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**Revision 0**

**PRE-DESIGN INVESTIGATION SUMMARY REPORT  
JANA ELEMENTARY SCHOOL NORTHWEST BANK OF  
COLDWATER CREEK AND ADJACENT MSD RIGHT-OF-WAY**

**FUSRAP North St. Louis County Sites  
St. Louis, Missouri**

**May 18, 2023**

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Prepared by:  
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**For:**  
U.S. Army Corps of Engineers St. Louis District  
FUSRAP Project Office  
114 James S. McDonnell Boulevard  
Hazelwood, Missouri 63042

Single Award Task Order Contract  
Contract Number W912P9-19-D-0011

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## **Table of Contents**

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List of Tables .....	i
List of Figures .....	ii
List of Attachments .....	ii
Acronyms and Abbreviations .....	iii
1.0 Introduction .....	1-1
1.1 Subject Area Boundary .....	1-2
1.2 Subject Area Description .....	1-2
2.0 Pre-Design Investigation Method .....	2-1
2.1 Evaluation of Historical and Geological Information .....	2-1
2.2 Pre-Design Investigation Sampling Overview .....	2-2
2.3 Gamma Walkover Survey .....	2-3
2.4 Sample Collection and Borehole Restoration .....	2-3
2.5 Evaluation of Analytical Data .....	2-4
2.6 Investigation-Derived Waste .....	2-5
2.7 Data Quality Assessment .....	2-5
3.0 Pre-Design Investigation Results and Evaluation .....	3-1
3.1 Historical Study and Evaluation .....	3-1
3.2 Results and Evaluation for Area 1 .....	3-2
3.3 Results and Evaluation for Area 2 .....	3-2
3.4 Results and Evaluation for Area 3 .....	3-3
3.5 Additional Results and Evaluation .....	3-3
4.0 Summary and Conclusions .....	4-1
5.0 References .....	5-1

## **List of Tables**

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<b>Table</b>	<b>Title</b>
1	Jana Elementary School NW Bank of Coldwater Creek and Adjacent MSD Right-of-Way Sample Locations with Radiological Contamination

## **List of Figures**

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<b>Figure</b>	<b>Title</b>
1	Cover Sheet
2	Existing Features, Utilities, and Topography
3	PDI Sample Locations
4A	Estimated Extent of Contamination Areas Key Map
4 (B through F)	Estimated Extent of Contamination
5 (A and B)	Cross-Sections

## **List of Appendices**

---

<b>Appendix</b>	<b>Title</b>
A	Historical and Geological Assessment - Jana Elementary School Northwest Bank of Coldwater Creek and Adjacent MSD Right-of-Way
B	Boring Logs
C	Pre-Design Investigation Analytical Data Table C.1 Jana Elementary School Northwest Bank of Coldwater Creek and Adjacent MSD Right-of-Way Pre-Design Investigation Radiological Data Results

## Acronyms and Abbreviations

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>	greater than
AEC	U.S. Atomic Energy Commission
ASTM	ASTM International
bcy	bank cubic yards
bgs	below ground surface
COC(s)	contaminant(s) of concern
CWC	Coldwater Creek
DQO(s)	data quality objective(s)
EPA	U.S. Environmental Protection Agency
EWG	East-West Gateway Council of Governments
FSSE	final status survey evaluation
FSSP	<i>Final Status Survey Plan for Soils, Structures, and Sediments at the St. Louis FUSRAP Sites, St. Louis, Missouri</i>
FUSRAP	Formerly Utilized Sites Remedial Action Program
Futura	Futura Coatings Company
GIS	Geographic Information System
GWS	gamma walkover survey
HGL	HydroGeoLogic, Inc.
HISS	Hazelwood Interim Storage Site
HSD	Hazelwood School District
HZ(s)	hydrostratigraphic zones
Mallinckrodt	Mallinckrodt LLC
MDNR	Missouri Department of Natural Resources
MED	Manhattan Engineer District
MSD	Metropolitan St. Louis Sewer District
msl	mean sea level
pCi/g	picoCuries per gram
PDI(s)	pre-design investigation(s)
PDI WD	<i>Pre-Design Investigation Work Description, FUSRAP North St. Louis County Sites, St. Louis, Missouri</i>
PDI WP	<i>Pre-Design Investigation Work Plan for Coldwater Creek North of St. Denis Bridge, St. Louis, Missouri</i>
PDI WP Addendum	<i>Addendum to the Pre-Design Investigation Work Plan for Coldwater Creek North of St. Denis Bridge: St. Ferdinand Park to Jana School, St. Louis, Missouri</i>
PDI WS	<i>Final Status Survey and Pre-Design Investigation Sample Work Scope for Jana Elementary School, FUSRAP North St. Louis County Sites, St. Louis, Missouri</i>

## **Acronyms and Abbreviations (Continued)**

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PDIR	Pre-Design Investigation Summary Report
PRAR	Post-Remedial Action Report
Ra-226	radium-226
RG(s)	remediation goal(s)
ROD	<i>Record of Decision for the North St. Louis County Sites, St. Louis, Missouri</i>
SAG	Sampling and Analysis Guide
SLAPS	St. Louis Airport Site
SOR <sub>N</sub>	net sum-of-ratios
Th-230	thorium-230
U-238	uranium-238
USACE	U.S. Army Corps of Engineers
USGS	U.S. Geological Survey
VP(s)	Vicinity Property(ies)

## 1.0 Introduction

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This Pre-Design Investigation Summary Report (PDIR) documents the activities and results of pre-design investigation (PDI) sampling completed in 2018 through 2022 by HydroGeoLogic, Inc. (HGL) and other U.S. Army Corps of Engineers (USACE) contractors on properties that are part of the Formerly Utilized Sites Remedial Action Program (FUSRAP) North St. Louis County sites in St. Louis, Missouri. The PDI activities were performed on Hazelwood School District (HSD) properties and the Metropolitan St. Louis Sewer District (MSD) right-of-way (ROW) located adjacent to the Jana Elementary School grounds at 405 Jana Lane in Florissant, Missouri. Specifically, this PDIR documents the PDI activities completed on the properties belonging to the HSD and adjacent MSD ROW properties near Jana Elementary School that have been found to contain radiological contamination. The results of the PDI activities for the portions of HSD property near Jana Elementary School that do not contain radiological contamination can be found in Appendix B of the *Pre-Design Investigation Summary Report and Final Status Survey Evaluation for Jana Elementary School Soil: Coldwater Creek Floodplain Properties CWC-365 and CWC-386 (Partial)* (USACE, 2023a).

The HSD and MSD properties documented within this report are situated to the northwest of Coldwater Creek (CWC) and are part of the St. Louis Airport Site (SLAPS) Vicinity Properties (VPs). For PDI designation purposes, these properties are part of CWC – Group 24, and henceforth, the portion of the properties encompassed by the subject area boundary depicted on Figure 1 will be referred to as the “subject area.”

The PDI activities were conducted within the subject area as directed by the USACE for the FUSRAP in accordance with the *Record of Decision for the North St. Louis County Sites, St. Louis, Missouri* (ROD) (USACE, 2005). The ROD was developed by the USACE in consultation with the U.S. Environmental Protection Agency (EPA) and the State of Missouri, pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act, to address Manhattan Engineer District (MED)/U.S. Atomic Energy Commission (AEC) contamination through implementation of the Selected Remedy. The Selected Remedy was deemed necessary to protect public health or welfare and the environment from actual or threatened releases of hazardous substances into the environment.

The purpose of the PDI activities at the subject area was to obtain sufficient radiological data to evaluate the subject area for the presence of radiological contaminants of concern (COCs) and to determine whether concentrations of radiological COCs exceeded ROD remediation criteria. In the context of this PDIR, radiological contamination is defined as the presence of radiological COCs in an individual soil or sediment sample or group of samples at net concentrations (above background concentration) that exceed the ROD remediation criteria. The PDI activities described

in this PDIR, including its associated Figures 1 through 5B, Table 1, and Appendices A through C, will be used in support of final status survey evaluation (FSSE) and/or remedial design for the subject area.

The ROD remediation goals (RGs) are based on the average concentration of the SLAPS VPs COCs within the entire population of data above the site background distribution for a 100-square-meter area. The final demonstration that ROD RGs have been met is not within the scope of this PDIR but will be completed as part of the FSSE to be conducted in accordance with the *Final Status Survey Plan for Soils, Structures, and Sediments at the St. Louis FUSRAP Sites, St. Louis, Missouri* (FSSP) (USACE, 2015). The results of the FSSE will be included in the Post-Remedial Action Report (PRAR) for the subject area.

## **1.1 Subject Area Boundary**

The subject area is bounded by the Jana Elementary School grounds to the northwest, vacant land to the northeast, CWC to the southeast, and Lawnview Creek to the south (see Figure 1). In general, the subject area boundary includes the following properties or portions thereof:

- HSD Parcel 06J220632 (CWC-386)
- HSD Parcel 06J220094 (CWC-387)
- HSD Parcel 06J220126 (CWC-388)
- MSD ROW (CWC Corridor)

## **1.2 Subject Area Description**

The subject area is located in Florissant, Missouri, west of CWC (see Figure 1) within a residential area that was developed during the 1960s. The Jana Elementary School building was constructed in the late 1960s and sits approximately 340 feet northwest outside the subject area boundary. A large sanitary sewer is present within the subject area which runs parallel to CWC adjacent to the northwestern edge of the berm at the top of bank (see Figure 2). There is also an overhead communication line and a buried fiber optic line toward the northern extent of the subject area. Portions of the subject area include grass-covered open land to the southwest, and tree- and scrub-vegetated areas are located within the northeast portion and along the southern boundary near CWC and Lawnview Creek.

## 2.0 Pre-Design Investigation Method

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The PDI activities completed by HGL and other USACE contractors documented in this PDIR were implemented at the direction of the USACE in accordance with the FSSP (USACE, 2015) and the following documents:

- *Pre-Design Investigation Work Plan for Coldwater Creek North of St. Denis Bridge, St. Louis, Missouri* (PDI WP) (USACE, 2019a),
- *Addendum to the Pre-Design Investigation Work Plan for Coldwater Creek North of St. Denis Bridge: St. Ferdinand Park to Jana School, St. Louis, Missouri* (PDI WP Addendum) (USACE, 2019b),
- *Pre-Design Investigation Work Description, FUSRAP North St. Louis County Sites, St. Louis, Missouri* (PDI WD) (HGL, 2021), and
- *Final Status Survey and Pre-Design Investigation Sampling Work Scope for Jana Elementary School, FUSRAP North St. Louis County Sites, St. Louis, Missouri* (PDI WS) (HGL, 2022).

The activities performed as part of this PDI consisted of the following:

- A review of the available historical and geological information, and historical analytical data collected prior to 2017 (U.S. Department of Energy, 1995),
- Identification of locations for biased (PDI) and systematic final status survey sampling,
- Collection of PDI soil and sediment samples, and
- A subsequent data review.

## 2.1 Evaluation of Historical and Geological Information

As part of the PDI planning, a review of the following available historical and geological information sources was conducted to aid in the determination of PDI sample locations:

- Aerial photographs obtained from the St. Louis County Geographic Information System (GIS) Service Center (St. Louis County, 2022), Google Earth (Google, 2022), and East-West Gateway Council of Governments (EWG) (EWG, 2015).
- U.S. Geological Survey (USGS) topographic maps of the Florissant and St. Charles, Missouri quadrangles (USGS, 1927, 1933, 1935, 1954, 1968, 1974, 1982, 1994, and 1998).
- Flood hazard areas and floodway data obtained from the St. Louis County GIS Service Center, as identified by the Federal Emergency Management Agency (St. Louis County, 2022).

- Information obtained from other USACE-directed FUSRAP PDI activities adjacent to the subject area documented in the *Pre-Design Investigation Summary Report and Final Status Survey Evaluation for Coldwater Creek (CWC) - Floodplain Properties CWC-307 through CWC-317, CWC-319 through CWC-330, and CWC-357, St. Louis, Missouri* (USACE, 2023b).
- Geologic data from the PDI boring logs (see Appendix B).

The historical land development activities and/or drainage/erosional features identified during the PDI were compared with the time periods and locations that MED/AEC by-products (residues) were handled, transported, and disposed, as discussed in Appendix A, Historical and Geological Assessment - Jana Elementary School Northwest Bank of Coldwater Creek and Adjacent MSD Right-of-Way. A determination was then made as to whether radiological contamination may be present around, within, or beneath the historical features identified in the subject area. This information was then used, in conjunction with the available historical and PDI analytical data, to develop the estimated extent of contamination (see Section 3.0).

## **2.2 Pre-Design Investigation Sampling Overview**

The initial subject area PDI sampling was performed by Leidos in August through September of 2018, June through July of 2019, and July through August of 2021 in accordance with the PDI WP and PDI WP Addendum. Biased and systematic soil samples were collected within and adjacent to the CWC corridor in support of FSSE. Samples were collected from locations within the subject area boundary from the ground surface to depths up to 12 feet below ground surface (bgs) (see boring logs in Appendix B). In general, biased sampling focused on delineating systematic samples that indicated radiological contamination to better define the extent of radiological contamination and to evaluate depositional features including drainages, areas associated with CWC channel improvements, and utility work.

Further soil and sediment sampling was conducted by HGL within the subject area in December 2022 in accordance with the PDI WS. The PDI WS was developed to address allegations regarding unacceptable levels of radiological COCs on and adjacent to the subject area associated with MED/AEC activities (Brustowicz, et al., 2022) and to further delineate the estimated extent of contamination within the subject area. The PDI activities included collection of biased soil samples and extending the overall depth of sample collection at previously sampled locations. In general, soil samples were collected from the ground surface to depths from 16.0 to 28.0 feet bgs. These depths were developed to evaluate the subject area well beyond the standard conceptual model for contamination within the 10-year floodplain of CWC, specifically, sampling was performed beyond the depth of potential contamination related to MED/AEC activities. The biased sampling was performed to further delineate radiological COCs identified during previous PDI activities, further evaluate historical and/or geological features (e.g., buried soil horizons, areas believed to be historically topographically low, potential historical floodplain deposits) that may harbor

radiological COCs, and collect sufficient radiological and geological data to fill data gaps in support of FSSE and/or remedial design for the subject area.

## **2.3 Gamma Walkover Survey**

A gamma walkover survey (GWS) was performed in accordance with the *FUSRAP Final Status Survey Plan for the St. Louis North County Vicinity Properties, St. Louis, Missouri* (USACE, 1999). Results of the GWS will be documented in the FSSE for this area.

## **2.4 Sample Collection and Borehole Restoration**

Biased and systematic samples were collected at various locations within the subject area. Systematic sampling was conducted using a Class 2 grid system to ensure samples representative of the entire subject area were collected. The biased sampling focused on target areas identified as having a greater potential for contamination to be present at levels above the ROD RGs (USACE, 2005). Target areas within the subject area included low-lying areas beyond the CWC corridor top of bank, but within the 10-year floodplain (see Figure 3). A total of 75 boreholes were sampled, with depths up to 28 feet bgs, within or adjacent to the subject area. Of these 75 boreholes, 64 were sampled as part of an initial evaluation of the subject area beginning in 2018, and the remaining 11 sample locations were added in 2022 to further evaluate the subject area (USACE, 2023).

The PDI sampling was completed using either the hand-sampling or drill rig methods described in the PDI WD, the PDI WP, and the PDI WP Addendum. The specific sampling equipment used for each boring is detailed on the boring logs in Appendix B. For both hand-sampling and drill rig sampling methods, sample cores were retrieved and evaluated in 2-foot evaluation lengths for adequate recovery, lithologic description, and field screening until the proposed boring depth was achieved. Within each evaluation length, one or more contiguous, discrete soil or sediment samples (typically 0.5 feet long) were collected for laboratory analysis or archiving.

The recovered soil or sediment was evaluated by the field geologist to determine whether more than 33 percent of the material in each 2-foot evaluation length was unrecoverable. Recovery issues were not encountered within the subject area that affected the evaluation of the soil column.

The sampled material was field screened for radiological activity using a Ludlum Model 2221 scaler/ratemeter together with a Ludlum Model 44-10 (2x2 sodium iodide scintillation detector). During drilling activities, the breathing zone and soil and sediment cores were screened for volatile organic compounds using a photoionization detector. The field geologist identified and lithologically described the sample material using ASTM International (ASTM) Method D2488-17e1, “Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)” (ASTM, 2017).

The lithology and screening results were recorded on the boring log. If applicable, remnant surface horizons, morphological elements (e.g., depositional features such as sediment lenses or repeating patterns), or other historical indicators (e.g., debris zones) were also recorded. These features may help identify areas of contamination. The available boring logs for sample locations specific to this PDIR are included in Appendix B.

Soil and sediment samples collected from each boring location were submitted under chain-of-custody to the St. Louis FUSRAP Laboratory for analysis of the SLAPS VPs radiological COCs by gamma and alpha spectroscopy, in accordance with the FSSP and the *Sampling and Analysis Guide for the St. Louis Sites, St. Louis, Missouri* (SAG) (USACE, 2000). Soil and sediment samples collected for archiving were transported to the on-site storage under chain-of-custody in accordance with SAG procedures. Also, in accordance with the SAG, the sampling equipment used was cleaned and decontaminated prior to the collection of the respective soil and sediment samples.

Boreholes were abandoned in accordance with the SAG and Missouri Department of Natural Resources (MDNR) requirements (MDNR, 2019 [or previous versions]), described below. The abandoned boreholes were then capped with material consistent with the surrounding surface material.

In general, sample borings were abandoned as follows:

- Boreholes at depths of 9.9 feet bgs and less were backfilled with bentonite chips.
- Boreholes deeper than 9.9 feet bgs were backfilled with a high-solids bentonite slurry grout.

## 2.5 Evaluation of Analytical Data

The subject area analytical data were used as the input for interpretation of the PDI results. The gross radiological soil and sediment sample results (not corrected for the arithmetic mean site background concentrations) for each sample were imported into a working database. Analytical data tables (see Table 1, and Table C.1 in Appendix C) were then generated. These data tables contain the gross analytical results and associated net sum-of-ratios (SOR<sub>N</sub>) value for each sample after correction for contribution from background. The SOR<sub>N</sub> calculations for surface soil (upper 0.5 feet), subsequent subsurface soil (0.5 feet bgs and greater), and sediment criteria (below the mean water gradient within the CWC corridor, defined as 474 feet mean sea level (msl) for the subject area) are provided in the following expressions (USACE, 2005):

$$\text{SOR}_{\text{N-surface}} = \frac{\text{Ra-226}_{\text{N}}}{5 \text{ pCi/g}} + \frac{\text{Th-230}_{\text{N}}}{14 \text{ pCi/g}} + \frac{\text{U-238}_{\text{N}}}{50 \text{ pCi/g}}$$

$$SOR_{N\text{-subsurface}} = \frac{Ra-226_N}{15 \text{ pCi/g}} + \frac{Th-230_N}{15 \text{ pCi/g}} + \frac{U-238_N}{50 \text{ pCi/g}}$$

$$SOR_{N\text{-sediment}} = \frac{Ra-226_N}{15 \text{ pCi/g}} + \frac{Th-230_N}{43 \text{ pCi/g}} + \frac{U-238_N}{150 \text{ pCi/g}}$$

Where pCi/g = picoCuries per gram, Ra-226 = radium-226, Th-230 = thorium-230, and U-238 = uranium-238

The calculated  $SOR_N$  value for each sample was compared to the ROD remediation criteria to determine if radiological contamination was present. A sample with a  $SOR_N$  value greater than 1.0 ( $SOR_N > 1.0$ ) was presumed to be contaminated. If contamination was identified, the available data and information were evaluated further to estimate the vertical and horizontal extent of radiological contamination.

