

TECHNICAL MEMORANDUM

DATE: October 5, 2009

TO: Mr. Tom Brent, NSA Crane

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Project File – CTO 467

SUBJECT: NSA Crane
Plan to complete Excavation at SWMU 9

The purpose of this Technical Memorandum is to present the extent of excavation required at Solid Waste Management Unit (SWMU) 9 to complete the goals of the Interim Measures Work Plan (IMWP) that was executed in November and December of 2008. The excavation activities described in this Technical Memorandum address the: 1) areas around former Building 55 where contaminants of concern (COCs) remain at concentrations above the cleanup goals, and 2) area around the former Fire Fighting Training Area where COC remain at concentrations above cleanup goals.

BACKGROUND

In the fall of 2008 an interim removal action was conducted for SWMU 9 located at the Naval Support Activity (NSA) Crane, in Crane, Indiana. The excavation was performed in accordance with specifications identified in the SWMU 9 IMWP, dated September 2008. Excavation was performed at three locations during the removal action. These excavations were conducted:

- Adjacent to Building 150,
- Adjacent to the former Building 55 Area, and
- At the former Fire Fighting Training Area located south of former Building 55.

Section 3 of the IMWP presents the proposed SWMU 9 excavation limits and associated specifications to achieve the goal of removing potential risk to human and ecological receptors.

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Following the 2008 excavation, verification samples were collected to verify the removal of all risk causing contaminants. The results of the verification sampling and analysis indicate that excavation has been completed adjacent to Building 150 and more excavation is required adjacent to former Building 55 and at the former Fire Fighting Training Area. The analytical results for the verification sampling are presented in Table 1. The locations of the verification samples and the results that exceed cleanup goals are presented in Figures 1, 2, and 3.

PRE-EXCAVATION SAMPLING

As a result of the verification sampling conducted in the fall of 2008 additional excavation is required within the former Building 55 Area and within the former Fire Fighting Training Area. The purpose of the pre-excavation sampling was to determine the required extent of additional excavation and to establish a row of clean samples to reduce the need for further excavation once the proposed excavation is performed. The pre-excavation samples were collected at the locations identified in Figures 4 and 5 and are summarized in Table 2. At each of the identified locations, samples were collected from the 0 to 2 foot, 2 to 4 foot, and 4 to 6 foot depth intervals. The 0 to 2 foot depth interval was replaced by a 0.5 to 2.0 foot depth interval for samples collected below the Former Building 55 concrete foundation (concrete thickness is 6 inches). These samples were collected in accordance with the United States Environmental Protection Agency (USEPA) approved Quality Assurance Project Plan (QAPP), developed for SWMU 9 titled Resource Conservation and Recovery Act QAPP for SWMUs 8, 9, 15, 18, 19, 20, and the Old Gun Tub Storage Lot and Interim Measures at SWMU 7 (Old Rifle Range), SWMU 8 (Building 106 Pond), SWMU 13 (Mine Fill B), SWMU 17 (PCB Burial/Pole Yard), and SWMU 9 (Pesticide Control Area) dated September 2008 (latest update).

The identified samples were divided into three groups of samples (Group 1, Group 2, and Group 3) and sent to a fixed base laboratory for extraction and analysis preparation. Following extraction and analysis preparation the fixed base laboratory analyzed the Group 1 samples for pesticides and diesel range organic compounds (DRO); holding the remaining samples until results on the Group 1 samples were determined. In the event Group 1 samples contained concentrations of COC above the cleanup goals, the Group 2 samples would be analyzed and likewise for the Group 3 samples. At the completion of the analytical process all of the group 1 samples and all group 2 samples were analyzed. Because of the analytical results of the Group 1 and Group 2 samples, Group 3 samples were not analyzed. Table 2 identifies the samples that were and were not analyzed, Table 3 presents the results of the July 2009 pre-excavation sampling event, and Figures 4 and 5 present the locations where COC were detected at concentrations that exceed the cleanup goals.

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EXCAVATION

The soil identified in the following paragraphs will be excavated, characterized, and transported offsite for disposal at a permitted landfill. The excavation, characterization, transportation, and disposal of the identified soil must be performed in accordance with all of the requirements and specifications identified in the September 2008 SWMU 9 IMWP. If in-situ characterization is approved by the selected disposal facility, soil that is excavated from the identified areas can be directly loaded and transported to the disposal facility. Stockpiling soil onsite is only needed if additional characterization or dewatering is required. Excavation will be required to the limits identified in this Technical Memorandum unless expanded due to the results of the verification sampling describe in this Technical Memorandum. Verification samples following the excavation activities will be required at identified locations to confirm the removal of all unacceptable risks to human health and ecological receptors. Actual limits of excavation will depend on the analytical results of the collected verification samples. All excavations and stockpiled soils must be covered while awaiting the analytical results of the verification samples.

Former Building 55 Area – The verification sampling and pre-excavation sampling performed for the former Building 55 area indicates that unacceptable levels of contamination remain in the soil and additional excavation is needed (Table 1 presents the verification samples results, contaminants of concern, and cleanup criteria and Table 3 presents the pre-excavation sampling results). Figure 6a identifies the horizontal and vertical limits of the remaining excavation at the former Building 55 area to achieve acceptable ecological and human health risk criteria. Based on the excavation areas and depths identified in Figure 6a, approximately 260 cubic yards of soil (including the 6 inch thick concrete material of the Former Building 55 foundation) needs to be removed to achieve acceptable risk criteria (excavation calculation attached). A portion of this excavation (59 cubic yards) is suitable for backfilling.

The excavation volume calculation assumes that when backfilling the previous excavation, clean backfill was placed in contact with the remaining contaminated soil. Therefore, the reported volume includes;

- The removal of approximately 1 foot of previously backfilled soil that is currently in contact with the remaining contaminated soil along the previously excavated excavation side walls.
- The removal of approximately 0.5 feet of previously backfilled soil that is currently in contact with the remaining contaminated soil found on the previously exposed excavation floor.

Actual volume of excavation may increase as a result of the verification sampling.

Former Fire Fighting Training Area – The verification sampling and pre-excavation sampling performed for the former Fire Fighting Training Area indicates that unacceptable levels of PCB contamination remain in the soil, and additional excavation is needed. Figure 7 identifies the horizontal and vertical limits of the

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remaining excavation at the former Fire Fighting Training Area to achieve acceptable ecological and human health risk criteria. Based on the area and depth identified in Figure 7a, approximately 705 cubic yards of soil needs to be excavated from the former Fire Fighting Training Area to achieve acceptable risk criteria. This volume assumes a 0.5 foot horizontal to 1 foot vertical slope where the excavation is 7 feet in depth (excavation calculation attached). Assuming that during backfilling of the previous excavation, separation geotextile (filter fabric) was used to line the excavation (as reported by the contractor), 35 cubic yards of the reported total excavation volume can be used as backfill material.

DISPOSAL

The excavated soil will be disposed off-site in accordance with the specifications identified in the September 2008 IMWP for SWMU 9.

Former Building 55 Area - Based on historical process it is estimated that the soil removed from the former Building 55 Area will need to be disposed as a listed hazardous waste (hazardous due to process, not concentration). Based on the verification samples and the pre-excavation samples collected from the former Building 55 Area, the excavated soil will be characterized into 4 different waste streams.

- Backfill Material – Clean onsite soil used to backfill the previous excavations.
- Special Waste - Listed hazardous waste with concentrations less than the toxicity characteristic leachate procedure (TCLP) concentrations.
- Hazardous Waste - Listed hazardous waste with concentrations greater than TCLP concentrations and less than land disposal restriction (LDR) concentrations.
- Hazardous Waste - Listed hazardous waste with concentrations greater than LDR concentrations.

Soil requiring treatment prior to land disposal within a hazardous waste landfill (Subtitle C) was determined by comparing the analytical results of the verification and pre-excavation samples with the Indiana Department of Environmental Management (IDEM) Industrial Direct Contact criteria and the Universal Treatment Standards. In order for soil to require treatment before land disposal, the contaminant concentrations must exceed the IDEM Industrial Direct Contact Cleanup criteria and also exceed the Universal Treatment Standards by 10 times. The results of this evaluation determined that some of the additional soil being excavated will need to be treated prior to land disposal. Table 4 presents this land disposal evaluation and Figure 6b identifies the limits of soil requiring treatment.

Former Fire Training Area - In addition, verification and pre-excavation sampling performed at the former Fire Fighting Training Area indicates that the excavated soil will be characterized into 3 different waste streams.

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- Backfill Material – Clean onsite soil used to backfill the previous excavations.
- Non-TSCA Waste – Excavated soil with a Total PCB concentration less than the toxic substance control act (TSCA) concentration of 50 mg/kg.
- TSCA Waste – Excavated soil with a Total PCB concentration greater than the TSCA concentration of 50 mg/kg.

Figure 7b identifies the estimated limits of these waste streams.

The following table and the attached calculation summarize the waste types that will be generated during the additional excavation to be performed at SWMU 9.

Excavation Area	Total Excavation Volume (cy)	Material Disposition	Volume (cy)
Former Building 55 Area	260	Dispose offsite as special waste (less than TCLP)	36
		Dispose offsite as hazardous waste (less than LDR)	70
		Dispose offsite as hazardous waste (greater than LDR)	95
		Stockpile onsite for use as clean backfill	59
Former Fire Training Area	705	Dispose offsite as non-TSCA regulated waste	491
		Dispose offsite as TSCA regulated waste	179
		Stockpile onsite for use as clean backfill	35

Volumes reported for Former Building 55 area assumes that concrete will be disposed according to the soil classification below the concrete. Characterization sampling of the concrete would be required if concrete segregation is desired.

VERIFICATION SAMPLING

The purpose of the verification sampling is to verify that the contaminants that remain on site (if any) are at concentrations that do not result in unacceptable risks to human health and ecological receptors. Verification samples will be collected in accordance with the September 2008 IMWP for SWMU 9. Verification samples will be collected at the locations identified on Figure 8 for the former Building 55 Area and where identified on Figure 9 for the Former Fire Fighting Training Area. The expected duration between sample collection and reporting preliminary analytical results is 5 working days. In addition to collecting verification samples from the exposed excavation surfaces, the Navy's representative will also collect verification samples from the limits of support facilities constructed to support excavation activities (decontamination pads, stockpiles, and haul roads) to verify that contamination was not spread during implementation of excavation activities. As indicated in the September 2008 IMWP for SWMU 9, based

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on the results of the verification samples the Navy may direct the EMAC Contractor to excavate additional soil.

RESTORATION

Following the verification of contamination removal, the EMAC contractor must backfill the excavations in accordance with the requirements presented in the September 2008 IMWP for SWMU 9. Based on the available data, approximately 871 cubic yards of certified clean backfill material will be needed to restore the SWMU 9 excavation areas. Following Navy approval, the excavation areas will be backfilled and vegetated with a permanent stand of vegetation. Based on the assumption that the soil retained from the excavation to be used as backfill material is used a common fill material and that the former Building 55 concrete foundation material will be replaced with vegetation, backfilling the excavations requires obtaining 765 cubic yards of common fill and 106 cubic yards of topsoil from one or more off-site source(s).

TABLES

1. SWMU Verification Sampling Results
2. Summary of July 2009 Pre-Excavation Sampling
3. July 2009 Pre-Excavation Sampling Results
4. Land Disposal Restriction Evaluation

TABLE 1

SWMU 9 VERIFICATION SAMPLING RESULTS
NSWC CRANE, CRANE, IN
(PAGE 1 OF 6)

Location ⁽¹⁾ Sample Number Sample Depth (ft) ⁽²⁾ Sample Date	Cleanup Goals			09SS001C-W 09SS001C0006 0 - 0.5 9/30/2008	09SS002C-W 09SS002C0006 0 - 0.5 9/30/2008	09SS003C-W 09SS003C0006 0 - 0.5 9/30/2008	09SS004C-W 09SS004C0006 0 - 0.5 9/30/2008	09SS005C-F 09SS005C0006 0 - 0.5 9/30/2008	09SS006C-W 09SS006C0006 0 - 0.5 10/2/2008	09SS007C-W 09SS007C0006 0 - 0.5 10/2/2008	09SS008C-W 09SS008C0006 0 - 0.5 10/2/2008
	IMWP Cleanup Goal (Ecological) ⁽⁴⁾	IDEM Default Residential	IDEM Default Industrial								
Pesticides/PCBs (ug/kg)											
4,4'-DDD ⁽³⁾	24300	28000	120000	NA	NA	NA	NA	NA	1200	18 J	580 J
4,4'-DDE ⁽³⁾	17150	20000	86000	NA	NA	NA	NA	NA	4800	230	2100
4,4'-DDT ⁽³⁾	3600	20000	86000	NA	NA	NA	NA	NA	17000	1000 J	3200
ALDRIN				NA	NA	NA	NA	NA	6.6 U	0.73 U	7.5 U
ALPHA-BHC				NA	NA	NA	NA	NA	6.6 U	0.73 U	7.5 U
ALPHA-CHLORDANE ⁽³⁾	3500	9600	38000	NA	NA	NA	NA	NA	390	41	7500
AROCLOR-1016				2200 U	1000 U	2800 U	1100 U	1100 U	NA	NA	NA
AROCLOR-1221				2200 U	1000 U	2800 U	1100 U	1100 U	NA	NA	NA
AROCLOR-1232				2200 U	1000 U	2800 U	1100 U	1100 U	NA	NA	NA
AROCLOR-1242				180000 J	130000	300000 J	47000	75000	NA	NA	NA
AROCLOR-1248				2200 U	1000 U	2800 U	1100 U	1100 U	NA	NA	NA
AROCLOR-1254				2200 U	1000 U	2800 U	1100 U	1100 U	NA	NA	NA
AROCLOR-1260				2200 U	1000 U	2800 U	1100 U	1100 U	NA	NA	NA
TOTAL PCBs Surface ⁽³⁾	1000			180000	130000	300000	47000	---	NA	NA	NA
TOTAL PCBs Subsurface ⁽³⁾	25000			---	---	---	---	75000	NA	NA	NA
BETA-BHC				NA	NA	NA	NA	NA	6.6 U	0.73 U	7.5 U
DELTA-BHC				NA	NA	NA	NA	NA	6.6 UJ	0.73 UJ	7.5 UJ
DIELDRIN ⁽³⁾	300	270	860	NA	NA	NA	NA	NA	14 U	1.6 U	16 U
ENDOSULFAN I				NA	NA	NA	NA	NA	6.6 U	0.73 U	7.5 U
ENDOSULFAN II				NA	NA	NA	NA	NA	14 U	88 R	16 U
ENDOSULFAN SULFATE				NA	NA	NA	NA	NA	14 U	1.6 U	16 U
ENDRIN				NA	NA	NA	NA	NA	14 U	1.6 U	450 J
ENDRIN ALDEHYDE				NA	NA	NA	NA	NA	14 U	780	16 U
ENDRIN KETONE				NA	NA	NA	NA	NA	14 U	1.6 U	16 U
GAMMA-BHC (LINDANE)				NA	NA	NA	NA	NA	6.6 U	0.73 U	7.5 U
GAMMA-CHLORDANE ⁽³⁾	3500	9600	68000	NA	NA	NA	NA	NA	550 J	37 J	7400
HEPTACHLOR ⁽³⁾	1050	930	2900	NA	NA	NA	NA	NA	6.6 U	13 J	340
HEPTACHLOR EPOXIDE				NA	NA	NA	NA	NA	6.6 U	17	1100
METHOXYCHLOR				NA	NA	NA	NA	NA	66 UJ	7.3 UJ	75 UJ
TOXAPHENE				NA	NA	NA	NA	NA	870 U	96 U	980 U
Petroleum Hydrocarbons (mg/kg)											
DIESEL RANGE ORGANICS	1600	80	1000	NA	NA	NA	NA	NA	99	180	77

- The location identifies the type of sample collected (C indicates composite sample) and location (F indicates excavation floor and W indicated excavation wall).
- Sample depth indicates the depth from the surface of exposed soils.
- These parameters were identified as the Chemicals of Concern. Cleanup goals are provided for these compounds only.
- Cleanup goal for comparison to samples taken from excavation sidewalls that represent soil conditions for the existing surface soil (0 to 2 feet bgs).
- One or more chemical concentration exceeds PRG presented in IMWP, however no additional excavation is needed since results are less than IDEM default values and location will be covered with a minimum of 2 feet of soil.

NA Parameter not analyzed for this sample
 U Parameter is not detected at the indicated detection limit
 J Indicated result is estimated
 --- Parameter not analyzed for indicated depth
 R Data rejected for use in risk development

Indicates that results exceeds one or more of the appropriate cleanup goals (ecological risk or IDEM Default Industrial).
 Indicates that further excavation is required.

