**BLOODY BROOK**

**ONONDAGA COUNTY**

**LIVERPOOL, NEW YORK**

# SITE MANAGEMENT PLAN

**Prepared for:**

Lockheed Martin Corporation
497 Electronics Parkway
Building EP-6, Room 100B
Liverpool, New York 13088

**Prepared by:**

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**Revisions to Final Approved Site Management Plan:**

| Revision No. | Date Submitted | Summary of Revision | NYSDEC Approval Date |
|---|---|---|---|
| 1 | March 29, 2019 | 1. Revised main text to reflect updates since February 2018 (including Tables 5, 6, and 7).<br>2. Updated Record Drawings (Appendix B).<br>3. Updated Field Sampling Plan to reflect 2018 biological monitoring.<br>4. Revised Restoration Monitoring Plan (Appendix J) to address changes per the adaptive management approach in the wooded and wetland areas. | March 04, 2020 |
| 2 | March 18, 2020 | 1. Revised main text to reflect updates since March 2019.<br>2. Revised Restoration Monitoring Plan (Appendix J) to address changes per the adaptive management approach in the wooded and wetland areas. | June 23, 2020 |
| 3 | March 02, 2021 | 1. Revised main text to reflect updates since March 2020 (including Tables 6, 7, and 8).<br>2. Updated Field Sampling Plan to reflect 2020 biological monitoring.<br>3. Revised Restoration Monitoring Plan (Appendix J) to address changes per the adaptive management approach in the wooded and wetland areas.<br>4. Updated Health and Safety Plan (HASP) (Appendix H) to address COVID-19 safety measures. | |

**MARCH 2021**

## CERTIFICATION STATEMENT

I, NICKCOLE EVANS, certify that I am currently a NYS registered professional engineer as defined in 6 NYCRR Part 375 and that this Site Management Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10) and that all activities were performed in full accordance with the DER-approved work plan and any DER-approved modifications.




NICKCOLE M. EVANS P.E.

MARCH 02, 2021 DATE

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# ONONDAGA COUNTY
# LIVERPOOL, NEW YORK

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## List of Acronyms

| | |
|---|---|
| ASP | Analytical Services Protocol |
| CAMP | Community Air Monitoring Plan |
| CLP | Contract Laboratory Program |
| COC | Certificate of Completion |
| COPC | Contaminant of Potential Concern |
| DER | Division of Environmental Remediation |
| EC | Engineering Control |
| ECL | Environmental Conservation Law |
| ELAP | Environmental Laboratory Approval Program |
| EWP | Excavation Work Plan |
| FSP | Field Sampling Plan |
| HASP | Health and Safety Plan |
| IC | Institutional Control |
| NYS | New York State |
| NYSDEC | New York State Department of Environmental Conservation |
| NYSDOH | New York State Department of Health |
| NYCRR | New York Codes, Rules and Regulations |
| PRR | Periodic Review Report |
| QA/QC | Quality Assurance/Quality Control |
| QAPP | Quality Assurance Project Plan |
| RAO | Remedial Action Objective |
| RAWP | Remedial Action Work Plan |
| RSO | Remedial System Optimization |
| SMP | Site Management Plan |
| USEPA | United States Environmental Protection Agency |
| VCA | Voluntary Cleanup Agreement |
| VCP | Voluntary Cleanup Program |
| WBBB | West Branch of Bloody Brook |

# ES EXECUTIVE SUMMARY

The following provides a brief summary of the controls implemented for the site, as well as the inspections, monitoring, maintenance, and reporting activities required by this Site Management Plan (SMP).

| | |
|---|---|
| Site Identification: | Bloody Brook Site, Onondaga County, New York, Former Voluntary Cleanup Program (VCP) Index No. D7-0001-01-09; Released March 21, 2018 |

| | |
|---|---|
| Institutional Controls: | 1. Provisions to address residual cadmium concentrations remaining at the site after remedial activities, as discussed in detail in Section 3.2. |
| | 2. All engineering controls must be inspected at a frequency and in a manner defined in the SMP. |
| Engineering Controls: | 1. Soil cover placed over a demarcation layer. |

| Inspections: | Frequency |
|---|---|
| 1. Site-Wide | Annually |
| Monitoring: | |
| 1. Restoration Monitoring | Annually for five years (see Section 4.2 for schedule) |
| 2. Biological Monitoring | Two, four, and six years following remediation (2018, 2020, and 2022) |
| Maintenance: | |
| 1. Erosion | As needed |
| 2. Vegetation | As needed |
| Reporting: | |
| 1. Restoration Monitoring Report | Annually for five years |
| 2. Biological Monitoring Report | Two, four, and six years following remediation (2018, 2020, and 2022) |
| 3. Periodic Review Report | Annually |

Further descriptions of the above requirements are provided in detail in the latter sections of this SMP.

# 1 Introduction

## 1.1 General

This Site Management Plan (SMP) is a required element of the remedial program for the Bloody Brook site located in Liverpool, New York ("site"). See Figure 1. At the time this SMP was first developed, the site was in the New York State (NYS) Voluntary Cleanup Program (VCP) Index No. D7-0001-01-09, which was administered by New York State Department of Environmental Conservation (NYSDEC). Lockheed Martin Corporation (Lockheed Martin) entered into a Voluntary Cleanup Agreement (VCA) on July 20, 2002 with the NYSDEC to remediate the site. A Release and Covenant Not to Sue was issued by NYSDEC on March 21, 2018. Figure 2 shows the boundaries of the site.

After completion of the remedial work, some contamination was left at this site, which is hereafter referred to as "residual cadmium." Institutional and engineering controls (ICs and ECs) have been incorporated into the site remedy to control exposure to residual cadmium to ensure protection of public health and the environment.

This SMP was prepared to manage residual cadmium at the site. This plan has been approved by the NYSDEC in consultation with the New York State Department of Health (NYSDOH), and compliance with this plan is required per the March 2014 Decision Document for the Bloody Brook Voluntary Cleanup Program (2014 Decision Document). This SMP may only be revised with the approval of the NYSDEC.

It is important to note that:

- This SMP details the site-specific implementation procedures that are required. Failure to properly implement the SMP is a violation of the 2014 Decision Document, which is grounds for revocation of the Certificate of Completion (COC);
- Failure to comply with this SMP is also a violation of Environmental Conservation Law and 6NYCRR Part 375, and thereby subject to applicable penalties.

All reports associated with the site can be viewed by contacting the NYSDEC or its successor agency managing environmental issues in New York State. A list of contacts for persons involved with the site is provided in Appendix A of this SMP.

This SMP was prepared by AECOM, on behalf of Lockheed Martin, in accordance with the requirements of the NYSDEC's DER-10 ("Technical Guidance for Site Investigation and Remediation"), dated May 2010, and the guidelines provided by the NYSDEC. This SMP addresses the means for implementing the ICs and ECs that are required by the 2014 Decision Document for the site.

## 1.2 Revisions

Revisions to this plan will be proposed in writing to the NYSDEC project manager. Revisions will be necessary upon, but not limited to, the following occurring: a change in media monitoring requirements, post-remedial removal of contaminated soil, or other significant change to the site conditions. The NYSDEC will provide a notice of any approved changes to the SMP and will append these notices to the SMP that is retained in its files.

## 1.3 Regulator Notifications

Notifications will be submitted by Lockheed Martin or their representative to the NYSDEC, as needed, in accordance with NYSDEC's DER – 10 for the following reasons:

- 60-day advance notice, following Lockheed Martin receiving notification or otherwise obtaining information, of any proposed changes in site use that are required under the terms of the 2014 Decision Document, 6NYCRR Part 375, and/or Environmental Conservation Law.
- 7-day advance notice of any field activity associated with the site management activities.
- Within 14 days following Lockheed Martin being notified of any activity that is anticipated to encounter remaining contamination, Lockheed Martin or their representative will notify the NYSDEC.
- Notice within 48-hours of any damage or defect to the foundation, structures, or EC that reduces or has the potential to reduce the effectiveness of an EC, and likewise, any action to be taken to mitigate the damage or defect.
- Verbal notice by noon of the following day of any emergency, such as a fire; flood; or earthquake that reduces or has the potential to reduce the effectiveness of ECs in place at the site, with written confirmation within 7 days that includes a summary of actions taken, or to be taken, and the potential impact to the environment and the public.
- Follow-up status reports on actions taken to respond to any emergency event requiring ongoing responsive action submitted to the NYSDEC within 45 days describing and documenting actions taken to restore the effectiveness of the ECs.

Any change in the ownership of the site or the responsibility for implementing this SMP will include the following notifications:

- At least 60 days prior to the change, the NYSDEC will be notified in writing of the proposed change. This will include a certification that the prospective purchaser/Remedial Party has been provided with a copy of the 2014 Decision Document and all approved work plans and reports, including this SMP.
- Within 15 days after the transfer of all or part of the site, the new owner's name, contact representative, and contact information will be confirmed in writing to the NYSDEC.

Table 1 includes contact information for the above regulator notifications. The information on this table will be updated as necessary to provide accurate contact information. A full listing of site-related contact information is provided in Appendix A.

# 2 Summary of Previous Investigations and Remedial Actions

## 2.1 Site Location and Description

The site is located in the Town of Salina, and a portion of the site is located in the Village of Liverpool, Onondaga County, New York. Site location and area maps are included as Figures 1 and 2, respectively. Final Record Drawings based on a 2017 topographic survey of the site after completion of all restoration activities are provided in Appendix B. The site consists of the West Branch of Bloody Brook (WBBB) and Bloody Brook from below the confluence of the West and Middle Branches of Bloody Brook (collectively referred to as WBBB) and soil surrounding the WBBB and Bloody Brook downstream of the Thruway and ending at the upstream side of Onondaga Lake Parkway. This portion of the site is approximately 5,000 feet long and flows through lands of varied use including a wooded area, a residential area, an apartment complex, and a commercial/light industrial area.

Upstream of the site, the WBBB originates in a wetland area surrounded by industrial properties. This wetland is located between Vine Street and Crossroads Industrial Park. The WBBB flows southward and is routed through culverts that transmit the WBBB underneath Electronics Business Park and the Thruway. Downstream of the site, Bloody Brook flows under Onondaga Lake Parkway and discharges into Onondaga Lake. The WBBB and Bloody Brook obtains a substantial fraction of its flow from storm water runoff from surrounding areas.

## 2.2 Site History and Development

An understanding of the history of the area is necessary to understand the distribution of cadmium at the site. This section provides relevant historical information in four subsections for ease of presentation (Electronics Park Development; History of Surrounding Area; Bloody Brook Location History; and Bloody Brook Drainage District).

### 2.2.1 Electronics Park Development

In August 1944, General Electric Company (GE) began construction of the Electronics Park facility on 180 acres of farm land in Liverpool, New York. Building EP-7 was the first building completed in April 1947. The remaining buildings in the original complex were completed by mid-1948. In 1993, Martin Marietta Corporation acquired GE's Aerospace business, including the Electronics Park facility. In 1995, Martin Marietta Corporation merged with Lockheed Corporation to form Lockheed Martin. From the construction of the Electronics Park facility to the present, operations at the facility were continuous.

On September 27, 1996, Lockheed Martin transferred ownership of the Electronics Park land and buildings to the Empire State Development Corporation (ESDC). ESDC then established the Electronics Business Park and leased the land and nine of the buildings to the local economic development agency, CEO-Centerstate Corporation for Economic Opportunity (previously named Metropolitan Development Association). At this time, Lockheed Martin is the largest tenant at the Electronics Business Park. The property is currently managed by Electronics Park, LLC.

### 2.2.2 History of Surrounding Area

The information presented in this section was obtained from the following sources: historical maps; aerial photographs; publicly available government resources; title information; and local historical societies.

The site has been divided into four distinct areas, based on land use, including a wooded area, a residential area, an apartment complex area, and a commercial/light industrial area. In addition to these areas, the Thruway borders the northern edge of the site. The Thruway is not part of the site; however, the history of its construction provides insight into the history of the site. A map illustrating the location of these areas within the site is included as Figure 2. Aerial photographs that were used in this summary are provided as Appendix C.

#### *2.2.2.1 New York State Thruway*

The WBBB is directed through culverts that begin north of Electronics Park and convey it beneath Electronics Park and the Thruway. According to the New York State Thruway Authority, construction began on this section of the Thruway on July 11, 1946 and was completed on October 11, 1947. The section of the Thruway from Westmoreland, New York to Rochester, New York, which includes the portion that borders the northern edge of the site, was opened in 1954.

#### *2.2.2.2 Wooded Area*

In 1938, the wooded area as well as the Electronics Park facility and the remainder of the site appear to have been farm land. Two agricultural fields were present on either side of the WBBB where the residential development is currently located. A dirt road can be seen connecting these fields and passing over the WBBB.

In 1951, following the construction of the Thruway and the Electronics Park facility, the agricultural fields and the road connecting them were no longer present. A culvert had been installed, allowing surface water within the WBBB to flow underneath the Thruway. It appears that the culvert was installed slightly west of the former channel location. A drainage swale installed during the construction of the Thruway ran along the southern side of the Thruway, apparently directing flow easterly and connecting with the main channel of the WBBB near the discharge end of the culvert. According to deed records, ownership of the wooded area was transferred to the Town of Salina in 1968.

#### *2.2.2.3 Residential Area*

Development of the residential area surrounding the WBBB appears to have been completed between 1951 and 1972. The culverts directing flow underneath Sunflower Drive and Brookview Lane appear to have been installed between 1951 and 1959. The culvert directing flow beneath Floradale Road appears to have been installed between 1959 and 1966. The homes along the WBBB appear to have been constructed as follows:

- Homes on the east side of the WBBB (excluding Floradale Road) were completed between 1951 and 1966;
- Homes on the west side of the WBBB south of the wooded area (excluding Floradale Road) were completed between 1959 and 1967;
- Homes along Floradale Road were completed between 1966 and 1972; and
- Homes on the west side of the wooded area were completed between 1959 and 1978.

Aerial photographs (Appendix C) and observations of site conditions indicate that a substantial amount of filling (approximately 3 to 15 feet) and grading was conducted during the construction of these residential areas. Furthermore, the United States Department of Agriculture Soil Survey for Onondaga County references a "Cut and Fill area" (USDA, 1977) in this area. Cut and Fill refers to

a construction process used to remove soil from higher elevations and placing it at lower elevations of an area and is used to properly slope or grade an area.

#### *2.2.2.4 Apartment Complex*

In 1938, there are several buildings on either side of Old Liverpool Road in this area. Clearing for the apartment complex occurred between 1959 and 1966. The apartment complex was constructed between 1967 and 1972.

#### *2.2.2.5 Commercial/Light Industrial Area*

The commercial/light industrial area mostly consists of three large properties described in this section. The building currently on the property zoned as light industrial located along Old Liverpool Road was constructed between 1981 and 1988. Based upon aerial photographs and a newspaper article announcing the start of construction activities, the former Lakeshore Drive-In Theater was constructed between 1956 and 1959. Based upon observations in the field and the newspaper article, a significant amount of fill material (approximately 4 to 9 feet) was imported in order to raise the level of the land for the construction. The source of this fill material is unknown. The drive-in theater operated until it was closed in 1990. Shortly thereafter, the theater was demolished, and the strip mall currently present on the property was constructed. The Liverpool Pump Station located between the railroad tracks and Onondaga Lake Parkway was constructed in 1960. The original pump station was expanded by addition of a holding tank between 1984 and 1988 and again in 2005 by the addition of a second, larger holding tank located on the north side of the railroad track across from the former drive-in theater.

### 2.2.3 Bloody Brook Location History

The approximate original course of the WBBB and Bloody Brook (1947 brook centerline) is illustrated on Figure 3. The original course of the WBBB and Bloody Brook was derived based upon interpretation of data obtained from historical topographic maps, historical aerial photographs, and site data (soil classification and soil sample analytical data). Five major modifications were made to the path of the brook channel during the development of the surrounding areas.

### 2.2.4 Bloody Brook Drainage District

Development in the vicinity of the WBBB occurred at an exceptionally fast rate during the 1950s and 1960s. By the late 1960s, the flood capacity of the WBBB had been far exceeded by the amount of new storm water drainage resulting from development in the area. In response to the flooding, Onondaga County commissioned Calocerinos & Spina Consulting Engineers of Syracuse, New York to perform a drainage basin study (*Bloody Brook Drainage Basin Study*, January 1972) for the entire Bloody Brook, including the WBBB. The purpose of the study was to present the current conditions of the drainage basin and to evaluate options and identify a means to improve conditions in the future. The report recommended the formation of the Bloody Brook Drainage District (Drainage District). The Drainage District included all branches of Bloody Brook and formed a funding mechanism under which Onondaga County could complete various improvements and maintain the drainage capacity of Bloody Brook. Following the establishment of the Drainage District, permanent rights-of-way and easements were obtained by Onondaga County from adjacent land owners. The Drainage District easement was thereby established allowing Onondaga County personnel access to Bloody Brook for various projects. The Drainage District easement within the site is illustrated on Figure 3.

Since the formation of the Drainage District, Onondaga County has funded several projects designed to improve and maintain drainage. These projects have ranged from installing erosion controls (flagstone, concrete, gabion baskets, etc.), to minor channel relocations, to reshaping of channel side banks, and installation and replacement of culverts. In addition to these projects, Onondaga County has periodically removed sediment deposits from the stream to maintain drainage capacity. These deposits typically accumulate around the culverts at the road crossings.

According to discussions with Onondaga County officials, the removed sediments were typically placed within the Drainage District easement. Reportedly, Onondaga County personnel were instructed to discontinue this practice after cadmium was found in the sediments of the stream and in the adjacent soils.

## 2.3 **Current Physical Setting and Land Use**

### 2.3.1 West Branch of Bloody Brook and Bloody Brook

The WBBB is relatively small in the upper section near the Thruway (approximately 4 to 6 feet wide, 1 to 2 feet deep) and increases in size (approximately 10 to 15 feet wide, 2 to 4 feet deep) closer to Onondaga Lake Parkway. Bloody Brook south of the Thruway is located within segments of property owned by the Town of Salina, various private owners, and Onondaga County. The bottom of the stream is a clay substrate which had some overlying non-cohesive sediments that accumulated through natural brook flow since the 1997 sediment removal project was completed. The stream is primarily used for storm water management and is included in the Drainage District. The stream located within the site is described in more detail below.

### 2.3.2 Wooded Area

This portion of the site extends approximately 1,050 feet south and downstream of the Thruway and is undeveloped and difficult to access. This area is approximately 6.25 acres, is irregularly shaped and relatively wide (i.e., greater than 150 feet). The east side of the WBBB has relatively steep slopes along wooded areas leading to residential properties. The west bank has a gentler slope along wooded and brush-vegetated areas leading to residential properties. The presence of fences on residential properties, steep slopes leading to the WBBB, dense vegetation, and wetlands limits access to this area. The wooded area is entirely within the Drainage District easement and is owned by the Town of Salina. Storm water drainage from the surrounding development enters the WBBB from the west via a drainage channel at the southern end of the wooded area.

### 2.3.3 Residential Area

The residential area surrounds the wooded area commencing at the Thruway and extends along the WBBB to the downstream side of Floradale Road. The portion of the residential area that is directly adjacent to the WBBB (from the southern end of the wooded area to the downstream side of Floradale Road) is approximately 1,300 feet in length. In this area, the WBBB is located within the Drainage District easement on property owned by the Town of Salina and Onondaga County. The Drainage District easement is typically 40 feet wide in this area and is maintained (i.e., mowed) by Onondaga County. This portion of the WBBB has been significantly modified to increase storm water capacity and to reduce erosion. Box culverts, installed in 2015, transmit the WBBB beneath the road crossing at Brookview Lane, Sunflower Drive, and Floradale Road.

In the residential area, residential properties abut the Drainage District easement. Many of these residences have fences installed on their properties which limit access and separate the Drainage District easement from the residential properties.

### 2.3.4 Apartment Complex Area

The apartment complex is located on Pearl Street and Town Gardens Drive between the residential properties along Floradale Road and the commercial properties along Old Liverpool Road. The apartment complex borders approximately 1,100 feet along the WBBB. The Drainage District easement is typically 40 feet wide and is maintained (e.g., mowed) by Onondaga County. A double barrel culvert transmits the WBBB under a paved apartment parking area at Pearl Street, and a

triple barrel culvert transmits the WBBB beneath the road crossing at Town Gardens Drive. In 2016 the corrugated culvert barrels were lined as an improvement project in coordination with Onondaga County.

Upstream of the Pearl Street culverts, commercially-landscaped and paved parking areas abut the Drainage District easement on both sides of the WBBB. Downstream of the Pearl Street culverts, the apartment complex borders the east side of the WBBB. Commercially landscaped areas abut the Drainage District easement. The confluence of the West and Middle Branches of Bloody Brook, creating Bloody Brook, occurs approximately 200 feet upstream of Old Liverpool Road.

### 2.3.5 Commercial/Light Industrial Area

The commercial/light industrial area consists of portions of the commercial properties that are adjacent to the WBBB and Bloody Brook and located on Old Liverpool Road and Onondaga Lake Parkway. The Drainage District easement varies between 40 and 60 feet wide in this area. A combination box and double barrel culvert system transmit Bloody Brook beneath the road crossing at Old Liverpool Road. A triple barrel culvert transmits Bloody Brook beneath the railroad bed that lies between Old Liverpool Road and Onondaga Lake Parkway.

Between the Pearl Street and Town Gardens Drive culverts, along the back side of the commercial properties located on Old Liverpool Road, commercially-landscaped and paved parking areas abut the Drainage District easement on the west side of the WBBB. Between the confluence with the Middle Branch of Bloody Brook and Old Liverpool Road, commercially-landscaped areas abut the Drainage District easement on both sides of Bloody Brook.

Upstream of the railroad crossing, the abutting land uses include a commercial office building on the east side and a retail strip mall to the west. West of Bloody Brook upstream of the railroad crossing (the former Lakeshore Drive-In Theater), there was visible evidence of non-site-related filling and disposal activities. Material observed in this area includes construction and demolition debris. The area east of Bloody Brook and upstream of the railroad crossing is isolated and relatively inaccessible.

Downstream of the railroad crossing, an unnamed tributary joins Bloody Brook from the west near Onondaga Lake Parkway. Periodic overflows from the Liverpool Pump Station are directed to this tributary. The area east of Bloody Brook is a mix of wooded and landscaped park areas (near Onondaga Lake Parkway).

## 2.4 **Geology and Hydrogeology**

General characterization observations of the soil remaining at the site obtained during sampling investigations are included in Tables 2A through 2D. The general profile from top down consists of a sand and silt mixture, followed by a dense clay and/or glacial till. The elevation of the clay/till appears to generally remain constant with the thickness of the overlying silt/sand varying as surface elevations fluctuate. The location of the former brook channel was typically confirmed by the presence of an organic layer. The composition of the organic layer varied and was generally characterized by the presence of root structures in some locations and highly organic black peat in other locations. This organic layer varied in thickness from less than 1 inch to up to 3 feet. Small scale variations (i.e., thin layers of soil not representative of this generalized profile) could be seen in several locations. The presence of substantial amounts of imported fill material including construction and demolition debris at the former Lakeshore Drive-In Theater and the presence of sand/shell mixtures at the southern end of the site near Onondaga Lake Parkway were noted.

A shallow water bearing zone was noted within the silty sands at the site during the soil sampling investigations. The depth to water in this zone varies depending upon surface elevation. The clay/till layer acts as an aquitard. In accordance with the NYSDEC and United States Army Corp of Engineers permitting for the remediation construction activities in the WBBB and its floodplain, the stream habitat of WBBB was upgraded by constructing 1.31 acres of replacement wetland habitat.

During the May 2017 inspection, a total of 1.57 acres of wetland were found. Thus, an excess of 0.26 acres of wetlands currently occupy the site in the wooded area.

## 2.5 Investigation and Remedial History

Cadmium is a naturally occurring metallic element that is present throughout the environment in soil, plants, and animals. Cadmium has many uses in industry and is found in consumer products such as an ingredient in batteries, paint, metal coatings and plastics. Lockheed Martin examined records relating to historic manufacturing processes at the Electronics Park facility positioned upstream from the portion of the West Branch of Bloody Brook located within the site. These records show that cadmium was historically used at the Electronics Park facility, but no evidence was found of a cadmium release. While a direct connection between site conditions and the Electronics Park facility could not be identified, Lockheed Martin agreed to investigate and remediate the site under the New York State Voluntary Cleanup Program.

The following narrative provides a remedial history timeline and a brief summary of the available project records to document key investigative and remedial milestones for the site. Full titles for each of the reports referenced below are provided in Section 8.0 - References.

### 2.5.1 Sampling and Remedial History

Various investigations other than soil sampling have been completed at the site. Those investigations including biota, surface water, and sediment sampling along the WBBB and Bloody Brook have been performed by NYSDEC, Lockheed Martin, and Onondaga County from September 1994 through January 2008. Investigations of water quality and biota within the WBBB were initiated by NYSDEC in September 1994 (NYSDEC, 1996). In April 1996, NYSDEC shared the results of the 1994 investigations with Lockheed Martin. Lockheed Martin conducted sediment and surface water sampling from May 1996 through May 1999 and additional sediment sampling in January 2008 in support of the 2008 Interim Remedial Measure (IRM). In addition to the biota, surface water, and sediment investigations, Lockheed Martin conducted soil sampling from November 2001 through September 2015. Lockheed Martin undertook these site investigations pursuant to a series of work plans approved by NYSDEC.

As requested by NYSDEC, early studies typically focused on PCBs, cadmium, copper, and mercury. In 1997 under NYSDEC oversight, Lockheed Martin removed all sediments from within the 200-foot long culvert beneath the Thruway and the adjacent downstream 750-foot segment of the WBBB (BBL, 1997). In January 1997, NYSDEC concluded that the concentrations of cadmium were elevated in the WBBB sediments, and PCBs, copper, and mercury did not pose a concern (NYSDEC, 1997). In 1999, a specific set of sediment samples was collected and analyzed for a more comprehensive list of organic and inorganic constituents. The results of the comprehensive analyses supported NYSDEC focus on cadmium, which became the constituent of potential concern (COPC) for the site.

Below is a summary of the sampling and remedial activities that were completed at the site.

#### *2.5.1.1 Biota, Surface Water, and Sediment Sampling*

Various biota, surface water, and sediment sampling activities have been conducted at the site since 1994 as described below:

- In September 1994, crayfish samples were collected by NYSDEC from locations along Bloody Brook and analyzed for inorganic compounds and PCBs.
- From October 1995 to May 2000, Lockheed Martin and NYSDEC collected surface water samples from various locations along Bloody Brook. Analytes included inorganic compounds and PCBs.

- From May 1996 to May 1999, Lockheed Martin and NYSDEC collected sediment samples within Bloody Brook. Samples were collected for various analyses including inorganic compounds, PCBs, total organic carbon, total petroleum hydrocarbons, volatile and semi volatile organic compounds, pesticides, and herbicides.
- In January 2008, Lockheed Martin collected five sediment samples from culverts along the WBBB to support the IRM. These samples were analyzed for Resource Conservation and Recovery Act characteristics and PCBs.
- In summer 2014, 2018, and 2020, samples were collected from the brook for biological monitoring. The 2014 samples serve as the pre-remediation baseline results, and the 2018 and 2020 samples are post-remediation results following completion of the remedy. Additional samples will be collected in summer 2022, as will be discussed in more detail below.

#### *2.5.1.2 Soil Sampling and Remedial History*

Soil sampling and remedial activities have been conducted at the site since 1996 as summarized below:

- In October 1996, Onondaga County collected five soil samples, from 0- to 6-inches in depth, in conjunction with the installation of the gabions north of Brookview Lane (OCDDS-4, OCDDS-5, OCDDS-6, OCDDS-7, and OCDDS-10).
- As described in the *West Branch of Bloody Brook Sediment Removal Certification Report* (BBL, 1997), in April 1997, Lockheed Martin collected two soil samples (Pre-SS-P1 and Post-SS-P1) from the area within the easement which was used to construct a stockpile area for sediment being removed during the 1997 sediment removal project.
- In 1997, under NYSDEC oversight, Lockheed Martin completed a project to remove all sediments from within the 200-foot long culvert beneath the Thruway and the adjacent downstream 750-foot segment of the WBBB. This removal addressed elevated concentrations of cadmium and polychlorinated biphenyls (PCBs) in this segment of the WBBB. The removed material was transported off site to Seneca Meadows Landfill located in Waterloo, New York (a New York State permitted landfill). Subsequent sediment sampling and analyses indicated that PCBs were not of concern in the brook channel downstream of this segment.
- In October 2001, NYSDEC collected two soil samples (EPSOIL-2 and EPSOIL-3) between the Thruway and the confluence of the West and Middle Branches: one sample upstream of Electronics Park on the WBBB (EPSOIL-1), and one downstream of the railroad tracks below the confluence of the West and Middle Branches of Bloody Brook (EPSOIL-4). These samples were collected within the 0- to 12-inch depth interval. Additionally, NYSDEC has periodically split samples collected by Lockheed Martin during later sampling events (described below).
- In November 2001, Lockheed Martin collected soil samples from 12 locations between the Thruway and the confluence of the West and Middle Branches (SB-01 through SB-12). Additionally, Lockheed Martin collected soil samples at six other locations downstream of the confluence of the West and Middle Branches (SB-13 through SB-18). These samples were collected from within the 0- to 12-inch depth interval and, where possible, between the 12- and 24-inch depth interval.
- In June 2002, Lockheed Martin collected shallow soil samples from 32 locations from 0- to 2-inches in depth between the Thruway and the confluence of the West and Middle Branches (SB-19 through SB-50). These samples were collected in accordance with NYSDEC-approved *Shallow Side Bank Surface Soil Sampling and Analysis Work Plan* (IT Corporation, 2002).
- In November 2002, Lockheed Martin collected soil samples from 48 locations (SB-51 through SB-85 and SB-201 through SB-215). Sampling depths ranged from surface samples (0- to 2-inches) to 12 feet below ground surface (bgs). A total of 181 samples were collected. These samples were collected in accordance with NYSDEC-approved *Phase III Side Bank Soil Investigation Work Plan* (Shaw, 2002).
- In October and November 2003, Lockheed Martin collected soil samples from 82 locations. Sampling depths ranged from surface samples (0- to 2-inches) to 16 feet bgs. A total of 731

soil samples were collected. These samples were collected in accordance with NYSDEC-approved *Phase IV Side Bank Soil Investigation Work Plan* (Shaw, 2003).

- In November 2003, Onondaga County collected 20 soil samples from 10 locations as part of the Liverpool Pump Station Improvement Project. Samples were collected at various depths.
- In April 2004, Lockheed Martin collected soil samples from 26 locations (borings SB-435 through SB-459 and SD-31). Sampling depths ranged from surface samples (0- to 2-inches) to 11.5 feet bgs. A total of 124 soil samples were collected. These samples were collected in accordance with NYSDEC-approved *Phase IV-A Side Bank Soil Investigation Work Plan* (Shaw, 2004).
- In December 2007, Lockheed Martin collected soil samples from five locations in the area between the existing WBBB channel and the former brook channel (borings SSSWP-1 through SSSWP-5). A single 2-foot core was collected from each of the five locations, and the cores were sampled from the 0- to 6-inch and 6- to 24-inch depth increments. These samples were collected in accordance with NYSDEC-approved *Supplemental Soil Sampling Work Plan* (ARCADIS BBL, 2007).
- Lockheed Martin conducted sediment removal from within the Brookview Lane, Sunflower Drive, Floradale Road, and Pearl Street culverts in 2008 as a NYSDEC-approved IRM. This work was completed at the request of the Onondaga County to increase the hydraulic capacity of the drainage system in the area. Approximately 91 tons of sediment were removed from the IRM project area (nine truckloads). The excavated sediment was transported off site to the Waste Management High Acres Landfill in Fairport, New York (a New York State permitted landfill).
- In August and September 2009, Lockheed Martin collected and analyzed 75 soil samples from 16 locations to support an Onondaga County Department of Water Environment Protection (OCDWEP) storm water drainage improvement project. Sampling depths ranged from 1 foot to 11 feet bgs. After reviewing the analytical results with NYSDEC and NYSDOH, Lockheed Martin removed and disposed of off-site at a permitted landfill approximately 1 cubic yard of soil from locations containing cadmium concentrations above 10 mg/kg in the top 4 feet in residential areas and in the top 2 feet in the Drainage District easement. The soil removal allowed for the installation of a drainage line needed to complete the storm water upgrades. The sampling and removal activities were completed in accordance with NYSDEC-approved work plans written for individual properties and are summarized in the report titled *OCDWEP Storm Water Drainage Improvement Project Soil Sampling Test Results* (Shaw, 2009b).
- In April, May, and August 2011, Lockheed Martin collected soil samples from 164 locations. Sampling depths ranged from 6 inches to 16 feet bgs. A total of 773 soil samples were collected, and 525 soil samples were analyzed. Those samples were collected in accordance with NYSDEC-approved *Design Soil Investigation Work Plan* (Shaw, 2011).
- Between 2013 and 2015, Lockheed Martin collected several additional soil samples on private properties as part of a pre-design investigation to further characterize the extent of cadmium distribution and to establish the excavation limits. Samples were also collected from soil borings in the roadways adjacent to the culverts crossing Brookview Lane, Sunflower Drive, Floradale Road, Pearl Street, and Town Gardens Drive.
- Between 2014 and 2017, remedial construction activities were completed for the site in accordance with the 2014 Decision Document, the 2013 *Remedial Action Work Plan* (RAWP) (AECOM, 2013), and subsequent annual Construction Work Plans. A 2018 Final Engineering Report (FER) documents the site's completed remedial actions.

Prior to site remediation, concentrations of cadmium detected in soil samples at the site varied from below laboratory detection limits (less than 1 mg/kg) to 5,350 mg/kg. The depth to the observed cadmium ranged from at the surface to 14 feet bgs. Cadmium concentrations were, in general, significantly higher on the northern portion of the site and decrease substantially towards the south end of the site.

Soil analytical results for soils remaining on the site post-remediation are summarized in Tables 2A, 2B, 2C, and 2D, and soil sample locations are shown on Figures 3A, 3B, and 3C. The "Figure Coordinate" column in the tables corresponds to the grid system shown on the figures.

### 2.5.2 Mobility and Distribution of Cadmium

This section presents a discussion on the fate and transport (mobility) of cadmium as well as an overview of the mechanisms affecting the cadmium distribution at the site.

Cadmium within soil buried below the ground surface adjacent to the stream is not mobile due to its chemical and physical characteristics. According to the Agency for Toxic Substances and Disease Registry (ATSDR), the general mobility and partitioning of cadmium among media (i.e., movement from soil to groundwater or surface water or the reverse) is dependent on physical and chemical factors within the environment. Two site factors that reduce the mobility of cadmium in soil are pH and organic matter content. Cadmium adsorption in soil generally increases with higher pH, and the presence of organic matter leads cadmium to form insoluble complexes (ATSDR, 1999).

The pH in the vicinity of the stream is elevated partly because bedrock at the site is dominated by carbonate minerals. These minerals act to neutralize acidic water and raise the pH of area groundwater and surface water. The measured pH in the surface water of the brook averages around 8.0. In addition, soil in the vicinity of the former brook channel, which has the highest cadmium concentrations, contains a high organic fraction, and in some cases is characterized as peat. The highly organic soil, combined with elevated pH, binds the cadmium to the soil and reduces its mobility in the subsurface.

In the aquatic environment, adsorption of cadmium by humic substances and other organic complexing agents plays a dominant role in transport and partitioning (ATSDR, 1999). As evidenced by sampling data from the site, cadmium precipitation and sorption to mineral surfaces and organic materials account for the lack of dissolved cadmium in the water column, thus water media were not further considered for the site.

Three primary mechanisms appear to have contributed to the distribution of cadmium observed within the soil adjacent to the stream. These mechanisms include the natural sediment movement within the stream channel, relocation of portions of the WBBB and Bloody Brook, and maintenance activities conducted on the brook.

The first mechanism influencing soil adjacent to the stream relates to the natural movement of cadmium adsorbed to sediment and soil by erosion and sedimentation. Natural flow within a water body will result in the erosion and deposition of sediments, including areas along and on top of the channel side banks during high flow events. After defining the historical course of the stream, the side banks of the original brook channel found in the northern portion of the site appeared to have been shallow allowing the brook to overflow the historical channel and create a wide floodplain where eroded sediment was deposited during periods of high flow. The mechanism of erosion and sedimentation along with the shape and size of the historical brook channel explains why higher cadmium concentrations are found in the northern portion of the site. Along the southern portions of the brook, the erosion control measures implemented to minimize movement of sediment reduced the area of the floodplain and deposition of cadmium.

The second mechanism is a series of stream relocations that were made to the brook channel beginning in the 1940s and proceeding into the 1970s. The distribution of cadmium follows the location of the former brook channel and its floodplain. These floodplain deposits were covered with soil/fill during the process of development, at depths of up to 15 feet bgs.

The third mechanism influencing soil adjacent to the stream relates to maintenance activities in the stream. Reportedly, sediments containing cadmium were periodically removed from the stream and placed on the adjacent banks during the installation of erosion controls and maintenance activities conducted to maintain the drainage capacity of the stream.

## 2.6 Remedial Action Objectives

The Remedial Action Objectives (RAOs) for the site as listed in the 2014 Decision Document are as follows for soil and sediment.

Soil

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil.

RAOs for Environmental Protection

- Prevent impacts to biota from ingestion/direct contact with soil causing toxicity or impacts from bioaccumulation through the terrestrial food chain.

Sediment

RAOs for Public Health Protection

- Prevent direct contact with contaminated sediments.

RAOs for Environmental Protection

- Prevent impacts to biota from ingestion/direct contact with sediments causing toxicity or impacts from bioaccumulation through the marine or aquatic food chain.
- Restore sediments to pre-release/background conditions to the extent feasible.

## 2.7 Excavation of Contaminated Soil and Sediment

Per the 2014 Decision Document and to address the site RAOs, excavation and off-site disposal of contaminated soil and sediment included the following:

- all sediment from the WBBB and Bloody Brook from below the confluence of the West and Middle Branches of Bloody Brook, between the New York State Thruway and the Onondaga Lake Parkway;
- top two feet of side bank soil from the WBBB and Bloody Brook, from below the confluence of the West and Middle Branches of Bloody Brook, between the New York State Thruway and Old Liverpool Road;
- side bank soil from Bloody Brook between Old Liverpool Road and the Onondaga Lake Parkway with known cadmium concentrations greater than 4 mg/kg in the top two feet;
- the wooded/wetland area: soils in the top two feet with known cadmium concentrations greater than 4 mg/kg, and soils from two to six feet below grade with known cadmium concentrations greater than 100 mg/kg;
- residential properties: soils in the top two feet with known cadmium concentrations greater than 2.5 mg/kg, and soils from two to four feet below grade with known cadmium concentrations greater than 10 mg/kg;
- apartment complex area: soils in the top two feet with known cadmium concentrations greater than 4.3 mg/kg and soils from two to four feet below grade with known cadmium concentrations greater than 10 mg/kg;
- Drainage District easement: soils in the top two feet with known cadmium concentrations greater than 10 mg/kg; and

- former drive-in theater area: soils in the top two feet with known cadmium concentrations greater than 9.3 mg/kg where surface disposal of brook dredge spoils had previously occurred.

## 2.8 Remaining Soil Contamination

Analytical results for soil remaining on the site post-remediation are summarized in Tables 2A, 2B, 2C, and 2D, and soil sample locations are shown on Figures 3A, 3B, and 3C. The "Figure Coordinate" column in the tables corresponds to the grid system shown on the figures. Samples indicating the presence of residual cadmium, as defined below for the different site areas and land uses, are also identified in these tables and figures.

- Residential areas– 10 mg/kg for depths greater than 2 feet.
- Wooded area and sidebanks between Old Liverpool Road and Onondaga Lake Parkway (sidebanks being the top of rip rap) – 4 mg/kg in the top 2 feet and 10 mg/kg greater than 2 feet.
- Apartment complex property – 10 mg/kg greater than 2 feet.
- Commercial properties – 9.3 mg/kg in the top 2 feet and 10 mg/kg greater than 2 feet.
- Drainage District easement (including CSX property) – 10 mg/kg for depths greater than 2 feet.

# 3 Institutional and Engineering Control Plan

## 3.1 General

Since remaining contamination exists at the site, institutional controls (ICs) and engineering controls (ECs) are required to protect human health and the environment. This IC/EC Plan describes the procedures for the implementation and management of all IC/ECs at the site. The IC/EC Plan is one component of the SMP and is subject to revision by the NYSDEC.

