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December 8, 2015

VIA PRIVATE CARRIER

Mr. James R. Carroll
Program Administrator
Land Restoration Program
Land Management Administration
Maryland Department of the Environment
1800 Washington Boulevard, Suite 625
Baltimore, Maryland 21230

Subject: Transmittal of the Block G Soil Remedial Action Plan
Addendum 4: Transformer Investigation II
Lockheed Martin Middle River Complex, Middle River, Maryland

Dear Mr. Carroll:

For your review, please find enclosed two hard copies with CD of the above-referenced document. This addendum presents proposed exploratory activities in areas that were identified as possible transformer burial locations in Tax Block G at Lockheed Martin's Middle River Complex in Middle River, Maryland. If possible, we respectfully request to receive MDE's comments by December 15, 2015.

Please let me know if you have any questions. My office phone is (301) 548-2227.

Sincerely,

A handwritten signature in black ink that reads "Lynnette Drake". The signature is written in a cursive style and is contained within a thin black rectangular border.

Lynnette Drake
Remediation Analyst, Environmental Remediation

Enclosures:

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Block G Soil Remedial Action Plan Addendum 4: Transformer Investigation II Lockheed Martin Middle River Complex 2323 Eastern Boulevard Middle River, Maryland

Prepared for:

Lockheed Martin Corporation

Prepared by:

Tetra Tech, Inc.

December 2015



Michael Martin, P.G.
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Acronyms

bgs	below ground surface
µg/kg	microgram(s) per kilogram
µg/wipe	microgram(s) per wipe
MRC	Middle River Complex
PCBs	polychlorinated biphenyls
RAP	remedial action plan
RSL	regional screening level
Tetra Tech	Tetra Tech, Inc.
USEPA	United States Environmental Protection Agency
VOCs	volatile organic compounds

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Section 1

Previous Transformer Investigations

1.1 BACKGROUND - POTENTIAL DISPOSAL AREAS

Discussions with current Middle River Complex (MRC) employees identified two potential transformer disposal areas within Block G at the Middle River Complex (Figure 1-1) (Tetra Tech, Inc. [Tetra Tech], 2013). An excerpt from that interview follows:

“On July 7, 2011, Tetra Tech interviewed three Lockheed Martin personnel to obtain additional information regarding historical or existing subsurface utilities in Block G that might not have been mapped on the MRC utility drawing. During that interview, a current Middle River Complex electrician recalled that electrical transformers had been buried in two areas in Block G in the early 1980s. One of the suspected burial areas is in the wooded area southwest of the southern fence for Lot 3, near Cow Pen Creek. The second suspected burial area is in the wooded area southwest of the concrete pads for the former aero physics laboratory/wind tunnel test building. Both suspected burial areas are near the embankments leading down to Cow Pen Creek.

“It was stated that five to ten canister type electrical transformers had been buried at each location. The transformers were 5– to 15–kilovolt units that had been removed from poles in Lots 2 and 3. Each transformer likely contained ten to 15 gallons of polychlorinated biphenyl (PCB) transformer oil which was not drained before placement in the pits. Several transformers were reportedly damaged and leaking oil before placement. Details regarding this interview are provided in the Utility Cross-Connection Investigation Report (Tetra Tech, 2012a).”

Per these discussions, geophysical surveys were performed to locate the reported disposal areas within Block G. In combination with the geophysical survey, four test pits (TP-A, TP-B, TP-C, and TP-D) were excavated in areas with strong geophysical signals that also corresponded with the anecdotes regarding the transformer disposal. No transformers were found within these test pits.