TABLE 1

SWMU 9 VERIFICATION SAMPLING RESULTS
NSWC CRANE, CRANE, IN
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Location ⁽¹⁾	Cleanup Goals			09SS009C-W	09SS010C-W	09SS011C-W	09SS012C-W	09SS013C-W	09SS014C-W	09SS015C-W	09SS016C-W
	IMWP Cleanup Goal (Ecological) ⁽⁴⁾	IDEM Default Residential	IDEM Default Industrial	09SS009C0006 0 - 0.5 10/2/2008	09SS010C0006 0 - 0.5 10/2/2008	09SS011C0006 0 - 0.5 10/9/2008	09SS012C0006 0 - 0.5 10/9/2008	09SS013C0006 0 - 0.5 10/9/2008	09SS014C0006 0 - 0.5 10/9/2008	09SS015C0006 0 - 0.5 10/9/2008	09SS016C0006 0 - 0.5 10/9/2008
Sample Number											
Sample Depth (ft) ⁽²⁾											
Sample Date											
Pesticides/PCBs (ug/kg)											
4,4'-DDD ⁽³⁾	24300	28000	120000	24	88	0.16 U	0.16 U	160 J	13 J	7300	720
4,4'-DDE ⁽³⁾	17150	20000	86000	30 J	150	3.8	1.9 J	170 J	81	8400	6400
4,4'-DDT ⁽³⁾	3600	20000	86000	21 J	1300	14	6.7	310 J	66	4100000	14000
ALDRIN				0.080 U	12 J	0.073 U	0.077 U	0.082 U	0.075 U	78 U	7.7 U
ALPHA-BHC				0.080 U	0.75 U	0.32 UJ	0.077 U	0.082 U	0.075 U	78 U	7.7 U
ALPHA-CHLORDANE ⁽³⁾	3500	9600	38000	45	320	0.073 U	1.6	1500	290	4400	500
AROCLOR-1016				NA							
AROCLOR-1221				NA							
AROCLOR-1232				NA							
AROCLOR-1242				NA							
AROCLOR-1248				NA							
AROCLOR-1254				NA							
AROCLOR-1260				NA							
TOTAL PCBs Surface ⁽³⁾	1000			NA							
TOTAL PCBs Subsurface ⁽³⁾	25000			NA							
BETA-BHC				0.080 U	0.75 U	0.073 U	0.077 U	0.082 U	0.075 U	78 U	7.7 U
DELTA-BHC				0.080 UJ	0.75 UJ	0.073 U	0.077 U	0.082 U	0.075 U	78 U	7.7 U
DIELDRIN ⁽³⁾	300	270	860	0.17 U	22 J	0.16 U	0.16 U	25 J	8.1 R	170 U	170 J
ENDOSULFAN I				0.080 U	0.75 U	0.073 U	0.077 U	0.082 U	0.075 U	78 U	7.7 U
ENDOSULFAN II				0.17 U	1.6 U	0.16 U	0.16 U	6.5 R	0.16 U	170 U	17 U
ENDOSULFAN SULFATE				0.17 U	1.6 U	0.16 U	0.16 U	0.18 U	0.16 U	170 U	17 U
ENDRIN				1.4 R	1.6 U	0.16 U	0.16 U	88 J	8.6 J	170 U	17 U
ENDRIN ALDEHYDE				0.17 U	1.6 U	0.16 UJ	0.16 U	49 R	0.16 U	170 U	17 U
ENDRIN KETONE				0.17 U	1.6 U	0.16 U	0.16 U	2.1 J	0.16 U	170 U	17 U
GAMMA-BHC (LINDANE)				0.080 U	0.75 U	0.073 U	0.077 U	0.082 U	0.075 U	320 J	7.7 U
GAMMA-CHLORDANE ⁽³⁾	3500	9600	68000	37	220	0.073 UJ	1.5 J	1800	280	5000	620
HEPTACHLOR ⁽³⁾	1050	930	2900	0.080 U	12 J	0.073 U	0.077 U	89 J	0.075 U	380 J	7.7 U
HEPTACHLOR EPOXIDE				2.9	300	0.073 U	0.077 U	22 J	5.9 J	78 U	7.7 U
METHOXYCHLOR				0.80 UJ	7.5 UJ	0.73 U	0.77 U	0.82 U	0.75 U	780 U	77 U
TOXAPHENE				10 U	99 U	9.6 U	10 U	11 U	9.8 U	10000 U	1000 U
Petroleum Hydrocarbons (mg/kg)											
DIESEL RANGE ORGANICS	1600	80	1000	3.0 U	190	16	6.4	18	7.7	1800	280

- (1) The location identifies the type of sample collected (C indicates composite sample) and location (F indicates excavation floor and W indicated excavation wall).
- (2) Sample depth indicates the depth from the surface of exposed soils.
- (3) These parameters were identified as the Chemicals of Concern. Cleanup goals are provided for these compounds only.
- (4) Cleanup goal for comparison to samples taken from excavation sidewalls that represent soil conditions for the existing surface soil (0 to 2 feet bgs).
- (5) One or more chemical concentration exceeds PRG presented in IMWP, however no additional excavation is needed since results are less than IDEM default values and location will be covered with a minimum of 2 feet of soil.

NA Parameter not analyzed for this sample
 U Parameter is not detected at the indicated detection limit
 J Indicated result is estimated
 --- Parameter not analyzed for indicated depth
 R Data rejected for use in risk development

Indicates that results exceeds one or more of the appropriate cleanup goals (ecological risk or IDEM Def
 Indicates that further excavation is required.

TABLE 1

SWMU 9 VERIFICATION SAMPLING RESULTS
NSWC CRANE, CRANE, IN
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Location ⁽¹⁾ Sample Number Sample Depth (ft) ⁽²⁾ Sample Date	Cleanup Goals			09SS017C-W 09SS017C0006 0 - 0.5 10/9/2008	09SS018C-W 09SS018C0006 0 - 0.5 10/9/2008	09SS019C-W 09SS019C0006 0 - 0.5 10/9/2008	09SS020C-W 09SS020C0006 0 - 0.5 10/9/2008	09SS021C-W 09SS021C0006 0 - 0.5 10/9/2008	09SS022C-F ⁽⁵⁾ 09SS022C0006 0 - 0.5 10/9/2008	09SS023C-F ⁽⁵⁾ 09SS023C0006 0 - 0.5 10/9/2008	09SS024C-F 09SS024C0006 0 - 0.5 10/10/2008
	IMWP Cleanup Goal (Ecological) ⁽⁴⁾	IDEM Default Residential	IDEM Default Industrial								
Pesticides/PCBs (ug/kg)											
4,4'-DDD ⁽³⁾	24300	28000	120000	390	6.1	110	4.8	36	320	1100	1.9 J
4,4'-DDE ⁽³⁾	17150	20000	86000	1800	1.7 R	43	1.6 J	46	180	2100	3.4 J
4,4'-DDT ⁽³⁾	3600	20000	86000	5700	460 J	2500 J	230	530 J	4600 J	9900	50 J
ALDRIN				7 U	0.08 U	0.85 U	0.08 U	0.08 U	0.81 U	7.7 U	0.077 U
ALPHA-BHC				7 U	4.3	0.85 U	0.08 U	0.08 U	0.81 UJ	7.7 U	0.077 U
ALPHA-CHLORDANE ⁽³⁾	3500	9600	38000	910	1.8	0.85 U	0.88 J	30	140	380	1.2 J
AROCLOR-1016				NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1221				NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1232				NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1242				NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1248				NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1254				NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1260				NA	NA	NA	NA	NA	NA	NA	NA
TOTAL PCBs Surface ⁽³⁾	1000			NA	NA	NA	NA	NA	NA	NA	NA
TOTAL PCBs Subsurface ⁽³⁾	25000			NA	NA	NA	NA	NA	NA	NA	NA
BETA-BHC				7 U	0.08 U	0.85 U	0.08 U	0.08 U	0.81 U	7.7 U	0.077 U
DELTA-BHC				7 U	0.08 U	0.85 U	0.08 U	0.08 U	0.81 U	7.7 U	0.077 U
DIELDRIN ⁽³⁾	300	270	860	200 J	0.17 U	1.8 U	0.17 U	11	19 J	110 J	0.17 U
ENDOSULFAN I				7 U	0.08 U	0.85 U	0.08 U	0.08 U	0.81 U	7.7 U	0.077 U
ENDOSULFAN II				15 U	2.1 R	1.8 U	0.17 U	5	12 J	17 U	0.17 U
ENDOSULFAN SULFATE				15 U	0.17 U	1.8 U	0.17 U	0.17 U	1.7 U	17 U	0.17 U
ENDRIN				41 R	0.17 U	1.8 U	0.17 U	0.17 U	1.7 U	17 U	0.17 U
ENDRIN ALDEHYDE				200 J	11 J	1.8 U	0.17 U	0.17 U	21 J	17 U	0.17 U
ENDRIN KETONE				15 U	0.17 U	1.8 U	0.17 U	0.17 U	1.7 U	17 U	0.17 U
GAMMA-BHC (LINDANE)				7 U	0.08 U	0.85 U	0.08 U	0.08 U	0.81 U	7.7 U	0.077 U
GAMMA-CHLORDANE ⁽³⁾	3500	9600	68000	880	1.8 R	9.7 R	2.4 J	33	150 R	400	1.2 R
HEPTACHLOR ⁽³⁾	1050	930	2900	7 U	3.8 J	0.85 U	0.08 U	3.3	13 J	7.7 U	0.077 U
HEPTACHLOR EPOXIDE				7 U	0.08 U	0.85 U	0.08 U	6.7 J	10 J	7.7 U	0.077 U
METHOXYCHLOR				70 U	0.8 U	8.5 U	0.8 U	0.8 U	8.1 U	77 U	0.77 U
TOXAPHENE				910 U	10 U	110 U	10 U	10 U	110 U	1000 U	10 U
Petroleum Hydrocarbons (mg/kg)											
DIESEL RANGE ORGANICS	1600	80	1000	480	32	23	3 U	3.1 U	620 J	16	2.9 U

- (1) The location identifies the type of sample collected (C indicates composite sample) and location (F indicates excavation floor and W indicated excavation wall).
- (2) Sample depth indicates the depth from the surface of exposed soils.
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- (4) Cleanup goal for comparison to samples taken from excavation sidewalls that represent soil conditions for the existing surface soil (0 to 2 feet bgs).
- (5) One or more chemical concentration exceeds PRG presented in IMWP, however no additional excavation is needed since results are less than IDEM default values and location will be covered with a minimum of 2 feet of soil.

NA Parameter not analyzed for this sample
 U Parameter is not detected at the indicated detection limit
 J Indicated result is estimated
 --- Parameter not analyzed for indicated depth
 R Data rejected for use in risk development

Indicates that results exceeds one or more of the appropriate cleanup goals (ecological risk or IDEM Def
 Indicates that further excavation is required.

TABLE 1

SWMU 9 VERIFICATION SAMPLING RESULTS
NSWC CRANE, CRANE, IN
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Location ⁽¹⁾ Sample Number Sample Depth (ft) ⁽²⁾ Sample Date	Cleanup Goals			09SS025C-F 09SS025C0006 0 - 0.5 10/10/2008	09SS026C-F 09SS026C0006 0 - 0.5 10/10/2008	09SS027C-F ⁽³⁾ 09SS027C0006 0 - 0.5 10/10/2008	09SS028C-F ⁽³⁾ 09SS028C0006 0 - 0.5 10/10/2008	09SS029C-W 09SS029C0006 0 - 0.5 10/10/2008	09SS030C-W 09SS030C0006 0 - 0.5 10/10/2008	09SS031C-W 09SS031C0006 0 - 0.5 10/10/2008	09SS032C-F 09SS032C0006 0 - 0.5 10/10/2008
	IMWP Cleanup Goal (Ecological) ⁽⁴⁾	IDEM Default Residential	IDEM Default Industrial								
Pesticides/PCBs (ug/kg)											
4,4'-DDD ⁽³⁾	24300	28000	120000	1.3 J	18000 J	530	2200 J	55	12	1.3 J	13
4,4'-DDE ⁽³⁾	17150	20000	86000	0.95 J	1500	26 J	1800	57	300	48	11
4,4'-DDT ⁽³⁾	3600	20000	86000	39	93000	5100	11000	96 J	380	46 J	35
ALDRIN				0.078 U	150 J	0.86 U	8.4 U	0.15 U	0.077 U	0.073 U	0.079 U
ALPHA-BHC				0.078 U	8.1 U	0.86 U	8.4 U	0.15 U	0.077 U	0.073 U	0.079 U
ALPHA-CHLORDANE ⁽³⁾	3500	9600	38000	2.2	290	0.86 U	670	32	1.8 J	0.073 U	4.8
AROCLOR-1016				NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1221				NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1232				NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1242				NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1248				NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1254				NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1260				NA	NA	NA	NA	NA	NA	NA	NA
TOTAL PCBs Surface ⁽³⁾	1000			NA	NA	NA	NA	NA	NA	NA	NA
TOTAL PCBs Subsurface ⁽³⁾	25000			NA	NA	NA	NA	NA	NA	NA	NA
BETA-BHC				0.078 U	8.1 U	0.86 U	8.4 U	0.15 U	0.077 U	0.073 U	2.1
DELTA-BHC				0.078 U	8.1 U	0.86 U	8.4 U	0.15 U	0.077 U	0.073 U	0.079 U
DIELDRIN ⁽³⁾	300	270	860	0.17 U	1100	1.8 U	18 U	0.33 U	4.3	0.16 U	48
ENDOSULFAN I				0.078 U	8.1 U	0.86 U	8.4 U	0.15 U	0.077 U	0.073 U	0.079 U
ENDOSULFAN II				0.17 U	17 U	1.8 U	18 U	0.33 U	0.17 U	0.16 U	0.17 U
ENDOSULFAN SULFATE				0.17 U	17 U	1.8 U	18 U	0.33 U	0.17 U	0.16 U	0.17 U
ENDRIN				0.17 U	17 U	1.8 U	18 U	0.33 U	0.17 U	1 R	0.17 U
ENDRIN ALDEHYDE				0.17 U	17 U	1.8 U	18 U	0.33 U	0.17 U	0.16 U	0.17 U
ENDRIN KETONE				0.17 U	17 U	1.8 U	18 U	0.33 U	0.17 U	0.16 U	0.17 U
GAMMA-BHC (LINDANE)				0.078 U	8.1 U	0.86 U	8.4 U	0.15 U	0.077 U	0.073 U	0.079 U
GAMMA-CHLORDANE ⁽³⁾	3500	9600	68000	1.6 R	380	0.86 U	790	37	0.9 R	0.073 U	2.6 J
HEPTACHLOR ⁽³⁾	1050	930	2900	0.078 U	8.1 U	0.86 U	8.4 U	1.5 J	0.077 U	0.073 U	0.079 U
HEPTACHLOR EPOXIDE				0.078 U	8.1 U	0.86 U	8.4 U	0.15 U	0.077 U	0.073 U	1.8
METHOXYCHLOR				0.78 U	81 U	8.6 U	84 U	1.5 U	0.77 U	0.73 U	0.79 U
TOXAPHENE				10 U	1100 U	110 U	1100 U	20 U	10 U	9.5 U	10 U
Petroleum Hydrocarbons (mg/kg)											
DIESEL RANGE ORGANICS	1600	80	1000	2.9 U	210	3.4 U	72	19	4.5 J	47	3 U

- The location identifies the type of sample collected (C indicates composite sample) and location (F indicates excavation floor and W indicated excavation wall).
- Sample depth indicates the depth from the surface of exposed soils.
- These parameters were identified as the Chemicals of Concern. Cleanup goals are provided for these compounds only.
- Cleanup goal for comparison to samples taken from excavation sidewalls that represent soil conditions for the existing surface soil (0 to 2 feet bgs).
- One or more chemical concentration exceeds PRG presented in IMWP, however no additional excavation is needed since results are less than IDEM default values and location will be covered with a minimum of 2 feet of soil.

NA Parameter not analyzed for this sample
 U Parameter is not detected at the indicated detection limit
 J Indicated result is estimated
 --- Parameter not analyzed for indicated depth
 R Data rejected for use in risk development

Indicates that results exceeds one or more of the appropriate cleanup goals (ecological risk or IDEM Def
 Indicates that further excavation is required.