This plan provides:

- A description of all IC/ECs on the site;
- The basic implementation and intended role of each IC/EC;
- A description of the controls to be evaluated during each required inspection and periodic review;
- A description of plans and procedures to be followed for implementation of IC/ECs, such as the implementation of the Excavation Work Plan (EWP) (as provided in Appendix D) for the proper handling of remaining contamination that may be disturbed during maintenance or redevelopment work on the site; and
- Any other provisions necessary to identify or establish methods for implementing the IC/ECs required by the site remedy, as determined by the NYSDEC.

## 3.2 Institutional Controls

A series of ICs is required by the 2014 Decision Document to: (1) implement, maintain and monitor EC systems; (2) prevent future exposure to remaining contamination; and, (3) limit the use and development of the site to appropriate uses for each area. Adherence to these ICs on the site is required by the 2014 Decision Document and will be implemented under this SMP. The IC boundaries are shown on Figure 4. These ICs include the following:

- All ECs must be maintained as specified in this SMP;
- All ECs must be inspected at a frequency and in a manner defined in the SMP.
- Data and information pertinent to site management must be reported at the frequency and in a manner as defined in this SMP;
- All future activities that will disturb remaining contaminated material must be conducted in accordance with this SMP;
- Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in this SMP;
- Operation, maintenance, monitoring, inspection, and reporting of any mechanical or physical component of the remedy shall be performed as defined in this SMP;
- Access to the site must be provided to agents, employees, or other representatives of the State of New York with reasonable prior notice to the property owner to assure compliance with the SMP.

Specific ICs as outlined in the 2014 Decision Document include the following:

- a provision for further investigation to refine the extent of contamination in the areas where access was previously hindered (e.g., any residential property where access is currently denied or future excavations that require the property owner to contact Lockheed Martin when digging at depths where residual cadmium has been or has the potential to be detected);
- maintaining site access controls and Department notification;

- tracking of property ownership changes to allow for the continued communication with owners;
- annual notification by Lockheed Martin to property owners of Lockheed Martin's offer to implement the remedy for property owners who chose to decline remedy implementation and/or sampling on their property;
- an annual reminder from Lockheed Martin to property owners with post remedy residual soil contamination of the presence of such residual contamination, and of Lockheed Martin's commitment to handle (excavate, manage and dispose) residual contaminated soils, as necessary and in accordance with the intended use of the property;
- a provision for Lockheed Martin to request that the Village of Liverpool Code Enforcement Office and the Town of Salina Department of Planning and Development timely inform Lockheed Martin of any building permits they grant for properties within the site boundaries where residual material remains post remedy. Details of this notification process with the Village of Liverpool and Town of Salina are provided in the following sections; and
- a provision for Lockheed Martin to request that the Town of Salina and Onondaga County timely inform Lockheed Martin of any Town or County plans to conduct intrusive maintenance work within the site boundaries (*e.g.*, soil disturbance work). Details of this notification process are provided in the contract Lockheed Martin entered into with Onondaga County on July 9, 2014 and included as Appendix E.

### 3.2.1 Institutional Control Notifications

As mentioned above and discussed in more detail in the subsections below, notifications are required as ICs for the site to prevent human and ecological contact with residual cadmium remaining on the site. These notifications are summarized in Table 3, and residual cadmium is defined in Section 2.8 for the different site areas and land uses.

#### *3.2.1.1 Village of Liverpool Code Enforcement Office and the Town of Salina Department of Planning and Development*

Following initial approval of this SMP in 2018, Lockheed Martin provided the Village of Liverpool Code Enforcement Office and the Town of Salina Department of Planning and Development detailed information regarding the locations and depths at which residual cadmium remains at certain properties within the site. The Village of Liverpool Code Enforcement Office and the Town of Salina Department of Planning and Development shall timely inform Lockheed Martin of any applications they receive for ground-intrusive building permits for properties within the site that contain residual cadmium. Sufficient notification must be made to Lockheed Martin so they can review the analytical soil data for the property(ies), obtain the appropriate resources to conduct any sampling that may be necessary and, depending on the results, coordinate with the property owner and obtain the resources to assist in the excavation and handling of disturbed soil. No permits shall be issued until Lockheed Martin notifies the Village of Liverpool Code Enforcement Office and the Town of Salina Department of Planning and Development of the results of their investigation. If there are no concerns, Lockheed Martin will recommend issuance of the permit with no further involvement. If results indicate elevated levels of cadmium (i.e., above the 2014 Decision Document soil cleanup objectives), Lockheed Martin will recommend issuance of the permit with the condition that Lockheed Martin will coordinate with the property owner to excavate and dispose of soil properly.

Notifications will be made as identified below, and Lockheed Martin will send annual reminder letters of these provisions to the Village of Liverpool Code Enforcement Office and the Town of Salina Department of Planning and Development.

- The Village of Liverpool Code Enforcement Office and the Town of Salina Department of Planning and Development will notify Lockheed Martin within 7 calendar days of receiving applications for ground-intrusive building permits for properties within the Site that contain

residual cadmium. The notification will include detailed information about the location and depth of soil disturbing activities.

- Lockheed Martin will review the analytical data and contact the owner of the property for which the permit is being requested and, if necessary, arrange for samples to be collected within 14 calendar days of the date they were notified by the Town of Salina or Village of Liverpool. Lockheed Martin will simultaneously contact the NYSDEC and NYSDOH and provide updates as activities continue.
- Lockheed Martin will collect soil samples in accordance with the Field Sampling Plan (FSP) and Quality Assurance Project Plan (QAPP), Appendices F and G, respectively. Samples will be sent to a NYSDOH Environmental Laboratory Accreditation Program (ELAP)-certified laboratory to be analyzed for cadmium and obtain results within 48 hours. Results will be reviewed and Lockheed Martin will report back to the Village of Liverpool Code Enforcement Office and Town of Salina Department of Planning and Development within 7 calendar days from receipt of the results. If soil analytical results indicate no elevated levels of cadmium above the concentrations defined in Section 2.8 for the different site areas and land uses, Lockheed Martin will recommend that the permit be issued.
- If soil analytical results indicate elevated levels of cadmium, Lockheed Martin will recommend issuance of the permit with the condition that Lockheed Martin will excavate and dispose of soil properly. Lockheed Martin will contact the property owner within 48 hours of notifying the Village of Liverpool Code Enforcement Office and Town of Salina Department of Planning and Development of the elevated levels of cadmium. A meeting will be scheduled with the property owner to discuss the soil excavation and disposal at a time and place that is convenient for them.
- Within 14 calendar days of notifying the property owner, Lockheed Martin will begin excavation activities to remove the soil on the property within the permit project area. Excavation activities will be conducted in accordance with the Excavation Work Plan (Attachment D).

Table 4 includes contact information for the above Village of Liverpool Code Enforcement Office and the Town of Salina Department of Planning and Development notifications. The information on this table will be updated as necessary to provide accurate contact information. A full listing of site-related contact information is provided in Appendix A.

#### *3.2.1.2 Lockheed Martin to Property Owners*

Following initial approval of the SMP in 2018, Lockheed mailed annual notices to property owners with post remedy residual soil, as defined in Section 2.8, as a reminder of the presence of residual contamination and of Lockheed Martin's commitment to handle (excavate, manage and dispose) residual contaminated soils, as necessary and in accordance with the intended use of the property. If the remaining residual cadmium is removed from the property, the annual notice letters would no longer be required.

Lockheed will also mail annual notices to property owners who chose to decline remedy implementation and/or sampling on their property with an offer to implement the remedy.

#### *3.2.1.3 Onondaga County*

Lockheed Martin entered into a contract with Onondaga County on July 9, 2014 that required the County to inform Lockheed Martin of any Town or County plans to conduct intrusive maintenance work within the site boundaries (*e.g.*, soil disturbance work). If the proposed County work has the potential to disturb residual cadmium, the County will notify and consult with Lockheed Martin with regards to the handling of soils (excavation, management, and disposal) contaminated with residual cadmium. The terms of this agreement are effective for up to 20 years with the option of extending the agreement. The fully executed agreement is included as Appendix E.

Table 5 includes contact information for the above Onondaga County notifications. The information on this table will be updated as necessary to provide accurate contact information. An annual reminder letter of the provisions of this contract will be sent to Onondaga County. A full listing of site-related contact information is provided in Appendix A.

## 3.3 **Engineering Controls**

### 3.3.1 Soil Cover

Exposure to remaining contamination at the site is prevented by a cover system placed over the site in the areas where soil was excavated. This cover system is comprised of a minimum of 24 inches of clean soil and other components as appropriate. Figure 5 presents the location of the engineering control area including soil cover and applicable demarcation layers. The Excavation Work Plan (EWP) provided in Appendix D outlines the procedures required to be implemented in the event the cover system is breached, penetrated or temporarily removed, and any underlying remaining contamination is disturbed. Procedures for the inspection of this cover are provided in the Monitoring and Sampling Plan included in Section 4.0 of this SMP. Any work conducted pursuant to the EWP must also be conducted in accordance with the procedures defined in a Health and Safety Plan (HASP) and associated Community Air Monitoring Plan (CAMP) prepared for the site and provided in Appendices H and D.

### 3.3.2 Criteria for Completion of Remediation/Termination of Remedial Systems

Generally, remedial processes are considered completed when monitoring indicates that the remedy has achieved the remedial action objectives identified by the decision document. The framework for determining when remedial processes are complete is provided in Section 6.4 of NYSDEC DER-10. The soil cover is a permanent control. The quality and integrity of this cover will be inspected at defined, regular intervals in accordance with this SMP in perpetuity.

# 4 Monitoring and sampling plan

## 4.1 General

This Monitoring and Sampling Plan describes the measures for evaluating the overall performance and effectiveness of the remedy. This Monitoring and Sampling Plan may only be revised with the approval of the NYSDEC. Where applicable, details regarding the sampling procedures, data quality usability objectives, analytical methods, etc. for all samples collected as part of site management activities are included in the Field Sampling Plan (FSP) and Quality Assurance Project Plan (QAPP) provided in Appendices F and G, respectively.

This Monitoring and Sampling Plan describes the methods to be used for evaluating site information periodically to confirm that the remedy continues to be effective in protecting public health and the environment.

To adequately address these issues, this Monitoring and Sampling Plan provides information on:

- Annual certification;
- Annual restoration monitoring to be completed for five years;
- Biological monitoring to be completed in 2022.

Reporting requirements are provided in Section 7.0 of this SMP, and Table 6 summarizes the monitoring and inspection schedule for the site.

## 4.2 Site Inspections

Annual site inspections will be performed by Lockheed Martin. Lockheed Martin will address any erosion issues within the Drainage District annually for five years, after which Onondaga County will resume all maintenance activities within the area including addressing erosion, removing accumulated sediments, and maintaining the integrity of the side banks. These activities will be completed in accordance with the contract that Lockheed Martin has executed with Onondaga County (Appendix E) and summarized in Section 3.

In the commercial and residential areas outside of the easement, vegetative restoration will be monitored annually for between one and five years, pursuant to NYSDEC approved work plans and property-specific access/restoration agreements between Lockheed Martin and the property owner. Effectiveness of the soil cover will be confirmed during the annual site inspections that will continue beyond the vegetation monitoring.

Restoration and site inspections were completed in spring and summer 2017, 2018, 2019, and 2020 as the first four of these annual inspections, with reports summarizing the inspections being submitted to NYSDEC in July 2017, August 2018, August 2019, and September 2020, respectively. At the time the 2017 inspection was completed, restoration was still in progress at the areas listed below and identified on Figure 2. Consequently, these areas were excluded from this inspection and were monitored for the first time during the annual inspection in 2018.

- Apartment complex area including the stream side banks and bottom
- Portion of the commercial property outside of the stream side banks and located between the Old Liverpool Road culvert and the railroad tracks
- Construction access area at Onondaga Lake Parkway

Modification to the frequency or duration of the inspections will require approval from the NYSDEC. Site-wide inspections will also be performed after all severe weather conditions that may affect ECs. Inspections completed by Lockheed Martin and any impacts observed by Onondaga County will be included on an inspection form as provided in Appendix I – Site Management Forms. The form will compile sufficient information to assess the following:

- Compliance with all ICs, including site usage;
- An evaluation of the condition and continued effectiveness of ECs;
- General site conditions at the time of the inspection;
- The site management activities being conducted including, where appropriate, confirmation sampling and a health and safety inspection; and
- Confirm that site records are up to date.

Inspections of all remedial components installed at the site will be conducted. A comprehensive site-wide inspection will be conducted and documented according to the SMP schedule, regardless of the frequency of the Periodic Review Report (PRR). The inspections will determine and document the following:

- Whether ECs continue to perform as designed;
- If these controls continue to be protective of human health and the environment;
- Compliance with requirements of this SMP;
- Achievement of remedial performance criteria; and
- If site records are complete and up to date.

Reporting requirements are outlined in Section 7.0 of this plan.

Inspections will also be performed in the event of an emergency. If an emergency, such as a natural disaster or an unforeseen failure of any of the ECs occurs that reduces or has the potential to reduce the effectiveness of ECs in place at the site, verbal notice to the NYSDEC must be given by noon of the following day. In addition, an inspection of the site will be conducted within 5 days of the event to verify the effectiveness of the IC/ECs implemented at the site by a qualified environmental professional, as determined by the NYSDEC. Written confirmation must be provided to the NYSDEC within 7 days of the event that includes a summary of actions taken, or to be taken, and the potential impact to the environment and the public.

## 4.3 **Post-Remediation Monitoring**

### 4.3.1 Vegetation Monitoring

Vegetation monitoring will be performed to evaluate the success of the vegetation planting at the Bloody Brook site. Vegetation monitoring for each area (i.e., wooded, residential, apartment complex, and commercial areas) will be completed as described in the Restoration Monitoring Work Plan (included as Appendix J) on an annual basis and will include an on-site inspection to be completed by a qualified person (e.g., biologist). Monitoring will continue for between one and five years, pursuant to approved work plans and property-specific access/restoration agreements between Lockheed Martin and the property owner.

### 4.3.2 Stream and Side Bank Erosion

In accordance with the 2014 Decision Document, the site will be inspected annually for ponding on the side banks and for erosion of the brook bottom and side banks by Lockheed Martin. This

inspection will be completed as part of the annual site-wide inspection discussed in Section 4.2. A Restoration Monitoring Work Plan is provided as Appendix J.

### 4.3.3 Biological Monitoring

The objective of the biological monitoring is to document cadmium concentrations in aquatic biota following the completion of the remedial activities at the site. Pre-remedial data, summarized in Table 7, was collected in 2014 to serve as a baseline data set. In accordance with the 2014 Decision Document post-remediation monitoring was conducted in 2018 and 2020 and reported to NYSDEC in letters dated October 31, 2018 and November 4, 2020, respectively. Per the NYSDEC comment letter regarding the 2020 biological monitoring dated December 11, 2020, an additional monitoring event will be conducted in 2022, consistent with previous sampling and as discussed below. These data will be used in part to support the evaluation of the effectiveness of the site remedial program in mitigating potential cadmium impacts to Bloody Brook.

Crayfish are the target organism for this work because they are known to accumulate cadmium, and they are relatively less mobile than other resident aquatic organisms (e.g., fish). Crayfish have been observed in the WBBB and Bloody Brook and have been sampled previously by both NYSDEC and Lockheed Martin. Crayfish will be collected from three general locations or stations within the brook, including an upper, middle, and lower location, consistent with the locations sampled during the baseline sampling. Sampling for each event will be completed during the same general time frame to avoid possible seasonal fluctuations in cadmium concentrations. The crayfish samples will be collected in accordance with the procedures described Appendix F and sent to a laboratory for cadmium analyses.

# 5 Operation and Maintenance Plan

The site remedy does not rely on any mechanical systems, such as groundwater treatment systems, sub-slab depressurization systems, or air sparge/soil vapor extraction systems to protect public health and the environment. Therefore, the operation and maintenance of such components is not included in this SMP.

# 6 Periodic Assessments/Evaluations

## 6.1 Climate Change Vulnerability Assessment

Increases in both the severity and frequency of storms/weather events, an increase in sea level elevations along with accompanying flooding impacts, shifting precipitation patterns and wide temperature fluctuation, resulting from global climactic change and instability, have the potential to significantly impact the performance, effectiveness and protectiveness of a given site and associated engineering controls. Vulnerability assessments provide information so that the site is prepared for the impacts of the increasing frequency and intensity of severe storms/weather events and associated flooding. This section briefly summarizes the vulnerability of the site and/or engineering controls to severe storms/weather events and associated flooding.

Because the site is located within a drainage system with a soil cover as an engineering control, a potential vulnerability to the site includes increased erosion resulting from intensity and severity of storm events that have the potential to cause significant flooding and erosion.

## 6.2 Green Remediation Evaluation

NYSDEC's DER-31 Green Remediation requires that green remediation concepts and techniques be considered during all stages of the remedial program including site management, with the goal of improving the sustainability of the cleanup and summarizing the net environmental benefit of any implemented green technology. This section of the SMP provides a summary of the major green remediation components for the site during site management that will be evaluated and summarized in the Periodic Review Report (PRR). Considering the environmental impacts of remedy stewardship over the long term, the major components are as follows.

- Reducing direct and indirect greenhouse gases and other emissions;
- Increasing energy efficiency and minimizing use of non-renewable energy;
- Conserving and efficiently managing resources and materials;
- Reducing waste, increasing recycling and increasing reuse of materials which would otherwise be considered a waste;
- Maximizing habitat value and creating habitat when possible;
- Fostering green and healthy communities and working landscapes which balance ecological, economic and social goals; and
- Integrating the remedy with the end use where possible and encouraging green and sustainable re-development.

### 6.2.1 Frequency of System Checks, Sampling and Other Periodic Activities

Transportation to and from the site, use of consumables in relation to visiting the site in order to complete inspection, monitoring, and maintenance activities, and collecting/shipping samples to a laboratory for analyses all have direct and/or inherent energy costs. The schedule and/or means of these periodic activities will be prepared so that these tasks can be accomplished in a manner that does not impact remedy protectiveness but reduces expenditure of energy or resources.

### 6.2.2 Metrics and Reporting

While the anticipated site management activities would not require this, if additional soil removal is warranted in the future in accordance with the ICs, information on energy usage, solid waste

generation, transportation and shipping, water usage and land use and ecosystems will be recorded to facilitate and document consistent implementation of green remediation during site management and to identify corresponding benefits.

## 6.3 Remedial Site Optimization

A Remedial Site Optimization (RSO) study will be conducted any time that the NYSDEC or the remedial party requests in writing that an in-depth evaluation of the remedy is needed. An RSO may be appropriate if any of the following occur:

- The remedial actions have not met or are not expected to maintain the remedy;
- The management of the remedial site is exceeding the estimated costs;
- The remedy is not performing as expected or as designed;
- Previously unidentified source material may be suspected;
- Site conditions change due to development, change of use, etc.;
- There is an anticipated transfer of the site management to another remedial party or agency; and
- A new and applicable remedial technology becomes available.

An RSO will provide a critique of a site's conceptual model, give a summary of past performance, document current cleanup practices, gather additional performance or media specific data and information, and provide recommendations for improvements to enhance the ability of the present system to maintain the remedy or to provide a basis for changing the remedial strategy.

The RSO study will focus on overall site cleanup strategy and management with the intent of identifying impediments to cleanup and improvements to site management to increase efficiency and cost effectiveness. Green remediation technology and principals are to be considered when performing the RSO.

# 7 Reporting Requirements

## 7.1 Site Management Reports

All site management inspection, maintenance and monitoring events will be recorded on the appropriate site management forms provided in Appendices I and J. These forms are subject to NYSDEC revision.

All applicable inspection forms and other records, including media sampling data and system maintenance reports, generated for the site during the reporting period will be provided in electronic format to the NYSDEC in accordance with the requirements of Section 1.3 and summarized in the Periodic Review Report.

All monitoring/inspections reports will include, at a minimum, as applicable:

- Date of event or reporting period;
- Name, company, and position of person(s) conducting monitoring/inspection activities;
- Description of the activities performed;
- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents noted (included either on the checklist/form or on an attached sheet);
- Type of samples collected (e.g., sub-slab vapor, indoor air, outdoor air, etc.) if applicable;
- Copies of all field forms completed (e.g., well sampling logs, chain-of-custody documentation, etc.);
- Sampling results in comparison to appropriate standards/criteria;
- A figure illustrating sample type and sampling locations;
- Copies of all laboratory data sheets and the required laboratory data deliverables required for all points sampled (to be submitted electronically in the NYSDEC-identified format);
- Any observations, conclusions, or recommendations; and
- A determination as to whether contaminant conditions have changed since the last reporting event.

Routine maintenance event reporting forms will include, at a minimum:

- Date of event;
- Name, company, and position of person(s) conducting maintenance activities;
- Description of maintenance activities performed;
- Any modifications to the system;
- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents noted (included either on the checklist/form or on an attached sheet); and,
- Other documentation such as copies of invoices for maintenance work, receipts for replacement equipment, etc., (attached to the checklist/form).

Non-routine maintenance event reporting forms will include, at a minimum:

- Date of event;
- Name, company, and position of person(s) conducting non-routine maintenance/repair activities;
- Description of non-routine activities performed;

- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents (included either on the form or on an attached sheet); and
- Other documentation such as copies of invoices for repair work, receipts for replacement equipment, etc. (attached to the checklist/form).

Data will be reported in digital format as determined by the NYSDEC. Currently, data is to be supplied electronically and submitted to the NYSDEC EQuIS™ database in accordance with the requirements found at this link http://www.dec.ny.gov/chemical/62440.html .

## 7.2 Periodic Review Report

A Periodic Review Report (PRR) will be submitted to the Department beginning sixteen (16) months after the SMP is approved. After submittal of the initial Periodic Review Report, the next PRR shall be submitted annually to the Department or at another frequency as may be required by the Department. In the event that the site is subdivided into separate parcels with different ownership, a single Periodic Review Report will be prepared that addresses the site. The report will be prepared in accordance with NYSDEC's DER-10 and submitted within 30 days of the end of each certification period. Media sampling results will also be incorporated into the Periodic Review Report. The report will include:

- Identification, assessment and certification of all ECs/ICs required by the remedy for the site.
- Results of the required annual site inspections and severe condition inspections, if applicable.
- All applicable site management forms and other records generated for the site during the reporting period in the NYSDEC-approved electronic format, if not previously submitted.
- A summary of any discharge monitoring data and/or information generated during the reporting period, with comments and conclusions.
- Data summary tables and graphical representations of contaminants of concern by media (groundwater, soil vapor, etc.), which include a listing of all compounds analyzed, along with the applicable standards, with all exceedances highlighted. These will include a presentation of past data as part of an evaluation of contaminant concentration trends.
- Results of all analyses, copies of all laboratory data sheets, and the required laboratory data deliverables for all samples collected during the reporting period will be submitted in digital format as determined by the NYSDEC. Currently, data is supplied electronically and submitted to the NYSDEC EQuIS™ database in accordance with the requirements found at this link: http://www.dec.ny.gov/chemical/62440.html .
- A site evaluation, which includes the following:
  - The compliance of the remedy with the requirements of the site-specific 2014 Decision Document;
  - Any new conclusions or observations regarding site contamination based on inspections or data generated by the Monitoring and Sampling Plan for the media being monitored;
  - Recommendations regarding any necessary changes to the remedy and/or Monitoring and Sampling Plan; and
- Trends in contaminant levels in the brook will be evaluated to determine if the remedy continues to be effective at preventing impacts to biota from ingestion/direct contact with sediments causing toxicity or impacts from bioaccumulation through the aquatic food chain. This will be achieved with the collection of crayfish samples two, four, and six years following remedy completion.
  - The overall performance and effectiveness of the remedy.

### 7.2.1 Certification of Institutional and Engineering Controls

Following the last inspection of the reporting period, a qualified environmental professional will prepare, and include in the Periodic Review Report, the following certification as per the requirements of NYSDEC DER-10:

"*For each institutional or engineering control identified for the site, I certify that all of the following statements are true:*

- *The inspection of the site to confirm the effectiveness of the institutional and engineering controls required by the remedial program was performed under my direction;*
- *The institutional control and/or engineering control employed at this site is unchanged from the date the control was put in place, or last approved by the Department;*
- *Nothing has occurred that would impair the ability of the control to protect the public health and environment;*
- *Nothing has occurred that would constitute a violation or failure to comply with any site management plan for this control;*
- *Access to the site will continue to be provided to the Department to evaluate the remedy, including access to evaluate the continued maintenance of this control;*
- *If a financial assurance mechanism is required under the oversight document for the site, the mechanism remains valid and sufficient for the intended purpose under the document;*
- *The engineering control systems are performing as designed and are effective;*
- *To the best of my knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the site remedial program; and*
- *The information presented in this report is accurate and complete.*

*I certify that all information and statements in this certification form are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law. I, [name], of [business address], am certifying as [Owner/Remedial Party or Owner's/Remedial Party's Designated Site Representative] for the site."*

## 7.3 Corrective Measures Work Plan

If any component of the remedy is found to have failed, or if the periodic certification cannot be provided due to the failure of an institutional or engineering control, a Corrective Measures Work Plan will be submitted to the NYSDEC for approval. This plan will explain the failure and provide the details and schedule for performing work necessary to correct the failure. Unless an emergency condition exists, no work will be performed pursuant to the Corrective Measures Work Plan until it has been approved by the NYSDEC.

## 7.4 Remedial Site Optimization Report

In the event that an RSO is to be performed (see Section 6.3, upon completion of an RSO, an RSO report must be submitted to the Department for approval. The RSO report will document the research/investigation and data gathering that was conducted, evaluate the results and facts obtained, present a revised conceptual site model and present recommendations. RSO recommendations are to be implemented upon approval from the NYSDEC. Additional work plans, design documents, HASPs etc., may still be required to implement the recommendations, based upon the actions that need to be taken. A final engineering report and update to the SMP may also be required.

The RSO report will be submitted, in electronic format, to the NYSDEC Central Office, Regional Office in which the site is located, Site Control (i.e., Onondaga County and Town of Salina), and the NYSDOH Bureau of Environmental Exposure Investigation.

# 8 References


6NYCRR Part 375, Environmental Remediation Programs. December 14, 2006.

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Agency for Toxic Substances and Disease Registry (ATSDR), 1999, *Toxicological Profile for Cadmium*.

ARCADIS BBL, 2007, *Supplemental Soil Sampling Work Plan*.

BBL, 1997. *West Branch of Bloody Brook Sediment Removal Certification Report*, November.

Calocerinos & Spina Consulting Engineers, 1972, *Bloody Brook Drainage Basin Study*, January.

IT Corporation, 2002, *Shallow Side Bank Surface Soil Sampling and Analysis Work Plan*, *June*.

NYSDEC, 1996, Memorandum from Robert Bode to Distribution regarding Bloody Brook Tissue Analysis Results, January.

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Shaw Environmental, Inc. (Shaw), 2002, *Phase III Side Bank Soil Investigation Work Plan*, November.

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Shaw, 2004, *Phase IV-A Side Bank Soil Investigation Work Plan*, April.

Shaw, 2009b, *OCDWEP Storm Water Drainage Improvement Project Soil Sampling Test Results*, December.

Shaw, 2011, *Design Soil Investigation Work Plan*, February

United States Department of Agriculture (USDA), 1977, *United States Department of Agriculture Soil Survey for Onondaga County*, January.

# TABLES

**Table 1**
**Bloody Brook**
**Regulator Notifications**

| Name | Contact Information |
|---|---|
| NYSDEC Project Manager<br>Jacky Luo | 518-402-9676<br>jacky.luo@dec.ny.gov |
| NYSDOH Project Manager<br>Mark Sergott, P.G. | 518-402-7860<br>beei@health.ny.gov |

*Note: Notifications are subject to change and will be updated as necessary.

# Table 2A
# Bloody Brook
# Post-Remediation Soil Cadmium Concentrations Remaining on Site
# NYS Thruway to Brookview Lane

| Boring ID[1] | Figure Coordinates[2] | Sampling Interval | Collection Date | Result (mg/kg) | General Soil Classification |
|---|---|---|---|---|---|
| DI-01-01 | G9 | 0' - 1' | 5/2/2011 | 0.15 J | Sandy silt, organics and wood |
| | | 1' - 2' | | 0.059 J [0.19 J] | Sandy silt |
| | | 2' - 3' | | 0.11 J | Sandy silt |
| | | 3' - 4' | | 0.047 J | Sandy silt |
| | | 4' - 5' | | 0.11 J | Sandy silt |
| | | 5' - 6' | | 0.060 J | Sandy silt |
| | | 6' - 7' | | 0.19 J | Silty sand with little clay, Sandy silt with organics at 6'-8" |
| | | 7' - 8' | | 0.079 J | Silt with little clay |
| | | 8' - 9' | | 3.1 | Grades to fine sand, little silt, silt with organics at 8'-10" |
| | | 9' - 10' | | 2,450 | Organics with some silt, trace sand, trace clay |
| | | 10' - 11' | | 2.6 | Grades to fine sand with white crystals, little silt |
| | | 11' - 12' | | 0.49 B | Medium to fine sand |
| | | 12' - 13' | | 13.8 | Medium to fine sand |
| DI-01-02 | G9 | 8' - 9' | 4/27/2011 | 0.40 | Silty clay |
| | | 9' - 10' | | 0.12 J | Silty clay |
| | | 10' - 11' | | 0.26 | Sandy silt, little clay at 10'-2" |
| | | 11' - 12' | | 12.9 | Sandy silt, little clay, organics |
| | | 12' - 13' | | 1.1 | Silty clay |
| | | 13' - 14' | | 2.8 | Silty clay |
| | | 14' - 15' | | 18.8 | Silty clay, organics |
| DI-02-01 | E9 | 2' - 3' | 4/27/2011 | 0.21 J | Clayey silt, silty clay |
| | | 3' - 4' | | 0.13 J | Clayey silt, sandy silt |
| | | 4' - 5' | | 0.16 J | Sandy silt, clayey silt |
| | | 5' - 6' | | 1.1 | Clayey silt, sandy silt, silt |
| | | 6' - 7' | | 2.9 | Sandy silt, silt, clayey silt |
| | | 7' - 8' | | 0.49 | Silty clay, clay, sandy silt, silty sand, organics |
| | | 8' - 9' | | 0.47 B | Till |
| | | 9' - 10' | | 0.27 B | Till |
| DI-02-02 | E9 | 0' - 1' | 4/27/2011 | 0.80 | Clayey silt, silt |
| | | 1' - 2' | | 0.070 J | Clayey silt |
| DI-03-01 | D12 | 0' - 1' | 4/27/2011 | 0.45 B | Silt, little fine sand, trace clay |
| | | 1' - 2' | | <0.26 U | Silt, little fine sand, trace clay |
| | | 2' - 3' | | <0.25 U | Silt, little fine sand, trace clay |
| | | 3' - 4' | | <0.24 U | Clayey silt |
| | | 4' - 5' | | <0.23 U | Clayey silt |
| | | 5' - 6' | | <0.25 U | Clayey silt |
| | | 6' - 7' | | <0.26 U | Clayey silt |
| | | 7' - 8' | | 0.096 J | Clayey silt |
| DI-03-02 | C12 | 0' - 1' | 4/27/2011 | 0.23 J | Silt with little fine sand, trace gravel |
| | | 1' - 2' | | 0.17 J | Silt, trace clay |
| | | 2' - 3' | | 0.15 J | Silt, trace clay |
| | | 3' - 4' | | 0.16 J | Silt, some clay |
| | | 4' - 5' | | 0.25 J | Silty clay |
| | | 5' - 6' | | <0.25 U | Silty clay |
| | | 6' - 7' | | <0.23 U | Silty clay |
| | | 7' - 8' | | <0.24 U | Silty clay |
| | | 8' - 9' | | <0.22 U | Silt |

**Table 2A**
**Bloody Brook**
**Post-Remediation Soil Cadmium Concentrations Remaining on Site**
**NYS Thruway to Brookview Lane**

| Boring ID[1] | Figure Coordinates[2] | Sampling Interval | Collection Date | Result (mg/kg) | General Soil Classification |
|---|---|---|---|---|---|
| DI-03-03 | C12 | 0' - 1' | 4/27/2011 | 0.18 J | Sandy gravel, organics, little silt |
| | | 1' - 2' | | 0.067 J | Medium to fine sand with little silt, trace gravel |
| | | 2' - 3' | | 0.068 J | Silty clay |
| | | 3' - 4' | | <0.24 | Silty clay |
| | | 4' - 5' | | 0.057 J | Medium to fine sand with trace gravel, trace silt |
| | | 5' - 6' | | 0.048 J | Silty clay, trace gravel at 5'-7" |
| | | 6' - 7' | | 0.084 J | Clayey silt |
| | | 7' - 8' | | 0.063 J | Clayey silt |
| | | 8' - 9' | | 1.3 | Clay with some silt |
| | | 9' - 10' | | 170 | Clay with some silt |
| DI-03-04 | C12 | 0' - 1' | 4/27/2011 | 0.28 | Sandy gravel, trace silt, organics |
| | | 1' - 2' | | 0.23 | Sandy gravel, some silt |
| | | 2' - 3' | | 0.31 | Coarse to fine sand, trace gravel, trace silt |
| | | 3' - 4' | | 0.25 | Coarse to fine sand, trace gravel, trace silt |
| | | 4' - 5' | | 0.13 J | Sandy gravel, trace silt |
| | | 5' - 6' | | 0.29 | Clayey silt and debris at 5'-7" |
| DI-03-05 | C12 | 0' - 1' | 4/27/2011 | 0.33 | Medium gravel, coarse to fine sand, trace silt |
| | | 1' - 2' | | 0.30 | Medium gravel, coarse to fine sand, trace silt |
| | | 2' - 3' | | 0.27 | Medium gravel, coarse to fine sand, trace silt |
| | | 3' - 4' | | 0.31 | Medium gravel, coarse to fine sand, some silt |
| | | 4' - 5' | | 0.11 J | Medium gravel, coarse to fine sand, some silt |
| | | 5' - 6' | | 0.12 J | Silt, fine sand, trace clay |
| | | 6' - 7' | | 0.15 J | Silt, fine sand, trace clay |
| | | 7' - 8' | | 0.14 J | Silt, fine sand, trace clay |
| | | 8' - 9' | | 0.074 J | Fine to coarse sand, trace silt at 8'-3" |
| | | 9' - 10' | | 0.15 J | Sandy gravel, little silt, Silty sand at 9'-8" |
| | | 10' - 11' | | 267 | Silty clay with organics |
| | | 11' - 12' | | 5.9 | Silty clay with organics, strong odor |
| DI-17-01 | D13 | 0' - 1' | 5/2/2011 | 0.43 | Silty sand, sandy silt, roots |
| | | 1' - 2' | | 0.15 J | Sandy silt, clayey silt |
| | | 2' - 3' | | 0.057 J | Sandy silt |
| | | 3' - 4' | | 0.048 J | Sandy silt, clayey silt |
| | | 4' - 5' | | 0.090 J | Silt, sandy silt |
| | | 5' - 6' | | 161 | Silt, clayey silt, organics |
| | | 6' - 7' | | 0.38 B | Sandy silt |
| | | 7' - 8' | | <0.31 U | Sandy silt, silt |
| | | 8' - 9' | | 0.46 B | Sandy silt, clayey silt |
| DI-17-02 | D13 | 4' - 5' | 5/2/2011 | 0.33 | Sandy silt |
| | | 5' - 6' | | 1.2 | Sandy silt with little clay |
| | | 6' - 7' | | 0.37 | Clayey silt with little fine sand |
| DI-19-01 | E4 | 2' - 3' | 5/3/2011 | 14.9 B | Sandy silt, silt, clayey silt, gravel |
| | | 3' - 4' | | 1.0 B | Sandy silt, gravels, clayey silt |
| DI-19-02 | E4 | 2' - 3' | 5/3/2011 | 2.6 | Sandy silt, silt |
| | | 3' - 4' | | 2.9 | Sandy silt, clayey silt, silt |
| DI-20-01 | F5 | 2' - 3' | 5/3/2011 | 2.6 B | Sandy silt, silt, roots |
| | | 3' - 4' | | 0.52 B | Clayey silt, sandy silt, silt, gravel |
| DI-21-01 | F9 | 0' - 1' | 4/29/2011 | 0.83 | Silty sand, organics |
| | | 1' - 2' | | 0.33 | Silty sand, organics |
| | | 2' - 3' | | 0.097 J | Silty sand |
| | | 3' - 4' | | 0.042 J | Silty sand |

**Table 2A**
**Bloody Brook**
**Post-Remediation Soil Cadmium Concentrations Remaining on Site**
**NYS Thruway to Brookview Lane**

| Boring ID[1] | Figure Coordinates[2] | Sampling Interval | Collection Date | Result (mg/kg) | General Soil Classification |
|---|---|---|---|---|---|
| DI-22-01 | F10 | 0' - 1' | 4/29/2011 | 0.73 | Silty sand, trace clay |
| | | 1' - 2' | | 0.19 J | Sandy silt, silty sand |
| | | 2' - 3' | | 0.14 J | Sandy silt, silty sand |
| | | 3' - 4' | | 0.074 J | Sandy silt, silty sand |
| DI-23-01 | D11 | 2' - 3' | 4/27/2011 | <0.21 U | Silty clay, clay |
| | | 3' - 4' | | 0.64 B | Silty clay, clay |
| DI-23-02 | D11 | 0' - 1' | 4/27/2011 | 0.30 | Clayey silt, silty clay |
| | | 1' - 2' | | 0.086 J | Clayey silt, sandy silt |
| DI-24-01 | D11 | 0' - 1' | 4/26/2011 | 0.76 | Silty sand, trace clay |
| | | 1' - 2' | | 0.15 J | Silt, little fine sand, trace clay |
| | | 2' - 3' | | 0.17 J | Clayey silt with some fine sand |
| | | 3' - 4' | | 0.18 J | Clayey silt with some fine sand |
| DI-25-01 | D12 | 0' - 1' | 4/26/2011 | 0.30 | Sandy silt, trace clay |
| | | 1' - 2' | | 0.13 J [0.17 J] | Sandy silt, trace clay |
| | | 2' - 3' | | 0.052 J | Clayey silt, some fine sand |
| | | 3' - 4' | | 0.11 J | Clayey silt, some fine sand, decrease in fine sand |
| DI-26-01 | D12 | 2' - 3' | 4/28/2011 | 74.2 J [9.2 J] | Sandy silt, silty clay, gravel (fill) |
| | | 3' - 4' | | 129 | Clayey silt, sandy silt, silt |
| DI-26-02 | D12 | 0' - 1' | 4/28/2011 | 0.66 | Fine sand, little silt |
| | | 1' - 2' | | 0.13 J | Silty sand |
| | | 2' - 3' | | 0.098 J | Silty sand |
| | | 3' - 4' | | 0.13 J | Sandy silt |
| DI-27-01 | D13 | 0' - 1' | 4/28/2011 | 0.61 | Clayey silt, sandy silt, silt |
| | | 1' - 2' | | 0.074 J | Sandy silt, silty sand |
| | | 2' - 3' | | 0.29 | Sandy silt, clayey silt |
| | | 3' - 4' | | 0.12 J | Sandy silt, clayey silt, silty clay |
| DI-28-01 | C13 | 0' - 1' | 4/26/2011 | 0.16 J | Silty clay |
| | | 1' - 2' | | 0.083 J | Clay, silty clay |
| | | 2' - 3' | | 0.039 J | Clay, silty clay |
| | | 3' - 4' | | 0.043 J [<0.26] | Clay |
| DI-29-01 | C14 | 0' - 1' | 4/26/2011 | 0.23 J | Silt, clayey silt |
| | | 1' - 2' | | 0.18 J | Silty clay, clay |
| | | 2' - 3' | | 0.24 | Silty clay, clay |
| | | 3' - 4' | | 0.11 J | Clay, silty clay, trace sandy silt |
| DI-30-01 | D14 | 0' - 1' | 4/28/2011 | 1.0 | Clayey silt, sandy silt, silty sand |
| | | 1' - 2' | | 0.89 | Sandy silt, silty sand |
| | | 2' - 3' | | 0.32 | Sandy silt, silty sand, clayey silt |
| | | 3' - 4' | | 0.11 J [0.17 J] | Sandy silt, silty sand, clayey silt |
| DI-31-01 | C15 | 0' - 1' | 4/28/2011 | 0.19 J | Clayey silt, silt |
| | | 1' - 2' | | 0.22 J | Clayey silt, silty clay |
| | | 2' - 3' | | 0.13 J | Silty clay, clay |
| | | 3' - 4' | | 0.15 J | Silty clay, clay |
| DI-40-01 | C3 | 0' - 1' | 8/25/2011 | 1.3 | Fine sand, little silt, organics to 6" then fine sand, trace silt |
| | | 1' - 2' | | 0.15 J | Fine sand, trace silt |
| | | 2' - 3' | | 0.12 J [0.21] | Fine sand, trace silt |
| | | 3' - 4' | | 0.13 J | Fine sand, trace silt |
| DI-41-01 | G5 | 0' - 1' | 5/2/2011 | 1.1 | Clayey silt, silt, sandy silt |
| | | 1' - 2' | | 0.19 J | Clayey silt, sandy silt, silt |
| | | 2' - 3' | | 0.19 J | Sandy silt, silt, clayey silt |
| | | 3' - 4' | | 0.65 | Sandy silt, clayey silt, silty clay, gravel |