The evaluation of the estimated extent of contamination was performed considering the available sample analytical data (see Table C.1 in Appendix C). Information pertaining to nearby structural features or barriers that might limit or influence the path of migration of contamination in a preferred direction was also considered. It should be noted that if radiological contamination was detected within a sample from a particular sample interval (e.g., from 0.0 to 0.5 feet bgs), it was conservatively assumed that the depth of contamination at that location extended to the top of the next sampled interval that did not contain radiological contamination, or to the top of a structural or geological barrier. Upon completion of the evaluation, contours depicting an estimation of the extent of contamination were developed.

## 2.6 Investigation-Derived Waste

Investigation-derived waste generated during the PDI activities was managed in accordance with applicable USACE contractor procedures and the waste minimization guidelines as specified in the PDI WD, the PDI WP, and the PDI WP Addendum. The waste included soil cuttings, decontamination water, disposable personal protective and sampling equipment, and analyzed soil and sediment samples.

## 2.7 Data Quality Assessment

Data quality objectives (DQOs) were established for the subject area as described in the PDI WD, the PDI WP, and the PDI WP Addendum. The DQOs were developed in accordance with the *Guidance on Systematic Planning Using the Data Quality Objectives Process* (EPA, 2006) and provided qualitative and quantitative statements that clarified the analytical project objectives based on the end use of the data being collected. The data quality assessment results for the subject area PDI will be included as part of the associated FSSE and/or PRAR.

### **3.0 Pre-Design Investigation Results and Evaluation**

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The PDI methods discussed in Section 2.0 resulted in the identification of three radiologically contaminated areas (Areas 1 through 3) within the subject area (see Figures 4A through 4F). These areas were identified by evaluating the analytical and geological results from the soil and sediment samples collected within the subject area during the 2022 PDI activities, and the previous data collected by other USACE contractors as described in Section 2.2.

The data were evaluated in conjunction with the relevant historical and geological information to develop an estimated extent of contamination within the subject area. The subject area PDI analytical results from radiologically contaminated sample locations are summarized in Table 1, and all sample data results are presented in Table C.1 in Appendix C. Additionally, boring logs are included in Appendix B.

#### **3.1 Historical Study and Evaluation**

Aerial photography from 1937, 1966, 1970, and 2008 was used to identify changes in various features and structures within the subject area (see Figures A-1 and A-2 in Appendix A). Features of interest identified include changes in the ground surface level, earthwork, the amount of vegetation present, and the construction of a sanitary sewer within the subject area.

The most significant finding of the historical assessment was related to changes in the shape of the northwest bank of CWC within the subject area. Coldwater Creek was channelized sometime before 1937 (see Figure A-1). Subsequent to channelization, radiological COCs associated with MED/AEC activities were deposited onto portions of the banks of CWC within the subject area during flood events that occurred prior to the removal of the COC's source material from the SLAPS and Hazelwood Interim Storage Site/Futura Coatings Company (see Appendix A). Analysis of historical topography and aerial photographs from 1966 and 1970 indicated that portions of the bank along CWC, within the subject area, were built up from their original post-channelization height, creating the potential for cover material to inadvertently bury radiological COCs that may have been deposited along the bank. Evaluation of the locations sampled during the PDI indicate this process may be the method of deposition that occurred in Areas 2 and 3 of the subject area.

Other results of the historical assessment indicated that potentially low-lying areas situated beyond the top of bank of CWC, but within the estimated 10-year floodplain, could have provided a depositional environment for sediments suspended in the creek water during overbank flood events of CWC. During the PDI, samples were collected in these low-lying areas to evaluate the soil for the presence of radiological COCs. The results of soil samples collected in these areas did not indicate that contamination was present, within the subject area, beyond the bank areas (as

discussed in Sections 3.2 through 3.5). See Appendix A for additional detailed information regarding the historical and geological assessment of the subject area.

### **3.2 Results and Evaluation for Area 1**

Area 1 contains the southernmost estimated extent of contamination within the subject area and is situated along the western bank of CWC near the water's edge within parcel 06J220632 (CWC-386). The area encompasses a portion of the bank approximately 15 feet long and 10 feet wide (see Figures 4A and 4B).

Sample location SVP205306 yielded a single sample (SVP205306, from 0.0 to 0.5 feet bgs) with analytical results of  $SOR_N > 1$  (see Table 1). Area 1 does not exceed ROD RGs (evaluated as a 100-square-meter area); however, the location was included within the estimated extent of contamination due to the proximity to Area 2 and the anticipated remedial action that will occur therein.

The maximum depth contained within the estimated extent of contamination in Area 1 is approximately 5.0 feet bgs and it averages approximately 2.0 feet bgs over the whole area. The variation in depth is due to the slope of the bank. The estimated extent of contamination in Area 1 covers approximately 77 square feet, with a soil volume of approximately 4 bank cubic yards (bcy).

### **3.3 Results and Evaluation for Area 2**

Area 2 begins approximately 30 feet northeast from Area 1. There is no radiological contamination indicated at the surface of Area 2, and the estimated extent of contamination lies above the water level of CWC during average conditions. The area encompasses a portion of the bank approximately 40 feet long and 25 feet wide within parcel 06J220632 (CWC-386) (see Figures 4A and 4B).

Contamination appears to lie upon a historical surface that was later covered by earthwork along the bank of CWC, as described in Section 3.1. Generally trending upward and away from CWC, the deepest point of estimated contamination in Area 2 is at 475.0 feet msl (approximately 3.0 to 5.0 feet bgs). Contaminated soil may continue uptrend toward uncontaminated bounding samples SVP202524 and SVP202516, and that is reflected in the estimated extent boundary. In total, seven sample results collected from four soil boring locations within Area 2 indicated the existence of radiological contamination. Soil boring locations SVP205296, SVP208715, SVP208721, and SVP208729 each have sample results with an  $SOR_N > 1$ . These seven samples represent the only radiological contamination identified on Jana Elementary School grounds, and they are located approximately 15 to 20 feet below the top of the northwest bank of CWC, approximately 640 feet from the school building.

The maximum depth contained within the estimated extent of contamination in Area 2 is approximately 3.0 to 5.0 feet bgs and includes up to 2 feet of potentially uncontaminated cover material. The estimated extent of contamination in Area 2 covers approximately 691 square feet, with a soil volume of approximately 115 bcy.

### **3.4 Results and Evaluation for Area 3**

Area 3 begins approximately 80 feet northeast from Area 2 and continues until the northernmost boundary of the subject area, where contamination is expected to continue and will be evaluated in a future PDI. There is no radiological contamination indicated at the surface of Area 3, and the estimated extent of contamination does not intersect CWC during average conditions. Area 3 encompasses a portion of the bank approximately 560 feet long and 40 feet wide in the parcel designated as MSD ROW (see Figures 4A and 4C through 4F).

Similar to Area 2, but on a larger scale, potential contamination generally trends upward and away from CWC in a lens extending from approximately 474.0 feet msl near the creek to approximately 492.0 feet msl toward the top of bank. This lens likely represents a historical ground surface along the bank of CWC that has since been buried due to earthwork along the top of bank, as described in Section 3.1. A trend was identified in the location of samples with an  $SOR_N > 1$  extending from northeast to southwest in a line parallel to CWC. Following the trend southwest, there is potential for a lens of contaminated material within the bank between sample locations SVP202554, SVP202564, SVP202574, SVP202584, and SVP202594 to the northwest, and sample locations SVP202206 and SVP205292 to the southeast, some of which contain elevated levels of radiological COCs below ROD RGs. Due to the lack of sample data density in this area, the estimated extent of contamination includes this area of uncertainty. In total, 17 sample results within Area 3 indicated radiological contamination.

The maximum depth contained within the estimated extent of contamination in Area 3 is approximately 12.0 feet bgs and includes up to 2 feet of potentially uncontaminated cover material. The estimated extent of contamination in Area 3 covers approximately 23,990 square feet, with a soil volume of approximately 6,612 bcy.

### **3.5 Additional Results and Evaluation**

Boring locations within the subject area were sampled and evaluated to depths greater than typical to ensure potential depositional environments, particularly a buried historical floodplain, were intersected and analyzed. The following biased sample locations were designed to evaluate a current low-lying area northwest of CWC within the subject area:

- SVP263943
- SVP264130
- SVP263919

- SVP263930
- SVP264117
- SVP263782
- SVP263795
- SVP263769

Each borehole was sampled beyond an elevation of 474 feet msl to coincide with the deepest known contamination in the subject area, which is only indicated along the lower banks of CWC. The elevation of 474 feet msl was also selected to ensure a continuous column of soil was evaluated to depths beyond any reasonable suspicion of potential contamination, partially in response to the allegations of MED/AEC-related radiological contamination present beyond the standard conceptual model for COCs in affected CWC properties (Brustowicz, et al., 2022). Additionally, the material was evaluated by field geologists to identify potential historical floodplains that may have been buried by construction or leveling operations completed within the subject area. No historical floodplains were identified that had been impacted by radiological contamination at these sample locations.

Three sample locations, SVP263954, SVP263969, and SVP264274, were designed to extend the depth of previously sampled locations SVP202524, SVP202534, and SVP202516. These borings had to be offset from the original sample locations due to the steepness of the bank. Each boring was sampled beyond an elevation of 474 feet msl to coincide with the elevation of the deepest known contamination in the subject area. None of the samples collected indicated COCs above RGs stated in the ROD.

## 4.0 Summary and Conclusions

Pre-design investigation activities were completed within the subject area, located in Florissant, Missouri, in 2018 through 2022. The subject area includes a portion of CWC – Group 24, specifically portions of the Jana Elementary School property owned by the HSD and MSD ROW adjacent to CWC (see Figure 1). The USACE directed HGL and other USACE contractors to perform PDI activities within the subject area to address potential radiological contamination due to flood events associated with CWC. In 2022, the USACE directed HGL to complete additional PDI sampling within the subject area in response to allegations of MED/AEC-related radiological contamination present beyond the standard conceptual model for COCs in affected CWC properties (Brustowicz, et al., 2022). In general, this PDIR documents the PDI activities conducted within the subject area.

The PDI samples collected from within the subject area were analyzed for radiological COCs as specified in the ROD (USACE, 2005). Radiological contamination was identified at sample locations within the subject area at Areas 1 through 3 (see Figure 4A). Areas 1 and 2 are located on HSD-owned property, parcel 06J220632 (CWC-386), approximately 640 feet from the Jana Elementary School building; Area 3 is located on the parcel designated as MSD ROW. The estimated extent of contamination was developed for these three Areas based on the PDI sample analytical results and geological information recorded in the boring logs. Where radiological contamination is present, it is situated within the bank of CWC, generally under cover material.

The estimated extent of contamination for each Area is summarized in the table below along with the estimated volume of radiologically contaminated soil. The total estimated volume of radiological contamination identified within the subject area represents approximately 6,731 bcy of soil.

**Summary of Estimated Radiological Contamination at Jana Elementary School Northwest Bank of CWC and Adjacent MSD ROW School East Portion**

Area	Location	Estimated Areal Extent of Radiological Contamination	Estimated Vertical Extent of Radiological Contamination	Estimated Volume of Radiological Contamination
1	Southern portion of the subject area; within the western bank of CWC on parcel 06J220632 (CWC-386)	77 ft <sup>2</sup>	474.0 to 479.0 feet msl	4 bcy

**Summary of Estimated Radiological Contamination at Jana Elementary School Northwest Bank of CWC and Adjacent MSD ROW School East Portion (Continued)**

Area	Location	Estimated Areal Extent of Radiological Contamination	Estimated Vertical Extent of Radiological Contamination	Estimated Volume of Radiological Contamination
2	Immediately northeast of Area 1; within the western bank of CWC on parcel 06J220632 (CWC-386). Includes potentially clean overburden.	691 ft <sup>2</sup>	475.0 to 485.0 feet msl	115 bcy
3	North of Area 2, extending to the northeastern edge of the subject area; within the western bank of CWC on the parcel designated as MSD ROW. Includes potentially clean overburden.	23,990 ft <sup>2</sup>	474.0 to 492.0 feet msl	6,612 bcy

*ft<sup>2</sup> = square feet*

## 5.0 References

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***TABLE***

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**Table 1**  
**Jana Elementary School NW Bank of Coldwater Creek and Adjacent MSD Right-of-Way**  
**Sample Locations with Radiological Contamination**

May 18, 2023  
Revision 0

Page 1 of 20

Sample Location	Sample Identification Number	Collection Date	Start Depth (ft bgs) <sup>1</sup>	End Depth (ft bgs)	Parameter	Result <sup>2</sup> (pCi/g <sup>3</sup> )	Error	Detection Limit (pCi/g)	SOR Value <sup>4</sup>
<b>SVP202606</b>	SVP202606	8/22/2018	0.0	0.5	AC-227	0.00	0.25	0.19	0.43
					AM-241	0.00	0.08	0.13	
					CS-137	0.05	0.01	0.02	
					PA-231	0.50	0.61	1.06	
					RA-226	1.73	0.43	0.07	
					RA-228	0.87	0.11	0.07	
					TH-228	0.86	0.34	0.16	
					TH-230	5.22	1.14	0.14	
					TH-232	0.55	0.26	0.13	
					U-235	0.02	0.22	0.36	
					U-238	1.29	0.24	0.47	
	SVP202607	8/22/2018	1.5	2.0	AC-227	0.98	0.13	0.15	4.80
					AM-241	0.02	0.04	0.07	
					CS-137	0.27	0.02	0.02	
					PA-231	0.78	0.28	0.76	
					RA-226	3.94	0.94	0.07	
					RA-228	0.88	0.12	0.06	
					TH-228	0.81	0.33	0.15	
					TH-230	71.10	12.20	0.15	
					TH-232	1.50	0.48	0.12	
					U-235	0.11	0.22	0.37	
					U-238	1.09	0.19	0.40	
	SVP205301	8/22/2018	2.0	2.5	AC-227	0.48	0.07	0.19	2.04
					AM-241	0.00	0.05	0.08	
					CS-137	0.31	0.04	0.03	
					PA-231	0.00	0.87	1.42	
					RA-226	2.57	0.65	0.10	
					RA-228	0.88	0.11	0.09	
					TH-228	1.01	0.37	0.16	
					TH-230	30.90	5.44	0.13	
					TH-232	0.78	0.32	0.13	
					U-235	0.39	0.28	0.47	
					U-238	1.48	0.26	0.46	
	SVP206968	8/22/2018	4.0	4.5	AC-227	0.00	0.16	0.16	0.16
					AM-241	0.00	0.03	0.05	
					CS-137	0.00	0.02	0.03	
					PA-231	0.24	0.61	1.04	
					RA-226	1.61	0.40	0.07	
					RA-228	0.98	0.12	0.07	
					TH-228	1.50	0.52	0.14	
					TH-230	3.69	0.97	0.14	
					TH-232	1.02	0.41	0.14	
					U-235	0.05	0.19	0.32	
					U-238	1.29	0.21	0.34	

**Table 1**  
**Jana Elementary School NW Bank of Coldwater Creek and Adjacent MSD Right-of-Way**  
**Sample Locations with Radiological Contamination**

May 18, 2023  
Revision 0

Page 2 of 20

Sample Location	Sample Identification Number	Collection Date	Start Depth (ft bgs) <sup>1</sup>	End Depth (ft bgs)	Parameter	Result <sup>2</sup> (pCi/g <sup>3</sup> )	Error	Detection Limit (pCi/g)	SOR Value <sup>4</sup>
<b>SVP202616</b>	SVP202616	8/23/2018	0.0	0.5	AC-227	0.00	0.22	0.15	0.23
					AM-241	0.01	0.04	0.06	
					CS-137	0.02	0.02	0.03	
					PA-231	0.33	0.60	1.03	
					RA-226	1.59	0.40	0.07	
					RA-228	0.84	0.12	0.06	
					TH-228	0.97	0.36	0.15	
					TH-230	2.96	0.74	0.14	
					TH-232	0.59	0.27	0.10	
					U-235	0.14	0.19	0.32	
					U-238	1.00	0.19	0.36	
	SVP202616-1	8/23/2018	0.0	0.5	AC-227	0.00	0.37	0.32	0.17
					AM-241	0.00	0.08	0.13	
					CS-137	0.02	0.03	0.06	
					PA-231	0.00	1.16	1.91	
					RA-226	1.39	0.38	0.14	
					RA-228	0.71	0.12	0.12	
					TH-228	0.64	0.29	0.15	
					TH-230	2.70	0.71	0.13	
					TH-232	1.13	0.40	0.11	
					U-235	0.02	0.36	0.60	
					U-238	0.00	0.17	1.29	
	<b>SVP202617</b>	8/23/2018	1.5	2.0	<b>AC-227</b>	<b>0.28</b>	<b>0.07</b>	<b>0.14</b>	<b>1.11</b>
					<b>AM-241</b>	<b>0.01</b>	<b>0.08</b>	<b>0.13</b>	
					<b>CS-137</b>	<b>0.05</b>	<b>0.01</b>	<b>0.02</b>	
					<b>PA-231</b>	<b>0.00</b>	<b>0.65</b>	<b>1.08</b>	
					<b>RA-226</b>	<b>2.31</b>	<b>0.56</b>	<b>0.07</b>	
					<b>RA-228</b>	<b>0.93</b>	<b>0.11</b>	<b>0.07</b>	
					<b>TH-228</b>	<b>0.95</b>	<b>0.36</b>	<b>0.16</b>	
					<b>TH-230</b>	<b>17.30</b>	<b>3.15</b>	<b>0.14</b>	
					<b>TH-232</b>	<b>0.93</b>	<b>0.35</b>	<b>0.10</b>	
					<b>U-235</b>	<b>0.20</b>	<b>0.23</b>	<b>0.38</b>	
					<b>U-238</b>	<b>1.37</b>	<b>0.25</b>	<b>0.44</b>	
	<b>SVP202618</b>	8/23/2018	3.0	3.5	<b>AC-227</b>	<b>0.63</b>	<b>0.08</b>	<b>0.14</b>	<b>2.76</b>
					<b>AM-241</b>	<b>0.00</b>	<b>0.08</b>	<b>0.13</b>	
					<b>CS-137</b>	<b>0.23</b>	<b>0.04</b>	<b>0.02</b>	
					<b>PA-231</b>	<b>0.54</b>	<b>0.23</b>	<b>0.67</b>	
					<b>RA-226</b>	<b>3.51</b>	<b>0.84</b>	<b>0.07</b>	
					<b>RA-228</b>	<b>0.95</b>	<b>0.12</b>	<b>0.07</b>	
					<b>TH-228</b>	<b>1.08</b>	<b>0.39</b>	<b>0.17</b>	
					<b>TH-230</b>	<b>40.80</b>	<b>7.24</b>	<b>0.17</b>	
					<b>TH-232</b>	<b>1.24</b>	<b>0.42</b>	<b>0.11</b>	
					<b>U-235</b>	<b>0.00</b>	<b>0.21</b>	<b>0.35</b>	
					<b>U-238</b>	<b>1.70</b>	<b>0.28</b>	<b>0.44</b>	

**Table 1**  
**Jana Elementary School NW Bank of Coldwater Creek and Adjacent MSD Right-of-Way**  
**Sample Locations with Radiological Contamination**