TABLE 1

SWMU 9 VERIFICATION SAMPLING RESULTS
NSWC CRANE, CRANE, IN
(PAGE 5 OF 6)

Location ⁽¹⁾ Sample Number Sample Depth (ft) ⁽²⁾ Sample Date	Cleanup Goals			09SS033C-F 09SS033C0006 0 - 0.5 10/10/2008	09SS034C-W 09SS034C0006 0 - 0.5 10/10/2008	09SS035C-W 09SS035C0006 0 - 0.5 10/10/2008	09SS036C-F 09SS036C0006 0 - 0.5 10/10/2008	09SS037C-F 09SS037C0006 0 - 0.5 10/14/2008	09SS038C-W 09SS038C0006 0 - 0.5 10/14/2008	09SS039C-W 09SS039C0006 0 - 0.5 10/14/2008	09SS040C-W 09SS040C0006 0 - 0.5 10/14/2008
	IMWP Cleanup Goal (Ecological) ⁽⁴⁾	IDEM Default Residential	IDEM Default Industrial								
Pesticides/PCBs (ug/kg)											
4,4'-DDD ⁽³⁾	24300	28000	120000	300	0.16 U	190	15	130	0.92 U	9.5 J	4000
4,4'-DDE ⁽³⁾	17150	20000	86000	270	3	2000	21	370	6.5 J	62 J	3000
4,4'-DDT ⁽³⁾	3600	20000	86000	2100	10 J	2600	130	220 J	3.4 R	51 J	3300 J
ALDRIN				0.8 U	0.073 U	0.74 U	0.076 U	0.46 U	0.43 U	0.43 UJ	4.5 U
ALPHA-BHC				14 J	0.073 U	0.74 U	0.076 U	0.46 U	0.43 U	0.43 UJ	4.5 U
ALPHA-CHLORDANE ⁽³⁾	3500	9600	38000	220	0.073 U	28	3.6	440	4 J	54 J	3500
AROCLOR-1016				NA							
AROCLOR-1221				NA							
AROCLOR-1232				NA							
AROCLOR-1242				NA							
AROCLOR-1248				NA							
AROCLOR-1254				NA							
AROCLOR-1260				NA							
TOTAL PCBs Surface ⁽³⁾	1000			NA							
TOTAL PCBs Subsurface ⁽³⁾	25000			NA							
BETA-BHC				0.8 U	0.073 U	0.74 U	0.076 U	0.46 U	0.43 U	0.43 UJ	4.5 U
DELTA-BHC				0.8 U	0.073 U	0.74 U	0.076 U	0.46 U	0.43 U	0.43 UJ	4.5 U
DIELDRIN ⁽³⁾	300	270	860	1.7 U	0.16 U	89	15	0.98 U	0.92 U	0.93 UJ	9.7 U
ENDOSULFAN I				0.8 U	0.073 U	0.74 U	0.076 U	0.46 U	0.43 U	0.43 UJ	4.5 U
ENDOSULFAN II				1.7 U	0.16 U	1.6 U	0.16 U	0.98 U	0.92 U	0.93 UJ	9.7 U
ENDOSULFAN SULFATE				1.7 U	0.16 U	1.6 U	0.16 U	0.98 U	0.92 U	0.93 UJ	9.7 U
ENDRIN				1.7 U	0.16 U	1.6 U	0.16 U	15 J	0.92 U	4.9 J	140 J
ENDRIN ALDEHYDE				1.7 U	0.16 U	1.6 U	0.16 U	0.98 U	0.92 U	6 J	9.7 U
ENDRIN KETONE				1.7 U	0.16 U	1.6 U	0.16 U	0.98 U	0.92 U	0.93 UJ	9.7 U
GAMMA-BHC (LINDANE)				0.8 U	0.073 U	0.74 U	0.076 U	0.46 U	0.43 U	0.43 UJ	4.5 U
GAMMA-CHLORDANE ⁽³⁾	3500	9600	68000	230	0.073 U	35 R	1.7 R	440	3.2 J	50 J	3500
HEPTACHLOR ⁽³⁾	1050	930	2900	20 J	0.073 U	0.74 U	0.076 U	5.9 J	0.43 U	0.43 UJ	4.5 U
HEPTACHLOR EPOXIDE				18	0.073 U	0.74 U	1 R	28	0.43 U	0.43 UJ	82 J
METHOXYCHLOR				8 U	0.73 U	7.4 U	0.76 U	4.6 UJ	4.3 U	4.3 UJ	45 U
TOXAPHENE				100 U	9.5 U	97 U	9.9 U	60 U	56 U	56 UJ	590 U
Petroleum Hydrocarbons (mg/kg)											
DIESEL RANGE ORGANICS	1600	80	1000	210	2.8 U	10	2.9 U	140	19 J	190	830

- The location identifies the type of sample collected (C indicates composite sample) and location (F indicates excavation floor and W indicated excavation wall).
- Sample depth indicates the depth from the surface of exposed soils.
- These parameters were identified as the Chemicals of Concern. Cleanup goals are provided for these compounds only.
- Cleanup goal for comparison to samples taken from excavation sidewalls that represent soil conditions for the existing surface soil (0 to 2 feet bgs).
- One or more chemical concentration exceeds PRG presented in IMWP, however no additional excavation is needed since results are less than IDEM default values and location will be covered with a minimum of 2 feet of soil.

NA Parameter not analyzed for this sample
 U Parameter is not detected at the indicated detection limit
 J Indicated result is estimated
 --- Parameter not analyzed for indicated depth
 R Data rejected for use in risk development

Indicates that results exceeds one or more of the appropriate cleanup goals (ecological risk or IDEM Def
 Indicates that further excavation is required.

TABLE 1

SWMU 9 VERIFICATION SAMPLING RESULTS
NSWC CRANE, CRANE, IN
(PAGE 6 OF 6)

Location ⁽¹⁾ Sample Number Sample Depth (ft) ⁽²⁾ Sample Date	Cleanup Goals			09SS041C-W 09SS041C0006 0 - 0.5 10/14/2008	09SS043C-W 09SS043C0006 0 - 0.5 10/14/2008	09SS044C-W 09SS044C0006 0 - 0.5 10/14/2008	09SS045C-W 09SS045C0006 0 - 0.5 10/14/2008	09SS046C-W 09SS046C0006 0 - 0.5 10/14/2008	09SS047C-F 09SS047C0006 0 - 0.5 10/14/2008
	IMWP Cleanup Goal (Ecological) ⁽⁴⁾	IDEM Default Residential	IDEM Default Industrial						
Pesticides/PCBs (ug/kg)									
4,4'-DDD ⁽³⁾	24300	28000	120000	1.8 U	NA	NA	NA	NA	NA
4,4'-DDE ⁽³⁾	17150	20000	86000	1.8 U	NA	NA	NA	NA	NA
4,4'-DDT ⁽³⁾	3600	20000	86000	260 J	NA	NA	NA	NA	NA
ALDRIN				0.84 U	NA	NA	NA	NA	NA
ALPHA-BHC				0.84 U	NA	NA	NA	NA	NA
ALPHA-CHLORDANE ⁽³⁾	3500	9600	38000	0.84 U	NA	NA	NA	NA	NA
AROCLOR-1016				NA	NA	NA	NA	NA	NA
AROCLOR-1221				NA	NA	NA	NA	NA	NA
AROCLOR-1232				NA	NA	NA	NA	NA	NA
AROCLOR-1242				NA	NA	NA	NA	NA	NA
AROCLOR-1248				NA	NA	NA	NA	NA	NA
AROCLOR-1254				NA	NA	NA	NA	NA	NA
AROCLOR-1260				NA	NA	NA	NA	NA	NA
TOTAL PCBs Surface ⁽³⁾	1000			NA	NA	NA	NA	NA	NA
TOTAL PCBs Subsurface ⁽³⁾	25000			NA	NA	NA	NA	NA	NA
BETA-BHC				0.84 U	NA	NA	NA	NA	NA
DELTA-BHC				0.84 UJ	NA	NA	NA	NA	NA
DIELDRIN ⁽³⁾	300	270	860	1.8 U	NA	NA	NA	NA	NA
ENDOSULFAN I				0.84 U	NA	NA	NA	NA	NA
ENDOSULFAN II				53 R	NA	NA	NA	NA	NA
ENDOSULFAN SULFATE				1.8 U	NA	NA	NA	NA	NA
ENDRIN				1.8 U	NA	NA	NA	NA	NA
ENDRIN ALDEHYDE				190 J	NA	NA	NA	NA	NA
ENDRIN KETONE				1.8 U	NA	NA	NA	NA	NA
GAMMA-BHC (LINDANE)				0.84 U	NA	NA	NA	NA	NA
GAMMA-CHLORDANE ⁽³⁾	3500	9600	68000	26 J	NA	NA	NA	NA	NA
HEPTACHLOR ⁽³⁾	1050	930	2900	26 J	NA	NA	NA	NA	NA
HEPTACHLOR EPOXIDE				0.84 U	NA	NA	NA	NA	NA
METHOXYCHLOR				8.4 UJ	NA	NA	NA	NA	NA
TOXAPHENE				110 U	NA	NA	NA	NA	NA
Petroleum Hydrocarbons (mg/kg)									
DIESEL RANGE ORGANICS	1600	80	1000	840	22 J	34	11 J	46	8.6 U

- (1) The location identifies the type of sample collected (C indicates composite sample) and location (F indicates excavation floor and W indicated excavation wall).
- (2) Sample depth indicates the depth from the surface of exposed soils.
- (3) These parameters were identified as the Chemicals of Concern. Cleanup goals are provided for these compounds only.
- (4) Cleanup goal for comparison to samples taken from excavation sidewalls that represent soil conditions for the existing surface soil (0 to 2 feet bgs).
- (5) One or more chemical concentration exceeds PRG presented in IMWP, however no additional excavation is needed since results are less than IDEM default values and location will be covered with a minimum of 2 feet of soil.

NA Parameter not analyzed for this sample
 U Parameter is not detected at the indicated detection limit
 J Indicated result is estimated
 --- Parameter not analyzed for indicated depth
 R Data rejected for use in risk development

 Indicates that results exceeds one or more of the appropriate cleanup goals (ecological risk or IDEM Def
 Indicates that further excavation is required.

TABLE 2

SUMMARY OF SWMU 9 PRE-EXCAVATION SAMPLING
NSWC CRANE, CRANE, IN
(PAGE 1 OF 2)

Sample Location			Sample Depth (ft bgs)	Sample Group	Analysis		
Identification	Northing	Easting			Pesticides	DRO	PCBs
09SB140	1311459.59	3025255.70	0.5 - 2	1	X	X	
			2 - 4		X	X	
			4 - 6		X	X	
09SB141	1311444.64	3025251.81	0.5 - 2	1	X	X	
			2 - 4		X	X	
			4 - 6		X	X	
09SB142	1311430.19	3025247.56	0.5 - 2	1	X	X	
			2 - 4		X	X	
			4 - 6		X	X	
09SB143	1311415.00	3025243.79	0.5 - 2	1	X	X	
			2 - 4		X	X	
			4 - 6		X	X	
09SB144	1311351.83	3025248.88	0 - 2	1	X	X	
			2 - 4		X	X	
			4 - 6		X	X	
09SB145	1311352.44	3025209.31	0 - 2	1	X	X	
			2 - 4		X	X	
			4 - 6		X	X	
09SB146	1311359.05	3025194.48	0 - 2	1	X	X	
			2 - 4		X	X	
			4 - 6		X	X	
09SB147	1311462.26	3025222.53	0 - 2	1	X	X	
			2 - 4		X	X	
			4 - 6		X	X	
09SB148	1311461.29	3025237.96	0 - 2	1	X	X	
			2 - 4		X	X	
			4 - 6		X	X	
09SB149	1311177.30	3025111.51	0 - 2	1			X
			2 - 4				X
			4 - 6				X
09SB150	1311087.96	3025094.43	0 - 2	1			X
			2 - 4				X
			4 - 6				X
09SB151	1311109.48	3025084.84	0 - 2	1			X
			2 - 4				X
			4 - 6				X
09SB152	1311136.14	3025089.75	0 - 2	1			X
			2 - 4				X
			4 - 6				X
09SB153	1311456.67	3025270.76	0.5 - 2	2	X	X	
			2 - 4		X	X	
			4 - 6		X	X	
09SB154	1311442.46	3025266.39	0.5 - 2	2	X	X	
			2 - 4		X	X	
			4 - 6		X	X	
09SB155	1311427.51	3025262.26	0.5 - 2	2	X	X	
			2 - 4		X	X	
			4 - 6		X	X	
09SB156	1311411.96	3025258.01	0.5 - 2	2	X	X	
			2 - 4		X	X	
			4 - 6		X	X	

TABLE 2

SUMMARY OF SWMU 9 PRE-EXCAVATION SAMPLING
 NSWCRANE, CRANE, IN
 (PAGE 2 OF 2)

Sample Location			Sample Depth (ft bgs)	Sample Group	Analysis		
Identification	Northing	Easting			Pesticides	DRO	PCBs
09SB157	1311343.98	3025257.09	0 - 2	2	X	X	
			2 - 4		X	X	
			4 - 6		X	X	
09SB158	1311341.17	3025206.41	0 - 2	2	X	X	
			2 - 4		X	X	
			4 - 6		X	X	
09SB159	1311347.17	3025188.97	0 - 2	2	X	X	
			2 - 4		X	X	
			4 - 6		X	X	
09SB160	1311474.77	3025227.39	0 - 2	2	X	X	
			2 - 4		X	X	
			4 - 6		X	X	
09SB161	1311473.07	3025241.85	0 - 2	2	X	X	
			2 - 4		X	X	
			4 - 6		X	X	
09SB162	1311454.24	3025285.71	0.5 - 2	3	X	X	
			2 - 4		X	X	
			4 - 6		X	X	
09SB163	1311438.69	3025280.97	0.5 - 2	3	X	X	
			2 - 4		X	X	
			4 - 6		X	X	
09SB164	1311424.23	3025277.44	0.5 - 2	3	X	X	
			2 - 4		X	X	
			4 - 6		X	X	
09SB165	1311409.17	3025273.43	0.5 - 2	3	X	X	
			2 - 4		X	X	
			4 - 6		X	X	

X Indicates samples were collected for analysis and analyzed.

X Indicated samples were collected for analysis and not analyzed due to results from previous groups of samples.

TABLE 3

SUMMARY OF PRE-EXCAVATION SAMPLE RESULTS
 SWMU 9
 NSWC CRANE, CRANE, IN
 (PAGE 2 OF 2)

Sample Location	Sample Number	Sample Depth (ft bgs)	Parameter	DDD (ppb)	DDE (ppb)	DDT (ppb)	Dieldrin (ppb)	Heptachlor (ppb)	Alpha-chlordane (ppb)	Gamma-chlordane (ppb)	DRO (ppm)	PCBs (ppm)
			PRG	24,300	17,150	3,600	300	1,050	3,500	3,500	1,600	1 or 25 ¹
09SB153	09SB1530002	0.5 - 2	0.66J	4.8	15	3.8U	1.5J	3.5	3.6	NA	NA	
	09SB1530204	2 - 4	4.0U	1.1J	4.0U	4.0U	1.1JP	0.24J	2.0U	NA	NA	
	09SB1530406	4 - 6	4.1U	4.1U	4.1U	4.1U	2.1U	2.1U	2.1U	NA	NA	
09SB154	09SB1540002	0.5 - 2	3.7U	2.6JP	9.8	3.7U	0.75JP	1.9U	1.6JP	NA	NA	
	09SB1540204	2 - 4	4.0U	4.0U	2.4J	4.0U	2.0U	0.93JP	2.0U	NA	NA	
	09SB1540406	4 - 6	4.0U	0.89JP	2.7J	4.0U	2.1U	1.2JP	2.1U	NA	NA	
09SB155	09SB1550002	0.5 - 2	32J	250	310	73U	38U	38U	38U	NA	NA	
	09SB1550204	2 - 4	4.0U	3.2J	3.4J	4.0U	2.1U	2.1U	2.1U	NA	NA	
	09SB1550406	4 - 6	4.1U	4.1U	4.1U	4.1U	2.1U	2.1U	2.1U	NA	NA	
09SB156	09SB1560002	0.5 - 2	0.75J	24	27	3.4U	0.82J	1.4JP	3.9	NA	NA	
	09SB1560204	2 - 4	3.9U	1.7J	5.5	3.9U	2.0U	2.0U	1.0JP	NA	NA	
	09SB1560406	4 - 6	4.1U	4.1U	2.3J	4.1U	2.1U	2.1U	0.67JP	NA	NA	
09SB157	09SB1570002	0 - 2	73J	190	750	170U	89U	46J	47J	NA	NA	
	09SB1570204	2 - 4	3.9U	3.9U	1.7J	3.9U	2.0U	2.0U	2.0U	NA	NA	
	09SB1570406	4 - 6	4.1U	4.1U	4.1U	4.1U	2.1U	2.1U	2.1U	NA	NA	
09SB158	09SB1580002	0 - 2	0.53J	3.8J	3.2J	4.1U	2.4P	2.1U	2.1U	NA	NA	
	09SB1580204	2 - 4	4.1U	4.1U	4.1U	4.1U	0.43J	2.1U	2.1U	NA	NA	
	09SB1580406	4 - 6	3.8U	1.2J	3.8U	3.8U	2.0U	2.0U	2.0U	NA	NA	
09SB159	09SB1590002	0 - 2	1400D	540D	1000D	410U	210U	34DJ	36DJ	NA	NA	
	09SB1590204	2 - 4	17DJ	52D	6.3DJ	20U	10U	2.0DJ	1.8DJ	NA	NA	
	09SB1590406	4 - 6	0.61J	0.49J	3.8U	3.8U	0.6JP	0.29JP	2.0U	NA	NA	
09SB160	09SB1600002	0 - 2	2.2J	29	46	20U	10U	7.1J	9.3J	NA	NA	
	09SB1600204	2 - 4	3.8U	2.1J	1.9JP	3.8U	0.46J	0.8JP	0.56J	NA	NA	
	09SB1600406	4 - 6	3.8U	3.8U	3.8U	3.8U	2.0U	2.0U	2.0U	NA	NA	
09SB161	09SB1610002	0 - 2	9.5	78E	240E	2.3J	3.1	13P	18EP	NA	NA	
	09SB1610204	2 - 4	3.8U	1.1J	2.1J	3.8U	2.0U	2.0U	2.0U	NA	NA	
	09SB1610406	4 - 6	3.9U	3.9U	3.9U	3.9U	2.0U	2.0U	2.0U	NA	NA	



Result exceeds the PRG
 Result reported as non-detect. However, the detection limit exceeds the PRG.

