contaminated soils are typically excavated with conventional earth moving equipment, such as backhoes and excavators. Backhoes with smaller buckets or smaller earth removal equipment can remove contaminated soils from difficult to reach locations next to structures or culverts, or in close proximity to utility lines. Sheet-pile walls, trench boxes, utility re-routings, and road closures would be necessary as described above for Alternative 3.

Excavation would continue until delineated contamination areas are removed. Backfilling and compaction would be conducted behind excavation activities to reduce the time areas of the excavation remain open.

Soils would be stabilized on-site by mixing with cement. The resulting stabilized material would be placed in an on-site construction and demolition land disposal unit meeting the substantive standards of 40 CFR Part 257, Subpart A. Land use controls, consisting of an environmental covenant, a fence, and signs would be implemented to restrict access to the disposal unit and its contents. Periodic maintenance would also be necessary to ensure the integrity of the disposal area. Five-year reviews would be required to evaluate whether the remedy continues to be



protective of human health and the environment. The total cost for this alternative is estimated to be \$1,464,892.

## 8.0 EVALUATION OF THE REMEDIAL ALTERNATIVES

The four remedial alternatives were screened against the three broad criteria of effectiveness, implementability and cost. Alternative 1 – No Further Action, did not pass the broad criteria screening and was not retained for further evaluation. The remaining three remedial alternatives were examined in a detailed analysis that was intended to allow decision makers to select the most appropriate remedial action.

During the detailed analysis, each alternative was assessed against the evaluation criteria described in the box to the left. The results compare the alternatives and identify the key tradeoffs among them. This approach was designed to provide decision makers with sufficient information to adequately compare the alternatives, select the appropriate remedy for the site, and demonstrate satisfaction with the CERCLA remedy selection requirements.

Nine evaluation criteria serve as the basis under CERCLA/NCP for analyzing proposed remedial alternatives to determine the most appropriate alternatives to address remediation. The nine criteria are divided into three categories: threshold, balancing and modifying.

### 8.1 Threshold Criteria

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

The most important evaluation is against the threshold criteria, as these must be met. Alternative 1 did not meet this threshold. Alternatives 2, 3, and 4 are considered protective of human health and the environment.

#### *Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)*

ARARs concern on-site requirements which must be attained (unless waived). The principal ARAR is New York's alternative site-specific soil cleanup standards for lead and arsenic. These standards apply to alternatives 2 through 4.

#### SUMMARY OF EVALUATION CRITERIA

##### **Threshold criteria:**

*Overall Protectiveness of Human Health and the Environment* – alternative must eliminate, reduce, or control threats to public health and the environment.

*Compliance with ARARs* – alternative must meet standards, cleanup levels, or other substantive requirements from Federal and State environmental statutes and regulations that pertain to the contaminant or proposed remedial action, or a waiver must be justified.

##### **Primary balancing criteria**

*Long-term Effectiveness and Permanence*- considers the ability of an alternative to maintain protection of human health and the environment over time.

*Reduction in Toxicity, Mobility, or Volume through Treatment*- evaluates an alternative's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the amount of contamination present.

*Implementability*- considers the technical and administrative feasibility of implementing the alternative, including factors such as the relative availability of goods and services.

*Short-Term Effectiveness*- considers the length of time needed to implement an alternative and the risks the alternative poses to workers, residents, and the environment during implementation.

*Cost*- includes the estimated capital and annual operations and maintenance costs, as well as present worth cost. Present worth cost is the total cost of an alternative over time in terms of today's dollar value. Cost estimates are expected to be accurate within a range of plus 50 or minus 30 percent.

##### **Modifying criteria:**

*State/Support Agency Acceptance*- considers the acceptance of the state or support agency of the preferred alternative.

*Community Acceptance*- considers the acceptance of the community of the preferred alternative.

As discussed in greater detail in the FS, certain provisions of the Resource Conservation and Recovery Act are ARARs with respect to some alternatives. For Alternative 4, the substantive requirements of 40 C.F.R. Part 257 Subpart A – criteria for landfills that do not accept hazardous waste – would be an ARAR if this alternative creates an onsite construction and disposal cell. If the soil is placed in such an onsite cell, the soil must be treated to stabilize the lead and arsenic. For the alternatives that involve disposal on-site (Alternative 4 and potentially Alternative 3), the treatment requirements of RCRA, 40 C.F.R. 268.40, .49(c), and .48, would be ARARs.

