Final Building Foundation Investigation Plan

Niagara Falls Storage Site Remedial and Site Services – Balance of Plant, Lewiston, New York

Contract No: **W912P423D0010**

Delivery Order No: **W912P423F0042**

Date: **March 19, 2024**

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ACRONYMS AND ABBREVIATIONS

APP	Accident Prevention Plan
BOP	Balance of Plant
COCs	Chemical of Concern
DOD	Department of Defense
DQIs	Data Quality Indicators
DQOs	Data Quality Objectives
EFS	Enviro-Fix Solutions LLC
EPA	United States Environmental Protection Agency
EPC	Exposure Point Concentrations
EU	Exposure Unit
NFSS	Niagara Falls Storage Site
OU	operable unit
PAHs	Polycyclic Aromatic Hydrocarbons
PARCCS	precision, accuracy, representativeness, comparability, completeness, and sensitivity
PCBs	poly-chlorinated biphenyl
QSM	Quality Systems Manual
RGs	Remedial Goals
ROCs	Radionuclides of Concern
ROD	Record of Decision
RPP	Radiation Protection Plan
RSO	Radiation Safety Officer
SATOC	Single Award Task Order Contract
SOW	Scope of Work
UFGS	Unified Facilities Guide Specifications
UFP-QAPP/SAP	Uniform Federal Policy Quality Assurance Project Plan / Sampling and Analysis Plan
USACE	United States Army Corps of Engineers

SIGNATURES

This Final Building Foundation Investigation Plan has been prepared by Enviro-Fix Solutions LLC (EFS) to describe the building investigation and sampling activities for the Niagara Falls Storage Site (NFSS) Remediation Single Award Task Order Contract (SATOC), Lewiston, New York Project in accordance with Unified Facilities Guide Specifications (UFGS) and the Scope of Work (SOW) for Niagara Falls Storage Site Remedial and Site Services Formerly Utilized Sites Remedial Action Program.

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1.0 INTRODUCTION

Enviro-Fix Solutions LLC (EFS) prepared this Final Building Foundation Investigation Plan for United States Army Corps of Engineers (USACE) under the Contract No. W912P423D0010 and Delivery Order No. W912P423F0042, to perform the project entitled: Niagara Falls Storage Site Remedial and Site Services – Balance of Plant (BOP) located at Lewiston, Niagara County, New York.

As part of CLIN 01 Mobilization and Preparatory Work for the BOP OU, the concrete foundations of former buildings and soil underlying the foundations will be investigated as documented in this Final Building Foundation Investigation Plan.

1.1 Constituents of Concern and Cleanup Goals

Remedial action for NFSS BOP and Groundwater OUs will encompass both radioactive and chemical contamination. Eight radionuclides of concern (ROCs) are identified for BOP soil and road bedding: actinium-227, protactinium-231, lead-210, radium-226, thorium-230, uranium-234, uranium-235, and uranium-238. Remedial goals (RGs) are developed for three representative ROCs — radium-226, thorium-230, and uranium-238. These individual radionuclide RGs include contributions from long-lived daughter products actinium-227, protactinium-231, uranium-234, and uranium-235 (included in uranium-238 RG) and lead-210 (included in radium-226 RG).

Several chemicals of concern (COCs) are identified for BOP soil. They include benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, and dibenz(a,h)anthracene, collectively known as polycyclic aromatic hydrocarbons (PAHs). In addition, several chlorinated volatile organic compound, specifically tetrachloroethene, trichloroethene, cis-1,2-dichloroethene, and vinyl chloride, are COCs in soil in the northeast portion of the site (Exposure Unit [EU]4), as well as in a small pocket of soil in the near center of the site (EU13). Building 401 COCs consist of polychlorinated biphenyls (PCBs), specifically aroclor-1254 and aroclor-1260. The PCBs are also identified as COCs in the utility water and sediment (aroclor-1254 only) associated with this building. COCs in groundwater are tetrachloroethene, trichloroethene, cis-1,2-dichloroethene, and vinyl chloride. A summary of the remediation goals for each COC and ROC identified in USACE investigations are listed in **Table 1**. Additional project specific details can be found in the Site Operations Plan.

Table 1: ROC and COC Data Summary

Media	Constituent	Units	RG		Basis for RG (ARAR or Risk)	RG Reference
			Surface*	Sub-surface		
Soil						
	Radium-226	pCi/g	5	15	ARAR	10 CFR Part 40, Appendix A
	Thorium-230	pCi/g	18	55	ARAR	10 CFR Part 40, Appendix A
	Uranium-238	pCi/g	115	346	ARAR	10 CFR Part 40, Appendix A

