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Scoping Summary for the ECODS N-1 (NBN), Central Shops Scrap Lumber Pile (631-2G), and Building 690-N, Process Heat Exchanger Repair Facility (Ford Building) Operable Unit (U)

(RFI/RI Work Plan Characterization)

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1.0 PROJECT PHASE AND STATUS

This scoping summary supports Core Team discussion for the development of the RCRA Facility Investigation/Remedial Investigation (RFI/RI) Work Plan for the Early Construction and Operational Disposal Site (ECODS) N-1, Central Shops Scrap Lumber Pile (631-2G), and Building 690-N, Process Heat Exchanger Repair Facility (aka Ford Building) Operable Unit (OU). These three OU subunits will be referred to as the ECODS N-1, Scrap Lumber Pile (631-2G) and the Ford Building (690-N) subunits for the remainder of the document (Figure 1). The OU is currently listed in Appendix E of the Federal Facility Agreement (FFA).

A significant amount of characterization data exists for the three OU subunits. RFI/RI data collected in 1997 and 1999 for the Central Shops Burning/Rubble Pits OU (631-1G and 631-3G), Site Evaluation data collected in 2001 for the ECODS N-1 subunit, deactivation and decommissioning (D&D) data collected in 2014 for the Ford Building (690-N), and pre-Work Plan characterization data collected in 2019 for the ECODS N-1, Scrap Lumber Pile (631-2G), and the Ford Building (690-N) subunits will be discussed in this scoping meeting. The objectives of the Work Plan scoping meeting are to reach Core Team understanding of OU conditions, nature and extent of contamination based on available data, and identify potential data gaps and uncertainties that could impact the scope of the RI investigation. Core Team agreements will support the development of a Work Plan Characterization and Sampling Analysis Plan (SAP). The RFI/RI Work Plan is scheduled for submittal on February 14, 2020.

2.0 LAND USE

The ECODS N-1, Central Shops Scrap Lumber Pile (631-2G), and Ford Building (690-N) are located in an area designated for industrial use as defined by the SRS Land Use Control Assurance Plan (LUCAP). No current or projected future development of the OU is planned. Land use controls (LUCs) will be part of any remedial action to ensure prevention of unrestricted use (e.g., residential), unless unrestricted use is supported by the RFI/RI/BRA results. Groundwater is not part of the OU and will be addressed as the Central Shops Groundwater OU. There is no current or projected future use of the groundwater as a drinking water source.

3.0 ECODS N-1 (NBN) SUBUNIT

3.1 *ECODS N-1 (NBN) History and Background*

ECODS N-1 is located in N-Area (i.e., Central Shops) within the Pen Branch Watershed (Figure 1). The subunit is ~107-meters (m) long by 15-m wide (350-feet (ft) long by 50-ft wide). ECODS N-1 is one of twenty-five ECODS at SRS which were identified during a review of early 1950s aerial photographs. These sites were used during the construction and early operation of SRS for disposal of construction debris and other non-radioactive waste materials. Waste disposed of in ECODS N-1 was buried in two trenches each ~46-m (150-ft) long and located end-to-end (Figure 2). ECODS N-1 was used to dispose of trash and construction debris, potentially containing asbestos, associated with the construction and operation of N Area. A portion of one pit may have been used as burn pit for disposal of combustible waste.

As reported in the *Site Evaluation Report for Early Construction and Operational Disposal Site (ECODS) N-1 (NBN)* (WSRC 2001b), ECODS N-1 is located in a relatively flat area that gradually slopes to the south. Ground surface elevation at ECODS N-1 is ~88-m (290-ft) above mean sea level (msl). Runoff from the subunit runs overland to the south and is collected by an unnamed tributary of Pen Branch ~366 m (1,200 ft) to the south. From this point, the unnamed tributary flows south for 1.9 km (1.2 mi) before discharging into Pen Branch, which then flows south and west for an additional 16.9 km (10.5 mi) before entering the Savannah River. Surface soils in much of the subunit consist of Dothan Sand, which is a well-drained sandy loam, strongly acidic, with moderately low permeability and moderate water capacity. The subsoil consists of sandy loam and sandy clay loam (SCS 1990). As observed in soil data collected in 2019, a very stiff silty-clay to sandy-silty-clay layer, approximately 6-m (20-ft) thick, was encountered at a depth of 2.44 m to 3.66 m

(8 ft to 12 ft). A lithology CPT log from the nearby N-Area Oil Seepage Basin also indicates this clay layer as relatively contiguous in N-Area.

Historical aerial photographs revealed that the area where ECODS N-1 is located was farmland prior to construction of the SRS (WSRC 2001b). ECODS N-1 was logged and replanted by the US Forestry Service in 2000 and is currently a wooded area containing mature pine trees providing a moderate habitat quality for ecological receptors.

Aerial photographs identify that ECODS N-1 was in use from approximately August 1952 to June 1954 (WSRC 2001b). A Site Evaluation characterization effort in 2001 collected 90 samples at 3 depth intervals at 27 locations for TAL and TCL analyses. Benzo(a)pyrene, antimony (Sb), arsenic (As), cadmium (Cd), iron (Fe), and lead (Pb) exceeded their respective EPA Region IX Residential Preliminary Remediation Goals (PRGs) and background levels (WSRC 2001). The Site Evaluation report concluded there are problems warranting further investigation and ECODS N-1 was moved to FFA Appendix E. The verified and validated (V&V) data from the 2001 Site Evaluation report will support the RFI/RI/Baseline Risk Assessment (BRA) evaluation of the ECODS N-1 subunit.

In 2019, a pre-Work Plan characterization effort collected soil samples at the surface (0- to 0.3-m [0- to 1-ft]), shallow subsurface (0.3- to 1.2-m [1- to 4-ft]), and deep subsurface (2.4- to 3-m [8- to 10-ft] and 3- to 3.7-m [10- to 12-ft]) soils at fourteen locations for TAL analysis (Figure 3). Sample locations were biased to locations that exceeded the screening criteria in the 2001 Site Evaluation report and to vertically and horizontally bound 2001 Site Evaluation locations with elevated metal results. Because of the site history of burning activities at ECODs N-1, hexavalent chromium (Cr^{+6}) analyses were performed on the 2019 samples collected adjacent to the 2001 samples that showed elevated total chromium (Cr) levels at depth (2.4-3.0 m [8-10 ft]).

3.2 *ECODS N-1 Preliminary Screening*

Due to the robust data set from the 2001 Site Evaluation and 2019 pre-Work Plan characterization effort, screening was performed for ECODS N-1 by comparing the soil data to SRS soils background data and USEPA Regional Screening Levels (RSLs). A more detailed screening at this stage allowed for better identification of problems that may warrant action and potential data gaps.

Preliminary human health (HH) risk screening on ECODS N-1 was performed using the maximum detected concentration from the 0.0 - 0.3 m (0-1 ft) soil depth interval. The USEPA RSL table (dated May 2019) was used to obtain the thresholds for the default residential scenario used in the evaluation. Aluminum (Al), Sb, As, Cr, Fe, Pb, vanadium (V), and cyanide were identified as human health (HH) constituents of potential concern (COPCs) in surface soil. Maximum detected concentrations of As, Cr, and Pb exceeded the industrial worker RSLs at the ECODS N-1 subunit (Figures 4-6).

Preliminary principal threat source material (PTSM) screening was performed using the maximum detected concentration from the all depth soil intervals (0.0 - 0.3 m, 0.3 - 1.2 m, 2.4 - 3.0 m, 3.0 - 3.7 m and 5.5 to 6.1 m [0-1 ft, 1-4 ft, 8-10 ft, 10-12 ft and 18-20 ft]). The USEPA RSL table (dated May 2019) was used to obtain the thresholds for the default industrial worker scenario used in the evaluation. The data screening indicated that there is no PTSM (Hazard Index [HI] = 7.2, risk = 6.9E-06) at the ECODS N-1 subunit.

Preliminary ecological (ECO) risk screening was performed using the maximum detected concentration from the 0.0 - 0.3 m (0-1 ft) depth interval. The USEPA Region 4 Ecological Risk Assessment Supplemental Guidance (March 2018 update) and the Los Alamos National Laboratory (LANL) EcoRisk Database (2015) were used to obtain the no-effect screening levels used in data screening. Sb, Cr, copper (Cu), Pb, mercury (Hg), nickel (Ni), selenium (Se), V, bis(2-ethylhexyl)phthalate, cyanide, polychlorinated biphenyl (PCB) 1254 (PCB 1254) and PCB 1260 were identified as ECO COPCs for terrestrial receptors. Maximum detected concentrations of Cu, cyanide, Pb, Ni, V and bis(2-ethylhexyl)phthalate are greater than lowest observed adverse effects level (LOAEL) – based refinement screening values (RSVs) for ecological receptors (Figures 7-11).

The preliminary contaminant migration constituent of concern (CMCOC) screen by VZCOMML identified Cr^{+6} as a potential CMCOC at the ECODS N-1 subunit (Figures 12 and 13).

Problem(s) Warranting Action	Remedial Action Objectives	Scope of Problem(s)	Likely Response Actions
• As, Cr and Pb were detected in surface soil (0-1 ft) at levels that may exceed 1E-06 risk or HQ=1 for the industrial worker scenario.	• Prevent exposure of an industrial worker to As, Cr and Pb in surface soils at levels exceeding 1E-06 risk or HQ=1.	• The total surface area of the ECODS N-1 subunit is 1,605 m^2. The total volume of unit media (based on a 0- to 1-ft depth) is estimated to be 489 m^3.	• No Action • LUCs • Soil Cover/LUCs • Excavate and off-site disposal
• Cu, Pb, Ni, V, bis(2-ethylhexyl)phthalate, and cyanide were detected in surface soil that may exceed a HQ=1 for terrestrial ecological receptors.	• Prevent exposure to Cu, Pb, Ni, V, bis(2-ethylhexyl) phthalate and cyanide in surface soil at levels that may exceed the risk for ecological receptors.	• The total surface area of the ECODS N-1 subunit is 1,605 m^2. The total volume of unit media (based on a 0- to 1-ft depth) is estimated to be 489 m^3.	• No Action • Soil Cover/LUCs • Excavate and off-site disposal
• Cr^{+6} was detected in soils at levels that may leach to groundwater at levels that exceed the Tap Water RSL.	• Prevent migration of Cr^{+6} from soils to groundwater at levels that exceed the Tap Water RSL.	• Cr^{+6} was found at six locations outside the perimeter of the ECODS N-1 subunit at a maximum depth interval of 8-10 ft. The volume of contaminated soil (based on a depth of 3 m [10 ft]) is estimated to be 4,815 m^3.	• No Action • Soil Cap/LUCs • Excavate and off-site disposal

Uncertainties

- It is uncertain if As, Cr, and Pb detected in surface soil (0-1 ft) are present at levels that constitute a human health problem warranting action for the industrial worker. This uncertainty impacts the nature of the problems warranting action and will be managed by a human health risk assessment and weight of evidence evaluation to identify the refined constituents of concern (RCOCs).
- Due to the absence of asbestos characterization, it is uncertain if asbestos is present at ECODS N-1 that constitutes a HH problem warranting action. This uncertainty impacts the nature of the problems warranting action and will be managed by the remedial action selected for this subunit or additional investigation.
- It is uncertain if Cu, cyanide, Pb, Ni, V, or bis(2-ethylhexyl)phthalate are present in surface soil (0-1 ft) at levels that constitute an ecological problem warranting action for terrestrial receptors. This uncertainty impacts the nature of the problems warranting action and will be managed by an ecological risk assessment and weight of evidence evaluation to identify the RCOCs.
- It is uncertain if Cr^{+6} detected in soils is unit related. This uncertainty impacts the problems warranting action and likely response actions. This uncertainty will be managed by collecting additional soil samples within the ECODS N-1 subunit and at background locations; the samples will be analyzed for total Cr and Cr^{+6}.
- It is uncertain if Cr^{+6} detected in soils is present at levels that constitutes a contaminant migration problem warranting action. This uncertainty impacts the nature of the problems warranting action and likely response actions and will be managed by a contaminant migration analysis for the subsurface soils to identify potential CMCOCs.

4.0 SCRAP LUMBER PILE (631-2G) SUBUNIT

4.1 *Scrap Lumber Pile (631-2G) History and Background*

The Scrap Lumber Pile (631-2G) is located in the Fourmile Branch watershed in N-Area (Figure 1). The area was cleared in 1951 and used for equipment laydown and rubble storage in addition to an area for burning construction related material. Prior to 1951, the area was used as farmland (WSRC 2003). Since 1975, operating procedures called for the Scrap Lumber Pile (631-2G) to receive inert, nonhazardous materials including such materials as nails, hinges, scrap lumber, poles, crates, pallets, and unsalvageable wood products (WSRC 1998). Historically, the Scrap Lumber Pile (631-2G) was used to burn various unknown types and quantities of wood. These wood types may have included treated lumber and creosote-treated wood. Historical burning at the Scrap Lumber Pile (631-2G) resulted in ash that was placed directly into Central Shops Burning/Rubble Pits (631-1G and 631-3G), which were closed under a ROD in 2002 (WSRC 2002). Several debris piles within the Scrap Lumber Pile (631-2G) were located in the wooded areas near an intermittent stream. The debris piles were approximately 6-m (20-ft) in diameter at the base and 3-m (10-ft) high. Metal shavings and other debris were clearly evident in some piles under a thin cover of leaves. All of the debris (including construction debris, plastics, and metal shavings) was removed disposed of in a landfill or recycled. Active burning at the Scrap Lumber Pile (631-2G) ended in the mid-2000s. The Scrap Lumber Pile (631-2G) is currently covered by immature volunteer pine trees and provides marginal habitat quality for ecological receptors.

Prior to 1996, a surface water impoundment area was created to capture surface water run-off from the Scrap Lumber Pile (631-2G). Sediment and surface water samples were collected at four locations (CSBRP-45, CSBRP-46, CSBRP-47, and CSBRP-48) in the surface water impoundment area as part of the Central Shops Burning/Rubble Pit (631-1G and 631-1G) OU investigations in 1997 and re-sampled for metals in 1999. The ROD for the Central Shops Burning/Rubble Pit (631-1G and 631-3G) identified one refined COC (arsenic) in surface water and sediment associated with the surface water impoundment area. However, the Core Team agreed to address the surface water impoundment area with the Scrap Lumber Pile (631-2G) when the characterization efforts were initiated for the Scrap Lumber Pile (631-2G).

In 2019, a pre-Work Plan characterization effort collected soil samples at the Scrap Lumber Pile (631-2G) subunit at the surface (0- to 0.3-m [0- to 1-ft]), shallow subsurface (0.3- to 1.2-m [1- to 4-ft]), and deep subsurface (2.4- to 3-m [8- to 10-ft] soils at nineteen locations (Figure 14). Sample locations were selected in a 30.5 m (100 ft) grid pattern to cover the area of the Scrap Lumber Pile (631-2G) subunit. The soil samples were analyzed for the complete list of TAL and TCL constituents, as well as radiological indicator analyses.

4.2 *Scrap Lumber Pile (631-2G) Preliminary Screening*

The 1997 and 1999 Central Shops Burning Rubble Pit (631-1G and 631-3G) OU data indicated the surface water in the surface water impoundment area had arsenic levels above the MCL (10 µg/L). Sediment data in the surface water impoundment area was above SRS background maximum soil values for arsenic, gross alpha, metals and PAHs. Additional surface water and sediment samples will be collected by the OU Work Plan to further characterize the surface water impoundment area.

Due to the robust data set from the 2019 pre-Work Plan characterization effort, screening was performed for the Scrap Lumber Pile (631-2G) subunit by comparing the soil data to SRS soils background data, the USEPA RSLs (May 2019), and the USEPA Preliminary Remedial Goal (PRG) website (2019) for radionuclides. A more detailed screening at this stage allowed for better identification of problems that may warrant action and potential data gaps. No soil samples for the Scrap Lumber Pile (631-2G) subunit exceeded the nonvolatile beta trigger limit (50 pCi/g) for additional beta-emitting radionuclide analyses (i.e., maximum nonvolatile beta result was 16.5 pCi/g).

A preliminary HH risk screening for the Scrap Lumber Pile (631-2G) subunit was performed using the maximum detected concentration from the 0-1 ft depth interval. The USEPA RSL table (dated May 2019) was used to obtain the thresholds for the default residential scenario used in the evaluation. As, Cr, Co, Fe, manganese (Mn), V, and benzo(a)pyrene were identified as HH COPCs in surface soil. The maximum detected concentrations of As and Cr are greater than industrial worker RSLs (Figures 15 and 16). Total Cr in surface soils exceeded the industrial worker RSL (6,300 µg/kg) but did not exceed the SRS maximum background value (33,700 µg/kg).

Preliminary PTSM screening for the Scrap Lumber Pile (631-2G) subunit was performed using the maximum detected concentration from all soil depth intervals (0-1 ft, 1-4 ft, 8-10 ft). The USEPA RSL table (dated May 2019) and USEPA PRG website (2019) were used to obtain the thresholds for the default industrial worker scenario used in the evaluation. The data screening indicated that there is no PTSM (HI = 0.6, risk = 1.9E-04) at the Scrap Lumber Pile (631-2G) subunit.

A preliminary ECO risk screening was performed using the maximum detected concentration from the 0-1 ft depth interval. The USEPA Region 4 Ecological Risk Assessment Supplemental Guidance (March 2018 update) and the LANL EcoRisk Database (2015) were used to obtain the no-effect screening levels used in data screening. As, Cr, Cu, Pb, Mn, Ni, Se, V, zinc (Zn), anthracene, benzo(g,h,i)perylene, benzo(a)pyrene, benzo(k)fluoranthene, bis(2-ethhylhexyl phthalate) and di-n-butyl phthalate were identified as ECO COPCs for terrestrial receptors. Maximum detected concentrations of Cu, Se, V and bis(2-ethylhexyl)phthalate are greater than LOAEL – based RSVs for terrestrial receptors (Figures 17-19). Although there were sediment and surface water exceedances for ecological receptors within the surface water impoundment area, toxicity tests conducted in 1999 concluded that there were no ECO COCs to support the Central Shops Burning Rubble Pit (631-1G and 631-3G) ROD (WSRC 2002).

A contaminant migration analysis for the Scrap Lumber Pile (631-2G) soil has not been conducted. Therefore, metals may be present at levels that migrate to groundwater at concentrations that exceed an MCL or EPA RSL. Cr^{+6} in the Scrap Lumber Pile (631-2G) surface water impoundment area sediments (0.0-0.3 m [0-1 ft]) did not exceed the industrial worker RSL (6,300 µg/kg), but Cr^{+6} may be present at levels that may migrate to groundwater at concentrations that exceed an RSL (Figure 20).

Problem(s) Warranting Action	Remedial Action Objectives	Scope of Problem(s)	Likely Response Actions
• As and Cr were detected in surface soil (0-1 ft) at levels that may exceed 1E-06 risk for the industrial worker scenario.	• Prevent exposure of an industrial worker to As and Cr in surface soils at levels exceeding 1E-06 risk.	• The total surface area of the Scrap Lumber Pile (631-2G) subunit is 8,354 m^2. The total volume of contaminated surface soil (based on a 0.00 - 0.30 m [0-1 ft] depth) is estimated to be 2,547 m^3.	• No Action • Land Use Controls (LUCs) • Soil Cover/LUCs • Excavate and off-site disposal
• Cu, Se, V and bis(2-ethylhexl phthalate) were detected in surface soil (0-1 ft) at levels that may exceed HQ = 1 for terrestrial ecological receptors.	• Prevent exposure to Cu, Se, V, bis(2-ethylhexyl) phthalate in surface soil at levels that may exceed the risk for ecological receptors.	• The total surface area of the Scrap Lumber Pile (631-2G) subunit is 8,354 m^2. The total volume of contaminated surface soil (based on a 0.00 - 0.305 m [0-1 ft] depth) is estimated to be 2,547 m^3.	• No Action • Soil Cover/LUCs • Excavate and off-site disposal
• Metals may be present in soils at levels that may leach to groundwater above their respective MCLs.	• Prevent migration of metals from soils to groundwater at levels that exceed the MCL.	• The total surface area of the Scrap Lumber Pile (631-2G) subunit is 8,354 m^2. The total volume of contaminated surface soil (based on a 3 m [10 ft] depth) is estimated to be 25,062 m^3.	• No Action • Soil Cap/LUCs • Excavate and off-site disposal

Uncertainties

- It is uncertain if As and Cr were detected in surface soil (0-1 ft) at levels that constitute a human health problem warranting action for the industrial worker. This uncertainty impacts the nature of the problems warranting action and will be managed by a human health risk assessment and weight of evidence evaluation to identify the RCOCs.
- It is uncertain if Cu, Se, V and bis(2-ethylhexyl)phthalate are present in surface soil (0-1 ft) at levels that constitute an ecological problem warranting action for terrestrial receptors. This uncertainty impacts the nature of the problems warranting action and will be managed by an ecological risk assessment and weight of evidence evaluation to identify the RCOCs.
- It is uncertain if metals are present in soils at levels that constitute a contaminant migration problem warranting action. This uncertainty impacts the nature of the problems warranting action and likely response actions and will be managed by a contaminant migration analysis for the subsurface soils to identify potential CMCOCs.
- It is uncertain if Cr^{+6} detected in soils is unit related. This uncertainty impacts the problems warranting action and likely response actions. This uncertainty will be managed by collecting soil samples within the Scrap Lumber Pile (631-2G) and at the CSBRP (631-1G and 631-3G) background locations; the samples will be analyzed for total Cr and Cr^{+6}.
- It is uncertain if contaminants are present in the surface water impoundment area at levels that exceed HH, ECO, and/or MCL standards. This uncertainty impacts the problems warranting action and likely response actions. This uncertainty will be managed by collecting sediment and surface water samples within the surface water impoundment area; the samples will be analyzed for full suite TAL (including Cr^{+6}), TCL, and radiological indicators.