All alternatives comply with ARARs.

## **8.2 Primary Balancing Criteria**

### *Long-Term Effectiveness and Permanence*

With regard to the balancing criteria, all of the Alternatives are effective at providing protection of human health and the environment over time. Each alternative in turn is effective in different ways. The Alternative 2, in the form of environmental easements, is expected to provide a high degree of reliable protection of human health and the environment. Alternative 3 will meet this criterion by removing the contamination from the site entirely. Alternative 4 will meet this criterion by making the contaminants inaccessible onsite and making the contaminants unavailable for future exposure.

### *Reduction in Toxicity, Mobility, or Volume of Contaminants through Treatment*

Of the three alternatives being weighed in this analysis, Alternative 4 provides the greatest reduction of mobility of the contaminants by mixing them with cement so that they were unavailable to move through the subsurface. Alternatives 2 and 3 are poor at meeting this criterion as there is no treatment considered. None of the alternatives are useful at either reducing toxicity or reducing volume of contamination due to the nature of the contamination (metals).

### *Short-Term Effectiveness*

Alternatives 3 and 4 will take significant time to implement as the contaminated soils are in places that are currently inaccessible for various reasons (i.e., near fire hydrants, under power poles, etc.) that led to their not being accessed and removed during past removal actions (Shaw, 2010). As well, Alternatives 3 and 4 both rely on digging up soils and thus causing brief periods of time during soil transport where exposure to soil contamination may be encountered by workers or residents or the environment during implementation. However, Alternative 2 shares none of the short-term effectiveness drawbacks as the other alternatives (e.g. – the soil will not be disturbed) and therefore is preferable for this criterion.

### *Implementability*

Alternative 2 is highly implementable as prior actions have relied upon Land Use Controls that are currently in place (the Department of Energy Office of Legacy Management, as the current owner of the Colonie Main Site, has agreed to implement the proposed Land Use Controls). The communication and cooperation with all stakeholders is high and therefore Alternative 2 has a great chance of success. On the other hand, Alternatives 3 and 4 both rely on having to remove subsurface soils from currently inaccessible locations making these alternatives technically challenging. All three alternatives are administratively feasible.

### *Cost*

Costs generally are a function of volume of soil to be removed and whether the soil will be treated. For this reason, Alternative 4 which encompasses both excavation and solidification is the most expensive. Alternative 3, involving digging the soil out and transporting it off-site for eventual disposal is the second most costly alternative. Alternative 2 with the implementation of Land Use Controls is the least expensive.

## **8.3 Modifying Criteria**

### *State/Support Agency Acceptance*

The New York Department of Environmental Conservation (NYSDEC) is the State regulatory agency. NYSDEC's comments will be formally evaluated after the comment period for this Proposed Plan closes. Therefore, these modifying criteria have not been included in this analysis, but will be included following review and input from NYSDEC.

### *Community Acceptance*

Community acceptance cannot be fully assessed until comments are processed following the public review period on the Proposed Plan. Community acceptance of the preferred alternative will be evaluated based on comments received during the public comment period. Comments will be considered and addressed in the Responsiveness Summary, which will be part of the Record of Decision (ROD).

## **9.0 PREFERRED ALTERNATIVE**

Alternative 2, the LUCs alternative, which includes an environmental easement which will prohibit digging with heavy equipment in the areas where residual contamination exists without appropriate measures as detailed in an approved Site Management Plan, is USACE's Preferred Remedial Action Alternative for the Colonie Main Site. As discussed in the description of alternative, use of the site will be restricted. USACE expects this remedy to protect against potential future exposure to metals soil concentrations above cleanup criteria in three (3) of the isolated locations that are currently inaccessible for removal: specifically these areas of the Site are Exposure Unit 104, Exposure Unit 124, and the North Lawn,. Implementation of this alternative will ensure that both of the remedial goals are met (Section 6.0). This alternative is also the least expensive of the three alternatives considered in Section 8.0, and it will take the least amount of time to implement.

## 10.0 COMMUNITY PARTICIPATION

USACE encourages input from the public and NYSDEC regarding this *Proposed Plan*. Comments on the *Proposed Plan* will be accepted during the public comment period. Public Notice of availability of the Proposed Plan and of the public comment period will appear in local newspapers. The public comment period will be from July 24, 2014 to August 23, 2014.