	Benzo(a)pyrene	mg/kg	1.1		ARAR	6 NYCRR Part 375-6.8(b)
	Benzo(a)anthracene	mg/kg	11		ARAR	6 NYCRR Part 375-6.8(b)
	Benzo(b)fluoranthene	mg/kg	11		ARAR	6 NYCRR Part 375-6.8(b)
	Dibenz(a,h)anthracene	mg/kg	1.1		ARAR	6 NYCRR Part 375-6.8(b)
	Tetrachloroethene	mg/kg	1.53		Risk	BOP & GW OU FS, Appendix E
	Trichloroethene	mg/kg	0.33		Risk	BOP & GW OU FS, Appendix E
	Cis-1,2-dichloroethene	mg/kg	0.75		Risk	BOP & GW OU FS, Appendix E
	Vinyl chloride	mg/kg	0.07		Risk	BOP & GW OU FS, Appendix E
Road Bedding						
	Radium-226	pCi/g	5	15	ARAR	10 CFR Part 40, Appendix A
	Thorium-230	pCi/g	18	55	ARAR	10 CFR Part 40, Appendix A
	Uranium-238	pCi/g	115	346	ARAR	10 CFR Part 40, Appendix A
Building Foundations**						
	Radium-226	pCi/g	5	15	ARAR	10 CFR Part 40, Appendix A
	Thorium-230	pCi/g	18	55	ARAR	10 CFR Part 40, Appendix A
	Uranium-238	pCi/g	115	346	ARAR	10 CFR Part 40, Appendix A
	Benzo(a)pyrene	mg/kg	1.1		ARAR	6 NYCRR Part 375-6.8(b)
	Benzo(a)anthracene	mg/kg	11		ARAR	6 NYCRR Part 375-6.8(b)
	Benzo(b)fluoranthene	mg/kg	11		ARAR	6 NYCRR Part 375-6.8(b)
	Dibenz(a,h)anthracene	mg/kg	1.1		ARAR	6 NYCRR Part 375-6.8(b)
	Aroclor-1254	mg/kg	25		ARAR	40 CFR Part 761.61
	Aroclor-1260	mg/kg	25		ARAR	40 CFR Part 761.61
Utility Sediment***						
	Aroclor-1254	mg/kg	25		ARAR	40 CFR Part 761.61
Utility Water						
	Aroclor-1260	mg/L	0.0001		Risk	USACE 2007
	Aroclor-1254	mg/L	0.0001		Risk	USACE 2007
Groundwater						
	Tetrachloroethene	mg/L	1.5		Risk	BOP & GW OU FS, Appendix E
	Trichloroethene	mg/L	0.33		Risk	BOP & GW OU FS, Appendix E
	Cis-1,2-dichloroethene	mg/L	2.4		Risk	BOP & GW OU FS, Appendix E
	Vinyl chloride	mg/L	0.17		Risk	BOP & GW OU FS, Appendix E

Notes:
* Surface soil [upper 15 centimeters (6 inches)]/subsurface soil [more than 15 centimeters (6 inches) below the surface] averaged over an area of 100 square meters; Ac-227, Pa-231, U-234, and U-235 included under U-238 and Pb-210 included under Ra-226
** Building foundations are assumed to have the same impacts as adjacent soils. However, the identified Aroclor 1254 impact is from a core sample from Bulding 401 and PRGs for Building 433 are only ROCs.
*** Liquid phase Aroclor 1254 detected in utility drains.
ARAR - Applicable or Relevant and Appropriate Requirement BRA – 2007 NFSS Baseline Risk Assessment FS – 2019 BOP nd Groundwater OUs Feasibility Study PRG - Preliminary Remediation Goal
mg/kg - milligrams per kilogram mg/L - milligrams per liter pCi/g - picocuries per gram
USACE 2007: Table A 702, Baseline Risk Assessment for the Niagara Falls Storage Site, December 2007
10 CFR Part 40: 10 CFR Part 40, Appendix A, Criterion 6(6) 40 CFR Part 761.61 criteria is for total PCBs

1.2 Problem Definition

The presence of contamination beneath former site buildings/ancillary structures has not been established during previous investigations. These buildings include #420, 423, 425, 427, 430, 431/432, 433 (Radium Vault), & the shop north of Oxidation Plant, and are shown on **Figures 1.3-1a, 1.3-1b, and 1.3-1-c**. This information is required to complete the remedial action in accordance with the soils OU ROD.

1.3 Investigation Goal

The goal of the investigation is to determine whether radioactive and/or chemical contamination is present beneath former site buildings/ancillary structures.

1.4 Purpose and Scope of the Plan

Data needed to address the investigation goal consists of ROC and COC concentrations in concrete and/or soil beneath the eight buildings and ancillary structures.

This plan provides guidelines to perform the investigation as well as identify and establish the following:

- The condition of site buildings/ancillary structures
- Data quality objectives
- Investigation activities
- Reporting requirements

2.0 SITE CONDITIONS

With the exception of Building 433 (Radium Vault), only the concrete slabs from Buildings 420, 423, 425, 427, 430, 431/432, 433, N 423, and shop north of Oxidation Plant remain. Building 433 (Radium Vault), if impacted, is approximately 82 tons of concrete for offsite transportation and disposal (USACE, 2020).

2.1 Topography and Drainage

The NFSS and surrounding region are located in the Ontario Lake Plain and are generally flat to gently rolling. The Niagara Escarpment sits about 5.2 kilometers (2 miles) south of the site and is the result of a division in bedrock stratigraphy in the region. North of the escarpment, where the NFSS is located, erosion wore away the upper 300 meters (1,000 feet) of Silurian deposits, leaving the Queenston Formation as the uppermost bedrock layer.

There is limited surface water at the site; no perennial natural streams, navigable waterways, or impoundments are maintained at the site. Several east-west ditches at the NFSS collect surface water runoff that empties into the northerly flowing Central Drainage Ditch. Surface water runoff from the western periphery of the site flows to the West Drainage Ditch, which flows northerly from a watershed that drains land south of the NFSS.

Surface water discharges onto the site from the Modern Landfill, Inc., property and from the properties to the south of the site that feed the Central Drainage and West Drainage Ditches. Surface water is present during part of the year only in some of these drainage ways. The Central Drainage Ditch and West Drainage Ditch join 0.8 kilometers (0.5 miles) north of the NFSS, then discharge to Four Mile Creek 2.4 kilometers (1.5 miles) north of the NFSS. Four Mile Creek eventually empties into Lake Ontario.