May 18, 2023  
Revision 0

Page 3 of 20

Sample Location	Sample Identification Number	Collection Date	Start Depth (ft bgs) <sup>1</sup>	End Depth (ft bgs)	Parameter	Result <sup>2</sup> (pCi/g <sup>3</sup> )	Error	Detection Limit (pCi/g)	SOR Value <sup>4</sup>
SVP202616	SVP202619	8/23/1918	4.5	5.0	AC-227	0.81	0.09	0.15	4.04
					AM-241	0.03	0.04	0.07	
					CS-137	0.31	0.06	0.02	
					PA-231	0.40	0.25	0.74	
					RA-226	3.83	0.92	0.07	
					RA-228	0.87	0.12	0.07	
					TH-228	0.95	0.38	0.18	
					TH-230	59.70	10.90	0.17	
					TH-232	1.88	0.59	0.17	
					U-235	0.12	0.23	0.38	
					U-238	1.41	0.23	0.43	
	SVP206976	8/23/2018	5.5	6.0	AC-227	0.36	0.08	0.14	2.36
					AM-241	0.05	0.08	0.14	
					CS-137	0.30	0.03	0.02	
					PA-231	0.47	0.66	1.11	
					RA-226	3.03	0.73	0.07	
					RA-228	0.97	0.12	0.07	
					TH-228	1.09	0.38	0.16	
					TH-230	35.00	6.25	0.10	
					TH-232	1.12	0.39	0.11	
					U-235	0.14	0.23	0.38	
					U-238	2.54	0.40	0.46	
SVP202626	SVP202626	8/23/2018	0.0	0.5	AC-227	0.00	0.13	0.14	0.19
					AM-241	0.01	0.03	0.05	
					CS-137	0.02	0.01	0.01	
					PA-231	0.18	0.52	0.90	
					RA-226	1.44	0.36	0.06	
					RA-228	0.78	0.10	0.06	
					TH-228	1.14	0.40	0.18	
					TH-230	2.77	0.72	0.16	
					TH-232	1.13	0.40	0.12	
					U-235	0.00	0.17	0.28	
					U-238	0.87	0.16	0.31	
	SVP202627	8/23/2018	1.5	2.0	AC-227	0.00	0.16	0.19	0.18
					AM-241	0.02	0.08	0.13	
					CS-137	0.00	0.02	0.03	
					PA-231	0.00	0.64	1.04	
					RA-226	1.64	0.42	0.07	
					RA-228	0.86	0.13	0.07	
					TH-228	0.56	0.27	0.15	
					TH-230	4.09	0.96	0.12	
					TH-232	0.70	0.31	0.20	
					U-235	0.28	0.22	0.38	
					U-238	1.16	0.46	0.44	

**Table 1**  
**Jana Elementary School NW Bank of Coldwater Creek and Adjacent MSD Right-of-Way**  
**Sample Locations with Radiological Contamination**

May 18, 2023  
Revision 0

Page 4 of 20

Sample Location	Sample Identification Number	Collection Date	Start Depth (ft bgs) <sup>1</sup>	End Depth (ft bgs)	Parameter	Result <sup>2</sup> (pCi/g <sup>3</sup> )	Error	Detection Limit (pCi/g)	SOR Value <sup>4</sup>
SVP202626	SVP205302	8/23/2018	3.5	4.0	AC-227	0.35	0.08	0.18	1.30
					AM-241	0.00	0.04	0.07	
					CS-137	0.08	0.02	0.02	
					PA-231	0.85	0.84	1.44	
					RA-226	2.28	0.59	0.08	
					RA-228	0.84	0.13	0.08	
					TH-228	0.99	0.37	0.19	
					TH-230	20.10	3.62	0.10	
					TH-232	1.38	0.44	0.13	
					U-235	0.01	0.26	0.44	
					U-238	1.44	0.22	0.41	
	SVP205291	8/23/2018	5.5	6.0	AC-227	1.06	0.16	0.17	5.69
					AM-241	0.00	0.04	0.07	
					CS-137	0.11	0.02	0.02	
					PA-231	0.78	0.29	0.78	
					RA-226	4.56	1.09	0.07	
					RA-228	0.96	0.12	0.07	
					TH-228	1.44	0.46	0.15	
					TH-230	83.60	14.70	0.15	
					TH-232	2.33	0.64	0.13	
					U-235	0.13	0.24	0.39	
					U-238	1.65	0.50	0.74	
SVP202636	SVP202636	8/27/2018	0.0	0.5	AC-227	0.00	0.21	0.15	0.25
					AM-241	0.03	0.03	0.06	
					CS-137	0.02	0.01	0.03	
					PA-231	0.00	0.54	0.89	
					RA-226	1.28	0.33	0.05	
					RA-228	0.81	0.11	0.05	
					TH-228	0.98	0.45	0.25	
					TH-230	4.12	1.16	0.22	
					TH-232	0.92	0.43	0.18	
					U-235	0.02	0.18	0.30	
					U-238	1.04	0.19	0.34	
	SVP202637	8/27/2018	1.5	2.0	AC-227	0.00	0.15	0.15	0.14
					AM-241	0.00	0.03	0.06	
					CS-137	0.04	0.01	0.01	
					PA-231	0.39	0.54	0.93	
					RA-226	1.30	0.32	0.06	
					RA-228	0.80	0.11	0.06	
					TH-228	1.12	0.47	0.23	
					TH-230	3.81	1.05	0.16	
					TH-232	0.99	0.43	0.18	
					U-235	0.01	0.18	0.30	
					U-238	1.03	0.19	0.32	

Table 1

May 18, 2023

**Jana Elementary School NW Bank of Coldwater Creek and Adjacent MSD Right-of-Way  
Sample Locations with Radiological Contamination**

Revision 0

Page 5 of 20

Sample Location	Sample Identification Number	Collection Date	Start Depth (ft bgs) <sup>1</sup>	End Depth (ft bgs)	Parameter	Result <sup>2</sup> (pCi/g <sup>3</sup> )	Error	Detection Limit (pCi/g)	SOR Value <sup>4</sup>
<b>SVP202636</b>	SVP202638	8/27/2018	3.5	4.0	AC-227	0.00	0.21	0.17	0.57
					AM-241	0.02	0.03	0.06	
					CS-137	0.07	0.01	0.02	
					PA-231	0.19	0.56	0.95	
					RA-226	1.55	0.38	0.06	
					RA-228	0.85	0.10	0.05	
					TH-228	1.14	0.49	0.24	
					TH-230	9.97	2.34	0.18	
					TH-232	1.31	0.53	0.18	
					U-235	0.13	0.19	0.32	
					U-238	1.27	0.23	0.32	
	SVP202639	8/27/2018	4.0	4.5	AC-227	0.28	0.07	0.13	1.23
					AM-241	0.01	0.04	0.06	
					CS-137	0.08	0.02	0.02	
					PA-231	0.10	0.57	0.97	
					RA-226	1.86	0.46	0.06	
					RA-228	0.83	0.10	0.06	
					TH-228	1.10	0.42	0.20	
					TH-230	19.60	3.77	0.17	
					TH-232	1.05	0.40	0.13	
					U-235	0.00	0.20	0.33	
					U-238	1.04	0.19	0.35	
	SVP207023	8/27/2018	5.5	6.0	AC-227	0.29	0.05	0.14	1.04
					AM-241	0.00	0.08	0.13	
					CS-137	0.07	0.03	0.02	
					PA-231	0.35	0.63	1.06	
					RA-226	2.35	0.58	0.06	
					RA-228	0.91	0.11	0.07	
					TH-228	1.37	0.47	0.19	
					TH-230	16.30	3.17	0.16	
					TH-232	1.04	0.40	0.21	
					U-235	0.11	0.22	0.36	
					U-238	1.28	0.24	0.43	
<b>SVP202646</b>	SVP202646	8/27/2018	0.0	0.5	AC-227	0.00	0.20	0.15	0.27
					AM-241	0.02	0.03	0.06	
					CS-137	0.02	0.01	0.01	
					PA-231	0.03	0.54	0.91	
					RA-226	1.34	0.34	0.05	
					RA-228	0.79	0.10	0.05	
					TH-228	1.24	0.46	0.19	
					TH-230	4.13	1.04	0.21	
					TH-232	0.96	0.39	0.15	
					U-235	0.00	0.19	0.31	
					U-238	1.27	0.21	0.32	

Table 1

May 18, 2023

**Jana Elementary School NW Bank of Coldwater Creek and Adjacent MSD Right-of-Way  
Sample Locations with Radiological Contamination**

Revision 0

Page 6 of 20

Sample Location	Sample Identification Number	Collection Date	Start Depth (ft bgs) <sup>1</sup>	End Depth (ft bgs)	Parameter	Result <sup>2</sup> (pCi/g <sup>3</sup> )	Error	Detection Limit (pCi/g)	SOR Value <sup>4</sup>
<b>SVP202646</b>	SVP202647	8/27/2018	1.5	2.0	AC-227	0.00	0.18	0.16	0.23
					AM-241	0.01	0.03	0.06	
					CS-137	0.03	0.01	0.02	
					PA-231	0.02	0.55	0.92	
					RA-226	1.40	0.36	0.06	
					RA-228	0.81	0.11	0.05	
					TH-228	0.86	0.36	0.17	
					TH-230	5.09	1.20	0.17	
					TH-232	1.20	0.44	0.14	
					U-235	0.10	0.18	0.31	
					U-238	1.13	0.21	0.34	
	SVP210124	8/27/2018	2.0	2.5	AC-227	0.00	0.25	0.19	0.24
					AM-241	0.00	0.08	0.13	
					CS-137	0.04	0.01	0.02	
					PA-231	0.20	0.65	1.11	
					RA-226	1.70	0.43	0.08	
					RA-228	0.85	0.11	0.07	
					TH-228	1.12	0.42	0.22	
					TH-230	4.82	1.13	0.15	
					TH-232	1.21	0.44	0.22	
					U-235	0.14	0.22	0.36	
					U-238	1.24	0.26	0.49	
	SVP206973	8/27/2018	4.0	4.5	AC-227	0.26	0.07	0.13	0.54
					AM-241	0.00	0.08	0.12	
					CS-137	0.05	0.02	0.02	
					PA-231	0.00	0.60	0.98	
					RA-226	1.68	0.42	0.06	
					RA-228	0.86	0.11	0.07	
					TH-228	1.36	0.49	0.18	
					TH-230	9.37	2.03	0.13	
					TH-232	1.30	0.48	0.24	
					U-235	0.00	0.21	0.34	
					U-238	1.06	0.21	0.42	
	SVP206974	8/27/2018	5.5	6.0	AC-227	0.31	0.07	0.15	1.21
					AM-241	0.00	0.08	0.13	
					CS-137	0.06	0.01	0.02	
					PA-231	0.00	0.65	1.04	
					RA-226	2.33	0.58	0.07	
					RA-228	0.94	0.11	0.07	
					TH-228	1.03	0.40	0.18	
					TH-230	18.80	3.59	0.22	
					TH-232	1.25	0.44	0.12	
					U-235	0.10	0.22	0.37	
					U-238	1.19	0.22	0.47	

**Table 1**  
**Jana Elementary School NW Bank of Coldwater Creek and Adjacent MSD Right-of-Way**  
**Sample Locations with Radiological Contamination**

May 18, 2023  
Revision 0

Page 7 of 20

Sample Location	Sample Identification Number	Collection Date	Start Depth (ft bgs) <sup>1</sup>	End Depth (ft bgs)	Parameter	Result <sup>2</sup> (pCi/g <sup>3</sup> )	Error	Detection Limit (pCi/g)	SOR Value <sup>4</sup>
<b>SVP202656</b>	SVP202656	8/27/2018	0.0	0.5	AC-227	0.00	0.09	0.15	0.19
					AM-241	0.00	0.03	0.05	
					CS-137	0.02	0.01	0.02	
					PA-231	0.36	0.55	0.96	
					RA-226	1.35	0.34	0.06	
					RA-228	0.80	0.10	0.06	
					TH-228	1.05	0.39	0.15	
					TH-230	3.04	0.78	0.15	
					TH-232	0.79	0.32	0.12	
					U-235	0.00	0.19	0.31	
					U-238	1.00	0.18	0.33	
	SVP202657	8/27/2018	1.5	2.0	AC-227	0.07	0.04	0.12	0.38
					AM-241	0.02	0.04	0.06	
					CS-137	0.06	0.01	0.02	
					PA-231	0.35	0.55	0.94	
					RA-226	1.52	0.38	0.05	
					RA-228	0.83	0.10	0.05	
					TH-228	1.14	0.45	0.19	
					TH-230	7.22	1.66	0.16	
					TH-232	0.85	0.37	0.13	
					U-235	0.06	0.19	0.32	
					U-238	1.10	0.21	0.36	
	<b>SVP202658</b>	<b>8/27/2018</b>	<b>3.0</b>	<b>3.5</b>	<b>AC-227</b>	<b>0.44</b>	<b>0.09</b>	<b>0.15</b>	<b>1.84</b>
					<b>AM-241</b>	<b>0.00</b>	<b>0.04</b>	<b>0.06</b>	
					<b>CS-137</b>	<b>0.09</b>	<b>0.02</b>	<b>0.03</b>	
					<b>PA-231</b>	<b>0.04</b>	<b>0.71</b>	<b>1.19</b>	
					<b>RA-226</b>	<b>2.64</b>	<b>0.65</b>	<b>0.07</b>	
					<b>RA-228</b>	<b>0.92</b>	<b>0.12</b>	<b>0.07</b>	
					<b>TH-228</b>	<b>1.20</b>	<b>0.43</b>	<b>0.18</b>	
					<b>TH-230</b>	<b>28.00</b>	<b>5.22</b>	<b>0.15</b>	
					<b>TH-232</b>	<b>0.95</b>	<b>0.37</b>	<b>0.12</b>	
					<b>U-235</b>	<b>0.11</b>	<b>0.22</b>	<b>0.38</b>	
					<b>U-238</b>	<b>0.77</b>	<b>0.16</b>	<b>0.42</b>	
	SVP202659	8/27/2018	4.0	4.5	AC-227	0.37	0.06	0.15	2.01
					AM-241	0.02	0.04	0.07	
					CS-137	0.12	0.02	0.02	
					PA-231	0.00	0.67	1.12	
					RA-226	2.68	0.66	0.07	
					RA-228	0.99	0.12	0.06	
					TH-228	1.46	0.53	0.21	
					TH-230	30.50	5.97	0.19	
					TH-232	1.92	0.62	0.13	
					U-235	0.12	0.22	0.38	
					U-238	1.32	0.24	0.41	

**Table 1**  
**Jana Elementary School NW Bank of Coldwater Creek and Adjacent MSD Right-of-Way**  
**Sample Locations with Radiological Contamination**

May 18, 2023  
Revision 0

Page 8 of 20

Sample Location	Sample Identification Number	Collection Date	Start Depth (ft bgs) <sup>1</sup>	End Depth (ft bgs)	Parameter	Result <sup>2</sup> (pCi/g <sup>3</sup> )	Error	Detection Limit (pCi/g)	SOR Value <sup>4</sup>
SVP202656	SVP205303	8/27/2018	5.5	6.0	AC-227	0.00	0.19	0.28	0.94
					AM-241	0.00	0.04	0.07	
					CS-137	0.08	0.02	0.03	
					PA-231	0.32	0.79	1.34	
					RA-226	2.08	0.53	0.09	
					RA-228	0.83	0.12	0.08	
					TH-228	1.59	0.52	0.18	
					TH-230	15.00	2.92	0.16	
					TH-232	1.69	0.54	0.14	
					U-235	0.32	0.26	0.43	
					U-238	1.25	0.23	0.40	
SVP202676	SVP202676	8/27/2018	0.0	0.5	AC-227	0.00	0.45	0.29	0.14
					AM-241	0.00	0.07	0.11	
					CS-137	0.02	0.03	0.06	
					PA-231	0.00	1.20	2.02	
					RA-226	1.24	0.36	0.14	
					RA-228	0.72	0.12	0.13	
					TH-228	1.20	0.42	0.18	
					TH-230	2.64	0.70	0.16	
					TH-232	0.97	0.36	0.12	
					U-235	0.11	0.36	0.62	
					U-238	0.90	0.28	0.59	
	SVP202676-1	8/27/2018	0.0	0.5	AC-227	0.00	0.28	0.32	0.13
					AM-241	0.01	0.07	0.11	
					CS-137	0.00	0.03	0.05	
					PA-231	0.19	1.22	2.10	
					RA-226	1.30	0.37	0.14	
					RA-228	0.77	0.12	0.12	
					TH-228	0.96	0.39	0.18	
					TH-230	2.35	0.69	0.14	
					TH-232	0.91	0.38	0.23	
					U-235	0.00	0.36	0.59	
					U-238	0.84	0.37	0.67	
	SVP202677	8/27/2018	1.5	2.0	AC-227	0.12	0.04	0.11	0.23
					AM-241	0.00	0.03	0.05	
					CS-137	0.06	0.01	0.02	
					PA-231	0.00	0.50	0.83	
					RA-226	1.44	0.36	0.06	
					RA-228	0.81	0.10	0.06	
					TH-228	1.11	0.42	0.18	
					TH-230	5.00	1.18	0.18	
					TH-232	0.84	0.36	0.16	
					U-235	0.00	0.17	0.28	
					U-238	1.17	0.19	0.31	

Table 1

May 18, 2023

**Jana Elementary School NW Bank of Coldwater Creek and Adjacent MSD Right-of-Way  
Sample Locations with Radiological Contamination**

Revision 0

Page 9 of 20

Sample Location	Sample Identification Number	Collection Date	Start Depth (ft bgs) <sup>1</sup>	End Depth (ft bgs)	Parameter	Result <sup>2</sup> (pCi/g <sup>3</sup> )	Error	Detection Limit (pCi/g)	SOR Value <sup>4</sup>
SVP202676	SVP202678	8/27/2018	3.0	3.5	AC-227	0.27	0.06	0.13	1.04
					AM-241	0.03	0.04	0.07	
					CS-137	0.08	0.02	0.02	
					PA-231	0.15	0.59	1.00	
					RA-226	2.03	0.51	0.06	
					RA-228	0.87	0.11	0.06	
					TH-228	1.36	0.48	0.20	
					TH-230	16.60	3.31	0.19	
					TH-232	1.34	0.48	0.13	
					U-235	0.15	0.21	0.35	
					U-238	1.14	0.20	0.36	
	SVP202679	8/27/2018	5.0	5.5	AC-227	0.38	0.09	0.15	2.12
					AM-241	0.01	0.04	0.06	
					CS-137	0.23	0.03	0.03	
					PA-231	0.00	0.68	1.13	
					RA-226	2.41	0.60	0.08	
					RA-228	0.89	0.12	0.07	
					TH-228	1.29	0.46	0.19	
					TH-230	32.40	6.00	0.13	
					TH-232	1.30	0.46	0.15	
					U-235	0.01	0.21	0.35	
					U-238	0.82	0.17	0.40	
	SVP205304	8/27/2018	5.5	6.0	AC-227	0.00	0.13	0.23	0.05
					AM-241	0.00	0.04	0.06	
					CS-137	0.00	0.02	0.03	
					PA-231	0.00	0.69	1.12	
					RA-226	1.22	0.32	0.08	
					RA-228	0.79	0.12	0.07	
					TH-228	1.59	0.56	0.19	
					TH-230	2.58	0.78	0.19	
					TH-232	1.34	0.51	0.16	
					U-235	0.00	0.22	0.35	
					U-238	0.95	0.18	0.33	
SVP202686	SVP202686	8/27/2018	0.0	0.5	AC-227	0.00	0.18	0.13	0.28
					AM-241	0.02	0.03	0.05	
					CS-137	0.03	0.01	0.02	
					PA-231	0.22	0.49	0.83	
					RA-226	1.47	0.37	0.06	
					RA-228	0.84	0.10	0.06	
					TH-228	1.19	0.42	0.17	
					TH-230	3.91	0.95	0.16	
					TH-232	1.17	0.41	0.15	
					U-235	0.11	0.17	0.28	
					U-238	0.92	0.17	0.30	