USACE will hold a public meeting during the public comment period at the West Albany Fire Station No. 2, 36 Osborne Road, Colonie, NY on August 6, 2014 at 7 p.m. to present the preferred response action as described in this *Proposed Plan*, elaborate further on the reasons for recommending the preferred action, and receive public comments. Either written or oral comments are acceptable. Comments will be accepted by USACE at any time during the public comment period and shall be submitted to:

U.S. Army Corps of Engineers, New York District  
Attn: James Moore, CENAN-PP-E  
26 Federal Plaza, Room 1811  
New York, New York, 10278-0090.

USACE will evaluate comments submitted during the comment period, with responses to significant public comments formally documented in a Responsiveness Summary. After considering all comments in consultation with NYSDEC, USACE will issue its decision (in a "Record of Decision") for the Main Site soils remedy. USACE's ROD will include the Responsiveness Summary. The ROD will be incorporated in the Administrative Record for the Colonie FUSRAP Site and will be available for review at the William K. Sanford Town Library, 629 Albany Shaker Road, Loudonville, New York 12211.

## 11.0 REFERENCES

- DOE, 1997. *Colonie Site Action Memorandum for Removal Action*, U.S. Department of Energy, February, 1997.
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- USACE, 2010. *Colonie FUSRAP Site Record of Decision, Colonie Site Groundwater*. U.S. Army Corps of Engineers – New York District. April 2010.
- USACE, 2013. *Colonie FUSRAP Site Main Site Soils Remedial Investigation Summary Report*. U.S. Army Corps of Engineers – New York District. September, 2013
- USACE, 2013. *Colonie FUSRAP Soils– Vicinity Properties Proposed Plan, Colonie FUSRAP Site*. U.S. Army Corps of Engineers – New York District. January 2013.
- USC. 42 USC § 9601, et. seq, *Comprehensive Environmental Response, Compensation, and Liability Act*.