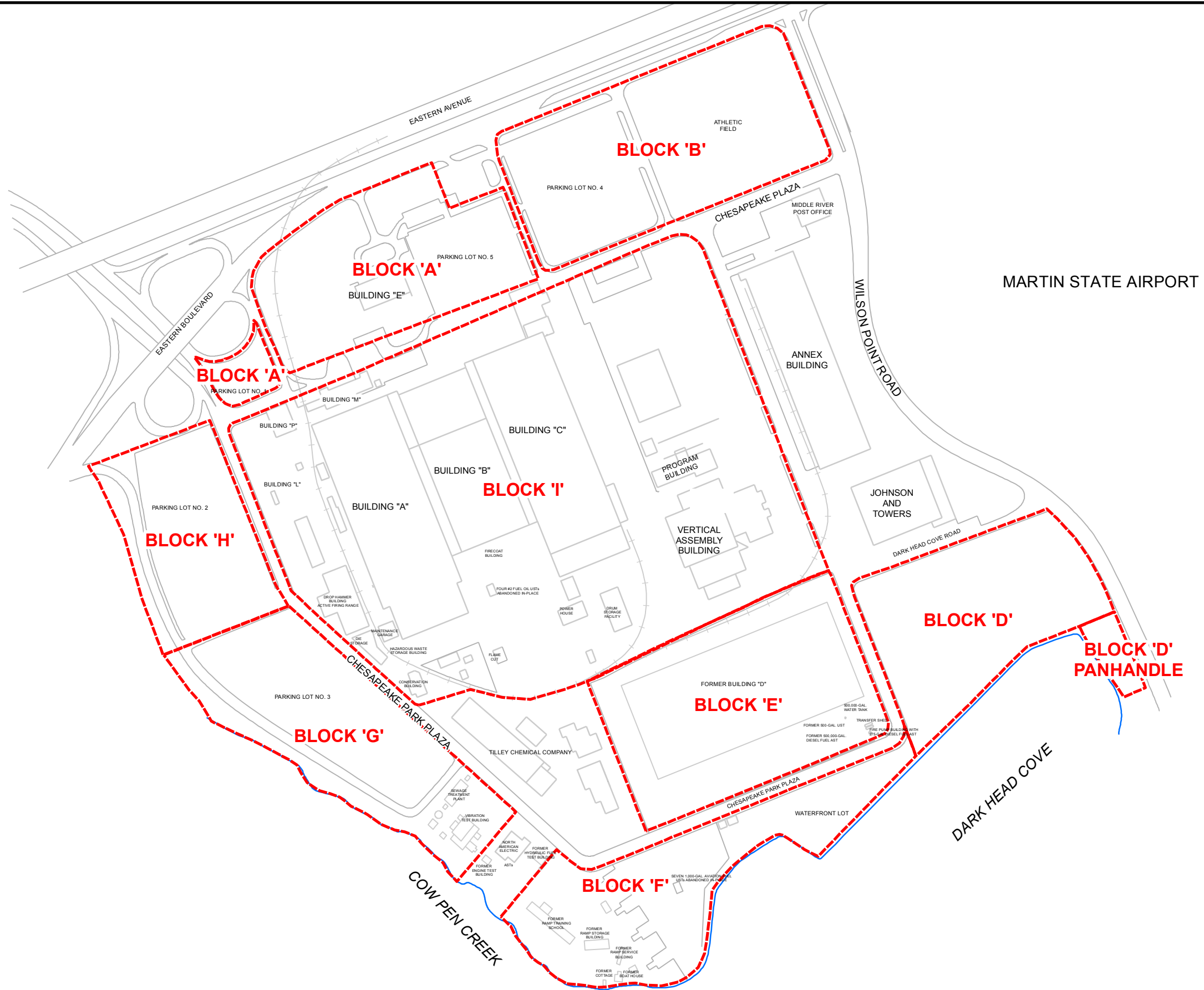



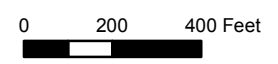


FIGURE 1-1
SITE LAYOUT AND TAX BLOCKS
MIDDLE RIVER COMPLEX

LEGEND

-  TAX BLOCK
-  STRUCTURE
-  RAILROAD TRACKS

Lockheed Martin Middle River Complex
Middle River, Maryland



DATE MODIFIED: 6/20/13

CREATED BY: MP



1.2 RECENT FINDINGS IN BLOCK G

1.2.1 June 2015

During the completion of the scheduled soil removal activity in Excavation Area J in Block G, parts for two electrical transformers were uncovered. The parts were found buried 2-3 feet below ground surface (bgs) northwest of Area J, in an area being cleared for placement of a stormwater bypass pipe. This area had not been identified as a possible disposal area during the previous geophysical survey because vegetation limited access and nearby concrete slabs caused interference. This transformer location, overlain on the geophysical survey results, is shown on Figure 1-2 below. Note that limited access areas are depicted in black on Figure 1-2.