2.2 Geology and Hydrogeology

Surface soil and fill at the NFSS is made up of unconsolidated materials that have been altered or deposited by human activities, such as site grading, and consists of generally dry, clayey silt with some fine sand that had been graded during past Department of Defense operations. The site is underlain by approximately 9 to 18 meters (30 to 60 feet) of unconsolidated glacial deposits that overlie shale bedrock of the Queenston formation. Eight distinct stratigraphic layers under the site include: fill material, alluvium, upper glacial till (or brown clay till), middle silt till, glaciolacustrine clay, glaciofluvial sand and gravel, red lodgment till, and Queenston shale bedrock.

Groundwater in the near-surface stratigraphy occurs in low-permeability unconsolidated deposits, and the water-table surface generally conforms to the local topography. Groundwater at the site occurs at approximately 1.5 to 3 meters (5 to 10 feet) below grade. A regional groundwater divide (Niagara Escarpment) lies about 3 kilometers (2 miles) south of NFSS, and regional groundwater north of the divide flows to the northwest toward the Niagara River, while groundwater south of the divide flows toward the southwest. Creeks and drainage ditches also influence localized groundwater flow patterns. The discontinuous nature of saturated lenses restricts lateral groundwater flow.

3.0 DATA QUALITY OBJECTIVES

Data quality objectives (DQOs) establish performance or acceptance criteria and set the minimum quality/quantity of data needed to address the problem. DQOs for this plan cover the following topics:

- The problem to be investigated (Section 1.2).
- What questions the investigation will attempt to answer (Section 1.3), what actions (decisions) may result (Section 1.2), and who the primary decision maker is (USACE).
- Information that needs to be obtained and the measurements that need to be taken to resolve the investigation goal (Section 4.0).
- Study boundaries (Section 2.0 and **Figures 1.3-1a, 1.3-1b, 1.3-1c**), when and where the data should be collected (Section 4.0).

Data quality indicators (DQIs) provide a means to evaluate the quality of data and are defined in terms of precision, accuracy, representativeness, comparability, completeness, and sensitivity (PARCCS). Measurement quality objectives are typically expressed in numerical or quantitative terms, along with one or more quality control (QC) samples that serve as a means for assessing the DQIs. DQIs and measurement quality objectives are identified in Section 4.0.

4.0 INVESTIGATION ACTIVITIES

This section outlines the subsurface investigation. All activities will be conducted in accordance with this plan and all other work plans established for the NFSS site soil remedial action. All work will be overseen and directed by an EFS Geologist or Engineer.

4.1 Sampling Design

Concrete coring and soil sample collection at eight existing former building slabs will be conducted in accordance with the Uniform Federal Policy Quality Assurance Project Plan / Sampling and Analysis Plan (UFP-QAPP/SAP). Both systematic (regularly spaced) and biased locations were selected based on either elevated gamma measurements, indications of potential chemical impact such as stains, cracks, drains, etc., and/or professional judgment. Sampling and subsurface characterization will be utilizing standard drilling and soil sampling methods and are discussed in Section 4.2.1.

4.2 Sampling Locations, Rationale, and Methods

The 42 concrete and soil boring sampling locations are illustrated on **Figures 1.3-1a, 1.3-1b, and 1.3-1c** in **Attachment 1**. Three samples will be collected from each boring location, one concrete sample and two soil samples (126 total samples). The coordinates that correspond to the sample locations are listed in **Table 2** in **Attachment 1**. **Table 4** identifies sampling requirements and rationale. Each sample will be analyzed for site ROCs and COCs found in **Table 1**. Laboratory analysis of the concrete and soil samples will be in accordance with the schedule shown in **Table 5** in Section 4.6.1.

Two additional concrete coring samples will be collected from inside the building through the existing floor slab of Building 433 (Radium Vault) to characterize the concrete debris and soil beneath the slab as discussed in Section 4.2.1. If the concrete coring and soil samples are clean,

the existing structure will remain in place with no further action. If the concrete coring and/or the soil samples are above the remediation goals, the structure will be demolished and the concrete debris and soil beneath the slab excavated and sent off site for proper disposal. All sampling efforts will follow the UFP-QAPP/SAP.

Samples that have elevated photoionization detector (PID) readings or appear visibly contaminated (including oily appearance, sheen, or black color) will also be analyzed if directed by the USACE for volatile organic compounds (VOCs) and polycyclic aromatic hydrocarbons (PAHs).

Borings may be relocated directly adjacent to cracks, expansion joints, floor drains, or other floor slab penetrations where COCs could migrate to the underlying soil. These locations will be decided at the job site with approval from USACE.

Sample IDs will conform to the following conventions:

Table 3: Building Foundation Investigation – Sample ID Formatting Convention

MMDDYY-CO-EUXXSUYY-RA-INZZZ-RG	Concrete	Core sample of entire depth of foundation (2 ft)	Grab	ROCs (Ra-226, Th-230, U-238) & PAHs (benzo[a]pyrene, benzo[a]anthracene, benzo[b]fluoranthene, dibenz[a,h]anthracene) (only from Building 430)	Soil Sampling SOP ENV-26	42 Building Foundation Concrete Core Samples
MMDDYY-SO-EUXXSUYY-RA-INZZZ-RG	Soil	0-0.5 below basecourse gravel	Grab	ROCs (Ra-226, Th-230, U-238), VOCs (TCA, TCE, cis-1,2-DCE, & VC), & PAHs (benzo[a]pyrene, benzo[a]anthracene, benzo[b]fluoranthene, dibenz[a,h]anthracene) (only from Building 430).	Soil Sampling SOP ENV-26	Sub-Foundation Soil Samples

MMDDYY-SB-EUXXSUYY-RA-INZZZ-RG	Soil	0.5-1.5 below basecourse gravel	Grab	ROCs (Ra-226, Th-230, U-238), VOCs (TCA, TCE, cis-1,2-DCE, & VC), & PAHs (benzo[a]pyrene, benzo[a]anthracene, benzo[b]fluoranthene, dibenz[a,h]anthracene) (only from Building 430).	Soil Sampling SOP ENV-26	Sub-Foundation Soil Samples