**Table 2A**
**Bloody Brook**
**Post-Remediation Soil Cadmium Concentrations Remaining on Site**
**NYS Thruway to Brookview Lane**

| Boring ID[1] | Figure Coordinates[2] | Sampling Interval | Collection Date | Result (mg/kg) | General Soil Classification |
|---|---|---|---|---|---|
| DI-42-01 | H9 | 0' - 1' | 8/24/2011 | 0.31 [0.47] | Fine to medium sand, some silt |
| | | 1' - 2' | | 0.20 J | Fine to medium sand, some silt |
| | | 2' - 3' | | 0.063 J | Fine to medium sand, some silt |
| | | 3' - 4' | | 0.075 J | Fine to medium sand, some silt, trace clay |
| DI-43-01 | C16 | 2' - 3' | 4/28/2011 | 0.24 J | Silty clay |
| | | 3' - 4' | | 0.24 J | Silty clay |
| DI-43-02 | C16 | 0' - 1' | 4/28/2011 | 0.35 | Clayey silt, silty sand |
| | | 1' - 2' | | 0.23 J | Silty clay |
| DI-44-01 | D15 | 0' - 1' | 4/28/2011 | 0.37 | Silt, fine sand with some silt at 3" |
| | | 1' - 2' | | 0.50 | Silty sand |
| | | 2' - 3' | | 0.19 J | Sandy silt |
| | | 3' - 4' | | 0.22 J | Sandy silt |
| DI-51-01 | E8 | 0' - 1' | 4/27/2011 | 3.8 B | Clayey silt, silt |
| | | 1' - 2' | | <0.26 U | Clayey silt |
| | | 2' - 3' | | <0.24 U | Clayey silt, sandy silt, silty clay |
| | | 3' - 4' | | 2.0 B | Sandy silt |
| DI-51-02 | E8 | 0' - 1' | 4/27/2011 | 0.53 | Clayey silt |
| | | 1' - 2' | | 0.13 J | Clayey silt, silt |
| DI-52-01 | H7 | 0' - 1' | 8/25/2011 | 0.042 J | Fine sand, trace silt, wet |
| | | 1' - 2' | | 0.059 J | Fine sand, trace silt, wet |
| | | 2' - 3' | | 0.059 J | Gravelly sand |
| | | 3' - 4' | | 0.054 J | Gravelly sand |
| DI-53-01 | I7 | 0' - 1' | 4/29/2011 | 2.5 | Sandy silt, organics, trace clay |
| | | 1' - 2' | | 1.3 J [0.39 J] | Sandy silt, organics, trace clay |
| | | 2' - 3' | | 0.39 | Sandy silt, organics, trace clay |
| | | 3' - 4' | | 0.13 J | Sandy silt, organics, trace clay |
| DI-53-02 | I7 | 0' - 1' | 4/29/2011 | 0.83 | Clayey silt, sandy silt, silt, organics |
| | | 1' - 2' | | 2.1 | Sandy silt, silt, organics |
| DI-54-01 | H9 | 0' - 1' | 8/25/2011 | 0.18 J [0.15 J] | Fine sand, trace silt & organics |
| | | 1' - 2' | | 0.11 J | Fine sand, trace silt & organics |
| | | 2' - 3' | | 0.094 J | Fine sand, trace silt & organics |
| | | 3' - 4' | | 0.096 J | Fine sand, trace silt & organics |
| DI-60-01 | G6 | 0' - 1' | 5/2/2011 | <0.24 U | Clayey silt, silt, roots |
| | | 1' - 2' | | <0.24 U [<0.25 U] | Clayey silt, sandy silt |
| | | 2' - 3' | | <0.30 U | Sandy silt, fine to coarse gravel |
| | | 3' - 4' | | <0.30 U | Sandy silt, clay, silt, fine to coarse gravel |
| DI-61-01 | H7 | 0' - 1' | 5/2/2011 | 1.1 | Silty clay, clayey silt, roots |
| | | 1' - 2' | | 0.20 J | Clayey silt, sandy silt, gravel, roots |
| | | 2' - 3' | | 0.099 J | Sandy silt, clayey silt, silty clay, gravel |
| | | 3' - 4' | | <0.24 U | Sandy silt, clayey silt, silty clay, gravel |
| DI-SB-01-05 | D10 | 0' - 1' | 5/2/2011 | 4.0 | Silty sand, organics, trace gravel |
| | | 1' - 2' | | 0.24 | Silt, little clay, little fine sand |
| | | 2' - 3' | | 0.23 | Silt |
| | | 3' - 4' | | <0.26 U | Sandy silt, fine sand with trace clay at 3'-10" |
| | | 4' - 5' | | 0.20 J | Silt with some fine sand, little clay |
| | | 5' - 6' | | 0.26 | Silty sand |
| | | 6' - 7' | | 0.14 J | Silty sand |
| | | 7' - 8' | | 0.16 J | Silty sand |
| | | 8' - 9' | | 0.19 J | Silt with little clay, organic silt at 8'-8" |
| | | 9' - 10' | | 0.45 | Organic silt |

**Table 2A**
**Bloody Brook**
**Post-Remediation Soil Cadmium Concentrations Remaining on Site**
**NYS Thruway to Brookview Lane**

| Boring ID[1] | Figure Coordinates[2] | Sampling Interval | Collection Date | Result (mg/kg) | General Soil Classification |
|---|---|---|---|---|---|
| DI-SB-03-05 | D14 | 0' - 1' | 5/2/2011 | 0.091 J | Silty sand, organics |
| | | 1' - 2' | | <0.25 | Silty sand |
| | | 2' - 3' | | 0.058 J | Silty sand |
| | | 3' - 4' | | 0.069 J | Silty sand |
| | | 4' - 5' | | 0.077 J [0.12 J] | Grades to Clayey silt, little fine sand |
| | | 5' - 6' | | 0.065 J | Clayey silt |
| | | 6' - 7' | | 0.12 J | Clayey silt |
| | | 7' - 8' | | 0.13 J | Clayey silt, organics |
| | | 8' - 9' | | 0.25 | Silty clay |
| | | 9' - 10' | | <0.26 | Silty clay |
| OCDDS-10 | E7 | 0" - 6" | 10/1996 | 0.4 | --- |
| | | 0" - 6" | | <0.025 | --- |
| Pre-SS-P1 | F7 | --- | 4/17/1997 | 1.3 | --- |
| | | --- | | <0.026 | --- |
| Post-SS-P1 | F7 | --- | 5/15/1997 | 0.14 | --- |
| | | --- | | <0.026 | --- |
| SA-SB-01-01 | D10 | 2' - 3' | 10/20/2003 | <0.59 | Clayey Sand |
| | | 3' - 4' | | <0.58 | Clayey Sand |
| | | 4' - 5' | | 442 | Organic Silt/Sand |
| | | 5' - 6' | | 0.86 | Organic Silt/Sand to Clayey Sand |
| | | 6' - 7' | | 4.3 | Clayey Sand |
| SA-SB-01-02 | D10 | 0' - 1' | 10/20/2003 | 1.87 | Sand |
| | | 1' - 2' | | <0.593 | Sand |
| | | 2' - 3' | | <0.581 | Sand |
| | | 3' - 4' | | <0.574 | Sand |
| | | 4' - 5' | | <0.583 | Sand |
| | | 5' - 6' | | 431 | Sand to Organic Silt/Sand |
| | | 6' - 7' | | 46.1 | Organic Silt/Sand |
| | | 7' - 8' | | <0.670 | Clayey Sand |
| SA-SB-01-03 | D10 | 0' - 1' | 10/20/2003 | 2.64 | Topsoil |
| | | 1' - 2' | | 6.48 [3.86] | Silty Sand |
| | | 2' - 3' | | <0.611 | Silty Sand |
| | | 3' - 4' | | <0.58 | Silty Sand |
| | | 4' - 5' | | <0.592 | Silty Sand |
| | | 5' - 6' | | <0.60 | Silty Sand |
| | | 6' - 7' | | 401 | Organic Silt/Sand |
| | | 7' - 8' | | 52.1 | Organic Silt/Sand to Silty Clay |
| | | 8' - 9' | | <0.668 | Silty Clay |
| SA-SB-01-04 | D10 | 0' - 1' | 10/20/2003 | 1.36 | Sand |
| | | 1' - 2' | | <0.597 | Silty Sand |
| | | 2' - 3' | | <0.623 | Silty Sand to Silty Clay |
| | | 3' - 4' | | <0.590 [<0.593] | Silty Clay |
| | | 4' - 5' | | <0.589 | Silty Sand |
| | | 5' - 6' | | <0.597 | Silty Sand |
| | | 6' - 7' | | <0.608 | Silty Sand |
| | | 7' - 8' | | <0.608 | Silty Sand |
| | | 8' - 9' | | 79.1 | Silty Sand to Organic Silt/Sand |
| | | 9' - 10' | | 0.85 | Organic Silt/Sand to Clay |

**Table 2A**
**Bloody Brook**
**Post-Remediation Soil Cadmium Concentrations Remaining on Site**
**NYS Thruway to Brookview Lane**

| Boring ID[1] | Figure Coordinates[2] | Sampling Interval | Collection Date | Result (mg/kg) | General Soil Classification |
|---|---|---|---|---|---|
| SA-SB-02-01 | E11 | 0' - 1' | 10/24/2003 | 1.4 | Silty Sand |
| | | 1' - 2' | | <0.55 [1.4] | Silty Sand |
| | | 2' - 3' | | <0.55 | Silty Sand |
| | | 3' - 4' | | <0.54 | Silty Sand |
| | | 4' - 5' | | 1.6 | Silty Sand |
| | | 5' - 6' | | 322 | Organic Silt/Sand |
| | | 6' - 7' | | <0.7 | Organic Silt/Sand |
| | | 7' - 8' | | <0.59 | Sandy Clay |
| | | 8' - 9' | | <0.61 | Sand to Silty Clay |
| | | 9' - 10' | | <0.65 | Silty Clay to Organic Silt/Sand |
| | | 10' - 11' | | <0.68 | Organic Silt/Sand/ Gravel |
| | | 11' - 12' | | <0.57 | Silty Clay |
| SA-SB-02-02 | E11 | 0' - 1' | 10/21/2003 | 0.761 | Silty Sand |
| | | 1' - 2' | | <0.552 | Silty Sand |
| | | 2' - 3' | | <0.577 | Silty Sand |
| | | 3' - 4' | | <0.559 | Silty Sand |
| | | 4' - 5' | | <0.577 | Silty Sand |
| | | 5' - 6' | | <0.611 | Silty Sand |
| | | 6' - 7' | | 282 | Silty Sand to Organic Silt/Sand |
| | | 7' - 8' | | 144 | Organic Silt/Sand |
| | | 8' - 9' | | 121 | Organic Silt/Sand |
| | | 9' - 10' | | 6.6 | Organic Silt/Sand to Silty Clay |
| | | 10' - 11' | | <0.62 | Silty Clay |
| | | 11' - 12' | | <0.632 | Silty Clay |
| SA-SB-02-03 | E11 | 0' - 1' | 10/21/2003 | <0.621 | Silty Sand |
| | | 1' - 2' | | <0.568 | Silty Sand |
| | | 2' - 3' | | <0.571 | Silty Sand |
| | | 3' - 4' | | <0.578 | Silty Sand |
| | | 4' - 5' | | <0.568 | Silty Sand |
| | | 5' - 6' | | <0.590 | Silty Sand |
| | | 6' - 7' | | <0.585 | Silty Sand |
| | | 7' - 8' | | 0.682 | Organic Silt/Sand |
| | | 8' - 9' | | 39.2 | Silty Sand |
| | | 9' - 10' | | <0.678 | Organic Silt/Sand |
| | | 10' - 11' | | 13.6 | Organic Silt/Sand to Clayey Silt |
| | | 11' - 12' | | <0.668 | Clayey Silt to Silty Clay |
| | | 12' - 13' | | <0.613 | Silty Clay |
| SA-SB-02-04 | E11 | 0' - 1' | 10/21/2003 | <0.659 | Silty Sand |
| | | 1' - 2' | | <0.602 | Silty Sand |
| | | 2' - 3' | | <0.588 | Silty Sand to Sand |
| | | 3' - 4' | | <0.550 | Sand |
| | | 4' - 5' | | <0.590 | Sand |
| | | 5' - 6' | | <0.564 | Sand |
| | | 6' - 7' | | <0.566 | Sand |
| | | 7' - 8' | | <0.578 | Sand |
| | | 8' - 9' | | <0.584 | Sand |
| | | 9' - 10' | | <0.610 | Organic Silt/Sand |
| | | 10' - 11' | | <0.621 | Silt/Sand |
| | | 11' - 12' | | <0.629 [<0.620] | Silt/Sand |
| | | 12' - 13' | | <0.636 | Silt/Sand |
| | | 13' - 14' | | 98.4 | Silt/Sand to Organic Silt/Sand |

**Table 2A**
**Bloody Brook**
**Post-Remediation Soil Cadmium Concentrations Remaining on Site**
**NYS Thruway to Brookview Lane**

| Boring ID[1] | Figure Coordinates[2] | Sampling Interval | Collection Date | Result (mg/kg) | General Soil Classification |
|---|---|---|---|---|---|
| SA-SB-03-01 | D14 | 2' - 3' | 10/21/2003 | 2.8 | Silty Sand |
| | | 3' - 4' | | 153 | Silty Sand to Organic Silt/Sand |
| | | 4' - 5' | | 372 | Organic Silt/Sand |
| | | 5' - 6' | | 1.8 | Clayey Sand to Sand |
| SA-SB-03-02 | D14 | 2' - 3' | 10/21/2003 | <0.605 | Silty Sand |
| | | 3' - 4' | | <0.608 | Silty Sand |
| | | 4' - 5' | | 142 | Organic Silt/Sand |
| | | 5' - 6' | | 36.6 | Organic Silt/Sand |
| | | 6' - 7' | | 3.58 | Organic Silt/Sand |
| | | 7' - 8' | | <0.726 | Organic Silt/Sand |
| SA-SB-03-03 | D14 | 0' - 1' | 10/21/2003 | <0.638 | Silty Sand |
| | | 1' - 2' | | <0.583 [<0.582] | Silty Sand |
| | | 2' - 3' | | <0.604 | Silty Sand |
| | | 3' - 4' | | <0.633 | Silty Sand |
| | | 4' - 5' | | <0.661 | Silty Sand |
| | | 5' - 6' | | 34.8 | Silty Sand to Organic Silt/Sand |
| | | 6' - 7' | | 14.1 | Organic Silt/Sand |
| | | 7' - 8' | | <0.707 | Organic Silt/Sand to Organic Silty Clay |
| | | 8' - 9' | | <0.677 | Organic Silty Clay |
| SA-SB-03-04 | D14 | 0' - 1' | 10/21/2003 | <0.629 | Silty Sand |
| | | 1' - 2' | | <0.600 | Silty Sand |
| | | 2' - 3' | | <0.590 [<0.590] | Silty Sand |
| | | 3' - 4' | | <0.578 | Silty Sand |
| | | 4' - 5' | | <0.605 | Silty Sand |
| | | 5' - 6' | | <0.610 | Silty Sand |
| | | 6' - 7' | | <0.622 | Silty Sand |
| | | 7' - 8' | | 19.0 | Silty Sand to Organic Sandy Silt |
| | | 8' - 9' | | <0.749 | Organic Sandy Silt to Silty Clay |
| | | 9' - 10' | | 1.61 | Silty Sand |
| SA-SB-04-01 | C15 | 0' - 1' | 10/20/2003 | <0.613 | Silty Sand |
| | | 1' - 2' | | <0.589 | Silty Sand |
| | | 2' - 3' | | <0.566 | Silty Sand |
| | | 3' - 4' | | <0.572 | Silty Sand |
| | | 4' - 5' | | <0.573 | Clay/Silt |
| | | 5' - 6' | | <0.610 | Clay/Silt |
| | | 6' - 7' | | <0.583 | Clay/Silt |
| | | 7' - 8' | | <0.629 | Clay/Silt |
| | | 8' - 9' | | 7.84 | Clay/Silt |
| | | 9' - 10' | | <0.671 | Organic Silt/Sand |
| | | 10' - 11' | | 3.73 | Clay |
| SA-SB-04-02 | C15 | 0' - 1' | 10/20/2003 | <0.597 | Silty Sand |
| | | 1' - 2' | | <0.602 | Silty Sand |
| | | 2' - 3' | | <0.586 | Silty Sand |
| | | 3' - 4' | | <0.602 | Silty Sand |
| | | 4' - 5' | | <0.573 | Silty Sand to Sand |
| | | 5' - 6' | | <0.613 [<0.595] | Sand to Silty Sand |
| | | 6' - 7' | | 139 | Silty Clay to Organic Clayey Silt |
| | | 7' - 8' | | 1.73 | Organic Silt/Sand |
| | | 8' - 9' | | 11.9 | Organic Silt/Sand |

**Table 2A**
**Bloody Brook**
**Post-Remediation Soil Cadmium Concentrations Remaining on Site**
**NYS Thruway to Brookview Lane**

| Boring ID[1] | Figure Coordinates[2] | Sampling Interval | Collection Date | Result (mg/kg) | General Soil Classification |
|---|---|---|---|---|---|
| SA-SB-04-03 | C15 | 0' - 1' | 10/20/2003 | 2.17 | Silty Sand |
| | | 1' - 2' | | <0.588 | Silty Sand |
| | | 2' - 3' | | <0.561 | Silty Sand |
| | | 3' - 4' | | <0.617 | Silty Sand |
| | | 4' - 5' | | <0.603 | Silty Sand |
| | | 5' - 6' | | <0.635 | Silty Sand |
| | | 6' - 7' | | 1,920 | Silty Sand to Organic Silt/Sand |
| | | 7' - 8' | | 199 | Organic Silt/Sand |
| SA-SB-04-04 | C15 | 2' - 3' | 10/20/2003 | <0.56 | Sandy Silt |
| | | 3' - 4' | | <0.59 | Silty Sand |
| | | 4' - 5' | | <0.58 | Silty Sand |
| | | 5' - 6' | | 84.7 | Silty Sand to Organic Silt/Sand |
| | | 6' - 7' | | 112 | Organic Silt/Sand |
| | | 7' - 8' | | 456 | Silty Sand |
| SB-51 | E4 | 2' - 3' | 11/2002 | 4.9 | Sandy Silt |
| | | 3' - 4' | | 7.2 | Sandy Silt |
| SB-52 | G7 | 2' - 3' | 11/2002 | 1.8 | Clayey Silt |
| | | 3' - 4' | | <0.67 | Clayey Silt |
| SB-53 | F8 | 0' - 1' | 11/2002 | <0.61 | Topsoil |
| | | 1' - 2' | | <0.58 | Sandy Silt |
| | | 2' - 3' | | <0.56 | Sandy Silt |
| | | 3' - 4' | | <0.55 | Sandy Silt |
| SB-60 | C15 | 2' - 3' | 11/2002 | 4.5 | Clayey Silt |
| | | 3' - 4' | | 139 | Clayey Silt/Peat |
| SB-201 | E8 | 0' - 1' | 11/2002 | <0.61 | Sandy Silt |
| | | 1' - 2' | | <0.58 | Sandy Silt |
| | | 2' - 3' | | <0.55 | Sandy Silt |
| | | 3' - 4' | | <0.56 | Sand |
| SB-202 | E10 | 2' - 3' | 11/2002 | 8.7 | Sandy Silt |
| | | 3' - 4' | | 2,330 | Sandy Silt/Peat |
| SB-203 | D12 | 0' - 1' | 11/2002 | 6.1 | Silty Sand |
| | | 1' - 2' | | <0.58 | Silty Sand |
| | | 2' - 3' | | 2.0 | Silty Sand |
| | | 3' - 4' | | 353 | Silty Sand |
| SB-204 | D12 | 2' - 3' | 11/2002 | 80.4 | Silty Sand |
| | | 3' - 4' | | 219 | Silty Sand/Peat |
| SB-205 | D13 | 2' - 3' | 11/2002 | 148 | Fill/Sandy Silt |
| | | 3' - 4' | | 291 | Sandy Silt/Peat |
| SB-206 | C14 | 2' - 3' | 11/2002 | 79.8 | Sandy Silt/Peat |
| | | 3' - 4' | | 82.6 | Peat |
| SB-207 | D15 | 2' - 3' | 11/2002 | 71.4 | Sandy Silt |
| | | 3' - 4' | | 125 | Silty Sand |
| SB-217 | C1 | 2' - 3' | 10/29/2003 | 0.68 | Sandy Silt |
| | | 3' - 4' | | <0.65 | Clayey Silt |
| | | 4' - 5' | | <0.53 | Till |
| SB-218 | D1 | 0' - 1' | 10/29/2003 | 0.76 | Silty Sand |
| | | 1' - 2' | | <0.60 | Silty Sand |
| | | 2' - 3' | | <0.60 | Fill |
| | | 3' - 4' | | <0.67 | Fill to Organic Silt Sand to Silt/Sand/ Gravel |
| | | 4' - 5' | | <0.63 | Silt/Sand/ Gravel |
| | | 5' - 6' | | <0.56 | Silt/Sand/ Gravel/Peat |
| | | 6' - 7' | | <0.55 | Till |
| SB-219 | D4 | 5' - 6' | 10/30/2003 | <0.54 | Till |

**Table 2A**
**Bloody Brook**
**Post-Remediation Soil Cadmium Concentrations Remaining on Site**
**NYS Thruway to Brookview Lane**

| Boring ID[1] | Figure Coordinates[2] | Sampling Interval | Collection Date | Result (mg/kg) | General Soil Classification |
|---|---|---|---|---|---|
| SB-220 | E4 | 0' - 1' | 10/30/2003 | <0.60 | Silty Sand |
| | | 1' - 2' | | <0.57 | Silty Sand |
| | | 2' - 3' | | <0.56 | Silty Sand |
| | | 3' - 4' | | <0.58 | Silty Sand |
| | | 4' - 5' | | <0.54 | Silt/Sand/ Gravel/Cobble |
| | | 5' - 6' | | <0.56 | Silt/Sand/ Gravel/Cobble |
| | | 6' - 7' | | <0.54 | Silt/Sand/ Gravel/Cobble |
| | | 7' - 8' | | <0.56 | Silt/Sand/ Gravel/Cobble |
| SB-221 | E5 | 3' - 4' | 10/28/2003 | 13.3 | Sandy Silt to Till |
| | | 4' - 5' | | <0.56 | Till |
| SB-222 | E4 | 2' - 3' | 10/28/2003 | 1.3 | Silty Sand |
| | | 3' - 4' | | 0.65 | Organic Silt/Sand |
| | | 4' - 5' | | 8.1 | Organic Silt/Sand |
| | | 5' - 6' | | <0.53 | Till |
| SB-223 | F5 | 2' - 3' | 10/28/2003 | 7.5 | Organic Silt/Sand |
| | | 3' - 4' | | 2.5 [2.8] | Organic Silt/Sand |
| | | 4' - 5' | | 26.6 | Till |
| | | 5' - 6' | | <0.55 | Till |
| | | 6' - 7' | | <0.533 | Till |
| | | 7' - 8' | | <0.545 | Till |
| SB-224 | F5 | 4' - 5' | 10/28/2003 | 17.5 | Till |
| | | 5' - 6' | | <0.54 | Till |
| | | 6' - 7' | | <0.546 | Till |
| SB-225 | G7 | 5' - 6' | 10/27/2003 | <0.50 | Silty Sand/Gravel/Cobbles |
| | | 6' - 7' | | <0.51 | Silty Sand/Gravel/Cobbles |
| | | 7' - 8' | | <0.52 | Silty Sand/Gravel/Cobbles |
| SB-226 | G7 | 2' - 3' | 10/27/2003 | 4.2 [3.9] | Organic Silt/Sand |
| | | 3' - 4' | | 0.80 | Organic Silt/Sand |
| | | 4' - 5' | | 4.3 | Till |
| | | 5' - 6' | | <0.55 | Till |
| | | 6'-7' | | <0.53 | Till |
| | | 7' - 8' | | <0.53 | Till |
| SB-227 | D4 | 2' - 3' | 10/28/2003 | 86.4 | Sandy Silt |
| | | 3' - 4' | | 13.7 | Organic Silt/Sand to Till |
| SB-400 | E3 | 0' - 1' | 10/30/2003 | <0.59 | Topsoil |
| | | 1' - 2' | | <0.56 | Silty Sand |
| | | 2' - 3' | | <0.54 | Silty Sand |
| | | 3' - 4' | | <0.53 | Silty Sand |
| | | 4' - 5' | | <0.55 | Silty Sand |
| | | 5' - 6' | | <0.55 | Silty Sand |
| | | 6' - 7' | | <0.53 | Silty Sand/ Gravel |
| | | 7' -8 ' | | <0.54 | Silty Sand/ Gravel |
| | | 8' - 9' | | <0.55 | Sand |
| | | 9' - 10' | | <0.54 | Sand |
| | | 10' - 11' | | <0.56 | Silty Sand/ Gravel |
| | | 11' - 12' | | <0.53 | Silty Sand/ Gravel |
| | | 12' - 13' | | <0.56 | Silty Sand/ Gravel |
| | | 13' - 14' | | <0.54 | Silty Sand/ Gravel |
| | | 14' - 15' | | <0.55 | Silty Sand/ Gravel |
| | | 15' - 16' | | <0.54 | Silty Sand/ Gravel |
| SB-401 | B1 | 2' - 3' | 10/28/2003 | 35.6 | Organic Silt/Sand to Till |
| | | 3' - 4' | | <0.55 | Till |

**Table 2A**
**Bloody Brook**
**Post-Remediation Soil Cadmium Concentrations Remaining on Site**
**NYS Thruway to Brookview Lane**

| Boring ID[1] | Figure Coordinates[2] | Sampling Interval | Collection Date | Result (mg/kg) | General Soil Classification |
|---|---|---|---|---|---|
| SB-402 | D2 | 2' - 3' | 10/29/2003 | <0.68 | Organic Silt/Sand /Gravel |
| | | 3' - 4' | | <0.63 | Organic Silt/Sand /Gravel |
| | | 4' - 5' | | <0.64 | Organic Silt/Sand /Gravel |
| | | 5' - 6' | | <0.61 [<0.61] | Organic Silt/Sand /Gravel to Sand |
| | | 6' - 7' | | <0.56 | Till |
| SB-403 | D4 | 2' - 3' | 10/30/2003 | 89.1 | Silt/Sand/ Gravel/Cobble |
| | | 3' - 4' | | 5.3 | Silt/Sand/ Gravel/Cobble |
| SB-404 | E4 | 2' - 3' | 10/28/2003 | <0.57 | Silty Sand |
| | | 3' - 4' | | <0.54 | Silty Sand |
| | | 4' - 5' | | <0.53 | Till |
| SB-405 | F6 | 0' - 1' | 10/28/2003 | <0.61 | Silty Sand |
| | | 1' - 2' | | <0.64 | Silty Sand |
| | | 2' - 3' | | <0.56 | Sand/Gravel |
| | | 3' - 4' | | <0.60 | Fill |
| | | 4' - 5' | | <0.63 | Fill |
| | | 5' - 6' | | <0.54 | Silty Sand |
| | | 6' - 7' | | <0.53 | Till |
| SB-406 | G7 | 0' - 1' | 10/27/2003 | 0.92 | Gravel |
| | | 1' - 2' | | <0.56 | Silty Sand |
| | | 2' - 3' | | <0.52 [<0.55] | Silty Sand |
| | | 3' - 4' | | <0.55 | Silty Sand |
| | | 4' - 5' | | <0.56 | Silty Sand |
| | | 5' - 6' | | <0.53 | Silty Sand |
| | | 6' - 7' | | <0.53 | Silty Sand |
| | | 7' - 8' | | <0.54 | Silty Sand |
| SB-407 | H7 | 2' - 3' | 10/30/2003 | <0.59 [<0.58] | Organic Silt/Sand |
| | | 3' - 4' | | <0.60 | Organic Silt/Sand |
| | | 4' - 5' | | 49.1 | Organic Silt/Sand to Peat |
| | | 5' - 6' | | <0.56 | Till |
| SB-408 | F8 | 0' - 1' | 10/27/2003 | 1.1 | Silty Sand |
| | | 1' - 2' | | <0.62 | Silty Sand |
| | | 2' - 3' | | <0.54 | Silty Sand |
| | | 3' - 4' | | <0.52 | Sand/Gravel/Cobbles |
| | | 4' - 5' | | <0.52 | Sand/Gravel/Cobbles |
| | | 5' - 6' | | <0.52 | Sand/Gravel/Cobbles |
| | | 6' - 7' | | <0.56 | Clayey Silt |
| | | 7' - 8' | | <0.54 | Clayey Silt |
| SB-409 | G8 | 6' - 7' | 10/28/2003 | 2.4 | Organic Silt/Sand |
| | | 7' - 8' | | 0.96 | Sand/Gravel |
| | | 8' - 9' | | 1,540 | Peat to Organic Silt/Sand |
| | | 9' - 10' | | 1.2 | Organic Silt/Sand to Sand/Gravel |
| | | 10' - 11' | | <0.56 | Sand/Gravel |
| | | 11' - 12' | | <0.53 | Till |
| SB-411 | H8 | 2' - 3' | 10/28/2003 | <1.0 | Organic Silt/Sand |
| | | 3' - 4' | | <0.78 | Organic Silt/Sand |
| | | 4' - 5' | | 2.1 | Organic Silt/Sand |
| | | 5' - 6' | | <0.63 | Organic Silt/Sand to Sand/Gravel |
| | | 6' - 7' | | <0.60 [<0.63] | Sand |
| | | 7' - 8' | | <0.56 | Sand to Till |
| SB-412 | H8 | 5' - 6' | 10/28/2003 | 13.6 | Organic Silt/Sand |
| | | 6' - 7' | | 16.3 | Till |
| | | 7' - 8' | | 1.1 | Till |

**Table 2A**
**Bloody Brook**
**Post-Remediation Soil Cadmium Concentrations Remaining on Site**
**NYS Thruway to Brookview Lane**

| Boring ID[1] | Figure Coordinates[2] | Sampling Interval | Collection Date | Result (mg/kg) | General Soil Classification |
|---|---|---|---|---|---|
| SB-413 | E10 | 4' - 5' | 10/20/2003 | 2.2 | Organic Silt/Sand |
| | | 5' - 6' | | 3.5 | Organic Clayey Sand |
| | | 6' - 7' | | <0.85 | Organic Silt/Sand |
| SB-414 | E10 | 6' - 7' | 10/24/2003 | 1.3 | Organic Clayey Silt |
| | | 7' - 8' | | <0.72 | Organic Silt/Sand |
| SB-435 | C1 | 2' - 3' | 4/28/2004 | 4.43 [4.87] | Till |
| SB-436 | B1 | 2' - 3' | 4/28/2004 | <0.736 | Organic Silt |
| SB-437 | B2 | 0' - 1' | 4/28/2004 | <0.655 | Organic Silt |
| | | 1' - 2' | | <0.644 | Organic Silt |
| | | 2' - 3' | | <0.596 | Silt |
| | | 3' - 4' | | <0.605 | Silt |
| SB-438 | C4 | 0' - 1' | 4/28/2004 | 1.91 | Organic Silty Sand |
| | | 1' - 2' | | 1.03 | Organic Silty Sand |
| | | 2' - 3' | | 4.63 | Silty Sand |
| | | 3' - 4' | | 5.65 | Silty Sand |
| SB-439 | E4 | 0' - 1' | 4/28/2004 | <0.641 | Organic Silty Sand |
| | | 1' - 2' | | <0.634 [<0.628] | Organic Silty Sand |
| SB-440 | E6 | 0' - 1' | 4/28/2004 | <0.644 | Silty Sand |
| | | 1' - 2' | | <0.614 | Sand |
| | | 2' - 3' | | <0.576 | Sand |
| | | 3' - 4' | | <0.590 | Sand |
| | | 4' - 5' | | <0.610 | Sand |
| SB-441 | F5 | 2' - 3' | 4/28/2004 | 2.37 | Silty Sand |
| SB-442 | G7 | 0' - 1' | 4/28/2004 | 0.685 | Organic Silty Sand |
| | | 1' - 2' | | <0.618 | Organic Silty Sand |
| | | 2' - 3' | | <0.618 | Sandy Silty Clay |
| SB-443 | G7 | 2' - 3' | 4/28/2004 | <0.871 | Organic Silt |
| | | 3' - 4' | | <0.624 | Silty Sandy Clay |
| SB-444 | H8 | 2' - 3' | 4/28/2004 | 28.4 | Sandy Silt |
| | | 3' - 4' | | 1.05 | Sandy Silt |
| | | 4' - 5' | | 0.973 | Sandy Silt |
| SB-445 | G7 | 4' - 5' | 4/28/2004 | 58.4 | Silty Sand |
| SB-448 | H9 | 0' - 1' | 4/28/2004 | 1.66 | Silty Sand |
| | | 1' - 2' | | <0.608 | Sandy Silt |
| | | 2' - 3' | | <0.605 | Sandy Silt |
| | | 3' - 4' | | 3,800 | Sandy Silt |
| | | 4' - 5' | | 2,120 | Sandy Silt |
| | | 5' - 6' | | 16.9 | Sand & Silt |
| SB-449 | G9 | 2' - 3' | 4/29/2004 | <0.609 | Clayey Silt |
| | | 3' - 4' | | <0.613 | Clayey Silt |
| | | 4' - 5' | | <0.64 | Clayey Silt |
| | | 5' - 6' | | <0.619 | Silty Clay |
| | | 6' - 7' | | 84.7 | Clayey Silt |
| | | 7' - 8' | | 2,220 | Organic Silt |
| | | 8' - 9' | | 8.27 | Silt |
| | | 9' - 10' | | 14.6 | Sandy Silt |
| | | 10' - 11' | | 18.3 | Organic Silt |
| | | 11' - 11.5' | | 8.21 | Sandy Silt |
| SB-450 | F9 | 2' - 3' | 4/29/2004 | 38.0 | Organic Clayey Silt |
| | | 3' - 4' | | 10.4 | Silt |
| | | 4' - 4.5' | | 1.44 | Silty Sand |

## Table 2A
## Bloody Brook
## Post-Remediation Soil Cadmium Concentrations Remaining on Site
## NYS Thruway to Brookview Lane

| Boring ID[1] | Figure Coordinates[2] | Sampling Interval | Collection Date | Result (mg/kg) | General Soil Classification |
|---|---|---|---|---|---|
| SB-452 | E10 | 0' - 1' | 4/29/2004 | <0.654 | Topsoil |
| | | 1' - 2' | | <0.623 | Clayey Silt |
| | | 0' - 1' | | <0.607 | Clayey Silt |
| | | 1' - 2' | | <0.620 | Silt |
| | | 2' - 3' | | <0.619 | Sandy Silt |
| | | 3' - 4' | | <0.605 | Clayey Silt |
| | | 4' - 5' | | <0.588 | Clayey Silt |
| | | 5' - 6' | | 1.46 | Sandy Silt |
| SB-457 | C2 | 2' -2.25' | 4/29/2004 | 3.9 | Sandy Silt |
| SB-459 | C2 | 2' - 3' | 4/29/2004 | 30.3 | Organic Clayey Silt |
| SSSWP-1N | F8 | 0" - 6" | 4/27/2011 | 1.8 | Silt and fine sand, organics |
| | | 6" - 12' | | 0.045 J | Fine sand |
| | | 1' - 2' | | 0.048 J | Fine sand, wet |
| SSSWP-1S | F8 | 0" - 6" | 4/27/2011 | 6.8 | Sandy silt with organics |
| | | 6" - 12' | | 4.3 | Sandy silt with organics |
| | | 1' - 2' | | 3.2 | Sandy silt with organics, trace gravel |
| SSSWP-1W | F8 | 0" - 6" | 4/27/2011 | 2.6 | Sandy silt with organics |
| | | 6" - 12' | | 0.40 | Silty sand with organics |
| | | 1' - 2' | | 0.58 J | Fine sand |
| SSSWP-2 | F7 | 0" - 6" | 12/19/2007 | 2.2 | --- |
| | | 6" - 15" | | 0.62 | --- |
| SSSWP-3 | F7 | 0" - 6" | 12/19/2007 | 0.77 | --- |
| | | 6" - 24" | | <0.05 | --- |
| SSSWP-4 | F6 | 0" - 6" | 12/19/2007 | 4.7 | --- |
| | | 6" - 24" | | <0.04 | --- |
| SSSWP-5 | E5 | 0" - 6" | 12/19/2007 | 3.2 | --- |
| | | 6" - 24" | | 0.28 | --- |

**Notes:**

1. Boring locations are shown on Figure 3A.
2. Figure coordinates correspond to coordinate system shown on Figure 3A.
3. Highlighted result indicates the presence of residual cadmium as defined in the SMP.
4. mg/kg = milligrams/kilograms (equivalent to ppm = parts per million).
5. Duplicate results are presented in brackets.
6. B - Compound was found in the blank and sample.
7. J - The detected concentration is an estimated value.
8. U - Result edited to reflect non-detect by data validation company due to presence of cadmium in the associated preparation blank at similar concentrations.
9. < - Analyte not detected at the reporting limit shown.
10. Any soil borings (the full boring or only down to a particular depth) that were fully removed during excavation activities have been omitted for this summary.