5.0 FORD BUILDING (690-N) SUBUNIT

5.1 *Ford Building (690-N) History and Background*

The Ford Building (690-N) is located within the N-Area facility boundary in the Pen Branch watershed (Figure 1). The Ford Building (690-N) is a one-story metal frame structure on a concrete pad, covering ~900 square meters (m^2) (9,700 square ft [ft^2]). The building was constructed in the 1950s for testing of Ford Company manufactured motor control packages for control rod drive mechanisms prior to their installation in the SRS reactors. The primary area of the building consisted of a machine shop with offices, storage rooms, restrooms, and a service area. During the early 1960s, the SRS reactors were operating at higher power levels and failure of heat exchangers prompted conversion of this facility from a testing facility to heat exchanger repair/rework. A sealed shell was installed inside the original building frame with a ventilation and High Efficiency Particulate Air (HEPA) filter system in order to maintain a slight negative pressure to serve as a repair shop for the leaking contaminated process water heat exchangers from SRS reactors. This mission continued until the early 1970s with the procurement of new heat exchangers for the SRS reactors. In the 1980s, the Ford Building (690-N) housed construction crews that performed minor repairs and to store miscellaneous equipment and supplies. During the early 1990s, the K-Reactor had a minor leak in a heat exchanger that resulted in reactivating the Ford Building (690-N) repair work. The facility operated for about six months and was closed. The Ford Building (690-N) was then utilized to store excess equipment (in waste containers [e.g., Sealands] and/or bagged/wrapped in plastic) that was chemically and/or radiologically contaminated. Services and utilities to the facility included domestic water, fire water, electrical power, sanitary sewer and process sewer (SRNS 2009).

The repair work that occurred in the Ford Building (690-N) generated wastewater contaminated with low levels of radioactivity and trace quantities of non-radioactive organic and inorganic compounds. Workers sent the wastewater to a 22,712.5 liter (6,000 gallon) underground retention tank adjacent to the Ford Building (690-N) where the wastewater was analyzed for radionuclides. Depending on the results, the wastewater was either released to the Ford Building Seepage Basin (904-91G) through an underground process sewer pipeline or transferred to other SRS operations for proper disposal (SRNS 2009). The process sewer pipeline and underground retention tank were removed in 1998 (WSRC 2001a).

In 2019, representatives from the Department of Energy, USEPA, and South Carolina Department of Health and Environmental Control reached agreement that the Ford Building (690-N), excluding the building slab, would undergo D&D using the Integrated Sampling Model (SRNS 2009). Post-decommissioning facility remnants (including the building slab) will be closed as part of the ECODS N-1 (NBN), Central Scraps Lumber Pile (631-2G), and Building 690-N, Process Heat Exchanger Repair Facility (aka Ford Building) OU. Ancillary equipment and other areas that will also be included in the Ford Building (690-N) subunit are the remnants of 1) 13.8 kV Substation (652-44N), located north of 690-N, 2) a Fuel Oil Tank Containment Dike, located south of 690-N, 3) shielding remnant area, located southwest of 690-N, and 4) the Excess Equipment Yard (745-N), located north of Ford Building (690-N).

The Excess Equipment Yard (745-N) is located north of the Ford Building (690-N) and was originally constructed in 1958 as part of a temporary metal (hangar style) building for storage of clean equipment (Figure 21). The building was demolished, and the remaining concrete pad was utilized to store reactor process heat exchangers in the early 1960s that were either awaiting repair or had been repaired (SRNS 2013b). The Excess Equipment Yard (745-N) included storage of 49 reactor heat exchangers, a Handi-House entry point, a contaminated Model 845- DLS filter/transport trailer, and a deionizer trailer. The associated equipment excluding the deionizer trailer has since been removed from N-Area (SRNS 2013a). The deionizer trailer is currently located southwest of the Ford Building (690-N) and is planned to be dispositioned as a portable equipment item separate from this subunit. The Excess Equipment Yard (745-N) concrete pad was removed in 2015 (SRNS 2015), the SRS Radiological Controls department conducted a soil survey and determined the soil was below the limits for a soil contamination area (SCA), and then the area was sodded in 2015. However, the entire area containing the Ford Building (690-N) and its remnants is considered an underground radioactive materials area (URMA). The 745-N Excess Equipment Yard (745-N) currently contains no equipment and the area is a grassy field.

In 2014, concrete samples were collected inside the Ford Building (690-N) at 21 locations at two intervals (0.00 – 15.24 cm [0 – 6 inches {in}] and 15.24 – 30.48 cm [6 – 12 in]). Soil samples were collected at the same 21 locations beneath the concreate slab at two soil intervals (0.00 – 15.24 cm [0 – 6 in] and 15.24 – 30.48 cm [6 – 12 in]) (Figure 22). All concrete and soil samples were analyzed for the following constituents: Toxicity Characteristic Leaching Procedure (TCLP) RCRA metals, volatile organic compounds (VOCs), semi-VOCs (SVOCs), PCBs, gross alpha, nonvolatile beta, tritium, and inorganic anions (bromide, chloride, fluoride, nitrate, nitrites, orthophosphate and sulfate). Additionally, some samples were analyzed for alpha spectroscopy radionuclides (Am, Cm, Np, Pu and U), gamma spectroscopy radionuclides, and beta-emitting specific radionuclides (C-14, Ni-59, Ni-63, Pu-241, Se-79, Sr-90, Tc-99). These data were analyzed at approved labs and standard methods, though the data were not validated. The concrete and soils data were used to evaluate contaminant migration risk and a human health risk screening evaluation for the Ford Building (690-N) concrete slab and underlying soils in support of the D&D strategy for the facility (SRNS 2019a). Following removal of the Ford Building (690-N) under the D&D program, an engineered concrete cap will be installed over the entire concrete slab area extending out 0.305 m (1 ft) from the building edge (SRNS 2019b). The 2014 concrete and soil data will be used in the contaminant migration analysis for the remaining Ford Building (690-N) slab and soils and documented in the OU RFI/RI/BRA.

As part of the 2019 pre-Work Plan characterization effort, soil samples were taken at the surface (0- to 0.3-m [0- to 1-ft]), shallow subsurface (0.3- to 1.2-m [1- to 4-ft]), and deeper subsurface locations (2.4- to 3-m [8- to 10-ft], 5.5- to 6.1-m [18- to 20-ft], and 8.5- to 9.0-m [28- to 30-ft]) around the Ford Building (690-N) subunit (Figure 21):

- At the Excess Equipment Yard (745-N), eleven locations in a 10-m to 15-m (30-ft to 50-ft) grid pattern to cover the area and at one deeper subsurface location (2.4- to 3-m [8- to 10-ft], 5.5- to 6.1-m [18- to 20-ft], and 8.5- to 9.0-m [28- to 30-ft]) soil samples;
- At the Ford Building (690-N), sixteen locations around the exterior of the Ford Building (690-N), the 13.8 kV Substation, and the Fuel Oil Tank Containment Dike using a biased sampling plan for areas of suspected contamination. Surface (0- to 0.3-m [0- to 1-ft]) soil and shallow subsurface (0.3- to 1.2-m [1- to 4-ft]) soil samples were collected at all sixteen locations;

- At the Ford Building (690-N), three of the sixteen locations soil samples were also collected at 2.4- to 3-m [8- to 10-ft], 5.5- to 6.1-m [18- to 20-ft], and 8.5- to 9.0-m [28- to 30-ft] depth intervals;
- Eleven sample locations around the shielding remnant area using a biased sampling plan for areas of suspected contamination; a deeper subsurface at one location (2.4- to 3-m [8- to 10-ft], 5.5- to 6.1-m [18- to 20-ft], and 8.5- to 9.0-m [28- to 30-ft]) soil samples were collected.

All samples collected as part of the 2019 pre-Work Plan characterization effort were analyzed for the complete list of TAL constituents, TCL organic compounds, polychlorinated biphenyls (PCBs), and the radiological indicator parameters (gross alpha and nonvolatile beta) analyses.

5.2 *Ford Building (690-N) Preliminary Screening*

The human health risk screening evaluation for the Ford Building (690-N) concrete slab and underlying soils in support of the D&D strategy identified concrete with PCBs (PCB 1254 max in concrete = 15 milligrams per kilogram [mg/kg]) and cesium-137 (Cs-137) (max in concrete = 1.75 pCi/g) at levels that warrant concern with respect to human health (SRNS 2019a). Cs-137 was not detected in the underlying soil samples and the maximum PCB result was an estimated ("J" qualified) value of 0.025 mg/kg for PCB 1254. No CMCOCs were identified as part of the evaluation for the Ford Building (690-N) concrete slab and underlying soils in support of the D&D strategy, but the TCLP RCRA metals were not evaluated for CM risk in that report.

Due to the robust data set from the 2019 pre-Work Plan characterization effort, screening was performed for the Ford Building (690-N) subunit (including the 13.8 kV Substation [652-44N], Fuel Oil Tank Containment Dike, shielding remnant area, and the Excess Equipment Yard [745-N]) by comparing the soil data to SRS soils background data, the USEPA RSLs (May 2019), and the USEPA Preliminary Remedial Goal (PRG) website (2019) for radionuclides. A more detailed screening at this stage allowed for better identification of problems that may warrant action and potential data gaps. No soil samples collected as part of the 2019 pre-Work Plan characterization effort exceeded the nonvolatile beta trigger limit (50 pCi/g) for additional beta-emitting radionuclide analyses (Figure 23). However, ten of the samples were selected for gamma spectroscopy analyses because the maximum nonvolatile beta result was 48.0 pCi/g and the presence of Cs-137 in soils is possible based on the results of the 2014 concrete sample data from inside the Ford Building (690-N). The maximum Cs-137 concentration in surface soil for the 2019 gamma spectroscopy analyses is 0.153 pCi/g (Figure 24), and all the deeper interval soil samples were below detection for Cs-137.

Preliminary HH risk screening was performed using the maximum detected concentration from the 0-1 ft depth interval. The USEPA RSL table (dated May 2019) and USEPA PRG website (2019) were used to obtain the thresholds for the default residential scenario used in the evaluation. Al, As, Cr, Co, Fe, Mn, Tl, V, and uranium-238 (U-238) were identified as HH COPCs in surface soil. Maximum detected concentrations of As, Cr, Tl and U-238 in surface soil are greater than industrial worker RSLs/PRGs for the Ford Building (690-N) subunit (Figures 25-28).

Preliminary PTSM screening was performed using the maximum detected concentration from all depth intervals (0-1 ft, 1-4 ft, 8-10 ft, 18-20 ft, 28-30 ft). The USEPA RSL table (dated May 2019) and USEPA PRG website (2019) were used to obtain the thresholds for the default industrial worker scenario used in the evaluation. The data screening indicated that there is no PTSM (HI = 5.2, risk = 3.9E-04) at this subunit.

Preliminary ECO risk screening was performed using the maximum detected concentration from the 0-1 ft depth interval. The USEPA Region 4 Ecological Risk Assessment Supplemental Guidance (March 2018 update) and the LANL EcoRisk Database (2015) were used to obtain the no-effect screening levels used in data screening. As, beryllium (Be), Cr, Cu, Pb, Mn, Hg, Se, Tl, V, Zn, cumene, benzo(g,h,i)perylene, bis(2-ethhylhexyl phthalate) di-n-butyl phthalate, PCB 1254, and PCB 1260 were identified as ECO COPCs for terrestrial receptors. Maximum detected concentrations of Hg, Se, Tl and V are greater than LOAEL – based RSVs for ecological receptors (Figures 29-33).

Metals may be present at the 745-N Excess Equipment Yard and shielding remnant area soil at levels that may migrate to groundwater at concentrations that exceed an MCL or EPA RSL. Preliminary CMCOC screen by VZCOMML for metals in the Ford Building concrete slab and underlying soil identified no CMCOCs based on extrapolated slab concentrations from TCLP data and travel times in excess of 1000 years.

Problem(s) Warranting Action	Remedial Action Objectives	Scope of Problem(s)	Likely Response Actions
• As, Cr, Tl and U-238 were detected in surface soil (0-1 ft) at levels that may exceed 1E-06 risk or HQ =1 for the industrial worker scenario.	• Prevent exposure of an industrial worker to As, Cr, Tl and U-238 in surface soils at levels exceeding 1E-06 risk.	• The total surface area of the Ford Building (690-N) subunit is 9,055 m^2. The total volume of contaminated surface soil (based on a 0.00- to 0.305-m [0- to 1-ft] depth) is estimated to be 2,762 m^3.	• No Action • LUCs • Soil Cover/LUCs • Excavate and off-SRS disposal
• Hg, Se, Tl, and V were detected in surface soil (0-1 ft) at levels that may exceed HQ =1 for terrestrial ecological receptors.	• Prevent exposure to Hg, Se, Tl, and V in surface soil at levels that may exceed the risk for ecological receptors.	• The total surface area of the Ford Building (690-N) subunit is 9,055 m^2. The total volume of contaminated surface soil (based on a 0.00– to 0.305-m [0- to 1-ft] depth) is estimated to be 2,762 m^3.	• No Action • Soil Cover/LUCs • Excavate and off-site disposal
• Metals were detected in soils at levels that may leach to groundwater above their respective MCLs.	• Prevent migration of metals from soils to groundwater at levels that exceed the MCL.	• The total surface area of the Ford Building (690-N) subunit is 8,354 m2. The total volume of contaminated surface soil (based on a 3-m [10-ft] depth) is estimated to be 25,062 m^3.	• No Action • Soil Cap/LUCs • Excavate and off-SRS disposal
Uncertainties			
• It is uncertain if As, Cr, Tl and U-238 in surface soil (0-1 ft) are present at levels that constitute a human health problem warranting action. This uncertainty impacts the nature of the problems warranting action and will be managed by a human health risk assessment and weight of evidence evaluation to identify the refined constituents of concern. • It is uncertain if Hg, Se, Tl, and V are present in surface soil (0-1 ft) at levels that constitute an ecological problem warranting action for terrestrial receptors. This uncertainty impacts the nature of the problems warranting action and will be managed by an ecological risk assessment and weight of evidence evaluation to identify the RCOCs. • It is uncertain if metals are present in soils at levels that constitute a contaminant migration problem warranting action. This uncertainty impacts the nature of the problems warranting action and likely response actions and will be managed by a contaminant migration analysis for the subsurface soils to identify potential CMCOCs.			

6.0 OPERABLE UNIT STRATEGY

The 2001 Site Evaluation data for the ECODS N-1 will be augmented with the 2019 pre-Work Plan characterization data. Additional data needs include TAL metals analyses (including Cr^{+6}) of surface soil samples (0.0-0.3 m [0-1 ft]), and subsurface soil samples (0.3-1.2 m [1-4 ft], 2.4-3.0 [8-10 ft] and 3.0-3.6 m [10-12 ft]) at three locations inside the subunit and at three background locations (Table 1 and Figure 34). These additional samples are needed to determine if the elevated metal results, including Cr^{+6} results, are representative of native soil or related to unit operations. At other SRS ECODS, the operable unit strategy has been based in part on known or suspected asbestos in the disposed materials. The Core Team recognizes that an asbestos investigation may be necessary to support the final risk management decision for ECODS N-1.

The 2019 pre-Work Plan characterization data will be used to evaluate the Scrap Lumber Pile (631-2G). Additional data needs include surface soil (0.0-0.3 m [0-1 ft]), subsurface soil (0.3-1.2 m [1-4 ft], 2.4-3.0 [8-10 ft] and 3.0-3.6 m [10-12 ft]) at 4 locations within the former operations area (i.e., within the site boundary excluding the surface impoundment area) and 3 background locations (Table 1 and Figure 35). Soil samples will be analyzed for metals and Cr^{+6}. These samples are needed to determine if metals and/or Cr^{+6} are contaminant migration risk at the Scrap Lumber Pile (631-2G) subunit.

For evaluation of the Scrap Lumber Pile (631-2G) surface water impoundment area, new surface water and sediment samples will supersede the 1997 and 1999 characterization data. The new sampling will include sediment and surface water samples at four locations; samples will be analyzed for full suite TAL (including Cr^{+6}), TCL, and radiological indicator analyses at two intervals (0.0-0.3 m [0-1 ft] and 0.3-1.2 m [1-4 ft]) (Table 1 and Figure 35). Sediment and surface water samples will also need to be collected at three background locations in an unimpacted Carolina Bay; these samples will be analyzed for TCL, TAL analyses, including Cr^{+6}, and radiological indicators (Table 1 and Figure 36). These samples and analyses are required to determine current conditions, potential

COCs within the surface water impoundment area, and to determine if elevated metal (e.g., Cr^{+6}) results are due to native soil conditions or related to unit operations.

The 2014 Ford Building (690-N) concrete and soil data will be used to evaluate contaminant migration from the Ford Building (690-N) slab and underlying soil. The Ford Building (690-N) D&D is anticipated to be completed by September 1, 2020, with radiological screening around the building to verify no contamination occurred outside the building during the D&D process. If contamination is observed following D&D activities, additional surface (0.0- to 0.3-m [0- to 1-ft]) soil samples around the building may be required (Table 1).

The RFI/RI Workplan for the ECODS N-1, Scrap Lumber Pile (631-2G), and the Ford Building (690-N) OU, including the SAP for the additional characterization required at the subunits, will be submitted by February 14, 2020.

7.0 REFERENCES

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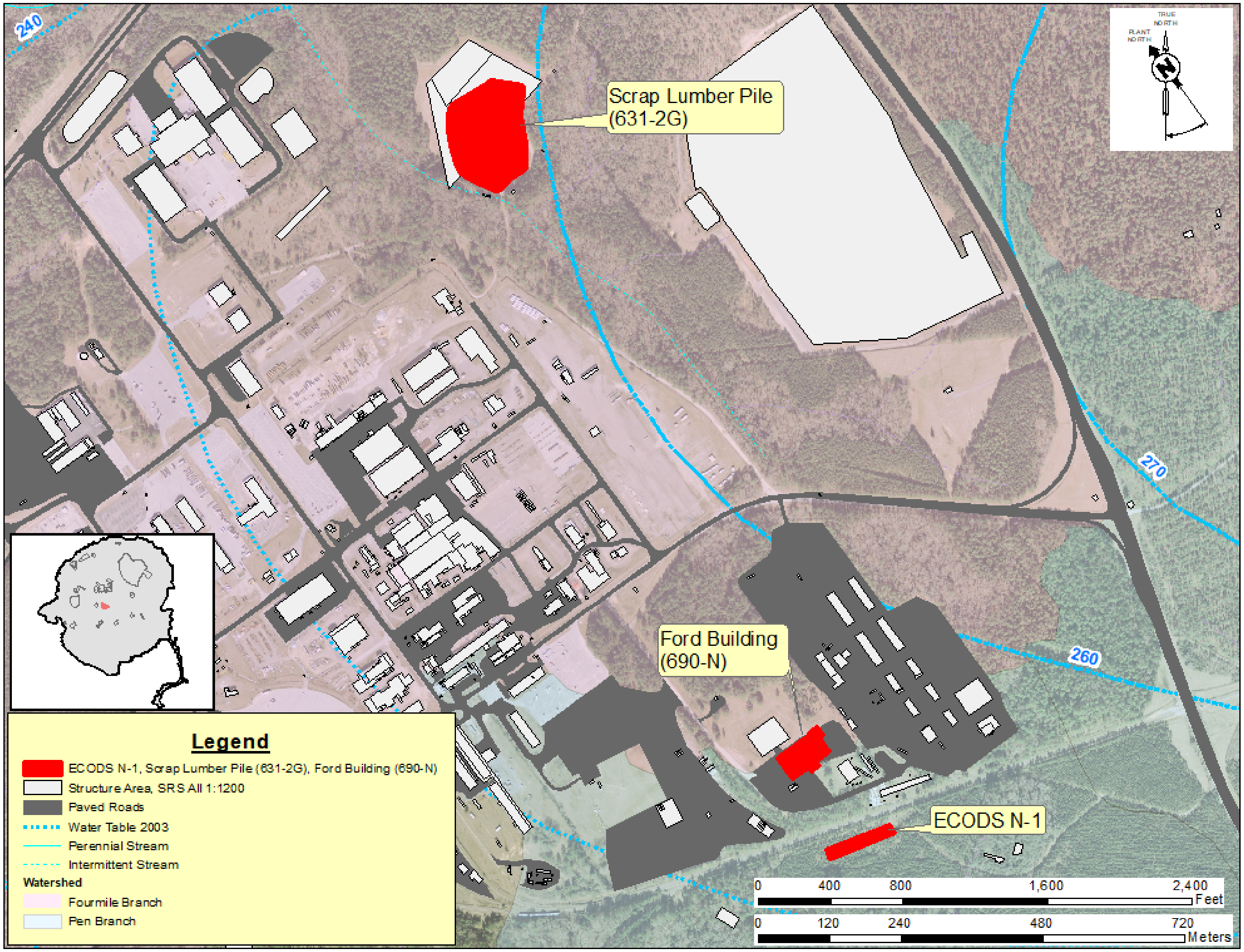


Figure 1. Location of the ECODS N-1, Scrap Lumber Pile (631-2G) and the Ford Building (690-N)