4.2.1 Drilling and Sampling

4.2.1.1 Concrete Borings

Concrete core samples will be collected at each location, utilizing a drilling rig or concrete coring machine. It is estimated the concrete slabs are two feet thick. The 3-inch diameter concrete cores will be placed on a plastic-lined work surface, radiological and organic vapor screening will be conducted utilizing a sodium iodide (NaI) gamma detector and a Photoionization detector, a visual description recorded or photographed, and the samples collected for analyses. The section of concrete core exhibiting the highest screening levels will be sent to the lab for analysis. The portion of the concrete core identified for sampling will be cut/broken off into an approximate 6-inch sample. If field screening does not indicate any apparent contamination, then the top 6 inches of the concrete core will be analyzed. Once the coring is complete, EFS will collect the concrete 3-inch diameter core samples, remove any granular base-course below the concrete slab and then advance a soil boring to a total depth of 18 inches.

4.2.1.2 Soil Borings

At each location, soil samples will be collected below the coarse gravel layer beneath the concrete slab which is the top of the native soil. All samples will be screened ex-situ for gamma and beta radiation, visibly inspected, and logged by a geologist or engineer who will oversee the drilling and sampling operation. A sodium iodide (NaI) gamma detector, such as a Ludlum 44-10/44-20, will be used to screen the soils for elevated gamma readings. RCTs will determine a background gamma level in a non-impacted area near the investigation areas prior to core screening. A minimum of two samples will be retained from each boring for laboratory analysis using the following rationale:

- The 0 to 6-inch interval below the coarse gravel layer beneath the concrete slab.
- Visible evidence of contamination or elevated gamma/beta readings.

- The 6 to 18-inch interval below the coarse gravel layer beneath the concrete slab. (see **Table 4** for approximate depths).

All soil cores will be archived on-site until the data are evaluated and the results are accepted by USACE. All borings will be sealed upon completion using hydrated bentonite.

Table 4: Sampling Requirements and Rationale

Type	Dimensions (minimum)	Minimum Number of Samples	Sample Depth (ft)	Rationale
Concrete Borings	Depth: 2 feet (estimated) Diameter: 3 inches	One	• Visible evidence of contamination (staining) or elevated gamma/beta readings. Otherwise, top 0.5 ft of core.	• Evaluate potential for contamination in concrete slab.
Soil Borings	Depth: 18 inches	Two	• 0 – 0.5 ft below coarse gravel layer. • 0.5 – 1.5 ft below coarse gravel layer. • Visible evidence of contamination (staining) or elevated gamma/beta readings.	• Evaluate potential for contamination beneath floor cracks. • Evaluate soil that appears to be visibly contaminated or exhibits elevated radioactivity.

4.3 Equipment Decontamination

Drilling/excavating equipment (i.e., vehicles and tools) must be clean upon arrival at the site. Soil, grease, or other contaminants on the equipment will not be allowed. Down-hole tools (i.e., rods and samplers) will also be decontaminated upon arrival at the site and between sample locations to meet the requirements of Table 7-1 of the Radiation Protection Plan (RPP) (USACE, 2023d).

Samplers will be cleaned after each use. This will be performed at the work site and consist of removing gross soil, brush cleaning with soapy water, and performing a final rinse with clean water. Used cleaning solutions will be containerized and disposed off-site at a USACE-approved location.

The drill rig and/or concrete corer will be cleaned between buildings to remove soil on tires, tracks, hydraulic jacks, and other parts that contact the ground within the exclusion zone (EZ). All drilling equipment (i.e., vehicle and tools) will be decontaminated prior to release from the site. This will be performed on the site decontamination pad in accordance with the Accident Prevention Plan (USACE 2023a). The equipment must meet free release criteria specified in the Contamination Control Plan (USACE 2023b) and RPP (USACE 2023d) prior to release from the site.

4.4 Field QC Samples

Field QC sample requirements are established in UFP-QAPP/SAP (USACE 2023e) and summarized below. Field duplicates, matrix spikes, and matrix spike duplicates will not be collected for concrete core samples.

- Field duplicates: ≥ one per 10 field samples per matrix.
- Matrix spike: ≥ one per 10 field samples per matrix.
- Matrix spike duplicate: ≥ one per 20 field samples per matrix.

4.5 Sample Containers, Preservation, and Holding Times

Sample containers, preservation, and holding time requirements by matrix and analyte are identified in the UFP-QAPP/SAP Worksheets #19 and #30 (USACE 2023e).

4.6 Laboratory Analysis

4.6.1 Analytical Methods

Table 5 lists analytical methods that will be used.

Table 5: Concrete and Soil Sample Analysis Schedule

PARAMETER	METHOD
Radium-226	EPA 901.1, Gamma spectroscopy
Isotopic Uranium	DOE EML HASL-300m, Alpha spectroscopy
Isotopic Thorium	DOE EML HASL-300m, Alpha spectroscopy
PAHs*	EPA SW846 8270D-Selected Ion Monitoring (SIM)
Volatile Organic Compounds	EPA Method 8260C

*Only select samples identified on Table 2 will be analyzed for PAHs.

4.6.2 PARCCS Criteria

4.6.2.1 Precision

Precision will be evaluated by reviewing laboratory duplicates and determining relative percent difference (RPD), replicate error ratio (RER), and duplicate error ratio (DER) in accordance with UFP-QAPP/SAP Worksheet #12 (USACE 2023e).