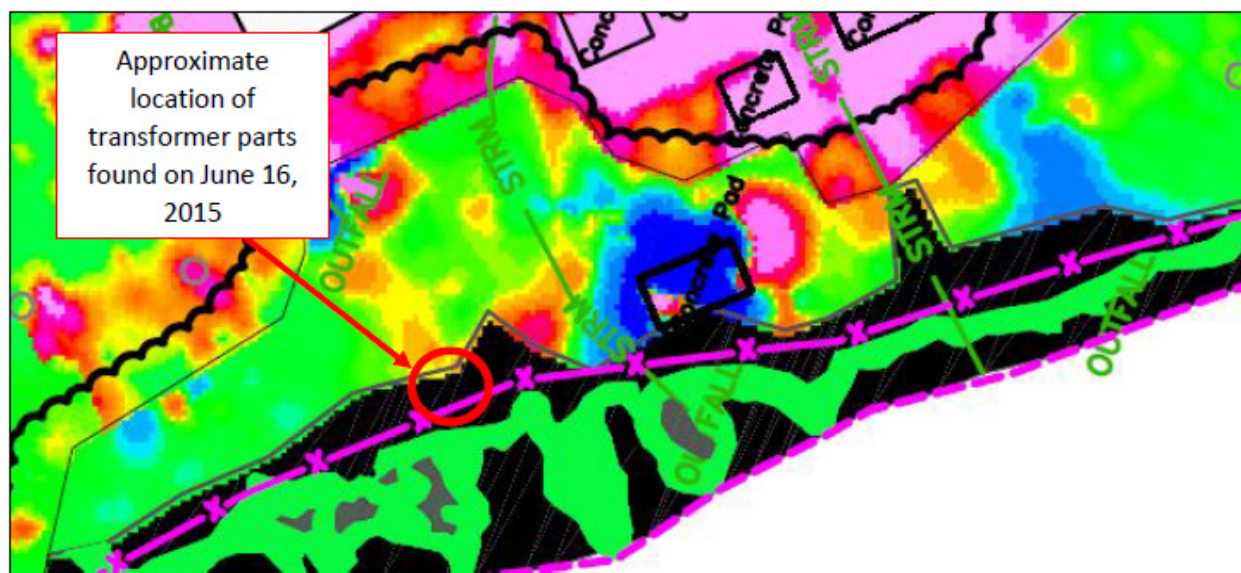


Figure 1-2 Location of Transformer Parts Found on June 16, 2015

When found, the transformer parts and soil adjacent to the transformers were excavated and placed in covered roll-off boxes, pending the completion of analysis for polychlorinated biphenyls (PCBs) via United States Environmental Protection Agency (USEPA) Method 8082A. Four samples were collected and analyzed for PCBs. Samples G-TR-1 and G-TR-2 were collected from the holes from which the transformers were removed. Composite soil samples G-TR-WC1 and G-TR-WC2 were collected from soil placed in the roll-off boxes. The results of the analyses are in Table 1-1.

Aroclor-1260 was the only PCB mixture detected in the samples. One of four detections exceeds the USEPA regional screening levels (RSLs) for industrial soils, and two of four detections exceed

the USEPA RSLs for residential soils (established at the 1×10^{-6} cancer risk level). No detections exceed either RSL if set at the 1×10^{-5} risk level. These concentrations do not exceed the (Block E) soil remedial goal established for Aroclor 1260 in for the industrial worker (10 milligrams per kilogram [mg/kg], set at the 1×10^{-5} cancer risk level). In addition, the maximum Aroclor 1260 detection would not present an adverse non-cancer risk for the worker or for a resident. The residual risk assessment would not have targeted this area for remediation (for purposes of direct contact worker protection). This is not a significant direct-contact risk issue for the worker.

To further investigate the possible presence of transformers in Block G, the following investigations, noted in subsequent sections, were recommended in Addendum 2 of the remedial action plan (RAP) for Block G. The proposed investigations were adjacent to recently identified transformer-disposal location and other areas within Block G.

1.2.2 30 × 30 Foot Gird Area – September 2015

On September 16, 2016 additional exploratory activities began adjacent to Excavation Area J (Figure 1-3), as described in Addendum 2 of the (RAP) for Block G (Tetra Tech, 2015). A 30 feet by 30 feet area adjacent to the location where the transformer parts were found on June 16, 2015 was excavated. The 30×30-foot area extended north/northwest of Excavation Area J along the limits of the existing silt fence installed for the soil removal activities.

Metallic pieces associated with a possible transformer were discovered during these exploratory activities approximately four feet bgs, along the southern edge of the excavation area and adjacent to the temporary silt fence. These newly discovered metallic pieces were located approximately two feet southwest of the suspected transformer found on June 16, 2015 and at a depth approximately 2 to 3 feet deeper (Figure 1-3).

Two wipe samples (G-WC-XFRMR-W3 and G-WC-XFRMR-W4) were collected from the metallic pieces on September 17th, and were sent to an off-site laboratory for PCB analysis by Method 8082A. One sample (G-WC-XFROR-COMP) was also collected from the stockpiled soil and sent to an off-site laboratory for PCB analysis by Method 8082A and volatile organic compound (VOC) analysis by Method 8260B.

Aroclor 1260 was the only PCB detected in soil and wipe samples. Aroclor 1260 was detected at 0.2 mg/kg in the stockpiled soil (G-WC-XFRMR-COMP). Aroclor 1260 was also detected on both wipe samples at 0.00088J mg/wipe (G-WC-XFRMR-W3) and 0.0015J mg/wipe (G-WC-XFRMR-W4). 2-Butanone (0.26 J mg/kg) was the only VOC detected in stockpiled soil. Analytical results for chemicals detected in the 30×30 foot sampling grid are presented in Table 1-2.