Notes

- 1 PCB PRGs are for surface soil (1 ppm) and for subsurface soil (25 ppm).
- E Parameter is detected at concentrations greater than the equipment detection range - samples requires dilution.
- U Parameter was not detected at the reported detection limit.
- P Difference between the primary and secondary column exceeded the laboratory quality control limit.
- D Results reported is the result of a diluted sample.
- J Result is estimated below the detection limit.
- NA Parameter not analyzed for this sample.
- ND None of the aroclors were detected in these samples; therefore, total PCBs were non-detect.

TABLE 4

SWMU 9 LAND DISPOSAL RESTRICTION EVALUATION
NSWC CRANE, CRANE, IN

PAGE 1 OF 2

Location Sample Number Sample Depth (ft) Sample Date	IDEM Default Industrial	Universal Treatment Standards	10 Times Universal Treatment Standards	09SS006C-W 09SS006C0006 0 - 0.5 10/2/2008	09SS008C-W 09SS008C0006 0 - 0.5 10/2/2008	09SS015C-W 09SS015C0006 0 - 0.5 10/9/2008	09SS016C-W 09SS016C0006 0 - 0.5 10/9/2008	09SS017C-W 09SS017C0006 0 - 0.5 10/9/2008	09SS026C-F 09SS026C0006 0 - 0.5 10/10/2008
Pesticides/PCBs (ug/kg)									
4,4'-DDD ⁽¹⁾	120,000	87	870	1200	580 J	7300	720	390	18000 J
4,4'-DDE ⁽¹⁾	86,000	87	870	4800	2100	8400	6400	1800	1500
4,4'-DDT ⁽¹⁾	86,000	87	870	17000	3200	4100000	14000	5700	93000
ALDRIN	800	66	660	6.6 U	7.5 U	78 U	7.7 U	7 U	150 J
ALPHA-BHC	4,000	66	660	6.6 U	7.5 U	78 U	7.7 U	7 U	8.1 U
ALPHA-CHLORDANE ⁽¹⁾	38,000	260	2600	390	7500	4400	500	910	290
BETA-BHC	12,000	66	660	6.6 U	7.5 U	78 U	7.7 U	7 U	8.1 U
DELTA-BHC	3,400	66	660	6.6 UJ	7.5 UJ	78 U	7.7 U	7 U	8.1 U
DIELDRIN ⁽¹⁾	860	130	1300	14 U	16 U	170 U	170 J	200 J	1100
ENDOSULFAN I	2,500,000	66	660	6.6 U	7.5 U	78 U	7.7 U	7 U	8.1 U
ENDOSULFAN II	2,900,000	130	1300	14 U	16 U	170 U	17 U	15 U	17 U
ENDOSULFAN SULFATE	NC	130	1300	14 U	16 U	170 U	17 U	15 U	17 U
ENDRIN	150,000	130	1300	14 U	450 J	170 U	17 U	41 R	17 U
ENDRIN ALDEHYDE	150,000	130	1300	14 U	16 U	170 U	17 U	200 J	17 U
ENDRIN KETONE	140,000	NA	NA	14 U	16 U	170 U	17 U	15 U	17 U
GAMMA-BHC (LINDANE)	19,000	66	660	6.6 U	7.5 U	320 J	7.7 U	7 U	8.1 U
GAMMA-CHLORDANE ⁽¹⁾	68,000	260	2600	550 J	7400	5000	620	880	380
HEPTACHLOR ⁽¹⁾	2,900	66	660	6.6 U	340	380 J	7.7 U	7 U	8.1 U
HEPTACHLOR EPOXIDE	1,500	66	660	6.6 U	1100	78 U	7.7 U	7 U	8.1 U
METHOXYCHLOR	2,500,000	180	1800	66 UJ	75 UJ	780 U	77 U	70 U	81 U
TOXAPHENE	12,000	2,600	26000	870 U	980 U	10000 U	1000 U	910 U	1100 U

(1) Parameter is a chemical of concern for SWMU 9

Sample Result reported as a detection and exceeds both the IDEM Industrial Default Criteria and the 10 Times Universal Treatment Standards.

TABLE 4

SWMU 9 LAND DISPOSAL RESTRICTION EVALUATION
NSWC CRANE, CRANE, IN

PAGE 2 OF 2

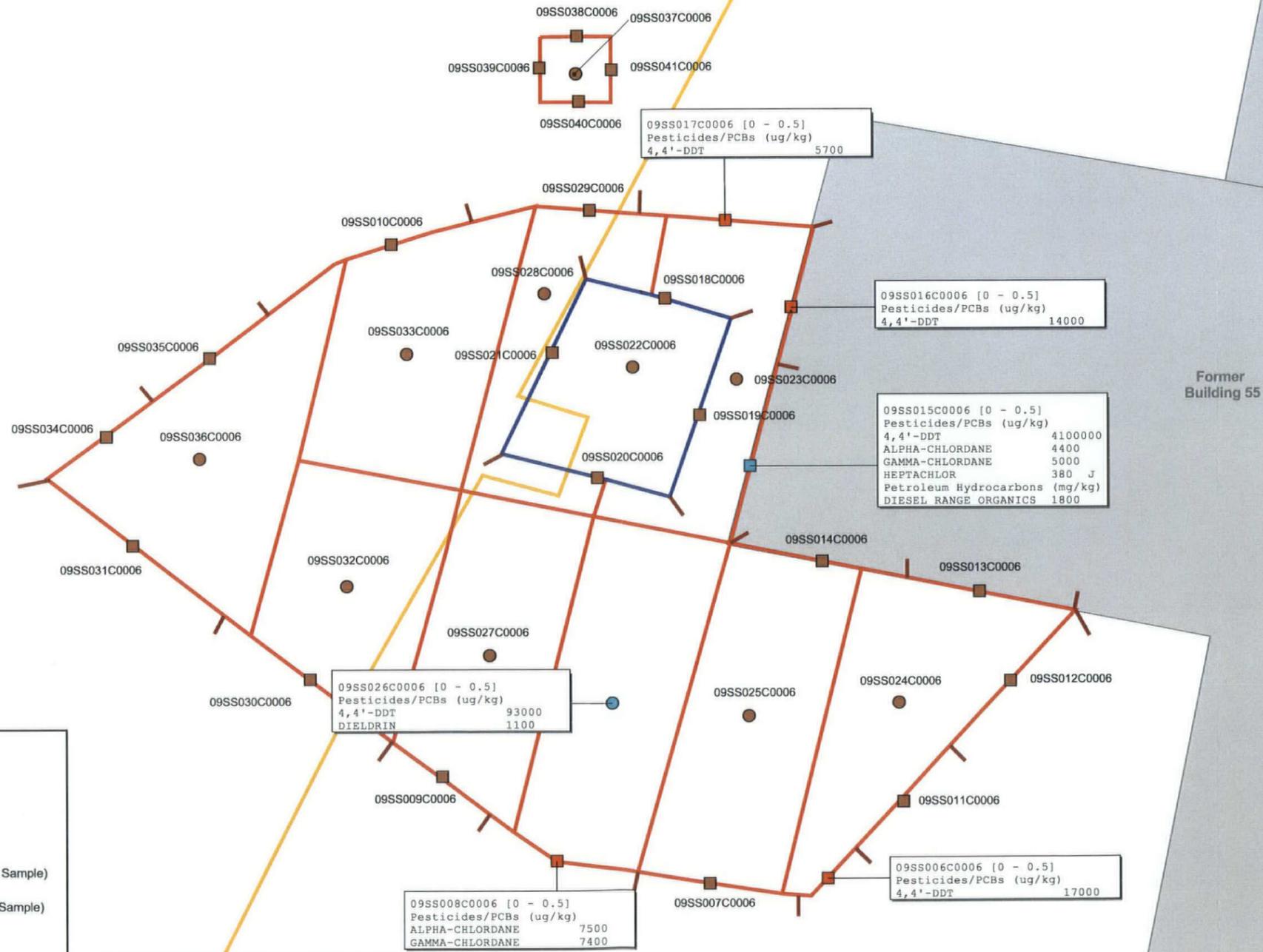
Location Sample Number Sample Depth (ft) Sample Date	IDEM Default Industrial	Universal Treatment Standards	10 Times Universal Treatment Standards	09SB142 09SB1420002 0 - 2 7/9/2009	09SB142 09SB1420204 2 - 4 7/9/2009	09SB143 09SB1430002 0 - 2 7/9/2009
Pesticides/PCBs (ug/kg)						
4,4'-DDD ⁽¹⁾	120,000	87	870	4200 DJP	180000 U	7900 DJP
4,4'-DDE ⁽¹⁾	86,000	87	870	7700 D	25000 DJ	94000 DJ
4,4'-DDT ⁽¹⁾	86,000	87	870	55000 D	350000 D	85000 D
ALDRIN	800	66	660	4000 U	93000 U	9300 U
ALPHA-BHC	4,000	66	660	4000 U	93000 U	9300 U
ALPHA-CHLORDANE ⁽¹⁾	38,000	260	2600	3100 DJP	93000 U	9300 U
BETA-BHC	12,000	66	660	2000 U	47000 U	4700 U
DELTA-BHC	3,400	66	660	4000 U	93000 U	9300 U
DIELDRIN ⁽¹⁾	860	130	1300	7700 U	180000 U	18000 U
ENDOSULFAN I	2,500,000	66	660	4000 U	93000 U	9300 U
ENDOSULFAN II	2,900,000	130	1300	7700 U	180000 U	18000 U
ENDOSULFAN SULFATE	NC	130	1300	7700 U	180000 U	18000 U
ENDRIN	150,000	130	1300	7700 U	180000 U	18000 U
ENDRIN ALDEHYDE	150,000	130	1300	7700 U	180000 U	18000 U
ENDRIN KETONE	140,000	NA	NA	7700 U	180000 U	18000 U
GAMMA-BHC (LINDANE)	19,000	66	660	4000 U	93000 U	9300 U
GAMMA-CHLORDANE ⁽¹⁾	68,000	260	2600	2100 U	12000 DJ	9300 U
HEPTACHLOR ⁽¹⁾	2,900	66	660	4000 U	93000 U	9300 U
HEPTACHLOR EPOXIDE	1,500	66	660	4000 U	93000 U	9300 U
METHOXYCHLOR	2,500,000	180	1800	40000 U	930000 U	93000 U
TOXAPHENE	12,000	2,600	26000	230000 U	5500000 U	550000 U

(1) Parameter is a chemical of concern for SWMU 9

Sample Result reported as a detection and exceeds both the IDEM Industrial Default Criteria and the 10 Times Universal Treatment Standards.

FIGURES

- Figure 1 - 2008 Verification Sample Results Exceeding Cleanup Goals For Former Building 55 Area Excavation
- Figure 2 - 2008 Verification Sample Results Exceeding Cleanup Goals For Former Fire Fighting Training Area
- Figure 3 - 2008 Verification Sample Results Exceeding Cleanup Goals For Building 150 Area Excavation
- Figure 4 - Pre-Excavation Sample Locations For Former Building 55 Area
- Figure 5 - Pre-Excavation Sample Locations For Former Fire Fighting Training Area
- Figure 6a - Proposed Excavation For Former Building 55 Area
- Figure 6b – Soil Disposition Map for Former Building 55 Area
- Figure 7a - Proposed Excavation For Former Fire Fighting Training Area
- Figure 7b – Soil Disposition Map for Former Fire Fighting Training Area
- Proposed Verification Sampling Locations for Former Building 55 Area
- Proposed Verification Sampling Locations for Former Fire Fighting Training Area



LEGEND

- 2008 Excavation Floor Sample (See Note)
- 2008 Excavation Sidewall Sample (See Note)
- Remaining Contamination Exceeds Ecological Cleanup Goals (Wall Sample)
- Remaining Contamination Exceeds Ecological, Residential, and Industrial Cleanup Goals (Floor Sample)
- Remaining Contamination Exceeds Ecological, Residential, and Industrial Cleanup Goals (Wall Sample)
- Steam Line
- Limit of Sidewall Sampling
- ▭ Limits of 2008 Excavation (0 to 2 ft Bgs)
- ▭ Limits of 2008 Excavation (2 to 4 ft Bgs)
- Building

Notes:
 1) Identified sample locations represent composite samples. These locations do not necessarily identify actual locations where soil was collected.
 2) Verification sample depths vary with respect to original ground surface. However all verification samples have been collected from a 0 to 6 inch depth interval of the exposed surface being sampled.

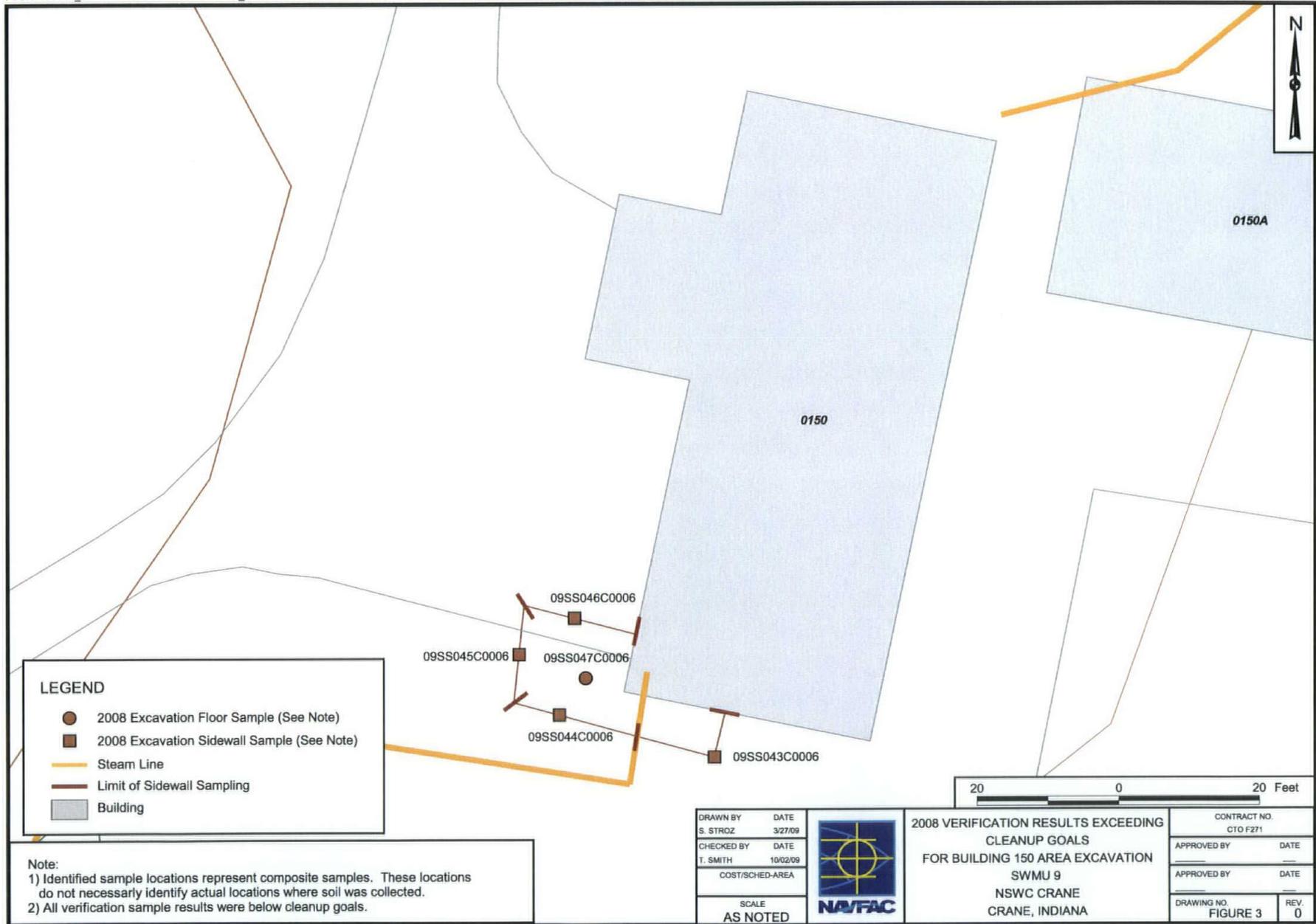


CONTRACT NO. CTO FZ71	DATE
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 1	REV 0

2008 VERIFICATION SAMPLE RESULTS EXCEEDING CLEANUP GOALS
 FOR FORMER BUILDING 55 AREA EXCAVATION
 SWMU 9
 NSWC CRANE
 CRANE, INDIANA