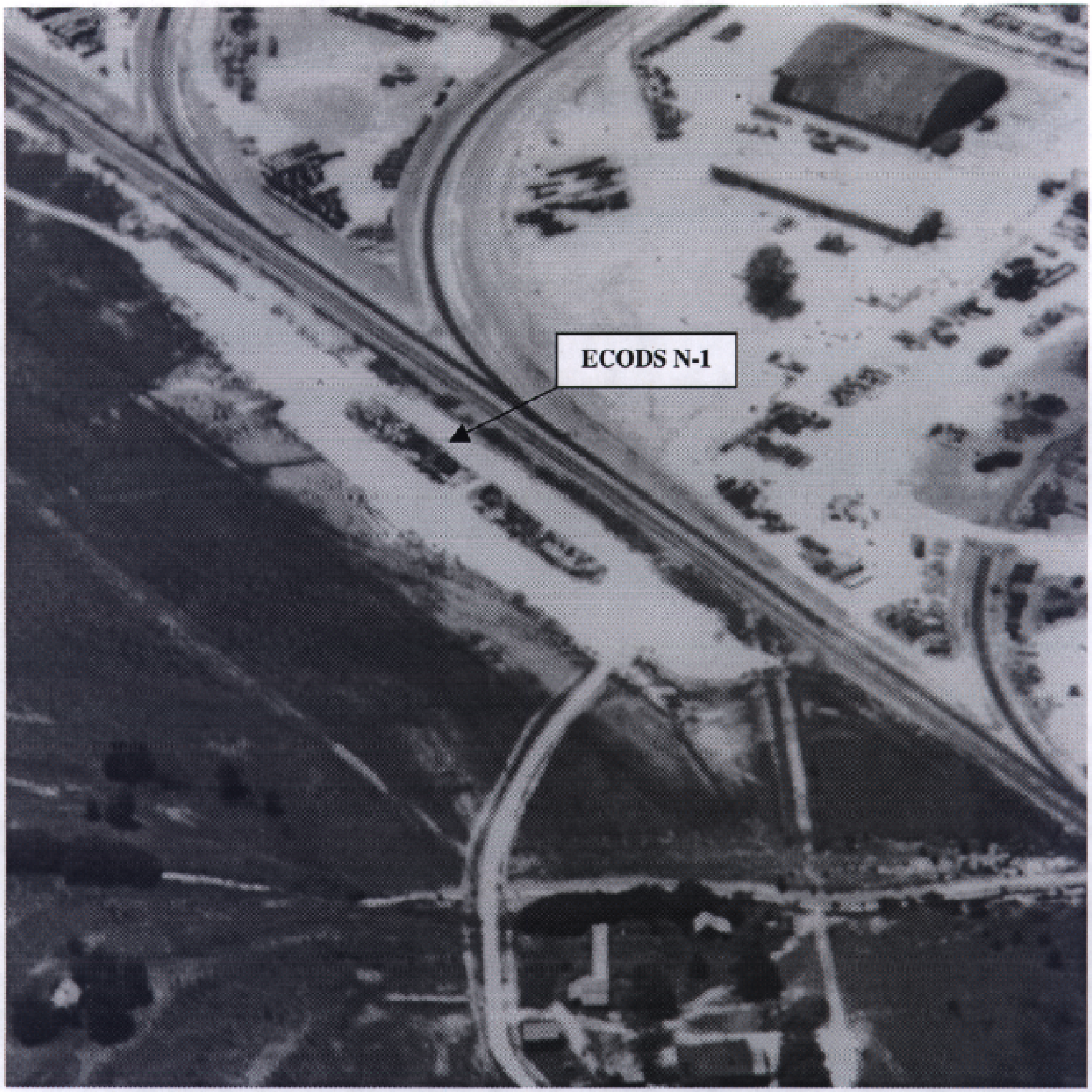


Figure 2. 1953 Photo of ECODS N-1 in Use

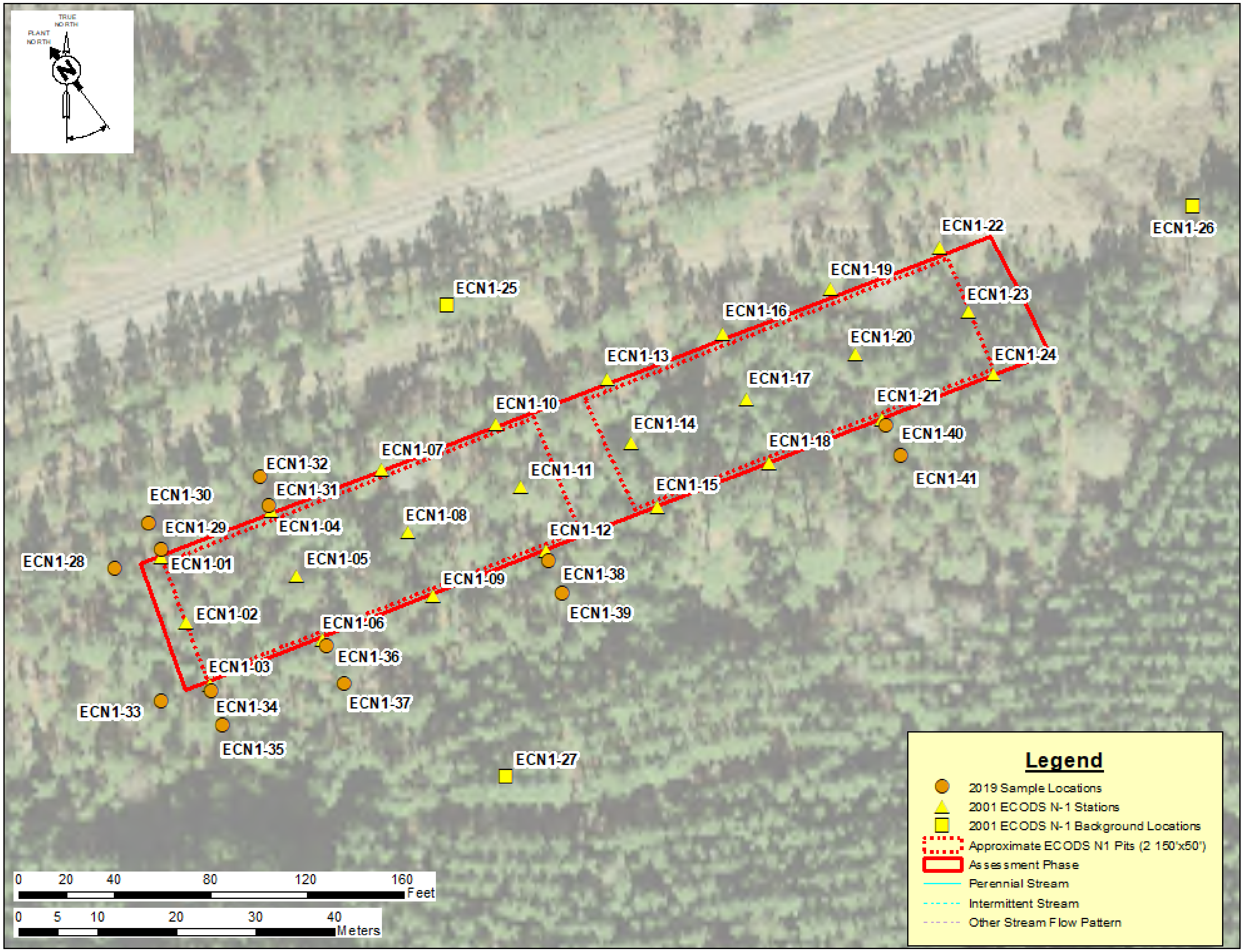


Figure 3. ECODS N-1 with 2001 Site Evaluation and 2019 Characterization Sample Locations

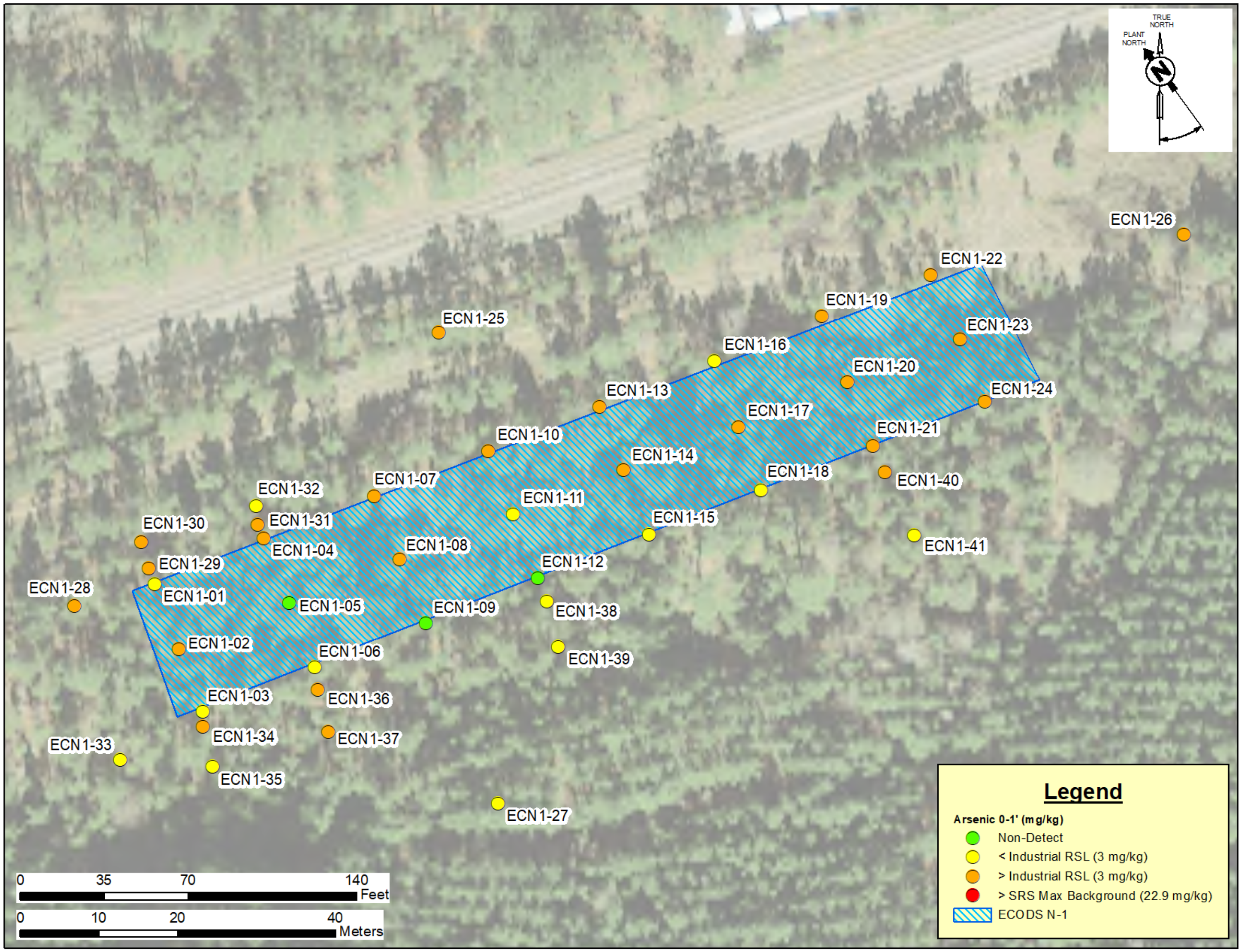


Figure 4. ECODS N-1 Arsenic Results (>RSL) Surface Soil (0-1 ft)

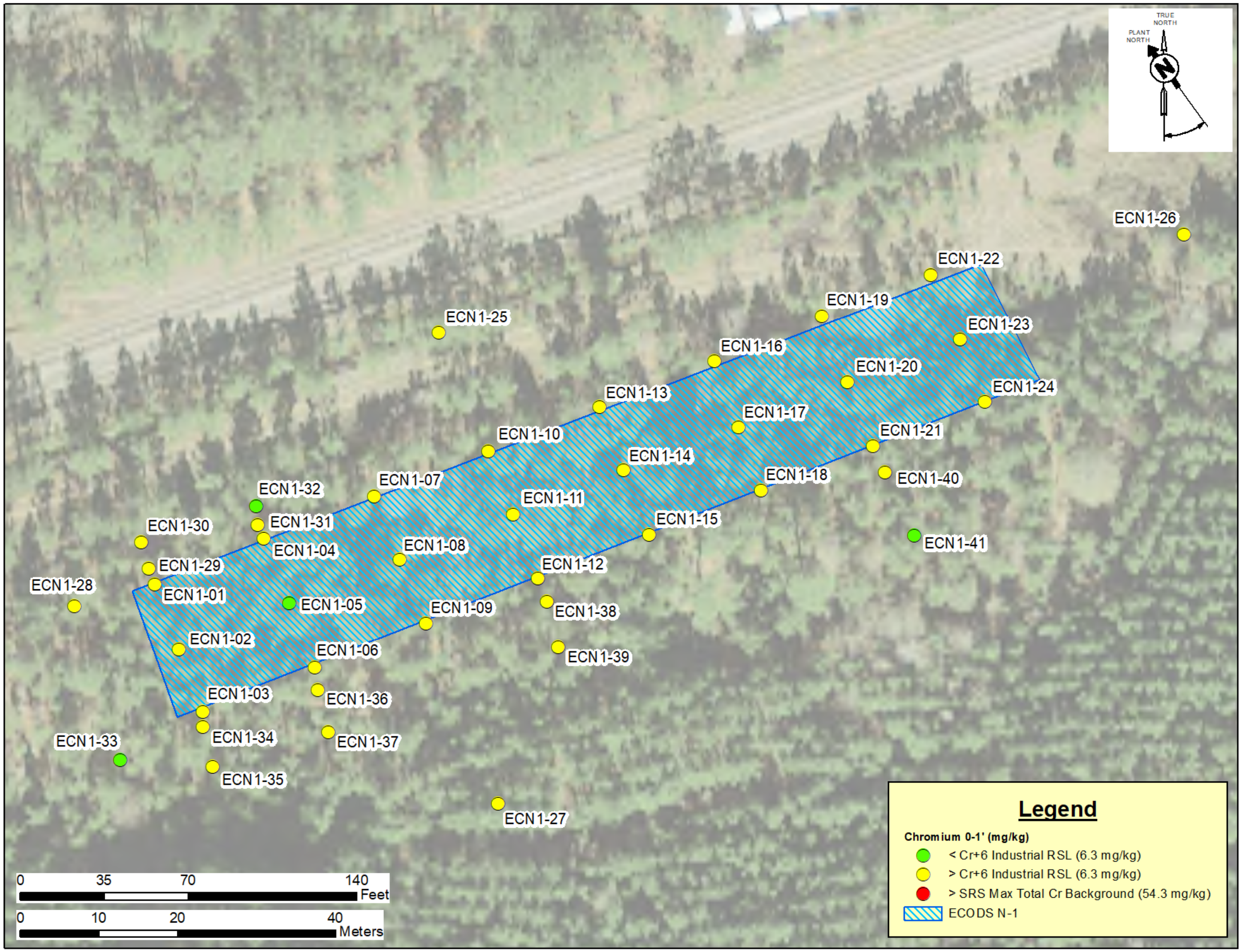


Figure 5. ECODS N-1 Total Cr Results (>RSL) Surface Soil (0-1 ft)

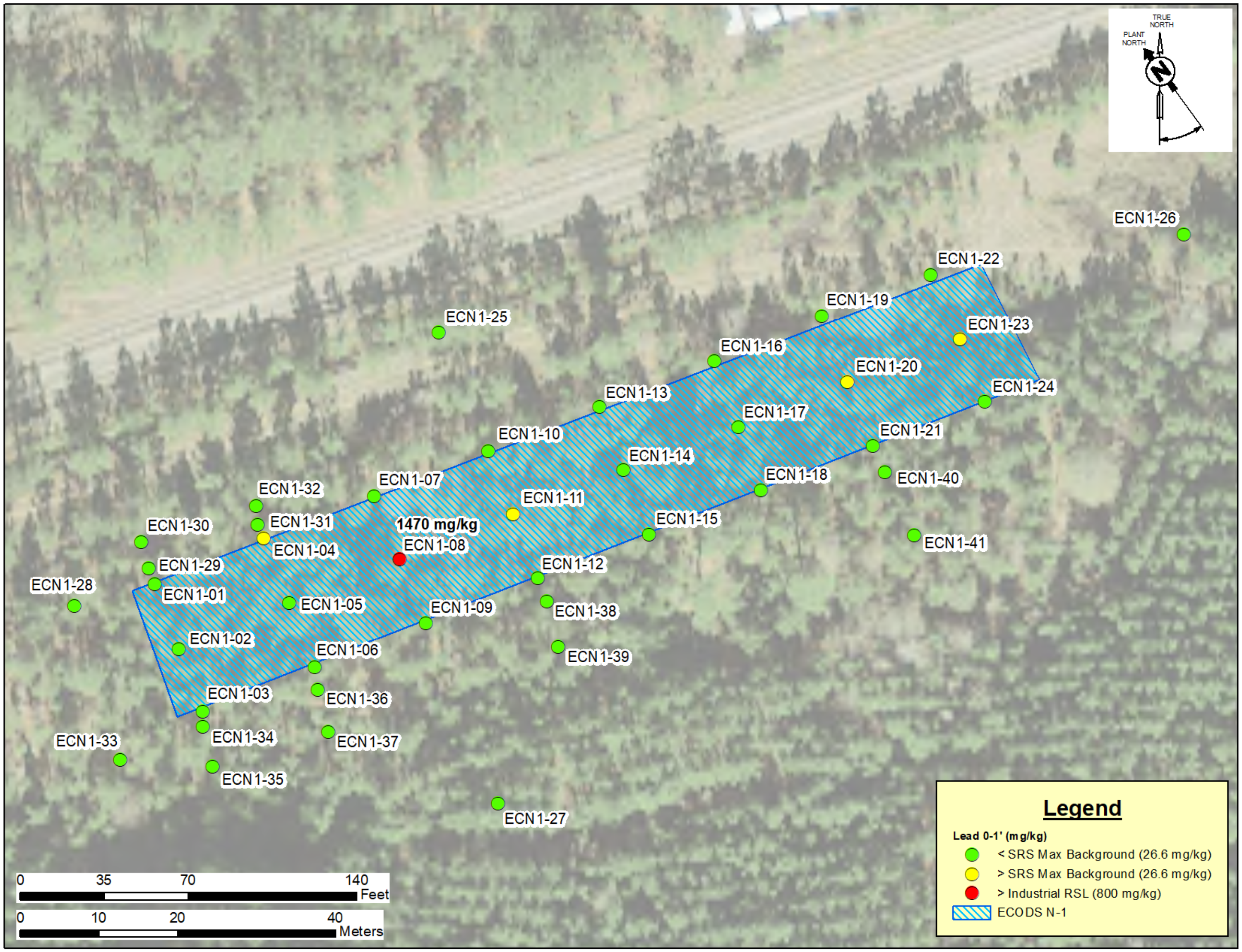


Figure 6. ECODS N-1 Pb Results (>RSL) Surface Soil (0-1 ft)

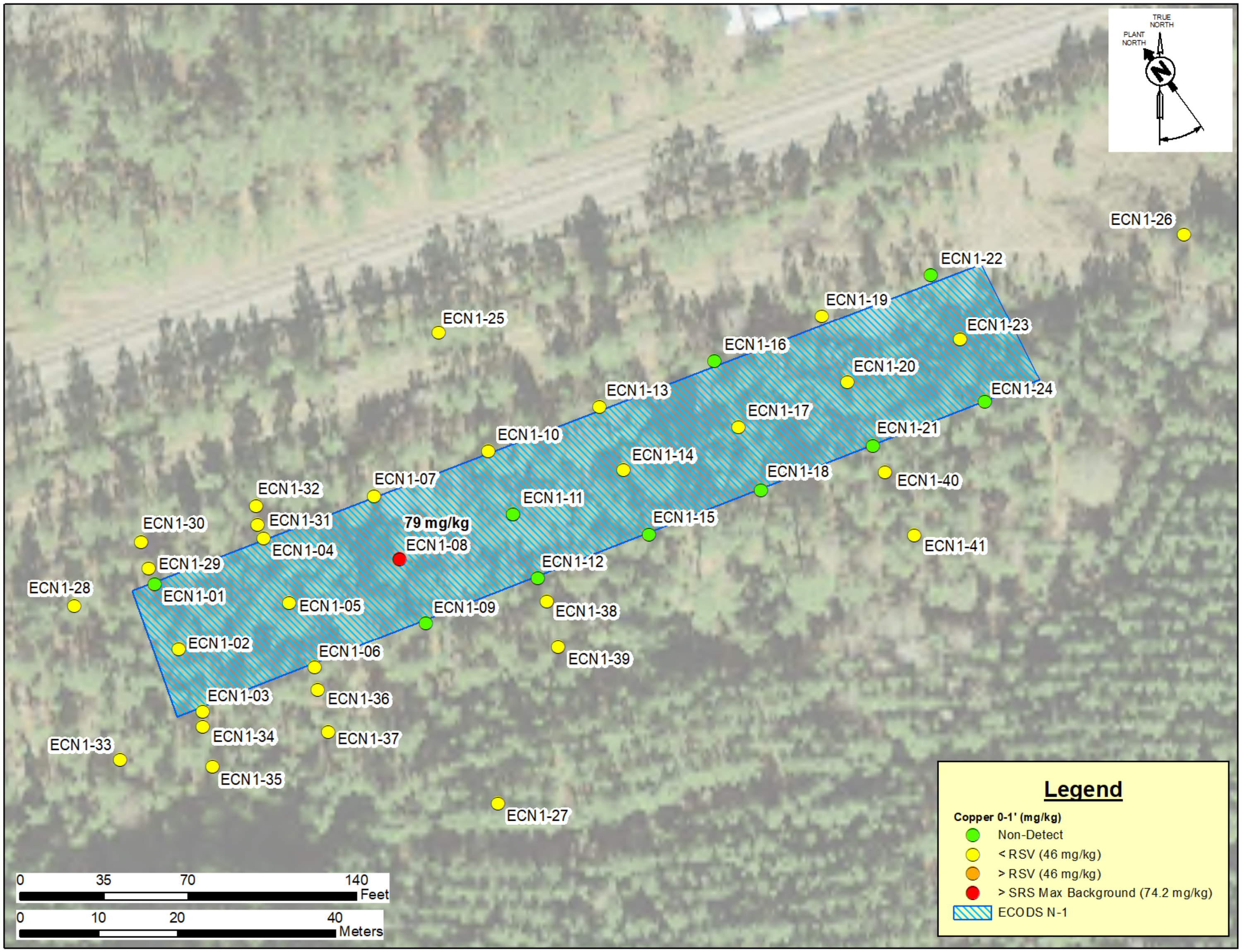


Figure 7. ECODS N-1 Cu Results (>RSV) Surface Soil (0-1 ft)