**Table 2B**
**Bloody Brook**
**Post-Remediation Soil Cadmium Concentrations Remaining on Site**
**Brookview Lane to Old Liverpool Road**

| Boring ID[1] | Figure Coordinates[2] | Sampling Interval | Collection Date | Result (mg/kg) | General Soil Classification |
|---|---|---|---|---|---|
| B-6 | E29 | 0.80' - 1.5' | 11/24/2003 | 0.97 | --- |
| | | 1.5' - 7.5' | | <0.59 | --- |
| B-7 | D29 | 0' - 1.5' | 11/24/2003 | 2 | --- |
| | | 1.5' - 10' | | 2.5 | --- |
| B-8 | E28 | 0' - 2.5' | 11/24/2003 | 0.72 | --- |
| | | 2.5' - 10' | | 0.93 | --- |
| B-9 | F27 | 0' - 1' | 11/24/2003 | <0.62 | --- |
| | | 1' - 10' | | <0.57 | --- |
| B-10 | F22 | 0' - 1.5' | 11/25/2003 | 7 | --- |
| | | 1.5' - 10' | | 0.95 | --- |
| DI-04-01 | F17 | 0' - 1' | 4/25/2011 | 1.7 | Silt with little clay & little sand |
| | | 5' - 6' | | 0.29 | Silty clay with some fine sand |
| | | 6' - 7' | | 1.4 | Clay with little silt (organics) |
| | | 7' - 8' | | 332 | Clay with little silt (organics) |
| | | 8' - 9' | | 0.98 | Clay with little silt (organics) |
| DI-05-01 | F17 | `` | 4/24/2015 | 0.091 J | Tan to brown silt, little low plasticity clay |
| | | 5' - 6' | | 0.83 | Tan to brown silt, some medium plasticity clay |
| | | 6' - 7' | | 0.051 J | Brown high plasticity clay, little silt |
| | | 7' - 8' | | 0.13 J | Tan to brown high plasticity clay |
| DI-05-04 | F18 | 2' - 3' | 6/17/2015 | 3.3 | Brown fine sand, gravel |
| | | 3' - 4' | | 0.45 | Brown fine sand, gravel |
| DI-05-05 | F18 | 0' - 1' | 6/17/2015 | 0.22 J | Very fine brown sand, silt |
| | | 1' - 2' | | 0.11 J | Brown silt, some very fine sand, trace clay |
| DI-06-01 | F18 | 0' - 1' | 4/25/2011 | 1.4 | Fine sand with little silt |
| | | 1' - 2' | | 0.19 J | Fine sand with little silt |
| | | 2' - 3' | | 0.24 | Silt with some fine sand & trace clay |
| | | 3' - 4' | | 0.25 | Silt with some fine sand & trace clay |
| | | 4' - 5' | | 0.47 | Silt with some fine sand & trace clay |
| | | 5' - 6' | | 10.5 | Silt with little sand & little clay |
| | | 6' - 7' | | 0.48 | Silt with little sand & little clay |
| | | 7' - 8' | | <0.26 U | Gray clay at 7'-6" |
| DI-06-02 | F18 | 4' - 5' | 4/25/2011 | 0.20 J | Silt with little clay |
| | | 5' - 6' | | 3.2 | Silt with little clay |
| | | 6' - 7' | | 0.26 J | Silt with little clay |
| DI-07-01 | F20 | 2' - 3' | 8/14/2009 | 20.7 J | Silt & sand |
| | | 3' - 4' | | 1.16 J | Silt & clay |
| DI-07-02 | F20 | 2' - 3' | 8/14/2009 | 10.8 J | Silt & clay/gravel |
| | | 3' - 4' | | 12.1 J | Silt & sand/clay |
| | | 4' - 5' | | 6.11 J | Silt & sand/clay |
| | | 5' - 6' | | 5.25 J | Silt & sand/clay |
| DI-07-03 | F20 | 0' - 1' | 8/14/2009 | 0.422 | Silt & clay/gravel & organics |
| | | 1' - 2' | | 0.535 | Silt & clay |
| | | 2' - 3' | | 7.38 | Silt & clay |
| | | 3' - 4' | | 3.39 | Silty clay |
| | | 4' - 5' | | 5.06 | Silt & sand/clay & gravel |
| | | 5' - 6' | | 73 | Silt & clay |
| | | 6' - 7' | | <0.267 | Silty clay/sand |
| | | 7' -8' | | <0.261 | Silt & sand |
| | | 8' - 9' | | 0.277 J | Silty clay/sand |
| | | 9' -10' | | 1.49 | Silty clay to sand |
| | | 10' - 11' | | <0.243 | Sand/clay to silty clay |
| DI-08-01 | F21 | 0' - 1' | 4/26/2011 | 0.25 | Clayey silt, sand |
| | | 1' - 2' | | 0.24 | Sand, silty clay |
| | | 2' - 3' | | 0.38 | Silty clay |
| | | 3' - 4' | | 0.10 J | Silty clay |
| | | 4' - 5' | | 5.6 | Clayey silt, silty clay |
| | | 5' - 6' | | 1.0 | Silty clay, clayey silt |
| DI-09-01 | F21 | 2 - 3' | 9/21/2009 | 5.74 | Sand & silt, trace organics & gravel |
| | | 3 - 4' | | 0.246 | Silt & sand, trace gravel |
| | | 4 - 5' | | 0.254 | Sand & silt |
| | | 5 - 6' | | 4.21 | Silt & sand, trace gravel |
| | | 6 - 7' | | 9.12 | Silt |

**Table 2B**
**Bloody Brook**
**Post-Remediation Soil Cadmium Concentrations Remaining on Site**
**Brookview Lane to Old Liverpool Road**

| Boring ID[1] | Figure Coordinates[2] | Sampling Interval | Collection Date | Result (mg/kg) | General Soil Classification |
|---|---|---|---|---|---|
| DI-09-02 | F21 | 2 - 3' | 9/21/2009 | 0.982 | Sand & silt, organics & trace clay |
| | | 3 - 4' | | 0.77 | Silt & sand, trace organics |
| | | 4 - 5' | | 9.40 | Silt & sand, trace organics |
| | | 5 - 6' | | 5.76 | Silty clay & fine sand |
| | | 6 - 7' | | 3.55 | Fine sand & silt |
| DI-11-01 | F22 | 2' - 3' | 8/14/2009 | 3.76 | Silt with sand/clay & gravel |
| | | 3' - 4' | | 49 | Silt with sand/clay & gravel |
| DI-11-02 | F22 | 0' - 1' | 8/14/2009 | 0.431 [0.276] | Silt with gravel/organics |
| | | 1' - 2' | | 0.062 J | Silt with clay/gravel & organics |
| | | 2' - 3' | | 0.266 | Silt with gravel |
| | | 3' - 4' | | 0.240 | Silt |
| | | 4' - 5' | | 0.213 J | Silt with gravel |
| | | 5' - 6' | | 0.074 J | Silt with gravel |
| DI-11-03 | F22 | 0' - 1' | 8/14/2009 | <0.261 | Silt & clay/organics & gravel |
| | | 1' - 2' | | 0.523 | Silt & clay/organics & gravel |
| | | 2' - 3' | | 0.154 J | Silt with gravel/organics |
| | | 3' - 4' | | 0.327 | Silt with gravel/organics |
| | | 4' - 5' | | <0.253 | Silt with gravel/organics |
| | | 5' - 6' | | 0.061 J | Silt with gravel/organics, some sand |
| | | 6' - 7' | | <0.243 | Silt with gravel/organics, some sand |
| | | 7' -8' | | <0.250 | Silt with gravel/organics, some sand |
| | | 8' - 9' | | <0.265 | Silt/clay |
| | | 9' -10' | | <0.235 | Silty clay/sand |
| | | 10' - 11' | | <0.267 | Silty clay/sand |
| DI-13-01 | F27 | 4' - 5' | 8/23/2011 | 0.19 J [0.14 J] | Sandy silt to 4'-6" then silty clay |
| | | 5' - 6' | | 0.22 J | Clay, trace silt |
| | | 6' - 7' | | 0.16 J | Clay, trace silt |
| DI-13-03 | F27 | 0' - 1' | 8/23/2011 | 0.91 | Fine sand, some gravel, organics |
| | | 1' - 2' | | 0.072 J | Fine sand, some gravel |
| | | 2' - 3' | | 0.25 | Fine sand, some gravel, organics |
| | | 3' - 4' | | 0.11 J | Fine sand, some gravel, organics |
| | | 4' - 5' | | 5.8 | Clayey silt, increasing clay with depth |
| | | 5' - 6' | | 1.1 | Silty clay to 5'-8" then silt |
| | | 6' - 7' | | <0.22 | Clayey silt |
| DI-14-01 | E27 | 0' - 1' | 8/23/2011 | 0.50 | Sand, some gravel, trace silt |
| | | 1' - 2' | | 0.14 J [0.40] | Sand, some gravel, some silt |
| | | 2' - 3' | | 0.15 J | Sand, some gravel, some silt, trace clay |
| | | 3' - 4' | | 0.045 J | Sand, some gravel, trace silt |
| | | 4' - 5' | | 5.3 | Sand, some gravel, trace silt to 4'-6" then silt, trace clay |
| | | 5' - 6' | | 78.1 | Silt with organics, trace clay |
| | | 6' - 7' | | 0.42 | Silt with less organics, trace clay |
| DI-14-02 | E27 | 4' - 5' | 8/23/2011 | 0.058 J | Sand, some gravel, trace silt |
| | | 5' - 6' | | 4.9 J | Sand, some gravel, trace silt to 5'-6" then silt, organics, trace clay |
| | | 6' - 7' | | 4.6 J | Silt, organics, trace clay |
| | | 7' - 8' | | 0.52 J | Clayey silt, trace fine sand |
| DI-15-01 | C30 | 2' - 3' | 8/22/2011 | 18 | Silty sand, little gravel, trace clay |
| | | 3' - 4' | | 4.9 | Silty sand, little gravel, trace clay |
| | | 4' - 5' | | 0.27 | Silt, trace clay |
| | | 5' - 6' | | 0.21 J | Silt, little clay |
| | | 6' - 7' | | 0.19 J | Silt, little clay |
| DI-15-02 | C30 | 0' - 1' | 8/22/2011 | 2.5 | Silty sand & gravel, trace clay |
| | | 1' - 2' | | 3.7 | Silty sand & gravel, trace clay |
| | | 2' - 3' | | 2.3 | Sandy silt with little gravel, trace clay |
| | | 3' - 4' | | 2.9 | Sandy silt with little gravel, trace clay |
| | | 4' - 5' | | 1.5 | Silt, little clay (green & red mottling) |
| | | 5' - 6' | | 0.26 [0.20 J] | Silt, little clay |
| | | 6' - 7' | | 0.14 J | Silt, little clay |
| DI-32-01 | E18 | 0' - 1' | 4/24/2015 | 0.28 | Brown loam, some low plasticity clay, little silt |
| | | 1' - 2' | | 0.076 J [0.22 J] | Tan silt, some low plasticity clay |
| | | 2' - 3' | | 0.068 J | Tan silt, some low plasticity clay |
| | | 3' - 4' | | 0.30 | Tan low plasticity clay, some silt |
| | | 4' - 5' | | 1.9 | Tan to brown silt, some clay, trace fine sand |
| | | 5' - 6' | | 2.0 | Tan to brown silt, some clay, trace fine sand |
| | | 6' - 7' | | 90.9 [86.7] | Tan to brown silt, some clay, trace fine sand |
| | | 7' - 8' | | 10.6 | Tan to brown silt, some clay, trace fine sand |

**Table 2B**
**Bloody Brook**
**Post-Remediation Soil Cadmium Concentrations Remaining on Site**
**Brookview Lane to Old Liverpool Road**

| Boring ID[1] | Figure Coordinates[2] | Sampling Interval | Collection Date | Result (mg/kg) | General Soil Classification |
|---|---|---|---|---|---|
| DI-32-02 | E18 | 5' - 6' | 4/24/2015 | 0.21 J | Brown silt, some high plasticity clay |
| | | 6' - 7' | | 0.23 J | Brown high plasticity clay, some silt |
| | | 7' - 8' | | 75.3 | Brown high plasticity clay, some silt |
| DI-32A-01 | F20 | 0 - 1' | 9/21/2009 | 0.276 [0.215 J] | Silt, organics and gravel |
| | | 1 - 2' | | 1.72 | Sand & silt, gravel |
| | | 2 - 3' | | 4.71 | Sand & silt, gravel |
| | | 3 - 4' | | 0.591 | Sand & silt, gravel |
| | | 4 - 5' | | 78.6 | Sand & silt, gravel |
| | | 5 - 6' | | 6.53 | Sand & silt, gravel |
| DI-32C-01 | F21 | 0 - 1' | 9/21/2009 | 0.444 | Sand & silt, organics |
| | | 1 - 2' | | 1.19 | Sand & silt, gravel |
| | | 2 - 3' | | 0.238 [0.180 J] | Sand & silt, gravel |
| | | 9 - 10' | | <0.255 | Silty clay |
| | | 10 - 11' | | <0.235 | Silty clay |
| DI-32C-02 | F21 | 0 - 1' | 9/21/2009 | 0.460 | Sand & silt, organics |
| | | 1 - 2' | | 1.32 | Sand & silt, organics |
| | | 2 - 3' | | 0.164 J | Silt & sand, trace clay |
| DI-33-01 | G23 | 0' - 1' | 8/11/2009 | 2.26 | Gravel/silt and sand |
| | | 1' - 2' | | 2.48 | Silty clay with gravel |
| | | 2' - 3' | | 2.05 [2.74] | Silty clay with gravel |
| | | 3' - 4' | | 3.95 | Silty clay with gravel/organics |
| | | 4' - 5' | | 2.73 | Silty clay with gravel/organics |
| DI-45-01 | F19 | 4' - 5' | 4/25/2011 | 4.5 | Clay, silty clay, occasional roots |
| | | 5' - 6' | | 2.8 | Clay, clayey silt, silt, sandy silt |
| | | 6' - 7' | | 9.5 | Clayey silt, clay, sandy silt |
| | | 7' - 8' | | 0.58 | Clay |
| DI-45-02 | F19 | 2' - 3' | 4/25/2011 | 2.5 | Clay, silty clay |
| | | 3' - 4' | | 2.6 | Clay, silty clay |
| DI-45-03 | F19 | 0' - 1' | 4/25/2011 | 0.50 | Clay, silty clay |
| | | 1' - 2' | | 0.21 J | Clay, silty clay |
| DI-46-02 | F21 | 0' - 1' | 4/27/2011 | 0.79 | Clayey silt, silty clay, fine to coarse gravel |
| | | 1' - 2' | | 0.70 | Fine to coarse gravel, silty clay |
| DI-47-01 | F21 | 0' - 1' | 4/26/2011 | 2.2 | Clayey silt with little fine sand |
| | | 1' - 2' | | 2.6 | Clayey silt with little fine sand |
| DI-47-03 | F21 | 0' - 1' | 4/26/2011 | 0.60 | Clayey silt with little fine sand, trace gravel |
| | | 1' - 2' | | 1.4 | Clayey silt with little fine sand, trace gravel, less clay |
| DI-48-01 | F21 | 2' - 3' | 4/25/2011 | 6.5 B | Silty clay with clay |
| | | 3' - 4' | | 9.8 B | Clay with silty clay |
| DI-49-01 | G23 | 2' - 3' | 4/25/2011 | 3.3 BJ [0.84 BJ] | Clay, silty clay, little gravel |
| | | 3' - 4' | | 1.7 B | Clay, silty clay |
| DI-55-01 | G23 | 0' - 1' | 4/25/2011 | 2.6 B | Silty clay, clay |
| | | 1' - 2' | | 1.5 B | Clay |
| | | 2' - 3' | | 30.5 B | Clay, silty clay, clayey silt |
| | | 3' - 4' | | 12.5 B | Clayey silt, silt |
| DI-55-03 | F23 | 0' - 1' | 4/25/2011 | 0.52 | Clay, silty clay, roots |
| | | 1' - 2' | | 1.0 | Silty clay, silt, trace gravel |
| | | 2' - 3' | | 1.9 | Silty clay, little sand |
| | | 3' - 4' | | 0.87 | Silty clay, little sand |
| | | 4' - 5' | | 35.9 | Clayey silt, some sand |
| DI-55-04 | F23 | 4' - 5' | 6/4/2013 | 20.3 | Silty Clay, some sand |
| DI-58-03 | F27 | 4' - 5' | 6/4/2013 | 1.6 | Clayey silt, some sand, organics |
| | | 5' - 6' | | 0.22 J | Silty clay, green mottling (organics) |
| DI-58-05 | F26 | 1' - 2' | 8/13/2013 | 2.1 B | Silt and Clay, some sand, trace gravel |
| DI-63-01 | F19 | 0' - 1' | 6/4/2013 | 0.54 | Clay and silt, some sand and gravel |
| DI-64-03 | F21 | 2' - 3' | 8/13/2013 | 10.8 B | Sand and Silt, trace gravel |
| | | 3' - 4' | | 5.4 B | Clayey Silt and Sand |
| DI-70-02 | D28 | 0' - 1' | 6/3/2013 | 2.7 | Clayey silt, little sand, organics |
| DI-72-01 | F19 | 2' - 3' | 6/5/2013 | 2.7 J [6.1 J] | Silty clay, some sand, trace gravel, oxidation zones |
| | | 3' - 4' | | 7.7 J | Clayey silt and sand |
| DI-76-02 | G23 | 1' - 2' | 6/4/2013 | 1.6 | Silty clay, some sand, trace gravel |
| DI-79-01 | F23 | 4' - 5' | 6/4/2013 | 29.1 | Silt, some sand, and clay |
| DI-79-02 | F23 | 4' - 5' | 6/4/2013 | 13.9 | Clayey silt, some sand, trace gravel |

**Table 2B**
**Bloody Brook**
**Post-Remediation Soil Cadmium Concentrations Remaining on Site**
**Brookview Lane to Old Liverpool Road**

| Boring ID[1] | Figure Coordinates[2] | Sampling Interval | Collection Date | Result (mg/kg) | General Soil Classification |
|---|---|---|---|---|---|
| DI-SB-05-05 | F19 | 0' - 1' | 4/25/2011 | 0.94 | Silty sand, trace clay |
| | | 1' - 2' | | 0.24 [0.23] | Sandy silt |
| | | 2' - 3' | | <0.26 U | Silty sand |
| | | 3' - 4' | | 0.52 B | Fine sand with some gravel, trace silt |
| | | 4' - 5' | | 0.33 B | Grades to Sandy silt with little gravel |
| | | 5' - 6' | | 0.54 B | Sandy silt, trace gravel, trace clay |
| | | 6' - 7' | | 0.88 B | Sandy silt, trace gravel, trace clay |
| | | 7' - 8' | | 1.0 B | Clay, trace gravel at 7' |
| DI-SB-07-01 | B30 | 0' - 1' | 8/22/2011 | 0.93 | Course sand, some silt, little gravel, trace clay |
| | | 1' - 2' | | 1.4 | Coarse sand, some silt, little gravel & clay |
| | | 2' - 3' | | 0.061 J | Fine sandy silt, little to trace clay |
| | | 3' - 4' | | 0.12 J | Clayey silt, trace fine sand |
| | | 4' - 5' | | 0.060 J | Silty Clay |
| | | 5' - 6' | | <0.23 | Silty Clay |
| | | 6' - 7' | | <0.22 | Silty Clay, silt lense 6'-2", clay at 6'-8" |
| DI-SB-07-02 | B30 | 0' - 1' | 8/22/2011 | 0.32 | Silty Sand, some gravel |
| | | 1' - 2' | | 0.28 | Silty fine sand, trace clay & gravel |
| | | 2' - 3' | | 0.10 J | Silty fine sand, trace clay & gravel |
| | | 3' - 4' | | 0.13 J [0.21 J] | Sand, silt, little clay |
| | | 4' - 5' | | 0.064 J | Clayey silt - increasing clay with depth |
| | | 5' - 6' | | 0.035 J | Silty clay - increasing clay with depth |
| | | 6' - 7' | | 0.059 J | Clay, little to trace silt |
| SA-SB-05-02 | F19 | 0' - 1' | 10/22/2003 | 1.4 | Silty Sand |
| | | 1' - 2' | | <0.58 | Silty Sand |
| | | 2' - 3' | | 1.4 | Silty Sand |
| | | 3' - 4' | | <0.60 | Silty Sand |
| | | 4' - 5' | | <0.60 | Clayey Silt |
| | | 5' - 6' | | 12.5 | Clayey Silt |
| | | 6' - 7' | | <0.58 | Sandy Silt |
| | | 7' - 8' | | <0.59 | Sandy Silt to Organic Clayey Silt |
| | | 8' - 9' | | 5.1 | Organic Clayey Silt |
| | | 9' - 10' | | 5.9 | Organic Clayey Silt |
| | | 10' - 11' | | 8.1 | Organic Clayey Silt |
| SA-SB-05-03 | F19 | 4' - 5' | 10/22/2003 | <0.607 | Clayey Silt |
| | | 5' - 6' | | 2.5 | Organic Clayey Silt |
| | | 6' - 7' | | 0.587 | Organic Clayey Silt |
| | | 7' - 8' | | 20.5 | Organic Clayey Silt |
| | | 8' - 9' | | 21.8 | Clayey Silt |
| | | 9' - 10' | | <0.661 | Clayey Silt |
| SA-SB-05-04 | F19 | 4' - 5' | 10/22/2003 | 7.5 | Organic Silty Clay |
| | | 5' - 6' | | 2.4 | Organic Silty Clay |
| | | 6' - 7' | | 12.0 | Organic Silty Clay |
| | | 7' - 8' | | 11.3 | Organic Clayey Silt |
| | | 8' - 9' | | 20.9 | Organic Clayey Silt |
| | | 9' - 10' | | <0.72 | Organic Sand/Silt |
| | | 10' - 11' | | <0.85 | Organic Sand/Silt |
| | | 11' - 12' | | <0.63 | Silty Sand |
| | | 12' - 13' | | <0.68 | Organic Silt/Sand |
| | | 13' - 14' | | <0.68 | Organic Silt/Sand |
| SA-SB-06-01 | E28 | 4' - 5' | 10/24/2003 | 2.6 | Silty Sand |
| | | 5' - 6' | | 3.4 | Silty Sand |
| | | 6' - 7' | | <0.60 | Silty Sand to Organic Clayey Silt |
| | | 7' - 8' | | <0.63 | Organic Clayey Silt |
| | | 8' - 9' | | <0.65 | Silty Clay |
| SA-SB-06-02 | E28 | 0' - 1' | 10/24/2003 | 1.09 [1.77] | Silty Sand |
| | | 1' - 2' | | <0.567 | Silty Sand |
| | | 2' - 3' | | <0.522 | Silty Sand |
| | | 3' - 4' | | 0.703 | Silty Sand |
| | | 4' - 5' | | 30.3 | Silty Sand to Organic Clayey Silt |
| | | 5' - 6' | | 60.1 | Organic Clayey Silt |
| | | 6' - 7' | | 1.44 | Organic Clayey Silt to Silty Clay |
| | | 7' - 8' | | 6.18 | Organic Clayey Silt |
| | | 8' - 9' | | 7.35 | Silty Clay |

**Table 2B**
**Bloody Brook**
**Post-Remediation Soil Cadmium Concentrations Remaining on Site**
**Brookview Lane to Old Liverpool Road**

| Boring ID[1] | Figure Coordinates[2] | Sampling Interval | Collection Date | Result (mg/kg) | General Soil Classification |
|---|---|---|---|---|---|
| SA-SB-06-03 | E28 | 0' - 1' | 10/24/2003 | <0.611 | Silty Sand |
| | | 1' - 2' | | <0.566 | Organic Silt/Sand |
| | | 2' - 3' | | <0.579 | Silty Sand |
| | | 3' - 4' | | <0.585 | Silty Sand |
| | | 4' - 5' | | 7.63 | Silty Sand |
| | | 5' - 6' | | 64.4 | Organic Clayey Silt |
| | | 6' - 7' | | <0.668 | Organic Clayey Silt |
| | | 7' - 8' | | <0.625 | Clayey Silt to Clay |
| | | 8' - 9' | | <0.634 | Clay |
| SA-SB-06-04 | E28 | 0' - 1' | 10/24/2003 | <0.605 | Silty Sand |
| | | 1' - 2' | | <0.561 | Silty Sand |
| | | 2' - 3' | | <0.573 | Silty Sand |
| | | 3' - 4' | | <0.554 | Silty Sand |
| | | 4' - 5' | | 1.78 | Fill |
| | | 5' - 6' | | 88.1 | Organic Clayey Silt |
| | | 6' - 7' | | <0.693 | Organic Clayey Silt |
| | | 7' - 8' | | <0.678 | Clay to Silty Clay |
| | | 8' - 9' | | <0.636 | Clay |
| SA-SB-216-01 | F19 | 2' - 3' | 10/22/2003 | <0.56 | Silty Sand |
| | | 3' - 4' | | 0.65 | Clayey Silt |
| | | 4' - 5' | | 24.9 | Clayey Silt |
| | | 5' - 6' | | 0.77 | Clayey Silt |
| | | 6' - 7' | | 4.7 | Clayey Silt |
| | | 7' - 8' | | <0.65 | Clayey Silt |
| | | 8' - 9' | | 20.6 | Clayey Silt |
| | | 9' - 10' | | <0.654 | Organic Clayey Silt |
| SA-SB-216-02 | E19 | 0' - 1' | 10/22/2003 | 0.659 | Silty Sand |
| | | 1' - 2' | | <0.588 | Silty Sand |
| | | 2' - 3' | | <0.617 | Silty Sand |
| | | 3' - 4' | | <0.602 | Silty Sand |
| | | 4' - 5' | | 5.38 | Silty Sand |
| | | 5' - 6' | | 14.5 | Organic Clayey Silt |
| | | 6' - 7' | | 1.57 [0.823] | Organic Clayey Silt |
| | | 7' - 8' | | <0.68 | Silty Clay |
| | | 8' - 9' | | 0.903 | Silty Clay |
| | | 9' - 10' | | <0.756 | Organic Clayey Silt |
| | | 10' - 11' | | <0.719 | Organic Clayey Silt |
| | | 11' - 12' | | <0.62 | Silty Clay |
| | | 12' - 13' | | <0.616 | Silty Sand |
| | | 13' - 14' | | <0.60 | Silty Sand |
| SA-SB-216-03 | E19 | 0' - 1' | 10/22/2003 | <0.60 | Silty Sand |
| | | 1' - 2' | | <0.598 | Silty Sand |
| | | 2' - 3' | | <0.617 | Silty Sand |
| | | 3' - 4' | | <0.624 | Silty Clay |
| | | 4' - 5' | | 1.54 | Silty Clay |
| | | 5' - 6' | | <0.632 | Sandy Silt |
| | | 6' - 7' | | <0.641 | Sandy Silt |
| | | 7' - 8' | | <0.713 | Sandy Silt |
| | | 8' - 9' | | <0.635 | Sandy Silt |
| | | 9' - 10' | | <0.635 | Organic Silt/Sand |
| SA-SB-216-04 | E19 | 0' - 1' | 10/22/2003 | <0.59 | Silty Sand |
| | | 1' - 2' | | <0.57 | Silty Sand |
| SB-12 | B31 | 0' - 1' | 11/2001 | 2.11 | --- |
| SB-61 | F19 | 2' - 3' | 11/2002 | 26.2 | Silty Sand |
| | | 3' - 4' | | 864 | Silty Sand/Peat |
| SB-62 | F19 | 2' - 3' | 11/2002 | 263 | Sandy Silt |
| | | 3' - 4' | | 208 | Silty Sand |
| SB-66 | G24 | 2' - 3' | 11/2002 | 1.1 | Clayey Silt |
| | | 3' - 4' | | <0.60 | Clayey Silt |
| SB-72 | D29 | 2' - 3' | 11/2002 | 1.7 | Silty Sand |
| | | 3' - 4' | | 4.3 | Silty Sand/Clay |
| SB-74 | B30 | 2' - 3' | 11/2002 | 1.4 | Fill |
| | | 3' - 4' | | <0.62 | Fill/Sandy Silt |
| SB-208 | F19 | 2' - 3' | 11/2002 | 600 | Silty Sand |
| | | 3' - 4' | | 41.7 | Sandy Silt |

**Table 2B**
**Bloody Brook**
**Post-Remediation Soil Cadmium Concentrations Remaining on Site**
**Brookview Lane to Old Liverpool Road**

| Boring ID[1] | Figure Coordinates[2] | Sampling Interval | Collection Date | Result (mg/kg) | General Soil Classification |
|---|---|---|---|---|---|
| SB-209 | F21 | 2' - 3' | 11/2002 | 10.0 | Silty Sand |
| | | 3' - 4' | | 10.7 | Silty Sand |
| SB-210 | C30 | 2' - 3' | 11/2002 | 1.9 | Silty Sand |
| | | 3' - 4' | | <0.54 | Silty Sand |
| SB-229 | F17 | 0' - 1' | 10/21/2003 | 1.9 | Silty Sand |
| | | 1' - 2' | | 0.67 | Silty Sand |
| | | 2' - 3' | | <0.61 [<0.60] | Silty Sand |
| | | 3' - 4' | | <0.61 | Silty Sand |
| | | 4' - 5' | | 103 | Silty Sand |
| | | 5' - 6' | | 1,390 | Organic Silt/Sand |
| | | 6' - 7' | | 247 | Organic Silt/Sand to Clayey Silt |
| | | 7' - 8' | | 2.7 | Clayey Silt to Silty Clay |
| SB-230 | F21 | 2' - 3' | 10/23/2003 | <0.57 | Fill |
| | | 3' - 4' | | 0.81 | Silty Sand |
| | | 4' - 5' | | <0.60 | Silty Sand |
| | | 5' - 6' | | <0.61 | Silty Sand to Silty Clay |
| | | 6' - 7' | | 6.0 | Organic Silty Clay |
| | | 7' - 8' | | <0.65 [<0.68] | Organic Silty Clay |
| | | 8' - 9' | | <0.62 | Silty Clay |
| | | 9' - 10' | | <0.59 | Silty Clay |
| | | 10' - 11' | | <0.67 | Organic Silty Clay |
| | | 11' - 12' | | <0.62 | Silty Clay |
| SB-415 | F24 | 0' - 1' | 10/23/2003 | 0.99 | Silty Sand |
| | | 1' - 2' | | 2.3 | Silty Sand |
| | | 2' - 3' | | <0.60 | Silty Sand |
| | | 3' - 4' | | <0.59 | Silty Sand to Clayey Silt |
| | | 4' - 5' | | 2.1 | Silty Sand |
| | | 5' - 6' | | <0.60 | Silty Sand |
| | | 6' - 7' | | <0.55 | Silty Sand |
| | | 7' - 8' | | <0.61 [<0.59] | Organic Silt/Sand |
| | | 8' - 9' | | <0.64 | Silty Clay |
| | | 9' - 10' | | <0.57 | Silty Clay to Silty Sand |
| SB-416 | G23 | 2' - 3' | 10/23/2003 | 1.1 | Silty Sand |
| | | 3' - 4' | | 123 | Organic Silt/Sand |
| | | 4' - 5' | | 16.8 | Organic Silt/Sand |
| | | 5' - 6' | | 0.79 | Organic Silt/Sand |
| | | 6' - 7' | | <0.62 | Silty Clay |
| | | 7' - 8' | | <0.65 | Silty Clay |
| SB-417 | G24 | 4' - 5' | 10/24/2003 | 18.4 | Organic Clayey Silt |
| | | 5' - 6' | | <0.73 | Organic Clayey Silt |
| | | 6' - 7' | | <0.63 | Organic Clayey Silt to Clay |
| | | 7' - 8' | | <0.73 | Silty Sand |
| SB-453 | F17 | 0' - 1' | 4/29/2004 | 4.03 | Sandy Silt |
| | | 1' - 2' | | <0.590 | Sandy Silt |
| | | 2' - 3' | | <0.612 | Sandy Silt |
| | | 3' - 4' | | <0.623 | Clayey Silt |
| | | 4' - 5' | | 3.29 | Clayey Silt |
| | | 5' - 6' | | 91.9 | Clayey Silt |
| | | 6' - 7' | | 130 | Clayey Silt |
| | | 7' - 8' | | <0.734 | Clayey Silt |
| SB-455 | G23 | 0' - 1' | 4/29/2004 | 2.31 | Sandy Silt |
| | | 1' - 2' | | <0.615 | Clayey Silt |
| | | 2' - 3' | | <0.602 | Clayey Silt |
| | | 3' - 4' | | 7.04 | Clayey Silt |
| | | 4' - 5' | | <0.681 | Clayey Silt |

**Notes:**

1. Boring locations are shown on Figure 3B.
2. Figure coordinates correspond to coordinate system shown on Figure 3B.
3. Highlighted result indicates the presence of residual cadmium as defined in the SMP.
4. mg/kg = milligrams/kilograms (equivalent to ppm = parts per million).
5. Duplicate results are presented in brackets.
6. B - Compound was found in the blank and sample.
7. J - The detected concentration is an estimated value.
8. U - Result edited to reflect non-detect by data validation company due to presence of cadmium in the associated preparation blank at similar concentrations.
9. < - Analyte not detected at the reporting limit shown.
10. Any soil borings (the full boring or only down to a particular depth) that were fully removed during excavation activities have been omitted for this summary.

**Table 2C**
**Bloody Brook**
**Post-Remediation Soil Cadmium Concentrations Remaining on Site**
**Old Liverpool Road to Onondaga Lake Parkway**

| Boring ID[1] | Figure Coordinates[2] | Sampling Interval | Collection Date | Result (mg/kg) | General Soil Classification |
|---|---|---|---|---|---|
| B-1 | G44 | 0' - 2.5' | 11/25/2003 | 1.5 | --- |
| | | 2.5' - 12' | | <0.63 | --- |
| B-2 | G44 | 7' -8' | 11/25/2003 | <0.59 | --- |
| B-3 | G44 | 0' - 5' | 11/24/2003 | <0.61 [<0.61] | --- |
| | | 5' - 14' | | <0.64 | --- |
| B-4 | E44 | 0' - 2' | 11/24/2003 | <0.63 | --- |
| | | 2' - 12' | | <0.71 | --- |
| B-5 | D43 | 0' - 1.5' | 11/24/2003 | <0.54 | --- |
| | | 1.5' - 12' | | 7.5 | --- |
| B-11 | C43 | 0' - 4' | 3/5/2004 | 0.74 [0.63] | --- |
| | | 4' - 8' | | 0.87 | -- |
| | | 8' - 12' | | 0.66 | --- |
| B-12 | B43 | 0' - 4' | 3/5/2004 | <0.61 | --- |
| | | 4' - 8' | | 0.69 | -- |
| | | 8' - 12' | | <0.58 | --- |
| DI-16-01 | D35 | 0' - 1' | 8/24/2011 | 3.3 | Gravelly coarse sand with organics |
| | | 1' - 2' | 8/24/2011 | 4.5 | Gravelly coarse to fine sand with organics |
| | | 2' - 3' | 8/24/2011 | 5.1 | Gravelly coarse to fine sand with organics |
| | | 3' - 4' | 8/24/2011 | 5.7 | Coarse to fine sand with trace silt, gravel & organics |
| | | 4' - 5' | 8/24/2011 | 0.19 J | Clayey silt |
| | | 5' - 6' | 8/24/2011 | 0.14 J | Silty clay to clay at 6' |
| DI-16-02 | D35 | 2' - 3' | 8/24/2011 | 3.2 | Fine sand, trace gravel, organics & silt |
| | | 3' - 4' | 8/24/2011 | 0.81 J | Coarse to fine gravelly sand |
| | | 4' - 5' | 8/24/2011 | 0.31 | Silt, little clay, little gravel & pebbles |
| | | 5' - 6' | 8/24/2011 | 0.17 J | Silty clay |
| DI-16-03 | D36 | 0' - 1' | 8/24/2011 | 6.2 | Organics, silt with pebbles, some sand |
| | | 1' - 2' | 8/24/2011 | 0.33 | Clayey silt, pebbles, trace fine sand |
| | | 2' - 3' | 8/24/2011 | 0.44 [0.17 J] | Silty clay with organics to 2'-3" then silty sand, little gravel, trace clay |
| | | 3' - 4' | 8/24/2011 | 0.040 J | Gravelly sand (coarse to fine) |
| | | 4' - 5' | 8/24/2011 | 0.24 | Silt |
| | | 5' - 6' | 8/24/2011 | 0.13 J | Clayey silt to silty clay with depth |
| DI-81-01 | D36 | 2' - 3' | 8/13/2013 | 11.4 B | Sandy Silt, trace gravel, rock fragments |
| EPSOIL-4 | F44 | 0' - 1' | 10/2001 | 4.5 | --- |
| SB-18 | G44 | 0' - 1' | 11/2001 | 6.25 | --- |
| SB-75 | D35 | 0" - 6" | 11/2002 | 1.3 | --- |
| | | 6" - 12" | | 0.67 | Sand & Gravel |
| | | 1' - 2' | | <0.58 | Sand, Silt, Clay |
| | | 2' - 3' | | <0.57 | Sand, Silt, Clay |
| | | 3' - 4' | | <0.61 | Clay |
| SB-76 | D35 | 0" - 6" | 11/2002 | 0.73 | --- |
| | | 6" - 12" | | <0.58 | Clayey Silt |
| | | 1' - 2' | | <0.61 | Clayey Silt |
| | | 2' - 3' | | 1.2 | Clayey Silt |
| | | 3' - 4' | | <0.52 | Silty Sand |
| SB-77 | E36 | 0" - 6" | 11/2002 | 18.9 | Gravelly Sand |
| | | 6" - 12" | | 1.1 | Gravelly Sand |
| | | 1' - 2' | | <0.55 | Gravelly Sand/Clayey Silt |
| | | 2' - 3' | | <0.56 | Clayey Silt/ Sand |
| | | 3' - 4' | | <0.57 | Silty Sand |
| SB-78 | C37 | 3' - 4' | 11/2002 | <0.58 | Clay |
| SB-79 | C37 | 0" - 6" | 11/2002 | 1.9 | --- |
| | | 6" - 12" | | 0.96 | --- |
| | | 1' - 2' | | <0.57 | Sandy Silt |
| | | 3' - 4' | | 1.2 | Clay |
| SB-80 | D40 | 0" - 6" | 11/2002 | 11.7 | --- |
| | | 6" - 12" | | 7.3 | --- |
| | | 0' - 4' | | 18.4 | Fill |
| | | 4' - 8' | | 22.6 | Fill/Peat |
| | | 8' - 12' | | <0.87 | Peat/Sand and Gravel |
| SB-81 | D40 | 2' - 3' | 11/2002 | 1.6 | Sand |
| | | 3' - 4' | | <0.63 | Clay |
| SB-82 | D40 | 0" - 6" | 11/2002 | 1.7 | --- |
| | | 6" - 12" | | 1.6 | --- |
| | | 1' - 2' | | <0.61 | Clayey Silt |
| | | 2' - 3' | | 1.6 | Sandy Silt |
| | | 3' - 4' | | 1.3 | Sandy Silt |
| SB-83 | C40 | 0" - 6" | 11/2002 | <0.52 | --- |
| | | 6" - 12" | | <0.51 | --- |
| | | 0' - 4' | | <0.55 | Clay/Fill |
| | | 4' - 8' | | <0.65 | Clay/Wood/Peat |
| SB-84 | D42 | 2' - 3' | 11/2002 | 11.4 | Peat |
| | | 3' - 4' | | <0.79 | Sand |
| SB-211 | D43 | 2' - 3' | 11/2002 | <0.56 | Cobbles, Sand |
| | | 3' - 4' | | <0.61 | Sandy Silt |

**Table 2C**
**Bloody Brook**
**Post-Remediation Soil Cadmium Concentrations Remaining on Site**
**Old Liverpool Road to Onondaga Lake Parkway**

| Boring ID[1] | Figure Coordinates[2] | Sampling Interval | Collection Date | Result (mg/kg) | General Soil Classification |
|---|---|---|---|---|---|
| SB-212 | G44 | 0" - 6" | 11/2002 | 8.0 | --- |
| | | 6" - 12" | | 2.6 | Silty Sand |
| | | 1' - 2' | | <0.59 | Sandy Silt |
| | | 2' - 3' | | <0.62 | Sandy Silt |
| | | 3' - 4' | | <0.75 | Sandy Silt |
| SB-231 | G43 | 0" - 6" | 11/3/2003 | 1.0 | Silty Sand |
| | | 6" - 12" | | 0.82 | Silty Sand |
| | | 1' - 2' | | 0.72 | Silty Sand |
| | | 2' - 3' | | <0.60 | Silty Sand |
| | | 3' - 4' | | <0.64 | Silty Sand |
| | | 4' - 5' | | <0.63 | Silty Sand to Organic Clayey Silt |
| | | 5' - 6' | | <0.68 | Organic Clayey Silt |
| | | 6' - 7' | | <0.59 | Organic Clayey Silt |
| | | 7' - 8' | | <0.74 | Sand/Gravel/ Shells |
| SB-232 | G42 | 2' - 3' | 11/3/2003 | 5.3 | Silty Sand |
| | | 3' - 4' | | <0.71 | Silty Sand to Organic Clayey Silt |
| | | 4' - 5' | | <0.70 | Organic Clayey Silt |
| SB-418 | E36 | 0" - 6" | 11/3/2003 | 0.96 | Fill |
| | | 6" - 12" | | 0.70 | Fill |
| | | 1' - 2' | | 0.75 | Fill |
| | | 2' - 3' | | <0.55 | Silty Sand/ Gravel |
| | | 3' - 4' | | 25.1 | Silty Sand to Organic Clayey Silt |
| | | 4' - 5' | | 0.65 | Organic Clayey Silt |
| SB-419 | D36 | 0" - 6" | 11/3/2003 | 1.8 | Fill |
| | | 6" - 12" | | 0.8 | Fill |
| | | 1' - 2' | | 1.7 | Fill |
| | | 2' - 3' | | 0.58 | Fill |
| | | 3' - 4' | | 2.5 | Fill |
| | | 4' - 5' | | 1.3 | Organic Clayey Silt |
| SB-420 | D35 | 2' - 3' | 11/3/2003 | 1.9 | Fill |
| | | 3' - 4' | | 2.9 | Fill to Organic Clayey Silt |
| | | 4' - 5' | | 1.1 | Organic Clayey Silt |
| SB-421 | D36 | 0" - 6" | 11/3/2003 | 1.9 | Fill |
| | | 6" - 12" | | 0.60 | Fill |
| | | 1' - 2' | | 1.3 | Fill |
| | | 2' - 3' | | 3.6 [3.1] | Fill |
| | | 3' - 4' | | <0.54 | Fill |
| | | 4' - 5' | | <0.52 | Silty Sand |
| SB-422 | D36 | 2' - 3' | 11/3/2003 | 0.62 | Fill |
| | | 3' - 4' | | 1.2 | Fill to Organic Clayey Silt |
| | | 4' - 5' | | 0.62 | Organic Clayey Silt |
| SB-423 | E36 | 0" - 6" | 10/31/2003 | <0.53 | Asphalt |
| | | 6" - 12" | | <0.52 | Sand/Gravel |
| | | 0' - 2' | | <0.54 | Asphalt/ Sand/ Gravel/ Fill |
| | | 2' - 4' | | <0.56 | Fill |
| | | 4' - 6' | | <0.56 [<0.28] | Fill to Sand |
| | | 6' - 8' | | <0.63 | Clay |
| SB-424 | F36 | 0" - 6" | 10/31/2003 | <0.53 | Asphalt |
| | | 6" - 12" | | <0.57 | Fill |
| | | 0' - 2' | | <0.59 | Fill |
| | | 2' - 4' | | <0.57 | Fill to Sand/Gravel/Cobbles |
| | | 4' - 6' | | <0.58 | Sand/Gravel/Cobbles to Silty Sand |
| | | 6' - 8' | | <0.62 | Silty Sand to Organic Silty Clay to Organic Clay |
| | | 8' - 10' | | <0.61 | Organic Clay |
| | | 10' - 12' | | <0.61 | Sand to Clay |
| SB-425 | F36 | 0" - 6" | 10/31/2003 | <0.53 | Asphalt |
| | | 6" - 12" | | <0.55 | Silty Sand/ Gravel/Cobbles |
| | | 0' - 2' | | <0.54 | Asphalt/ Silty Sand/ Gravel/Cobbles |
| | | 2' - 4' | | <0.55 | Silty Sand/ Gravel/Cobbles to Sand |
| | | 4' - 6' | | 22.0 | Sand to Organic Clayey Silt |
| | | 6' - 8' | | <0.63 | Organic Clayey Silt to Clay |
| | | 8' - 10' | | 6.8 | Silty Clay to Clay to Sand/Gravel to Clay to Sand with Shells |
| | | 10' - 12' | | <0.59 | Sand with shells to Clay |
| SB-426 | F38 | 0" - 6" | 10/31/2003 | <0.58 | Fill |
| | | 6" - 12" | | <0.58 | Fill |
| | | 0' - 2' | | <0.56 | Fill |
| | | 2' - 4' | | <0.55 [<0.56] | Silt/Sand/ Gravel/Cobble |
| | | 4' - 6' | | 28.9 | Organic Clayey Silt |
| | | 6' - 8' | | 21.1 | Organic Clayey Silt |
| | | 8' - 10' | | 11.7 | Organic Clayey Silt to Sand with Shells |
| | | 10' - 12' | | <0.789 | Clay to Organic Silty Clay to Silty Sand with Shells |