**Table 1**  
**Jana Elementary School NW Bank of Coldwater Creek and Adjacent MSD Right-of-Way**  
**Sample Locations with Radiological Contamination**

May 18, 2023  
Revision 0

Page 10 of 20

Sample Location	Sample Identification Number	Collection Date	Start Depth (ft bgs) <sup>1</sup>	End Depth (ft bgs)	Parameter	Result <sup>2</sup> (pCi/g <sup>3</sup> )	Error	Detection Limit (pCi/g)	SOR Value <sup>4</sup>
<b>SVP202686</b>	SVP202687	8/27/2018	1.5	2.0	AC-227	0.00	0.16	0.16	0.22
					AM-241	0.00	0.04	0.06	
					CS-137	0.04	0.01	0.01	
					PA-231	0.00	0.53	0.88	
					RA-226	1.49	0.37	0.05	
					RA-228	0.83	0.11	0.05	
					TH-228	1.38	0.48	0.17	
					TH-230	4.75	1.14	0.16	
					TH-232	0.98	0.39	0.14	
					U-235	0.04	0.19	0.32	
					U-238	1.19	0.20	0.32	
	SVP206969	8/27/2018	3.0	3.5	AC-227	0.00	0.03	0.16	0.31
					AM-241	0.00	0.03	0.05	
					CS-137	0.04	0.01	0.02	
					PA-231	0.50	0.59	1.03	
					RA-226	1.70	0.43	0.07	
					RA-228	0.94	0.12	0.06	
					TH-228	1.12	0.40	0.18	
					TH-230	5.96	1.30	0.12	
					TH-232	1.08	0.39	0.13	
					U-235	0.00	0.19	0.31	
					U-238	1.08	0.20	0.34	
	SVP208537	10/25/2018	4.0	4.5	AC-227	0.28	0.07	0.12	0.77
					AM-241	0.00	0.03	0.05	
					CS-137	0.07	0.04	0.02	
					PA-231	0.25	0.55	0.93	
					RA-226	1.97	0.48	0.06	
					RA-228	0.89	0.11	0.06	
					TH-228	1.35	0.49	0.21	
					TH-230	12.60	2.63	0.17	
					TH-232	1.26	0.47	0.18	
					U-235	0.04	0.18	0.30	
					U-238	0.84	0.16	0.35	
	<b>SVP208538</b>	<b>10/25/2018</b>	<b>4.5</b>	<b>5.0</b>	<b>AC-227</b>	<b>0.48</b>	<b>0.09</b>	<b>0.15</b>	<b>1.78</b>
					<b>AM-241</b>	<b>0.00</b>	<b>0.03</b>	<b>0.05</b>	
					<b>CS-137</b>	<b>0.08</b>	<b>0.04</b>	<b>0.02</b>	
					<b>PA-231</b>	<b>0.00</b>	<b>0.61</b>	<b>1.01</b>	
					<b>RA-226</b>	<b>2.65</b>	<b>0.64</b>	<b>0.07</b>	
					<b>RA-228</b>	<b>0.91</b>	<b>0.11</b>	<b>0.06</b>	
					<b>TH-228</b>	<b>1.14</b>	<b>0.42</b>	<b>0.17</b>	
					<b>TH-230</b>	<b>27.10</b>	<b>5.07</b>	<b>0.15</b>	
					<b>TH-232</b>	<b>1.83</b>	<b>0.57</b>	<b>0.15</b>	
					<b>U-235</b>	<b>0.15</b>	<b>0.20</b>	<b>0.34</b>	
					<b>U-238</b>	<b>0.85</b>	<b>0.17</b>	<b>0.40</b>	

**Table 1**  
**Jana Elementary School NW Bank of Coldwater Creek and Adjacent MSD Right-of-Way**  
**Sample Locations with Radiological Contamination**

May 18, 2023  
Revision 0

Page 11 of 20

Sample Location	Sample Identification Number	Collection Date	Start Depth (ft bgs) <sup>1</sup>	End Depth (ft bgs)	Parameter	Result <sup>2</sup> (pCi/g <sup>3</sup> )	Error	Detection Limit (pCi/g)	SOR Value <sup>4</sup>
<b>SVP202686</b>	SVP208539	10/25/2018	5.0	5.5	AC-227	0.26	0.07	0.13	0.86
					AM-241	0.00	0.03	0.05	
					CS-137	0.07	0.02	0.02	
					PA-231	0.00	0.56	0.93	
					RA-226	2.20	0.54	0.07	
					RA-228	0.97	0.12	0.06	
					TH-228	1.54	0.49	0.19	
					TH-230	13.70	2.62	0.14	
					TH-232	1.23	0.42	0.12	
					U-235	0.07	0.18	0.31	
					U-238	1.38	0.22	0.34	
	SVP206970	8/27/2018	5.5	6.0	AC-227	0.00	0.26	0.19	0.02
					AM-241	0.01	0.08	0.13	
					CS-137	0.00	0.02	0.02	
					PA-231	0.01	0.62	1.05	
					RA-226	1.33	0.34	0.07	
					RA-228	0.93	0.11	0.07	
					TH-228	0.93	0.35	0.17	
					TH-230	1.41	0.45	0.12	
					TH-232	0.85	0.33	0.19	
					U-235	0.06	0.22	0.37	
					U-238	1.50	0.28	0.45	
<b>SVP202690</b>	SVP202690	8/28/2018	0.0	0.5	AC-227	0.00	0.14	0.18	0.17
					AM-241	0.00	0.04	0.06	
					CS-137	0.03	0.01	0.02	
					PA-231	0.16	0.67	1.14	
					RA-226	1.48	0.38	0.08	
					RA-228	0.81	0.11	0.07	
					TH-228	1.20	0.45	0.20	
					TH-230	2.40	0.70	0.14	
					TH-232	1.24	0.46	0.15	
					U-235	0.10	0.21	0.35	
					U-238	1.11	0.20	0.37	
	SVP202690-1	8/28/2018	0.0	0.5	AC-227	0.00	0.33	0.30	0.11
					AM-241	0.01	0.08	0.14	
					CS-137	0.02	0.03	0.06	
					PA-231	0.92	1.17	2.09	
					RA-226	1.22	0.35	0.14	
					RA-228	0.71	0.12	0.15	
					TH-228	1.23	0.47	0.21	
					TH-230	2.26	0.69	0.20	
					TH-232	1.31	0.49	0.18	
					U-235	0.00	0.37	0.60	
					U-238	0.78	0.27	0.69	

**Table 1**  
**Jana Elementary School NW Bank of Coldwater Creek and Adjacent MSD Right-of-Way**  
**Sample Locations with Radiological Contamination**

May 18, 2023  
Revision 0

Page 12 of 20

Sample Location	Sample Identification Number	Collection Date	Start Depth (ft bgs) <sup>1</sup>	End Depth (ft bgs)	Parameter	Result <sup>2</sup> (pCi/g <sup>3</sup> )	Error	Detection Limit (pCi/g)	SOR Value <sup>4</sup>
<b>SVP202690</b>	SVP202691	8/28/2018	1.5	2.0	AC-227	0.00	0.11	0.15	0.12
					AM-241	0.03	0.03	0.06	
					CS-137	0.02	0.01	0.01	
					PA-231	0.00	0.54	0.90	
					RA-226	1.44	0.36	0.05	
					RA-228	0.81	0.10	0.05	
					TH-228	1.26	0.45	0.16	
					TH-230	3.40	0.87	0.15	
					TH-232	0.94	0.37	0.13	
					U-235	0.14	0.19	0.32	
					U-238	1.13	0.20	0.32	
	SVP202692	8/28/2018	3.0	3.5	AC-227	0.00	0.21	0.15	0.29
					AM-241	0.02	0.03	0.05	
					CS-137	0.03	0.01	0.02	
					PA-231	0.00	0.59	0.99	
					RA-226	1.75	0.44	0.07	
					RA-228	0.84	0.11	0.07	
					TH-228	1.47	0.52	0.24	
					TH-230	5.54	1.32	0.13	
					TH-232	1.13	0.44	0.17	
					U-235	0.08	0.18	0.31	
					U-238	0.99	0.17	0.32	
	<b>SVP202693</b>	<b>8/28/2018</b>	<b>4.0</b>	<b>4.5</b>	<b>AC-227</b>	<b>0.25</b>	<b>0.06</b>	<b>0.14</b>	<b>1.18</b>
					<b>AM-241</b>	<b>0.00</b>	<b>0.08</b>	<b>0.13</b>	
					<b>CS-137</b>	<b>0.09</b>	<b>0.04</b>	<b>0.02</b>	
					<b>PA-231</b>	<b>0.00</b>	<b>0.62</b>	<b>1.01</b>	
					<b>RA-226</b>	<b>2.17</b>	<b>0.53</b>	<b>0.07</b>	
					<b>RA-228</b>	<b>0.90</b>	<b>0.12</b>	<b>0.06</b>	
					<b>TH-228</b>	<b>1.24</b>	<b>0.44</b>	<b>0.17</b>	
					<b>TH-230</b>	<b>18.50</b>	<b>3.52</b>	<b>0.16</b>	
					<b>TH-232</b>	<b>1.22</b>	<b>0.43</b>	<b>0.14</b>	
					<b>U-235</b>	<b>0.00</b>	<b>0.21</b>	<b>0.35</b>	
					<b>U-238</b>	<b>1.19</b>	<b>0.33</b>	<b>0.41</b>	
	SVP205305	8/28/2018	5.5	6.0	AC-227	0.00	0.26	0.26	0.40
					AM-241	0.00	0.04	0.06	
					CS-137	0.02	0.02	0.02	
					PA-231	0.00	0.76	1.26	
					RA-226	1.76	0.45	0.08	
					RA-228	0.91	0.12	0.08	
					TH-228	1.60	0.53	0.16	
					TH-230	7.22	1.60	0.15	
					TH-232	0.85	0.36	0.12	
					U-235	0.00	0.24	0.39	
					U-238	1.12	0.26	0.37	

Table 1

May 18, 2023

**Jana Elementary School NW Bank of Coldwater Creek and Adjacent MSD Right-of-Way  
Sample Locations with Radiological Contamination**

Revision 0

Page 13 of 20

Sample Location	Sample Identification Number	Collection Date	Start Depth (ft bgs) <sup>1</sup>	End Depth (ft bgs)	Parameter	Result <sup>2</sup> (pCi/g <sup>3</sup> )	Error	Detection Limit (pCi/g)	SOR Value <sup>4</sup>
<b>SVP205296</b>	SVP205296	9/6/2018	0.0	0.5	AC-227	0.00	0.28	0.15	0.26
					AM-241	0.03	0.03	0.05	
					CS-137	0.01	0.02	0.03	
					PA-231	0.24	0.55	0.94	
					RA-226	1.62	0.41	0.06	
					RA-228	0.85	0.10	0.06	
					TH-228	1.12	0.44	0.23	
					TH-230	3.22	0.88	0.17	
					TH-232	1.14	0.44	0.13	
					U-235	0.05	0.18	0.31	
					U-238	1.13	0.19	0.33	
	SVP205297	9/6/2018	1.5	2.0	AC-227	0.00	0.28	0.14	0.09
					AM-241	0.00	0.03	0.05	
					CS-137	0.02	0.02	0.03	
					PA-231	0.00	0.54	0.88	
					RA-226	1.56	0.39	0.06	
					RA-228	0.84	0.10	0.06	
					TH-228	0.85	0.35	0.20	
					TH-230	2.84	0.74	0.15	
					TH-232	0.65	0.30	0.21	
					U-235	0.05	0.17	0.29	
					U-238	1.00	0.18	0.32	
	<b>SVP205298</b>	<b>9/6/2018</b>	<b>3.5</b>	<b>4.0</b>	<b>AC-227</b>	<b>0.26</b>	<b>0.07</b>	<b>0.13</b>	<b>1.26</b>
					<b>AM-241</b>	<b>0.01</b>	<b>0.03</b>	<b>0.05</b>	
					<b>CS-137</b>	<b>0.08</b>	<b>0.01</b>	<b>0.02</b>	
					<b>PA-231</b>	<b>0.00</b>	<b>0.58</b>	<b>0.94</b>	
					<b>RA-226</b>	<b>2.10</b>	<b>0.51</b>	<b>0.06</b>	
					<b>RA-228</b>	<b>0.87</b>	<b>0.11</b>	<b>0.06</b>	
					<b>TH-228</b>	<b>1.31</b>	<b>0.46</b>	<b>0.21</b>	
					<b>TH-230</b>	<b>19.80</b>	<b>3.76</b>	<b>0.15</b>	
					<b>TH-232</b>	<b>1.06</b>	<b>0.40</b>	<b>0.13</b>	
					<b>U-235</b>	<b>0.00</b>	<b>0.19</b>	<b>0.31</b>	
					<b>U-238</b>	<b>0.99</b>	<b>0.17</b>	<b>0.36</b>	
	<b>SVP205299</b>	<b>9/6/2018</b>	<b>4.0</b>	<b>4.5</b>	<b>AC-227</b>	<b>0.47</b>	<b>0.07</b>	<b>0.13</b>	<b>1.93</b>
					<b>AM-241</b>	<b>0.00</b>	<b>0.04</b>	<b>0.06</b>	
					<b>CS-137</b>	<b>0.15</b>	<b>0.02</b>	<b>0.02</b>	
					<b>PA-231</b>	<b>0.26</b>	<b>0.64</b>	<b>1.07</b>	
					<b>RA-226</b>	<b>2.90</b>	<b>0.70</b>	<b>0.07</b>	
					<b>RA-228</b>	<b>0.98</b>	<b>0.12</b>	<b>0.06</b>	
					<b>TH-228</b>	<b>0.78</b>	<b>0.33</b>	<b>0.21</b>	
					<b>TH-230</b>	<b>29.00</b>	<b>5.19</b>	<b>0.16</b>	
					<b>TH-232</b>	<b>1.19</b>	<b>0.42</b>	<b>0.15</b>	
					<b>U-235</b>	<b>0.07</b>	<b>0.21</b>	<b>0.34</b>	
					<b>U-238</b>	<b>0.97</b>	<b>0.18</b>	<b>0.38</b>	

**Table 1**  
**Jana Elementary School NW Bank of Coldwater Creek and Adjacent MSD Right-of-Way**  
**Sample Locations with Radiological Contamination**

May 18, 2023  
Revision 0

Page 14 of 20

Sample Location	Sample Identification Number	Collection Date	Start Depth (ft bgs) <sup>1</sup>	End Depth (ft bgs)	Parameter	Result <sup>2</sup> (pCi/g <sup>3</sup> )	Error	Detection Limit (pCi/g)	SOR Value <sup>4</sup>
<b>SVP205296</b>	SVP205300	9/6/2018	4.5	5.0	AC-227	0.08	0.04	0.11	0.38
					AM-241	0.00	0.03	0.05	
					CS-137	0.02	0.01	0.02	
					PA-231	0.02	0.53	0.90	
					RA-226	1.92	0.47	0.06	
					RA-228	0.86	0.11	0.06	
					TH-228	0.93	0.38	0.23	
					TH-230	6.75	1.52	0.22	
					TH-232	1.13	0.43	0.27	
					U-235	0.06	0.18	0.30	
					U-238	1.38	0.22	0.34	
<b>SVP205306</b>	SVP205306	9/17/2018	0.0	0.5	AC-227	0.28	0.06	0.13	1.81
					AM-241	0.00	0.03	0.06	
					CS-137	0.10	0.02	0.02	
					PA-231	0.16	0.62	1.04	
					RA-226	2.48	0.61	0.07	
					RA-228	0.91	0.11	0.06	
					TH-228	1.17	0.44	0.18	
					TH-230	22.60	4.39	0.15	
					TH-232	1.12	0.42	0.12	
					U-235	0.01	0.20	0.33	
					U-238	1.00	0.18	0.35	
	SVP205307	9/17/2018	1.5	2.0	AC-227	0.00	0.13	0.14	0.22
					AM-241	0.00	0.03	0.05	
					CS-137	0.00	0.02	0.02	
					PA-231	0.00	0.55	0.88	
					RA-226	1.85	0.46	0.06	
					RA-228	0.89	0.11	0.06	
					TH-228	1.23	0.45	0.21	
					TH-230	4.48	1.10	0.18	
					TH-232	0.94	0.38	0.15	
					U-235	0.10	0.18	0.31	
					U-238	0.99	0.17	0.34	
	SVP205308	9/17/2018	2.0	2.5	AC-227	0.00	0.21	0.12	0.00
					AM-241	0.00	0.03	0.04	
					CS-137	0.00	0.01	0.02	
					PA-231	0.05	0.47	0.80	
					RA-226	1.11	0.28	0.06	
					RA-228	0.88	0.10	0.06	
					TH-228	0.97	0.41	0.21	
					TH-230	1.76	0.59	0.22	
					TH-232	0.74	0.35	0.16	
					U-235	0.04	0.16	0.26	
					U-238	1.10	0.19	0.30	

**Table 1**  
**Jana Elementary School NW Bank of Coldwater Creek and Adjacent MSD Right-of-Way**  
**Sample Locations with Radiological Contamination**

May 18, 2023  
Revision 0

Page 15 of 20

Sample Location	Sample Identification Number	Collection Date	Start Depth (ft bgs) <sup>1</sup>	End Depth (ft bgs)	Parameter	Result <sup>2</sup> (pCi/g <sup>3</sup> )	Error	Detection Limit (pCi/g)	SOR Value <sup>4</sup>
<b>SVP208715</b>	SVP208715	6/11/2019	0.0	0.5	AC-227	0.00	0.35	0.14	0.21
					AM-241	0.00	0.03	0.05	
					CS-137	0.01	0.01	0.02	
					PA-231	0.00	0.56	0.92	
					RA-226	1.45	0.36	0.06	
					RA-228	0.87	0.11	0.06	
					TH-228	1.04	0.41	0.23	
					TH-230	3.06	0.83	0.20	
					TH-232	0.75	0.34	0.14	
					U-235	0.12	0.18	0.31	
					U-238	0.95	0.17	0.32	
	SVP208716	6/11/2019	1.0	1.5	AC-227	0.00	0.20	0.14	0.15
					AM-241	0.01	0.03	0.05	
					CS-137	0.03	0.01	0.01	
					PA-231	0.02	0.51	0.86	
					RA-226	1.41	0.35	0.06	
					RA-228	0.81	0.10	0.06	
					TH-228	1.22	0.48	0.23	
					TH-230	3.81	1.03	0.22	
					TH-232	1.20	0.47	0.14	
					U-235	0.20	0.18	0.30	
					U-238	0.85	0.16	0.31	
	SVP208717	6/11/2019	2.5	3.0	AC-227	0.11	0.05	0.12	0.41
					AM-241	0.00	0.03	0.05	
					CS-137	0.05	0.01	0.02	
					PA-231	0.00	0.56	0.90	
					RA-226	1.63	0.41	0.06	
					RA-228	0.91	0.11	0.06	
					TH-228	1.67	0.57	0.22	
					TH-230	7.44	1.71	0.19	
					TH-232	0.73	0.35	0.19	
					U-235	0.14	0.18	0.31	
					U-238	1.11	0.19	0.33	
	<b>SVP208718</b>	<b>6/11/2019</b>	<b>3.0</b>	<b>3.5</b>	<b>AC-227</b>	<b>0.39</b>	<b>0.08</b>	<b>0.14</b>	<b>2.09</b>
					<b>AM-241</b>	<b>0.00</b>	<b>0.04</b>	<b>0.06</b>	
					<b>CS-137</b>	<b>0.05</b>	<b>0.02</b>	<b>0.02</b>	
					<b>PA-231</b>	<b>0.00</b>	<b>0.68</b>	<b>1.12</b>	
					<b>RA-226</b>	<b>2.50</b>	<b>0.61</b>	<b>0.07</b>	
					<b>RA-228</b>	<b>0.98</b>	<b>0.13</b>	<b>0.07</b>	
					<b>TH-228</b>	<b>1.76</b>	<b>0.70</b>	<b>0.19</b>	
					<b>TH-230</b>	<b>31.80</b>	<b>7.31</b>	<b>0.24</b>	
					<b>TH-232</b>	<b>1.22</b>	<b>0.56</b>	<b>0.22</b>	
					<b>U-235</b>	<b>0.08</b>	<b>0.22</b>	<b>0.37</b>	
					<b>U-238</b>	<b>0.95</b>	<b>0.18</b>	<b>0.40</b>	