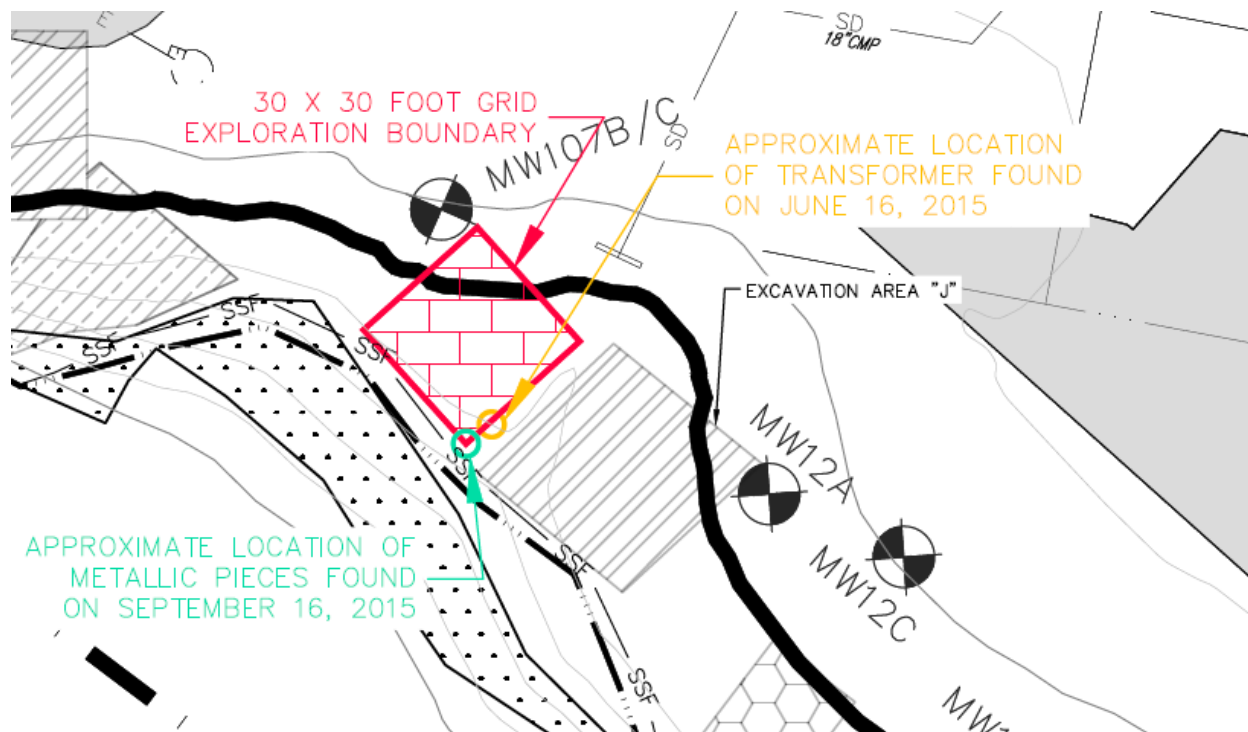


Figure 1-3 30×30 Foot Grid Sampling Area

1.2.3 Potential Transformer Disposal Areas – September 2015

Given that two disposal areas were believed to have been used for transformer disposal within Block G, additional test pits were excavated along the top of the bank of Cow Pen Creek, and in the areas adjacent to Block G Excavations Areas H and J. The test pits were excavated within the anomalous areas identified during the geophysical survey northwest of the known transformer area and northwest of Excavation area H (Figure 1-4). The test pits were placed as close as possible to the top of the stream bank and the tree line. The test pits were stabilized at the end of each workday to minimize the potential for erosion. The test pit exploration intentionally occurred during fair weather so that runoff from rain was avoided.

No metallic pieces or evidence of transformers was discovered in these test pit areas. All test pits were backfilled and restored at the end of each day's work. Restoration included regrading and seeding.