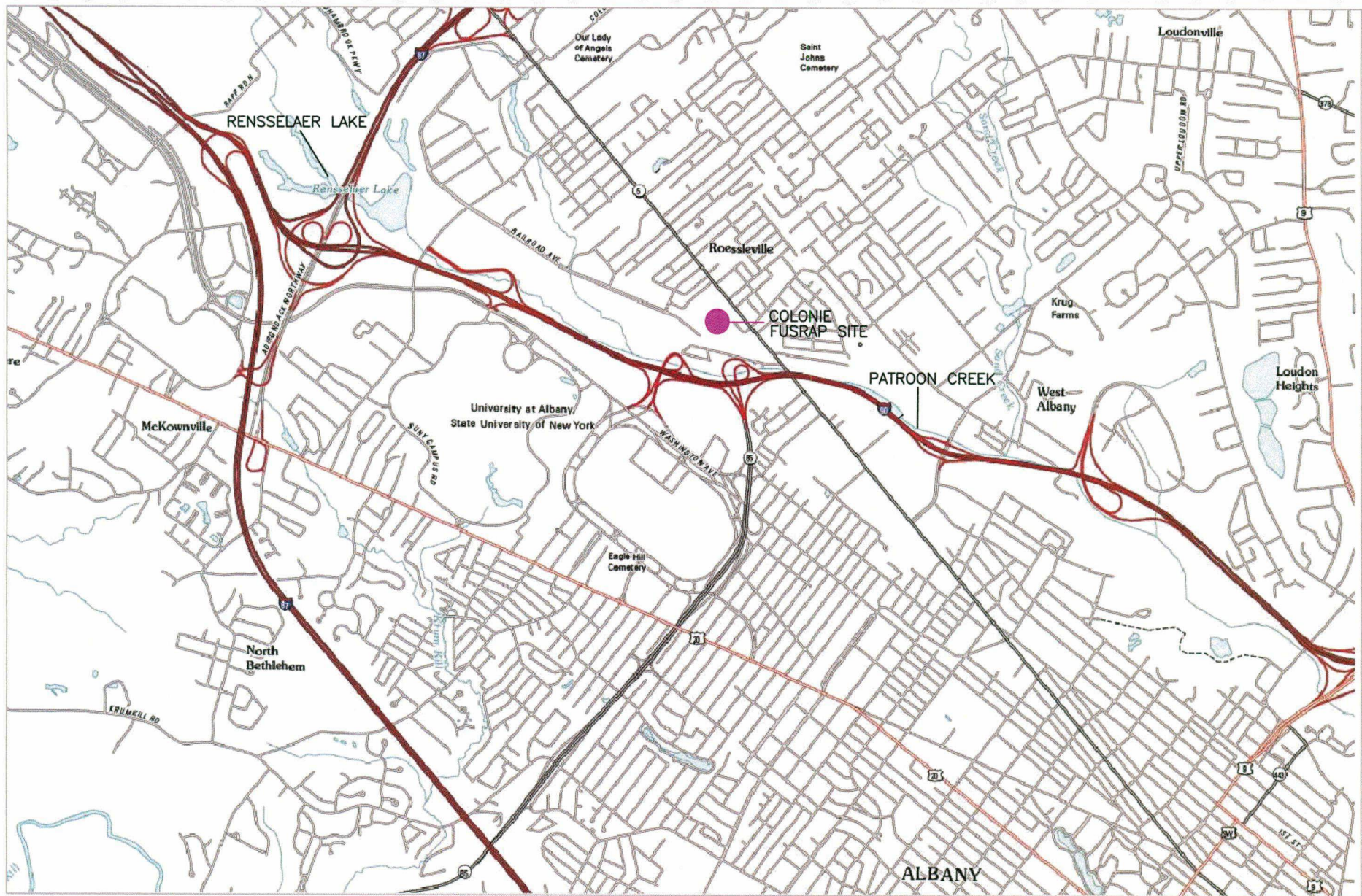
**FIGURES**



**Figure 1: Location Map – Colonie FUSRAP Site**

**Figure 2: Site Map – Colonie FUSRAP Site**

**Figure 3: Areas Being Considered for Land Use Controls**



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SCALE IN MILES



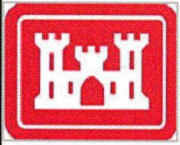
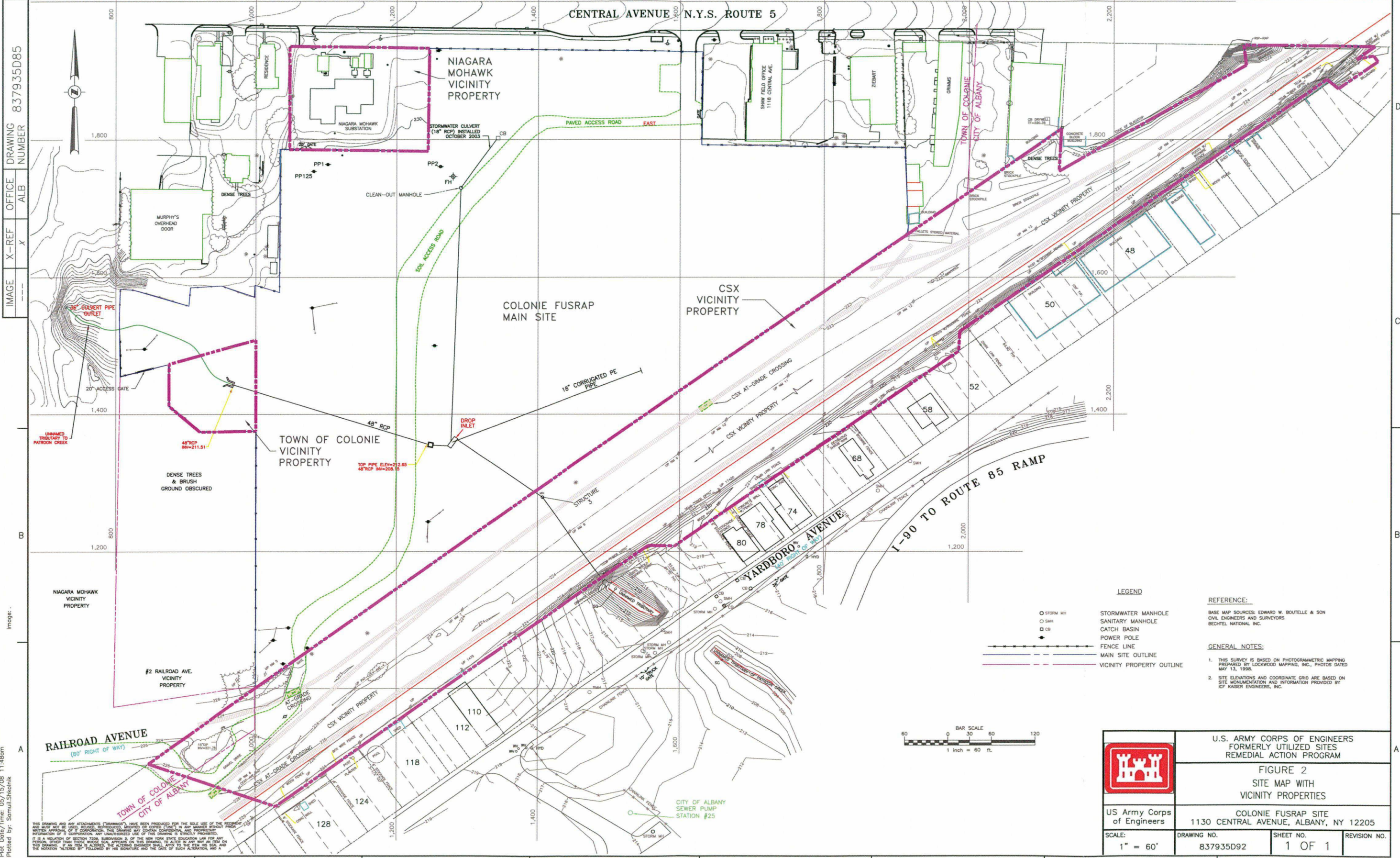
	U.S. ARMY CORPS OF ENGINEERS FORMERLY UTILIZED SITES REMEDIAL ACTION PROGRAM		
	FIGURE 1 LOCATION MAP - COLONIE FUSRAP SITE		
US Army Corps of Engineers	COLONIE FUSRAP SITE 1130 CENTRAL AVENUE, ALBANY, NY 12205		
Cabrera Services	DRAWING NO.	SHEET NO. 1 OF 1	REVISION NO.