Table 1

May 18, 2023

**Jana Elementary School NW Bank of Coldwater Creek and Adjacent MSD Right-of-Way  
Sample Locations with Radiological Contamination**

Revision 0

Page 16 of 20

Sample Location	Sample Identification Number	Collection Date	Start Depth (ft bgs) <sup>1</sup>	End Depth (ft bgs)	Parameter	Result <sup>2</sup> (pCi/g <sup>3</sup> )	Error	Detection Limit (pCi/g)	SOR Value <sup>4</sup>
SVP208715	SVP208719	6/11/2019	3.5	4.0	AC-227	0.30	0.06	0.12	1.81
					AM-241	0.00	0.03	0.05	
					CS-137	0.05	0.02	0.02	
					PA-231	0.39	0.57	0.96	
					RA-226	2.09	0.51	0.06	
					RA-228	0.88	0.11	0.06	
					TH-228	1.53	0.55	0.23	
					TH-230	28.10	5.72	0.18	
					TH-232	1.49	0.54	0.25	
					U-235	0.00	0.18	0.29	
					U-238	1.26	0.20	0.32	
	SVP208720	6/11/2019	4.0	4.5	AC-227	0.35	0.07	0.12	1.36
					AM-241	0.00	0.03	0.05	
					CS-137	0.05	0.01	0.02	
					PA-231	0.00	0.57	0.95	
					RA-226	2.22	0.54	0.06	
					RA-228	0.86	0.10	0.06	
					TH-228	1.47	0.50	0.21	
					TH-230	21.20	4.13	0.17	
					TH-232	0.97	0.39	0.15	
					U-235	0.03	0.19	0.31	
					U-238	0.90	0.17	0.33	
SVP208721	SVP208721	6/12/2019	0.0	0.5	AC-227	0.00	0.11	0.18	0.26
					AM-241	0.00	0.03	0.05	
					CS-137	0.02	0.01	0.01	
					PA-231	0.02	0.56	0.93	
					RA-226	1.49	0.37	0.06	
					RA-228	0.83	0.10	0.05	
					TH-228	1.38	0.53	0.19	
					TH-230	3.66	1.02	0.20	
					TH-232	0.78	0.38	0.15	
					U-235	0.09	0.18	0.30	
					U-238	1.16	0.20	0.35	
	SVP208721-1	6/12/2019	0.0	0.5	AC-227	0.00	0.11	0.17	0.20
					AM-241	0.02	0.03	0.06	
					CS-137	0.02	0.01	0.02	
					PA-231	0.00	0.56	0.92	
					RA-226	1.40	0.35	0.05	
					RA-228	0.81	0.11	0.06	
					TH-228	1.28	0.48	0.22	
					TH-230	3.09	0.87	0.22	
					TH-232	0.91	0.39	0.17	
					U-235	0.01	0.19	0.31	
					U-238	1.01	0.19	0.33	

**Table 1**  
**Jana Elementary School NW Bank of Coldwater Creek and Adjacent MSD Right-of-Way**  
**Sample Locations with Radiological Contamination**

May 18, 2023  
Revision 0

Page 17 of 20

Sample Location	Sample Identification Number	Collection Date	Start Depth (ft bgs) <sup>1</sup>	End Depth (ft bgs)	Parameter	Result <sup>2</sup> (pCi/g <sup>3</sup> )	Error	Detection Limit (pCi/g)	SOR Value <sup>4</sup>
<b>SVP208721</b>	SVP208722	6/12/2019	1.0	1.5	AC-227	0.00	0.28	0.19	0.41
					AM-241	0.00	0.04	0.06	
					CS-137	0.04	0.01	0.02	
					PA-231	0.00	0.60	0.95	
					RA-226	1.72	0.43	0.06	
					RA-228	0.89	0.12	0.05	
					TH-228	1.56	0.53	0.16	
					TH-230	7.42	1.66	0.18	
					TH-232	1.11	0.43	0.24	
					U-235	0.05	0.20	0.33	
					U-238	1.19	0.24	0.32	
	SVP208723	6/12/2019	2.5	3.0	AC-227	0.27	0.07	0.13	1.31
					AM-241	0.00	0.03	0.05	
					CS-137	0.06	0.01	0.02	
					PA-231	0.08	0.55	0.92	
					RA-226	2.06	0.50	0.06	
					RA-228	0.90	0.12	0.06	
					TH-228	1.31	0.59	0.24	
					TH-230	20.60	5.02	0.20	
					TH-232	1.47	0.64	0.22	
					U-235	0.11	0.19	0.31	
					U-238	0.96	0.17	0.33	
	SVP208724	6/12/2019	3.5	4.0	AC-227	0.17	0.05	0.12	0.85
					AM-241	0.01	0.03	0.05	
					CS-137	0.05	0.01	0.02	
					PA-231	0.00	0.55	0.88	
					RA-226	1.96	0.48	0.06	
					RA-228	0.85	0.10	0.06	
					TH-228	1.22	0.48	0.26	
					TH-230	13.80	2.95	0.19	
					TH-232	0.84	0.38	0.14	
					U-235	0.00	0.18	0.30	
					U-238	1.21	0.20	0.33	
	SVP208725	6/12/2019	4.0	4.5	AC-227	0.15	0.04	0.11	0.52
					AM-241	0.00	0.03	0.05	
					CS-137	0.03	0.01	0.01	
					PA-231	0.00	0.52	0.85	
					RA-226	1.75	0.43	0.06	
					RA-228	0.85	0.10	0.06	
					TH-228	1.50	0.50	0.12	
					TH-230	9.10	1.91	0.12	
					TH-232	1.08	0.41	0.12	
					U-235	0.15	0.17	0.29	
					U-238	1.07	0.18	0.31	

**Table 1**  
**Jana Elementary School NW Bank of Coldwater Creek and Adjacent MSD Right-of-Way**  
**Sample Locations with Radiological Contamination**

May 18, 2023  
Revision 0

Page 18 of 20

Sample Location	Sample Identification Number	Collection Date	Start Depth (ft bgs) <sup>1</sup>	End Depth (ft bgs)	Parameter	Result <sup>2</sup> (pCi/g <sup>3</sup> )	Error	Detection Limit (pCi/g)	SOR Value <sup>4</sup>
SVP208721	SVP208726	6/12/2019	4.5	5.0	AC-227	0.00	0.24	0.13	0.23
					AM-241	0.00	0.03	0.04	
					CS-137	0.00	0.01	0.02	
					PA-231	0.00	0.49	0.80	
					RA-226	1.42	0.35	0.05	
					RA-228	0.83	0.11	0.05	
					TH-228	0.59	0.31	0.17	
					TH-230	5.04	1.27	0.16	
					TH-232	1.30	0.49	0.18	
					U-235	0.08	0.16	0.27	
					U-238	1.24	0.20	0.30	
	SVP208727	6/12/2019	5.0	5.5	AC-227	0.12	0.04	0.10	0.18
					AM-241	0.02	0.03	0.05	
					CS-137	0.00	0.01	0.02	
					PA-231	0.00	0.49	0.83	
					RA-226	1.36	0.34	0.05	
					RA-228	0.86	0.10	0.05	
					TH-228	1.48	0.52	0.15	
					TH-230	4.32	1.09	0.24	
					TH-232	0.79	0.36	0.24	
					U-235	0.14	0.16	0.28	
					U-238	1.13	0.18	0.29	
	SVP208728	6/12/2019	5.5	6.0	AC-227	0.00	0.24	0.12	0.02
					AM-241	0.00	0.03	0.04	
					CS-137	0.00	0.01	0.02	
					PA-231	0.02	0.46	0.78	
					RA-226	1.18	0.30	0.05	
					RA-228	0.82	0.11	0.05	
					TH-228	1.18	0.46	0.16	
					TH-230	2.08	0.66	0.13	
					TH-232	0.95	0.41	0.25	
					U-235	0.07	0.16	0.26	
					U-238	1.01	0.17	0.28	
SVP208729	SVP208729	6/11/2019	0.0	0.5	AC-227	0.00	0.18	0.14	0.22
					AM-241	0.00	0.03	0.05	
					CS-137	0.02	0.01	0.01	
					PA-231	0.33	0.51	0.89	
					RA-226	1.43	0.36	0.06	
					RA-228	0.84	0.11	0.06	
					TH-228	1.26	0.45	0.19	
					TH-230	3.25	0.86	0.22	
					TH-232	0.69	0.32	0.13	
					U-235	0.10	0.17	0.29	
					U-238	1.10	0.19	0.31	

**Table 1**  
**Jana Elementary School NW Bank of Coldwater Creek and Adjacent MSD Right-of-Way**  
**Sample Locations with Radiological Contamination**

May 18, 2023  
Revision 0

Page 19 of 20

Sample Location	Sample Identification Number	Collection Date	Start Depth (ft bgs) <sup>1</sup>	End Depth (ft bgs)	Parameter	Result <sup>2</sup> (pCi/g <sup>3</sup> )	Error	Detection Limit (pCi/g)	SOR Value <sup>4</sup>
<b>SVP208729</b>	SVP208730	6/11/2019	0.5	1.0	AC-227	0.00	0.20	0.14	0.09
					AM-241	0.02	0.03	0.05	
					CS-137	0.01	0.02	0.03	
					PA-231	0.00	0.56	0.91	
					RA-226	1.48	0.37	0.06	
					RA-228	0.85	0.10	0.06	
					TH-228	1.62	0.52	0.19	
					TH-230	2.84	0.76	0.16	
					TH-232	0.71	0.32	0.14	
					U-235	0.28	0.19	0.32	
					U-238	1.06	0.19	0.33	
	SVP208731	6/11/2019	2.0	2.5	AC-227	0.56	0.07	0.14	2.29
					AM-241	0.00	0.04	0.06	
					CS-137	0.15	0.02	0.02	
					PA-231	0.13	0.68	1.14	
					RA-226	3.01	0.73	0.07	
					RA-228	0.90	0.11	0.07	
					TH-228	1.22	0.46	0.17	
					TH-230	34.30	6.61	0.18	
					TH-232	1.20	0.45	0.13	
					U-235	0.10	0.21	0.35	
					U-238	1.35	0.23	0.38	
	SVP212850	6/11/2019	3.0	3.5	AC-227	0.12	0.19	0.34	0.68
					AM-241	0.01	0.03	0.06	
					CS-137	0.05	0.02	0.02	
					PA-231	0.00	0.67	1.10	
					RA-226	1.77	0.45	0.07	
					RA-228	0.93	0.13	0.07	
					TH-228	1.47	0.55	0.21	
					TH-230	11.40	2.54	0.20	
					TH-232	1.74	0.60	0.17	
					U-235	0.03	0.21	0.36	
					U-238	1.32	0.21	0.35	
	SVP208732	6/11/2019	3.5	4.0	AC-227	0.00	0.25	0.14	0.23
					AM-241	0.00	0.03	0.05	
					CS-137	0.04	0.01	0.01	
					PA-231	0.02	0.56	0.93	
					RA-226	1.57	0.39	0.06	
					RA-228	0.87	0.12	0.06	
					TH-228	1.85	0.62	0.20	
					TH-230	4.79	1.23	0.23	
					TH-232	1.32	0.50	0.18	
					U-235	0.12	0.18	0.30	
					U-238	1.30	0.21	0.31	

**Table 1**  
**Jana Elementary School NW Bank of Coldwater Creek and Adjacent MSD Right-of-Way**  
**Sample Locations with Radiological Contamination**

May 18, 2023  
Revision 0

Page 20 of 20

Sample Location	Sample Identification Number	Collection Date	Start Depth (ft bgs) <sup>1</sup>	End Depth (ft bgs)	Parameter	Result <sup>2</sup> (pCi/g <sup>3</sup> )	Error	Detection Limit (pCi/g)	SOR Value <sup>4</sup>
<b>SVP208729</b>	SVP208733	6/11/2019	4.0	4.5	AC-227	0.06	0.04	0.11	0.16
					AM-241	0.00	0.03	0.05	
					CS-137	0.01	0.01	0.03	
					PA-231	0.00	0.50	0.84	
					RA-226	1.37	0.34	0.05	
					RA-228	0.87	0.11	0.06	
					TH-228	1.20	0.44	0.15	
					TH-230	3.98	0.99	0.17	
					TH-232	0.71	0.33	0.23	
					U-235	0.00	0.17	0.28	
					U-238	0.96	0.17	0.31	
	SVP208734	6/11/2019	4.5	5.0	AC-227	0.00	0.25	0.13	0.09
					AM-241	0.00	0.03	0.04	
					CS-137	0.00	0.01	0.02	
					PA-231	0.32	0.48	0.83	
					RA-226	1.26	0.32	0.05	
					RA-228	0.85	0.10	0.05	
					TH-228	1.34	0.49	0.26	
					TH-230	3.09	0.86	0.15	
					TH-232	1.21	0.46	0.13	
					U-235	0.00	0.16	0.27	
					U-238	0.89	0.16	0.28	

NA = Information not available per the *Radiological Characterization Report for FUSRAP Properties in the St. Louis, Missouri, Area* (Bechtel National, Inc., 1990).

<sup>1</sup> ft bgs - feet below ground surface

<sup>2</sup> Analytical data include background values (i.e., concentrations reflect gross radionuclide values)

<sup>3</sup> pCi/g - PicoCuries per gram

<sup>4</sup> Prior to calculating the Sum of Ratios (SOR), background values for each radionuclide were subtracted from their respective gross radionuclide values:

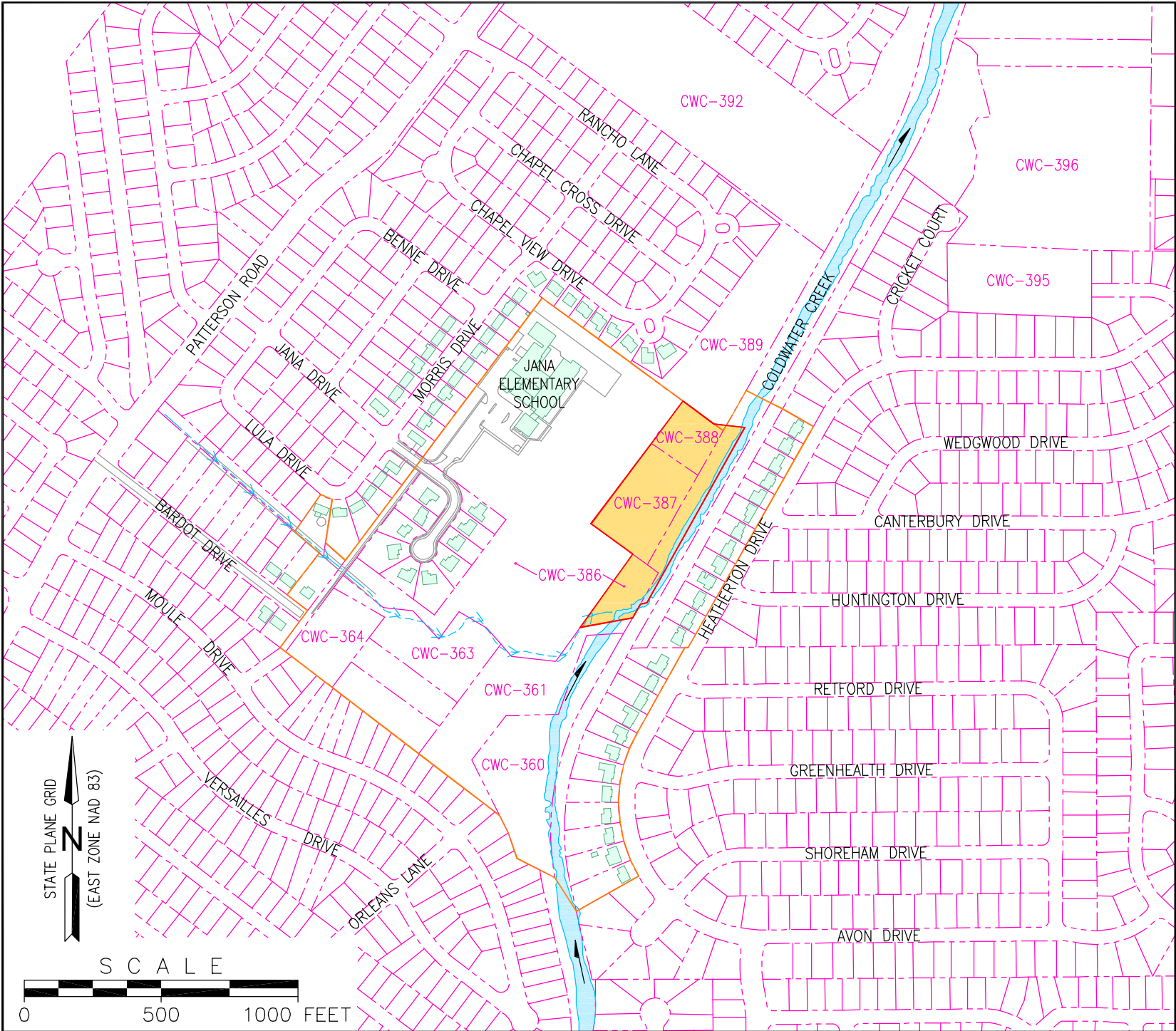
Background Values:	Surface Soil	Subsurface Soil
Radium-226 =	0.95 pCi/g	1.15 pCi/g
Thorium-230 =	1.49 pCi/g	1.83 pCi/g
Uranium 238 =	1.08 pCi/g	1.27 pCi/g

**Bold** values indicate soil sample exceeding *Record of Decision for the North St. Louis County Sites, St. Louis, Missouri* remediation goals (U.S. Army Corps of Engineers, 2005).

---

## ***FIGURES***

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SITE LOCATION MAP

UTILITY NOTES:

EXISTING UTILITIES SHOWN HEREON ARE LOCATED ACCORDING TO AVAILABLE PUBLIC AND PRIVATE MAPS AND SURVEYS. LOCATIONS ARE ASSUMED TO BE APPROXIMATE AND SHOULD BE FIELD VERIFIED BEFORE SAMPLING BEGINS.

CALL BEFORE YOU DIG: 800-DIG-RITE.