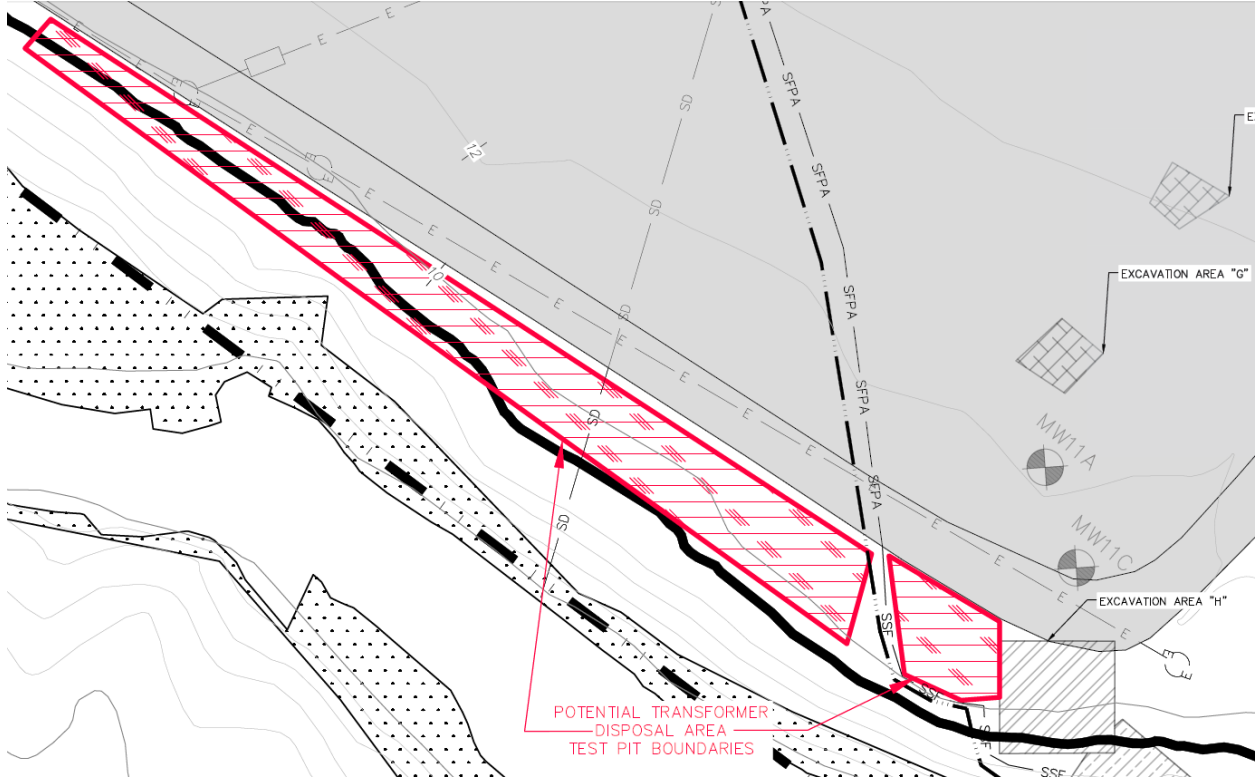


Figure 1-4 Potential Transformer Test Pit Exploration Boundaries

Table 1-1
PCB Results in Soil Samples Collected Near Transformer Parts

SAMPLE ID	G-TR-1	G-TR-2	G-TR-WC1	G-TR-WC2
	06/16/2015	06/16/2015	06/16/2015	06/16/2015
	Soil from Excavation	Soil from Excavation	Soil (composite from rolloff for characterization)	Soil (composite from rolloff for characterization)
Polychlorinated biphenyls [PCBs] (mg/kg)				
AROCLOR-1016	0.017 U	0.071 U	0.013 U	0.014 U
AROCLOR-1221	0.023 U	0.095 U	0.017 U	0.018 U
AROCLOR-1232	0.028 U	0.120 U	0.021 U	0.023 U
AROCLOR-1242	0.016 U	0.065 U	0.011 U	0.012 U
AROCLOR-1248	0.011 U	0.047 U	0.0083 U	0.009 U
AROCLOR-1254	0.020 U	0.083 U	0.015 U	0.016 U
AROCLOR-1260	0.3	1.1 J	0.095	0.14

J – estimated concentration
U – not detected
mg/kg – milligrams per kilogram

Table 1-2

Summary of Soil Results and Wipe Samples from Transformer Investigation
Samples Collected September 19, 2015
Lockheed Martin Middle River Complex, Middle River, Maryland
Page 1 of 3

NSAMPLE LAB ID SAMPLE DATE SAMPLE TYPE	G-WC-XFRMR- 240-55592-3 09/17/2015 SOIL	G-WC-XFRMR-W3 240-55592-1 09/17/2015 WIPE	G-WC-XFRMR-W4 240-55592-2 09/17/2015 WIPE
Volatile organic compounds (mg/kg)			
1,1,1,2-TETRACHLOROETHANE	0.00056 U	--	--
1,1,1-TRICHLOROETHANE	0.00073 UJ	--	--
1,1,2,2-TETRACHLOROETHANE	0.00035 U	--	--
1,1,2-TRICHLOROTRIFLUOROETHANE	0.00047 UJ	--	--
1,1-DICHLOROETHANE	0.00038 U	--	--
1,1-DICHLOROETHENE	0.00089 U	--	--
1,1-DICHLOROPROPENE	0.00041 U	--	--
1,2,3-TRICHLOROBENZENE	0.00056 U	--	--
1,2,3-TRICHLOROPROPANE	0.00087 U	--	--
1,2,3-TRIMETHYLBENZENE	0.00051 U	--	--
1,2,4-TRICHLOROBENZENE	0.00043 U	--	--
1,2,4-TRIMETHYLBENZENE	0.00065 U	--	--
1,2-DIBROMO-3-CHLOROPROPANE	0.003 U	--	--
1,2-DIBROMOETHANE	0.00059 U	--	--
1,2-DICHLOROBENZENE	0.00038 U	--	--
1,2-DICHLOROETHANE	0.00051 U	--	--
1,2-DICHLOROPROPANE	0.00016 U	--	--
1,3-DICHLOROBENZENE	0.00077 U	--	--
1,3-DICHLOROPROPANE	0.00045 U	--	--
1,4-DICHLOROBENZENE	0.00031 U	--	--
2,2-DICHLOROPROPANE	0.00049 UJ	--	--
2-BUTANONE	0.0026 J	--	--
2-CHLOROETHYL VINYL ETHER	0.00072 U	--	--
2-CHLOROTOLUENE	0.00034 U	--	--
2-HEXANONE	0.00076 U	--	--
4-CHLOROTOLUENE	0.00029 U	--	--
4-ISOPROPYLTOLUENE	0.00046 U	--	--
4-METHYL-2-PENTANONE	0.0014 U	--	--
ACETONE	0.011 U	--	--
BENZENE	0.001 U	--	--
BROMOBENZENE	0.00037 U	--	--
BROMOCHLOROMETHANE	0.00037 U	--	--
BROMODICHLOROMETHANE	0.00032 U	--	--
BROMOFORM	0.00027 U	--	--
BROMOMETHANE	0.00047 U	--	--
CARBON DISULFIDE	0.00066 U	--	--
CARBON TETRACHLORIDE	0.00073 UJ	--	--
CHLOROBENZENE	0.00059 U	--	--
CHLORODIBROMOMETHANE	0.00041 U	--	--