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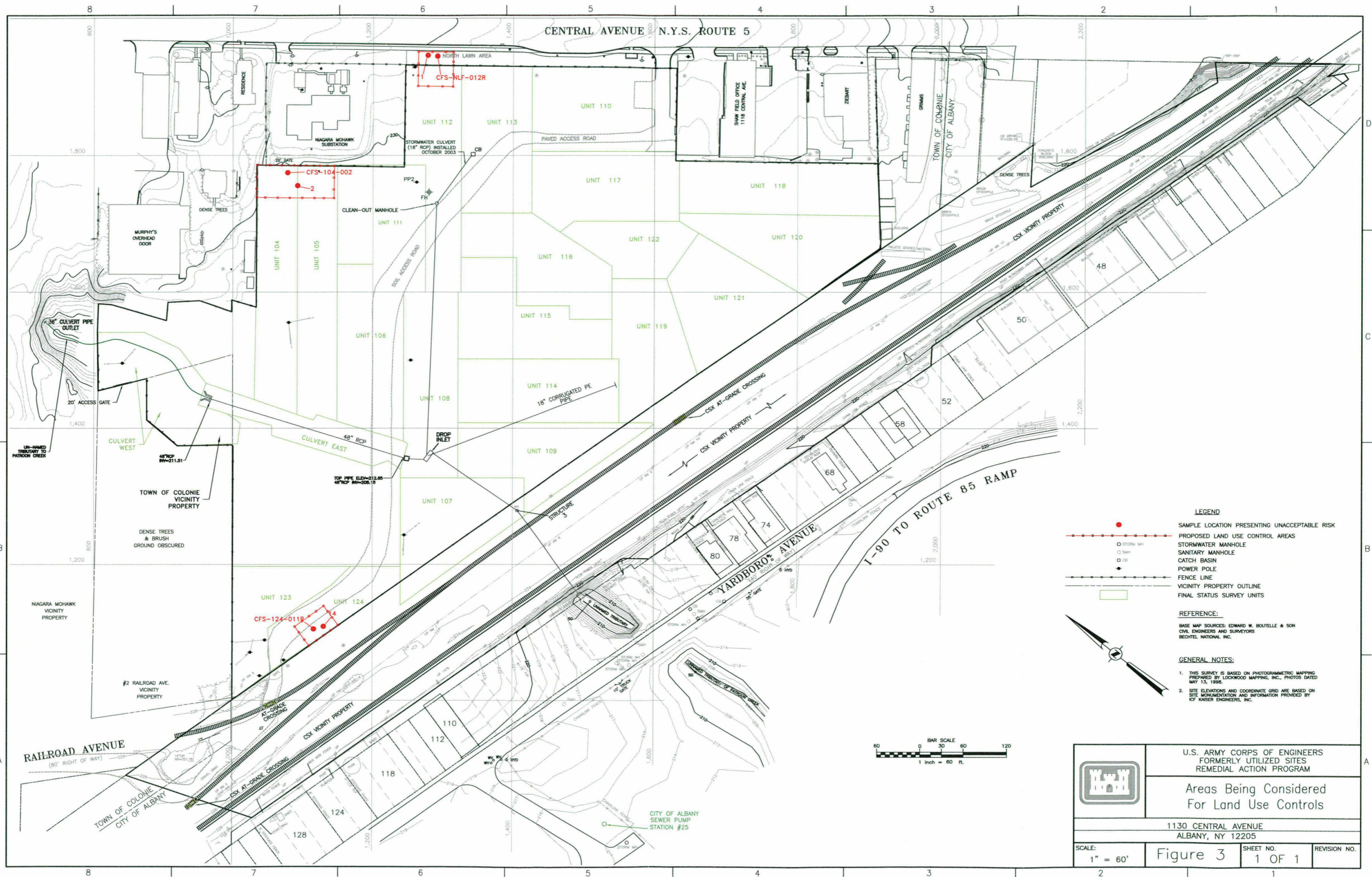
- LEGEND**
- STORM MH
  - SMH
  - CB
  - POWER POLE
  - FENCE LINE
  - MAIN SITE OUTLINE
  - VICINITY PROPERTY OUTLINE