MISSOURI LAW REQUIRES THAT ANY PERSON MAKING OR BEGINNING ANY EXCAVATION/DRILLING NOTIFY ALL UNDERGROUND FACILITY OWNERS/OPERATORS WHICH MAY BE AFFECTED BY SAID EXCAVATION AT LEAST THREE BUT NOT MORE THAN TEN WORKING DAYS IN ADVANCE, EXCEPT IN THE CASE OF AN EMERGENCY.

ABBREVIATIONS:

CWC = COLDWATER CREEK  
ELEM. = ELEMENTARY  
FSSE = FINAL STATUS SURVEY EVALUATION  
FUSRAP = FORMERLY UTILIZED SITES REMEDIAL ACTION PROGRAM  
ID = IDENTIFICATION  
MSD = METROPOLITAN ST. LOUIS SEWER DISTRICT  
MSL = MEAN SEA LEVEL  
NAD = NORTH AMERICAN DATUM  
NW = NORTHWEST  
PDI = PRE-DESIGN INVESTIGATION  
PDIR = PRE-DESIGN INVESTIGATION SUMMARY REPORT  
ROW = RIGHT-OF-WAY  
SOR<sub>N</sub> = NET SUM-OF-RATIOS  
USACE = UNITED STATES ARMY CORPS OF ENGINEERS

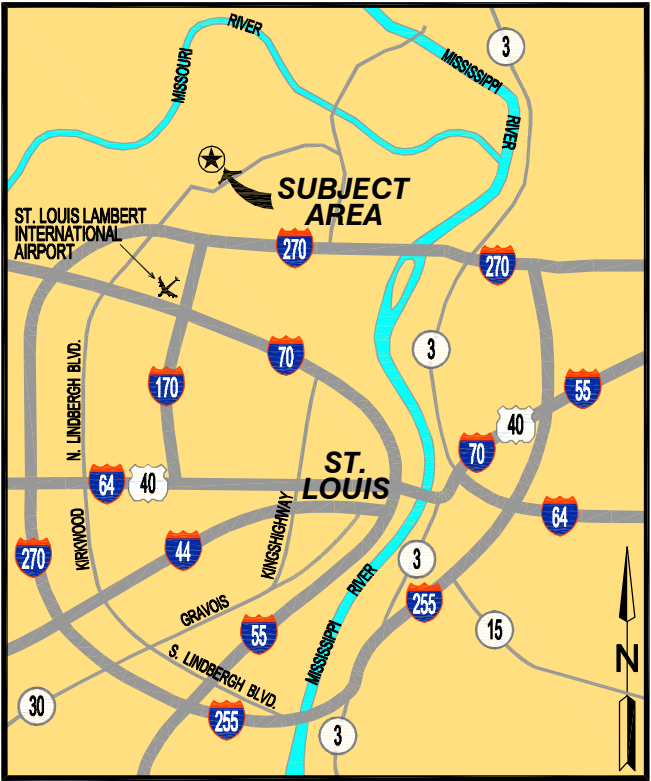
PRE-DESIGN INVESTIGATION SUMMARY REPORT  
JANA ELEMENTARY SCHOOL NORTHWEST BANK OF  
COLDWATER CREEK AND ADJACENT MSD ROW  
FUSRAP NORTH ST. LOUIS COUNTY SITES  
ST. LOUIS, MISSOURI

Prepared for:  
U.S. ARMY CORPS of ENGINEERS  
ST. LOUIS DISTRICT

FIGURE TITLE:	FIGURE NUMBER:
COVER SHEET.	1
EXISTING FEATURES, UTILITIES, AND TOPOGRAPHY.	2
PDI SAMPLE LOCATIONS.	3
ESTIMATED EXTENT OF CONTAMINATION AREAS KEY MAP.	4A
ESTIMATED EXTENT OF CONTAMINATION.	4 (B THROUGH F)
CROSS-SECTIONS.	5 (A AND B)



GENERAL LEGEND:

- APPROXIMATE PROPERTY LINE
- PROPERTY ID
- SUBJECT AREA BOUNDARY
- SUBJECT AREA
- GROUP 24 BOUNDARY
- EXISTING BUILDING (INCLUDING TEMPORARY BUILDING)
- EXISTING GROUND CONTOUR (ELEVATION IN FEET ABOVE MSL)
- EDGE OF PAVEMENT
- CHANNEL FLOW DIRECTION
- SURFACE DRAINAGE AND FLOW DIRECTION
- GAS LINE
- WATER LINE
- SANITARY SEWER LINE
- STORM SEWER LINE
- UNDERGROUND ELECTRIC LINE
- OVERHEAD COMMUNICATION LINE
- FIBER OPTIC LINE
- GRATED INLET



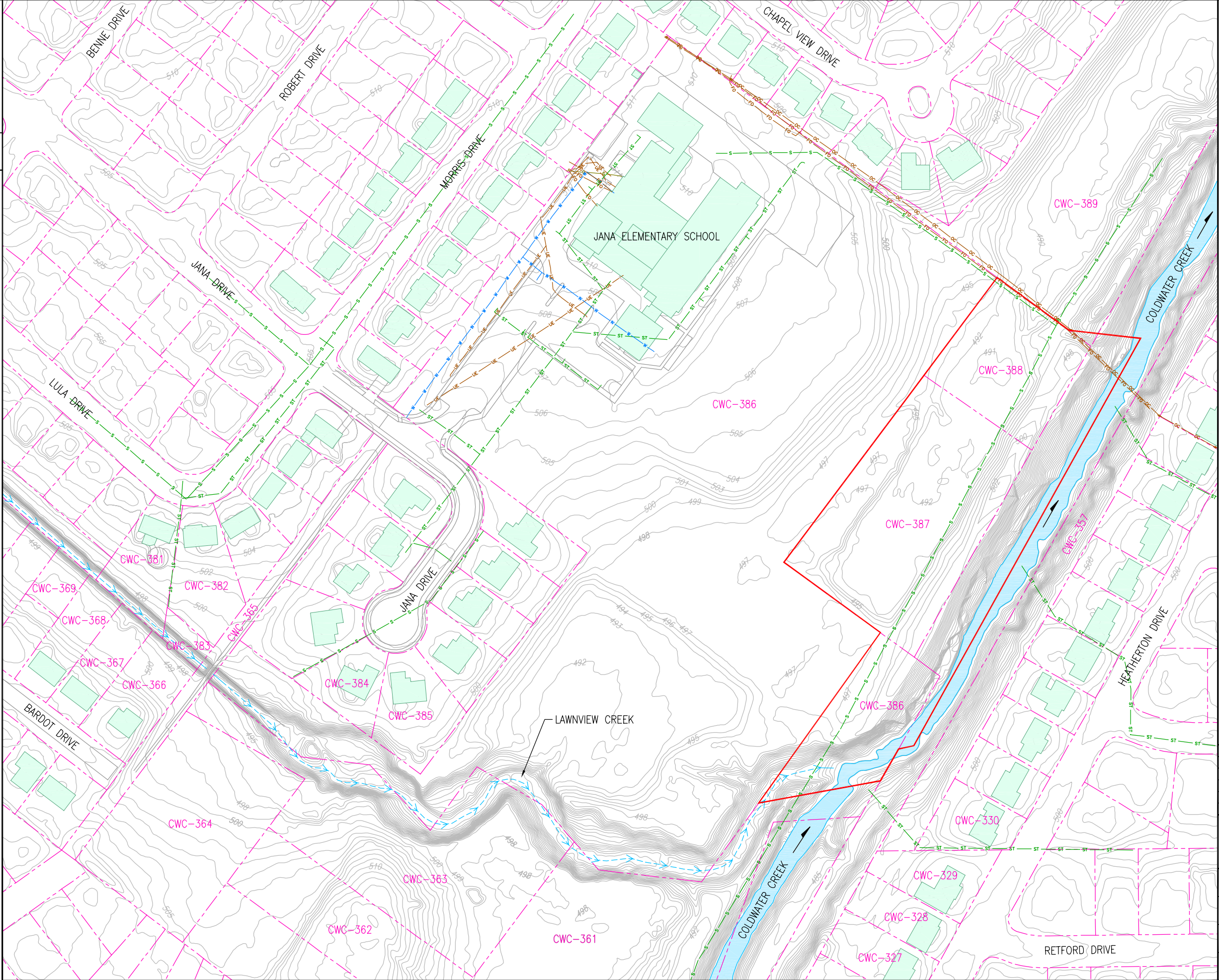
SITE VICINITY MAP  
NOT TO SCALE

Revisions			
Symbol	Descriptions	Date	Approved
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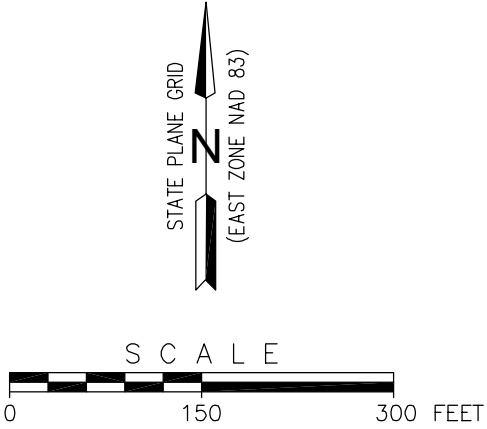
			
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Drawn by:  M. Herzog			
Checked by:			
M. Cummings			
Approved by:  A. Neil DeYong			
Scale:  As Shown		Figure Number:  1	Sheet:  -
Drawing File:  123438B615.dwg		Contract No.  W912P9-19-D-0011	



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Plotted By: mherzog

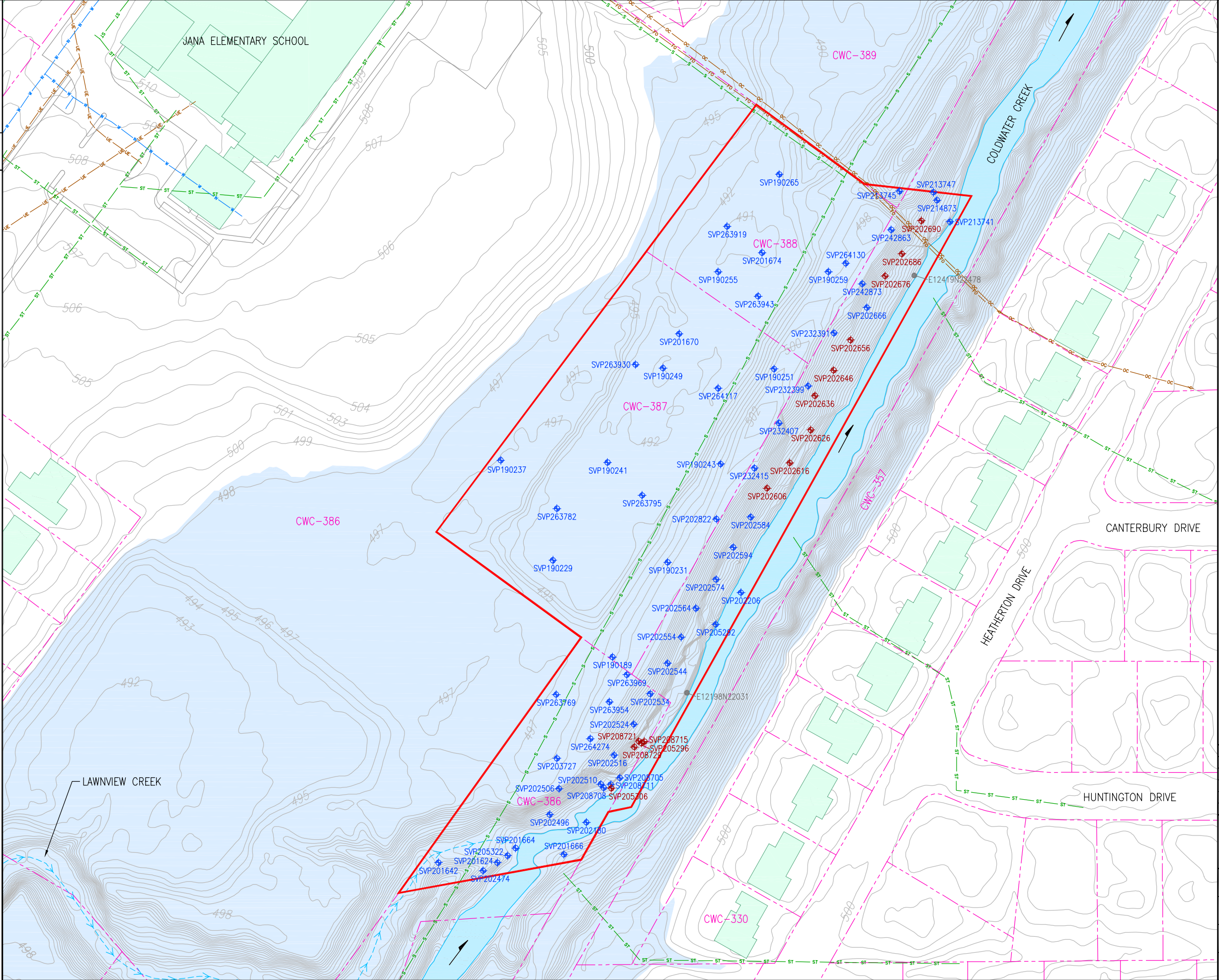
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Drawing File: 123438-B615



GENERAL NOTE:  
SEE COVER SHEET FOR GENERAL LEGEND AND ABBREVIATIONS.



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Symbol	Descriptions	Date	Approved	
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Designed by: P. Cluffini				EXISTING FEATURES, UTILITIES, AND TOPOGRAPHY JANA ELEM. SCHOOL NW BANK OF CWC AND ADJACENT MSD ROW U.S. ARMY CORPS OF ENGINEERS FUSRAP NORTH ST. LOUIS COUNTY SITES ST. LOUIS, MISSOURI
Drawn by: T. May/M. Herzog				
Checked by: M. Cummings				
Approved by: A. Neil DeYong		Scale: As Shown	Figure Number:  2	Sheet:  —
		Drawing File: 123438B615.dwg		Contract No. W912P9-19-D-0011



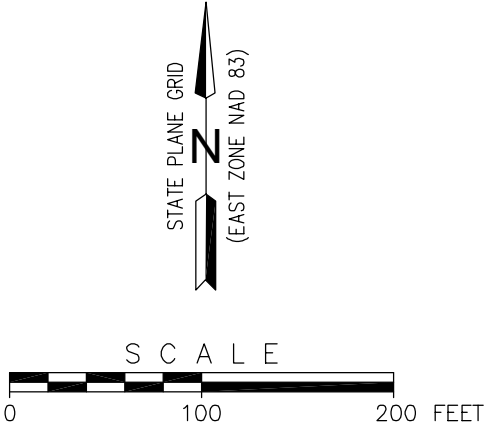
GENERAL NOTE:  
SEE COVER SHEET FOR GENERAL LEGEND AND ABBREVIATIONS.

SAMPLE LEGEND:

SYMBOL	ID	DESCRIPTION
	SVPxxxxxx	PDI SAMPLE LOCATION WITH $SOR_N \leq 1.0$
	SVPxxxxxx	PDI SAMPLE LOCATION WITH $SOR_N > 1.0$
	ExxxxNxxxxx	HISTORICAL SAMPLE LOCATION WITH $SOR_N \leq 1.0$

LEGEND:

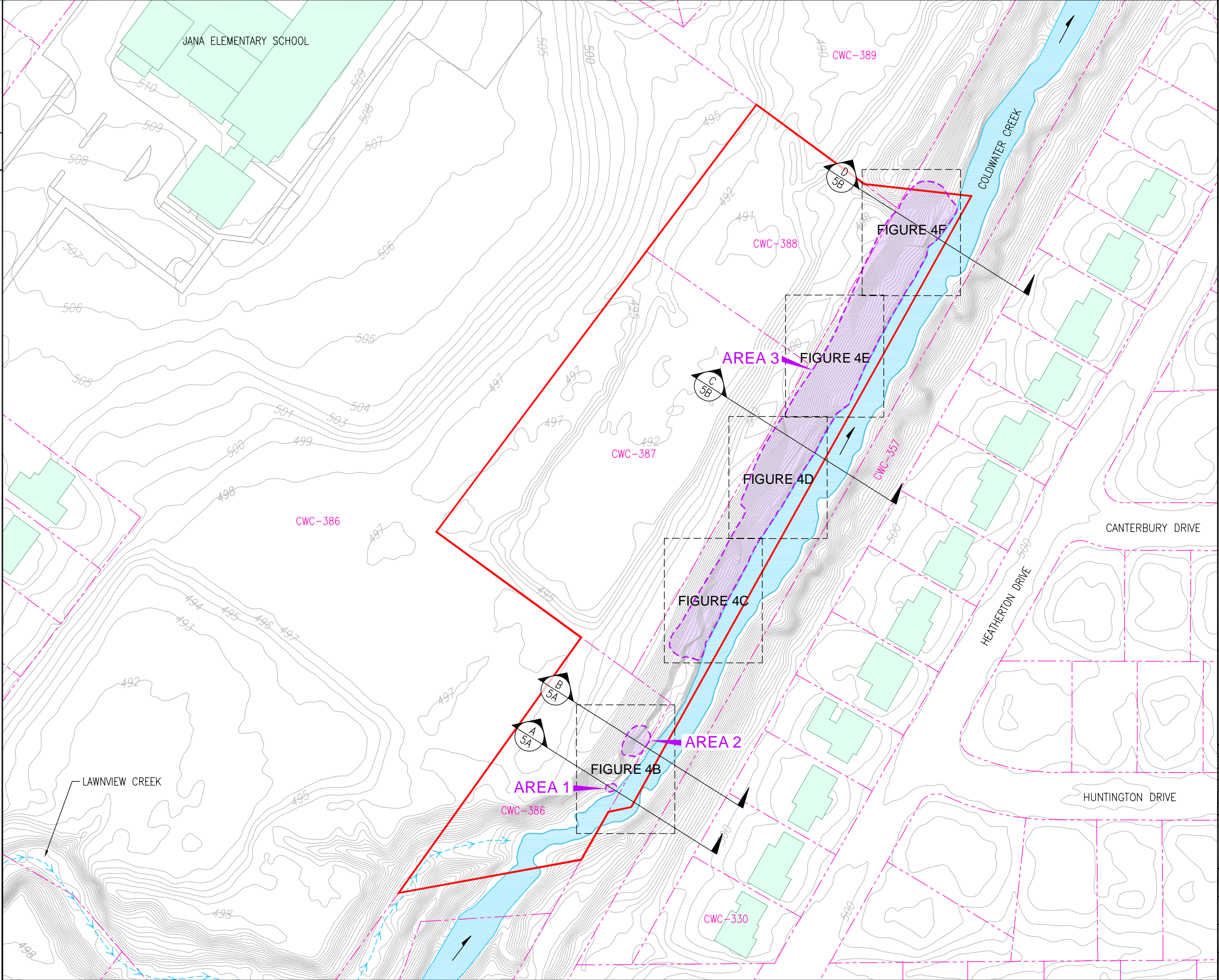
	10-YEAR FLOODPLAIN
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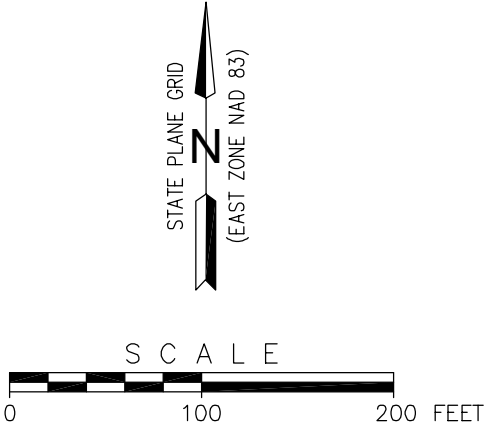