DRAWN BY S. STROZ	DATE 03/25/09
CHECKED BY T. SMITH	DATE 10/05/09
COST/SCHED-AREA	SCALE AS NOTED



LEGEND

- 2008 Excavation Floor Sample (See Note)
- 2008 Excavation Sidewall Sample (See Note)
- Steam Line
- Limit of Sidewall Sampling
- Building

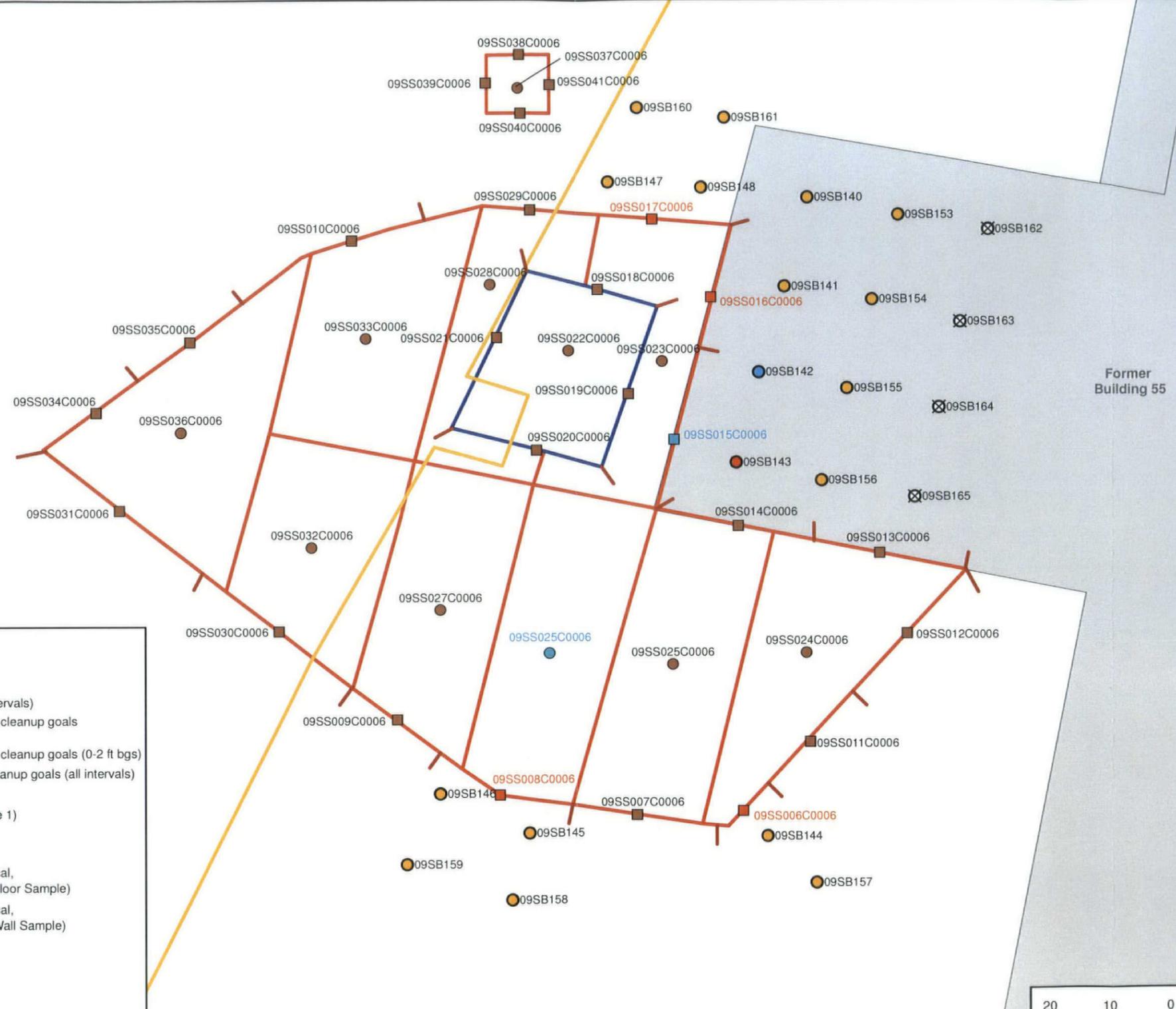
Note:
 1) Identified sample locations represent composite samples. These locations do not necessarily identify actual locations where soil was collected.
 2) All verification sample results were below cleanup goals.

DRAWN BY	DATE
S. STROZ	3/27/09
CHECKED BY	DATE
T. SMITH	10/02/09
COST/SCHED-AREA	
SCALE	
AS NOTED	



2008 VERIFICATION RESULTS EXCEEDING CLEANUP GOALS FOR BUILDING 150 AREA EXCAVATION SWMU 9 NSWC CRANE CRANE, INDIANA

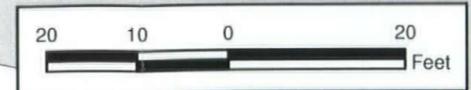
CONTRACT NO. CTO FZ71	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 3	REV. 0



LEGEND

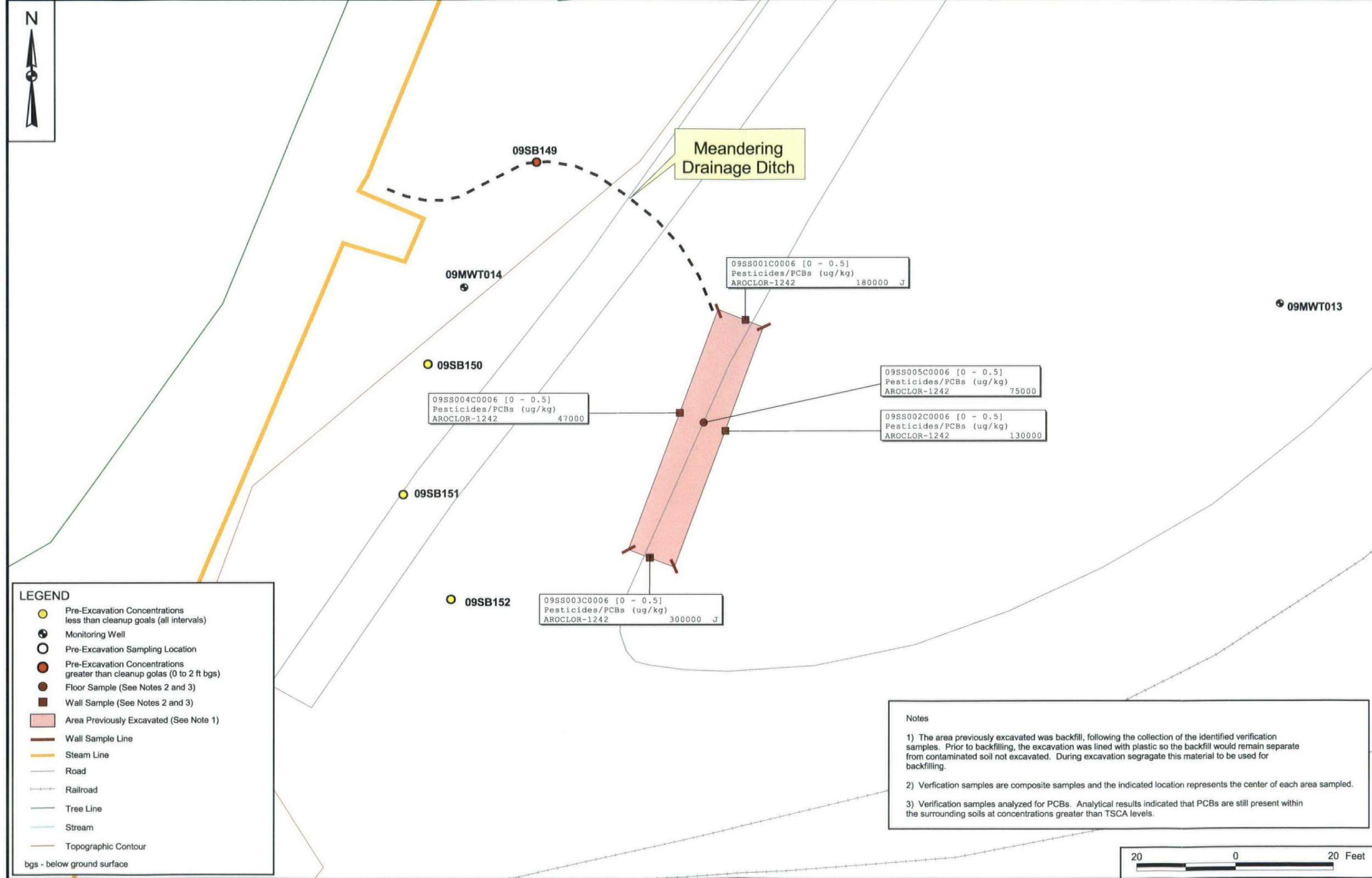
- Pre-Excavation Sample Locations
- ⊗ Pre-Excavation Sample not analyzed (all intervals)
- Pre-Excavation Concentrations greater than cleanup goals (0-2 ft bgs and 2-4 ft bgs)
- Pre-Excavation Concentrations greater than cleanup goals (0-2 ft bgs)
- Pre-Excavation Concentrations less than cleanup goals (all intervals)
- 2008 Excavation Floor Sample (See Note 1)
- 2008 Excavation Sidewall Sample (See Note 1)
- Remaining Contamination Exceeds Ecological Cleanup Goals (Wall Sample)
- Remaining Contamination Exceeds Ecological, Residential, and Industrial Cleanup Goals (Floor Sample)
- Remaining Contamination Exceeds Ecological, Residential, and Industrial Cleanup Goals (Wall Sample)
- Steam Line
- Limit of Sidewall Sampling
- Limits of 2008 Excavation (0 to 2 ft Bgs)
- Limits of 2008 Excavation (2 to 4 ft bgs)
- Building

Note: Identified sample locations represent composite samples. These locations do not necessarily identify actual locations where soil was collected.



CONTRACT NO. CTO F271		DATE		DATE		REV 0	
APPROVED BY		APPROVED BY		APPROVED BY		FIGURE NO. FIGURE 4	
PRE-EXCAVATION SAMPLE LOCATIONS FOR FORMER BUILDING 55 AREA SWMU 9 NSWC CRANE CRANE, INDIANA							
DRAWN BY K. MOORE		DATE 8/12/09		CHECKED BY T. SMITH		DATE 10/05/09	
COST/SCHED-AREA		SCALE AS NOTED					





CONTRACT NO. CTO F271		DATE	
APPROVED BY		APPROVED BY	DATE
DRAWING NO. FIGURE 5		REV 0	
PRE-EXCAVATION SAMPLE LOCATIONS AND RESULTS FOR FORMER FIRE FIGHTING TRAINING AREA SWMU 9 NSWC CRANE CRANE, INDIANA			
DATE 03/23/09	DATE 10/05/09	SCALE AS NOTED	
DRAWN BY S. STROZ	CHECKED BY T. SMITH	COST/SCHED-AREA	

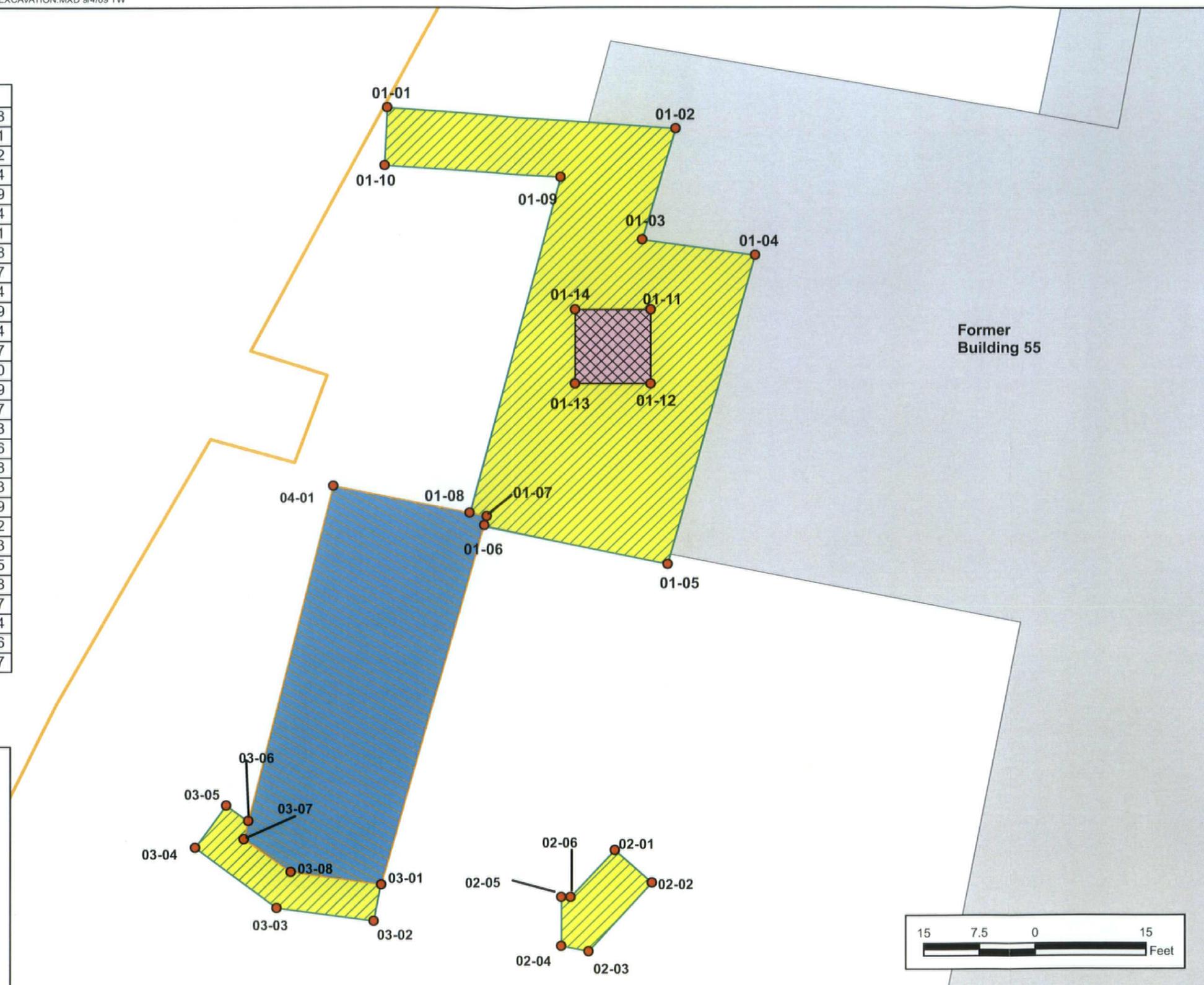




Node	Northing	Easting
01-01	1,311,462.61	3,025,217.38
01-02	1,311,459.49	3,025,255.51
01-03	1,311,445.11	3,025,250.92
01-04	1,311,442.61	3,025,266.34
01-05	1,311,401.15	3,025,255.09
01-06	1,311,405.83	3,025,230.14
01-07	1,311,407.54	3,025,230.51
01-08	1,311,407.79	3,025,228.18
01-09	1,311,453.25	3,025,240.07
01-10	1,311,454.47	3,025,216.64
01-11	1,311,435.23	3,025,252.69
01-12	1,311,425.31	3,025,252.44
01-13	1,311,425.19	3,025,242.27
01-14	1,311,435.23	3,025,242.40
02-01	1,311,361.59	3,025,247.79
02-02	1,311,357.43	3,025,252.57
02-03	1,311,348.11	3,025,244.23
02-04	1,311,348.85	3,025,240.56
02-05	1,311,355.71	3,025,240.68
02-06	1,311,355.59	3,025,242.03
03-01	1,311,357.43	3,025,216.79
03-02	1,311,352.28	3,025,215.32
03-03	1,311,353.99	3,025,202.33
03-04	1,311,362.20	3,025,191.55
03-05	1,311,367.96	3,025,196.08
03-06	1,311,365.76	3,025,198.77
03-07	1,311,363.18	3,025,198.04
03-08	1,311,358.90	3,025,204.66
04-01	1,311,411.34	3,025,210.17

LEGEND

- Excavation Node Location
- Steam Line
- Proposed Excavation (0 to 2 ft bgs)
- Proposed Excavation (0 to 3 ft bgs)
- Proposed Excavation (0 to 4 ft bgs)
- Building