**Table 2C**
**Bloody Brook**
**Post-Remediation Soil Cadmium Concentrations Remaining on Site**
**Old Liverpool Road to Onondaga Lake Parkway**

| Boring ID[1] | Figure Coordinates[2] | Sampling Interval | Collection Date | Result (mg/kg) | General Soil Classification |
|---|---|---|---|---|---|
| SB-427 | F38 | 0" - 6" | 10/31/2003 | <0.59 | Fill |
| | | 6" - 12" | | <0.59 | Fill |
| | | 0' - 2' | | <0.58 | Fill |
| | | 2' - 4' | | <0.55 | Fill |
| | | 4' - 6' | | 0.85 | Fill to Gravel/Sand/ Ceramic |
| | | 6' - 8' | | 4.8 | Organic Silty Clay |
| | | 8' - 10' | | <0.750 | Sand with shells to Clay |
| | | 10' - 12' | | <0.832 | Silty Clay, Wood at 10' |
| SB-428 | F38 | 0" - 6" | 10/31/2003 | <0.57 | Sand/Gravel/Cobbles |
| | | 6" - 12" | | <0.55 | Sand/Gravel/Cobbles |
| | | 0' - 2' | | <0.54 | Sand/Gravel/Cobbles |
| | | 2' - 4' | | <0.55 | Sand/Gravel/Cobbles |
| | | 4' - 6' | | <0.56 | Sand/Gravel/Cobbles |
| | | 6' - 8' | | 28.7 | Organic Silty Clay (ceramics at 6'-6") to Clay |
| | | 8' - 10' | | <0.693 | Clay |
| | | 10' - 12' | | 1.02 | Organic Silty Sand to Sand with Shells |
| SB-429 | F40 | 0" - 6" | 10/31/2003 | <0.60 | Fill |
| | | 6" - 12" | | 0.58 | Fill |
| | | 0' - 2' | | <0.54 | Fill |
| | | 2' - 4' | | <0.55 | Fill |
| | | 4' - 6' | | 0.67 [0.62] | Clay |
| | | 6' - 8' | | <0.54 | Silty Sand/ Gravel, Organic Clay, Ceramics |
| | | 8' - 10' | | 5.7 | Ceramics to Organic Clayey Silt |
| | | 10' - 12' | | 0.73 | Organic Clayey Silt |
| | | 12' - 14' | | 0.99 | Organic Clayey Silt |
| | | 14' - 16' | | <0.71 | Clay to Sand/Gravel/ Shells |
| SB-430 | F40 | 0" - 6" | 10/31/2003 | <0.56 | Fill |
| | | 6" - 12" | | 0.59 | Fill |
| | | 0' - 2' | | <0.57 | Fill |
| | | 2' - 4' | | 0.57 | Fill |
| | | 4' - 6' | | <0.57 | Fill |
| | | 6' - 8' | | <0.55 | Concrete to Sand/Gravel to Silty Sand |
| | | 8' - 10' | | <0.59 | Silty Sand |
| | | 10' - 12' | | 2.5 | Gravel/Cobbles/Shells to Silty Clay |
| SB-431 | G40 | 0" - 6" | 10/31/2003 | <0.54 | Fill |
| | | 6" - 12" | | <0.54 | Fill |
| | | 0' - 2' | | <0.54 | Fill |
| | | 2' - 4' | | 3.0 | Fill to Sand/Gravel |
| | | 4' - 6' | | 0.78 | Silt/Sand/ Gravel to Fill |
| | | 6' - 8' | | 0.71 | Fill |
| | | 8' - 10' | | <0.57 | Cobbles/Ceramic to Silty Sand to Ceramics |
| | | 10' - 12' | | 3.3 | Organic Silty Clay |
| SB-432 | F42 | 0" - 6" | 11/3/2003 | 13.8 | Organic Silt/Sand |
| | | 6" - 12" | | <0.50 | Organic Silt/Sand |
| | | 1' - 2' | | 3.0 | Silty Sand |
| | | 2' - 3' | | <0.64 | Silty Sand |
| | | 3' - 4' | | <0.75 | Silty Sand to Organic Clayey Silt |
| | | 4' - 5' | | <0.75 | Sand/Gravel/ Shells |
| SB-433 | E40 | 0" - 6" | 10/31/2003 | 0.66 | Fill |
| | | 6" - 12" | | 1.0 | Fill |
| | | 0' - 2' | | 0.99 | Fill |
| | | 2' - 4' | | 0.66 | Fill |
| | | 4' - 6' | | 1.2 | Fill |
| | | 6' - 8' | | <0.57 | Fill to Silty Sand/ Ceramics |
| | | 8' - 10' | | 0.8 | Organic Clayey Silt |
| | | 10' - 12' | | <0.70 | Organic Clayey Silt |
| SB-434 | E41 | 0" - 6" | 10/31/2003 | 0.61 | Fill |
| | | 6" - 12" | | 0.68 | Fill |
| | | 0' - 2' | | <0.57 | Fill |
| | | 2' - 4' | | 1.9 | Fill |
| | | 4' - 6' | | 1.3 | Fill |
| | | 6' - 8' | | 1.3 [<0.54] | Fill to Silty Sand/ Ceramics |
| | | 8' - 10' | | <0.78 | Organic Clayey Silt/ Ceramics to Sand/Gravel/ Shells |
| | | 10' - 12' | | <0.79 | Sand/Gravel/ Shells |

**Notes:**

1. Boring locations are shown on Figure 3C.
2. Figure coordinates correspond to coordinate system shown on Figure 3C.
3. Highlighted result indicates the presence of residual cadmium as defined in the SMP.
4. mg/kg = milligrams/kilograms (equivalent to ppm = parts per million).
5. Duplicate results are presented in brackets.
6. B - Compound was found in the blank and sample.
7. J - The detected concentration is an estimated value.
8. U - Result edited to reflect non-detect by data validation company due to presence of cadmium in the associated preparation blank at similar concentrations.
9. < - Analyte not detected at the reporting limit shown.
10. Any soil borings (the full boring or only down to a particular depth) that were fully removed during excavation activities have been omitted for this summary.

**Table 2D**
**Bloody Brook**
**Post-Remediation Soil Cadmium Concentrations Remaining on Site**
**Within the Roadway Adjacent to Culverts**

| Boring ID[1] | Figure Coordinates[2] | Sample Depth Interval | Collection Date | Result (mg/kg) | General Soil Classification |
|---|---|---|---|---|---|
| DI-82-01 | F20 | 0' - 1' | 4/29/2014 | 0.35 | Gray coarse to fine sand and coarse to fine gravel |
| | | 1' - 2' | 4/29/2014 | 0.9 | Gray coarse to fine gravel, some fine sand, some Silt |
| | | 2' - 3' | 4/29/2014 | 0.6 | Brown silty clay, little sand |
| | | 3' - 4' | 4/29/2014 | 2.3 | Brown silty clay, little sand |
| | | 4' - 5' | 4/29/2014 | 0.11 | Brown clayey silt, some sand |
| | | 5' - 6' | 4/29/2014 | 0.22 | Brown clayey silt, some sand |
| | | 6' - 7' | 4/29/2014 | 0.37 | Brown clayey silt, some sand |
| | | 7' - 8' | 4/29/2014 | 0.59 | Brown clayey silt, some sand |
| | | 8' - 9' | 4/29/2014 | 0.29 | Gray coarse to fine gravel, some fine sand, some Silt |
| | | 9' - 10' | 4/29/2014 | 0.11 | Gray coarse to fine gravel, some fine sand, some silt |
| | | 10' - 11' | 4/29/2014 | 4.8 | Gray coarse to fine gravel, some fine sand, some silt |
| | | 11' - 12' | 4/29/2014 | 0.18 | Gray coarse to fine gravel, some fine sand, some silt |
| DI-82-02 | F20 | 8' - 9' | 4/29/2014 | 0.54 U | Brown clayey silt, some sand |
| | | 9' - 10' | 4/29/2014 | 0.033 | Brown clayey silt, some sand |
| | | 10' - 11' | 4/29/2014 | 0.65 U | Brown clayey silt, some sand |
| | | 11' - 12' | 4/29/2014 | 0.63 U | Brown clayey silt, some sand |
| DI-83-01 | F20 | 0' - 1' | 4/29/2014 | 0.12 | Gray coarse to fine sand and coarse to fine gravel |
| | | 1' - 2' | 4/29/2014 | 0.49 | Gray medium to fine sand and medium to fine gravel |
| | | 2' - 3' | 4/29/2014 | 19.1 | Brown fine sand and silt, some clay |
| | | 3' - 4' | 4/29/2014 | 5.8 | Brown fine sand and silt, some clay |
| | | 4' - 5' | 4/29/2014 | 16.6 | Brown fine sand and silt, some clay |
| | | 5' - 6' | 4/29/2014 | 14.4 [4.5] | Brown fine sand and silt, some clay |
| | | 6' - 7' | 4/29/2014 | 1.3 | Black fine sand and silt, some clay |
| | | 7' - 8' | 4/29/2014 | 0.085 | Black fine sand and silt, some clay |
| | | 8' - 9' | 4/29/2014 | 0.16 [0.15] | Black fine sand and silt, some clay |
| | | 9' - 10' | 4/29/2014 | 0.21 | Black fine sand and silt |
| | | 10' - 11' | 4/29/2014 | 0.15 | Black fine sand and silt |
| | | 11' - 12' | 4/29/2014 | 0.14 | Black fine sand and silt |
| DI-83-02 | F20 | 2' - 3' | 4/29/2014 | 3.9 | Dark brown to black sandy silt, some clay |
| | | 4' - 5' | 4/29/2014 | 0.29 | Dark brown to black sandy silt, some clay |
| | | 5' - 6' | 4/29/2014 | 0.28 | Dark brown to black sandy silt, some clay |
| DI-83-03 | F20 | 0' - 1' | 4/29/2014 | 0.19 | Gray coarse to fine sand and medium to fine gravel |
| | | 1' - 2' | 4/29/2014 | 0.63 | Brown silty clay, little sand |
| | | 2' - 3' | 4/29/2014 | 0.031 | Brown clayey silt, little sand |
| | | 3' - 4' | 4/29/2014 | 0.57 U | Brown clayey silt, little sand |
| | | 4' - 5' | 4/29/2014 | 0.2 | Brown sandy silt, some clay |
| DI-84-01 | C16 | 0' - 1' | 12/2/2014 | 0.17 J | Red brown fine-coarse sand, some angular gravel |
| | | 1' - 2' | 12/2/2014 | 0.52 | Brown silty clay, trace fine sand |
| | | 2' - 3' | 12/2/2014 | 7.2 | Brown clayey silt, little fine sand |
| | | 3' - 4' | 12/2/2014 | 3.2 | Brown fine-coarse sand, little angular gravel |
| | | 4' - 5' | 12/2/2014 | 0.16 J | Brown clayey silt 4-4.5' Brown clay, little silt 4.5-5' |
| | | 5' - 6' | 12/2/2014 | 0.94 | Brown clay, some silt, little sub angular gravel |
| | | 6' - 7' | 12/2/2014 | 0.4 J [1.1 J] | Brown clayey silt, some fin sand, little subangular gravel |
| | | 7' - 8' | 12/2/2014 | 0.82 | Brown fine silty sand, trace clay, clay increase with depth |
| | | 8' - 9' | 12/2/2014 | <0.27 | Brown silt clay, trace fine sand |
| | | 9' - 10' | 12/2/2014 | 0.19 J | Brown clay, little silt |
| | | 10' - 11' | 12/2/2014 | 10.9 | Brown clay, little silt, trace sub angular gravel |
| | | 11' - 12' | 12/2/2014 | 0.051 J | Red brown fine sand, little silt |
| DI-84-02 | C16 | 2' - 3' | 12/2/2014 | 3.8 | Brown clayey silt, little course sand |
| | | 3' - 4' | 12/2/2014 | 0.11 J | Brown silty clay, some fine-course sand |
| | | 10' - 11' | 12/2/2014 | <0.27 | Brown fine sand, some silt, little clay |
| DI-84-03 | C16 | 2' - 3' | 12/2/2014 | 0.14 J | Dark brown silty clay |
| DI-85-01 | C15 | 0' - 1' | 12/2/2014 | 0.3 B | Red brown fine-coarse sand, little angular gravel |
| | | 2' - 3' | 12/2/2014 | 25.7 B | Red brown fine- med. sand, little rounded gravel, clay lense at 2.2' |
| | | 3' - 4' | 12/2/2014 | 36.9 B | Brown fine silty sand, little clay |
| | | 4' - 5' | 12/2/2014 | 80.2 B | Dark brown fine sandy silt, little clay, little med.-course sand |
| | | 5' - 6' | 12/2/2014 | 71 B | Dark brown fine sandy silt, little clay, trace med.-course sand |
| | | 6' - 7' | 12/2/2014 | 0.78 B | Dark brown clayey silt, little fine-med. Sand, increase in clay with depth |
| | | 7' - 8' | 12/2/2014 | 0.5 B | Brown fine silty sand |
| | | 8' - 9' | 12/2/2014 | 0.38 J [0.20 J] | Brown fine silty sand |
| | | 9' - 10' | 12/2/2014 | 48.6 | Brown silty clay, trace sub angular gravel |
| | | 10' - 11' | 12/2/2014 | 0.42 | Brown fine sand silt, trace med. Sand |
| | | 11' - 12' | 12/2/2014 | 0.53 J [0.43 J] | Brown fine sandy silt, trace med. Sand. Fine sand lens at 11.8' |
| DI-85-02 | D15 | 1' - 2' | 12/2/2014 | 39.5 | Dark brown sandy silt, little clay |
| | | 3' - 4' | 12/2/2014 | 5.4 | Brown fine sandy silt, some clay |
| | | 4' - 5' | 12/2/2014 | 143 | Brown fine sandy silt, little clay |
| | | 5' - 6' | 12/2/2014 | 1.7 | Dark brown silty sand, little clay, clay decreasing with depth |
| | | 9' - 10' | 12/2/2014 | 0.085 J | Brown silty clay, little fine sand |

**Table 2D**
**Bloody Brook**
**Post-Remediation Soil Cadmium Concentrations Remaining on Site**
**Within the Roadway Adjacent to Culverts**

| Boring ID[1] | Figure Coordinates[2] | Sample Depth Interval | Collection Date | Result (mg/kg) | General Soil Classification |
|---|---|---|---|---|---|
| DI-85-03 | D15 | 1' - 2' | 12/2/2014 | 0.097 J | Brown fine silty sand, trace clay, clay increase with depth |
| | | 2' - 3' | 12/2/2014 | 0.33 | Brown sandy silt, little clay, little rounded gravel |
| | | 3' - 4' | 12/2/2014 | 0.13 J | Brown sandy silt, little clay, little rounded gravel |
| | | 4' - 5' | 12/2/2014 | 0.31 | Dark brown clayey silt, little fine sand |
| DI-86-01 | F23 | 0' - 1' | 12/3/2014 | 5.9 | Dark brown fine sandy silt, little coarse sand |
| | | 2' - 3' | 12/3/2014 | 2.6 | Dark brown fine sandy silty little clay |
| | | 3' - 4' | 12/3/2014 | 3.1 | Dark brown fine sandy silty little clay |
| | | 4' - 5' | 12/3/2014 | 2.6 | Brown silt, little rounded gravel, trace clay |
| | | 5' - 6' | 12/3/2014 | 3.8 | Brown silt, some fine-course sand |
| | | 6' - 7' | 12/3/2014 | 0.42 | Grey fine silty sand, trace clay 6-6.7'. Light brown fine silty sand 6.7'-7' |
| | | 7' - 8' | 12/3/2014 | 0.35 | Brown fine sandy silt |
| | | 8' - 9' | 12/3/2014 | 0.47 | Brown fine sandy silt |
| | | 9' - 10' | 12/3/2014 | 0.25 J | Dark brown fine silty sand, wet. |
| | | 10' - 11' | 12/3/2014 | 0.39 | Pinkish-brown silty clay, trace fine sand |
| | | 11' - 12' | 12/3/2014 | 0.30 | Pinkish-brown silty clay, trace fine sand |
| DI-86-02 | F23 | 0' - 1' | 12/3/2014 | 0.19 J | Grey-brown silt, little fine sand, trace clay |
| | | 1' - 2' | 12/3/2014 | 0.10 J | Subangular and angular gravel, little fine-coarse sand |
| | | 2' - 3' | 12/3/2014 | 0.074 J | Brown fine-course sand, little angular gravel (fill) |
| DI-86-03 | F23 | 3' - 4' | 12/3/2014 | <0.28 | Light brown silt, little clay, little pure sand |
| | | 4' - 5' | 12/3/2014 | <0.28 | Light brown silt, some fine sand |
| | | 5' - 6' | 12/3/2014 | <0.26 | Light brown silt, some fine sand |
| DI-87-01 | G22 | 0' - 1' | 12/3/2014 | 0.073 J | Dark brown fine sandy silt, trace clay, increase clay with depth |
| | | 1' - 2' | 12/3/2014 | 0.12 J | Dark brown silty clay, little fine sand |
| | | 2' - 3' | 12/3/2014 | 1.2 | Brown fine sandy silt 2-2.5' Black fine sandy silt 2.5-3' |
| | | 3' - 4' | 12/3/2014 | 32.8 | Black fine sandy silt |
| | | 4' - 5' | 12/3/2014 | 0.73 | Dark brown fine sandy silt, trace clay, increase clay with depth |
| | | 5' - 6' | 12/3/2014 | 0.29 | Brown silty clay, trace fine sand |
| | | 6' - 7' | 12/3/2014 | 2.9 | Brown fine sandy silt, little clay |
| | | 7' - 8' | 12/3/2014 | 0.12 J | Brown fine sandy silt, trace clay |
| | | 8' - 9' | 12/3/2014 | 0.43 | Brown fine sandy silt, trace clay |
| | | 9' - 10' | 12/3/2014 | 0.25 J | Brown fine silty sand |
| | | 10' - 11' | 12/3/2014 | 1.7 | Brown silt, some fine sand, trace clay |
| | | 11' - 12' | 12/3/2014 | 0.07 J | Brown fine silty sand, trace clay |
| DI-87-02 | G22 | 3' - 4' | 12/3/2014 | 1.7 | Brown clayey silt, little fine sand, decrease in clay with depth |
| | | 6' - 7' | 12/3/2014 | 0.079 J | Brown clayey silt, trace fine sand |
| DI-88-02 | G26 | 0' - 1' | 12/5/2014 | 0.53 | Brown silt, some F-M angular gravel, little F-sand |
| | | 1' - 2' | 12/5/2014 | 2.1 | Dark brown clay, some silt, trace F-sand |
| | | 2' - 3' | 12/5/2014 | 0.33 | Light brown clay, little salt |
| | | 4' - 5' | 12/5/2014 | 0.039 J | Brown clay, little silt; gravel lense at 4.5'-5.0' |
| | | 5' - 6' | 12/5/2014 | 0.074 J | Tan clay, trace silt; large rock at 5.5'-6.0' |
| | | 6' - 7' | 12/5/2014 | 0.079 J | Tan clay, trace silt; large rock at 5.5'-6.0' |
| | | 7' - 8' | 12/5/2014 | 0.064 J | Tan clay, trace silt; large rock at 5.5'-6.0' |
| | | 8' - 9' | 12/5/2014 | 1.5 | Dark brown clay, trace silt |
| | | 9' - 10' | 12/5/2014 | 0.07 J | Dark brown clay, trace silt; gravel lense |
| | | 10' - 11' | 12/5/2014 | 0.067 J | Tan clay, trace silt |
| | | 11' - 12' | 12/5/2014 | 0.053 J | Tan clay, trace silt |
| DI-88-03 | G26 | 3' - 4' | 12/5/2014 | 0.99 | Dark brown clay, some silt, little F-sand |
| DI-89-01 | G26 | 0' - 1' | 12/2/2014 | 0.63 J [1.5 J] | Brown fine silty sand, some clay. |
| | | 1' - 2' | 12/2/2014 | 1.6 B | Brown silt, some clay, trace rounded gravel |
| | | 2' - 3' | 12/2/2014 | 0.82 B | Brown silt, some clay, little angular gravel (slough) |
| | | 3' - 4' | 12/2/2014 | 0.8 B | Brown clayey silt, trace sub angular gravel |
| | | 4' - 5' | 12/2/2014 | 1.2 B | Brown clayey silt, trace sub angular gravel |
| | | 5' - 6' | 12/2/2014 | 0.77 B [0.043 J] | Brown silty clay , little fine sand |
| | | 6' - 7' | 12/2/2014 | 0.49 J | Brown silty clay, little fine sand |
| | | 7' - 8' | 12/2/2014 | 0.56 B | Brown clayey silt, some fine sand |
| | | 8' - 9' | 12/2/2014 | 0.4 B | Brown clayey silt, increasing clay with depth, trace fine sand. |
| | | 9' - 10' | 12/2/2014 | 0.45 B | Brown silty clay, lenses of fine sand throughout |
| | | 10' - 11' | 12/2/2014 | 0.4 B | Brown silty clay, little angular gravel, wet. |
| | | 11' - 12' | 12/2/2014 | 0.38 B | Brown silty clay, little fine sand |
| DI-90-01 | C29 | 0' - 1' | 12/1/2014 | 0.051 J | Brown silty clay with some rounded gravel |
| | | 3' - 4' | 12/1/2014 | 0.087 J | Brown silty clay with some rounded gravel |
| | | 4' - 5' | 12/1/2014 | 0.072 J | Brown fine to coarse sand little angular gravel |
| | | 5' - 6' | 12/1/2014 | 0.076 J | Brown fine to coarse sand little angular gravel |
| | | 6' - 7' | 12/1/2014 | 0.083 J | Brown fine to coarse sand little angular gravel |
| | | 7' - 8' | 12/1/2014 | 0.09 J | Brown fine silty sand little clay |
| | | 8' - 9' | 12/1/2014 | 0.12 J [0.14 J] | Brown fine silty sand little clay |
| | | 9' - 10' | 12/1/2014 | 0.078 J | Light brown fine silty sand some clay fine sand lense 9'-9.2' |
| | | 10' - 11' | 12/1/2014 | 0.11 J | Gray fine sandy silt, little clay |
| | | 11' - 12' | 12/1/2014 | 0.14 J | Bark brown fine sand little silt, red mottling |

**Table 2D**
**Bloody Brook**
**Post-Remediation Soil Cadmium Concentrations Remaining on Site**
**Within the Roadway Adjacent to Culverts**

| Boring ID[1] | Figure Coordinates[2] | Sample Depth Interval | Collection Date | Result (mg/kg) | General Soil Classification |
|---|---|---|---|---|---|
| DI-90-02 | C29 | 1' - 2' | 12/1/2014 | 0.041 J | Angular gravel and coarse sand (slough from pavement) |
| | | 2' - 3' | 12/1/2014 | 1.3 | Angular gravel and coarse sand (slough from pavement) |
| DI-91-01 | C30 | 0' - 1' | 12/1/2014 | 0.86 | Brown fine-coarse sand, trace clay |
| | | 1' - 2' | 12/1/2014 | 8.5 | Dark brown fine sand, little silt |
| | | 2' - 3' | 12/1/2014 | 0.30 | Dark brown fine sand, little silt |
| | | 3' - 4' | 12/1/2014 | 0.11 J | Brown fine sand, little silt, trace sub-angular gravel |
| | | 4' - 5' | 12/1/2014 | 0.67 | Brown fine sand, some silt |
| | | 5' - 6' | 12/1/2014 | 0.27 | Gray fine sand, some clay |
| | | 6' - 7' | 12/1/2014 | 0.44 | Gray fine sand, some clay |
| | | 7' - 8' | 12/1/2014 | 0.41 | Gray fine sand, some clay |
| | | 8' - 9' | 12/1/2014 | 0.39 | Brown fine sand, little soil, wet |
| | | 9' - 10' | 12/1/2014 | 0.22 J | Brown fine silty sand, trace clay |
| | | 10' - 11' | 12/1/2014 | 0.53 J [0.070 J] | Brown fine silty sand, trace clay |
| DI-91-02 | C30 | 1' - 2' | 12/1/2014 | 0.72 | Red-brown fine to coarse sand, little clay |

Notes:

1. Boring locations are shown on Figure s 3A through 3C.
2. Figure coordinates correspond to coordinate system shown on Figures 3A through 3C.
3. Highlighted result indicates the presence of residual cadmium as defined in the SMP.
4. mg/kg = milligrams/kilograms (equivalent to ppm = parts per million).
5. Duplicate results are presented in brackets.
6. B - Compound was found in the blank and sample.
7. J - The detected concentration is an estimated value.
8. U - Result edited to reflect non-detect by data validation company due to presence of cadmium in the associated preparation blank at similar concentrations.
9. < - Analyte not detected at the reporting limit shown.

**Table 3**
**Bloody Brook**
**Summary of Required Institutional Control Notifications**

| Frequency | Notification From/To | Purpose |
|---|---|---|
| Annual | Lockheed Martin to property owners who chose to decline remedy implementation and/or sampling on their property. | Offer to implement the remedy |
| Annual | Lockheed Martin to property owners with post remedy residual soil contamination (including commercial, residential, and municipal properties). | Reminder of the presence of residual contamination and of Lockheed Martin's commitment to handle (excavate, manage and dispose) residual contaminated soils, as necessary and in accordance with the intended use of the property. |
| Ongoing | Village of Liverpool Code Enforcement Office and the Town of Salina Department of Planning and Development to Lockheed Martin | Any building permits they grant for properties within the site boundaries where residual material remains post remedy. |
| Ongoing | Onondaga County to Lockheed Martin | Any Town or County plans to conduct intrusive maintenance work within the site boundaries (e.g., soil disturbance work). |

**Table 4**
**Bloody Brook**
**Contact Information for Village of Liverpool Code Enforcement Office and the Town of Salina Department of Planning and Development Notifications**

| Contact Name/Title | Phone Number(s) | Email Address |
|---|---|---|
| Jill Fonte<br>Environmental Engineer<br>Lockheed Martin Corporation | 315-456-1993 desk<br>315-944-8082 cell<br>315-456-3723 (ESH Admin) | jill.a.fonte@lmco.com |
| Mark Lafaver<br>Town of Salina<br>Department of Planning and Development | 315-451-0492 | MLafaver@salina.ny.us |
| Bill Raegan<br>Village of Liverpool<br>Code Enforcement Office | 315-457-3441 x4 | codes@villageofliverpool.org |
| Jacky Luo<br>New York State Department of Environmental Conservation | 518-402-9676 | jacky.luo@dec.ny.gov |
| Mark Sergott, P.G.<br>New York State Department of Health | 518-402-7860 | beei@health.ny.gov |

*See SMP Section 3.2.1

**Table 5**
**Bloody Brook**
**Contact information for Onondaga County Notifications**

| Contact Name/Title | Phone Number(s) | Email Address |
|---|---|---|
| Jill Fonte<br>Environmental Engineer<br>Lockheed Martin Corporation | 315-456-1993 desk<br>315-944-8082 cell<br>315-456-3723<br>(ESH Admin) | jill.a.fonte@lmco.com |
| Bob Pezzimenti, Esq.<br>General Counsel<br>Lockheed Martin Corporation | 315-456-3916 | robert.pezzimenti@lmco.com |
| Nicolas Capozza<br>Department of Water Environment Protection<br>Onondaga County | 315-435-2260 | NickCapozza@ongov.net |
| Benjamin Yaus<br>Department of Law<br>Onondaga County | 315-435-2170 x5918 | BenjaminYaus@ongov.net |
| Jacky Luo<br>New York State Department Environmental Conservation | 518-402-9676 | jacky.luo@dec.ny.gov |
| Mark Sergott, P.G.<br>New York State Department of Health | 518-402-7860 | beei@health.ny.gov |

*See SMP Section 3.2.1

**Table 6**
**Bloody Brook**
**Monitoring/Inspection Schedule**

| Monitoring Program | Frequency | Purpose |
|---|---|---|
| Site-Wide Institutional Control Certification | Annually | Ensure Institutional Controls are being properly implemented. |
| Site-Wide Engineering Control Inspections | Annually | Inspection of the soil cover to ensure no erosion is occurring. |
| Restoration Monitoring[1] | Annually for five years | Ensure no erosion of the channel and banks is occurring and that vegetation is growing as intended. |
| Biological Monitoring[2] | Two, four, and six years following remediation (summer 2018, 2020, and 2022) | Document cadmium concentrations in aquatic biota following completion of remedial activities. |

1. See Section 4.2 of the Site Management Plan for schedule.

2. Biological monitoring will include the collection of crayfish from the brook channel for analysis of total cadmium by SW-846 EPA Method 6020A. This is the only chemical analysis that is anticipated during monitoring activities unless the collection of soil sampling becomes necessary as discussed in Section 3 of the Site Management Plan.

**Table 7**
**Analytical Data for Baseline (2014) and Post-Remediation (2018 and 2020) Biota Monitoring**
**Bloody Brook**
**Onondaga County, New York**

| Sample Location | Sample Location | 2014 Cadmium (mg/kg-ww) | 2018 Cadmium (mg/kg-ww) | 2020 Cadmium (mg/kg-ww) | Sample Location Start | | Sample Location End | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Northing | Easting | Northing | Easting |
| Upper Channel - between Ontario Place and Cranberry Drive | CR-1-01 | 3.1 | 0.53 | 1.2 | 1131978.925 | 923602.724 | 1132094.739 | 923709.624 |
| | CR-1-02 | 3.6 | 0.56 | 2.3 | | | | |
| | CR-1-03 | 3.2 | 1.3 | 0.84 | | | | |
| | CR-1-04 | 2.5 | 0.76 | | | | | |
| | CR-1-05 | 4.4 | | | | | | |
| | **Average** | 3.4 | 0.79 | 1.4 | | | | |
| Middle Channel - downstream from Floradale Road | CR-2-01 | 4.3 | Not sampled | 0.47 | 1130529.201 | 922854.378 | 1130680.907 | 923003.430 |
| | CR-2-02 | 3.5 | Not sampled | 0.37 | | | | |
| | CR-2-03 | 5.2 | Not sampled | 0.82 | | | | |
| | CR-2-04 | 3.6 | Not sampled | 0.36 | | | | |
| | CR-2-05 | 3.5 | Not sampled | | | | | |
| | **Average** | 4.0 | No samples | 0.51 | | | | |
| Lower Channel-upstream from Onondaga Lake Parkway | CR-3-01 | 0.97 | 0.059 J | 0.085 J | 1128853.259 | 922571.533 | 1128930.078 | 922690.995 |
| | CR-3-02 | 0.76 | 0.13 | 0.088 | | | | |
| | CR-3-03 | 1.3 | 0.12 | 0.069 J | | | | |
| | CR-3-04 | 1.5 | 0.22 | 0.043 J | | | | |
| | CR-3-05 | 0.33 | 0.18 | 0.067 | | | | |
| | **Average** | 0.97 | 0.16 | 0.07 | | | | |

Notes:

1.Biota samples were whole body crayfish.

2. Results are reported in wet weight.

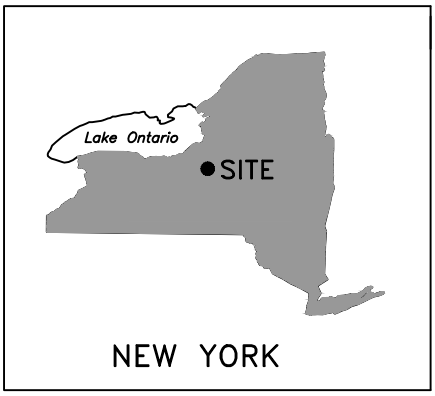
3. No crayfish were located in the "middle" sample from 2018.

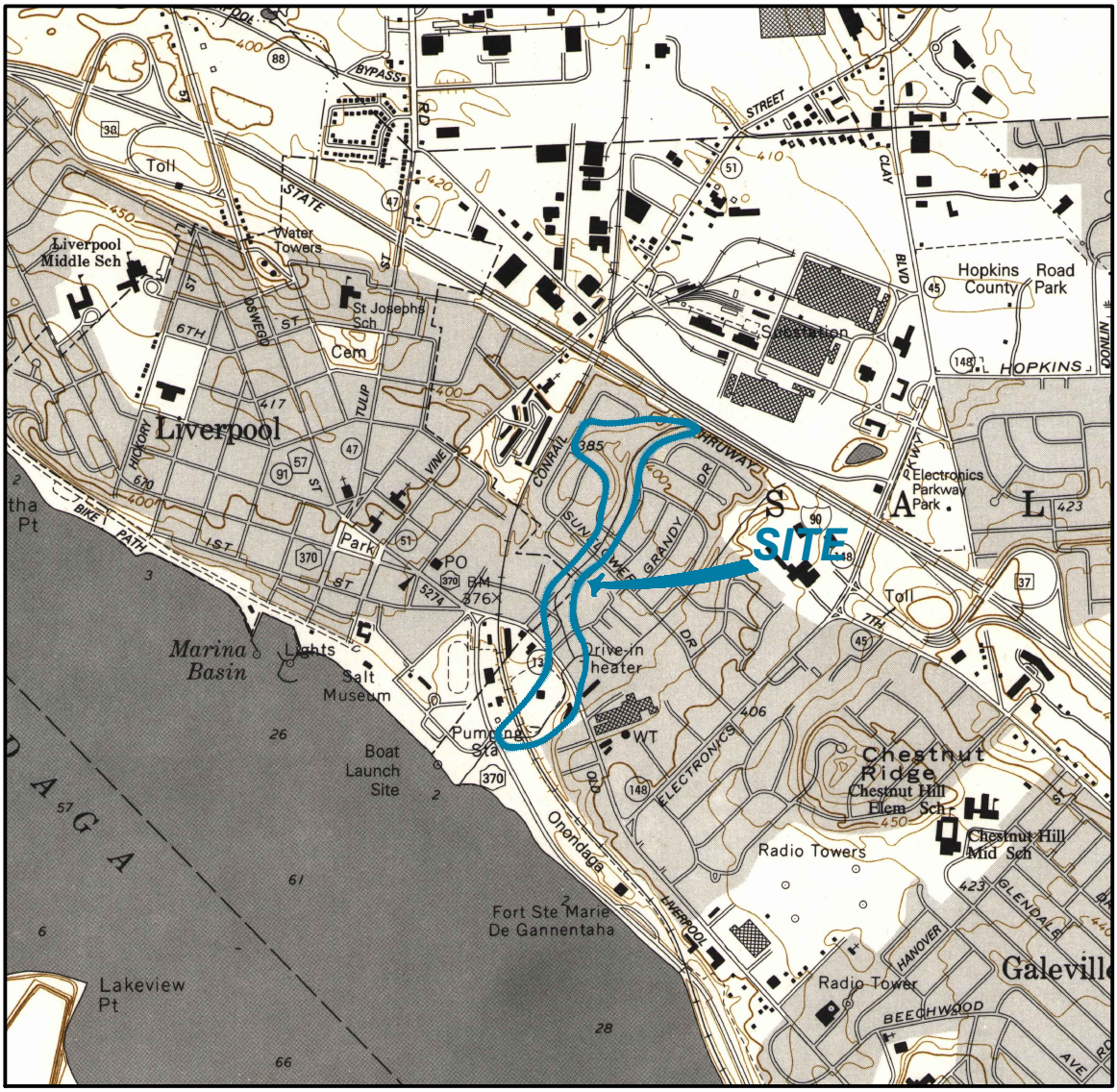
4. J - estimated value; detected above the method detection limit but below the reporting limit.

**Table 8**
**Bloody Brook**
**Reporting Summary/Schedule**

| Task/Report | Reporting Frequency |
|---|---|
| Periodic Review Report | Annually |
| Restoration Monitoring Report | Annually for five years |
| Biological Monitoring Report | Two, four, and six years following remediation (summer/fall 2018, 2020, and 2022) |

# FIGURES




0 2000 4000

APPROXIMATE SCALE

REFERENCE:

1. NYSDOT 7.5 MIN TOPOGRAPHIC MAP OF SYRACUSE WEST, QUADRANGLE 1990, SCALE: 1" = 2000'.

AECOM

LOCKHEED MARTIN CORPORATION

SITE LOCATION MAP

BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

| FILE NAME: | DRN | PROJECT NO. | DATE | FIGURE NO. |
|---|---|---|---|---|
| SMP_FIG1.dwg | RNB | 60_44270 | 2 / 2018 | 1 |

Plotted By: Bookasr
Layout-Sheet Name: LAYOUT1
Plot File Date Created: Feb/12/2018 11:27 AM

Filename: N:\MARKETING\PROPOSALS\LOCKHEED MARTIN – BLOODY BROOK\CAD\SMP – 2018\SMP_FIG1.DWG




## Legend

- CURRENT BROOK ALIGNMENT
- WOODED AREA
- RESIDENTIAL AREA
- APARTMENT COMPLEX AREA
- COMMERCIAL-LIGHT INDUSTRIAL AREA
- COMMERCIAL AREAS E□CLUDED FROM MAY 2017 MONITORING

0□ 300□ 600□

APPRO□IMATE SCALE

AECOM

LOCKHEED MARTIN CORPORATION

SITE AREA MAP

BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

| FILE NAME: | DRN | PROJECT NO. | DATE | FIGURE NO. |
|---|---|---|---|---|
| SMP□FIG2.dwg | RNB | 60□44270 | 2 / 2018 | 2 |

Plotted By: Bookasr
Layout-Sheet Name: FIGURE 1-2
Plot File Date Created: Feb/12/2018 11:29 AM

Filename: N:\MARKETING\PROPOSALS\LOCKHEED MARTIN – BLOODY BROOK\CAD\SMP – 2018\SMP_FIG2.DWG

ONTARIO PLACE

MIDWOOD DRIVE

CRANBERRY DRIVE

MIDWOOD DRIVE

NEW YORK STATE THRUWAY

SUNFLOWER DRIVE

MATCHLINE TO SHEET 2 OF 3

E BOX CULVERT INV.=384.4

INV.12"CSP=397.23

HIGHWAY BOUNDARY

CHAIN LINK FENCE

N 1,132,000

N 1,132,500

E 924,000

E 923,500

## LEGEND

- WETLANDS
- BLOODY BROOK DRAINAGE DISTRICT EASEMENT
- NEW YORK STATE THRUWAY EASEMENT
- PROPERTY BORDER
- 365 TOPOGRAPHIC CONTOUR LINE
- CENTERLINE OF CHANNEL
- STREAM/WATER EDGE
- CULVERT
- LOCATION HISTORIC BROOK ALIGNMENT
- DI-84-01 SOIL BORING FOR USE IN CULVERT REPLACEMENT WITH RESIDUAL CADMIUM (CADMIUM CONCENTRATIONS EXCEEDING 10 mg/kg)
- DI-84-02 SOIL BORING FOR USE IN CULVERT REPLACEMENT WITHOUT RESIDUAL CADMIUM (CADMIUM CONCENTRATIONS 10 mg/kg OR LESS)
- SB-204 EASEMENT SAMPLING LOCATION WITH RESIDUAL CADMIUM (CADMIUM CONCENTRATIONS EXCEEDING 10 mg/kg BELOW 2 FEET)
- SB-26 EASEMENT SAMPLING LOCATION WITHOUT RESIDUAL CADMIUM (CADMIUM CONCENTRATIONS 10 mg/kg OR LESS)
- DI-01-01 RESIDENTIAL SAMPLING LOCATION WITH RESIDUAL CADMIUM (CADMIUM CONCENTRATIONS EXCEEDING 10 mg/kg BELOW 2 FEET)
- DI-02-02 RESIDENTIAL SAMPLING LOCATION WITHOUT RESIDUAL CADMIUM (CADMIUM CONCENTRATIONS 2.5 mg/kg OR LESS IN THE TOP 2 FEET AND 10 mg/kg OR LESS BELOW 2 FEET)
- SB-409 WOODED AREA SAMPLING LOCATION WITH RESIDUAL CADMIUM (CADMIUM CONCENTRATIONS EXCEEDING 4 mg/kg IN THE TOP 2 FEET AND /OR 10 mg/kg BELOW 2 FEET)
- SB-408 WOODED AREA SAMPLING LOCATION WITHOUT RESIDUAL CADMIUM (CADMIUM CONCENTRATIONS 4 mg/kg OR LESS IN THE TOP 2 FEET AND 10 mg/kg OR LESS BELOW 2 FEET)
- SB-63 SAMPLING LOCATION FULLY REMOVED DURING EXCAVATION ACTIVITIES
- LIMITS OF EXCAVATION (2 FT MAX DEPTH BGS)
- LIMITS OF EXCAVATION WITHIN EXISTING BROOK CHANNEL
- LIMITS OF EXCAVATION (3FT DEPTH BGS)
- LIMITS OF EXCAVATION (4FT DEPTH BGS)
- LIMITS OF EXCAVATION (5FT DEPTH BGS)
- LIMITS OF EXCAVATION (6FT DEPTH BGS)

## NOTE

1. SEE FIGURE 3C FOR IDENTIFICATION OF ADDITIONAL MAP SYMBOLS.

0 50 100

APPROXIMATE SCALE

**REFERENCES:**

1. BASE MAP SOURCE: IANUZI & ROMANS, P.C. AND CT MALE ASSOCIATES P.C.
2. THE VALUES SHOWN ARE BASED ON NEW YORK (CENTRAL ZONE) STATE PLANE COORDINATE SYSTEM NORTH AMERICAN DATUM 1983.