- REFERENCE:**
- BASE MAP SOURCES: EDWARD W. BOUTELLE & SON  
CIVIL ENGINEERS AND SURVEYORS  
BECHTEL NATIONAL INC.
- GENERAL NOTES:**
- THIS SURVEY IS BASED ON PHOTODRAGMATIC MAPPING PREPARED BY LOCKWOOD MAPPING, INC., PHOTOS DATED MAY 13, 1998.
  - SITE ELEVATIONS AND COORDINATE GRID ARE BASED ON SITE MONUMENTATION AND INFORMATION PROVIDED BY ICF KAISER ENGINEERS, INC.



	U.S. ARMY CORPS OF ENGINEERS FORMERLY UTILIZED SITES REMEDIAL ACTION PROGRAM		
	FIGURE 2 SITE MAP WITH VICINITY PROPERTIES		
US Army Corps of Engineers	COLONIE FUSRAP SITE 1130 CENTRAL AVENUE, ALBANY, NY 12205		
SCALE: 1" = 60'	DRAWING NO. 837935D92	SHEET NO. 1 OF 1	REVISION NO.

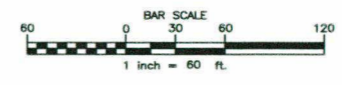
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- LEGEND**
- SAMPLE LOCATION PRESENTING UNACCEPTABLE RISK
  - PROPOSED LAND USE CONTROL AREAS
  - STORM MH
  - SMH
  - CB
  - ◆ POWER POLE
  - FENCE LINE
  - VICINITY PROPERTY OUTLINE
  - FINAL STATUS SURVEY UNITS

**REFERENCE:**  
 BASE MAP SOURCES: EDWARD W. BOUTELLE & SON  
 CIVIL ENGINEERS AND SURVEYORS  
 BECHTEL NATIONAL, INC.

- GENERAL NOTES:**
1. THIS SURVEY IS BASED ON PHOTOGRAMMETRIC MAPPING PREPARED BY LOCKWOOD MAPPING, INC., PHOTOS DATED MAY 13, 1998.
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	U.S. ARMY CORPS OF ENGINEERS FORMERLY UTILIZED SITES REMEDIAL ACTION PROGRAM		
	Areas Being Considered For Land Use Controls		
1130 CENTRAL AVENUE ALBANY, NY 12205			
SCALE:	Figure 3	SHEET NO.	REVISION NO.
1" = 60'	1 OF 1	1	1