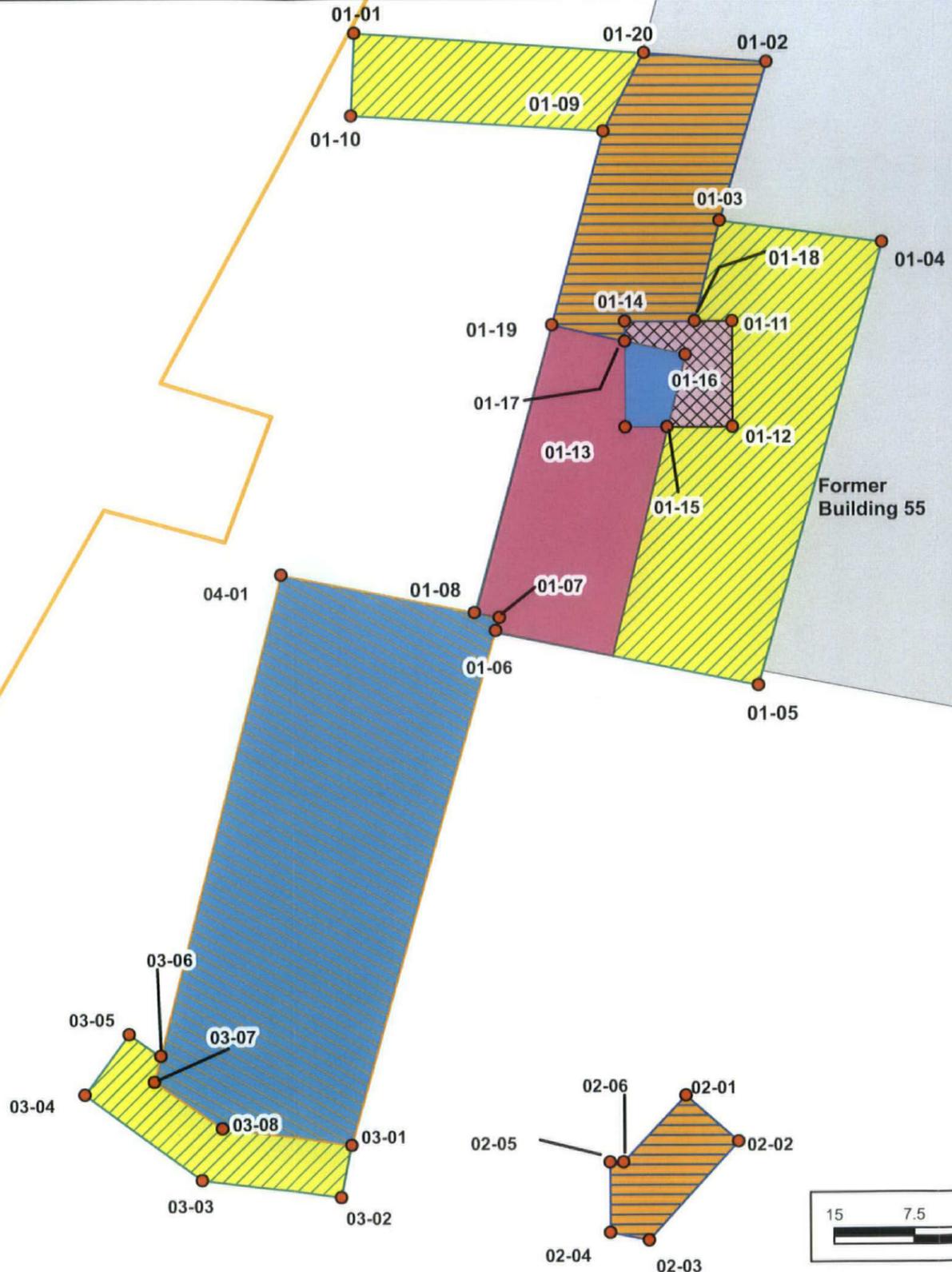
CONTRACT NO. CTO F271	DATE _____	DATE _____	REV 1
APPROVED BY _____	DATE _____	DATE _____	FIGURE NO. FIGURE 6A
PROPOSED EXCAVATION FOR FORMER BUILDING 55 AREA SWMU 9 NSWC CRANE CRANE, INDIANA			
		DRAWN BY K. MOORE	DATE 8/12/09
SCALE AS NOTED		CHECKED BY T. SMITH	DATE 9/4/09
COST/SCHED-AREA			



Node	Northing	Easting
01-01	1,311,462.61	3,025,217.38
01-02	1,311,459.49	3,025,255.51
01-03	1,311,445.11	3,025,250.92
01-04	1,311,442.61	3,025,266.34
01-05	1,311,401.15	3,025,255.09
01-06	1,311,405.83	3,025,230.14
01-07	1,311,407.54	3,025,230.51
01-08	1,311,407.79	3,025,228.18
01-09	1,311,453.25	3,025,240.07
01-10	1,311,454.47	3,025,216.64
01-11	1,311,435.23	3,025,252.69
01-12	1,311,425.31	3,025,252.44
01-13	1,311,425.19	3,025,242.27
01-14	1,311,435.23	3,025,242.40
01-15	1,311,425.36	3,025,246.38
01-16	1,311,432.19	3,025,247.75
01-17	1,311,433.55	3,025,242.11
01-18	1,311,435.43	3,025,248.94
01-19	1,311,435.09	3,025,235.97
01-20	1,311,460.52	3,025,244.67
02-01	1,311,361.59	3,025,247.79
02-02	1,311,357.43	3,025,252.57
02-03	1,311,348.11	3,025,244.23
02-04	1,311,348.85	3,025,240.56
02-05	1,311,355.71	3,025,240.68
02-06	1,311,355.59	3,025,242.03
03-01	1,311,357.43	3,025,216.79
03-02	1,311,352.28	3,025,215.32
03-03	1,311,353.99	3,025,202.33
03-04	1,311,362.20	3,025,191.55
03-05	1,311,367.96	3,025,196.08
03-06	1,311,365.76	3,025,198.77
03-07	1,311,363.18	3,025,198.04
03-08	1,311,358.90	3,025,204.66
04-01	1,311,411.34	3,025,210.17

LEGEND

- Excavation Node Location
- Steam Line
- Dispose Soil Off-site as Hazardous Waste Less Than LDR (0 to 2 ft bgs)
- Dispose Soil Off-site as Hazardous Waste Greater Than LDR (1.5 to 3 ft bgs) and Retain Soil for Backfill (0 to 1.5 ft bgs)
- Dispose Soil Off-site as Hazardous Waste Greater Than LDR (2 to 4 ft bgs) and Hazardous Waste Less Than LDR (0 to 2 ft bgs)
- Dispose Soil Off-site as Special Waste Less Than TCLP (0 to 2 ft bgs)
- Dispose Soil Off-site as Hazardous Waste Greater Than LDR (0 to 2 ft bgs)
- Dispose Soil Off-site as Hazardous Waste Greater Than LDR (0 to 4 ft bgs)
- Building



CONTRACT NO. CTO F271	DATE	REV 1
APPROVED BY	DATE	FIGURE NO. FIGURE 6B
APPROVED BY	DATE	

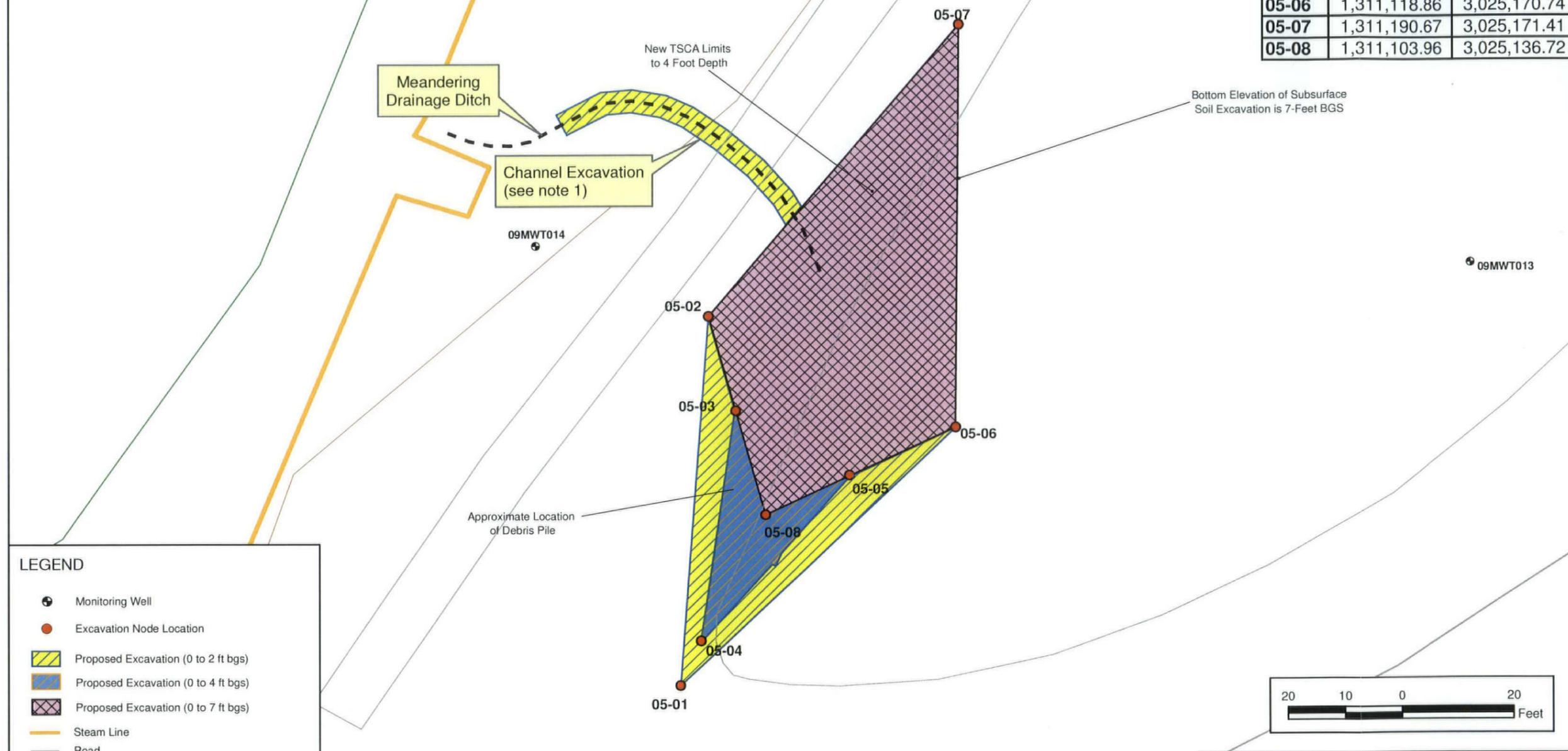
SOIL DISPOSITION MAP
FOR FORMER BUILDING 55 AREA
SWMU 9
NSWC CRANE
CRANE, INDIANA



DRAWN BY K. MOORE	DATE 08/12/09	CHECKED BY T. SMITH	DATE 09/09/09	COST/SCHED-AREA	SCALE AS NOTED
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Node	Northing	Easting
05-01	1,311,073.72	3,025,122.05
05-02	1,311,139.54	3,025,127.38
05-03	1,311,122.19	3,025,131.61
05-04	1,311,081.95	3,025,125.60
05-05	1,311,111.30	3,025,151.62
05-06	1,311,118.86	3,025,170.74
05-07	1,311,190.67	3,025,171.41
05-08	1,311,103.96	3,025,136.72



LEGEND

- Monitoring Well
- Excavation Node Location
- ▨ Proposed Excavation (0 to 2 ft bgs)
- ▨ Proposed Excavation (0 to 4 ft bgs)
- ▨ Proposed Excavation (0 to 7 ft bgs)
- Steam Line
- Road
- Railroad
- Tree Line
- Stream
- Topographic Contour

Bottom Elevation of Subsurface Soil Excavation is 7-Feet BGS

Meandering Drainage Ditch

Channel Excavation (see note 1)

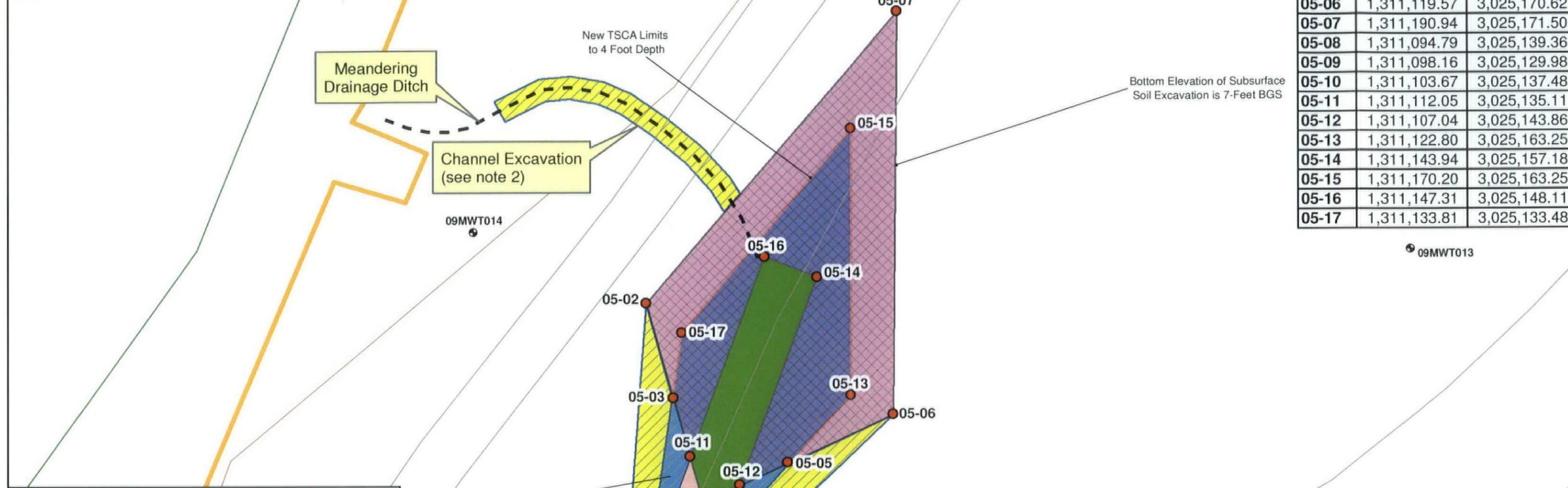
New TSCA Limits to 4 Foot Depth

Approximate Location of Debris Pile



NOTES:
 1) Proposed excavation to extend from former fire fighting training area along meandering drainage ditch to a point 10 feet beyond sample location 09SB149. Excavation to be 4 feet wide (centered on drainage ditch) and 2 feet deep. Center of drainage ditch will be located in the field (No coordinates provided).

CONTRACT NO. CTO F271		DATE	DATE	REV 1	
APPROVED BY	APPROVED BY	FIGURE NO.	FIGURE 7A		
PROPOSED EXCAVATION FORMER FIRE FIGHTING TRAINING AREA SWMU 9 NSWC CRANE CRANE, INDIANA					
		DRAWN BY K. MOORE	DATE 8/12/09	CHECKED BY T. SMITH	DATE 9/4/09
		COST/SCHED-AREA	SCALE	AS NOTED	



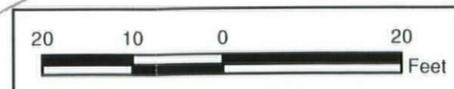
LEGEND

- Monitoring Well
- Excavation Node Location
- ▨ Dispose off-site as Non-TSCA soil (0 to 2 ft bgs)
- ▨ Dispose off-site as TSCA soil (0 to 4 ft bgs)
- ▨ Dispose off-site as Non-TSCA soil (0 to 7 ft bgs)
- ▨ Dispose off-site as TSCA soil (0 to 4 ft bgs) and Non-TSCA soil (4 to 7 ft bgs)
- Top 2 ft stockpile for backfill, 2 ft to 4 ft bgs dispose as TSCA soil, 4 ft to 7 ft bgs dispose as Non-TSCA soil (See Note 1)
- Top 2 ft stockpile for backfill, 2 ft to 4 ft bgs dispose as TSCA soil (See Note 1)
- Steam Line
- Road
- Railroad
- Tree Line
- Stream
- Topographic Contour

Node	Northing	Easting
05-01	1,311,073.42	3,025,122.47
05-02	1,311,139.33	3,025,127.35
05-03	1,311,122.45	3,025,132.23
05-04	1,311,081.43	3,025,125.73
05-05	1,311,110.94	3,025,152.11
05-06	1,311,119.57	3,025,170.62
05-07	1,311,190.94	3,025,171.50
05-08	1,311,094.79	3,025,139.36
05-09	1,311,098.16	3,025,129.98
05-10	1,311,103.67	3,025,137.48
05-11	1,311,112.05	3,025,135.11
05-12	1,311,107.04	3,025,143.86
05-13	1,311,122.80	3,025,163.25
05-14	1,311,143.94	3,025,157.18
05-15	1,311,170.20	3,025,163.25
05-16	1,311,147.31	3,025,148.11
05-17	1,311,133.81	3,025,133.48