4.6.2.2 Accuracy

Accuracy will be evaluated by determining if laboratory control sample/laboratory control sample duplicates (LCS/LCSD), method blanks, tracer/surrogate recoveries, and matrix spike/matrix spike duplicates (MS/MSD) are within criteria established in UFP-QAPP/SAP Worksheet #12 (USACE 2023e).

4.6.2.3 Representativeness

Representativeness is dependent on the proper design of the sampling program and will be satisfied by ensuring that approved plans were followed during sampling and analysis.

4.6.2.4 Comparability

Comparability will be satisfied by ensuring that approved plans were followed, and that proper sampling and analysis techniques were used.

4.6.2.5 Completeness

The UFP-QAPP/SAP Worksheets #34 and #35 (USACE 2023e) identify completeness requirements and procedures for field records and analytical data packages. The goal is 90 percent usable valid results for each analytical data package.

4.6.2.6 Sensitivity

Sensitivity is an instruments or method's minimum concentration that can be reliably measured or reported. Method blank and field blank samples will be evaluated against sensitivity criteria established in UFP-QAPP/SAP Worksheet #12 (USACE 2023e).

4.7 Worker Health and Safety Monitoring

Worker health and safety monitoring will be performed in accordance with the following USACE documents and project work plans:

- Accident Prevention Plan (USACE 2023a).
- Radiation Protection Plan (USACE 2023d).

4.8 Documentation and Records

Borings and test pit locations and dimensions will be documented using global positioning system equipment. Coordinates and dimensions will be noted on the logs.

4.8.1 Drilling Logs

A drilling log will be prepared for each hole by the field geologist/engineer in accordance with Unified Facilities Guide Specification (UFGS) 02 32 00.

4.8.2 Locational Information

Geospatial data will be recorded in accordance with UFGS 01 35 13.43 10 and Section 5.1.

5.0 REPORTING REQUIREMENTS

Analytical results are subjected to a 100% stage 2b validation, which includes results, method, and instrument quality control data. Ten percent (10%) of the laboratory data packages are subject to

stage 3 validation, as defined in the DOD QSM. Data verification and validation will be conducted in accordance with the UFP-QAPP/SAP (see specifically Worksheets #34, #35, #36, and #37) (USACE 2023e) to ultimately produce a usable investigation data set while identifying those sample data that present quality concerns, including qualifiers, lost, unusable, or rejected assessment.

5.1 Data Format

Data format will be compliant with UFGS 01 35 13.43 10 and the requirements noted below.

- All analytical data will be provided to USACE in an ERPIMS format. ERPIMS is "Environmental Restoration Program Information Management System" (https://www.afcec.af.mil/What-We-Do/Environment/Restoration/ERPIMS.aspx).
- Geospatial data will be provided to USACE in a SDSFIE Gold compliant file database. SDSFIE is "Spatial Data Standards for Facilities, Infrastructure, and Environment" (https://www.sdsfieonline.org/).
- Final report maps will be provided to USACE in an ESRI Map Package.

5.2 Database Entries

All data from the investigation will be entered into an environmental data management system prepared for the NFSS site soils OU remedial action (refer to UFGS 01 35 13.43 10).

5.3 Building Foundation Investigation Report

After the data has been validated and verified, the EFS Radiation Safety Officer (RSO) and Environmental Engineer will assess the usable data generated from the Building Foundation Investigation. Results will be compared to the remedial goals applicable to each ROC and chemical contaminant of concern. EFS will prepare a Building Foundation Investigation Report, in which the results will be tabulated, mapped, and interpreted. This information will then be used to inform the remedial design strategy for the remaining building foundations and underlying soil.

A building foundation investigation report will be prepared and submitted to USACE in accordance with UFGS 02 32 00. The report will include the following information (minimum requirements):

- Purpose, description, and scope of the investigation.
- Description of site investigation activities and laboratory analysis.
- Presentation of investigation results.
- Interpretation of the investigation results.
    - Subsurface characteristics associated with each building/structure.
    - Sample locations, characteristics, and analytical results.

  - Conformance with PARCCS criteria.
- Tables and figures:
  - Sample locations and dimensions.
  - Analytical results.
- Attachments:
  - Boring logs
  - Sampling logs
  - Photographs
  - Field notes
  - Laboratory analytical reports

6.0 REFERENCES

EFS 2023. *Draft Site Operations Plan, Niagara Falls Storage Site Remedial and Site Services - Balance of Plant, Lewiston, New York,* December.

EPA 2005. *Uniform Federal Policy Quality Assurance Project Plan / Sampling and Analysis Plan,* March

USACE 2020. *Proposed Plan, Balance of Plant and Groundwater Operable Units, Niagara Falls Storage Site*, October.

USACE 2023a. *Draft Accident Prevention Plan, Niagara Falls Storage Site Remedial and Site Services - Balance of Plant, Lewiston, New York,* September.