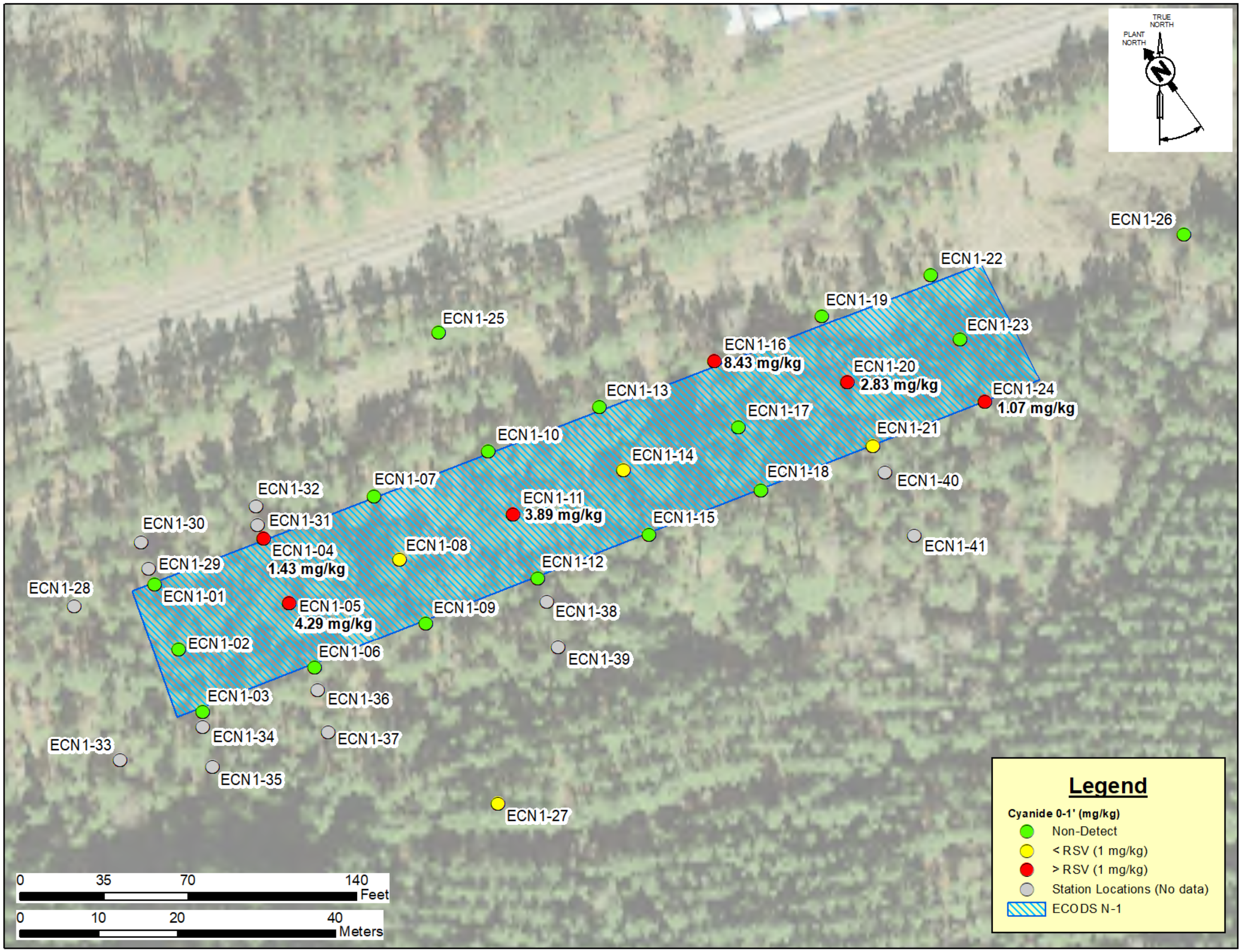


Figure 8. ECODS N-1 Cyanide Results (>RSV) Surface Soil (0-1 ft)

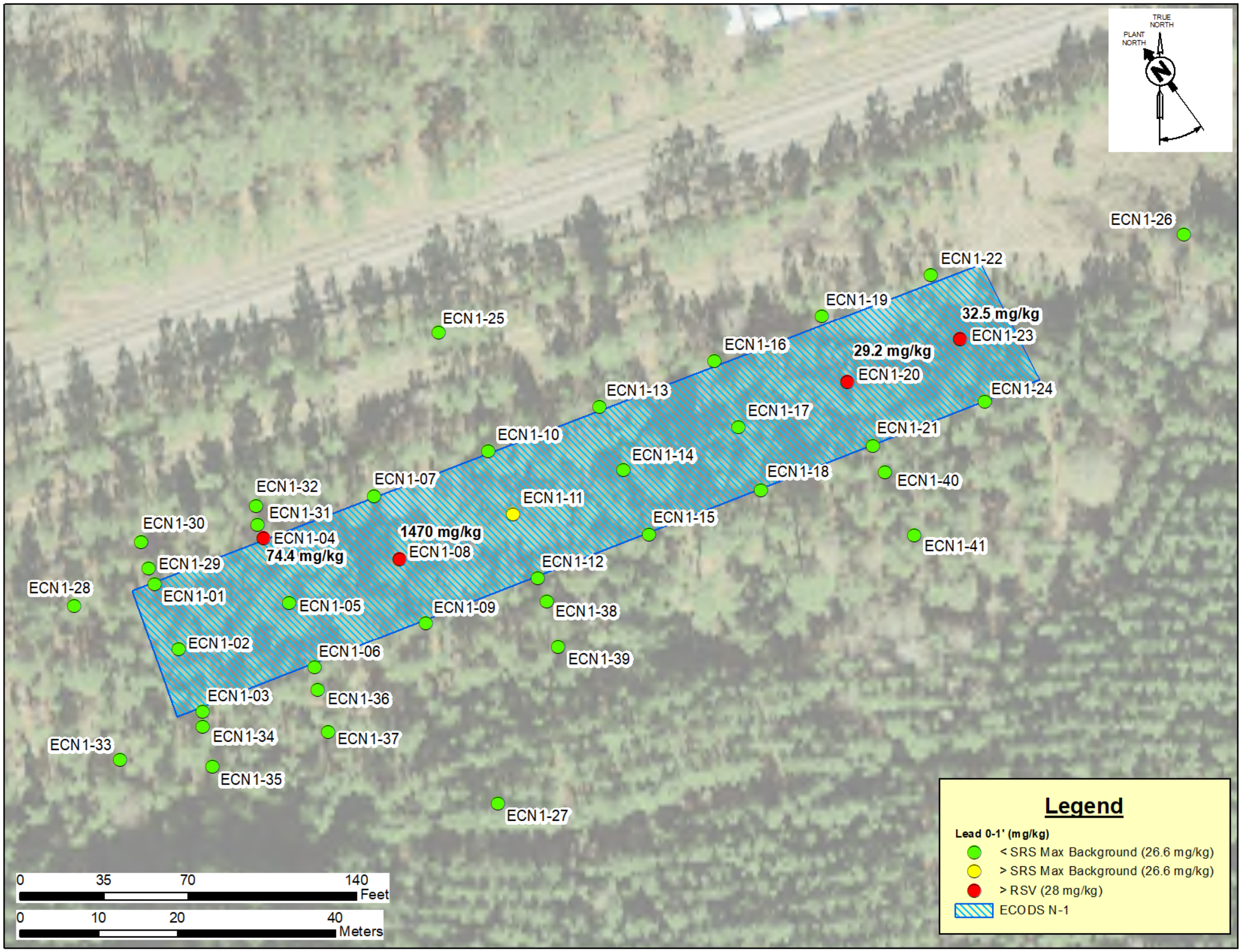


Figure 9. ECODS N-1 Pb Results (>RSV) Surface Soil (0-1 ft)

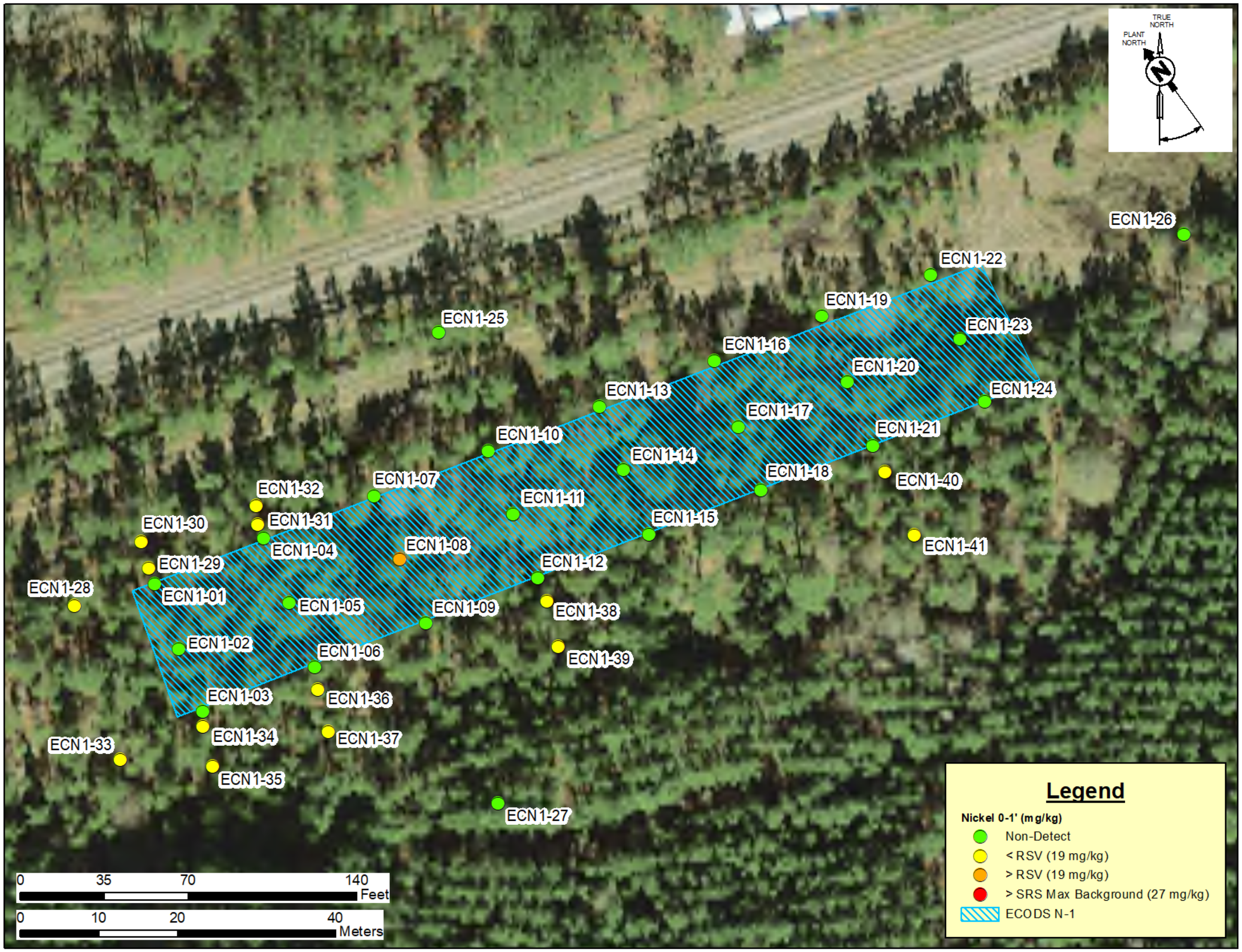


Figure 10. ECODS N-1 Ni Results (>RSV) Surface Soil (0-1 ft)

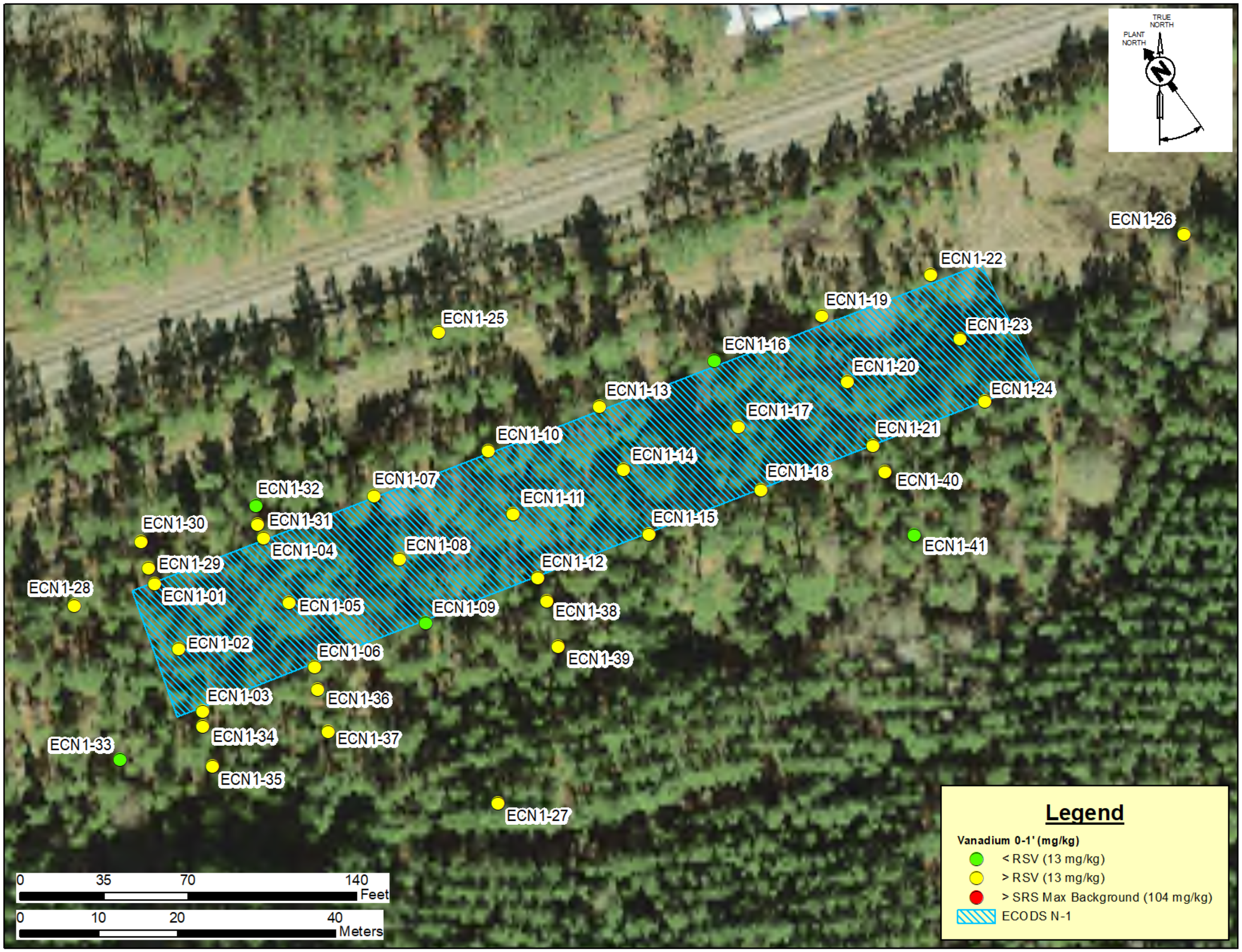


Figure 11. ECODS N-1 V Results (>RSV) Surface Soil (0-1 ft)

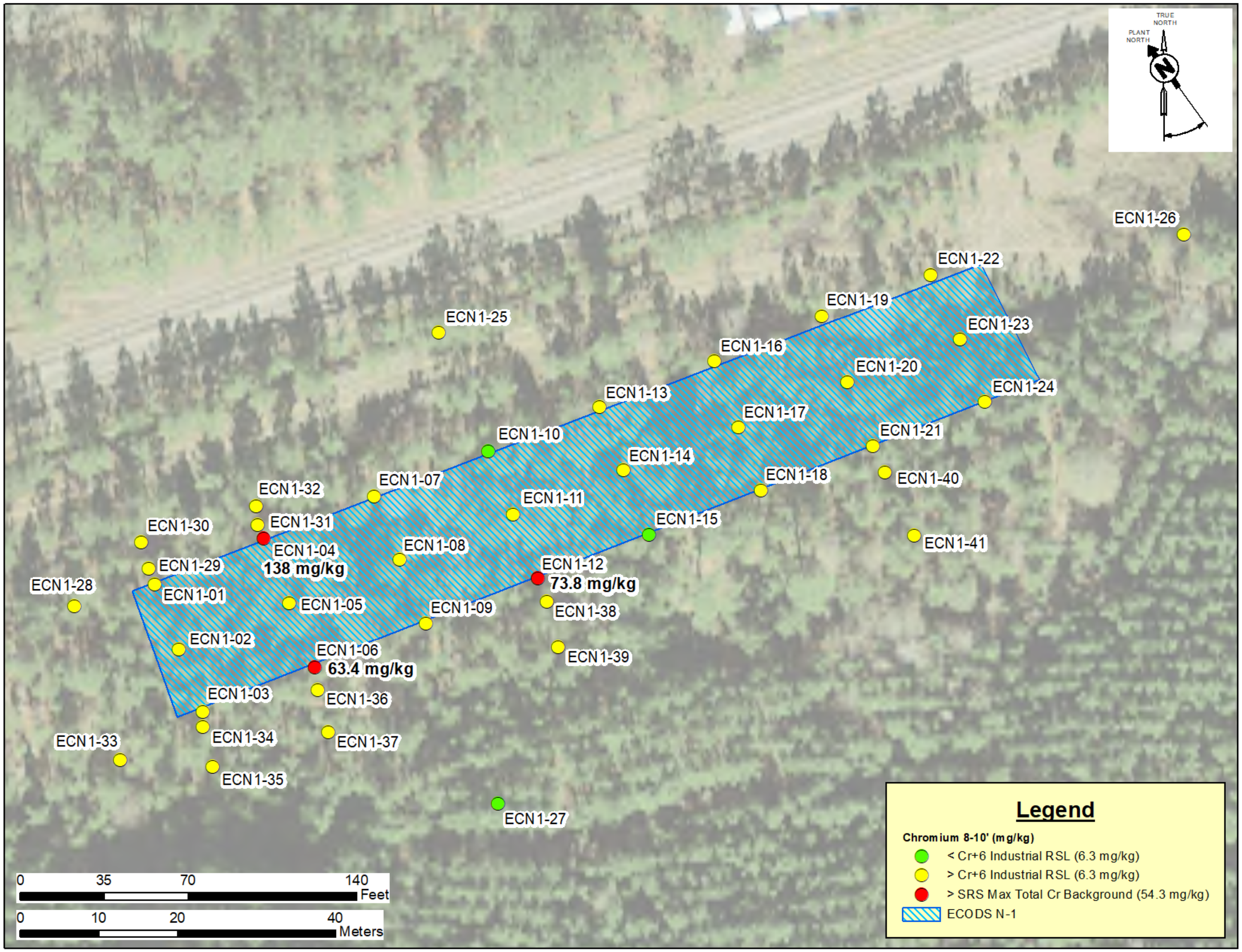


Figure 12. ECODS N-1 Total Cr Results (>RSL) Subsurface Soil (8-10 ft)

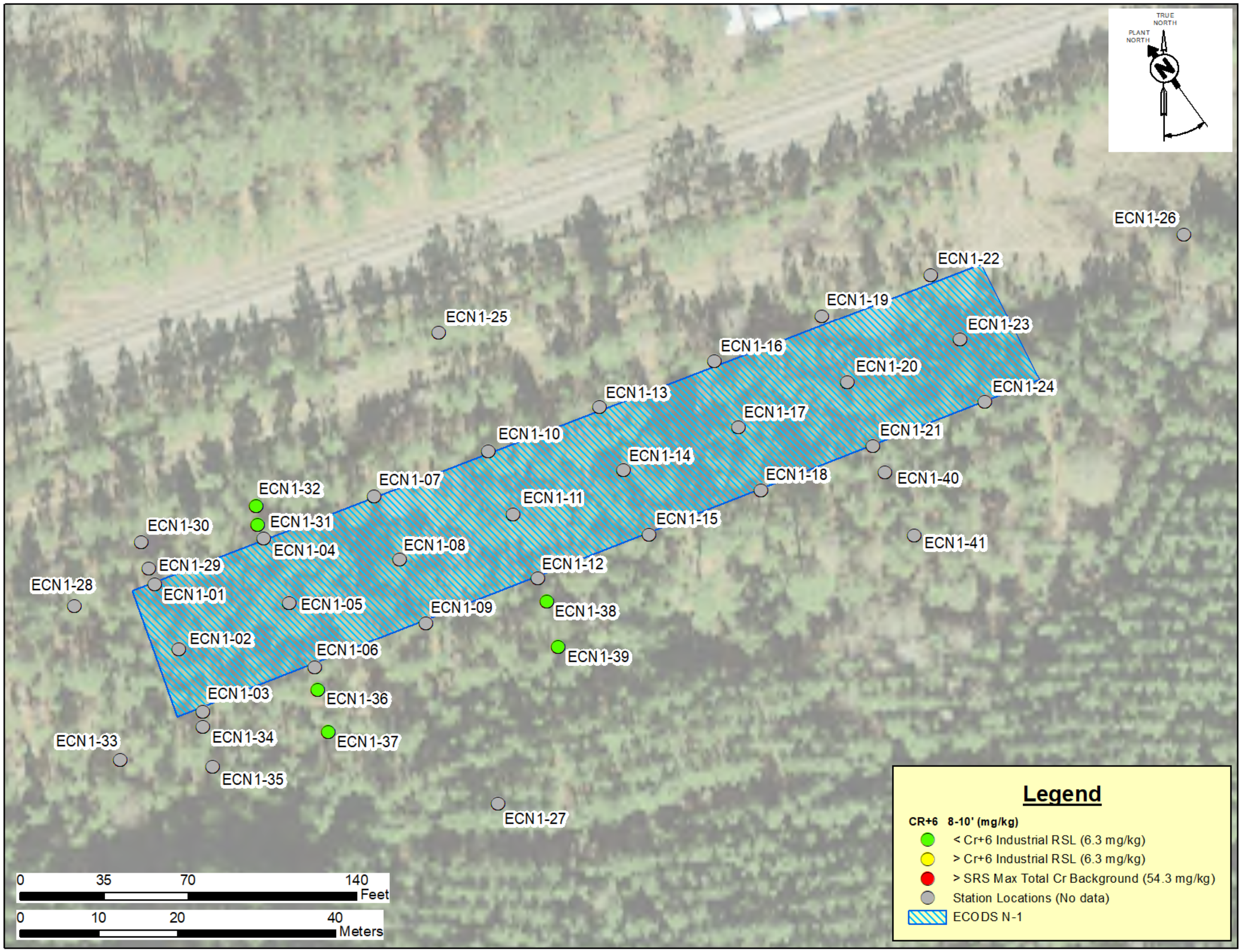


Figure 13. ECODS N-1 Hexavalent Cr^{+6} Results (>RSL) Subsurface Soil (8-10 ft)