CONTRACT NO. CTO F271	DATE	DATE	REV 1
APPROVED BY	APPROVED BY	FIGURE NO. FIGURE 7B	

SOIL DISPOSITION MAP
FORMER FIRE FIGHTING TRAINING AREA
SWMU 9
NSWC CRANE
CRANE, INDIANA

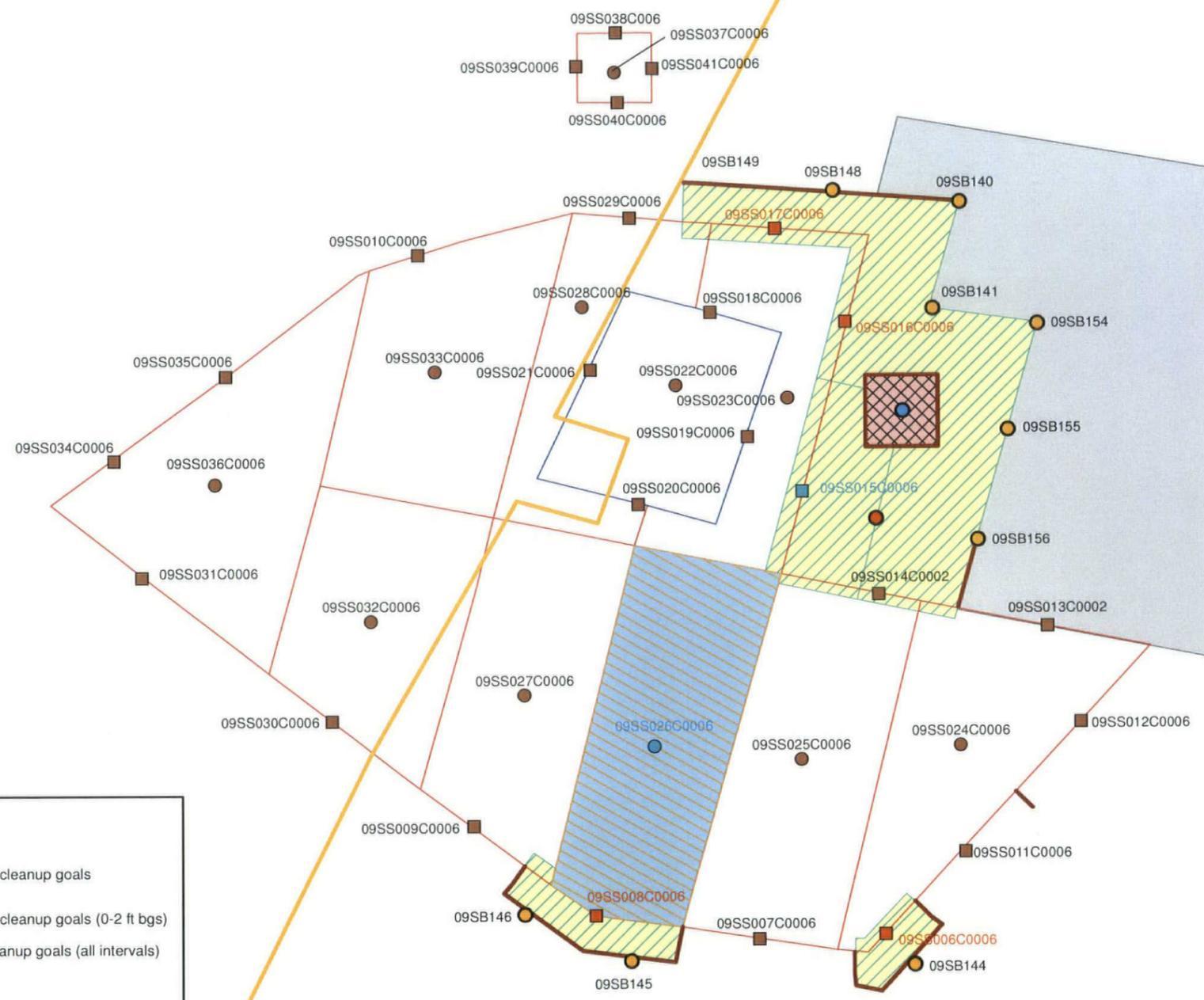


NOTES:

1) The area previously excavated was backfilled, following the collection of verification samples. Prior to backfilling the excavation was lined with plastic so the backfill would remain separate from contaminated soil. During excavation segregate the original backfill material for reuse.

2) Proposed excavation to extend from former fire fighting training area along meandering drainage ditch to a point 10 feet beyond sample location 09SB149. Excavation to be 4 feet wide (centered on drainage ditch) and 2 feet deep.

DRAWN BY K. MOORE	DATE 8/12/09	CHECKED BY T. SMITH	DATE 9/4/09	COST/SCHED-AREA	SCALE AS NOTED
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LEGEND

- Pre-Excavation Concentrations greater than cleanup goals (0-2 ft bgs and 2-4 ft bgs)
- Pre-Excavation Concentrations greater than cleanup goals (0-2 ft bgs)
- Pre-Excavation Concentrations less than cleanup goals (all intervals)
- Steam Line
- Limit of Sidewall Sampling
- Limits of 2008 Excavation (0 to 2 ft Bgs)
- Limit of 2008 Excavation (2 to 4 ft bgs)
- Area Excavated to 4 ft bgs (verification samples are required from exposed excavation floor)
- Area Excavated to 2 ft bgs (verification samples are required from exposed excavation floor)
- Area Excavated to 3 ft bgs (verification samples are required from exposed excavation floor)
- Building

NOTES:

- 1) Verification samples collected from excavation wall will be collected at a rate of one verification sample per 25 linear feet of exposed excavation wall.
- 2) Verification samples collected from excavation floors will be collected at a rate of one verification sample per 1000 square feet of exposed excavation floor.
- 3) All verification samples will be analyzed for pesticides.



CONTRACT NO. CTO F271	DATE
APPROVED BY	DATE
APPROVED BY	DATE
FIGURE NO. FIGURE 8	REV 0

PROPOSED VERIFICATION SAMPLE LOCATIONS
FORMER BUILDING 55 AREA
 SWMU 9
 NSWC CRANE
 CRANE, INDIANA



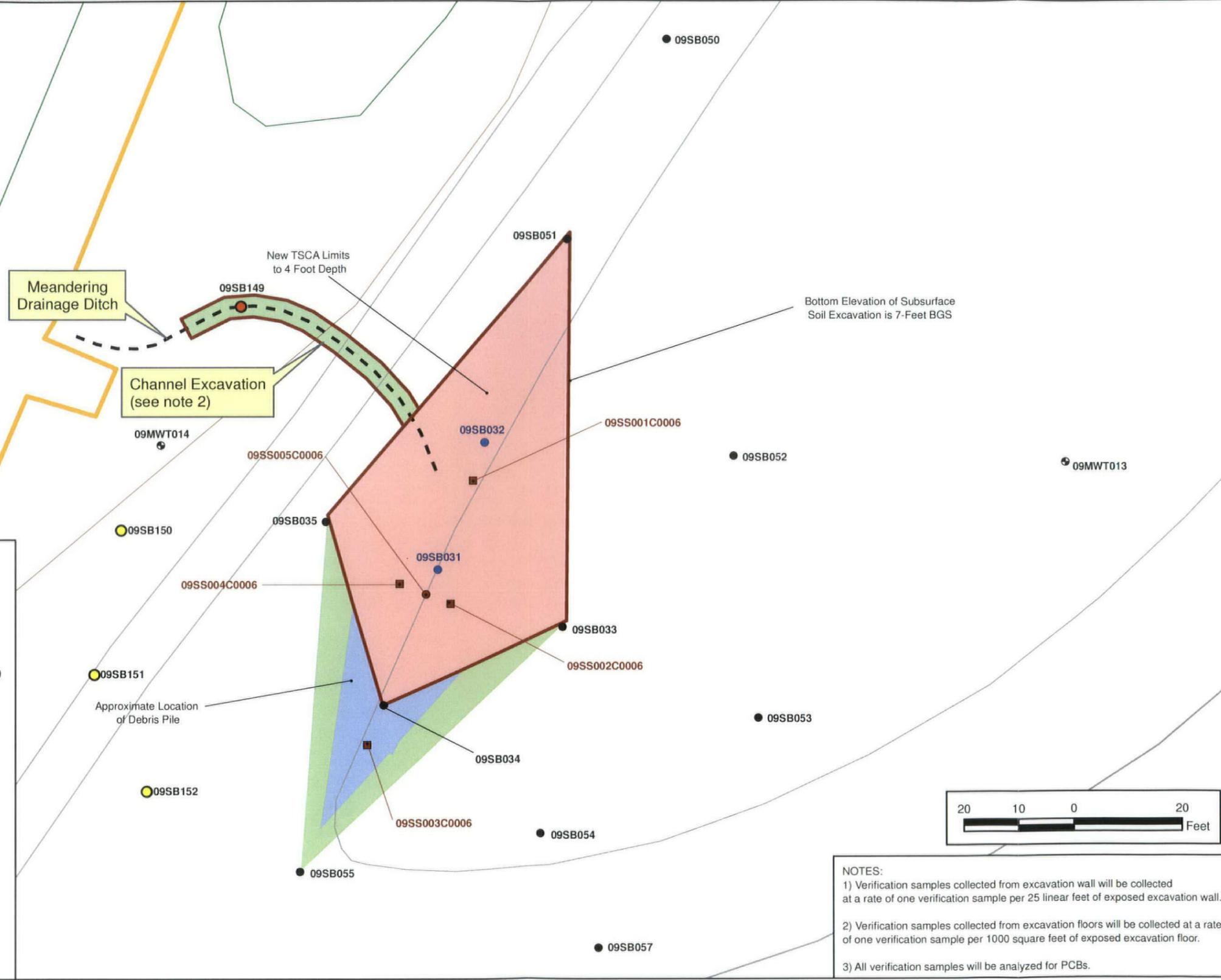
DRAWN BY K. MOORE	DATE 8/12/09
CHECKED BY T. SMITH	DATE 10/05/09
COST/ISCHED-AREA	
SCALE AS NOTED	



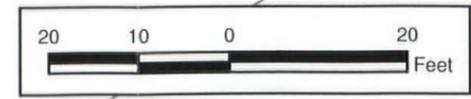
LEGEND

- Pre-Excavation Concentrations less than cleanup goals (all intervals)
- Soil Boring
- Soil Boring (Surface Excavation Required)
- Soil Boring (Surface and Subsurface Excavation Required)
- ⊙ Monitoring Well
- Verification Sample Required from Excavation Sidewall
- Steam Line
- Area Excavated to 2 feet verification samples required on exposed excavated floor
- Area Excavated to 4 feet verification samples required on exposed excavated floor
- Area Excavated to 7 feet verification samples required on exposed excavated floor
- Road
- Railroad
- Tree Line
- Stream
- Topographic Contour

bgs - below ground surface



Bottom Elevation of Subsurface Soil Excavation is 7-Foot BGS



NOTES:

- 1) Verification samples collected from excavation wall will be collected at a rate of one verification sample per 25 linear feet of exposed excavation wall.
- 2) Verification samples collected from excavation floors will be collected at a rate of one verification sample per 1000 square feet of exposed excavation floor.
- 3) All verification samples will be analyzed for PCBs.

CONTRACT NO. CTO F271	APPROVED BY DATE	APPROVED BY DATE	REV 0
PROPOSED VERIFICATION SAMPLING LOCATIONS FOR FORMER FIRE FIGHTING TRAINING AREA SWMU 9 NSWC CRANE CRANE, INDIANA			
DRAWN BY K. MOORE	DATE 8/12/09	CHECKED BY T. SMITH	DATE 10/05/09
COST/SCHED-AREA		SCALE AS NOTED	
FIGURE NO. FIGURE 9			

VOLUME CALCULATIONS

CLIENT: NSA CRANE - SWMU 9		JOB NUMBER: 112G01573	
SUBJECT: SWMU 9 - ADDITIONAL EXCAVATION TECHNICAL MEMORANDUM - VOLUME CALCULATION			
BASED ON: Figures 6A, 6B, 7A, and 7B		DRAWING NUMBER:	
BY: TWS	CHECKED BY: TJR	APPROVED BY:	DATE:
Date: 09-03-09	Date: 09/09/09		

The purpose of this calculation is to determine the volume of soil to be excavated from SWMU 9 (as identified in the SWMU 9 Additional Excavation Technical Memorandum) and to determine the volume associated with the different waste streams generated by the excavation.

Reported areas were measured using a planimeter.

VOLUME CALCULATIONS FOR FORMER BUILDING 55 AREA:

The volumes associated with the former Building 55 Area of SWMU 9 were calculated assuming no side-sloping of the excavation side walls.

Refer to the figure provided on page 3 of 6 of this calculation.

Location	Area (sf)	Excavation Depth (ft)	Volume (cf)	Volume (cy)
Area 1	83.7	2	167	6.2
Area 2	139.5	2	279	10.3
Area 3	1046.3	3	3139	116.3
Area 4	1503.6	2	3007	111.4
Area 5	100	4	400	14.8

Total Excavation Volume (cy) =	259
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Based on the analytical results from the verification samples collected in 2008 and the pre-excavation samples collected in July 2009 the following is a summary of the waste streams associated with the former Building 55 Area excavation. Refer to the figure provided on page 4 of 6 of this calculation.

Location	Area (sf)	Volume (cy)	Waste Stream
Area 1 (0 to 2 ft)	83.7	6.2	Dispose offsite as special waste (less than TCLP)
Area 2 (0 to 2 ft)	139.5	10.3	Dispose offsite as hazardous waste (less than LDR)
Area 3A (0 to 1.5 ft)	1046.3	58.1	Stockpile onsite for use as backfill material.
Area 3B (1.5 to 3 ft)	1046.3	58.1	Dispose offsite as hazardous waste (greater than LDR)
Area 4A (0 to 2 ft)	353.3	26.2	Dispose offsite as hazardous waste (greater than LDR)
Area 4B (0 to 2 ft)	593.9	44.0	Dispose offsite as hazardous waste (less than LDR)
Area 4C (0 to 2 ft)	342.7	25.4	Dispose offsite as special waste (less than TCLP)
Area 4D (0 to 2 ft)	213.7	15.8	Dispose offsite as hazardous waste (less than LDR)
Area 5A (0 to 4 ft)	43.6	6.5	Dispose offsite as hazardous waste (greater than LDR)
Area 5B (0 to 2 ft)	56.4	4.2	Dispose offsite as special waste (less than TCLP)
Area 5C (2 to 4 ft)	56.4	4.2	Dispose offsite as hazardous waste (greater than LDR)

Total Excavation Volume (cy) =	259
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CLIENT: NSA CRANE - SWMU 9		JOB NUMBER: 112G01573	
SUBJECT: SWMU 9 - ADDITIONAL EXCAVATION TECHNICAL MEMORANDUM - VOLUME CALCULATION			
BASED ON: Figures 6A, 6B, 7A, and 7B		DRAWING NUMBER:	
BY: TWS	CHECKED BY: TJR	APPROVED BY:	DATE:
Date: 09-03-09	Date: 09/09/09		

VOLUME CALCULATIONS FOR FORMER FIGHTING TRAINING AREA:

The volumes associated with the former Fire Fighting Training Area of SWMU 9 were calculated assuming a 0.5 ft horizontal to 1 ft vertical side-sloping on the excavation side walls that are excavated to 7 feet below ground surface. No side sloping is provided for other excavation depths.

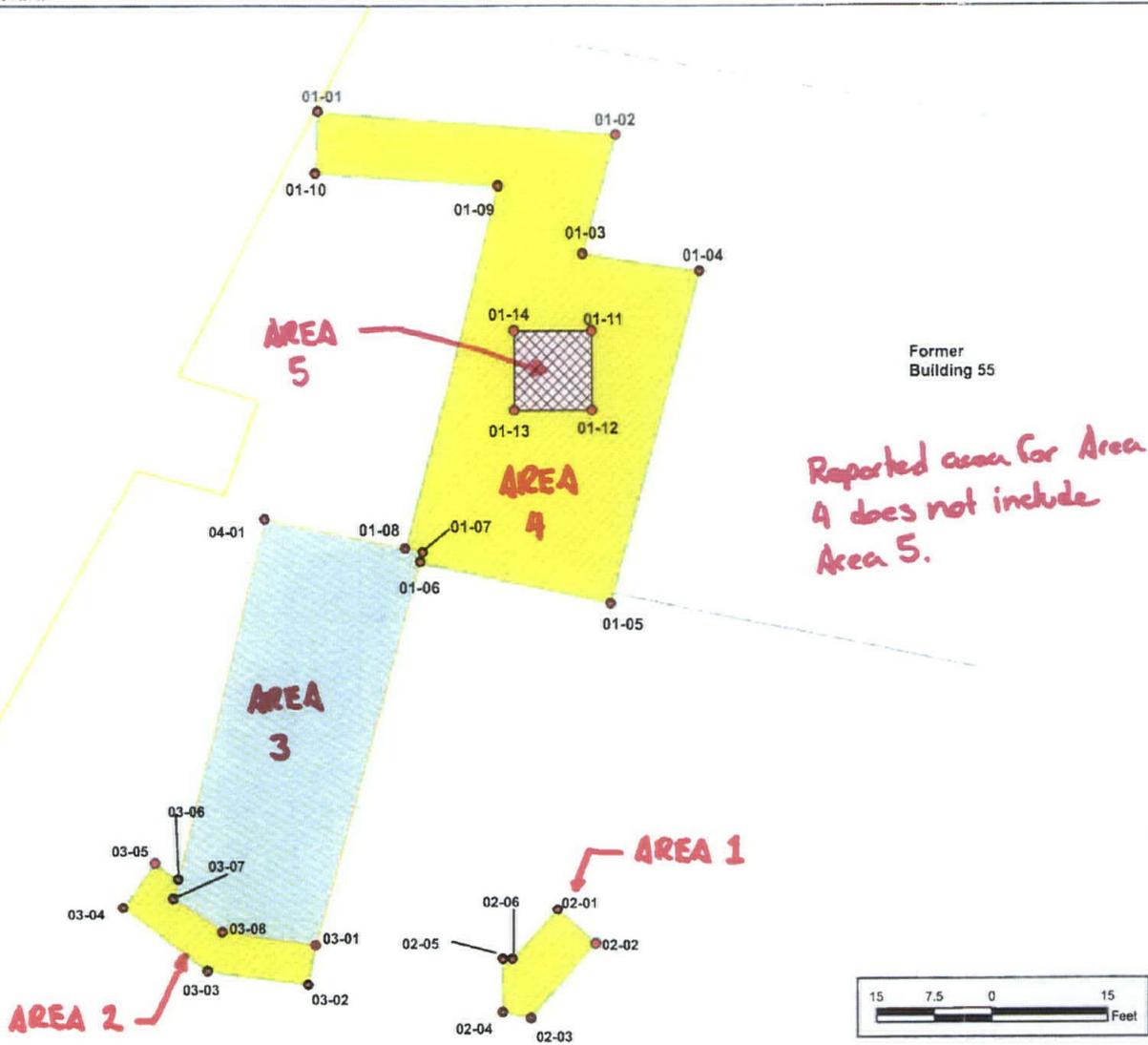
Refer to the figure provided on page 5 of 6 of this calculation.