AECOM

LOCKHEED MARTIN CORPORATION
POST-REMEDIATION
RESIDUAL CADMIUM
SHEET 1 OF 3

BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

| FILE NAME | DRN | PROJECT NO. | DATE | FIGURE NO. |
|---|---|---|---|---|
| SMP FIG3.dwg | RNB | 60 44270 | 2 / 2018 | 3A |

Plotted By Booker
Plot Time/Date 9:43 AM on Fri, Feb 02, 2018

Filename: N:_MARKETING_PROPOSALS\LOCKHEED MARTIN – BLOODY BROOK\CAD\SMP – 2018\SMP_FIG3.DWG

ROYAL DRIVE

TOWN GARDENS DRIVE
(PRIVATE ROAD)

SUNFLOWER DRIVE

FLORADALE ROAD

A STREET

PEARL STREET

OLD LIVERPOOL ROAD
(C.R. No. 137)

TOWN OF SALINA
VILLAGE OF LIVERPOOL

N 1,131,000

N 1,130,500

N 1,130,000

E 923,500

E 922,500

MATCHLINE
TO SHEET 1 OF 3

MATCHLINE TO SHEET 3 OF 3

## LEGEND

- TOWN/VILLAGE BORDER
- LOCATION HISTORIC BROOK ALIGNMENT
- DI-84-01 — SOIL BORING FOR USE IN CULVERT REPLACEMENT WITH RESIDUAL CADMIUM (CADMIUM CONCENTRATIONS EXCEEDING 10 mg/kg)
- DI-84-02 — SOIL BORING FOR USE IN CULVERT REPLACEMENT WITHOUT RESIDUAL CADMIUM (CADMIUM CONCENTRATIONS 10 mg/kg OR LESS)
- SB-417 — EXISTING SAMPLING LOCATION WITHIN APARTMENT COMPLEX PROPERTY WITH RESIDUAL CADMIUM (CADMIUM CONCENTRATIONS EXCEEDING 10 mg/kg BELOW 2 FEET)
- B-7 — EXISTING SAMPLING LOCATION WITHIN APARTMENT COMPLEX PROPERTY WITHOUT RESIDUAL CADMIUM (CADMIUM CONCENTRATIONS 4.3 mg/kg OR LESS IN THE TOP 2 FEET AND 10 mg/kg OR LESS BELOW 2 FEET)
- SB-209 — EASEMENT SAMPLING LOCATION WITH RESIDUAL CADMIUM (CADMIUM CONCENTRATIONS EXCEEDING 10 mg/kg BELOW 2 FEET)
- SB-72 — EASEMENT SAMPLING LOCATION WITHOUT RESIDUAL CADMIUM (CADMIUM CONCENTRATIONS 10 mg/kg OR LESS)
- DI-06-01 — RESIDENTIAL SAMPLING LOCATION WITH RESIDUAL CADMIUM (CADMIUM CONCENTRATIONS EXCEEDING 10 mg/kg BELOW 2 FEET)
- DI-06-02 — RESIDENTIAL SAMPLING LOCATION WITHOUT RESIDUAL CADMIUM (CADMIUM CONCENTRATIONS 2.5 mg/kg OR LESS IN THE TOP 2 FEET AND 10 mg/kg OR LESS BELOW 2 FEET)
- SB-12 — COMMERCIAL SAMPLING LOCATION WITHOUT RESIDUAL CADMIUM (CADMIUM CONCENTRATIONS 9.3 mg/kg OR LESS)
- SB-63 — SAMPLING LOCATION FULLY REMOVED DURING EXCAVATION ACTIVITIES
- LIMITS OF EXCAVATION (2 FT MAX DEPTH BGS)
- LIMITS OF EXCAVATION WITHIN EXISTING BROOK CHANNEL
- LIMITS OF EXCAVATION (4FT DEPTH BGS)

## NOTE

1. SEE FIGURE 3C FOR IDENTIFICATION OF ADDITIONAL MAP SYMBOLS.

REFERENCES:

1. BASE MAP SOURCE: IANUZI & ROMANS, P.C. AND CT MALE ASSOCIATES P.C.
2. THE VALUES SHOWN ARE BASED ON NEW YORK (CENTRAL ZONE) STATE PLANE COORDINATE SYSTEM NORTH AMERICAN DATUM 1983.

0 50 100

APPROXIMATE SCALE

AECOM

LOCKHEED MARTIN CORPORATION
POST-REMEDIATION
RESIDUAL CADMIUM
SHEET 2 OF 3

BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

| FILE NAME | DRN | PROJECT NO. | DATE | FIGURE NO. |
|---|---|---|---|---|
| SMP FIG3.dwg | RNB | 60 44270 | 2 / 2018 | 3B |

Plotted By: Bodoker
Plot Scale: 1 = 1 Inches
Plot File Date Created: Feb/13/2018 1:09 PM

Filename: N:\MARKETING\PROPOSALS\LOCKHEED MARTIN - BLOODY BROOK\CAD\SMP - 2018\SMP_FIG3.DWG

33 34 3□ 36 37 38 3□ 40 41 42 43 44 4□ 46 47 48

A B C D E F G H I J

N 1,129,500

N 1,129,000

E 923,000

N 1,128,500

E 922,500

OLD LIVERPOOL ROAD (C.R. No. 137)

MATCHLINE TO SHEET 2 OF 3

OLD LIVERPOOL ROAD (C.R. No. 137)

ONONDAGA LAKE PARKWAY

E 922,500

E 922,000

PARKING

PATIO

ASPHALT PARKING LOT

CONCRETE CURB

BRUSH

SHED

BOX CULVERT

INV.±=362.0 ARCH BOX CULVERT

SB-79 SB-14/SB-78 SB-13 SB-83 SB-82 SB-81 SB-80 SB-433 SB-434 SB-75 SB-81-01 DI-81-02 DI-16-02 SB-420 SB-422 SB-421 DI-16-01 SB-76 DI-16-03 SB-419 SB-77 SB-418 SB-423 SB-424 SB-425 SB-426 SB-427 SB-428 SB-429 SB-430 SB-431 SB-432 SB-84/SB-76 SB-211 B-5 SB-16 B-4 EPSOIL-4 SB-17/SB-85 SB-18 B-3 B-2 B-1 SB-232 SB-212 SB-23 B-12 B-11

REFERENCES:

1. BASE MAP SOURCE: IANUZI & ROMANS, P.C. AND CT MALE ASSOCIATES P.C.
2. THE VALUES SHOWN ARE BASED ON NEW YORK (CENTRAL ZONE) STATE PLANE COORDINATE SYSTEM NORTH AMERICAN DATUM 1983.

## LEGEND

- BLOODY BROOK DRAINAGE DISTRICT EASEMENT
- PROPERTY BORDER
- 365 TOPOGRAPHIC CONTOUR LINE
- CENTERLINE OF CHANNEL
- STREAM/WATER EDGE
- UNDERGROUND DRAIN LINE
- OHW OVERHEAD WIRES
- RW RETAINING WALL
- GUARD RAIL
- UMH UTILITY MANHOLE
- DMH DRAINAGE MANHOLE
- SMH SANITARY MANHOLE
- RAILROAD TRACKS
- CB CATCH BASIN
- DS DRAINAGE STRUTURES
- FP FLAG POLE
- CULVERT
- E 924,000 NYS PLANE COORDINATE SYSTEM EASTING
- N 1,131,000 NYS PLANE COORDINATE SYSTEM NORTHING
- BL-115 AERIAL SURVEY GROUND CONTROL POINT
- 7+50 CHANNEL CENTERLINE SURVEY STATION
- 367.4 TOPOGRAPHIC SPOT ELEVATION
- CONIFEROUS TREE
- DECIDUOUS TREE
- LIGHT POLE
- UTILITY POLE / GUY WIRE
- LOCATION HISTORIC BROOK ALIGNMENT
- LIMITS OF EXCAVATION (2 FT MAX DEPTH BGS)
- LIMITS OF EXCAVATION WITHIN EXISTING BROOK CHANNEL
- SB-84 EASEMENT SAMPLING LOCATION WITH RESIDUAL CADMIUM (CADMIUM CONCENTRATIONS EXCEEDING 10 mg/kg BELOW 2 FEET)
- SB-420 EASEMENT SAMPLING LOCATION WITHOUT RESIDUAL CADMIUM (CADMIUM CONCENTRATIONS 10 mg/kg OR LESS)
- SB-80 COMMERCIAL SAMPLING LOCATION WITH RESIDUAL CADMIUM (CADMIUM CONCENTRATIONS EXCEEDING 9.3 mg/kg IN THE TOP 2 FEET AND/OR EXCEEDING 10 mg/kg BELOW 2 FEET)
- SB-75 COMMERCIAL SAMPLING LOCATION WITHOUT RESIDUAL CADMIUM (CADMIUM CONCENTRATIONS 9.3 mg/kg OR LESS IN THE TOP 2 FEET AND 10 mg/kg OR LESS BELOW 2 FEET)
- SB-13 SAMPLING LOCATION FULLY REMOVED DURING EXCAVATION ACTIVITIES

0 0□ 100□

APPROXIMATE SCALE

AECOM

LOCKHEED MARTIN CORPORATION
POST-REMEDIATION
RESIDUAL CADMIUM
SHEET 3 OF 3

BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

| FILE NAME: | DRN | PROJECT NO. | DATE | FIGURE NO. |
|---|---|---|---|---|
| SMP FIG3.dwg | RNB | 60 44270 | 2 / 2018 | 3C |

Plotted By: Bodziak
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Path: File Date Created: Feb./1/2018

Filename: N:\MARKETING\PROPOSALS\LOCKHEED MARTIN – BLOODY BROOK\CAD\SMP – 2018\SMP_FIG3.DWG

ONTARIO PLACE

MIDWOOD DRIVE

CRANBERRY DRIVE

MIDWOOD DRIVE

MATCHLINE TO SHEET 2 OF 3

NEW YORK STATE THRUWAY

SUNFLOWER DRIVE

BROOKVIEW LANE

N 1,132,000

N 1,131,500

N 1,132,500

E 924,000

E 923,500

E 923,000

E BOX CULVERT INV.=384.4

INV.12"CSP=397.23

INV=377.92

HIGHWAY BOUNDARY

CHAIN LINK FENCE

BRUSH

## LEGEND

- WETLANDS
- BLOODY BROOK DRAINAGE DISTRICT EASEMENT
- PROPERTY BORDER
- 365 TOPOGRAPHIC CONTOUR LINE
- CENTERLINE OF CHANNEL
- STREAM/WATER EDGE
- CULVERT
- LOCATION HISTORIC BROOK ALIGNMENT
- NYS THRUWAY EASEMENT
- INSTITUTIONAL CONTROL AREA

0 0 100

APPROXIMATE SCALE

## NOTE

1. SEE FIGURE 4C FOR IDENTIFICATION OF ADDITIONAL MAP SYMBOLS.

## REFERENCES:

1. BASE MAP SOURCE: IANUZI & ROMANS, P.C. AND CT MALE ASSOCIATES P.C.
2. THE VALUES SHOWN ARE BASED ON NEW YORK (CENTRAL ZONE) STATE PLANE COORDINATE SYSTEM NORTH AMERICAN DATUM 1983.

AECOM

LOCKHEED MARTIN CORPORATION

INSTITUTIONAL CONTROL AREA
SHEET 1 OF 3

BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

| FILE NAME: | DRN | PROJECT NO. | DATE | FIGURE NO. |
|---|---|---|---|---|
| SMP: FIG4.dwg | RNS | 60: 44270 | 2 / 2018 | 4A |

Plotted By:Bolster
Plot File Date: Created by FIG4.ctb 2/7/2018 8:54 AM

Filename: N:\MARKETING\PROPOSALS\LOCKHEED MARTIN – BLOODY BROOK\CAD\SMP – 2018\SMP_FIG4.DWG

ROYAL DRIVE

TOWN GARDENS DRIVE
(PRIVATE ROAD)

SUNFLOWER DRIVE

FLORADALE ROAD

SALINA STREET

PEARL STREET

OLD LIVERPOOL ROAD
(C.R. No. 137)

TOWN OF SALINA
VILLAGE OF LIVERPOOL

MATCHLINE
TO SHEET 1 OF 3

MATCHLINE TO SHEET 3 OF 3

N 1,131,000

N 1,130,500

N 1,130,000

E 923,500

E 923,000

E 922,500

REFERENCES:

1. BASE MAP SOURCE: IANUZI & ROMANS, P.C. AND CT MALE ASSOCIATES P.C.
2. THE VALUES SHOWN ARE BASED ON NEW YORK (CENTRAL ZONE) STATE PLANE COORDINATE SYSTEM NORTH AMERICAN DATUM 1983.

LEGEND

- TOWN/VILLAGE BORDER
- LOCATION HISTORIC BROOK ALIGNMENT
- INSTITUTIONAL CONTROL AREA

NOTE

1. SEE FIGURE 4C FOR IDENTIFICATION OF ADDITIONAL MAP SYMBOLS.

0 50 0 100

APPROXIMATE SCALE

AECOM

LOCKHEED MARTIN CORPORATION
INSTITUTIONAL CONTROL AREA
SHEET 2 OF 3

BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

| FILE NAME: | DRN | PROJECT NO. | DATE | FIGURE NO. |
|---|---|---|---|---|
| SMP_FIG4.dwg | RNS | 60: 44270 | 2 / 2018 | 4B |

Plotted By:Brooker
Plotted Date/Time: FIGURE 4B
Plot File Date Created: Feb/12/2018 1:11 PM

Filename: N:\MARKETING\PROPOSALS\LOCKHEED MARTIN – BLOODY BROOK\CAD\SMP – 2018\SMP_FIG4.DWG

33 34 3□ 36 37 38 3□ 40 41 42 43 44 4□ 46 47 48

A B C D E F G H I J

N 1,129,500

N 1,129,000

E 923,000

N 1,128,500

E 922,500

OLD LIVERPOOL ROAD (C.R. No. 137)

PATIO

PARKING

PARKING

BRUSH

BRUSH

BRUSH

BRUSH

BRUSH

BRUSH

BRUSH

ASPHALT PARKING LOT

CONCRETE CURB

CONCRETE CURB

BOX CULVERT

INV.±=362.0 ARCH BOX CULVERT

SHED

ONONDAGA LAKE PARKWAY

MATCHLINE TO SHEET 2 OF 3

OLD LIVERPOOL ROAD (C.R. No. 137)

E 922,500

E 922,000

35+50 39+00 39+50 40+00 40+50 41+00 41+50 42+00 42+50 43+00 43+50 44+00 44+50 45+00 45+50 46+00 46+50 47+00 47+50 48+00 48+86.35

## LEGEND

- BLOODY BROOK DRAINAGE DISTRICT EASEMENT
- PROPERTY BORDER
- 365 TOPOGRAPHIC CONTOUR LINE
- CENTERLINE OF CHANNEL
- STREAM/WATER EDGE
- UNDERGROUND DRAIN LINE
- OHW OVERHEAD WIRES
- RW RETAINING WALL
- GUARD RAIL
- UMH UTILITY MANHOLE
- DMH DRAINAGE MANHOLE
- SMH SANITARY MANHOLE
- RAILROAD TRACKS
- CB CATCH BASIN
- DS DRAINAGE STRUTURES
- FP FLAG POLE
- CULVERT
- E 924,000 NYS PLANE COORDINATE SYSTEM EASTING
- N 1,131,000 NYS PLANE COORDINATE SYSTEM NORTHING
- BL-115 AERIAL SURVEY GROUND CONTROL POINT
- 7+50 CHANNEL CENTERLINE SURVEY STATION
- 367.4 TOPOGRAPHIC SPOT ELEVATION
- CONIFEROUS TREE
- DECIDUOUS TREE
- LIGHT POLE
- UTILITY POLE / GUY WIRE
- LOCATION HISTORIC BROOK ALIGNMENT
- INSTITUTIONAL CONTROL AREA

REFERENCES:

1. BASE MAP SOURCE: IANUZI & ROMANS, P.C. AND CT MALE ASSOCIATES P.C.
2. THE VALUES SHOWN ARE BASED ON NEW YORK (CENTRAL ZONE) STATE PLANE COORDINATE SYSTEM NORTH AMERICAN DATUM 1983.

0 0□ 100□

APPROXIMATE SCALE

AECOM

LOCKHEED MARTIN CORPORATION
INSTITUTIONAL CONTROL AREA
SHEET 3 OF 3

BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

| FILE NAME: | DRN | PROJECT NO. | DATE | FIGURE NO. |
|---|---|---|---|---|
| SMP_FIG4.dwg | RNB | 60 44270 | 2 / 2018 | 4C |

Plotted By: Bookstar
Plot Scale: 1 inch = 100 feet
Plot File Date: Created Feb/12/2018 9:58 AM

Filename: N:\MARKETING\PROPOSALS\LOCKHEED MARTIN – BLOODY BROOK\CAD\SMP – 2018\SMP_FIG4.DWG

ONTARIO PLACE

MIDWOOD DRIVE

CRANBERRY DRIVE

MIDWOOD DRIVE

NEW YORK STATE THRUWAY

SUNFLOWER DRIVE

BROOKVIEW LANE

MATCHLINE TO SHEET 2 OF 3

E BOX CULVERT INV.=384.4

INV.12"CSP=397.23

HIGHWAY BOUNDARY

CHAIN LINK FENCE

N 1,132,000

N 1,131,500

N 1,132,500

E 924,000

E 923,500

E 923,000

E 923

REFERENCES:

1. BASE MAP SOURCE: IANUZI & ROMANS, P.C. AND CT MALE ASSOCIATES P.C.
2. THE VALUES SHOWN ARE BASED ON NEW YORK (CENTRAL ZONE) STATE PLANE COORDINATE SYSTEM NORTH AMERICAN DATUM 1983.

## LEGEND

- WETLANDS
- BLOODY BROOK DRAINAGE DISTRICT EASEMENT
- PROPERTY BORDER
- 365 TOPOGRAPHIC CONTOUR LINE
- CENTERLINE OF CHANNEL
- STREAM/WATER EDGE
- CULVERT
- LOCATION HISTORIC BROOK ALIGNMENT
- NYS THRUWAY EASEMENT
- ENGINEERING CONTROL AREA

0 0 100

APPROXIMATE SCALE

## NOTE

1. SEE FIGURE 5C FOR IDENTIFICATION OF ADDITIONAL MAP SYMBOLS.

AECOM

LOCKHEED MARTIN CORPORATION

ENGINEERING CONTROL AREA
SHEET 1 OF 3

BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

| FILE NAME: | DRN | PROJECT NO. | DATE | FIGURE NO. |
|---|---|---|---|---|
| SMP_FIG...dwg | RNS | 60 44270 | 2 / 2018 | 1A |

Plotted By: Brooker
Plot File Date: Created on Feb 13 2018 8:57 AM

Filename: N:\MARKETING\PROPOSALS\LOCKHEED MARTIN – BLOODY BROOK\CAD\SMP – 2018\SMP_FIGS.DWG

ROYAL DRIVE

TOWN GARDENS DRIVE
(PRIVATE ROAD)

SUNFLOWER DRIVE

FLORADALE ROAD

SALINA STREET

PEARL STREET

OLD LIVERPOOL ROAD
(C.R. No. 137)

TOWN OF SALINA
VILLAGE OF LIVERPOOL

MATCHLINE
TO SHEET 1 OF 3

MATCHLINE TO SHEET 3 OF 3

N 1,131,000

N 1,130,500

N 1,130,000

E 923,500

E 923,000

E 922,500

REFERENCES:

1. BASE MAP SOURCE: IANUZI & ROMANS, P.C. AND CT MALE ASSOCIATES P.C.
2. THE VALUES SHOWN ARE BASED ON NEW YORK (CENTRAL ZONE) STATE PLANE COORDINATE SYSTEM NORTH AMERICAN DATUM 1983.

LEGEND

- TOWN/VILLAGE BORDER
- LOCATION HISTORIC BROOK ALIGNMENT
- ENGINEERING CONTROL AREA

NOTE

1. SEE FIGURE 5C FOR IDENTIFICATION OF ADDITIONAL MAP SYMBOLS.

0 0 100

APPROXIMATE SCALE

AECOM

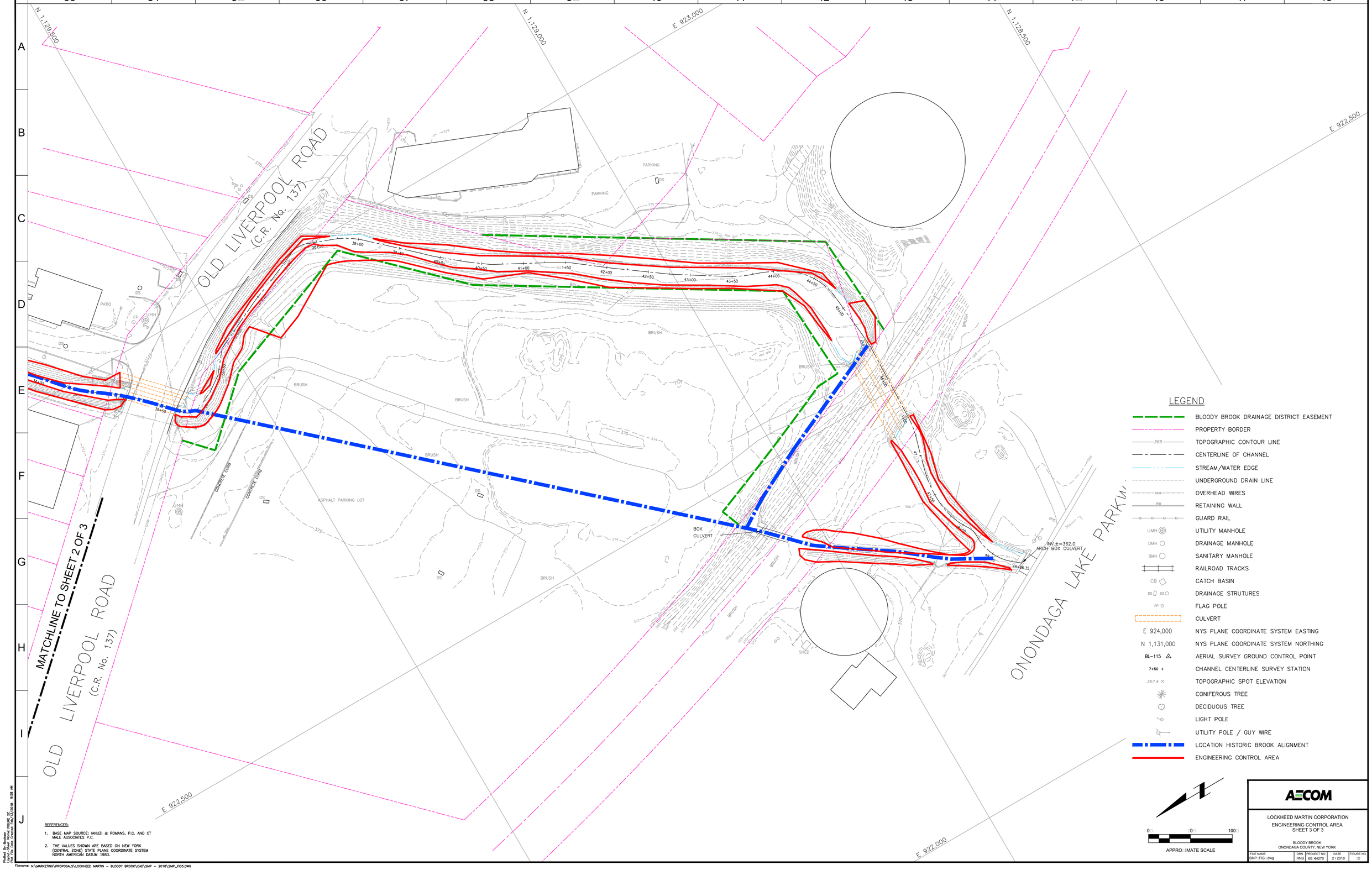
LOCKHEED MARTIN CORPORATION
ENGINEERING CONTROL AREA
SHEET 2 OF 3

BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

| FILE NAME: | DRN | PROJECT NO. | DATE | FIGURE NO. |
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Plotted By:Brubaker
Plotted Name:FIG#8_59
Plot File Date Created: Feb/12/2018 1:12 PM

Filename: N:\MARKETING\PROPOSALS\LOCKHEED MARTIN – BLOODY BROOK\CAD\SMP – 2018\SMP_FIGS.DWG




LEGEND

- BLOODY BROOK DRAINAGE DISTRICT EASEMENT
- PROPERTY BORDER
- 365 TOPOGRAPHIC CONTOUR LINE
- CENTERLINE OF CHANNEL
- STREAM/WATER EDGE
- UNDERGROUND DRAIN LINE
- OHW OVERHEAD WIRES
- RW RETAINING WALL
- GUARD RAIL
- UMH UTILITY MANHOLE
- DMH DRAINAGE MANHOLE
- SMH SANITARY MANHOLE
- RAILROAD TRACKS
- CB CATCH BASIN
- DS DRAINAGE STRUTURES
- FP FLAG POLE
- CULVERT
- E 924,000 NYS PLANE COORDINATE SYSTEM EASTING
- N 1,131,000 NYS PLANE COORDINATE SYSTEM NORTHING
- BL-115 AERIAL SURVEY GROUND CONTROL POINT
- 7+50 CHANNEL CENTERLINE SURVEY STATION
- 367.4 TOPOGRAPHIC SPOT ELEVATION
- CONIFEROUS TREE
- DECIDUOUS TREE
- LIGHT POLE
- UTILITY POLE / GUY WIRE
- LOCATION HISTORIC BROOK ALIGNMENT
- ENGINEERING CONTROL AREA

REFERENCES:

1. BASE MAP SOURCE: IANUZI & ROMANS, P.C. AND CT MALE ASSOCIATES P.C.
2. THE VALUES SHOWN ARE BASED ON NEW YORK (CENTRAL ZONE) STATE PLANE COORDINATE SYSTEM NORTH AMERICAN DATUM 1983.

0 50 100

APPROXIMATE SCALE

AECOM

LOCKHEED MARTIN CORPORATION
ENGINEERING CONTROL AREA
SHEET 3 OF 3

BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

| FILE NAME: | DRN | PROJECT NO. | DATE | FIGURE NO. |
|---|---|---|---|---|
| SMP_FIG _.dwg | RNB | 60 44270 | 2 / 2018 | C |

Plotted By: Booksar
Plot Scale: 1 inch = 50 feet
Plot File Date: Created: Feb/12/2018 9:58 AM

Filename: N:\MARKETING\PROPOSALS\LOCKHEED MARTIN – BLOODY BROOK\CAD\SMP – 2018\SMP_FIG5.DWG

# APPENDIX A

## Site Contact List

| AFFILIATION | NAME/TITLE | TELEPHONE | EMAIL |
|---|---|---|---|
| New York State Department of Environmental Conservation | Jacky Luo<br>Project Manager | 518-402-9676 | jacky.luo@dec.ny.gov |
| New York State Department of Health | Mark Sergott, P.G.<br>Project Manager | 518-402-7860 | beei@health.ny.gov |
| Lockheed Martin Corporation | Jill Fonte<br>Environmental Engineer | 315-456-1993 desk<br>315-944-8082 cell<br>315-456-3723 (ESH Admin) | jill.a.fonte@lmco.com |

# APPENDIX B

## 2017 Record Drawings

XREFS: NONE

PROJECT NUMBER: 03.1070

CAD DWG. FILE NAME: Bloody Brook Record Survey 12-08-17.dwg




LEGEND

- FP — FLAG POLE
- LP — LIGHT POLE
- UTILITY POLE / GUY WIRE
- SMH — SANITARY MANHOLE
- UMH — UTILITY MANHOLE
- DS — DRAINAGE STRUCTURES
- DMH — DRAINAGE MANHOLE
- SMH — SANITARY MANHOLE
- FENCES
- GP — GATE POST
- BOL — BOLLARD
- MAP REFERENCE 1 PROPERTY LINE
- GUIDE RAIL
- OHW — OVERHEAD WIRES
- EDGE OF RIP-RAP
- SS — SANITARY SEWER
- ST — STORM DRAIN
- EDGE OF WATER

MAP NOTES

1.) NORTH ORIENTATION IS BASED CENTRAL ZONE OF THE NEW YORK STATE PLANE COORDINATE SYSTEM NAD 83

2.) VERTICAL DATUM IS BASED ON NAVD 1988.

3.) GRAYSCALE DATA SHOWN HEREON IS THE RESULT OF CONTROLLED, STEREO AERIAL PHOTOGRAPHY OBTAINED BY THE FIRM OF LAFAVE, WHITE & McGIVERN ON NOVEMBER 12, 2005 IN CONJUNCTION WITH CONTROL PROVIDED BY THE UNDERSIGNED, AND PREVIOUS INFORMATION AS SHOWN ON MAP REFERENCE No.1.

4.) UNDERGROUND FACILITIES, STRUCTURES AND UTILITIES HAVE BEEN PLOTTED FROM DATA OBTAINED BY FIELD SURVEY, PREVIOUS MAPS AND RECORDS, (AND PAROL TESTIMONY). THEREFORE THEIR LOCATIONS MUST BE CONSIDERED APPROXIMATE ONLY. THERE MAY BE OTHER UNDERGROUND UTILITIES, THE EXISTENCE OF WHICH ARE NOT KNOWN TO THE UNDERSIGNED. SIZE AND LOCATION OF ALL UNDERGROUND UTILITIES AND STRUCTURES MUST BE VERIFIED BY THE APPROPRIATE AUTHORITIES PRIOR TO ANY CONSTRUCTION.

5.) RECORD DATA FIELD WORK PERFORMED DURING THE MONTHS OF JUNE AND JULY 2017.

MAP REFERENCE

1.) MAP ENTITLED "WEST BRANCH OF BLOODY BROOK" PREPARED BY IANUZI & ROMANS, P.C. DATED JANUARY 28, 2003 FILE NUMBER 2974.001

BAR SCALE

60 0 30 60 120

1 inch = 60 ft.

"ONLY COPIES OF THIS MAP SIGNED IN RED INK AND EMBOSSED WITH THE SEAL OF AN OFFICER OF C.T. MALE ASSOCIATES OR A DESIGNATED REPRESENTATIVE SHALL BE CONSIDERED TO BE A VALID 'TRUE COPY'".

DAVID J. UHRINEC, PLS
P.L.S. NO. 050052

STATE OF NEW YORK — DAVID JOSEPH UHRINEC — 050052 — LICENSED LAND SURVEYOR

| DATE | | REVISIONS RECORD/DESCRIPTION | DRAFTER | CHECK | APPR. |
|---|---|---|---|---|---|
| 08/28/17 | 1 | added topo soil in private areas | dju | dju | dju |
| 08/30/17 | 2 | removed addresses | dju | dju | dju |
| 12/08/17 | 3 | weirs 2 & 3, OLP Road Rip Rap | dju | dju | dju |
| | 4 | | | | |
| | 5 | | | | |
| | 6 | | | | |
| | 7 | | | | |
| | 8 | | | | |
| | 9 | | | | |

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APPROVED: dju
DRAFTED : dju
CHECKED : dju
PROJ. NO : 03.1070
SCALE : 1"=60'
DATE : 07/13/14

# 2017 RECORD SURVEY

## LOCKHEED MARTIN COPORATION

### WEST BRANCH BLOODY BROOK

TOWN OF SALINA — ONONDAGA COUNTY, NEW YORK

**C.T. MALE ASSOCIATES**
Engineering, Surveying, Architecture & Landscape Architecture, D.P.C.
200 GATEWAY PARK DRIVE, BLDG. C, P.O. BOX 3246
SYRACUSE, NY 13220-3246
315.458.6498 * FAX 315.458.4427

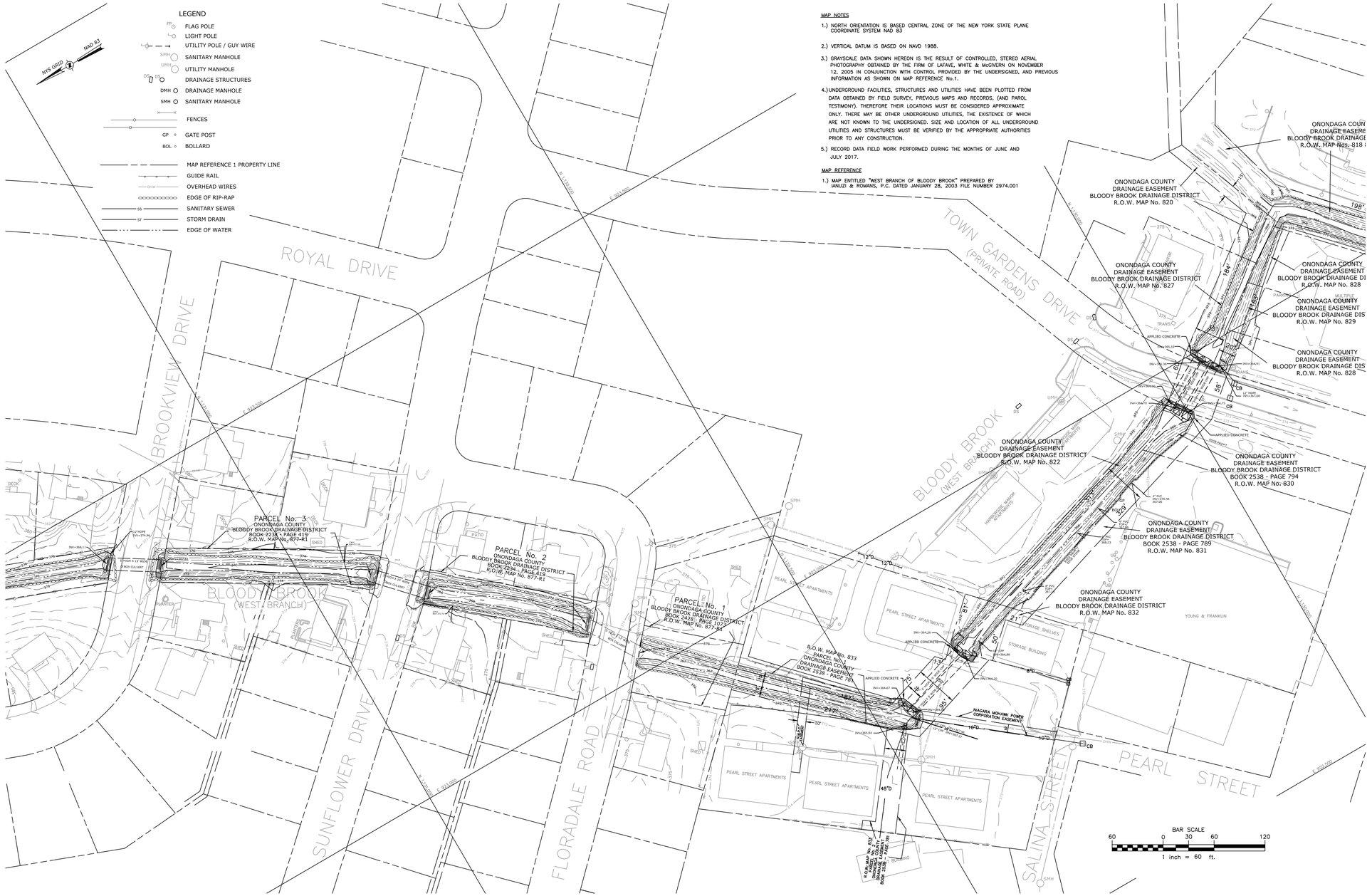
SHEET 1 OF 3

DWG. NO: 17-0419

XREFS: NONE

PROJECT NUMBER: 03.1070

CAD DWG. FILE NAME: Bloody Brook Record Survey 12-08-17




"ONLY COPIES OF THIS MAP SIGNED IN RED INK AND EMBOSSED WITH THE SEAL OF AN OFFICER OF C.T. MALE ASSOCIATES OR A DESIGNATED REPRESENTATIVE SHALL BE CONSIDERED TO BE A VALID TRUE COPY".