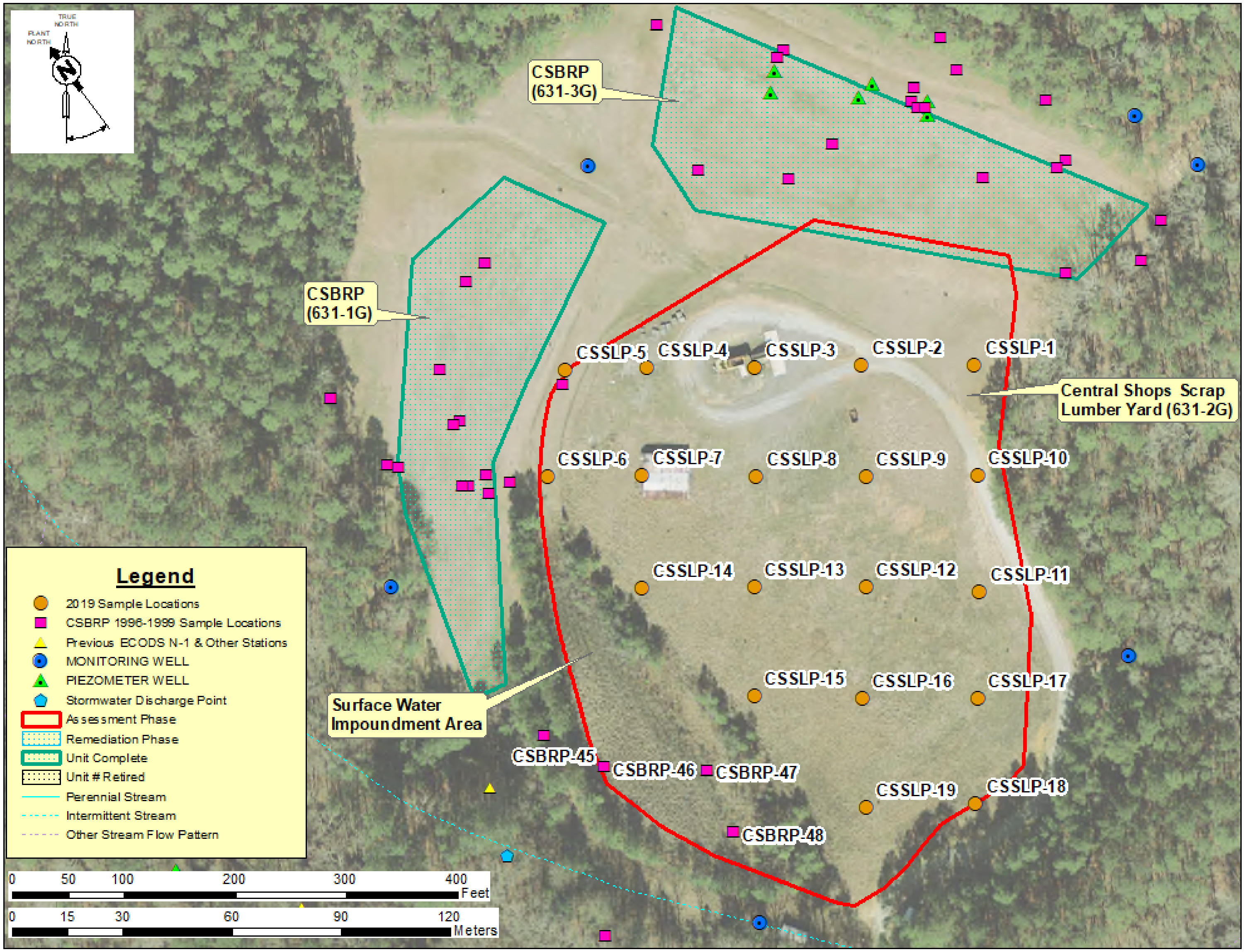


Figure 14. Scrap Lumber Pile (631-2G) 2019 Characterization Sample Locations

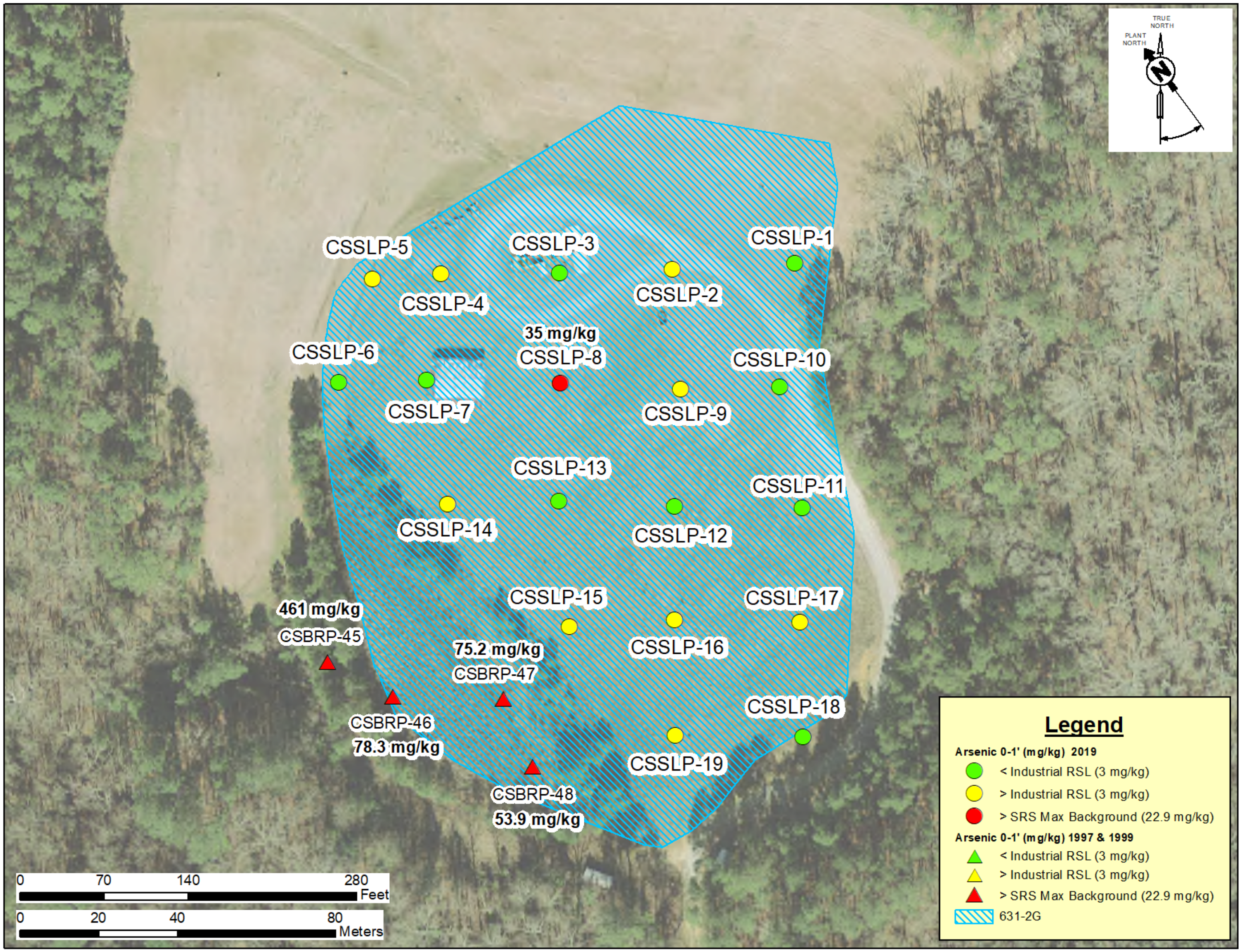


Figure 15. Scrap Lumber Pile (631-2G) Arsenic Results (>RSL) Surface Soil (0-1 ft)

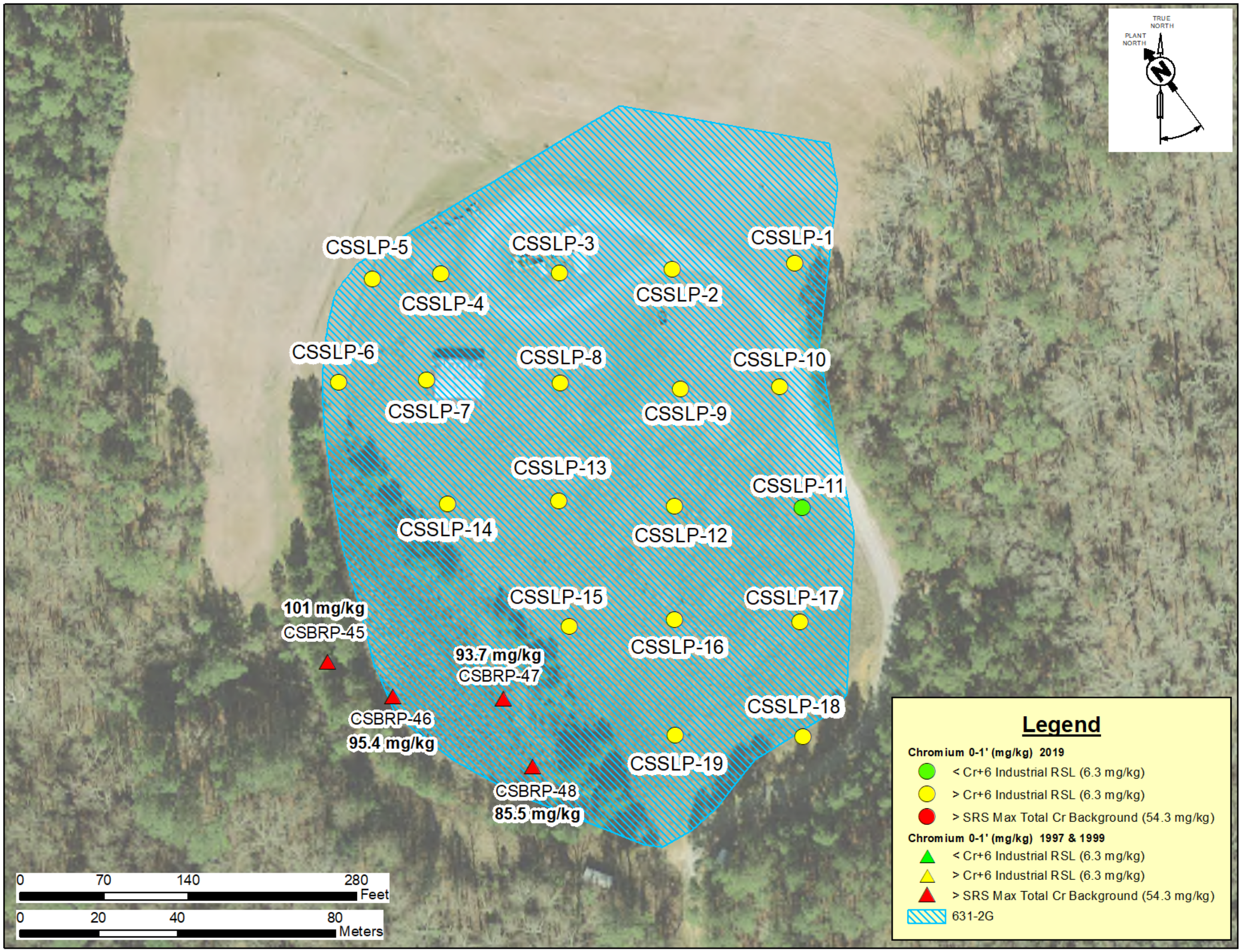


Figure 16. Scrap Lumber Pile (631-2G) Cr Results (>RSL) Surface Soil (0-1 ft)

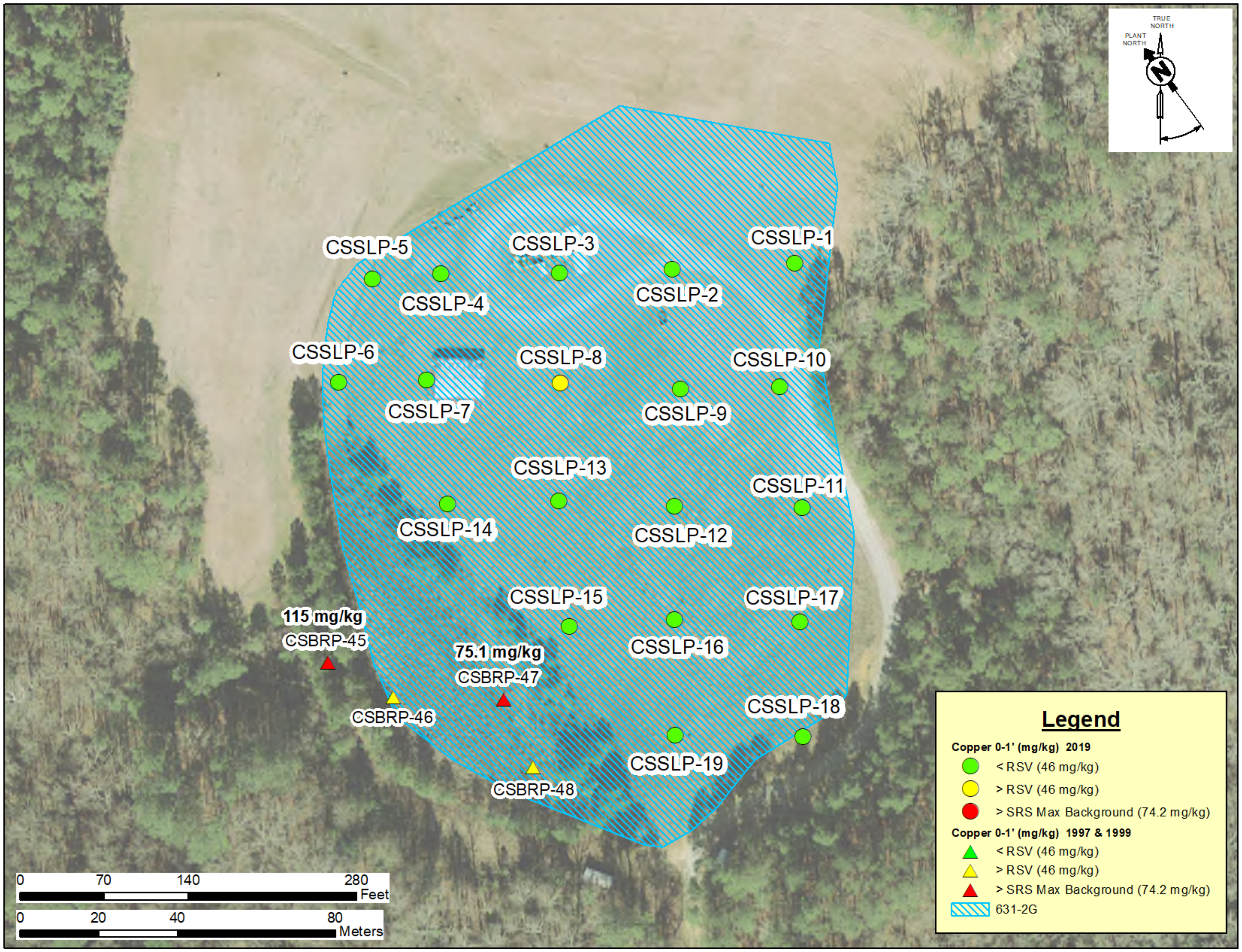


Figure 17. Scrap Lumber Pile (631-2G) Cu Results (>RSV) Surface Soil (0-1 ft)

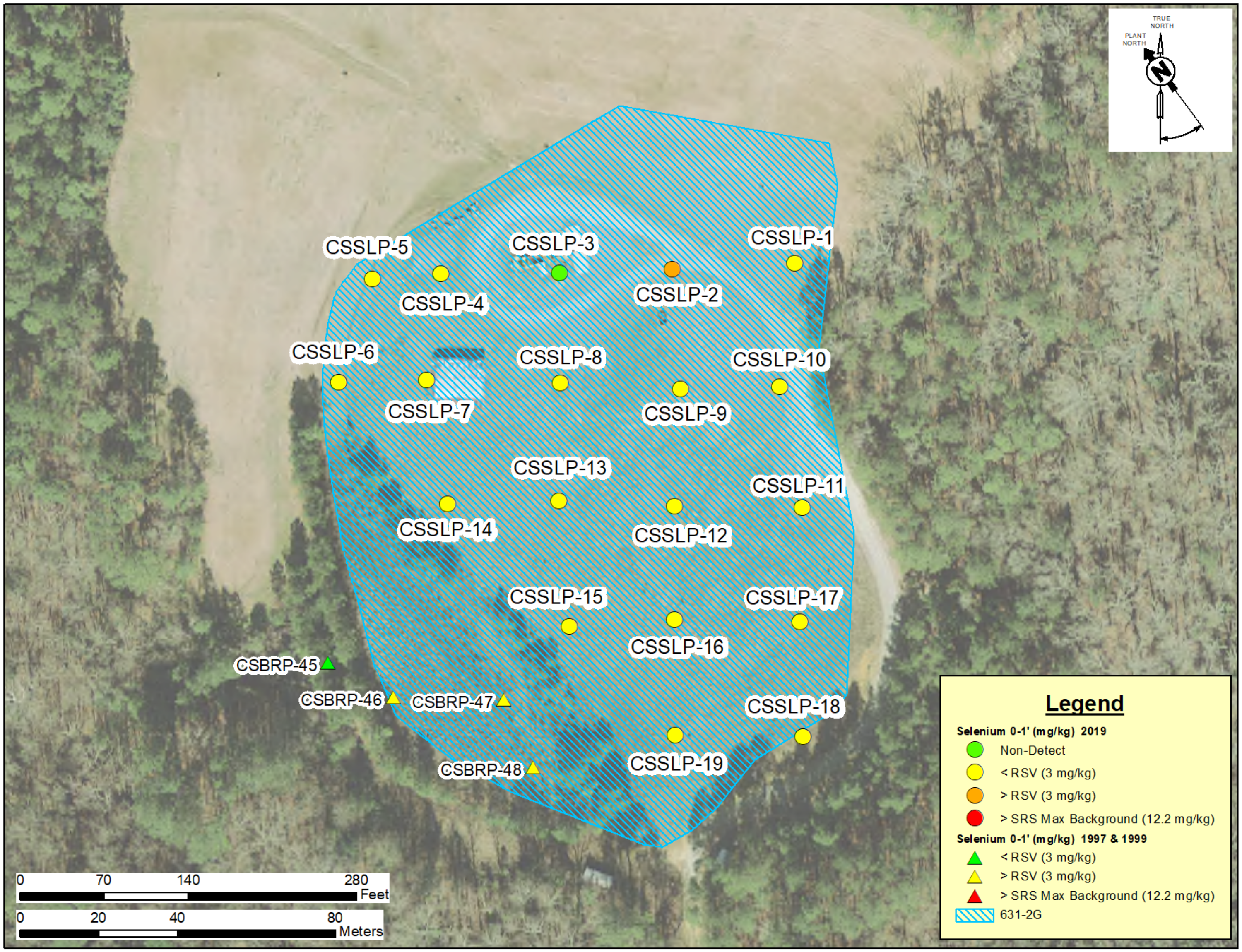


Figure 18. Scrap Lumber Pile (631-2G) Se Results (>RSV) Surface Soil (0-1 ft)

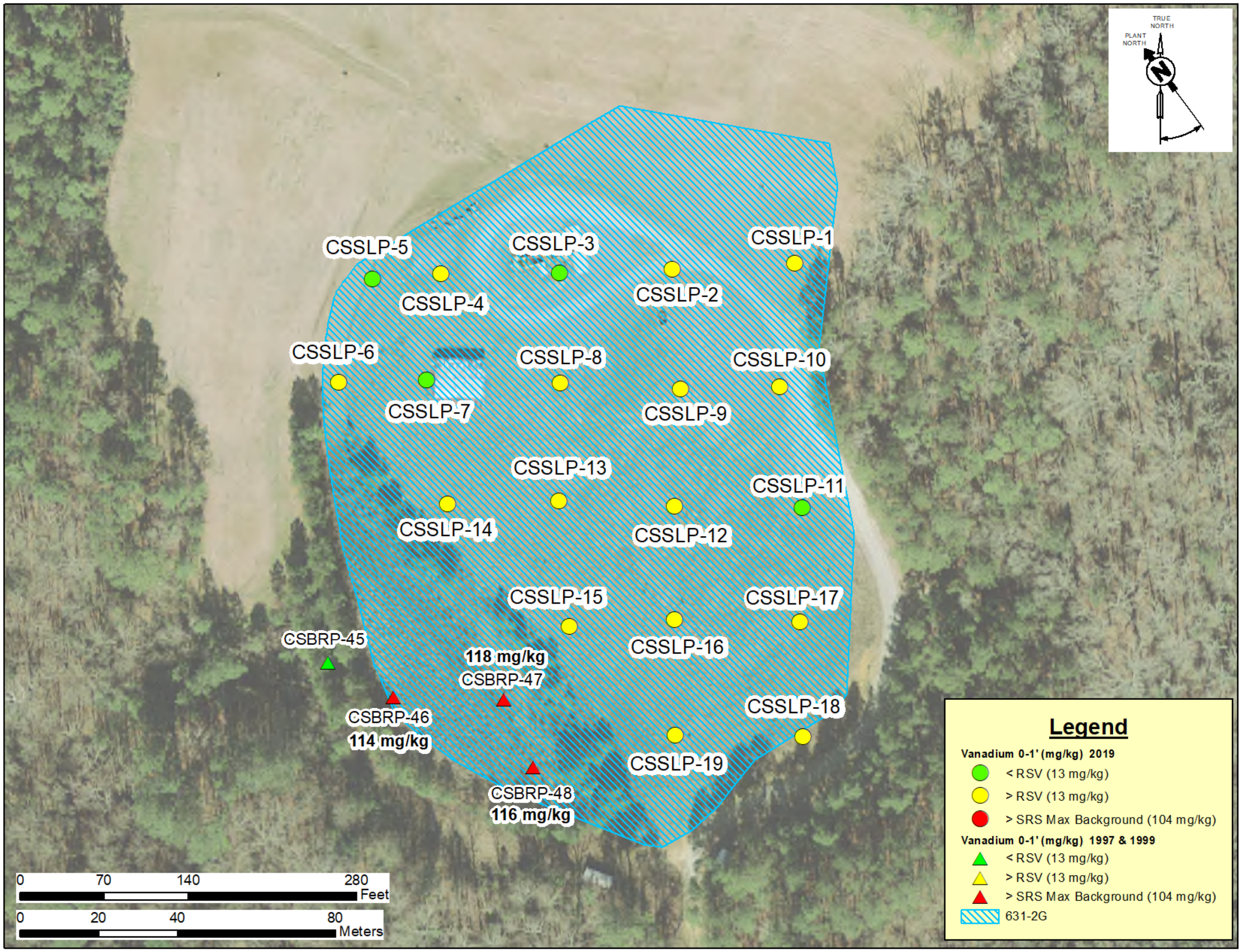


Figure 19. Scrap Lumber Pile (631-2G) V Results (>RSV) Surface Soil (0-1 ft)