Location	Area (sf)	Excavation Depth (ft)	Volume (cf)	Volume (cy)
Area 1	378.0	2	756	28.0
Area 2	272.8	4	1091	40.4
Area 3	2441.6	7	17091	633.0
Area 4	48	2	96	3.6
Total Excavation Volume (cy) =				705

Based on the analytical results from the verification samples collected in 2008 and the pre-excavation samples collected in July 2009 the following is a summary of the waste streams associated with the former Building 55 Area excavation. Refer to the figure provided on page 6 of 6 of this calculation.

Location	Area (sf)	Volume (cy)	Waste Stream
Area 1 (0 to 2 ft)	378.0	28.0	Dispose offsite as Non-TSCA regulated soil
Area 2A (0 to 4 ft)	204.8	30.3	Dispose offsite as TSCA regulated soil
Area 2B (0 to 2 ft)	68.0	5.0	Stockpile onsite for use as backfill material.
Area 2C (2 to 4 ft)	68.0	5.0	Dispose offsite as TSCA regulated soil
Area 3A (0 to 2 ft)	399.9	29.6	Stockpile onsite for use as backfill material.
Area 3B (2 to 4 ft)	399.9	29.6	Dispose offsite as TSCA regulated soil
Area 3C (4 to 7 ft)	399.9	44.4	Dispose offsite as Non-TSCA regulated soil
Area 3D (0 to 4 ft)	771.6	114.3	Dispose offsite as TSCA regulated soil
Area 3E (4 to 7 ft)	771.6	85.7	Dispose offsite as Non-TSCA regulated soil
Area 3F (0 to 7 ft)	1270.1	329.3	Dispose offsite as Non-TSCA regulated soil
Area 4 (0 to 2 ft)	48.0	3.6	Dispose offsite as Non-TSCA regulated soil
Total Excavation Volume (cy) =		705	

VT ON MKD 9-4-99 (T)

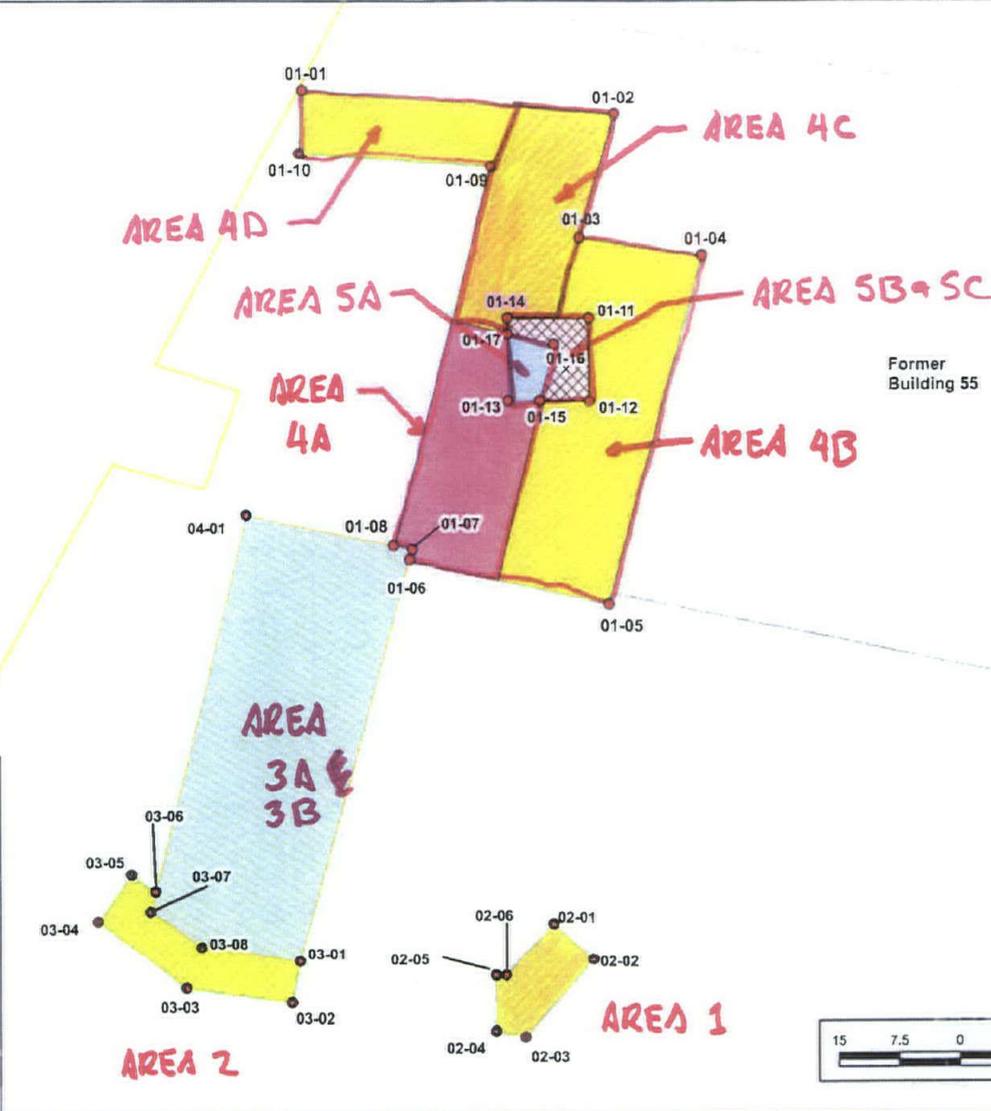


Former Building 55

Reported area for Area 4 does not include Area 5.

CONTRACT NO. CTO 1-271	DATE	REV 1
APPROVED BY	DATE	FIGURE NO. FIGURE 5A
APPROVED BY	DATE	FIGURE 6A
PROPOSED EXCAVATION FOR FORMER BUILDING 55 AREA SWMU 9 NSWC CRANE CRANE, INDIANA		
		
DRAWN BY K. MOORE	DATE 8/12/09	SCALE AS NOTED
CHECKED BY T. SMITH	DATE 8/16/09	
DATE/TITLE/AREA		

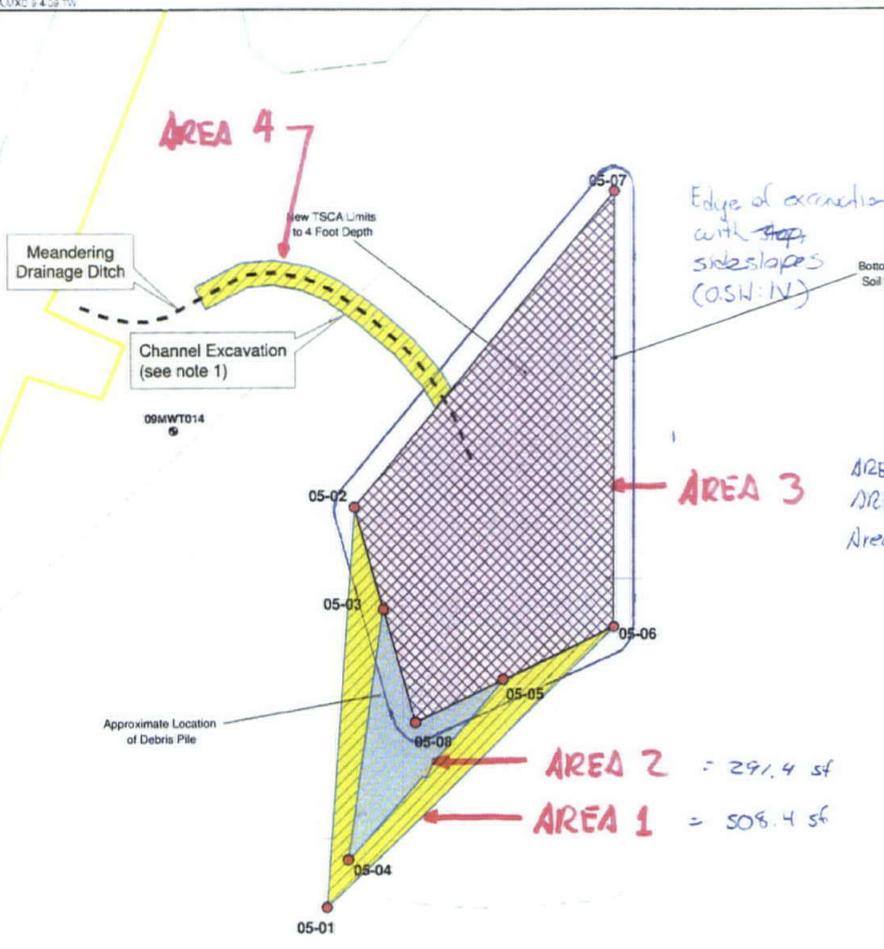
JXD 5-4-58 TV



- 1 (0 to 2 ft bgs)
- 1.5 to 3 ft bgs)
- 2 to 4 ft bgs)
- 3 to 4 ft bgs)
- 4 to 5 ft bgs)
- 5 to 6 ft bgs)

CONTRACT NO. CIU177		DATE		DATE		REV 1	
APPROVED BY		DATE		APPROVED BY		DATE	
APPROVED BY		DATE		APPROVED BY		DATE	
FIGURE NO.		FIGURE NO.		FIGURE NO.		FIGURE NO.	
FIGURE 6B		FIGURE 6B		FIGURE 6B		FIGURE 6B	
SOIL DISPOSITION MAP FOR FORMER BUILDING 55 AREA SWMU 9 NSWC CRANE CRANE, INDIANA							
							
DRAWN BY	DATE	CHECKED BY	DATE	COSITISED AREA	SCALE	AS NOTED	
K. MOORE	5/12/09	T. SMITH	5/12/09	AREA			

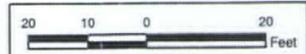
CFR 1000 3-4-09.TW



Node	Northing	Easting
05-01	1,311,073.72	3,025,122.05
05-02	1,311,139.54	3,025,127.38
05-03	1,311,122.19	3,025,131.61
05-04	1,311,081.95	3,025,125.60
05-05	1,311,111.30	3,025,151.62
05-06	1,311,118.86	3,025,170.74
05-07	1,311,190.67	3,025,171.41
05-08	1,311,103.96	3,025,136.72

AREA Bottom = ~~2006.3~~ 2006.3 sf
 AREA Top = 2876.8 sf
 Area Verge = ~~2441.6~~ 2441.6 sf

AREA 2 = 291.4 sf
 AREA 1 = 508.4 sf



NOTES:
 1) Proposed excavation to extend from former fire fighting training area along meandering drainage ditch to a point 10 feet beyond sample location 09SB149. Excavation to be 4 feet wide (centered on drainage ditch) and 2 feet deep. Center of drainage ditch will be located in the field (No coordinates provided).

CONTRACT NO. C101271	DATE
APPROVED BY	DATE
APPROVED BY	DATE
FIGURE NO.	FIGURE 7A
REV	1

PROPOSED EXCAVATION
 FORMER FIRE FIGHTING TRAINING AREA
 SWMU 9
 NSWC CRANE
 CRANE, INDIANA



DATE 8/28/09	DATE 8/4/09
DRAWN BY K. MOORE	CHECKED BY T. SMITH
COST/SCHED-AREA	SCALE AS NOTED

RFTA/M/KC 2 4-06 TW

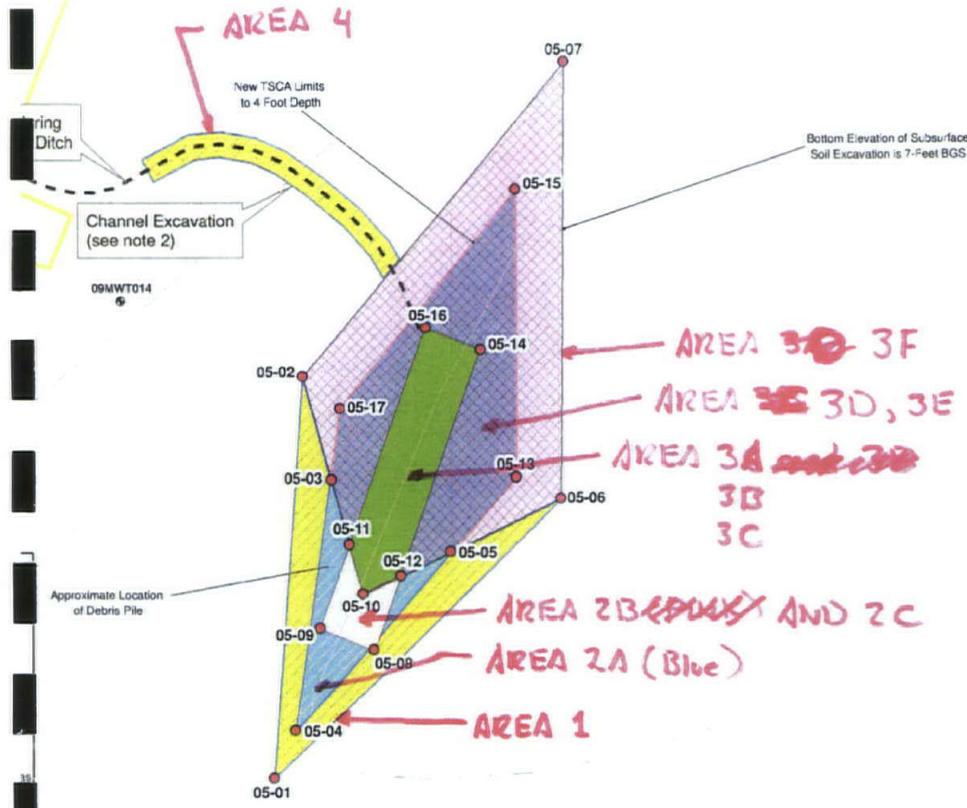
Node	Northing	Easting
05-01	1,311,073.42	3,025,122.47
05-02	1,311,139.33	3,025,127.35
05-03	1,311,122.45	3,025,132.23
05-04	1,311,081.43	3,025,125.73
05-05	1,311,110.94	3,025,152.11
05-06	1,311,119.57	3,025,170.62
05-07	1,311,190.94	3,025,171.50
05-08	1,311,094.79	3,025,139.36
05-09	1,311,098.16	3,025,129.98
05-10	1,311,103.67	3,025,137.48
05-11	1,311,112.05	3,025,135.11
05-12	1,311,107.04	3,025,143.86
05-13	1,311,122.80	3,025,163.25
05-14	1,311,143.94	3,025,157.18
05-15	1,311,170.20	3,025,163.25
05-16	1,311,147.31	3,025,148.11
05-17	1,311,133.81	3,025,133.48

CONTRACT NO. C101221	DATE
APPROVED BY	DATE
APPROVED BY	DATE
FIGURE NO	FIGURE 7B
REV	1

SOIL DISPOSITION MAP
FORMER FIRE FIGHTING TRAINING AREA
SWMU 9
NSWC CRANE
CRANE, INDIANA



DRAWN BY K. MOORE	DATE 8/2/09
CHECKED BY T. SMITH	DATE 8/4/09
COST/CHED-AREA	SCALE AS NOTED



NOTES:
1) The area previously excavated was backfilled, following the collection of the identified verification samples. Prior to backfilling the excavation was lined with plastic so the backfill would remain separate from contaminated soil. During excavation segregate this material for reuse as backfill underlying.
2) Proposed excavation to extend from former fire fighting training area along meandering drainage ditch to a point 10 feet beyond sample location 09SB149. Excavation to be 4 feet wide (centered on drainage ditch) and 2 feet deep.