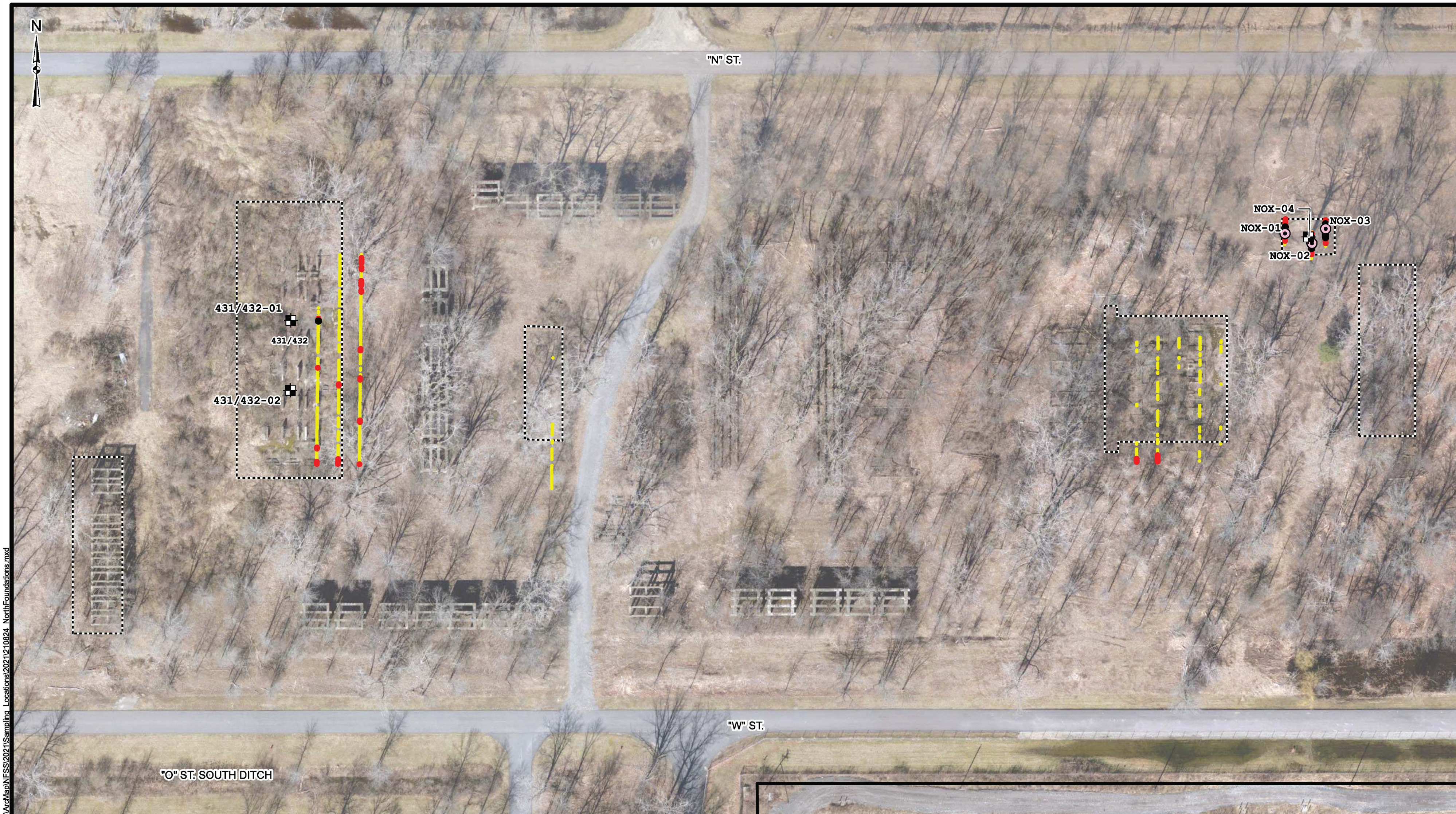
USACE 2023b. *Draft Contamination Control Plan, Niagara Falls Storage Site Remedial and Site Services - Balance of Plant, Lewiston, New York,* December.

USACE 2023c. *Draft Quality Control Plan, Niagara Falls Storage Site Remedial and Site Services - Balance of Plant, Lewiston, New York,* November.

USACE 2023d. *Draft Radiation Protection Plan, Niagara Falls Storage Site Remedial and Site Services - Balance of Plant, Lewiston, New York,* October.

USACE 2023e. *Draft Uniform Federal Policy Quality Assurance Project Plan/Sampling and Analysis Plan, Niagara Falls Storage Site Remedial and Site Services - Balance of Plant, Lewiston, New York,* December.

Attachment 1 - Proposed Building Foundation Sample Locations and Coordinates



Legend

- Biased Building Foundation Sample
- Systematic Foundation Sample
- Former Building
- Structure (Active)
- NFSS Site Boundary

Gamma Walkover Survey (RI)