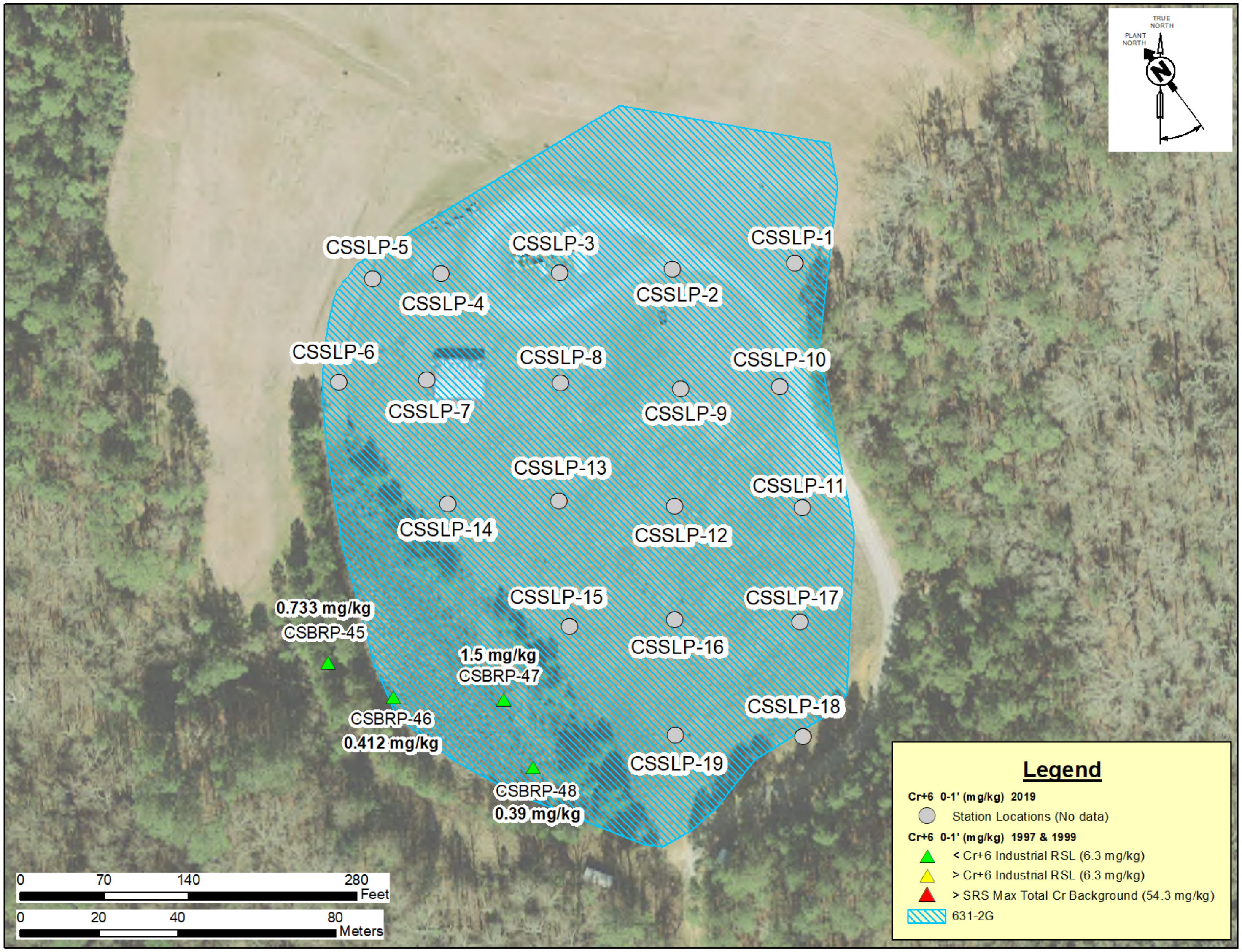


Figure 20. **Scrap Lumber Pile (631-2G) Cr^{+6} Results (>RSL) Surface Soil (0-1 ft)**

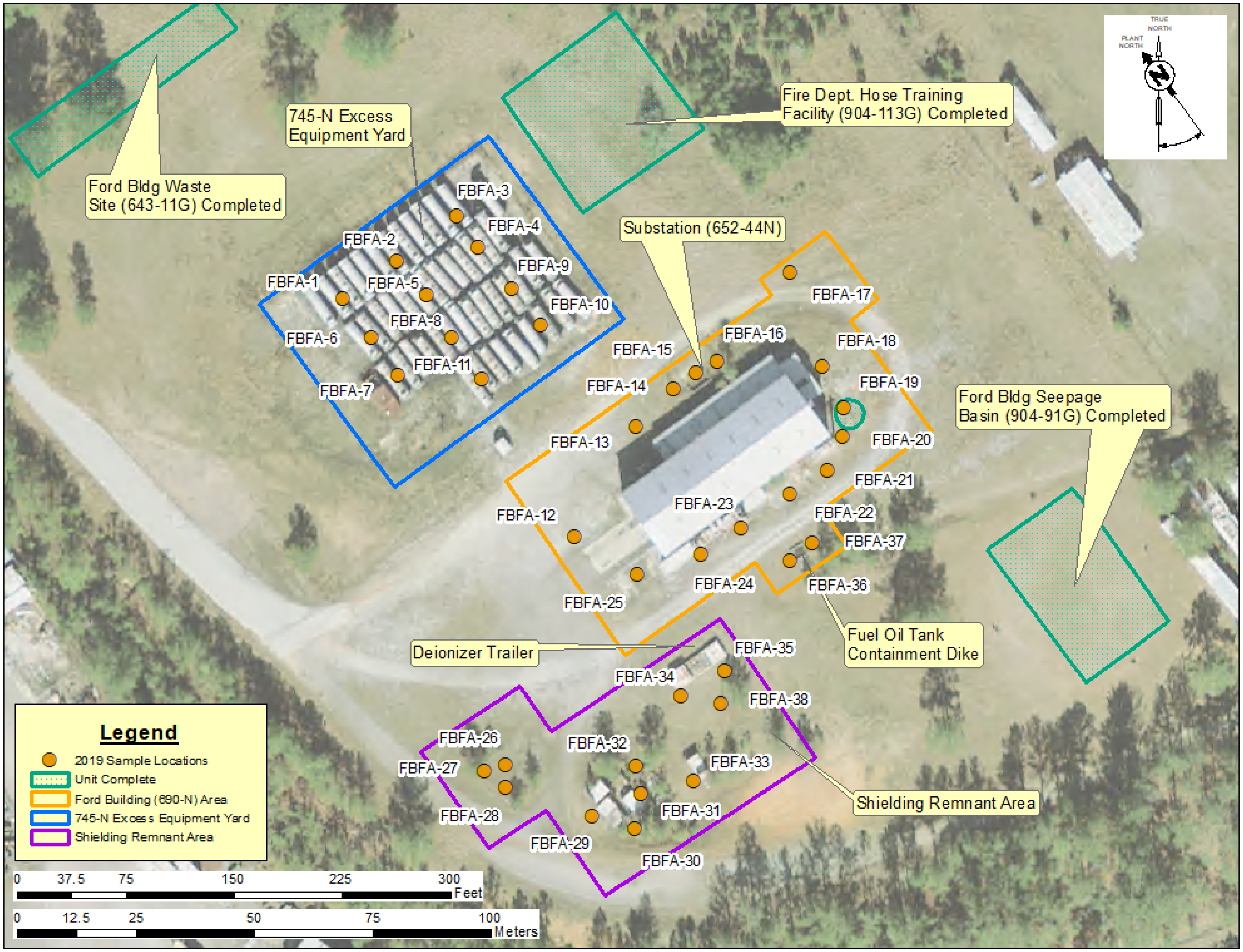
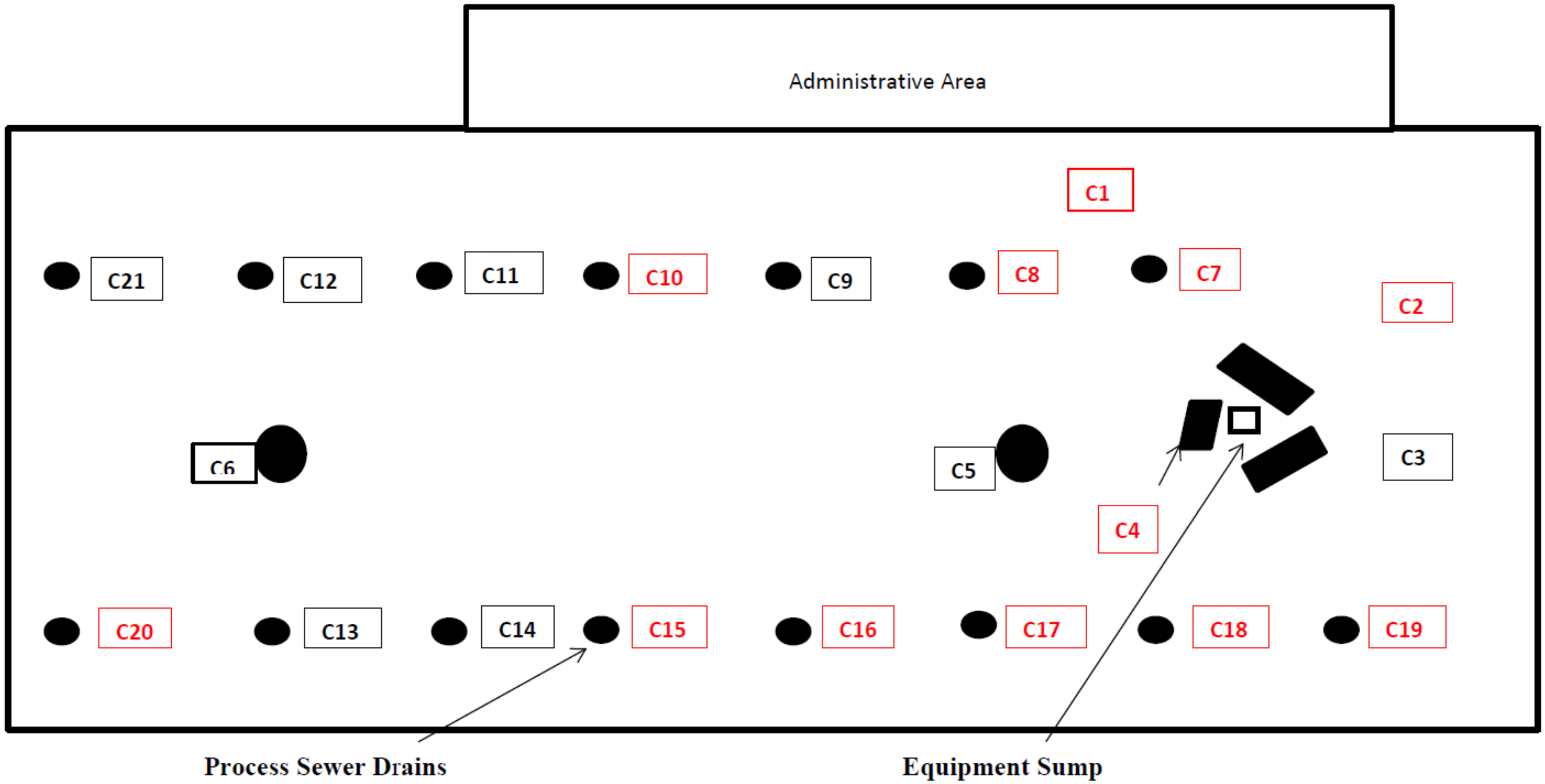


Figure 21. Ford Building (690-N) 2019 Characterization Sample Locations



Note: Sample locations noted in RED indicate radiological activity.

Figure 22. Ford Building (690-N) 2014 Concrete & Soil Sample Locations

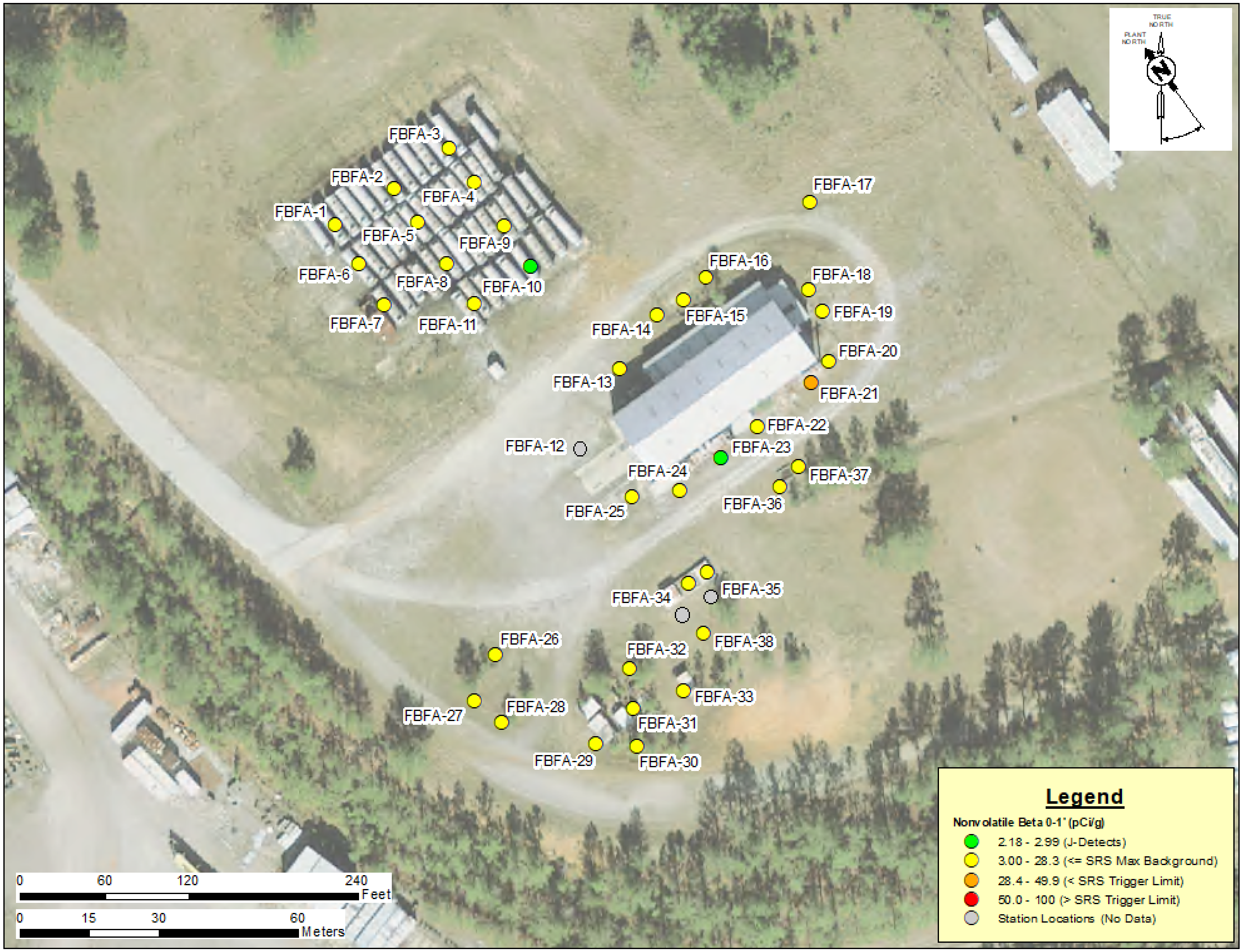


Figure 23. Ford Building (690-N) Nonvolatile Beta Results (> SRS Max Background) Surface Soil (0-1 ft)

Figure 24. Ford Building (690-N) Nonvolatile Beta Results (> SRS Max Background) Surface Soil (0-1 ft)

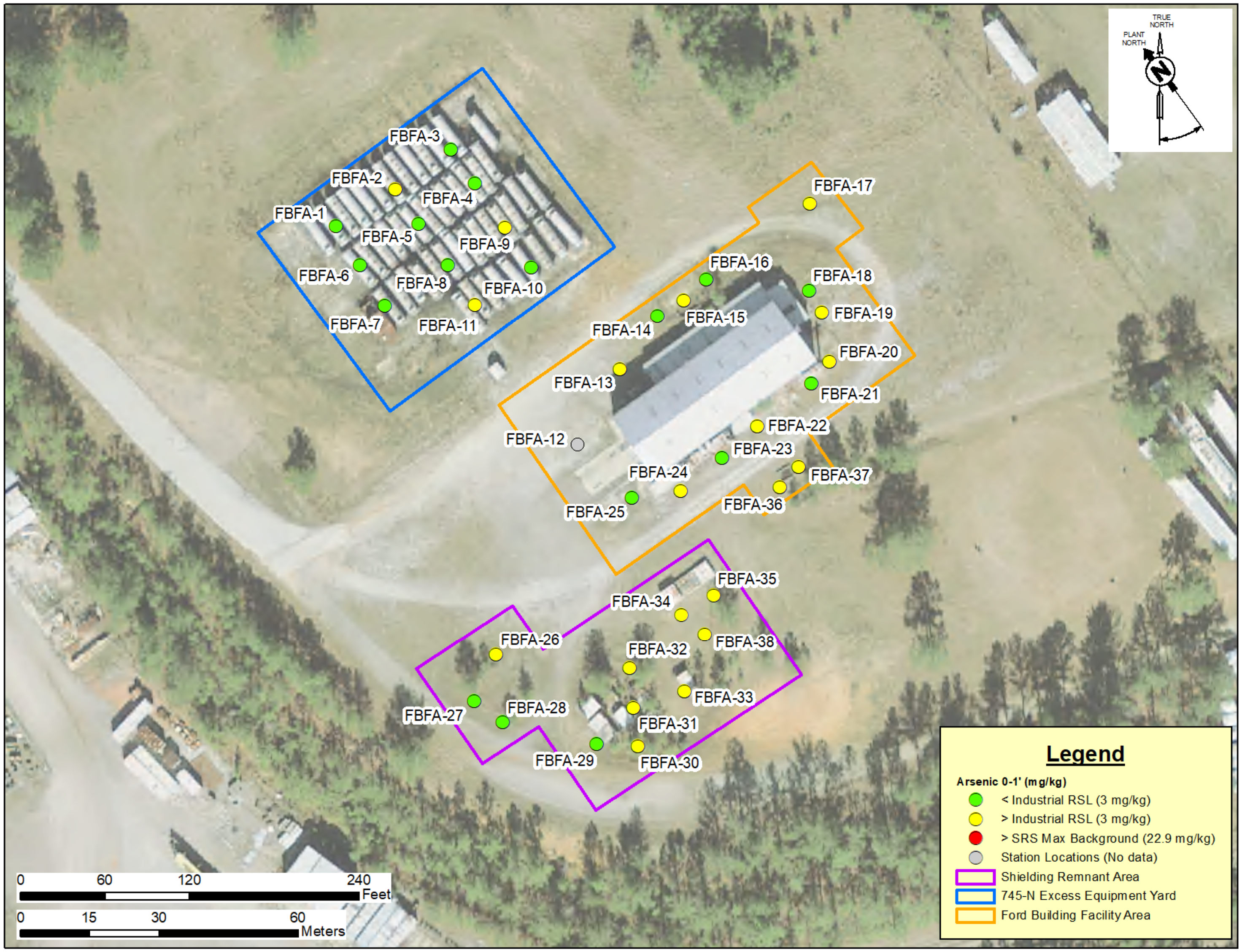


Figure 25. Ford Building (690-N) Arsenic Results (>RSL) Surface Soil (0-1 ft)