**TABLES**

**Table 1: Selected Cleanup Criteria for Colonie Main Site Soils**

Contaminant	Selected Cleanup Criteria <sup>1</sup>
Uranium-238	35 (pCi/g) <sup>2</sup>
Thorium-232	2.8 (pCi/g) <sup>2</sup>
Lead, total	450 (mg/kg)
Copper, total	1,912 (mg/kg)
Arsenic, total	7.4 (mg/kg)

**Notes:**

pCi/g = picocuries per gram

mg/kg = milligram per kilogram

<sup>1</sup> The cleanup goals are based on urban residential use

<sup>2</sup> Cleanup goals represent values in excess of background (Action Memorandum [AM], USACE 2001a)

Table reference: AM, USACE 2001a

**Table 2: Removal Action Goals for Colonie Main Site Soils**

Removal Action Goals
Excavation and off-site disposal of site material(s) with U-238 levels greater than or equal to 35 pCi/g, regardless of the depth at which these materials are encountered.
Excavation and off-site disposal of site material(s) with Th-232 levels greater than or equal to 2.8 pCi/g, regardless of the depth at which these materials are encountered.
Excavation and off-site disposal of site material(s) with total lead levels greater than or equal to 450 mg/kg encountered at depths of nine (9) feet or less below original grade
Excavation and off-site disposal of site material(s) with total copper levels greater than or equal to 1,912 mg/kg encountered at depths of nine (9) feet or less below original grade
Excavation and off-site disposal of site material(s) with total arsenic levels greater than or equal to 7.4 mg/kg encountered at depths of nine (9) feet or less below original grade
Excavation of a minimum of six (6) inches of material from the entire site, fenceline to fenceline, prior to the execution of Final Status Surveys over the entire site
Placement of a minimum of six (6) inches and average of two (2) feet of clean backfill soil over the site.

**Notes:**

U-238 = uranium-238

Th-232 = thorium-232

pCi/g = picocuries per gram

mg/kg = milligrams per kilogram

Table reference: Action Memorandum, USACE 2001a

**Table 3: Land Use Control Data Points for Main Site**

Unit	Sample	Depth (ft bgs)	Arsenic	Copper	Lead
104	CFS-104-002	1.82	<b>85.4</b>	234	232
124	CFS-124-011R	5.30	3.1	<b>2,450</b>	<b>734</b>
North Lawn	CFS-NLF-012R	3.90	7.3	<b>4,340</b>	<b>3,370</b>
AM Criteria (mg/kg)			7.4	1,912	450

Notes:

Refer to Figure 3 for location of land use control data appoints

AM = 2001 Action Memorandum (USACE, 2001a)

ft bgs = feet below ground surface

mg/kg = milligram per kilogram

**BOLD** = concentrations exceeding AM criteria (see Table 1)

Per removal action goals (Table 2), AM criteria applicable to 0-9 ft bgs depth.

Table reference: Final Post Remedial Action Report (Shaw, 2010) .

**Table 4 – Comparative Analysis of Alternatives**

	Screening Criterion	Alternative 2: Land Use Controls (LUCs)	Alternative 3: Soil Excavation and Off-Site Disposal	Alternative 4: Soil Excavation, Solidification and On-Site Disposal and LUCs
Threshold	Overall Protection of Human Health and Environment	●	●	●
	Compliance with ARARs	●	●	●
Balancing	Long-Term Effectiveness	◐	●	●
	Reduction of Toxicity, Mobility and Volume Through Treatment <sup>1</sup>	○	○	◐
	Short-Term Effectiveness	●	◐	◐
	Implementability	●	◐	◐
	Technical Feasibility	●	◐	◐
	Administrative Feasibility	●	●	●
	Availability of Materials and Services	●	●	●
	Cost <sup>2</sup>	<b>\$0.585 million</b>	<b>\$1.546 million</b>	<b>\$1.465 million</b>
Modifying <sup>3</sup>	Regulator Acceptance	TBD	TBD	TBD
	Community Acceptance	TBD	TBD	TBD
	<b>Recommended</b>	●		

Favorable ('YES' for threshold criteria)

◐ Moderately Favorable

○ Not Favorable ('NO' for threshold criteria)

1 – While excavation and landfill disposal reduce toxicity, mobility, and volume at the property, the statutory preference is permanent reduction through treatment; therefore, this criterion is not assessed as 'Favorable'.

2 – Costs are detailed in Appendix B.

3 – The Modifying criteria of regulator and community acceptance are 'To Be Determined' following review and input from these parties.