- < 8,500 CPM
- 8,500 - 10,500 CPM
- 10,500 - 12,500 CPM
- > 12,500 CPM

0 35 70 140 Feet

US Army Corps of Engineers. Buffalo District

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
BUFFALO, NY

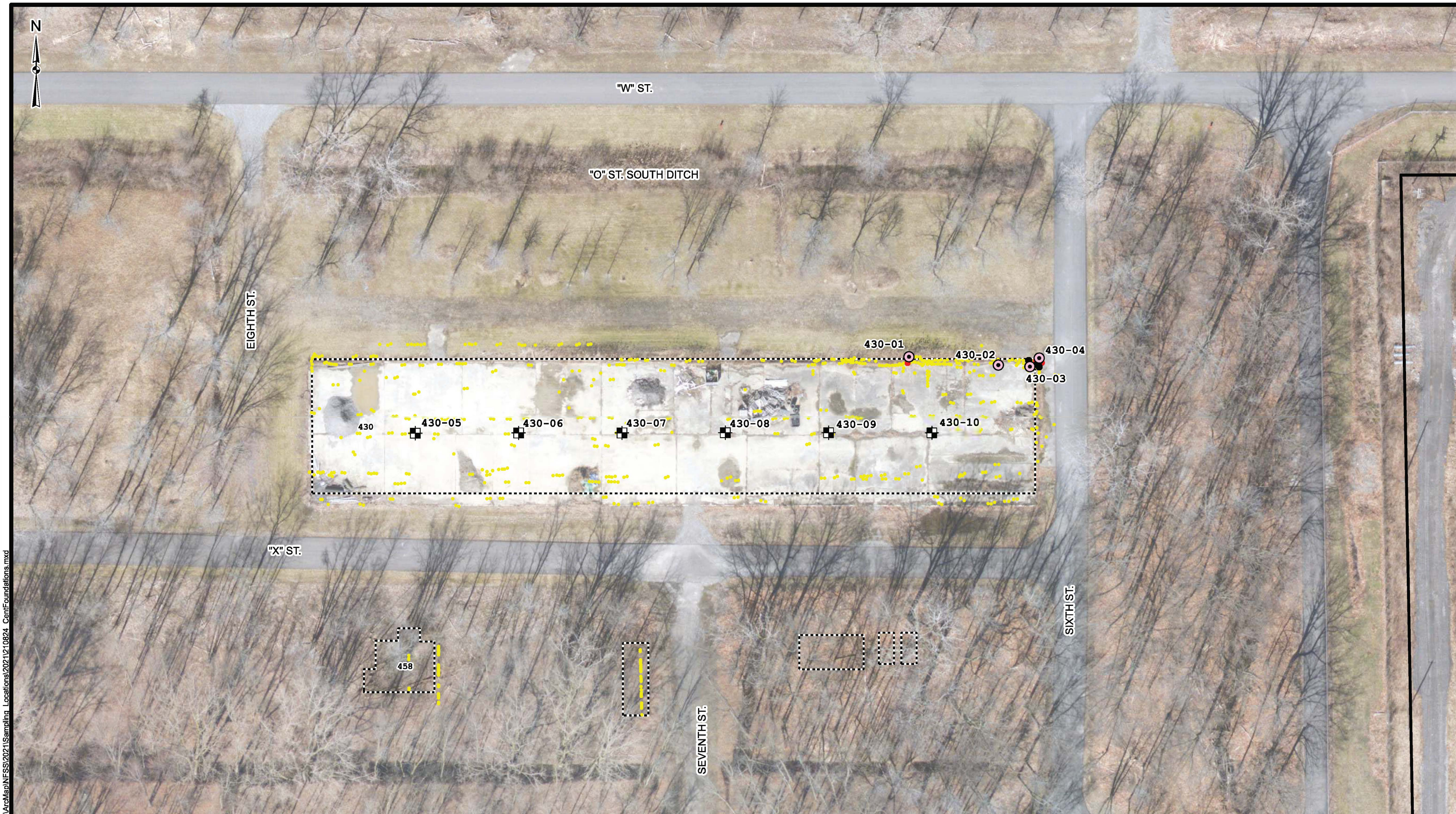
PROPOSED BUILDING FOUNDATION SAMPLE LOCATIONS (BUILDING 431/432 AND SHOP NORTH OF OXIDATION PLANT)

Name: 210824_NorthFoundations.mxd
Drawn By: H5TDESPM
Date Saved: 16 May 2022
Time Saved: 8:18:49 AM

NIAGARA FALLS STORAGE SITE
LEWISTON, NEW YORK

FIGURE 1.3-1

Document Path: D:_Projects\C19\GIS\ArcMap\NFSS\2021\Sampling_Locations\2021\210824_NorthFoundations.mxd



Legend

- Biased Building Foundation Sample
- Systematic Foundation Sample
- Former Building
- Structure (Active)
- NFSS Site Boundary

Gamma Walkover Survey (RI)

- < 8,500 CPM
- 8,500 - 10,500 CPM
- 10,500 - 12,500 CPM
- > 12,500 CPM

0 25 50 100 Feet

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
BUFFALO, NY

US Army Corps of Engineers®
Buffalo District

PROPOSED BUILDING FOUNDATION SAMPLE LOCATIONS (BUILDING 430)

Name: 210824_CentFoundations.mxd
Drawn By: H5TDESPM
Date Saved: 27 Aug 2021
Time Saved: 10:58:26 AM