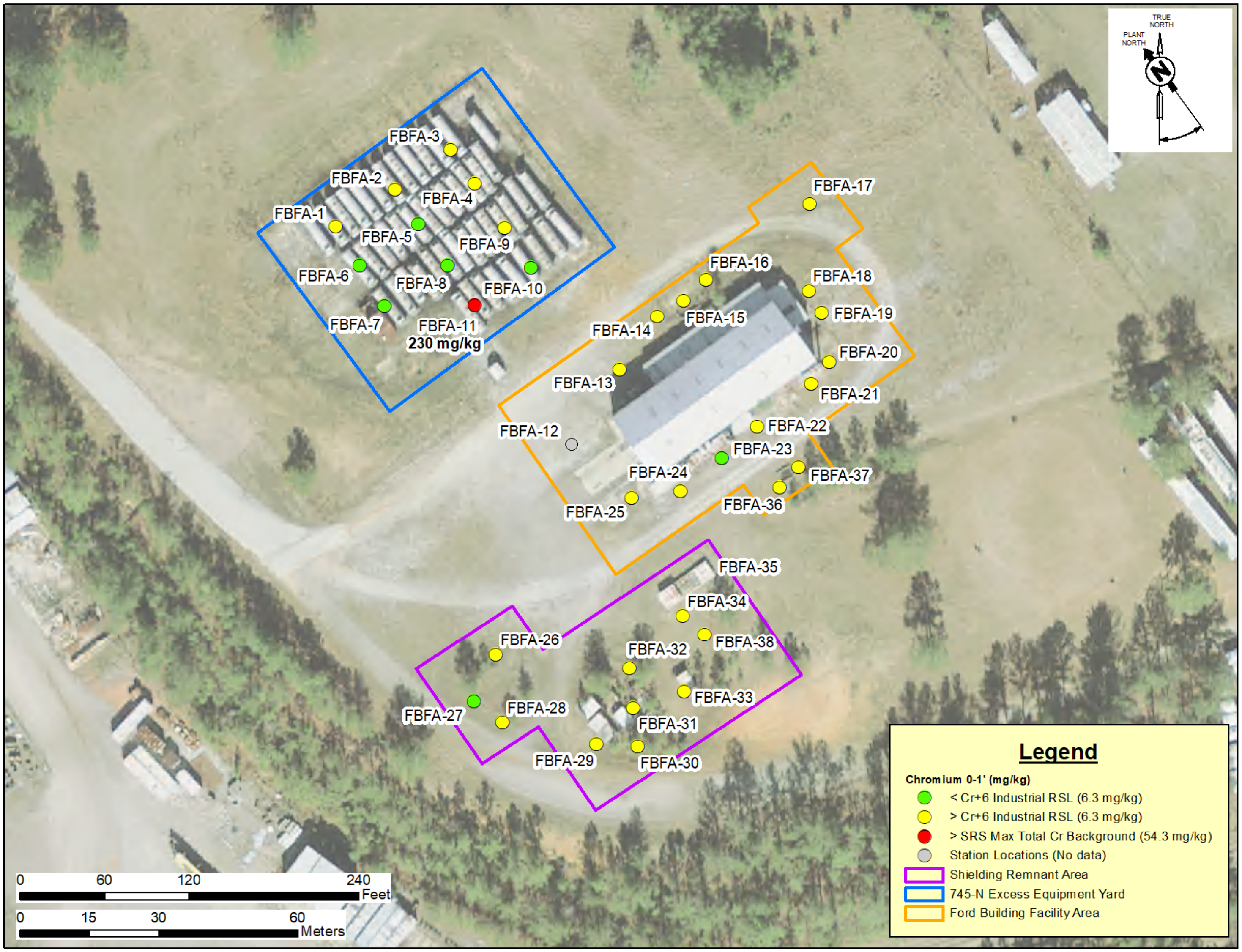


Figure 26. Ford Building (690-N) Cr Results (>RSL) Surface Soil (0-1 ft)

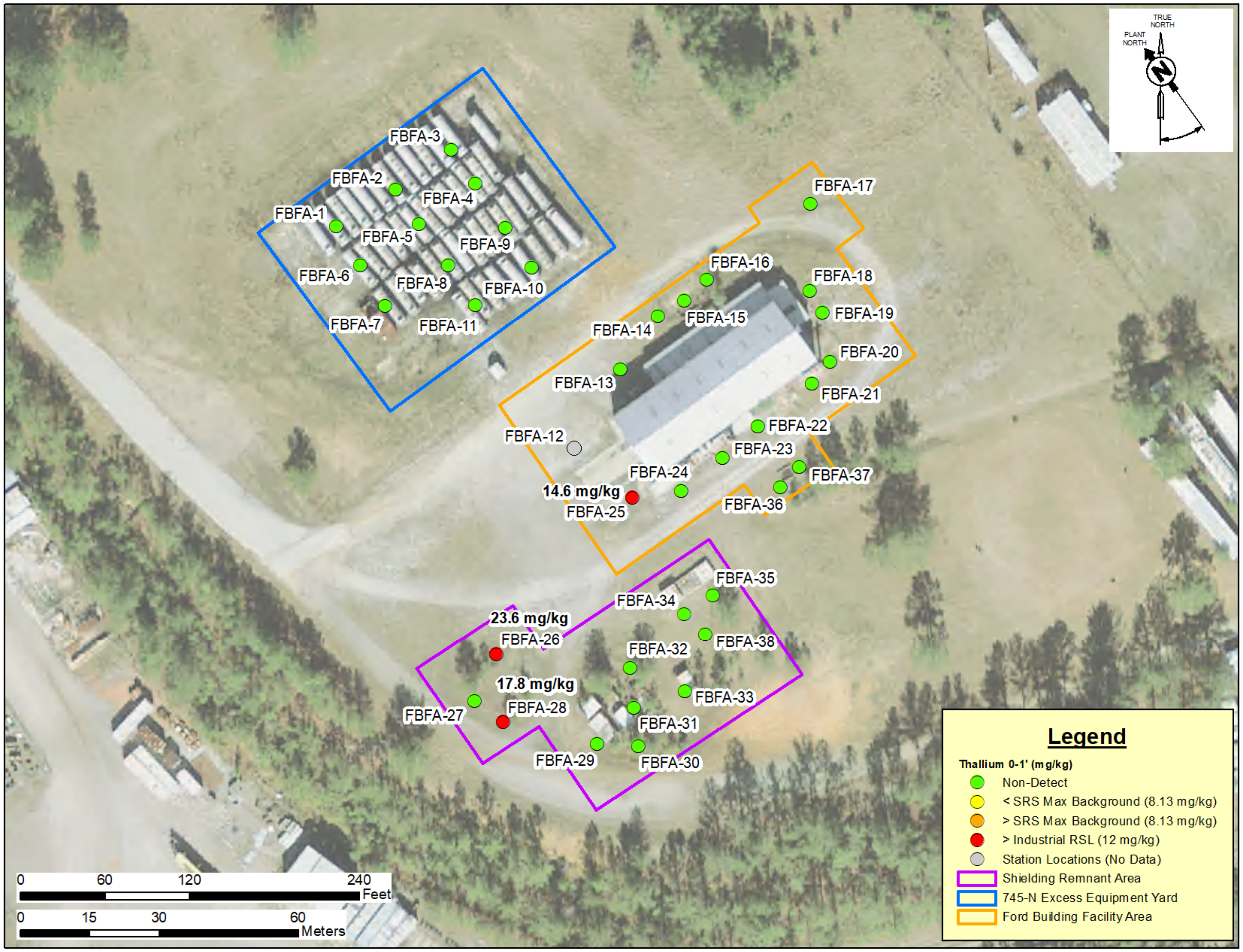


Figure 27. **Ford Building (690-N) Tl Results (>RSL) Surface Soil (0-1 ft)**

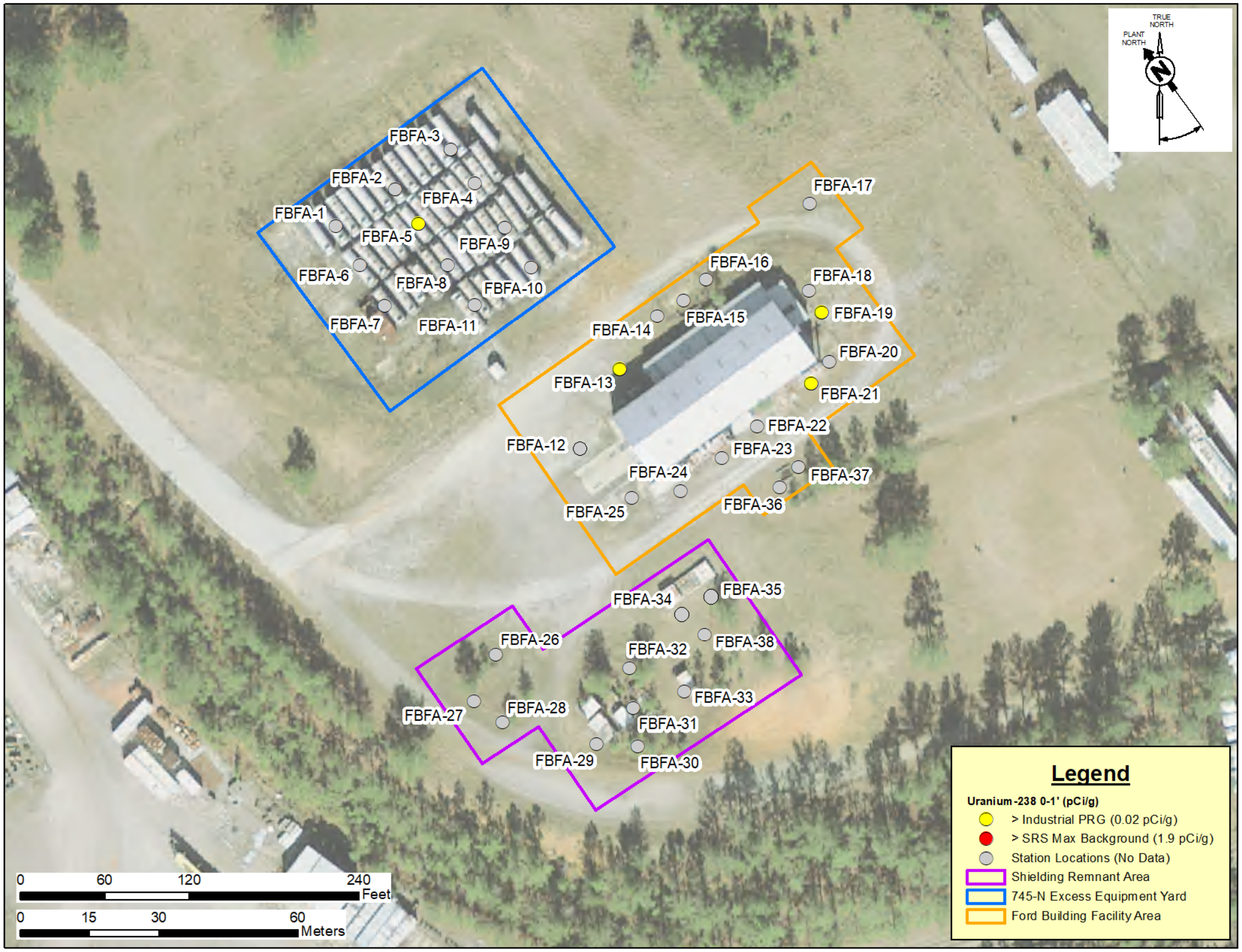


Figure 28. Ford Building (690-N) U Results (>PRG) Surface Soil (0-1 ft)

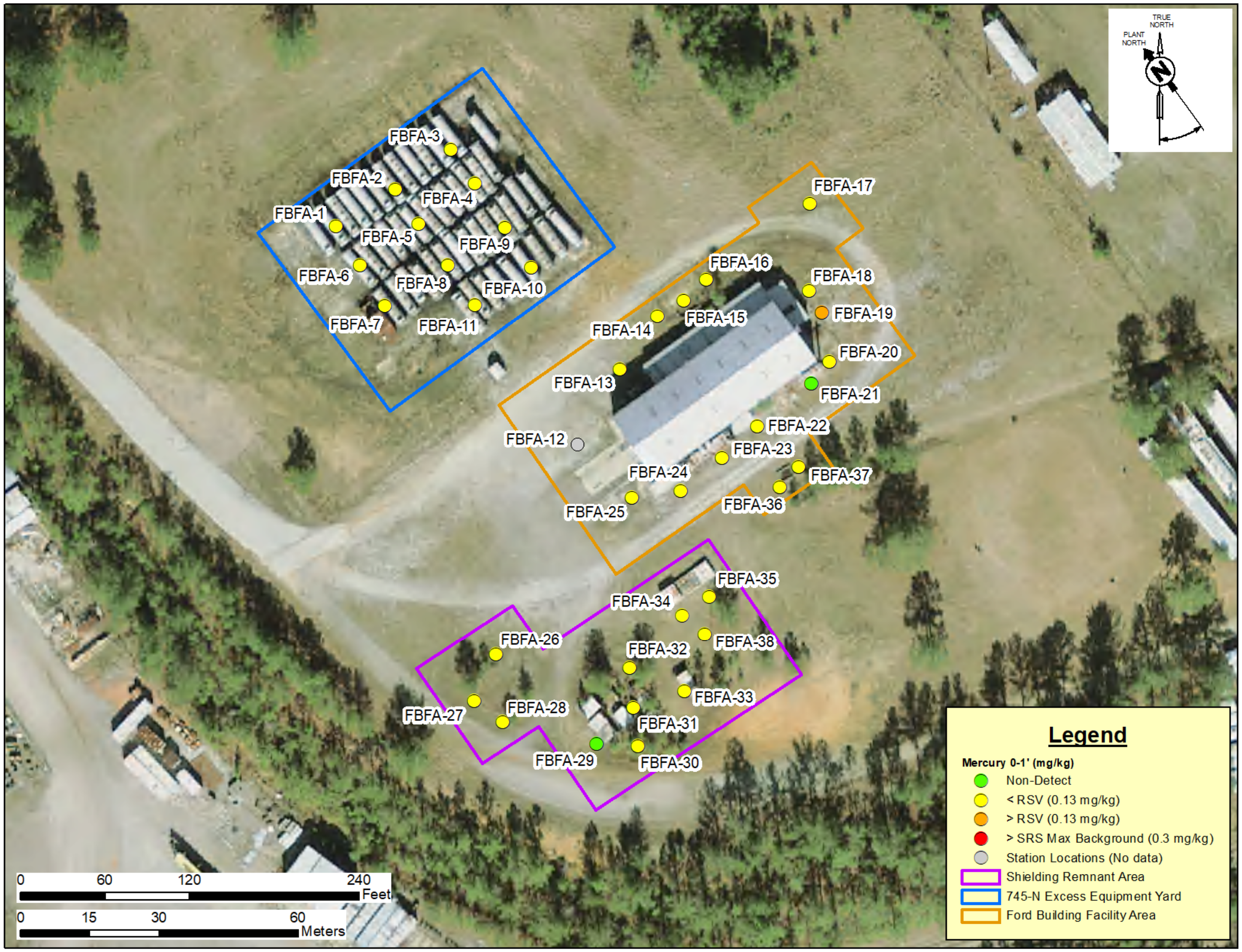


Figure 29. Ford Building (690-N) Hg Results (>RSV) Surface Soil (0-1 ft)

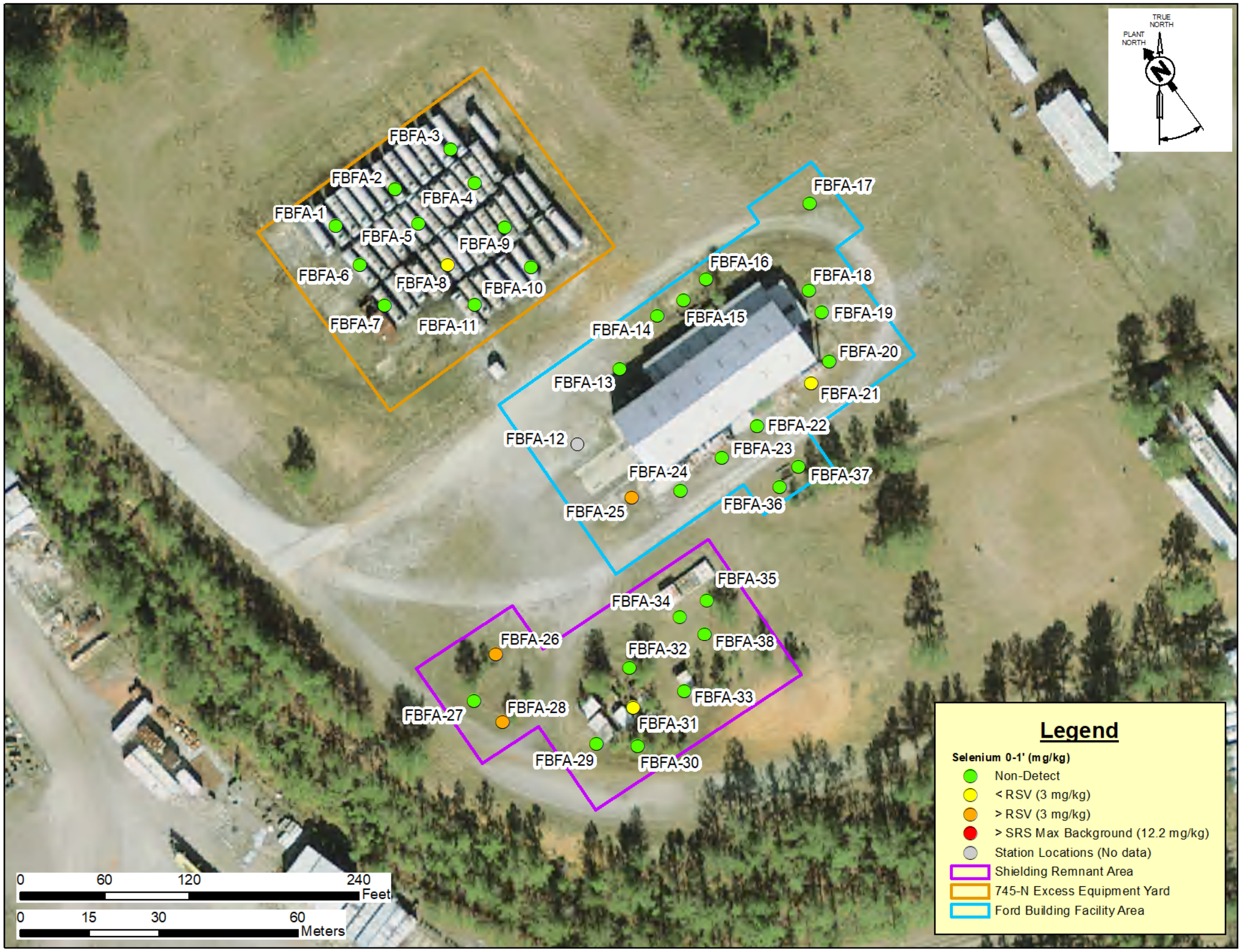


Figure 30. Ford Building (690-N) Se Results (>RSV) Surface Soil (0-1 ft)

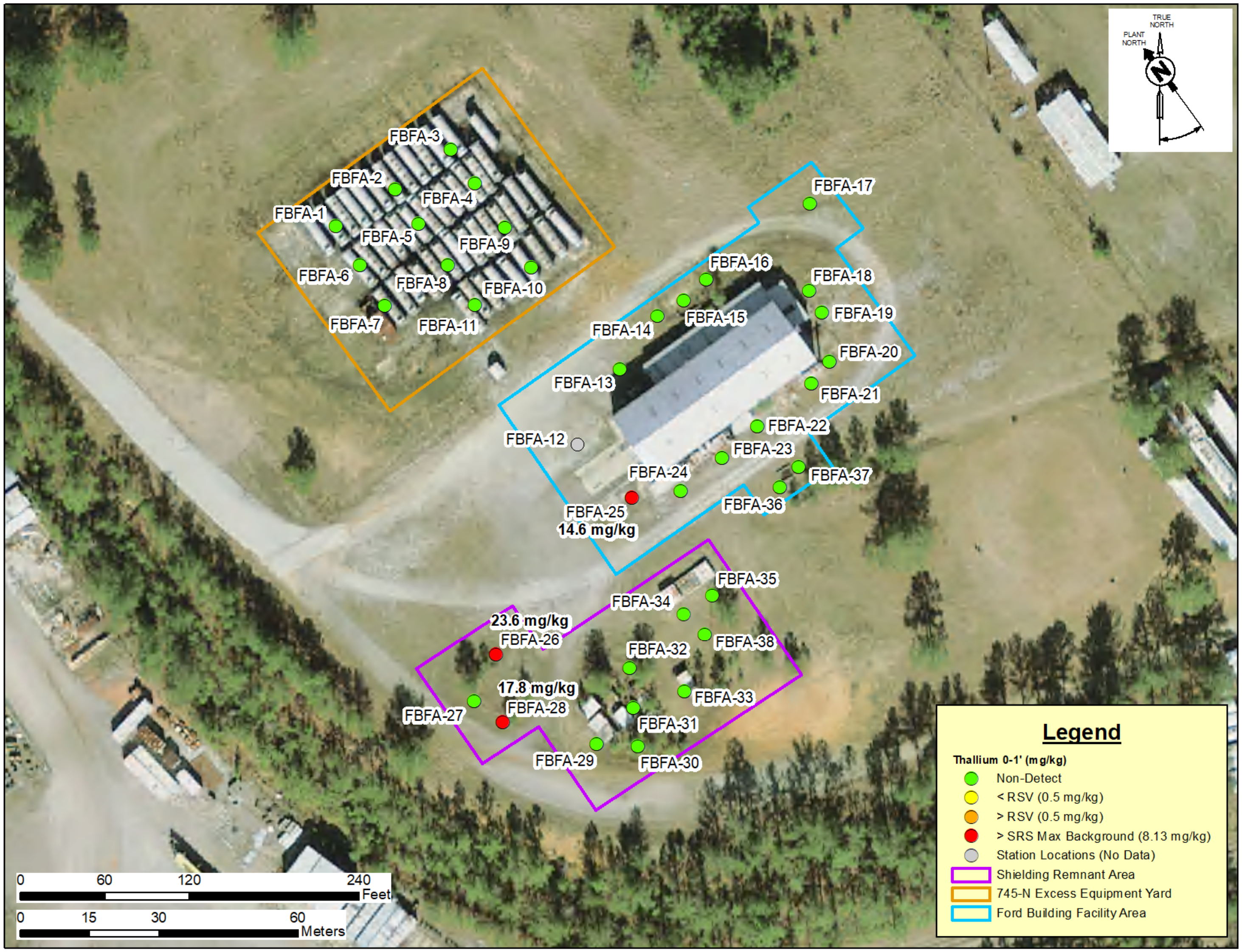


Figure 31. Ford Building (690-N) Tl Results (>RSV) Surface Soil (0-1 ft)