Table 1-2

Summary of Soil Results and Wipe Samples from Transformer Investigation
Samples Collected September 19, 2015
Lockheed Martin Middle River Complex, Middle River, Maryland
Page 2 of 3

NSAMPLE LAB ID SAMPLE DATE SAMPLE TYPE	G-WC-XFRMR- 240-55592-3 09/17/2015 SOIL	G-WC-XFRMR-W3 240-55592-1 09/17/2015 WIPE	G-WC-XFRMR-W4 240-55592-2 09/17/2015 WIPE
Volatile organic compounds (mg/kg)			
CHLOROETHANE	0.00049 U	--	--
CHLOROFORM	0.0004 U	--	--
CHLOROMETHANE	0.00088 UJ	--	--
CIS-1,2-DICHLOROETHENE	0.00031 U	--	--
CIS-1,3-DICHLOROPROPENE	0.00079 U	--	--
DIBROMOMETHANE	0.00047 U	--	--
DICHLORODIFLUOROMETHANE	0.00031 UJ	--	--
DIISOPROPYL ETHER	0.00066 U	--	--
ETHYL TERT-BUTYL ETHER	0.00046 U	--	--
ETHYLBENZENE	0.00036 U	--	--
HEXACHLOROBUTADIENE	0.00045 UJ	--	--
ISOPROPYLBENZENE	0.00022 U	--	--
M+P-XYLENES	0.00047 U	--	--
METHYL TERT-BUTYL ETHER	0.00048 U	--	--
METHYLENE CHLORIDE	0.0014 U	--	--
NAPHTHALENE	0.00039 U	--	--
N-BUTYLBENZENE	0.00066 U	--	--
N-PROPYLBENZENE	0.00067 U	--	--
O-XYLENE	0.00064 U	--	--
SEC-BUTYLBENZENE	0.001 U	--	--
STYRENE	0.00045 U	--	--
TERT-AMYL METHYL ETHER	0.00048 U	--	--
TERT-BUTYLBENZENE	0.00075 U	--	--
TERTIARY-BUTYL ALCOHOL	0.0064 U	--	--
TETRACHLOROETHENE	0.00089 U	--	--
TOLUENE	0.0003 U	--	--
TOTAL XYLENES	0.0006 U	--	--
TRANS-1,2-DICHLOROETHENE	0.00036 U	--	--
TRANS-1,3-DICHLOROPROPENE	0.00032 U	--	--
TRICHLOROETHENE	0.00043 U	--	--
TRICHLOROFLUOROMETHANE	0.00032 UJ	--	--
VINYL ACETATE	0.00074 UJ	--	--
VINYL CHLORIDE	0.00034 U	--	--
Polychlorinated biphenyls (mg/kg)			
AROCLOR-1016	0.015 U	--	--
AROCLOR-1221	0.02 U	--	--
AROCLOR-1232	0.025 U	--	--
AROCLOR-1242	0.014 U	--	--
AROCLOR-1248	0.01 U	--	--

Table 1-2

Summary of Soil Results and Wipe Samples from Transformer Investigation
Samples Collected September 19, 2015
Lockheed Martin Middle River Complex, Middle River, Maryland
Page 3 of 3

NSAMPLE LAB ID SAMPLE DATE SAMPLE TYPE	G-WC-XFRMR- 240-55592-3 09/17/2015 SOIL	G-WC-XFRMR-W3 240-55592-1 09/17/2015 WIPE	G-WC-XFRMR-W4 240-55592-2 09/17/2015 WIPE
Volatile organic compounds (mg/kg)			
AROCLOR-1254	0.018 U	--	--
AROCLOR-1260	0.2	--	--
Polychlorinated biphenyls (mg/wipe)			
AROCLOR-1016	--	0.002 U	0.002 U
AROCLOR-1221	--	0.002 U	0.002 U
AROCLOR-1232	--	0.002 U	0.002 U
AROCLOR-1242	--	0.002 U	0.002 U
AROCLOR-1248	--	0.002 U	0.002 U
AROCLOR-1254	--	0.002 U	0.002 U
AROCLOR-1260	--	0.00088 J	0.0015 J

Notes:

Bold font indicates positive detection.