CAD DWG. FILE NAME: \\Sv-fp\data\Projects\031070\Survey\2017 Record Survey\Bloody Brook Record Survey 12-08-17.dwg

DAVID J. UHRINEC, PLS
P.L.S. NO. 050052

STATE OF NEW YORK DAVID JOSEPH UHRINEC 050052 LICENSED LAND SURVEYOR

| DATE | | REVISIONS RECORD/DESCRIPTION | DRAFTER | CHECK | APPR. |
|---|---|---|---|---|---|
| 08/28/17 | 1 | added topo soil in private areas | dju | dju | dju |
| 08/30/17 | 2 | removed addresses | dju | dju | dju |
| 12/08/17 | 3 | weirs 2 & 3, OLP Road Rip Rap | dju | dju | dju' |
| | 4 | | | | |
| | 5 | | | | |
| | 6 | | | | |
| | 7 | | | | |
| | 8 | | | | |
| | 9 | | | | |

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APPROVED: dju
DRAFTED : dju
CHECKED : dju
PROJ. NO : 03.1070
SCALE : 1"=60'
DATE : 07/13/14

# 2017 RECORD SURVEY
## LOCKHEED MARTIN COPORATION
## WEST BRANCH BLOODY BROOK

TOWN OF SALINA — ONONDAGA COUNTY, NEW YORK

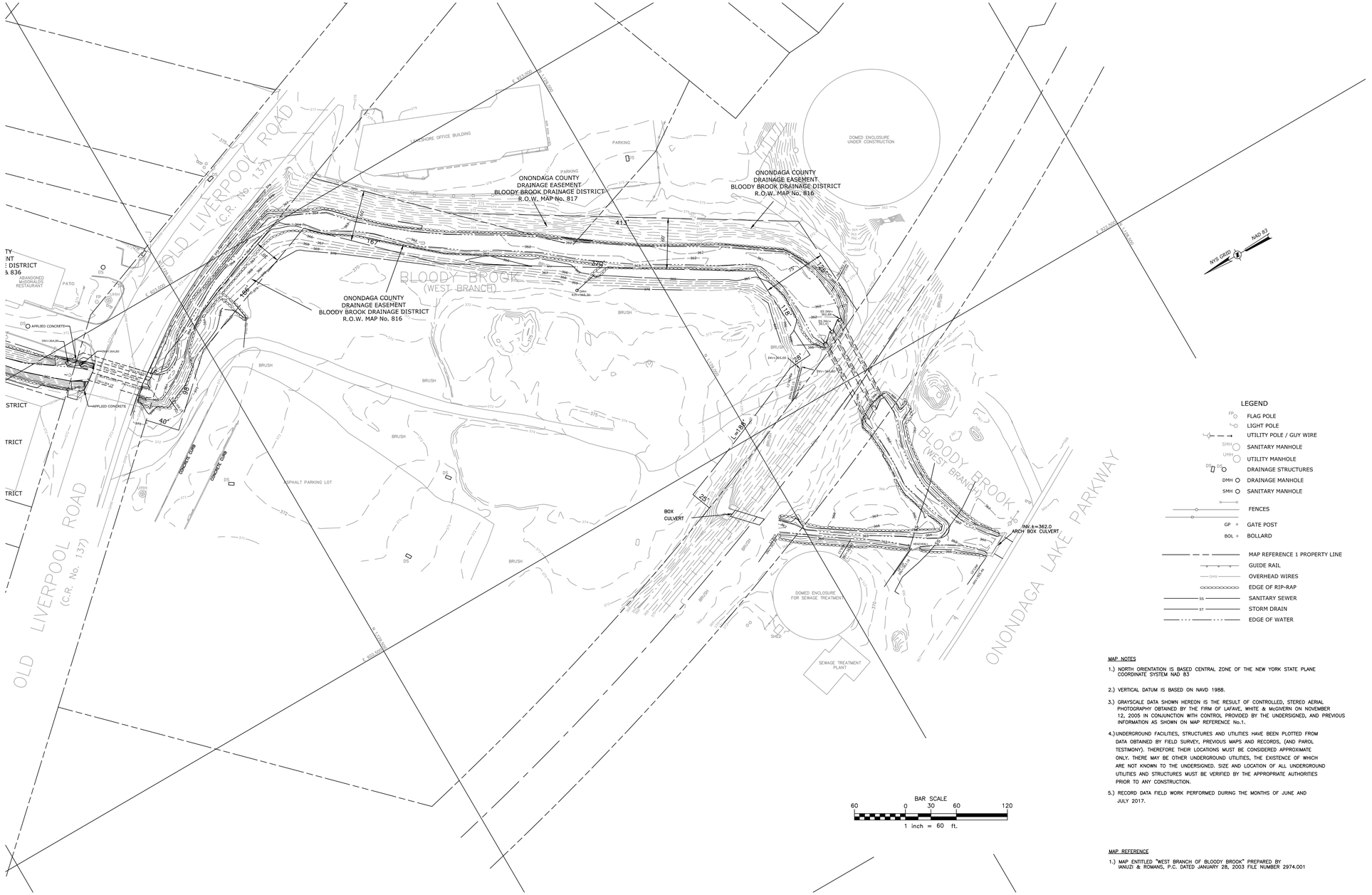
**C.T. MALE ASSOCIATES**
Engineering, Surveying, Architecture & Landscape Architecture, D.P.C.
200 GATEWAY PARK DRIVE, BLDG. C, P.O. BOX 3246
SYRACUSE, NY 13220-3246
315.458.6498 * FAX 315.458.4427

SHEET 2 OF 3
DWG. NO: 17-0419

XREFS: NONE

PROJECT NUMBER: 03.1070

CAD DWG. FILE NAME: Bloody Brook Record Survey 12-08-17.dwg




LEGEND

- FLAG POLE
- LIGHT POLE
- UTILITY POLE / GUY WIRE
- SANITARY MANHOLE
- UTILITY MANHOLE
- DRAINAGE STRUCTURES
- DRAINAGE MANHOLE
- SANITARY MANHOLE
- FENCES
- GATE POST
- BOLLARD
- MAP REFERENCE 1 PROPERTY LINE
- GUIDE RAIL
- OVERHEAD WIRES
- EDGE OF RIP-RAP
- SANITARY SEWER
- STORM DRAIN
- EDGE OF WATER

BAR SCALE

60 0 30 60 120

1 inch = 60 ft.

MAP NOTES

1.) NORTH ORIENTATION IS BASED CENTRAL ZONE OF THE NEW YORK STATE PLANE COORDINATE SYSTEM NAD 83

2.) VERTICAL DATUM IS BASED ON NAVD 1988.

3.) GRAYSCALE DATA SHOWN HEREON IS THE RESULT OF CONTROLLED, STEREO AERIAL PHOTOGRAPHY OBTAINED BY THE FIRM OF LAFAVE, WHITE & McGIVERN ON NOVEMBER 12, 2005 IN CONJUNCTION WITH CONTROL PROVIDED BY THE UNDERSIGNED, AND PREVIOUS INFORMATION AS SHOWN ON MAP REFERENCE No.1.

4.) UNDERGROUND FACILITIES, STRUCTURES AND UTILITIES HAVE BEEN PLOTTED FROM DATA OBTAINED BY FIELD SURVEY, PREVIOUS MAPS AND RECORDS, (AND PAROL TESTIMONY). THEREFORE THEIR LOCATIONS MUST BE CONSIDERED APPROXIMATE ONLY. THERE MAY BE OTHER UNDERGROUND UTILITIES, THE EXISTENCE OF WHICH ARE NOT KNOWN TO THE UNDERSIGNED. SIZE AND LOCATION OF ALL UNDERGROUND UTILITIES AND STRUCTURES MUST BE VERIFIED BY THE APPROPRIATE AUTHORITIES PRIOR TO ANY CONSTRUCTION.

5.) RECORD DATA FIELD WORK PERFORMED DURING THE MONTHS OF JUNE AND JULY 2017.

MAP REFERENCE

1.) MAP ENTITLED "WEST BRANCH OF BLOODY BROOK" PREPARED BY IANUZI & ROMANS, P.C. DATED JANUARY 28, 2003 FILE NUMBER 2974.001

"ONLY COPIES OF THIS MAP SIGNED IN RED INK AND EMBOSSED WITH THE SEAL OF AN OFFICER OF C.T. MALE ASSOCIATES OR A DESIGNATED REPRESENTATIVE SHALL BE CONSIDERED TO BE A VALID TRUE COPY".

DAVID J. UHRINEC, PLS
P.L.S. NO. 050052

STATE OF NEW YORK · DAVID JOSEPH UHRINEC · 050052 · LICENSED LAND SURVEYOR

| DATE | | REVISIONS RECORD/DESCRIPTION | DRAFTER | CHECK | APPR. |
|---|---|---|---|---|---|
| 08/28/17 | 1 | added topo soil in private areas | dju | dju | dju |
| 08/30/17 | 2 | removed addresses | dju | dju | dju |
| 12/08/17 | 3 | weirs 2 & 3, Old Road Rip Rap | dju | dju | dju |
| | 4 | | | | |
| | 5 | | | | |
| | 6 | | | | |
| | 7 | | | | |
| | 8 | | | | |
| | 9 | | | | |

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APPROVED: dju
DRAFTED : dju
CHECKED : dju
PROJ. NO : 03.1070
SCALE : 1"=60'
DATE : 07/13/14

# 2017 RECORD SURVEY

## LOCKHEED MARTIN COPORATION

## WEST BRANCH BLOODY BROOK

TOWN OF SALINA — ONONDAGA COUNTY, NEW YORK


**C.T. MALE ASSOCIATES**
Engineering, Surveying, Architecture & Landscape Architecture, D.P.C.
200 GATEWAY PARK DRIVE, BLDG. C, P.O. BOX 3246
SYRACUSE, NY 13220-3246
315.458.6498 * FAX 315.458.4427


SHEET 3 OF 3

DWG. NO: 17-0419

# APPENDIX C

## Historical Aerial Photos



NOT TO SCALE

REFERENCES:

1. PHOTO SOURCE: DATED 9-6-38, ID ARX-31-53.

AECOM

LOCKHEED MARTIN CORPORATION

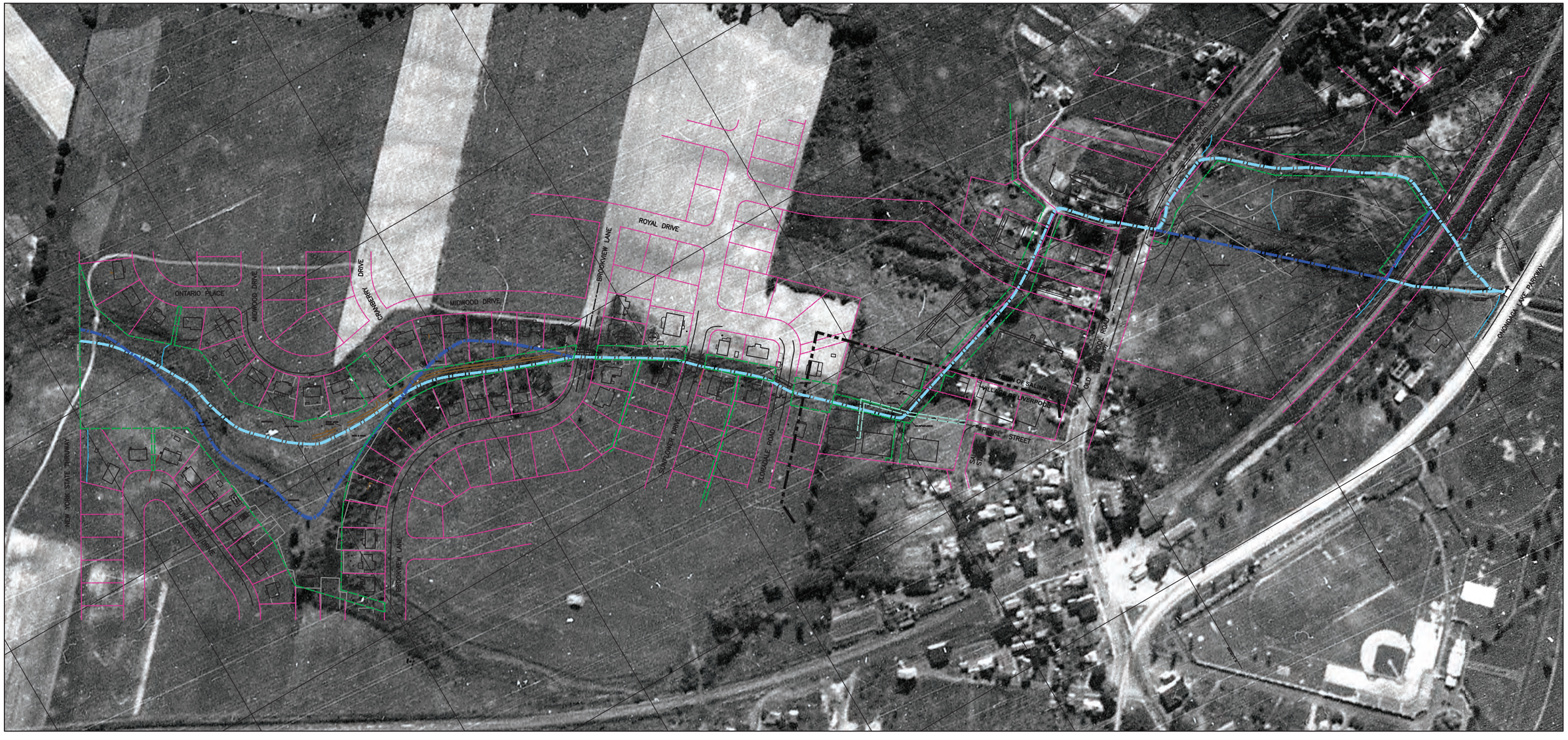
1938 AERIAL PHOTOGRAPH

WEST BRANCH OF BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

| FILE NAME: | DRN | PROJECT NO. | DATE | FIGURE NO. |
|---|---|---|---|---|
| D11APPXAFIG1A_B.dwg | --- | 60194430 | 12 / 2012 | 1A |

Plotted By: bookasr
Layout: Sheet Name: FIGURE 1A
Plot File Date Created: Dec/17/2012 8:21 AM

Filename: N:\MARKETING\PROPOSALS\LOCKHEED MARTIN – BLOODY BROOK\CAD\D11APPXAFIG1A_B.DWG




NOT TO SCALE

REFERENCES:

1. BASE MAP SOURCE: IANUZI & ROMANS, P.C. AND CT MALE ASSOCIATES P.C
2. PHOTO SOURCE: DATED 9-6-38, ID ARX-31-53.

## LEGEND

- BLOODY BROOK DRAINAGE DISTRICT EASEMENT
- CURRENT PROPERTY BORDER
- CURRENT BROOK ALIGNMENT
- HISTORIC BROOK ALIGNMENT

AECOM

LOCKHEED MARTIN CORPORATION

1938 AERIAL PHOTOGRAPH
WITH SITE BASE MAP

WEST BRANCH OF BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

| FILE NAME: | DRN | PROJECT NO. | DATE | FIGURE NO. |
|---|---|---|---|---|
| D11APPXAFIG1A_B.dwg | --- | 60194430 | 12 / 2012 | 1B |

Plotted By: bookasr
Layout: Sheet Name: FIGURE 1B
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NOT TO SCALE

REFERENCES:

1. PHOTO SOURCE: DATED 5-7-56, ID GS-VKX.

AECOM

LOCKHEED MARTIN CORPORATION

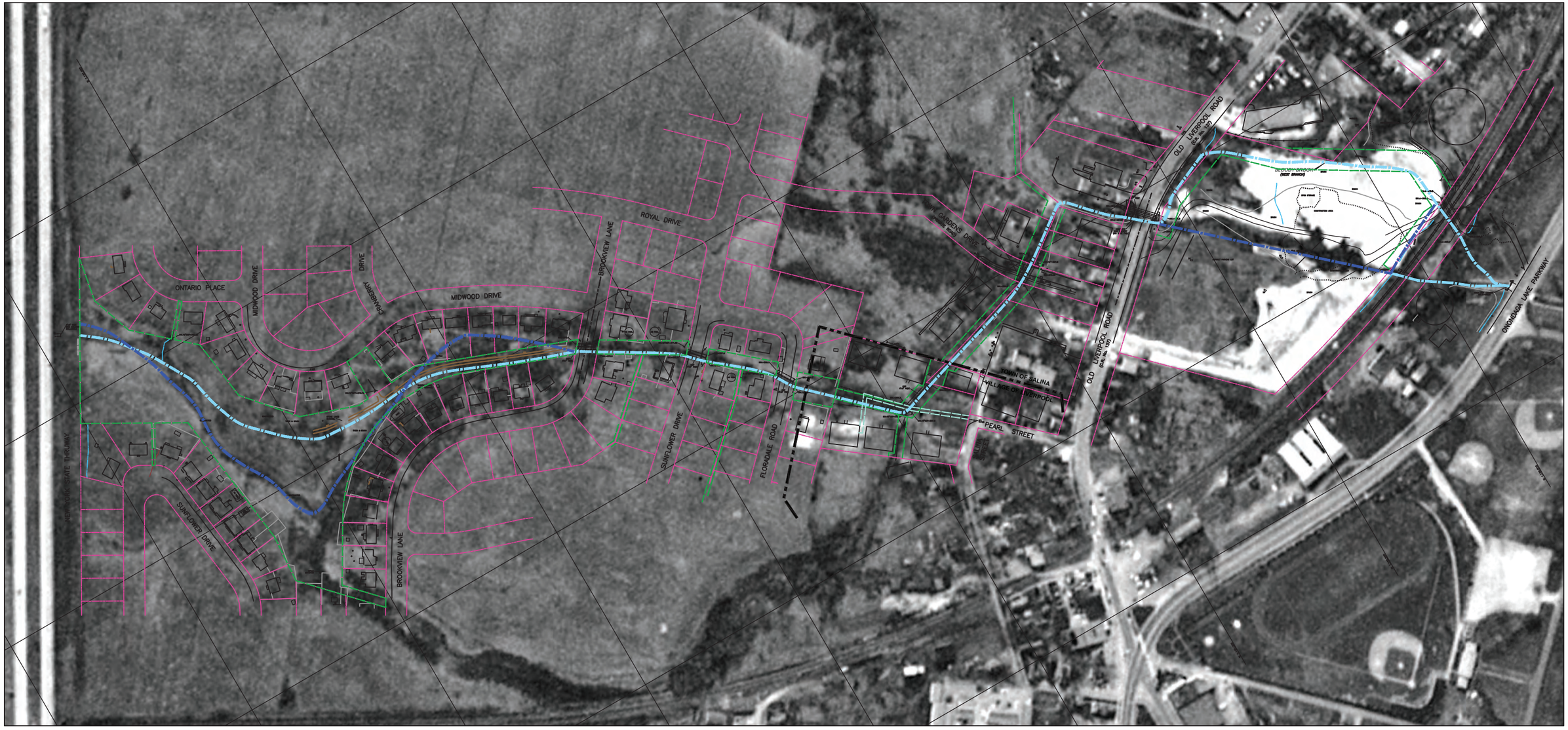
1956 AERIAL PHOTOGRAPH

WEST BRANCH OF BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

| FILE NAME: | DRN | PROJECT NO. | DATE | FIGURE NO. |
|---|---|---|---|---|
| D12APPXAFIG2A_B.dwg | --- | 60194430 | 12 / 2012 | 2A |

Plotted By: bookasr
Layout-Sheet Name: FIGURE 2A
Plot File Date Created: Dec/17/2012 8:27 AM

Filename: N:\MARKETING\PROPOSALS\LOCKHEED MARTIN – BLOODY BROOK\CAD\D12APPXAFIG2A_B.DWG




NOT TO SCALE

## LEGEND

- BLOODY BROOK DRAINAGE DISTRICT EASEMENT
- CURRENT PROPERTY BORDER
- CURRENT BROOK ALIGNMENT
- HISTORIC BROOK ALIGNMENT

REFERENCES:

1. BASE MAP SOURCE: IANUZI & ROMANS, P.C. AND CT MALE ASSOCIATES P.C
2. PHOTO SOURCE: DATED 5-7-56, ID GS-VKX.

AECOM

LOCKHEED MARTIN CORPORATION

1956 AERIAL PHOTOGRAPH
WITH SITE BASE MAP

WEST BRANCH OF BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

| FILE NAME: | DRN | PROJECT NO. | DATE | FIGURE NO. |
|---|---|---|---|---|
| D12APPXAFIG2A_B.dwg | --- | 60194430 | 12 / 2012 | 2B |

Plotted By: bookser
Layout-Sheet Name: FIGURE 2B
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NOT TO SCALE

REFERENCES:

1. PHOTO SOURCE: DATED 4-26-64, ID 1426 14 82.

AECOM

LOCKHEED MARTIN CORPORATION

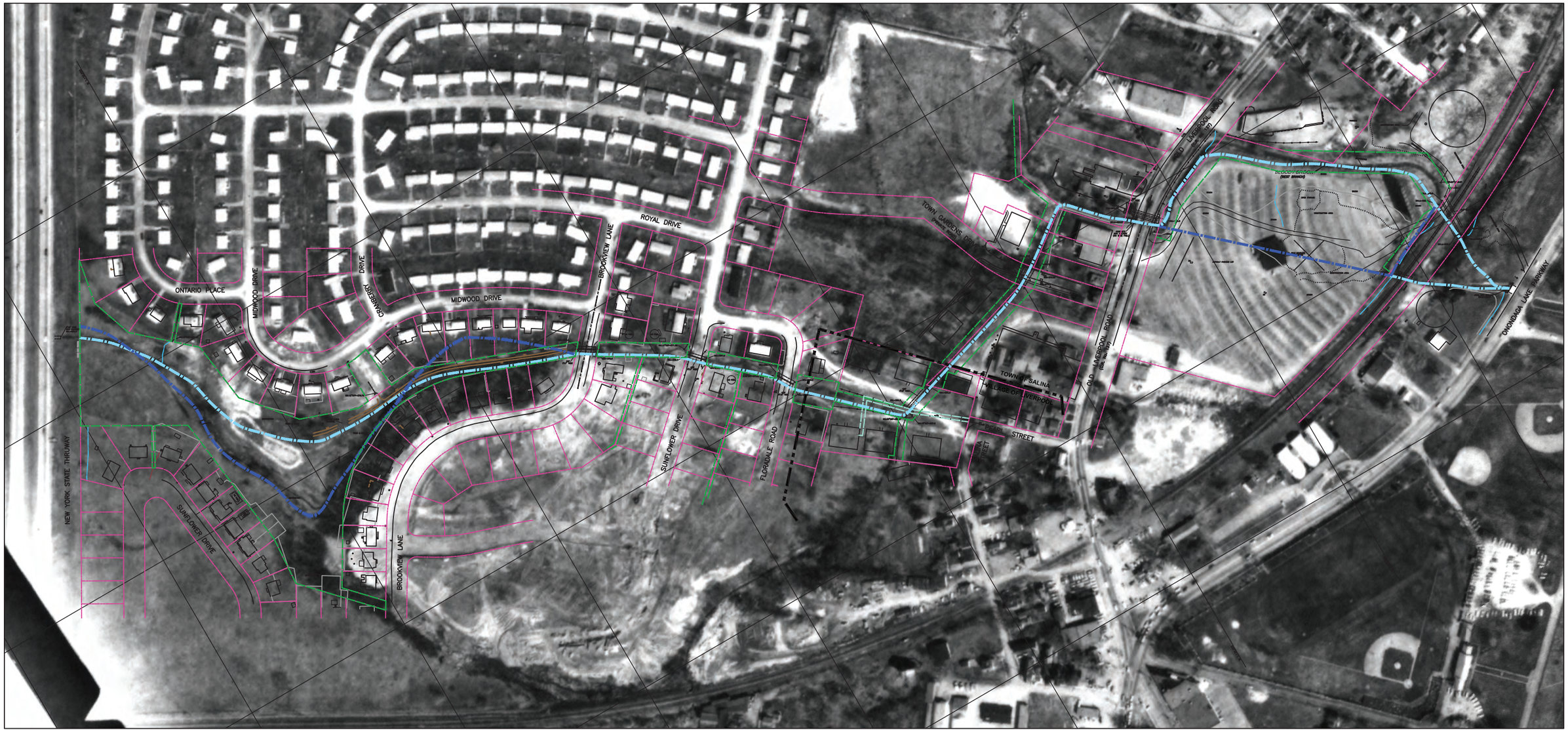
1964 AERIAL PHOTOGRAPH

WEST BRANCH OF BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

| FILE NAME: | DRN | PROJECT NO. | DATE | FIGURE NO. |
|---|---|---|---|---|
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Plotted By: bookasr
Layout: Sheet Name: FIGURE_3A
Plot File Date Created: Dec/17/2012 8:32 AM

Filename: N:\MARKETING\PROPOSALS\LOCKHEED MARTIN – BLOODY BROOK\CAD\D13APPXAFIG3A_B.DWG




NOT TO SCALE

REFERENCES:

1. BASE MAP SOURCE: IANUZI & ROMANS, P.C. AND CT MALE ASSOCIATES P.C
2. PHOTO SOURCE: DATED 4-26-64, ID 1426 14 82.

## LEGEND

- BLOODY BROOK DRAINAGE DISTRICT EASEMENT
- CURRENT PROPERTY BORDER
- CURRENT BROOK ALIGNMENT
- HISTORIC BROOK ALIGNMENT

AECOM

LOCKHEED MARTIN CORPORATION

1964 AERIAL PHOTOGRAPH
WITH SITE BASE MAP

WEST BRANCH OF BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

| FILE NAME: | DRN | PROJECT NO. | DATE | FIGURE NO. |
|---|---|---|---|---|
| D13APPXAFIG3A_B.dwg | --- | 60194430 | 12 / 2012 | 3B |

Plotted By: bookasr
Layout: Sheet Name: FIGURE 3B
Plot File Date Created: Dec/17/2012 8:34 AM

Filename: N:\MARKETING\PROPOSALS\LOCKHEED MARTIN – BLOODY BROOK\CAD\D13APPXAFIG3A_B.DWG



NOT TO SCALE

REFERENCES:

1. PHOTO SOURCE: LaFAVE, WHITE & McGIVERN, L.S., P.C.; DATED 11–12–05, 1–1 THROUGH 1–6.

AECOM

LOCKHEED MARTIN CORPORATION

2005 AERIAL PHOTOGRAPH

WEST BRANCH OF BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

| FILE NAME: | DRN | PROJECT NO. | DATE | FIGURE NO. |
|---|---|---|---|---|
| D14APPXAFIG4A_B.dwg | --- | 60194430 | 12 / 2012 | 4A |

Plotted By: bookasr
Layout-Sheet Name: FIGURE 4A
Plot File Date Created: Dec/17/2012 8:36 AM

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NOT TO SCALE

## LEGEND

- BLOODY BROOK DRAINAGE DISTRICT EASEMENT
- CURRENT PROPERTY BORDER
- CURRENT BROOK ALIGNMENT
- HISTORIC BROOK ALIGNMENT

REFERENCES:

1. BASE MAP SOURCE: IANUZI & ROMANS, P.C. AND CT MALE ASSOCIATES P.C
2. PHOTO SOURCE: LaFAVE, WHITE & McGIVERN, L.S., P.C.; DATED 11-12-05, 1-1 THROUGH 1-6.

AECOM

LOCKHEED MARTIN CORPORATION

2005 AERIAL PHOTOGRAPH
WITH SITE BASE MAP

WEST BRANCH OF BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

| FILE NAME: | DRN | PROJECT NO. | DATE | FIGURE NO. |
|---|---|---|---|---|
| D14APPXAFIG4A_B.dwg | --- | 60194430 | 12 / 2012 | 4B |

Plotted By: bookasr
Layout-Sheet Name: FIGURE 4B
Plot File Date Created: Dec/17/2012 8:38 AM

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# APPENDIX D

## Excavation Work Plan

**BLOODY BROOK**

**ONONDAGA COUNTY**

**LIVERPOOL, NEW YORK**

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# Excavation Work Plan

**Prepared for:**

Lockheed Martin Corporation
497 Electronics Parkway
Building EP-6, Room 100B
Liverpool, New York 13088

**Prepared by:**

AECOM
5015 Campuswood Drive, Suite 104
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# 1 INTRODUCTION

This Excavation Work Plan (EWP) has been prepared to summarize general requirements related to handling contaminated soil when completing ground-intrusive activities on the Bloody Brook site (the "site") in areas determined to have the potential for residual cadmium. This EWP is presented as Appendix B to the Site Management Plan (SMP) and has been developed in accordance with the New York State Department of Environmental Conservation (NYSDEC) May 2010 guidance, *DER-10 Technical Guidance for Site Investigation and Remediation* (DER-10) and the NYSDEC *Site Management Plan Template*.

Because the site encompasses privately-owned single-family and multi-family residential and commercial properties, public-owned Town of Salina and Onondaga County properties, and the Onondaga County Drainage District Easement, institutional controls (ICs) will be implemented to address the potential for ground-intrusive activities in the different areas. The provisions included in these ICs are discussed in Section 3 of the SMP (Institutional and Engineering Control Plan). This EWP addresses only the handling of the soils during excavation activities once determined necessary in accordance to the applicable IC.

# 2 NOTIFICATION

Within 14 days following Lockheed Martin being notified of any activity that is anticipated to encounter remaining contamination, Lockheed Martin or their representative will notify the NYSDEC. Table 1 of the SMP includes contact information for this notification. This information will be updated as necessary to provide accurate contact information. A full listing of site-related contact information is provided in Appendix A.

This notification will include:

- A detailed description of the work to be performed, including the location and areal extent of excavation, plans/drawings for site re-grading, intrusive elements or utilities to be installed below the soil cover, estimated volumes of contaminated soil to be excavated, and any work that may impact an engineering control;

- A summary of environmental conditions anticipated to be encountered in the work areas, including the nature and concentration levels of contaminants of concern, potential presence of grossly contaminated media, and plans for any pre-construction sampling;

- A schedule for the work, detailing the start and completion of all intrusive work;

- A summary of the applicable components of this EWP;

- A statement that the work will be performed in compliance with this EWP and 29 CFR 1910.120;

- A copy of the contractor's health and safety plan (HASP), in electronic format, if it differs from the HASP provided in Appendix G of this SMP;

- Identification of disposal facilities for potential waste streams; and

- Identification of sources of any anticipated backfill, along with all required chemical testing results.

## 3 SOIL SCREENING METHODS

Soil screening methods will not be used at this site. Remedial investigations at the Bloody Brook site have identified cadmium (a heavy metal) as a contaminant of concern, and excavation limits with concentrations of concern will be identified using existing and pre-construction sample data. Existing and pre-construction sample data will be reviewed and excavation limits determined for all excavations into known or potentially contaminated material (remaining contamination). Review of soil samples will be performed when invasive work is going to be completed and will include all excavation and invasive work performed.

Soils will be segregated based on previous environmental data into material that requires off-site disposal, material that is confirmed clean cover soil, and material that requires testing to determine if the material can be reused on-site as soil beneath a cover or if the material can be used as cover soil. Further discussion of off-site disposal of materials and on-site reuse is provided in Sections 6 through 8 of this appendix.

## 4 SOIL STAGING METHODS

Soil stockpiles will be continuously encircled with a berm and/or silt fence. Hay bales will be used as needed near catch basins, surface waters, and other discharge points.

Stockpiles will be kept covered at all times with appropriately anchored tarps. Stockpiles will be routinely inspected, and damaged tarp covers will be promptly replaced.

Stockpiles will be inspected at a minimum once each week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the site and available for inspection by the NYSDEC.

## 5 MATERIALS EXCAVATION AND LOAD-OUT

A qualified environmental professional or person under their supervision will oversee all invasive work and the excavation and load-out of all excavated material.

The owner of the property and remedial party and its contractors are responsible for safe execution of all invasive and other work performed under this Plan.

The presence of utilities and easements on the site will be investigated by the qualified environmental professional. It will be determined whether a risk or impediment to the planned work under this SMP is posed by utilities or easements on the site.

Loaded vehicles leaving the site will be appropriately lined, tarped, securely covered, manifested, and placarded in accordance with appropriate Federal, State, local, and NYSDOT requirements (and all other applicable transportation requirements).

A truck decontamination and/or wash will be operated on-site, as appropriate. The qualified environmental professional will be responsible for ensuring that all outbound trucks will be cleaned of potentially contaminated site soil. If needed, trucks will be washed at the truck wash before leaving the site until the activities performed under this section are complete. Truck wash waters will be collected and disposed of off-site in an appropriate manner.

Locations where vehicles enter or exit the site shall be inspected daily for evidence of off-site soil tracking.

The qualified environmental professional will be responsible for ensuring that all egress points for truck and equipment transport from the site are clean of dirt and other materials derived from the site during intrusive excavation activities. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to site-derived materials.

## 6 MATERIALS TRANSPORT OFF-SITE

All transport of materials will be performed by licensed haulers in accordance with appropriate local, State, and Federal regulations, including 6 NYCRR Part 364. Haulers will be appropriately licensed and trucks properly placarded.

Material transported by trucks exiting the site will be secured with tight-fitting covers. Loose-fitting canvas-type truck covers will be prohibited. If loads contain wet material capable of producing free liquid, truck liners will be used.

Truck transport routes are provided in Figure 1 of this appendix. Routes direct all traffic from the site to the New York State Thruway (Exit 37). All trucks loaded with site materials will exit the vicinity of the site using only these approved truck routes, which will take into account: (a) limiting transport through residential areas and past sensitive sites; (b) use of city mapped truck routes; (c) prohibiting off-site queuing of trucks entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; and (f) overall safety in transport.

Trucks will be prohibited from stopping and idling in the neighborhood outside the project site.

Egress points for truck and equipment transport from the site will be kept clean of dirt and other materials during site remediation and development.

Queuing of trucks will be performed on-site in order to minimize off-site disturbance. Off-site queuing will be prohibited.

## 7 MATERIALS DISPOSAL OFF-SITE

All material excavated and removed from the site will be treated as contaminated and regulated material and will be transported and disposed in accordance with all local, State (including 6NYCRR Part 360) and Federal regulations. If disposal of material from this site is proposed for unregulated off-site disposal (i.e. clean soil removed for development purposes), a formal request with an associated plan will be made to the NYSDEC. Unregulated off-site management of materials from this site will not occur without formal NYSDEC approval.

Off-site disposal locations for excavated soils will be identified in the pre-excavation notification. This will include estimated quantities and a breakdown by class of disposal facility if appropriate, i.e. hazardous waste disposal facility, solid waste landfill, petroleum treatment facility, C/D recycling facility, etc. Actual disposal quantities and associated documentation will be reported to the NYSDEC in the Periodic Review Report. This documentation will include: waste profiles, test results, facility acceptance letters, manifests, bills of lading and facility receipts.

Non-hazardous historic fill and contaminated soils taken off-site will be handled, at minimum, as a Municipal Solid Waste per 6NYCRR Part 360-1.2. Material that does not meet Unrestricted SCOs is prohibited from being taken to a New York State recycling facility (6NYCRR Part 360-16 Registration Facility).

## 8 MATERIALS REUSE ON-SITE

The qualified environmental professional will ensure that procedures defined for materials reuse in this SMP are followed and that unacceptable material does not remain on-site. Contaminated on-site material, including historic fill and contaminated soil, that is acceptable for reuse on-site will be placed below the demarcation layer or impervious surface, and will not be reused within a cover soil layer, within landscaping berms, or as backfill for subsurface utility lines.

Concrete crushing or processing on-site will not be performed without prior NYSDEC approval. Organic matter (wood, roots, stumps, etc.) or other solid waste derived from clearing and grubbing of the site will not be reused on-site.

## 9 FLUIDS MANAGEMENT

All liquids to be removed from the site, including but not limited to excavation dewatering and decontamination waters, will be handled, transported and disposed of in accordance with applicable local, State, and Federal regulations. Dewatering and decontamination fluids will not be recharged back to the land surface or subsurface of the site, and will be managed off-site, unless prior approval is obtained from NYSDEC.

Discharge of water generated during large-scale construction activities to surface waters (i.e. a local pond, stream or river) will be performed under a SPDES permit.

## 10 COVER SYSTEM RESTORATION

After completion of soil removal and any other invasive activities, the cover system will be restored in a manner that complies with the 2014 Decision Document and the applicable Construction and Restoration Work Plans. The existing cover system is comprised of a minimum of 24 inches of clean soil or stone. The demarcation layer, consisting of white geotextile or equivalent material, will be replaced to provide a visual reference to the top of the remaining contamination zone, the zone that requires adherence to special conditions for disturbance of remaining contaminated soils defined in this SMP. If the type of cover system changes from that which exists prior to the excavation (i.e., a soil cover is replaced by asphalt), this will constitute a modification of the cover element of the remedy and the upper surface of the remaining contamination. A figure showing the modified surface will be included in the subsequent Periodic Review Report and in an updated SMP.

## 11 BACKFILL FROM OFF-SITE SOURCES

All materials proposed for import onto the site will be approved by the qualified environmental professional and will be in compliance with provisions in this SMP prior to receipt at the site. A Request to Import/Reuse Fill or Soil form, which can be found at http://www.dec.ny.gov/regulations/67386.html, will be prepared and submitted to the NYSDEC project manager allowing a minimum of 5 business days for review.

Material from industrial sites, spill sites, or other environmental remediation sites or potentially contaminated sites will not be imported to the site.

All imported soils will meet the backfill and cover soil quality standards established in 6NYCRR 375-6.7(d). Based on an evaluation of the land use, protection of groundwater, and protection of ecological resources criteria, the resulting soil quality standards are listed in 6 NYCRR 375-6.8. Soils that meet ‘exempt’ fill requirements under 6 NYCRR Part 360, but do not meet backfill or

cover soil objectives for this site, will not be imported onto the site without prior approval by NYSDEC. Solid waste will not be imported onto the site.

Trucks entering the site with imported soils will be securely covered with tight fitting covers. Imported soils will be stockpiled separately from excavated materials and covered to prevent dust releases.

## 12 STORMWATER POLLUTION PREVENTION

Barriers and hay bale checks will be installed and inspected once a week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the site and available for inspection by the NYSDEC. All necessary repairs shall be made immediately.

Accumulated sediments will be removed as required to keep the barrier and hay bale check functional.

All undercutting or erosion of the silt fence toe anchor shall be repaired immediately with appropriate backfill materials.

Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering.

Erosion and sediment control measures identified in the SMP shall be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters.

Silt fencing or hay bales will be installed around the entire perimeter of the construction area.

## 13 EXCAVATION CONTINGENCY PLAN

If underground tanks or other previously unidentified contaminant sources are found during post-remedial subsurface excavations or development related construction, excavation activities will be suspended until sufficient equipment is mobilized to address the condition.

Sampling will be performed on product, sediment and surrounding soils, etc. as necessary to determine the nature of the material and proper disposal method. Chemical analysis will be performed for a full list of analytes (TAL metals; TCL volatiles and semi-volatiles, TCL pesticides and PCBs), unless the site history and previous sampling results provide a sufficient justification to limit the list of analytes. In this case, a reduced list of analytes will be proposed to the NYSDEC for approval prior to sampling.

Identification of unknown or unexpected contaminated media identified by screening during invasive site work will be promptly communicated by phone to NYSDEC's Project Manager. Reportable quantities of petroleum product will also be reported to the NYSDEC spills hotline. These findings will be also included in the Periodic Review Report.

## 14 COMMUNITY AIR MONITORING PLAN

This Community Air Monitoring Plan (CAMP) has been prepared to summarize the air monitoring procedures that will be implemented during ground intrusive activities into contaminated and/or potentially contaminated soil at the Bloody Brook site. This CAMP has been developed consistent with NYSDEC's May 2010 guidance entitled DER-10 Technical Guidance for Site Investigation

and Remediation (DER-10) and the New York State Department of Health Generic Community Air Monitoring Plan (NYSDOH Generic CAMP) included as Attachment 1A of DER-10. The remedial investigation at the Bloody Brook site has identified cadmium (a heavy metal) as a contaminant of concern. Because a heavy metal was identified as the contaminant of concern, DER-10 requires that the CAMP include real-time monitoring for particulates (i.e., dust) at the downwind perimeter of a work area during ground intrusive activities. The intent of this CAMP is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses) from potential airborne contaminant releases as a direct result of the ground intrusive activities. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Instrument readings obtained as part of the CAMP will be recorded and available for NYSDEC and New York State Department of Health (NYSDOH) personnel to review.

Real-time air monitoring for particulates (i.e., dust) will be conducted continuously for all ground intrusive activities into contaminated and/or potentially contaminated soil (e.g., soil excavation, backfilling, etc.). The remedial investigation at the Bloody Brook site did not identify volatile organic compounds (VOCs) as a contaminant of concern. Therefore, community air monitoring for VOCs is not included.

CAMP monitoring locations will initially be located at the boundary of the work area. The CAMP monitoring will be performed using real-time aerosol monitors such as a Thermo MIE pDR-4000 DataRam (data-RAM) or equivalent equipment capable of monitoring airborne dust consisting of particulate matter measuring less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level listed below.

The specific location of each of the CAMP monitors will be determined daily as weather conditions change. The CAMP monitor locations will be based on factors such as wind direction and the proximity of potential receptors to the excavation activities. A CAMP monitor will be placed at a location upwind and downwind of the excavation activities. In addition, a CAMP monitor will be placed near the closest off-site receptor.

The following action levels for particulates are in accordance with the NYSDOH Generic CAMP:

| **Action Level** | **Response** |
|---|---|
| >0.1 $mg/m^3$ Above the background for the 15 minute average or if airborne dust is observed leaving the work area | Employ dust suppression techniques |
| 0.1 to 0.15 $mg/m^3$ | Work may continue with dust suppressions techniques provided downwind PM-10 particulate levels do not exceed 0.15 $mg/m^3$ above background for the 15-minute average and airborne dust is not observed leaving the work area |
| >0.15 $mg/m^3$ | Cease operations. Contact PM, Director of Health, and Safety or designee immediately. |

Air monitoring readings will be measured and recorded both electronically via the instrument data logger and manually using an excel file, as appropriate. The readings will be exported from the monitoring equipment and placed in the project records. Additionally, instantaneous readings used for decision purposes, if any, will be recorded on the daily notes and/or logs and placed in the project records. The air monitoring data and manual recordings will be made available to the NYSDEC and NYSDOH personnel upon request.

## 15 ODOR CONTROL PLAN

The odor control plan is capable of controlling emissions of nuisance odors on- and off-site. Remedial investigations at the Bloody Brook site have identified cadmium (a heavy metal) as a contaminant of concern. Because a heavy metal is the contaminate of concern and past ground intrusive activities have not resulted in nuisance odor, no site specific odor control methods have been identified If nuisance odors are identified at the site boundary, or if odor complaints are received, work will be halted and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated. NYSDEC and NYSDOH will be notified of all odor events and of any other complaints about the project. Implementation of all odor controls, including the halt of work, is the responsibility of the remedial party's Remediation Engineer, and any measures that are implemented will be discussed in the Periodic Review Report.

All necessary means will be employed to prevent on- and off-site nuisances. At a minimum, these measures will include: (a) limiting the area of open excavations and size of soil stockpiles; (b) shrouding open excavations with tarps and other covers; and (c) using foams to cover exposed odorous soils. If odors develop and cannot be otherwise controlled, additional means to eliminate odor nuisances will include: (d) direct load-out of soils to trucks for off-site disposal; (e) use of chemical odorants in spray or misting systems; and, (f) use of staff to monitor odors in surrounding neighborhoods.