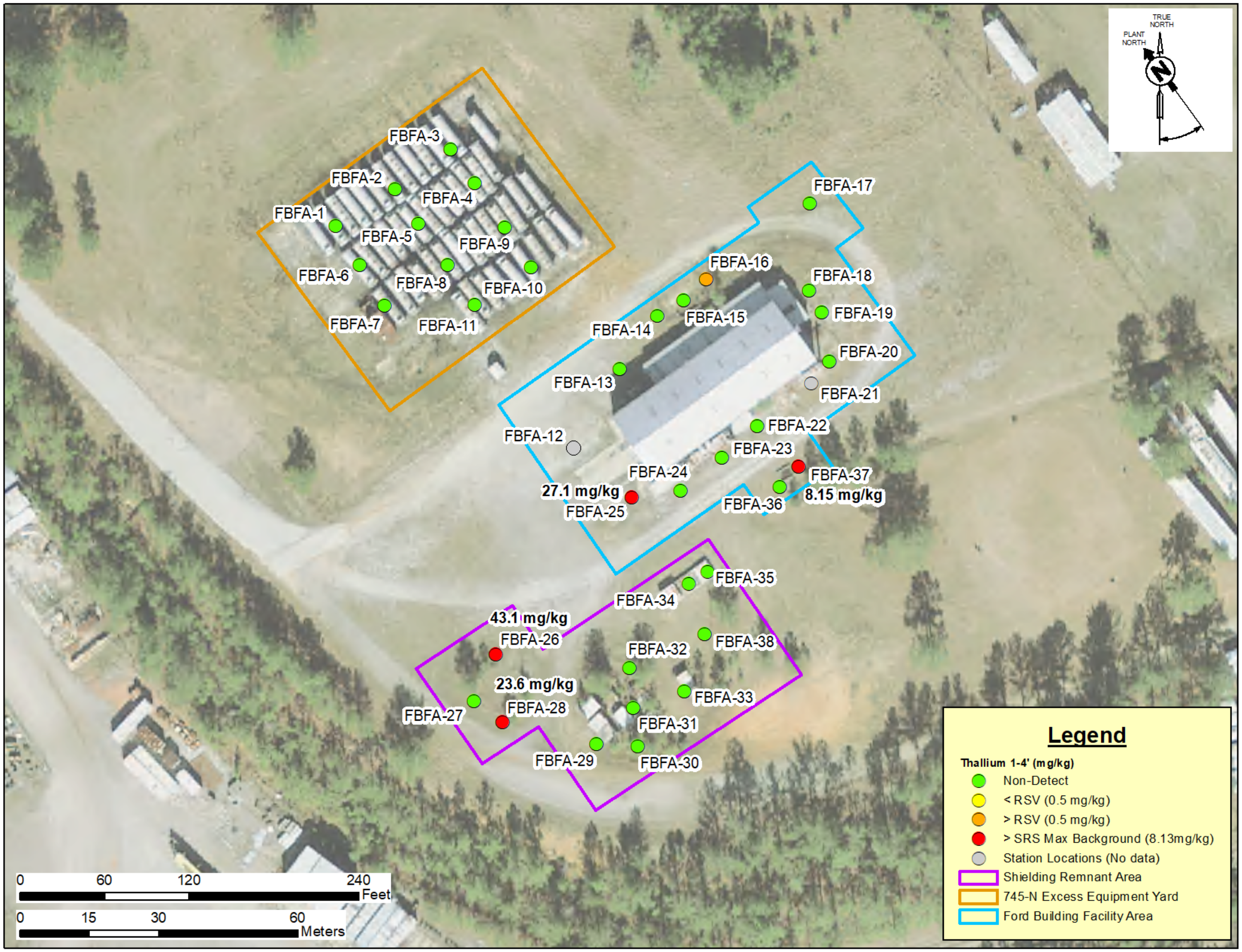


Figure 32. Ford Building (690-N) Tl Results (>RSV) Subsurface Soil (1-4 ft)

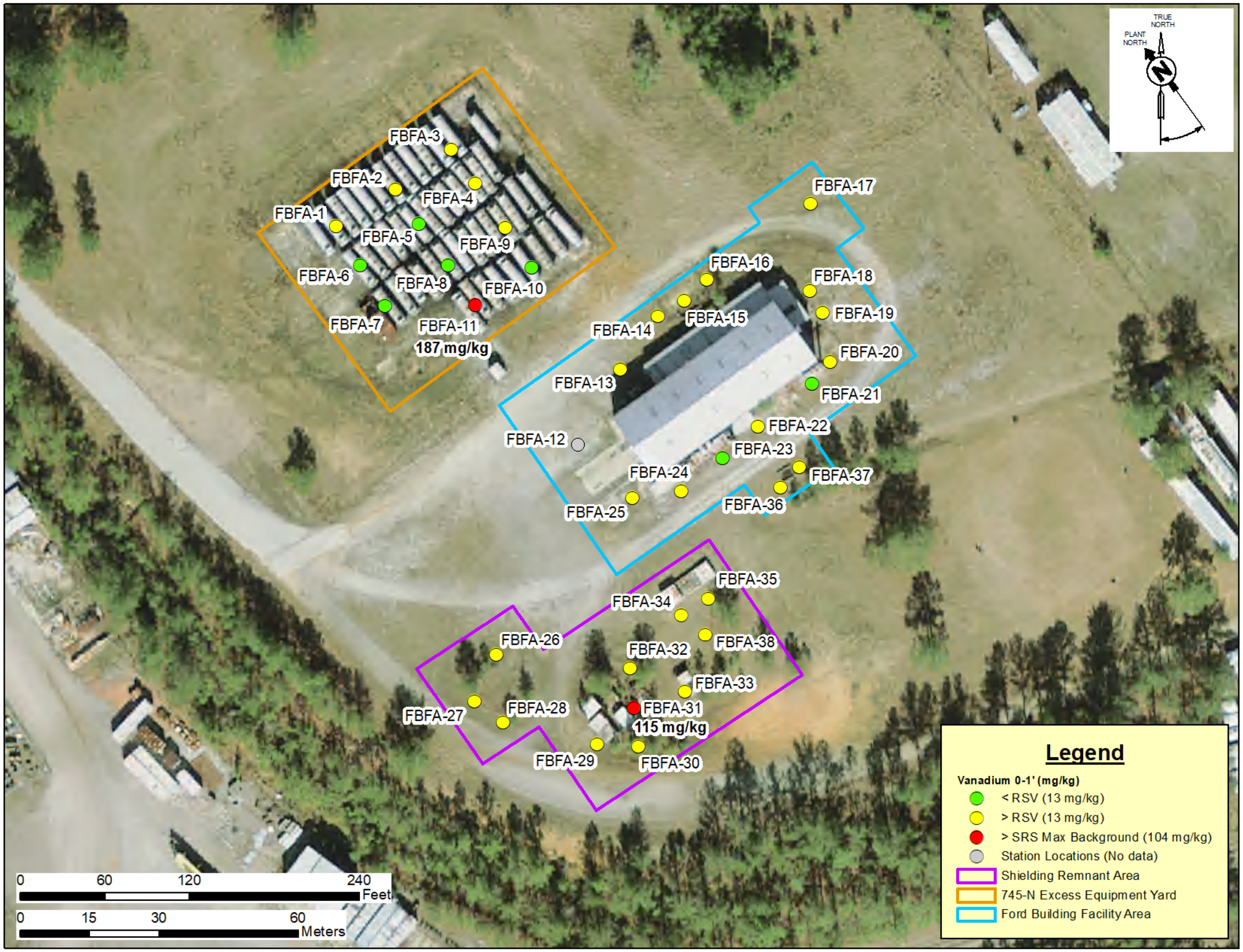


Figure 33. Ford Building (690-N) V Results (>RSV) Surface Soil (0-1 ft)

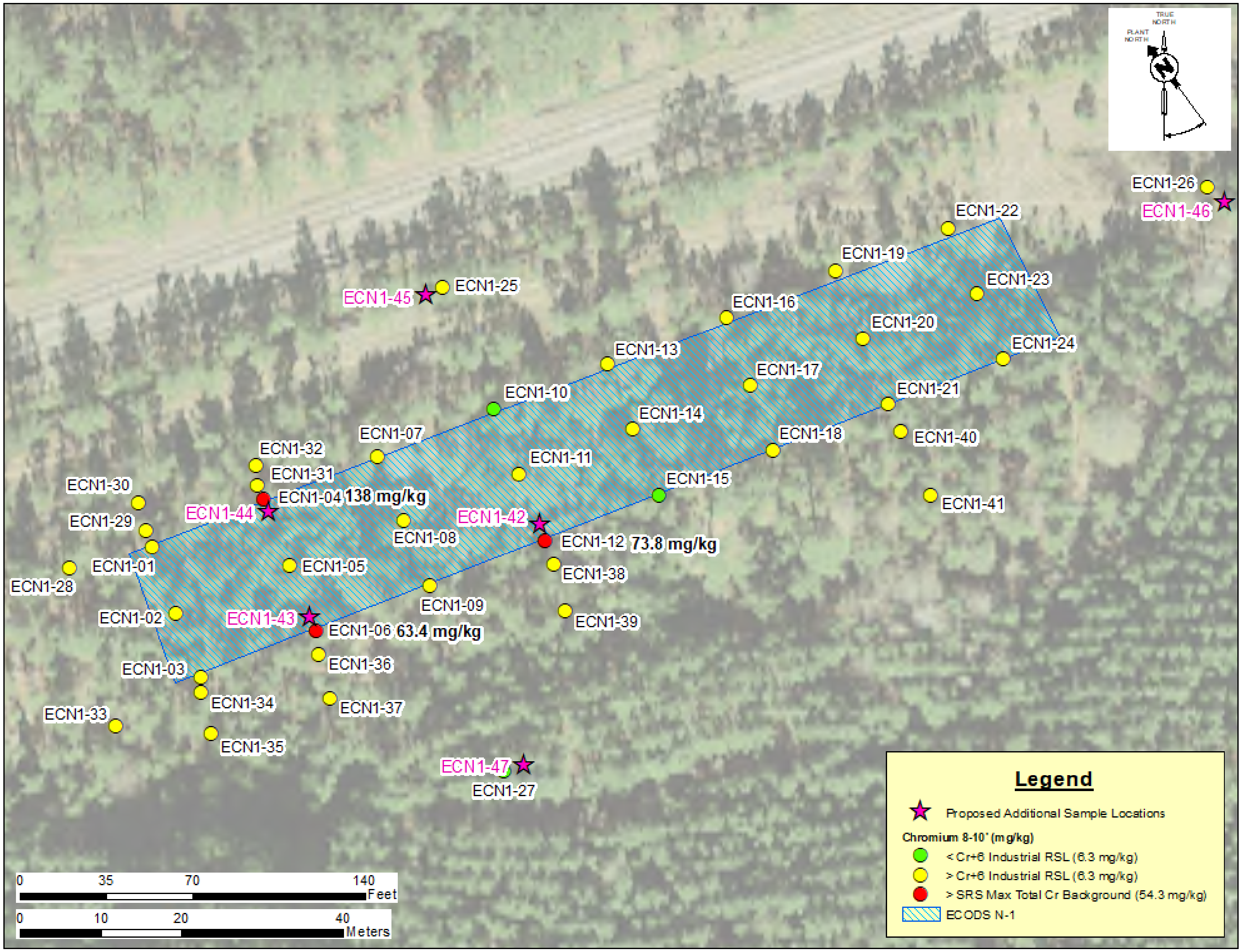


Figure 34. Proposed Additional ECODS N-1 Sample Locations

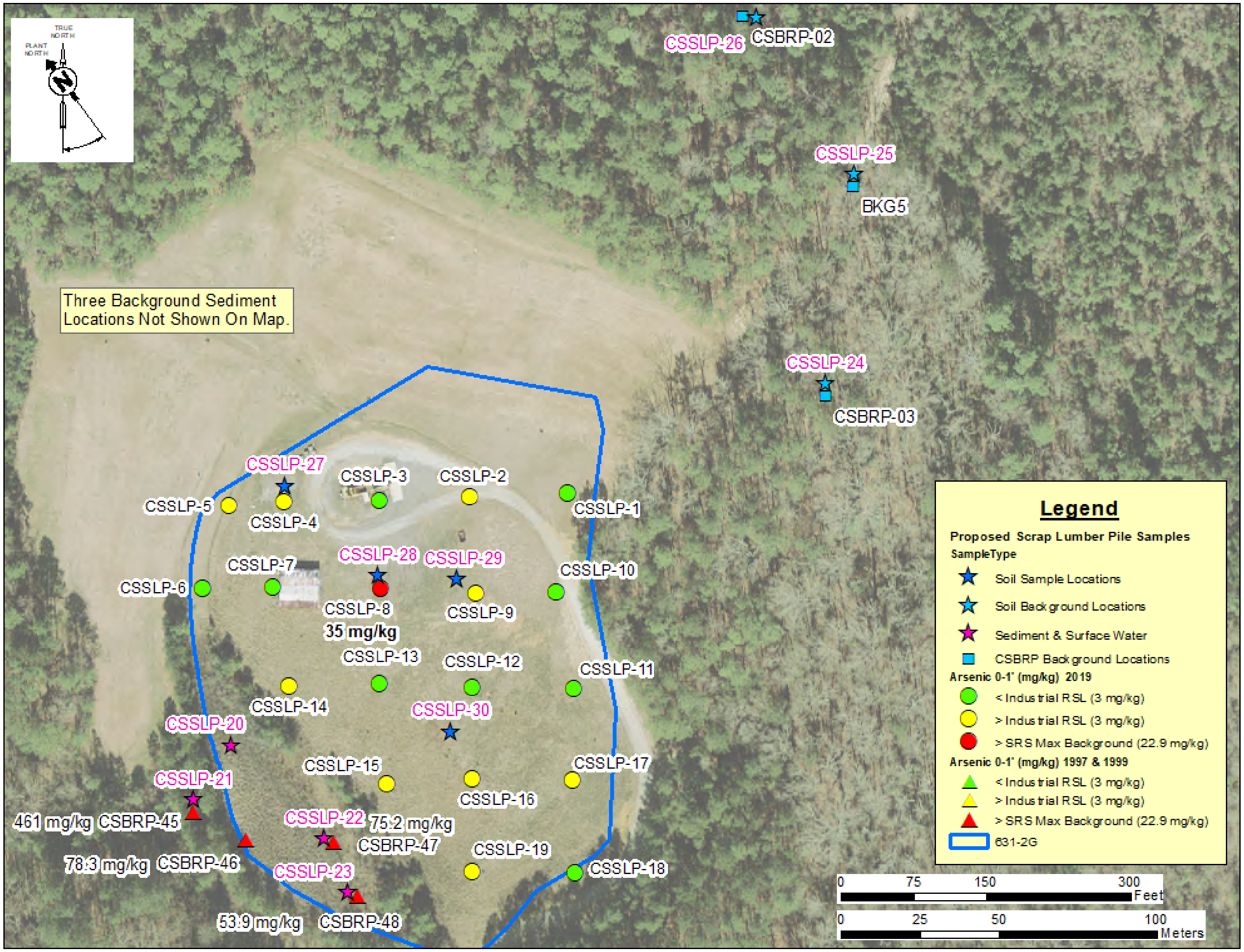


Figure 35. Proposed Additional Scrap Lumber Pile (631-2G) Sample Locations

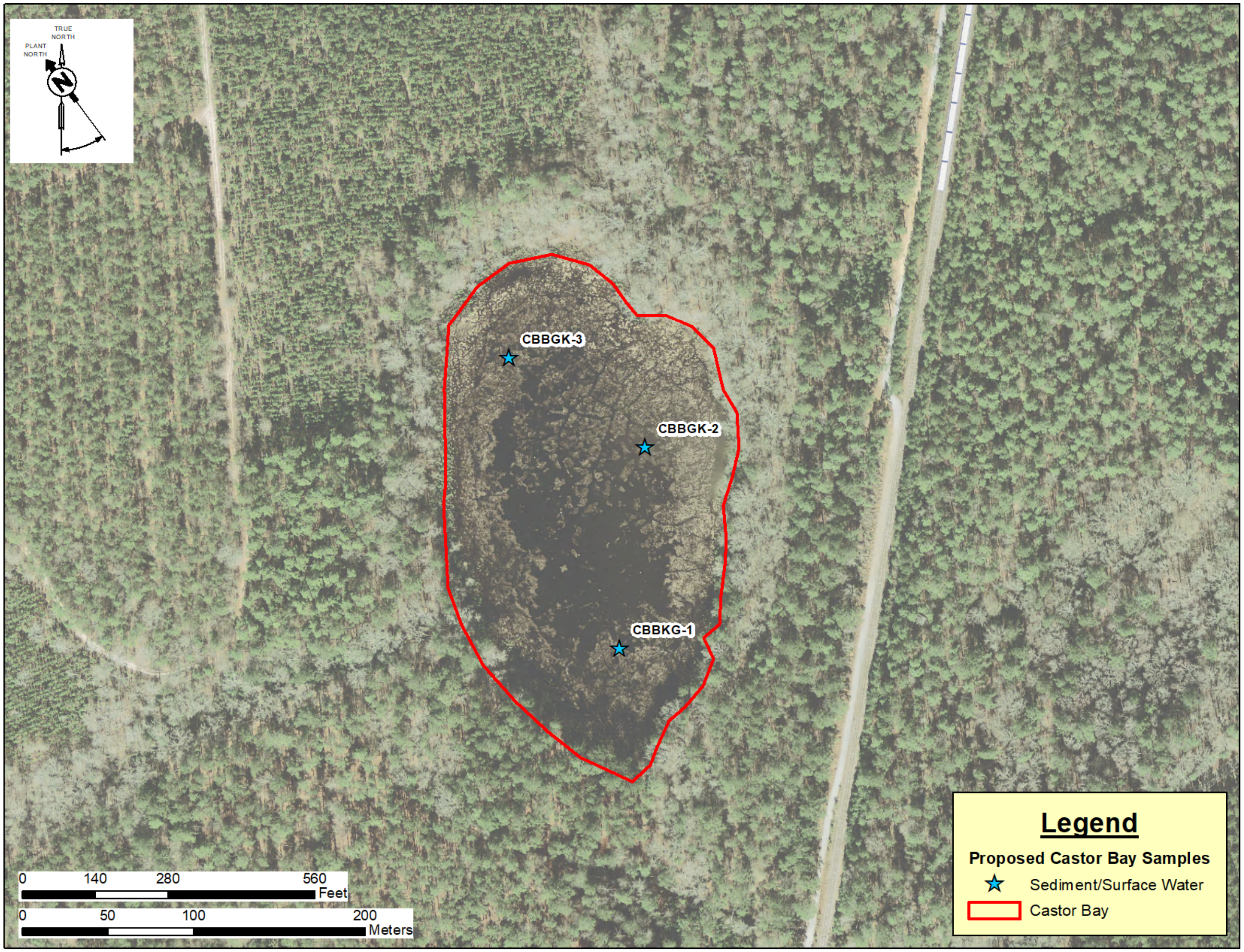


Figure 36. Proposed Background Castor Bay Sample Locations

Table 1. Summary of RFI/RI Data Needs

Subunit	Sample Type	Number of Locations	Depth Intervals	Analyses	Purpose
ECODS N-1	Soil Cores	6 Locations: 3 inside subunit boundary and 3 background locations	0-1 ft; 1-4 ft; 8-10 ft; and 10-12 ft	TAL Metals (including Cr^{+6})	Determine if metals are unit related or natural.
Scrap Lumber Pile (631-2G)	Surface Water and Sediment Samples	7 Locations: 4 inside the Surface Water Impoundment Area, and 3 surface water and sediment background locations	Surface Water, 0-1 ft, and 1-4 ft Sediment	TCL, TAL Metals (including Cr^{+6}), radiological indicators	Determine current conditions within the surface water impoundment area.
Scrap Lumber Pile (631-2G)	Soil Samples	7 Locations: 4 soil locations inside former operations area and 3 soil background locations	0-1 ft, 1-4 ft, 8-10 ft, and 10-12 ft	Metals and Cr^{+6} at SLP and soil background locations.	Determine if metals are unit related or naturally-occurring.
Ford Building (690-N)	Contingent Soil Samples	Number of locations will be dependent on the radiological survey after D&D.	0-1 ft	PCBs, TAL Metals, radiological indicators and gamma spectroscopy (Cs-137)	Determine if contamination occurred to soil around the Ford Building (690-N) during D&D.

Table 2. Record of Core Team Agreements[1]

RECORD OF CORE TEAM AGREEMENTS	
Date	**Description of Agreement**
12/18/2019	*Core Team agrees six additional soil sample locations with four sample intervals are needed at the ECODS N-1 subunit, and these samples will receive total metals and Cr^{+6} analyses.*
12/18/2019	*If no other problem warranting action is found at the ECODS N-1 subunit, the Core Team agrees that an asbestos investigation is necessary to determine whether asbestos is present that poses a problem warranting action.*
12/18/2019	*Core Team agrees that Castor Bay (or equivalent unimpacted bay) will be sampled for three sediment/surface water background locations for the surface water impoundment area within the Scrap Lumber Pile (631-2G) subunit.*
12/18/2019	*Core Team agrees to take additional soil samples at four locations and at four sample intervals within the Scrap Lumber Pile for total metals and Cr^{+6} analyses. Three background soil locations will also be sampled at four intervals for total metals and Cr^{+6} analyses.*
12/18/2019	*Core Team agrees to use the 2014 concrete data during the contaminant migration evaluation for the Ford Building (690-N) subunit.*
12/18/2019	*Core Team agrees to the additional contingent surface (0-1 ft) samples (pending radiological survey) around the Ford Building (690-N) concrete pad prior to installation of the concrete cap.*

[1] Core team agreements should be documented at each phase and should be retained for each successive phase in order to maintain a comprehensive list for the life of the project.

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