Designed by: P. Ciuffini	PDI SAMPLE LOCATIONS JANA ELEM. SCHOOL NW BANK OF CWC AND ADJACENT MSD ROW U.S. ARMY CORPS OF ENGINEERS FUSRAP NORTH ST. LOUIS COUNTY SITES ST. LOUIS, MISSOURI		
Drawn by: T. May/M. Herzog			
Checked by: M. Cummings	Scale: As Shown	Figure Number: 3	Sheet: -
Approved by: A. Neil DeYong	Drawing File: 123438B615.dwg	Contract No. W912P9-19-D-0011	

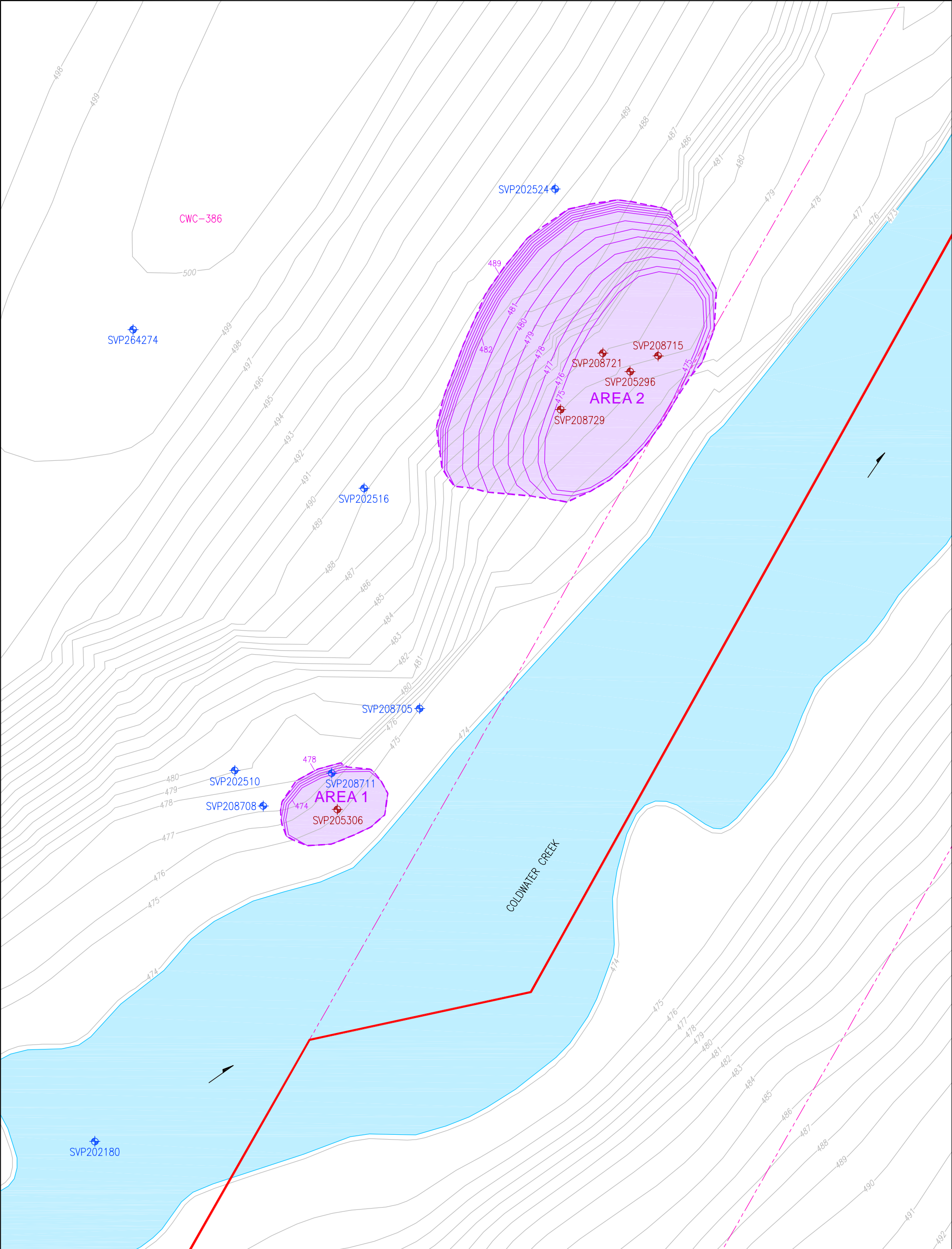


**GENERAL NOTE:**  
SEE COVER SHEET FOR GENERAL LEGEND AND ABBREVIATIONS.

- LEGEND:**
- APPROXIMATE PROPERTY LINE
  - PROPERTY ID
  - SUBJECT AREA BOUNDARY
  - ESTIMATED EXTENT OF CONTAMINATION AREA
  - CROSS SECTION LOCATION WITH DETAIL # AND FIGURE REFERENCE



Revisions			
Symbol	Descriptions	Date	Approved
0	ISSUED FOR POIR	05/18/23	D. Williams
			
Designed by: P. Ciuffini		<u>ESTIMATED EXTENT OF CONTAMINATION AREAS</u> <u>KEY MAP</u> JANA ELEM. SCHOOL NW BANK OF CWC AND ADJACENT MSD ROW U.S. ARMY CORPS OF ENGINEERS FUSRAP NORTH ST. LOUIS COUNTY SITES ST. LOUIS, MISSOURI	
Drawn by: M. Herzog			
Checked by: M. Cummings			
Approved by: A. Neil DeYong			
Scale: As Shown		Figure Number:  4A	Sheet:  —
Drawing File: 123438B615.dwg			Contract No. W912P9-19-D-0011



GENERAL NOTE:

SEE COVER SHEET FOR GENERAL LEGEND AND ABBREVIATIONS.



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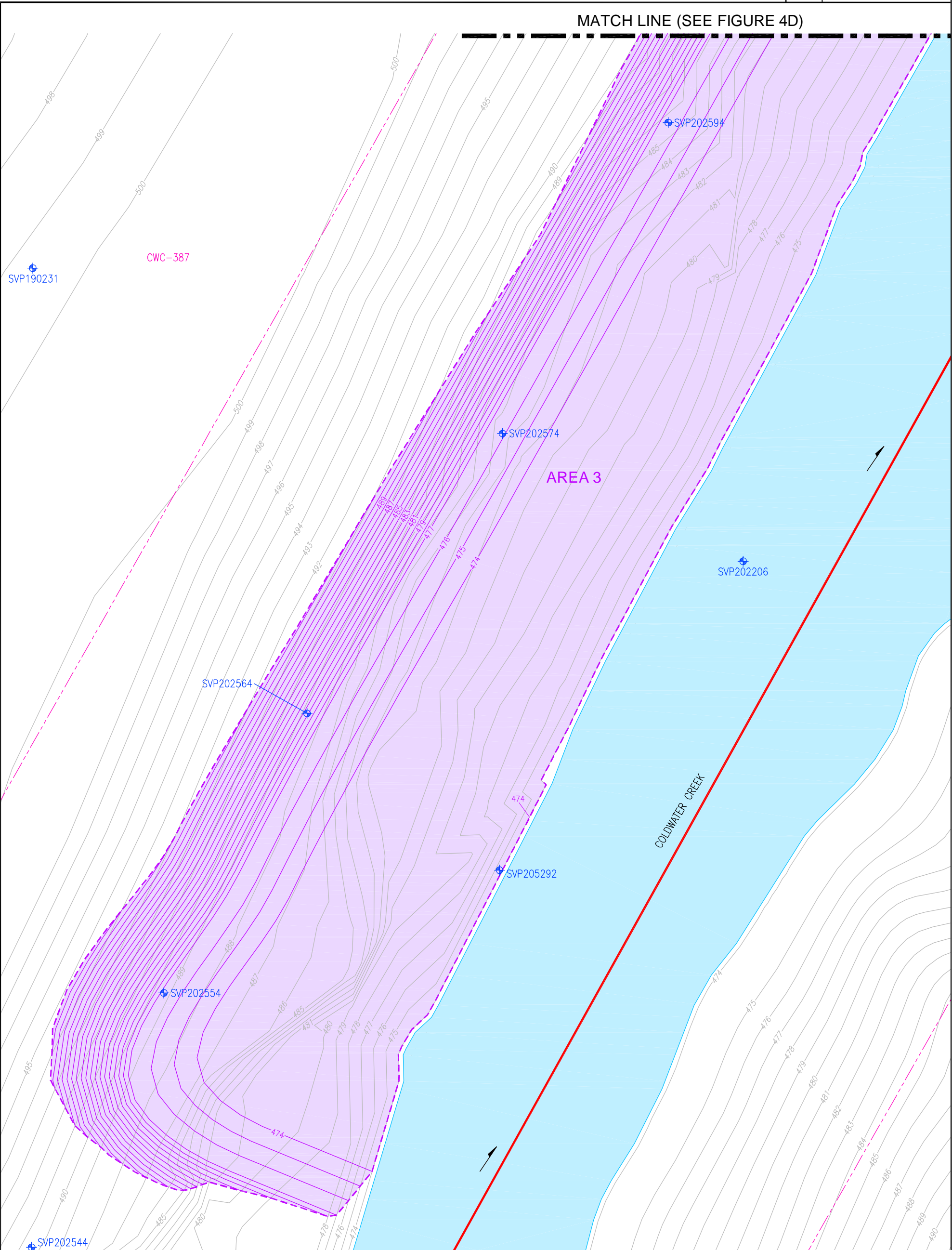
SYMBOL	ID	DESCRIPTION
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	SVPxxxxxx	PDI SAMPLE LOCATION WITH SOR <sub>N</sub> > 1.0

LEGEND:

	APPROXIMATE PROPERTY LINE
	PROPERTY ID
	SUBJECT AREA BOUNDARY
	EXISTING GROUND CONTOUR (ELEVATION IN FEET ABOVE MSL)
	ESTIMATED EXTENT OF CONTAMINATION CONTOUR (ELEVATION IN FEET ABOVE MSL)
	ESTIMATED EXTENT OF CONTAMINATION AREA



Revisions			
Symbol	Descriptions	Date	Approved
0	ISSUED FOR PDIR	05/18/23	D. Williams
			
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Drawn by: M. Herzog			
Checked by: M. Cummings			
Approved by: A. Neil DeYong			
Scale: As Shown		Figure Number: 4B	Sheet: —
Drawing File: 123438B615.dwg		Contract No. W912P9-19-D-0011	



GENERAL NOTE:

SEE COVER SHEET FOR GENERAL LEGEND AND ABBREVIATIONS.

SAMPLE LEGEND:



SYMBOL	ID	DESCRIPTION
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	SVPxxxxxx	PDI SAMPLE LOCATION WITH SOR <sub>N</sub> > 1.0

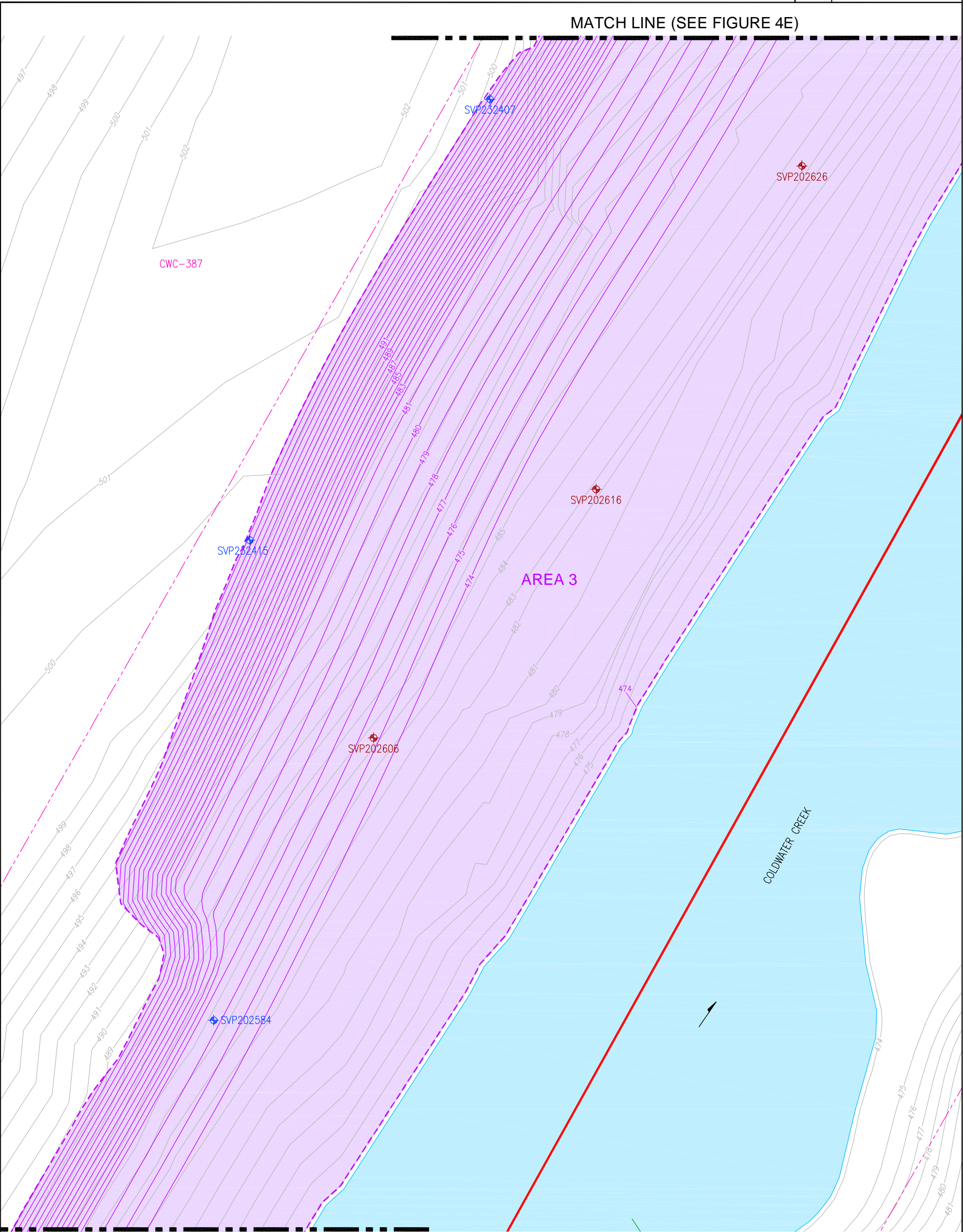
LEGEND:

	APPROXIMATE PROPERTY LINE
	PROPERTY ID
	SUBJECT AREA BOUNDARY
	EXISTING GROUND CONTOUR (ELEVATION IN FEET ABOVE MSL)
	ESTIMATED EXTENT OF CONTAMINATION CONTOUR (ELEVATION IN FEET ABOVE MSL)
	ESTIMATED EXTENT OF CONTAMINATION AREA

STATE PLANE GRID  
N  
(EAST ZONE NAD 83)



Revisions			
Symbol	Descriptions	Date	Approved
0	ISSUED FOR PDIR	05/18/23	D. Williams
			
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Drawn by: M. Herzog			
Checked by: M. Cummings			
Approved by: A. Neil DeYong			
Scale: As Shown		Figure Number:  4C	Sheet:  -
Drawing File: 123438B615.dwg		Contract No. W912P9-19-D-0011	



**GENERAL NOTE:**

SEE COVER SHEET FOR GENERAL LEGEND AND ABBREVIATIONS.

**SAMPLE LEGEND:**

SYMBOL	ID	DESCRIPTION
	SVPxxxxxx	PDI SAMPLE LOCATION WITH SOR <sub>N</sub> ≤ 1.0
	SVPxxxxxx	PDI SAMPLE LOCATION WITH SOR <sub>N</sub> > 1.0

**LEGEND:**

- APPROXIMATE PROPERTY LINE
- SUBJECT AREA BOUNDARY
- EXISTING GROUND CONTOUR (ELEVATION IN FEET ABOVE MSL)
- ESTIMATED EXTENT OF CONTAMINATION CONTOUR (ELEVATION IN FEET ABOVE MSL)
- ESTIMATED EXTENT OF CONTAMINATION AREA

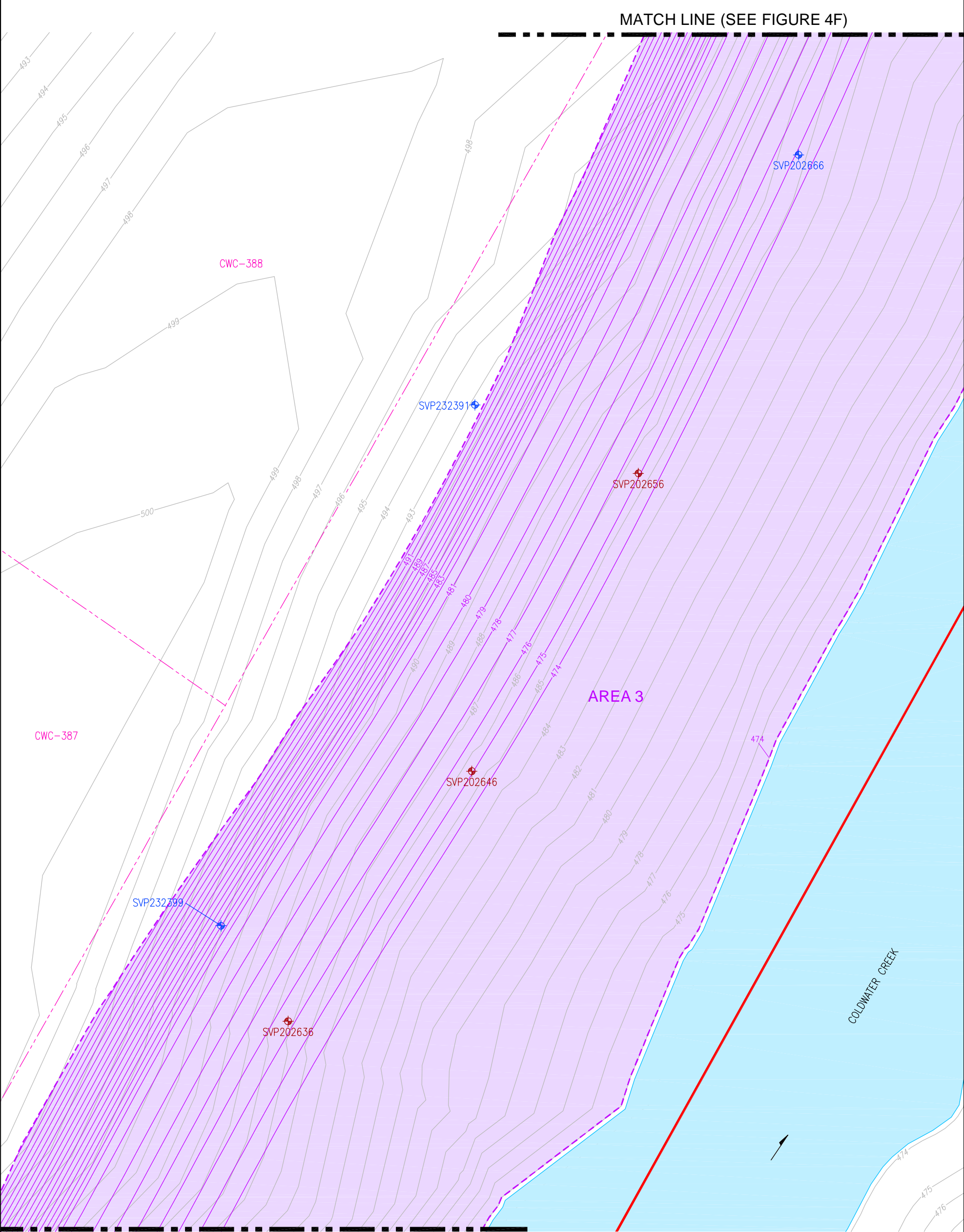
STATE PLANE GRID  
(EAST ZONE NAD 83)

SCALE

0 10 20 FEET

Revisions			
Symbol	Descriptions	Date	Approved
0	ISSUED FOR PDIR	05/18/23	D. Williams

Designed by: P. Cluffini	<b>ESTIMATED EXTENT OF CONTAMINATION</b>		
Drawn by: M. Herzog	JANA ELEM. SCHOOL NW BANK OF CWC AND ADJACENT MSD ROW U.S. ARMY CORPS OF ENGINEERS FUSRAP NORTH ST. LOUIS COUNTY SITES ST. LOUIS, MISSOURI		
Checked by: M. Cummings	Scale: As Shown	Figure Number: 4D	Sheet: -
Approved by: A. Neil DeYong	Drawing File: 123438B615.dwg	Contract No. W912P9-19-D-0011	



**GENERAL NOTE:**

SEE COVER SHEET FOR GENERAL LEGEND AND ABBREVIATIONS.