Data Qualifiers:

U - non-detect

J - estimated

mg/kg - milligram(s) per kilogram

mg/wipe - milligram(s) per wipe

Section 2

Proposed Exploratory Activities

Two additional exploratory areas were identified as possible transformer burial locations following the September 2015 investigation. Proposed Area 1 is located within the current soil remedial-action limit of disturbance, and is an extension of the 30 foot × 30 foot area excavated in September 2015. This location was described in the July 11, 2011 interviews with site personnel as a possible burial area. Proposed Area 2 is southwest of the location where the transformer and metallic pieces were uncovered outside of the limit of disturbance. Figure 2-1 depicts the locations of both proposed areas.

Area 1 has been cleared of dense vegetation, but brush clearance will be required in Area 2. Since Area 2 is outside of the limit of disturbance, the proper Baltimore County permits will be obtained before exploratory activities begin.

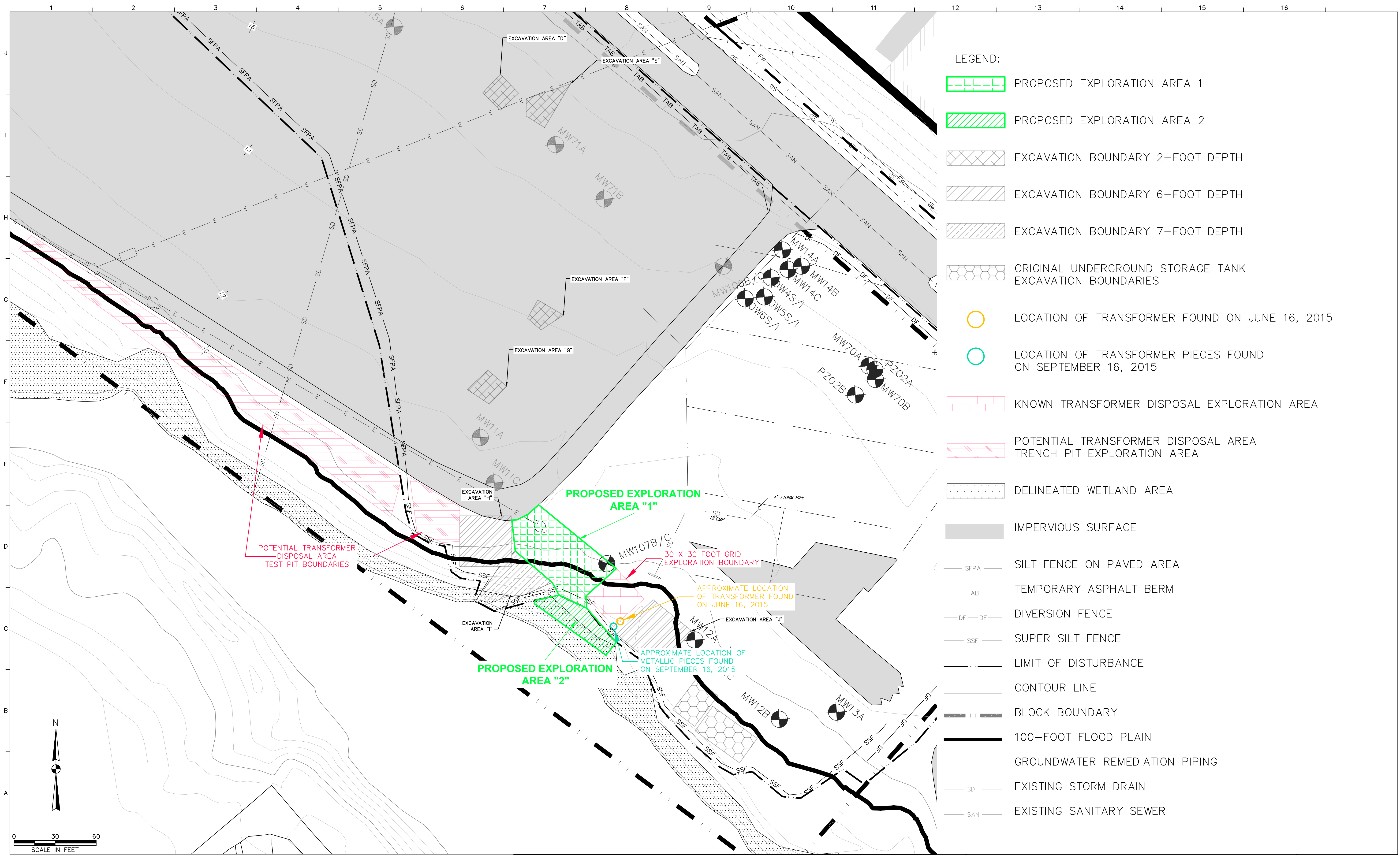
Before exploration activities start, a metal detector (magnetic pipe and cable locator) survey will be conducted in both areas to aid in the identification of possible anomalies before excavation. The survey equipment can detect metallic items at shallow depth and will help minimize potential disturbance of fluid-containing transformers, if present.