NIAGARA FALLS STORAGE SITE
LEWISTON, NEW YORK

FIGURE 1.3-1

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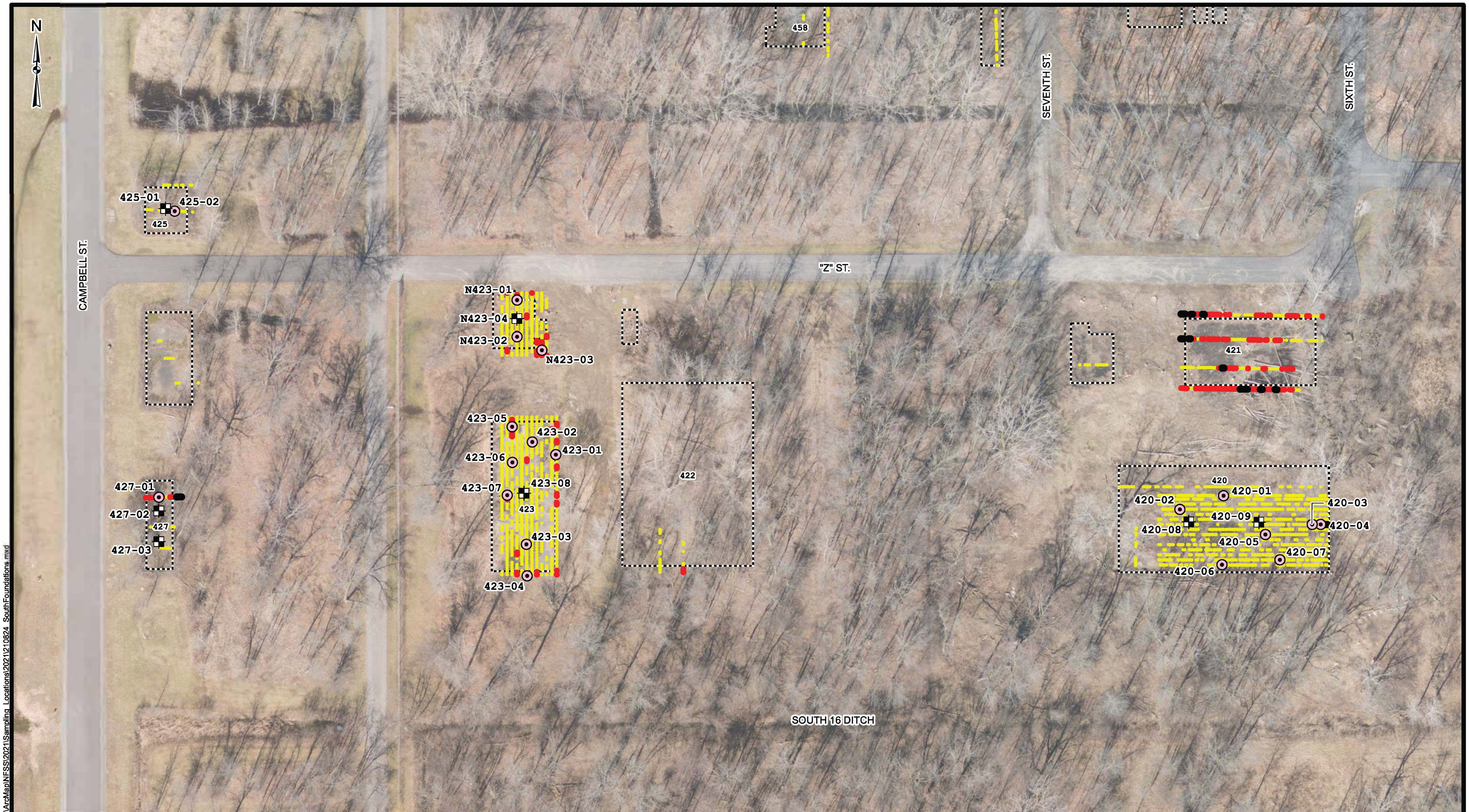

Legend

- Biased Building Foundation Sample
- Systematic Foundation Sample
- Former Building
- Structure (Active)
- NFSS Site Boundary

Gamma Walkover Survey (RI)

Concrete GWS Data

- < 8,500 CPM
- 8,500 - 10,500 CPM
- 10,500 - 12,500 CPM
- > 12,500 CPM

NOTE: Gamma Walkover Survey results for Building 421 were classified as soil media.

0 30 60 120 Feet

US Army Corps of Engineers. Buffalo District

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
BUFFALO, NY

PROPOSED BUILDING FOUNDATION SAMPLE LOCATIONS (BUILDINGS 420, 423, 425, 427 AND BUILDING NORTH OF 423)

Name: 210824_SouthFoundations.mxd
Drawn By: H5TDESPM
Date Saved: 27 Aug 2021
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NIAGARA FALLS STORAGE SITE
LEWISTON, NEW YORK

FIGURE 1.3-1

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Table 2 Proposed Building Foundation Sample Coordinates

BUILDING NO.	SAMPLE TYPE	LOCATION ID	NORTHING	EASTING
420	Biased	420-01	1172003.39	1042281.641
420	Biased	420-02	1171994.302	1042252.548
420	Biased	420-03	1171984.336	1042340.402
420	Biased	420-04	1171984.336	1042346.013
420	Biased	420-05	1171977.68	1042309.331
420	Biased	420-06	1171957.516	1042280.466
420	Biased	420-07	1171960.839	1042318.942
420	Systematic	420-08	1171986.087	1042258.507
420	Systematic	420-09	1171985.797	1042304.978
423	Biased	423-01	1172030.404	1041838.567
423	Biased	423-02	1172038.738	1041822.942
423	Biased	423-03	1171971.029	1041819.036
423	Biased	423-04	1171950.196	1041819.557
423	Biased	423-05	1172048.968	1041809.531
423	Biased	423-06	1172025.196	1041809.661
423	Biased	423-07	1172003.581	1041806.275
423	Systematic	423-08	1172005.094	1041817.514
425	Biased	425-01	1172191.965	1041585.649
425	Systematic	425-02	1172193.629	1041579.694
427	Biased	427-01	1172002.315	1041575.214
427	Systematic	427-02	1171993.318	1041575.209
427	Systematic	427-03	1171973.006	1041575.209
430	Biased	430-01*	1172486.158	1042278.763
430	Biased	430-02*	1172481.645	1042328.099
430	Biased	430-03*	1172480.726	1042345.422
430	Biased	430-04*	1172485.55	1042350.551
430	Systematic	430-05*	1172443.987	1042006.474
430	Systematic	430-06*	1172444.039	1042063.467
430	Systematic	430-07*	1172444.091	1042120.46
430	Systematic	430-08*	1172444.143	1042177.453
430	Systematic	430-09*	1172444.195	1042234.445
430	Systematic	430-10*	1172444.247	1042291.438
431/432	Systematic	431/432-01	1172943.737	1042189.911
431/432	Systematic	431/432-02	1172889.876	1042189.386
N 423	Biased	N423-01	1172132.892	1041812.812
N 423	Biased	N423-02	1172108.581	1041812.812
N 423	Biased	N423-03	1172099.657	1041829.281
N 423	Systematic	N423-04	1172120.72	1041812.812
Oxidation Bldg	Biased	NOX-01	1173010.81	1042958.085
Oxidation Bldg	Biased	NOX-02	1173003.1	1042978.721
Oxidation Bldg	Biased	NOX-03	1173014.353	1042989.417
Oxidation Bldg	Systematic	NOX-04	1173008.244	1042976.225

*Sample analyses will include PAHs