**LEGEND:**

- CWC-388 --- APPROXIMATE PROPERTY LINE
- PROPERTY ID ---
- SUBJECT AREA BOUNDARY ---
- EXISTING GROUND CONTOUR (ELEVATION IN FEET ABOVE MSL) ---
- 475 --- ESTIMATED EXTENT OF CONTAMINATION CONTOUR (ELEVATION IN FEET ABOVE MSL)
- ESTIMATED EXTENT OF CONTAMINATION AREA ---

**SAMPLE LEGEND:**

SYMBOL	ID	DESCRIPTION
+	SVPxxxxxx	PDI SAMPLE LOCATION WITH $SOR_N \leq 1.0$
+	SVPxxxxxx	PDI SAMPLE LOCATION WITH $SOR_N > 1.0$

**SCALE**

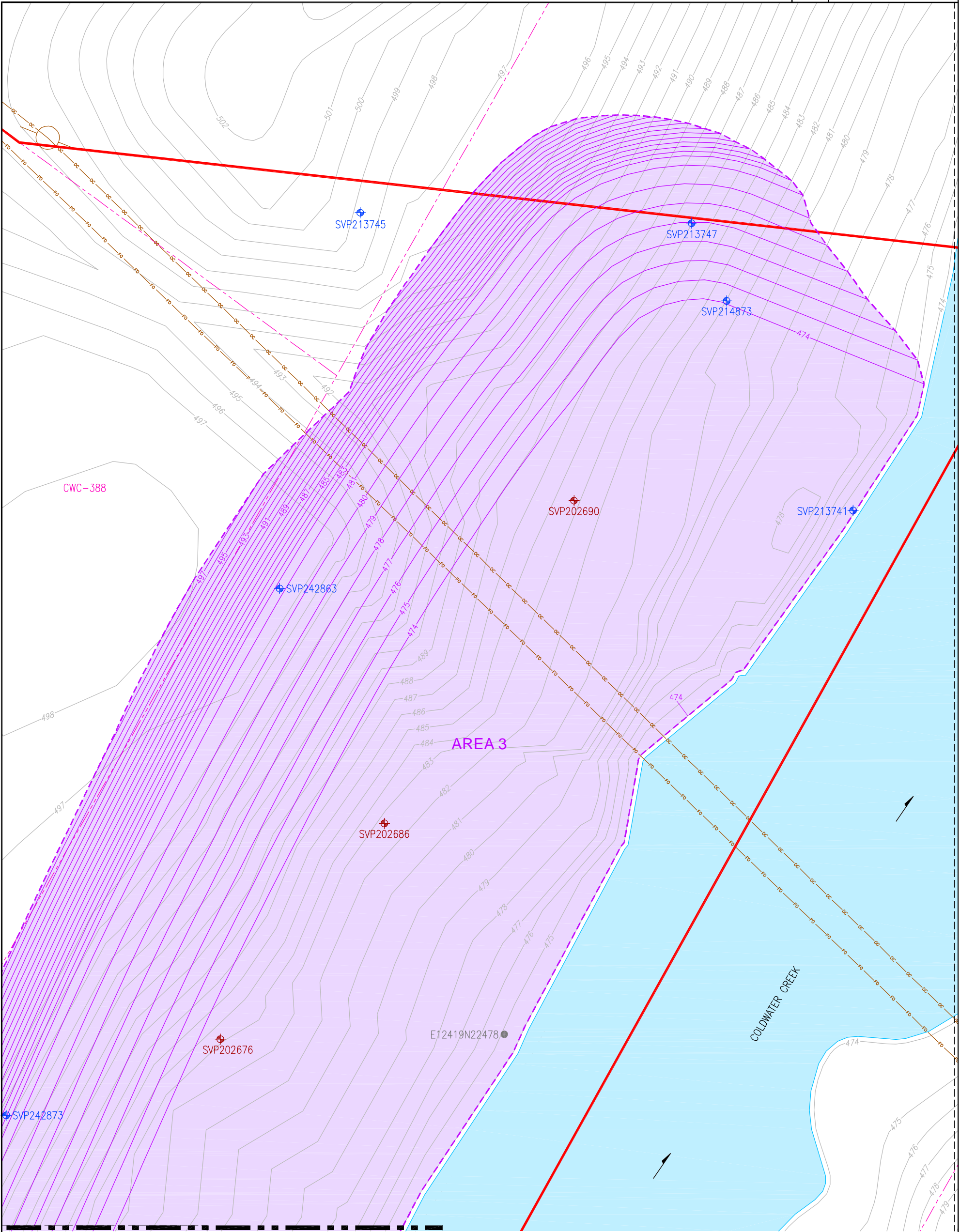
0 10 20 FEET

**STATE PLANE GRID**

(EAST ZONE NAD 83)

Revisions			
Symbol	Descriptions	Date	Approved
0	ISSUED FOR PDIR	05/18/23	D. Williams

Designed by: P. Cluffini	<b>ESTIMATED EXTENT OF CONTAMINATION</b>		
Drawn by: M. Herzog	JANA ELEM. SCHOOL NW BANK OF CWC AND ADJACENT MSD ROW U.S. ARMY CORPS OF ENGINEERS FUSRAP NORTH ST. LOUIS COUNTY SITES ST. LOUIS, MISSOURI		
Checked by: M. Cummings	Scale: As Shown	Figure Number: 4E	Sheet: -
Approved by: A. Neil DeYong	Drawing File: 123438B615.dwg	Contract No. W912P9-19-D-0011	



MATCH LINE (SEE FIGURE 4E)

GENERAL NOTE:

SEE COVER SHEET FOR GENERAL LEGEND AND ABBREVIATIONS.

SAMPLE LEGEND:



SYMBOL	ID	DESCRIPTION
	SVPxxxxxx	PDI SAMPLE LOCATION WITH SOR <sub>N</sub> ≤ 1.0
	SVPxxxxxx	PDI SAMPLE LOCATION WITH SOR <sub>N</sub> > 1.0
	ExxxxxNxxxxx	HISTORICAL SAMPLE LOCATION WITH SOR <sub>N</sub> ≤ 1.0

LEGEND:

- APPROXIMATE PROPERTY LINE
- CWC-388
- SUBJECT AREA BOUNDARY
- EXISTING GROUND CONTOUR (ELEVATION IN FEET ABOVE MSL)
- 475
- ESTIMATED EXTENT OF CONTAMINATION CONTOUR (ELEVATION IN FEET ABOVE MSL)
- ESTIMATED EXTENT OF CONTAMINATION AREA

STATE PLANE GRID  
N  
(EAST ZONE NAD 83)

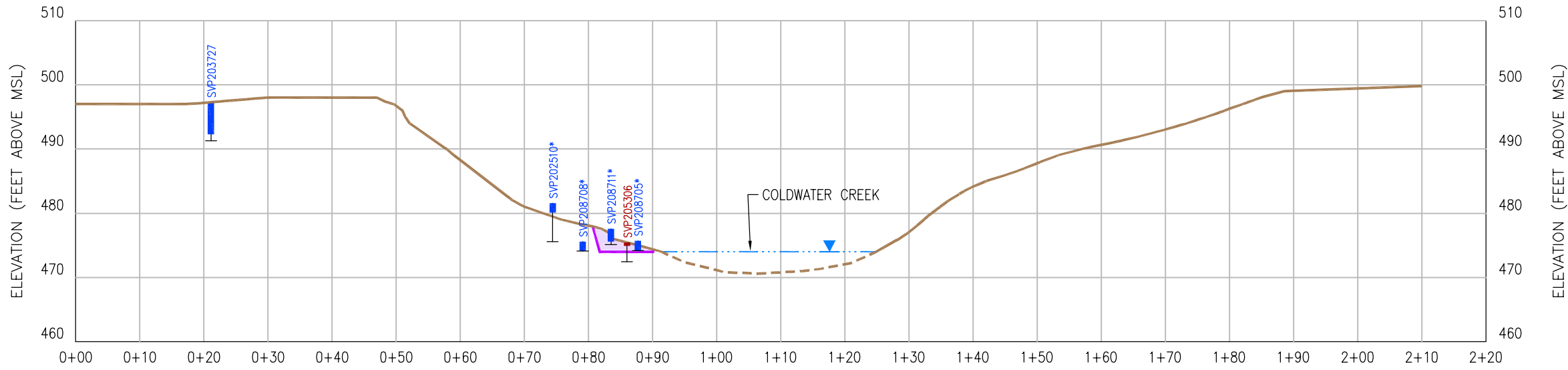


Revisions			
Symbol	Descriptions	Date	Approved
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Designed by: P. Ciuffini		ESTIMATED EXTENT OF CONTAMINATION  JANA ELEM. SCHOOL NW BANK OF CWC AND ADJACENT MSD ROW U.S. ARMY CORPS OF ENGINEERS FUSRAP NORTH ST. LOUIS COUNTY SITES ST. LOUIS, MISSOURI	
Drawn by: M. Herzog			
Checked by: M. Cummings			
Approved by: A. Neil DeYong			
Scale: As Shown		Figure Number: 4F	Sheet: —
Drawing File: 123438B615.dwg		Contract No. W912P9—19—D—0011	

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Plot Date/Time: May 17, 2023 - 11:29am  
Plotted By: mherzog

123438-B615  
Drawing File:  
OFFICE STL

WEST



**SECTION A**  
SCALE: 1" = 20'

EAST

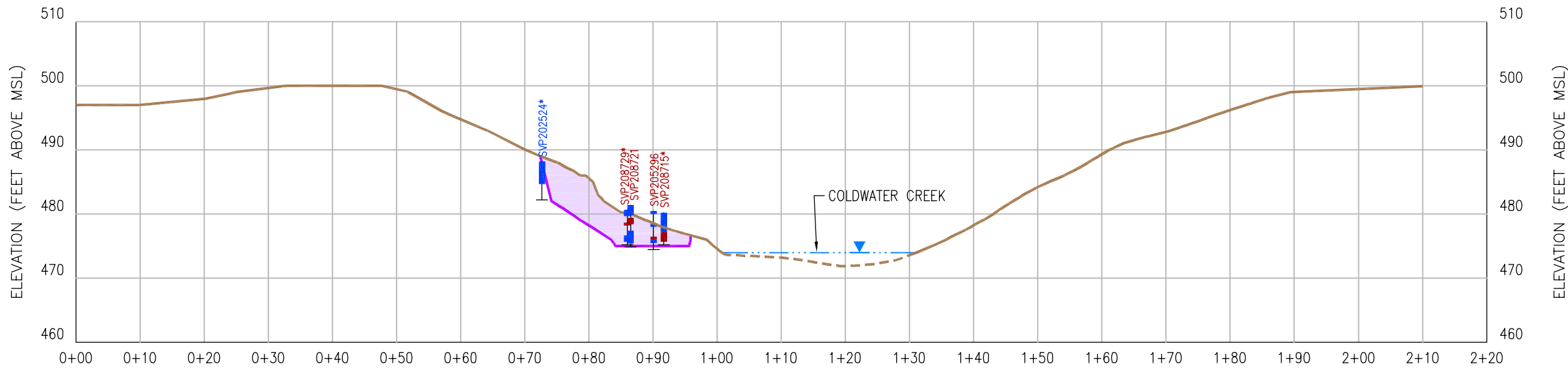
**GENERAL NOTE:**

SEE COVER SHEET FOR GENERAL LEGEND AND ABBREVIATIONS.

**LEGEND:**

- EXISTING GROUND SURFACE
- INFERRED CREEK BED
- ESTIMATED EXTENT OF CONTAMINATION AREA
- APPROXIMATE WATER LEVEL
- SAMPLE INTERVAL WITH  $SOR_N \leq 1.0$
- SAMPLE INTERVAL WITH  $SOR_N > 1.0$
- SAMPLE LOCATION IS PROJECTED ONTO CROSS-SECTION

WEST





**SECTION B**  
SCALE: 1" = 20'

EAST



Revisions			
Symbol	Descriptions	Date	Approved
0	ISSUED FOR PDIR	05/18/23	D. Williams

	
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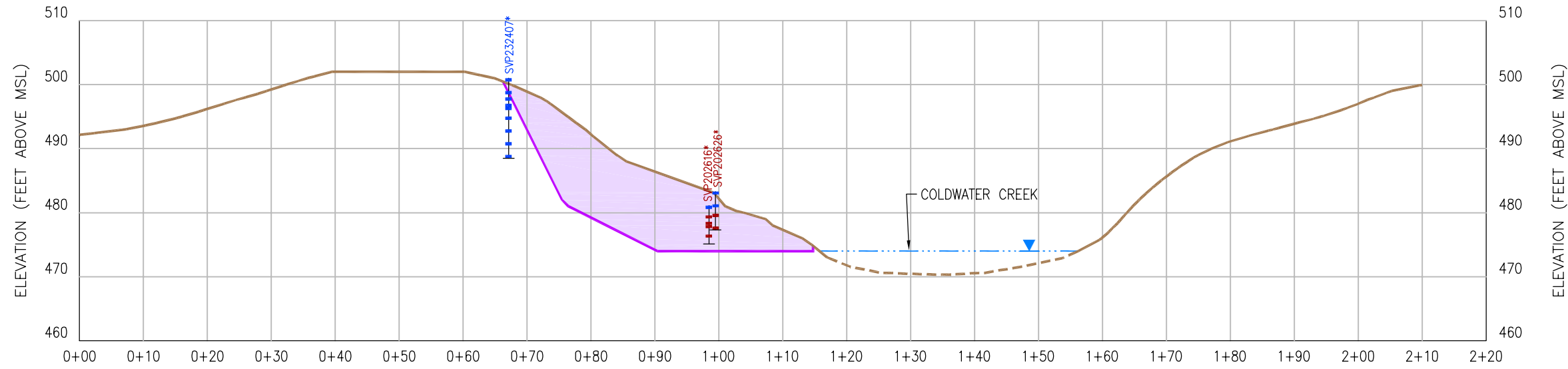
Designed by: P. Ciuffini	<div>CROSS—SECTIONS</div> <div>JANA ELEM. SCHOOL NW BANK OF CWC AND ADJACENT MSD ROW U.S. ARMY CORPS OF ENGINEERS FUSRAP NORTH ST. LOUIS COUNTY SITES ST. LOUIS, MISSOURI</div>
Drawn by: M. Herzog	
Checked by: M. Cummings	
Approved by: A. Neil DeYong	

Scale: As Shown	Figure Number: 5A	Sheet: —
Drawing File: 123438B615.dwg		Contract No. W912P9-19-D-0011

File: X:\123438\North St. Louis County Sites\Coldwater Creek\Reach C\Group 24 Jana School\123438B615.dwg  
Plot Date/Time: May 17, 2023 - 11:30am  
Plotted By: mherzog

123438-B615  
Drawing File:  
OFFICE STL

WEST



**SECTION C**  
SCALE: 1" = 20'

EAST

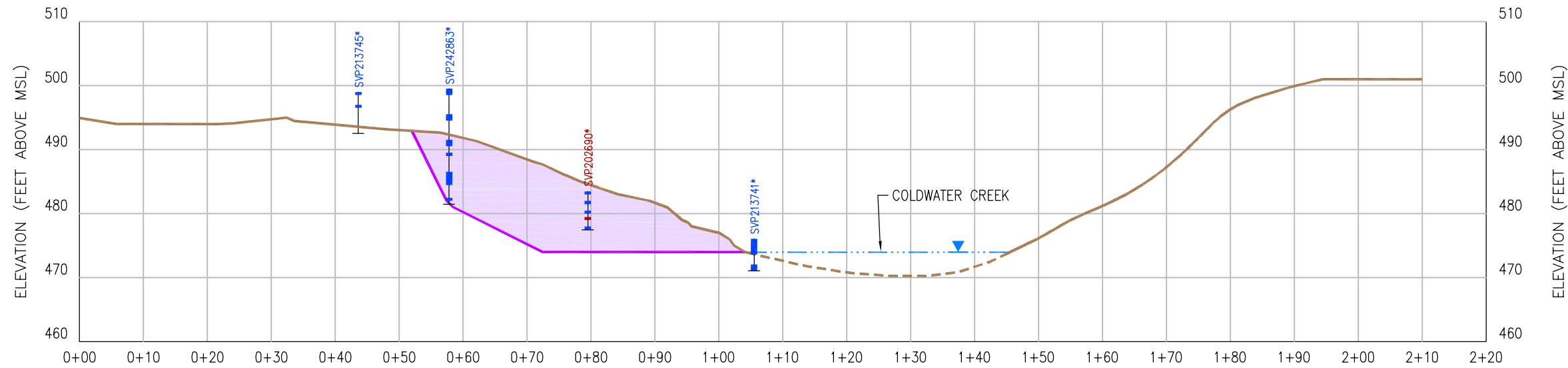
**GENERAL NOTE:**

SEE COVER SHEET FOR GENERAL LEGEND AND ABBREVIATIONS.

**LEGEND:**

- EXISTING GROUND SURFACE
- INFERRED CREEK BED
- ESTIMATED EXTENT OF CONTAMINATION AREA
- APPROXIMATE WATER LEVEL
- SAMPLE INTERVAL WITH  $SOR_N \leq 1.0$
- SAMPLE INTERVAL WITH  $SOR_N > 1.0$
- SAMPLE LOCATION IS PROJECTED ONTO CROSS-SECTION

WEST





**SECTION D**  
SCALE: 1" = 20'

EAST



Revisions			
Symbol	Descriptions	Date	Approved
0	ISSUED FOR PDIR	05/18/23	D. Williams

			
Designed by: P. Cluffini	<div>CROSS—SECTIONS</div> <div>JANA ELEM. SCHOOL NW BANK OF CWC AND ADJACENT MSD ROW U.S. ARMY CORPS OF ENGINEERS FUSRAP NORTH ST. LOUIS COUNTY SITES ST. LOUIS, MISSOURI</div>		
Drawn by: M. Herzog			
Checked by: M. Cummings			
Approved by: A. Neil DeYong	Scale: As Shown	Figure Number: 5B	Sheet: —
	Drawing File: 123438B615.dwg		Contract No. W912P9—19—D—0011