A series of test trenches will be excavated in Area 1 to explore for transformers. Excavated material will be staged adjacent to the trench and then used to backfill if no evidence of transformers is found.

Soil in Area 2 along the bank of Cow Pen Creek will be removed in approximate one foot lifts. The soil will be placed in roll-off boxes and covered. Following removal of first foot of soil, the resulting surface area will be scanned with a metal detector, and an additional one foot of soil will be removed. Excavation will continue in this manner to a depth of four feet in Area 2.

If a transformer is found, it will be placed in an overpack drum to ensure any fluids within are properly contained. Any fluids or soils near the transformer will be sampled and properly

characterized. All soil samples collected during the progress of the work will be analyzed for polychlorinated biphenyls (PCBs) via Method 8082A and volatile organic compounds (VOCs) via Method 8260B, along with any analyses required for characterization and disposal. The transformer or transformer pieces will remain in the overpack drum pending further characterization. The investigation areas will be surveyed at completion, and recorded in the Block G construction report.



- LEGEND:
- PROPOSED EXPLORATION AREA 1
 - PROPOSED EXPLORATION AREA 2
 - EXCAVATION BOUNDARY 2-FOOT DEPTH
 - EXCAVATION BOUNDARY 6-FOOT DEPTH
 - EXCAVATION BOUNDARY 7-FOOT DEPTH
 - ORIGINAL UNDERGROUND STORAGE TANK EXCAVATION BOUNDARIES
 - LOCATION OF TRANSFORMER FOUND ON JUNE 16, 2015
 - LOCATION OF TRANSFORMER PIECES FOUND ON SEPTEMBER 16, 2015
 - KNOWN TRANSFORMER DISPOSAL EXPLORATION AREA
 - POTENTIAL TRANSFORMER DISPOSAL AREA TRENCH PIT EXPLORATION AREA
 - DELINEATED WETLAND AREA
 - IMPERVIOUS SURFACE
 - SFPA SILT FENCE ON PAVED AREA
 - TAB TEMPORARY ASPHALT BERM
 - DF DIVERSION FENCE
 - SSF SUPER SILT FENCE
 - LIMIT OF DISTURBANCE
 - CONTOUR LINE
 - BLOCK BOUNDARY
 - 100-FOOT FLOOD PLAIN
 - GROUNDWATER REMEDIATION PIPING
 - SD EXISTING STORM DRAIN
 - SAN EXISTING SANITARY SEWER

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MARK	DATE	DESCRIPTION	BY

**LOCKHEED MARTIN
MIDDLE RIVER COMPLEX**
SOIL REMEDIAL ACTION PLAN ADDENDUM 4
TRANSFORMER INVESTIGATION II
BLOCK G

DATE:	12/3/2015
PROJECT NO.:	112IC07483
DESIGNED BY:	ISG
DRAWN BY:	ISG
CHECKED BY:	SAN
SHEET:	1 OF 1
COPYRIGHT TETRA TECH INC.	
FIGURE 2-1	

Section 3

References

1. Enviroscan, Inc., 2012. *Geophysical Survey, Electrical Transformer Pit Phase 2 Martin Middle River Complex, Middle River, Maryland*. September.
2. Tetra Tech, Inc. (Tetra Tech), 2012. *Utility Cross-Connection Investigation Report, Lockheed Martin Middle River Complex, 2323 Eastern Boulevard, Middle River, Maryland*. Prepared by Tetra Tech, Inc., Germantown, Maryland for Lockheed Martin Corporation, Bethesda, Maryland. January.
3. Tetra Tech, Inc. (Tetra Tech), 2013. *Block G Transformer Investigation Report. Lockheed Martin Middle River Complex, 2323 Eastern Boulevard, Middle River, Maryland*. Prepared by Tetra Tech, Inc., Germantown, Maryland for Lockheed Martin Corporation, Bethesda, Maryland. April.
4. Tetra Tech, Inc. (Tetra Tech), 2015. *Block G Remedial Action Plan Addendum 2 Supplemental Underground Storage Tank and Transformer Investigation, Lockheed Martin Middle River Complex, 2323 Eastern Boulevard, Middle River, Maryland*. Prepared by Tetra Tech, Inc., Germantown, Maryland for Lockheed Martin Corporation, Bethesda, Maryland. July

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