If nuisance odors develop during intrusive work that cannot be corrected, or where the control of nuisance odors cannot otherwise be achieved due to on-site conditions or close proximity to sensitive receptors, odor control will be achieved by sheltering the excavation and handling areas in a temporary containment structure equipped with appropriate air venting/filtering systems.

## 16 DUST CONTROL PLAN

A dust suppression plan that addresses dust management during invasive on-site work will include, at a minimum, the items listed below:

- Dust suppression will be achieved through wetting of areas using an on-site water source (e.g., fire hydrant or water from West Branch of Bloody Brook or Bloody Brook).
- Clearing and grubbing of larger sites will be done in stages to limit the area of exposed, unvegetated soils vulnerable to dust production.
- Gravel will be used on roadways to provide a clean and dust-free road surface.
- On-site roads will be limited in total area to minimize the area required for water truck sprinkling.

## 17 OTHER NUISANCES

Work activity scheduling will comply with local noise ordinances, which specify permitted noises as including construction work, between the hours of 7:00 am and 9:00 pm. Unavoidable work outside of these permitted hours shall not emit noise levels above 88 decibels when measured 50 feet from the work. No unnecessary construction shall be permitted on weekends unless local proper police, fire, and safety groups are notified.

# APPENDIX E

## Agreement with Onondaga County

COUNTY OF ONONDAGA

DEPARTMENT OF LAW
John H. Mulroy Civic Center, 10th Floor
421 Montgomery Street
Syracuse, New York 13202
(315) 435-2170 • Fax (315) 435-2043
www.ongov.net

JOANNE M. MAHONEY
COUNTY EXECUTIVE

GORDON J. CUFFY
COUNTY ATTORNEY

July 9, 2014

Jill Fonte, Environmental Engineer
Lockheed Martin Mission Systems & Training
497 Electronics Parkway
Liverpool, New York 13088

Dear Ms. Fonte:

Enclosed for your records is one (1) fully executed copy of the contract you entered with the County of Onondaga.

This letter will serve as your notice to proceed with the service as set forth in said contracts.

Very truly yours,

Mary Beth Paul
Confidential Assistant

Enclosure

# AGREEMENT RELATING TO BLOODY BROOK VOLUNTARY CLEANUP SITE

**THIS AGREEMENT** (the "Agreement"), made as of July 9, 2014, by and between the COUNTY OF ONONDAGA, 421 Montgomery Street, Syracuse, New York 13202, by Joanne M. Mahoney, its County Executive ("the County") and LOCKHEED MARTIN CORPORATION, P.O. Box 4840, Syracuse, New York 13221-4840 ("Lockheed Martin"), each a "party" and, collectively, the "parties" to this Agreement.

**WHEREAS**, Lockheed Martin entered into a Voluntary Cleanup Agreement, dated July 19, 2002 (Index # D7-0001-01-09) (the "VCA"), with the New York State Department of Environmental Conservation ("NYSDEC"), pursuant to which Lockheed Martin agreed to develop and implement a remedial program in a portion of Bloody Brook, as depicted on a map attached to this Agreement as Exhibit A, which portion of Bloody Brook for purposes of this Agreement shall be referred to as the "Site;"

**WHEREAS**, the VCA governs the submission and implementation by Lockheed Martin of work plans for the Site investigation, remediation and operation, maintenance and monitoring;

**WHEREAS**, the County holds a drainage district easement located within the boundaries of the Site for purposes of construction, operation and maintenance of drainage and flood control facilities, the boundaries of which easement are depicted on a map attached to this Agreement as Exhibit B;

**WHEREAS**, the County granted Lockheed Martin access to the drainage district easement by an Access Agreement for Temporary Use And Occupancy Of Property, dated April 1, 2008;

**WHEREAS**, pursuant to the VCA, NYSDEC has issued a Final Decision Document selecting the remedy proposed in Lockheed Martin's Remedial Action Work Plan dated February 2013 (the "RAWP") that was prepared to address, among other things, the presence of cadmium in brook sediment and soil located in the drainage district easement that was identified by Lockheed Martin during its remedial investigation of the Site;

**WHEREAS**, studies performed by Lockheed Martin indicate that after Lockheed Martin implements the remedy described in the RAWP, some cadmium will remain in certain soil within the drainage district easement at various depths; and

**WHEREAS**, the County has determined that to protect its legal interests, it desires to enter into this Agreement with Lockheed Martin to assure that the presence in the future of cadmium in soil within the drainage district easement will not adversely affect County uses of the drainage district easement or result in additional cost to the County for drainage district operation, maintenance or construction after Lockheed Martin constructs the remedy described in the RAWP.

**NOW, THEREFORE,** in consideration of the foregoing, the mutual agreements herein contained and other good and valuable consideration, it is hereby mutually agreed as follows:

## 1. Use of Drainage District Easement

Lockheed Martin acknowledges that certain activities it will perform to implement the remedy described in the RAWP will occur within the County's drainage district easement. For purposes of this Agreement, any activities performed by Lockheed Martin within the drainage district easement in accordance with the RAWP, as the RAWP may be amended from time to time with NYSDEC's approval, or otherwise, which activities shall include but not be limited to sampling, construction, restoration, and operation, monitoring and/or maintenance of the remedy, shall be referred to, collectively, as the "Lockheed Martin Work." Lockheed Martin will design and implement the Lockheed Martin Work within the drainage district easement in a manner that does not unreasonably interfere with or preclude the County's intended uses of the drainage district easement or its operation, maintenance, construction, reconstruction and use of drainage and flood control facilities constructed and/or maintained by the County in the easement area now or in the future. Lockheed Martin shall be responsible for all costs and expenses of all types required to perform the Lockheed Martin Work.

## 2. Residual Cadmium in Soil

The Lockheed Martin Work will involve the removal of all Bloody Brook sediments and the removal of soil containing cadmium at certain prescribed depths from within the drainage district easement to achieve certain soil cleanup levels approved by NYSDEC (the "SCLs"). However, the RAWP provides that cadmium will remain in soil in certain locations within the drainage district easement at depths to be identified by Lockheed Martin post-remediation. The cadmium that remains in soil post-remediation in the drainage district easement at concentrations that exceed the SCLs is hereinafter referred to as "Residual Cadmium." The County anticipates that the presence of Residual Cadmium may increase the County's cost for work to construct, reconstruct, repair, replace, operate and maintain drainage and flood control facilities in the drainage district easement in accordance with applicable federal, state and local laws and regulations (collectively, the "County Work").

In accordance with the provisions of this Agreement, Lockheed Martin will pay the County a sum representing the increased cost, if any, to perform the County Work in areas where Residual Cadmium is present as compared to the cost the County would have incurred for County Work if there were no Residual Cadmium. For purposes of this Agreement, the sum representing the increased cost to the County will be the "Increment." To clarify what is meant by an Increment, if the cost of excavation, transportation and disposal of soil containing Residual Cadmium in accordance with applicable laws and regulations is $10,000, and the cost of this same work for soil that does not contain Residual Cadmium is $8,000, the Increment is $2,000. Lockheed Martin shall have no obligation to pay the County under this Agreement any Increment

that arises from the presence of contamination in the drainage district easement caused by pollutants other than cadmium in concentrations that exceed the SCLs.

For purposes of this Agreement, the term "County Work" does not include "Culvert Work," as this term is defined in paragraph 5 below. The terms and conditions of this Agreement that address Culvert Work are set forth in paragraph 5 of this Agreement, unless Lockheed Martin exercises its right not to proceed with the Culvert Work as described in paragraph 5(k). If Lockheed Martin exercises this right, the terms of this paragraph and paragraph 3 with regard to incremental costs will apply to any culvert work undertaken by the County.

## 3. Increment Request

Increment requests will be submitted by the County to Lockheed Martin in writing and shall be accompanied by (a) a detailed and dated estimate of the cost of the County Work performed in areas of the drainage district easement where Residual Cadmium is present, which estimate will show discrete work tasks and supporting vendor and contractor quotes, (b) a detailed and dated estimate for the cost of the same County Work, but assuming Residual Cadmium is not present in the drainage district easement, which estimate will show discrete work tasks and supporting vendor and contractor quotes, and (c) evidence of payment by the County for the County Work, disposal manifests, weigh tickets, and analytical sampling results, if required. Each estimate shall be dated no earlier than three (3) months before the date the County commenced the work for which it is seeking an Increment. The County shall submit any Increment request to Lockheed Martin within forty-five (45) days of completing and paying for County Work for which an Increment is sought. If Lockheed Martin disputes all or any portion of an Increment request, it shall provide written notification to the County of such dispute and the reasons therefore within thirty (30) days of receipt of the Increment request. Lockheed Martin will pay the undisputed amount of any Increment to the County within sixty (60) days of receipt of the documentation required to be submitted pursuant to this Agreement.

## 4. Notice of Work

Within thirty (30) days of placing a line item in its budget for County Work that may encounter Residual Cadmium, the County will provide written notice to Lockheed Martin of the date it anticipates commencing the budgeted County Work (the "initial notice") and a detailed description of the County Work, which will include identification of the areas at the Site that will be disturbed by the County Work and the anticipated depths of that disturbance. Within thirty (30) days of receipt of the initial notice from the County, Lockheed Martin will advise the County whether, based on soil sampling data and any other relevant information in Lockheed Martin's records, the County Work is expected to disturb Residual Cadmium.

After Lockheed Martin completes the remediation work at the Site required pursuant to the VCA, it will maintain a site drawing that shows the estimated locations and depths of Residual Cadmium in the drainage district easement based on then

available data. Lockheed Martin will update the site drawing periodically when additional information, if any, regarding the location of Residual Cadmium in the drainage district easement becomes available. Lockheed Martin will provide a copy of the initial site drawing and any updates to the County for its information regarding Residual Cadmium.

If the proposed County Work has the potential to disturb Residual Cadmium, at the County's request, Lockheed Martin will consult with the County regarding the management of the Residual Cadmium. At least ninety (90) days prior to the actual start date for such County Work, the County shall provide Lockheed Martin with a written budget, including copies of the detailed and dated estimates referenced in subsections (a) and (b) of paragraph 3 above. Within thirty (30) days of receipt of the written budget, Lockheed Martin shall submit to the County any comments and/or objections concerning the cost of the County Work, which the parties shall thereafter discuss and attempt to resolve. At least thirty (30) days prior to the actual start date for such County Work, the County shall provide written notice to Lockheed Martin of the start date. The written notice of the actual start date shall describe the County Work and shall attach a copy of proposed plans and a map showing the location of the County Work. This notice provision does not apply to the County's routine mowing activities in the drainage district easement or similar nonintrusive activities.

**5. Culvert Work**

(a) Culvert Work. The County maintains five culvert crossings at the Site where Lockheed Martin plans to conduct remedial work pursuant to the VCA. The map attached to this Agreement as Exhibit B shows each of these five culvert crossings labeled Culverts 1 through 5 and shows the number of culvert barrels associated with each of the five culverts. The County desires to replace these five culverts because of their age and condition. The County is concerned that cadmium may be present in the soil surrounding the culvert structures and in the soil between the roadways and the culvert structures. Lockheed Martin, at its sole cost and expense, will schedule and undertake work to remove and replace the five culverts and the roadways above the five culverts (the "Culvert Work") and to manage any Residual Cadmium that may be encountered during the Culvert Work.

(b) Project Design. Lockheed Martin will arrange for the preparation of draft and final design documents for the Culvert Work, which shall include detailed construction plans and specifications that will be adequate for Lockheed Martin to retain a contractor for the work (the "Design Documents"). At Lockheed Martin's request, the County will designate an employee(s) knowledgeable in culvert and roadway design and that employee(s) will provide to Lockheed Martin detailed written specifications that will be needed for preparation of the Design Documents and will meet with Lockheed Martin and its design consultant for a pre-design meeting and for follow-up consultation and collaboration on the project design and construction on an as-needed basis.

Lockheed Martin will deliver to the County for comment a copy of draft Design Documents for each of the culverts to be replaced and the County will provide

its comments on the draft Design Documents within forty-five (45) days of receipt. When finalized, Lockheed Martin will deliver to the County a copy of final Design Documents for each culvert to be replaced. Within 30 days of receipt of the final Design Documents, the County shall provide to Lockheed Martin its written, unqualified acceptance of the final Design Documents, or a written explanation as to why it cannot accept the final Design Documents. Lockheed Martin shall respond to any concerns of the County regarding the final Design Documents and shall not commence the Culvert Work until it has received written, unqualified acceptance of the final Design Documents from the County.

(c) Construction. Lockheed Martin shall perform the following work in accordance with the Design Documents (i) remove the roadway above each of the five culverts and remove the five culverts; (ii) construct replacement culverts; (iii) backfill around and above each culvert; and (iv) replace the roadways (collectively, the "Construction Work"). Lockheed Martin shall retain experienced contractors and shall require its contractors to retain only experienced subcontractors to perform the Construction Work. The Construction Work will include but not be limited to stream flow management; material removal, handling, management, transport, storage, treatment, and/or disposal; traffic flow management; and excavation of Residual Cadmium, including staging, hauling, disposal and trench support. Lockheed Martin will be the generator of any material it removes from the Site for off-site disposal, and as such, a Lockheed Martin representative will sign all non-hazardous waste bills of lading or manifests and hazardous waste manifests, as applicable.

(d) Roadway Paving. Lockheed Martin will be responsible for the performance of the work associated with the construction of the road beds and the paving of the roadways above each culvert that it replaces.

(e) Construction Timing. The Construction Work shall be performed in accordance with a schedule to be developed by Lockheed Martin, in its sole discretion and control, and shall be completed in conjunction with the construction of remedial work that Lockheed Martin will be performing at the Site. An anticipated schedule for the Construction Work is attached to this Agreement as Exhibit C. Lockheed Martin reserves the right to modify this schedule at any time and it shall provide periodic updates to the County of the modified schedule.

(f) Project Managers. The County and Lockheed Martin shall each designate a project manager who will facilitate the implementation of this Agreement and serve as the point of contact for each party.

(g) Recordkeeping. Lockheed Martin shall maintain records relating to the Construction Work and the on-site and off-site disposal of any materials removed from the drainage district easement during the Culvert Work for inspection and copying by the County. These records shall include a Health and Safety Plan, bills of lading, waste characterization documentation, waste manifests, disposal documentation and certificates.

(h) Access. The parties each acknowledge that Lockheed Martin and its contractors and their subcontractors shall have access to the drainage district easement for purposes of conducting the Construction Work in accordance with and subject to the provisions of the Access Agreement for Temporary Use And Occupancy Of Property between the parties, dated April 1, 2008 (the "Access Agreement"), a copy of which is attached to this Agreement as Exhibit D. For purposes of clarification, the County hereby confirms that the Culvert Work and the Construction Work are included within the scope of the term "Work," as the term "Work" is defined in the Access Agreement.

(i) Permits and Approvals. Lockheed Martin shall obtain and maintain for the duration of this Agreement and at its own cost all consents, approvals and permits, if any are needed, for the work it performs under this Agreement. Specifically, prior to commencing the Culvert Work, Lockheed Martin will obtain and maintain all approvals required from the Town of Salina and any other governmental agencies (the "municipal authorizations") for the Construction Work and for traffic control during the work. The parties acknowledge that Lockheed Martin will be unable to perform the work if required municipal authorizations are not issued to Lockheed Martin. Lockheed Martin will consult with the Town of Salina regarding any specifications it will require Lockheed Martin to incorporate into the roadway removal and replacement portion of the Construction Work. Lockheed Martin will also be responsible for obtaining access to any privately-owned real property, access to which will be necessary to perform the Culvert Work.

(j) Acceptance of the Work. After the Culvert Work is completed for each of the five culverts and for each of the roadways proposed to be removed and replaced, a County engineer will inspect the Culvert Work and indicate in writing whether it is accepted. Lockheed Martin will provide an as-built report to the County demonstrating that the Culvert Work for a specific culvert and roadway was performed in accordance with the Design Documents and Lockheed Martin will request the County to sign the as-built report, thereby acknowledging its acceptance of the work. After the Culvert Work, on a culvert-by-culvert basis, is accepted by the County as indicated by its signature on the applicable inspection and as-built report, Lockheed Martin shall have no further obligation to the County relative to the replacement culvert and roadway, including but not limited to any obligation for the operation, maintenance, repair, or replacement of the culvert and roadway. The Bloody Brook Drainage District will be the owner of the replacement culverts, and not Lockheed Martin.

(k) Right to Cease Culvert Work. Lockheed Martin reserves the right to determine, in its sole discretion, that it will not remove and replace one or more of the five culverts and roadways at the Site that are addressed in this Agreement, provided that such decision is made prior to Lockheed Martin's commencing any work that would disturb the culvert(s) and roadway(s) above the culvert for which removal and replacement is planned. If Lockheed Martin determines to abandon the culvert removal and replacement work at any time, it will provide prompt notice to the County of that decision, after which time, Lockheed Martin shall have no further obligation under this Agreement to perform Culvert Work. Lockheed Martin's exercise of its right not to proceed with the Culvert Work relative to one or more of the five culverts shall not alter

or affect in any way Lockheed Martin's obligations pursuant to paragraph 2 of this Agreement relative to any Residual Cadmium in and around the culverts at the Site. Management of Residual Cadmium which the County is required to undertake in connection with any work that the County performs in and around any culverts that Lockheed Martin elects not to replace pursuant to this paragraph shall be subject to the incremental cost provisions of paragraph 2.

## 6. Dispute Resolution

Unless otherwise expressly provided for in this Agreement, the dispute resolution procedures of this paragraph shall be the exclusive mechanism to resolve disputes arising under this Agreement. The parties shall, without delay, continue to perform their respective obligations under this Agreement which are not affected by the dispute. The parties agree to use their best efforts to resolve any dispute(s) that may arise regarding this Agreement. Any dispute that arises under or with respect to this Agreement that cannot be resolved shall be considered to have arisen when one party sends the other party a written notice of dispute. The period for informal negotiations shall be fourteen (14) days from receipt of the written notice of dispute unless such time period is modified by written agreement of the parties. In the event that the parties cannot resolve a dispute by informal negotiations, the parties agree to submit the dispute to mediation to be conducted in accordance with the Construction Industry Mediation Procedures (including procedures for large, complex construction disputes) of the American Arbitration Association in effect at the time of the dispute. Within fourteen (14) days following the expiration of the time period for informal negotiations, the parties shall propose and agree upon a neutral and otherwise qualified mediator. The mediation shall occur at location in Onondaga County, New York, that is mutually agreed upon by the parties. In the event that the parties fail to agree upon a mediator, the parties shall request that the American Arbitration Association appoint a mediator. The period for mediation shall commence upon the appointment of the mediator and shall not exceed sixty (60) days, unless such time period is modified by written agreement of the parties. The decision to continue mediation shall be in the sole discretion of each party. The parties will bear their own costs of the mediation. The fees and expenses of the mediator shall be borne equally by the parties. In the event that the parties cannot resolve a dispute by informal negotiations or mediation, venue for judicial enforcement shall be as provided in this Agreement.

## 7. Term of Agreement

The term of this Agreement will commence on the Effective Date (as defined below) and will expire on the earlier of the twenty (20)-year anniversary of the Effective Date or the date when the County may undertake County Work in the drainage district easement depicted in the map attached to this Agreement as Exhibit B in accordance with applicable law without encountering Residual Cadmium. If this Agreement expires on the twenty-year anniversary of the Effective Date, the County may, by written notice delivered to Lockheed Martin within 60 days after the expiration date, extend the provisions of this Agreement related to Residual Cadmium for an additional 10-year term. The parties acknowledge that the enforceability of this Agreement does not

depend on whether the remedy approved by NYSDEC in the RAWP is implemented or on any determination by Lockheed Martin, whether or not sanctioned by NYSDEC, to leave Residual Cadmium at the Site. This Agreement may also be terminated by the parties if the parties so determine by the execution of a written instrument evidencing the termination by mutual agreement of the parties.

## 8. Communications

Any notice, demand, or request, required or agreed to be given by any party, shall be sufficiently given or served if in writing and signed by the party giving it, and delivered by hand with receipt acknowledged (including by national overnight courier, such as Federal Express) or mailed by U.S. mail, certified mail, return receipt requested, addressed to the party to be notified at the party's mailing address set forth below, with optional confirmation sent by facsimile or electronic mail:

County of Onondaga

County of Onondaga
Department of Water Environment Protection
Nicolas Capozza
650 Hiawatha Blvd. West
Syracuse, New York 13204
Phone: (315) 435-2260
Fax: (315) 435-
E-mail: NicolasCapozza@ongov.net

With a copy to:

Onondaga County Dept. of Law
Luis A. Mendez, Esq.
421 Montgomery Street – 10th Floor
Syracuse, New York 13202
Phone: (315) 435-2170
Fax: (315) 446-7162
E-mail: LuisMendez@ongov.net

Lockheed Martin Corporation

Bloody Brook Project Manager
Jill A. Fonte
Lockheed Martin Corporation
Building EP-6, Room 100B
P.O. Box 4840
Syracuse, New York 13221-4840
Phone: (315) 456-1993
Fax: (315) 456-0150
E-mail: jill.a.fonte@lmco.com

With a copy to:

General Counsel
Sandra L. Fenske, Esq.
Lockheed Martin Corporation
EP-5-118, MD 17
P.O. Box 4840
Syracuse, NY 13221-4840
Phone: (315) 456-3598
Fax: (315) 456-0669
E-mail: sandra.fenske@lmco.com

With a copy to:

Director, Office of the Environment
County of Onondaga
David Coburn
421 Montgomery Street – 14th Floor
Syracuse, New York 13202
Phone: (315) 435-2647
Fax: (315) 446-8582
E-mail: DavidCoburn@ongov.net

With a copy to:

Vice President Energy, Environment,
Safety and Health
Lockheed Martin Corporation
6801 Rockledge Drive
Bethesda, MD 20817

Hand deliveries to Lockheed Martin's Syracuse operations shall be made to the Patrol Office in Building 7 located at 497 Electronics Parkway, Liverpool, NY. The County or Lockheed Martin may designate a different person or entity to which notices shall be given by delivering a written notice to that effect to the other party.

**9. Entire Agreement**

This Agreement shall constitute the entire agreement of the parties regarding its subject matter, and shall supersede any previous oral or written understandings. The Exhibits attached hereto are incorporated herein and made a part of this Agreement. Furthermore, this Agreement may only be amended, modified or supplemented by a written instrument signed by both parties.

**10. Compliance with Law**

In performing work pursuant to this Agreement, the parties shall comply with all applicable laws, including but not limited to federal, state and local laws and regulations.

**11. Governing Law and Venue**

This Agreement and any and all issues arising hereunder or relating hereto shall be governed and construed according to the laws of the State of New York without reference to its principles of conflicts of law. All actions or proceedings arising in connection with this Agreement shall be tried and litigated only in the County, State and/or Federal Courts located in the County of Onondaga and State of New York

**12. Descriptive Headings**

The descriptive headings of the various provisions of this Agreement are included for convenience only, and they are not intended to affect the meaning or construction of any of the provisions of this Agreement.

**13. Assignment**

This Agreement may not be assigned in whole or in part by Lockheed Martin or the County without the written consent of the other party. However, Lockheed Martin

may unilaterally assign this Agreement in the event of change of ownership of either Lockheed Martin or the business unit located at the Syracuse site.

**14. Binding Effect**

This Agreement shall benefit and be binding upon the parties to this Agreement and their respective successors.

**15. Severability**

If any terms or provisions of this Agreement are determined by a court of competent jurisdiction to be invalid, illegal or otherwise unenforceable, such determination shall not affect the validity or enforceability of the remaining terms and provisions of this Agreement or the whole of this Agreement, but such term or provision shall be deemed modified to the extent necessary in the court's opinion to render such term or provision enforceable, and the rights and obligations of the parties shall be construed and enforced accordingly, preserving to the fullest permissible extent the intent and agreement of the parties set forth herein.

**16. Waiver**

No waiver by either party to this Agreement of any failure or refusal of the other party to comply with its obligations shall be deemed a waiver of any other or subsequent failure or refusal to so comply.

**17. Counterparts**

This Agreement may be executed in multiple counterparts, and the counterparts, when combined, shall form and constitute a complete agreement.

**18. Effective Date**

This Agreement shall be effective on the date of execution by both parties (the "Effective Date").

**IN WITNESS WHEREOF**, the parties hereto have executed this Agreement the date and year hereinafter written.

DATED: 7-9, 2014.

COUNTY OF ONONDAGA

By: Joanne M. Mahoney
Joanne M. Mahoney
County Executive

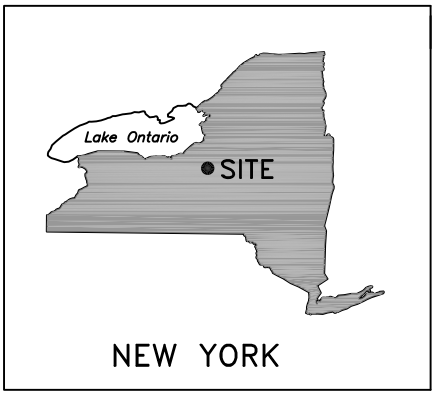
LOCKHEED MARTIN CORPORATION

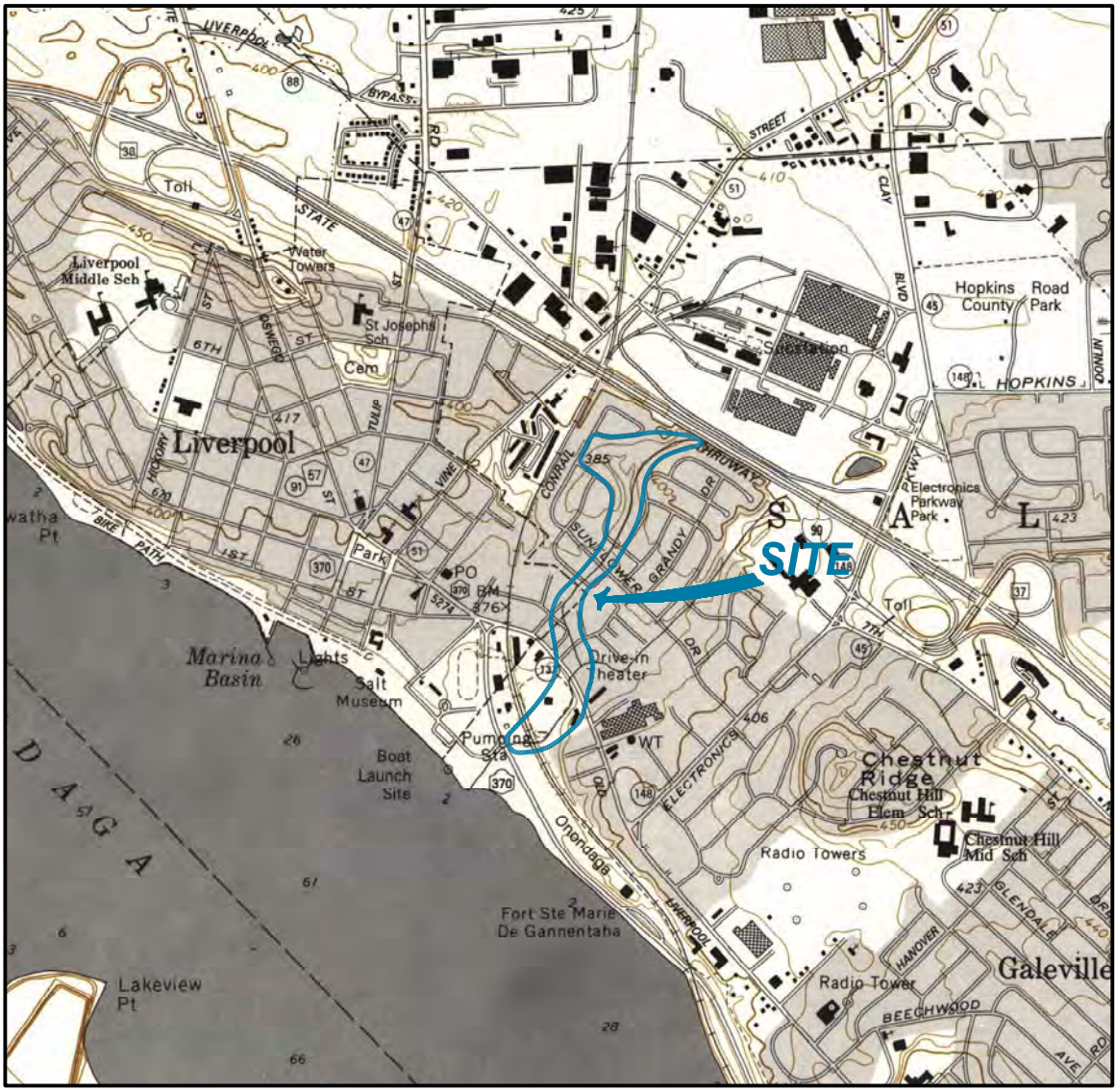
DATED: May 28, 2014

By: _____

Michael J . Sarpu
[print the name signed above]

Its: Vice President Operations
[title]




0' 2000' 4000'

APPROXIMATE SCALE

REFERENCE:

1. NYSDOT 7.5 MIN TOPOGRAPHIC MAP OF SYRACUSE WEST, QUADRANGLE 1990, SCALE: 1" = 2000'.

AECOM

LOCKHEED MARTIN CORPORATION

SITE LOCATION MAP

WEST BRANCH OF BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

| FILE NAME: | DRN | PROJECT NO. | DATE | EXHIBIT |
|---|---|---|---|---|
| EXHIBITA.dwg | — | 60303286 | 04 / 2014 | A |

Plotted By: bookasr
Layout-Sheet Name: EXHIBIT A
Plot File Date Created: Apr/01/2014 9:41 AM

Filename: N:\MARKETING\PROPOSALS\LOCKHEED MARTIN – BLOODY BROOK\CAD\EXHIBITA.DWG

ONTARIO PLACE

MIDWOOD DRIVE

CRANBERRY DRIVE

MIDWOOD DRIVE

MATCHLINE TO SHEET 2 OF 3 — BROOKVIEW LANE

NEW YORK STATE THRUWAY

SUNFLOWER DRIVE

BROOKVIEW LANE

N 1,132,000

N 1,131,500

N 1,132,500

E 924,000

E 923,500

E 923,000

6'x8' WIDE BOX CULVERT INV.=384.4

S 39°10'35" W 271.55'

S 39°10'35" W 271.55'

S 59°45'45" E 350.00'

204.97'

233.96'

INV.12"CSP=397.23 DRAINAGE PIPE

INV.12"CPP=376.79 DRAINAGE PIPE

30"CMP INV=377.90 DRAINAGE PIPE

47"x76" INV=392.95

CULVERT 1

INV.=370.4

INV.=370.

CSP 5'x7' WIDE

BL-114

CHANNEL

CABION LINED CHANNEL

RESTRICTED

TREES & BRUSH

SPRUCE TREES

CHAIN LINK FENCE

10'

SHED

DECK

PATIO

DECK PATIO

POOL

40' POOL

PLANTERS

PLANTER

CONC.

UMH

DMH

CB

DS

FP

RW

OHW

0+00 1+00 1+50 2+50 3+00 3+50 4+00 4+50 5+00 6+00 6+50 7+00 7+50 8+00 8+50 9+00 9+50 10+00 10+50

LEGEND

- WETLAND/PHRAGMITES
- BLOODY BROOK DRAINAGE DISTRICT EASEMENT
- NYS THRUWAY EASEMENT
- PROPERTY BORDER
- 365 TOPOGRAPHIC CONTOUR LINE
- WEST BRANCH OF BLOODY BROOK CENTERLINE
- STREAM/WATER EDGE
- UNDERGROUND DRAIN LINE
- OHW OVERHEAD WIRES
- RW RETAINING WALL
- GUARD RAIL
- UMH UTILITY MANHOLE
- DMH DRAINAGE MANHOLE
- CB CATCH BASIN
- DS DRAINAGE STRUTURES
- FP FLAG POLE
- CULVERT
- E 924,000 NYS PLANE COORDINATE SYSTEM EASTING
- N 1,131,000 NYS PLANE COORDINATE SYSTEM NORTHING
- BL-115 AERIAL SURVEY GROUND CONTROL POINT
- GABIONS (ROCK-FILLED WIRE CAGES)
- 7+50 + CHANNEL CENTERLINE SURVEY STATION
- 367.4 × TOPOGRAPHIC SPOT ELEVATION
- CONIFEROUS TREE
- DECIDUOUS TREE
- LIGHT POLE
- UTILITY POLE / GUY WIRE

0' 50' 100'

APPROXIMATE SCALE

REFERENCES:

1. BASE MAP SOURCE: IANUZZI & ROMANS, P.C. AND CT MALE ASSOCIATES P.C.
2. THE VALUES SHOWN ARE BASED ON NEW YORK (CENTRAL ZONE) STATE PLANE COORDINATE SYSTEM NORTH AMERICAN DATUM 1983.

AECOM

LOCKHEED MARTIN CORPORATION

SITE MAP
SHEET 1 OF 3

WEST BRANCH OF BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

| FILE NAME: | DRN. | PROJECT NO.: | DATE | EXHIBIT |
|---|---|---|---|---|
| EXHIBITB.dwg | --- | 60303266 | 04 / 2014 | B-1 |

Plotted By: Bookser
Last Plot Date Created: Apr/07/2014 9:12 AM
EXHIBIT B-1

Filename: N:\MARKETING\PROPOSALS\LOCKHEED MARTIN – BLOODY BROOK\CAD\EXHIBITB.DWG

N 1,131,000

N 1,130,500

E 923,500

N 1,130,000

ROYAL DRIVE

BROOKVIEW LANE

TOWN GARDENS DRIVE
(PRIVATE ROAD)

MATCHLINE TO SHEET 1 OF 3

MATCHLINE TO SHEET 3 OF 3

CULVERT 1

CULVERT 2

CULVERT 3

CULVERT 4

CULVERT 5

SUNFLOWER DRIVE

FLORADALE ROAD

PEARL STREET

SALINA STREET

TOWN OF SALINA
VILLAGE OF LIVERPOOL

E 923,000

E 922,500

PATIO

AG POOL

SHED

PLANTER

PLANTERS

FORMER AG POOL

DECK

PARKING

TRANS.

STORAGE SHELVES

DRAINAGE PIPE
42"D

CSP
5'x7' WIDE

CSP
7'x9' WIDE

CSP
6'x9' WIDE

SHEET PILES

INV.=370.0

INV.12"CSP=371.68
DRAINAGE PIPE

INV.=368.1

BL-201

INV.=367.8

INV.12"CSP=371.9

INV.=366.1

INV.=366.3

INV.12"CSP=369.1

INV.12"CSP=370.2

INV.=364.4

INV.=364.6

INV.12"=367.8

RIM=373.25

RIM=373.3

INV.=364.3

INV.=364.3

INV.48"CSP=365.6
DRAINAGE PIPE

INV.10"VCP=367.5

INV.=364.4

INV.=364.0

CONCRETE BOX CULVERT
(NO BASE)

16+50 17+00 17+50 18+00 18+50 19+00 19+50 20+00 20+50 21+00 21+50 22+00 22+50 23+00 23+50 24+00 24+50 25+00 25+50 26+00 26+50 27+00 27+50 28+00 28+50 29+00 29+50 30+00 30+50 31+00 31+50 32+00 32+50 33+00 33+50 34+00 34+50 35+00

REFERENCES:

1. BASE MAP SOURCE: IANUZI & ROMANS, P.C. AND CT MALE ASSOCIATES P.C.
2. THE VALUES SHOWN ARE BASED ON NEW YORK (CENTRAL ZONE) STATE PLANE COORDINATE SYSTEM NORTH AMERICAN DATUM 1983.

## LEGEND

- BLOODY BROOK DRAINAGE DISTRICT EASEMENT
- PROPERTY BORDER
- 365 TOPOGRAPHIC CONTOUR LINE
- WEST BRANCH OF BLOODY BROOK CENTERLINE
- STREAM/WATER EDGE
- TOWN/VILLAGE BORDER
- OHW UNDERGROUND DRAIN LINE
- OVERHEAD WIRES
- RW RETAINING WALL
- GUARD RAIL
- UMH UTILITY MANHOLE
- DMH DRAINAGE MANHOLE
- SMH SANITARY MANHOLE
- CB CATCH BASIN
- DS DRAINAGE STRUTURES
- FP FLAG POLE
- CULVERT
- E 924,000 NYS PLANE COORDINATE SYSTEM EASTING
- N 1,131,000 NYS PLANE COORDINATE SYSTEM NORTHING
- BL-115 AERIAL SURVEY GROUND CONTROL POINT
- 7+50 CHANNEL CENTERLINE SURVEY STATION
- 367.4 TOPOGRAPHIC SPOT ELEVATION
- CONIFEROUS TREE
- DECIDUOUS TREE
- LIGHT POLE
- UTILITY POLE / GUY WIRE

0' 50' 100'

APPROXIMATE SCALE

AECOM

LOCKHEED MARTIN CORPORATION

SITE MAP
SHEET 2 OF 3

WEST BRANCH OF BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

| FILE NAME: | DRN | PROJECT NO. | DATE | EXHIBIT |
|---|---|---|---|---|
| EXHIBITB.dwg | — | 60303286 | 04 / 2014 | B-2 |

Plotted By: bostwar
Plotted On: EXHIBIT B-2
Plot File Date Created: 4/9/2014 9:13 AM

Filename: N:\MARKETING\PROPOSALS\LOCKHEED MARTIN – BLOODY BROOK\CAD\EXHIBITB.DWG

N 1,129,500

N 1,129,000

E 923,000

N 1,128,500

E 922,500

E 922,000

OLD LIVERPOOL ROAD (C.R. No. 137)

MATCHLINE TO SHEET 2 OF 3

ONONDAGA LAKE PARKWAY

PATIO

CSP 5'x7' WIDE

CONCRETE BOX CULVERT (NO BASE FND.)

BL-127

BL-115

INV.=364.4

INV.±=364.0

INV.±=364.0

INV.±=364.0

INV.24"=362.51

INV.±=361.2

INV.±=360.8

INV.±=360.9

54" RCP

INV.±=360.9

INV.±=360.8

INV.±=360.9

BOX CULVERT

ARCH BOX CULVERT INV.±=362.0

SHED

PARKING

CONSTRUCTION AREA

OPEN STORAGE

BRUSH

ASPHALT PARKING LOT

CONCRETE CURB

DS

UMH

FP

OHW

RW

REFERENCES:

1. BASE MAP SOURCE: IANUZI & ROMANS, P.C. AND CT MALE ASSOCIATES P.C.
2. THE VALUES SHOWN ARE BASED ON NEW YORK (CENTRAL ZONE) STATE PLANE COORDINATE SYSTEM NORTH AMERICAN DATUM 1983.

## LEGEND

- BLOODY BROOK DRAINAGE DISTRICT EASEMENT
- PROPERTY BORDER
- 365 TOPOGRAPHIC CONTOUR LINE
- WEST BRANCH OF BLOODY BROOK CENTERLINE
- STREAM/WATER EDGE
- UNDERGROUND DRAIN LINE
- OHW OVERHEAD WIRES
- RW RETAINING WALL
- GUARD RAIL
- RAILROAD TRACKS
- UMH UTILITY MANHOLE
- DMH DRAINAGE MANHOLE
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- DS DRAINAGE STRUTURES
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- CULVERT
- E 924,000 NYS PLANE COORDINATE SYSTEM EASTING
- N 1,131,000 NYS PLANE COORDINATE SYSTEM NORTHING
- BL-115 AERIAL SURVEY GROUND CONTROL POINT
- 7+50 + CHANNEL CENTERLINE SURVEY STATION
- 367.4 × TOPOGRAPHIC SPOT ELEVATION
- CONIFEROUS TREE
- DECIDUOUS TREE
- LIGHT POLE
- UTILITY POLE / GUY WIRE

0' 50' 100'

APPROXIMATE SCALE

AECOM

LOCKHEED MARTIN CORPORATION

SITE MAP
SHEET 3 OF 3

WEST BRANCH OF BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

| FILE NAME: | DRN | PROJECT NO. | DATE | EXHIBIT |
|---|---|---|---|---|
| EXHIBITB.dwg | — | 60303286 | 04 / 2014 | B-3 |

Plotted By: bostonr
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Plot File Date Created: Apr/01/2014 - 8:18 AM

Filename: N:\MARKETING\PROPOSALS\LOCKHEED MARTIN – BLOODY BROOK\CAD\EXHIBITB.DWG

**Exhibit C**
**Remedial Action Construction Schedule**
**West Branch of Bloody Brook**
**Bloody Brook Voluntary Cleanup Program**
**Onondaga County, New York**

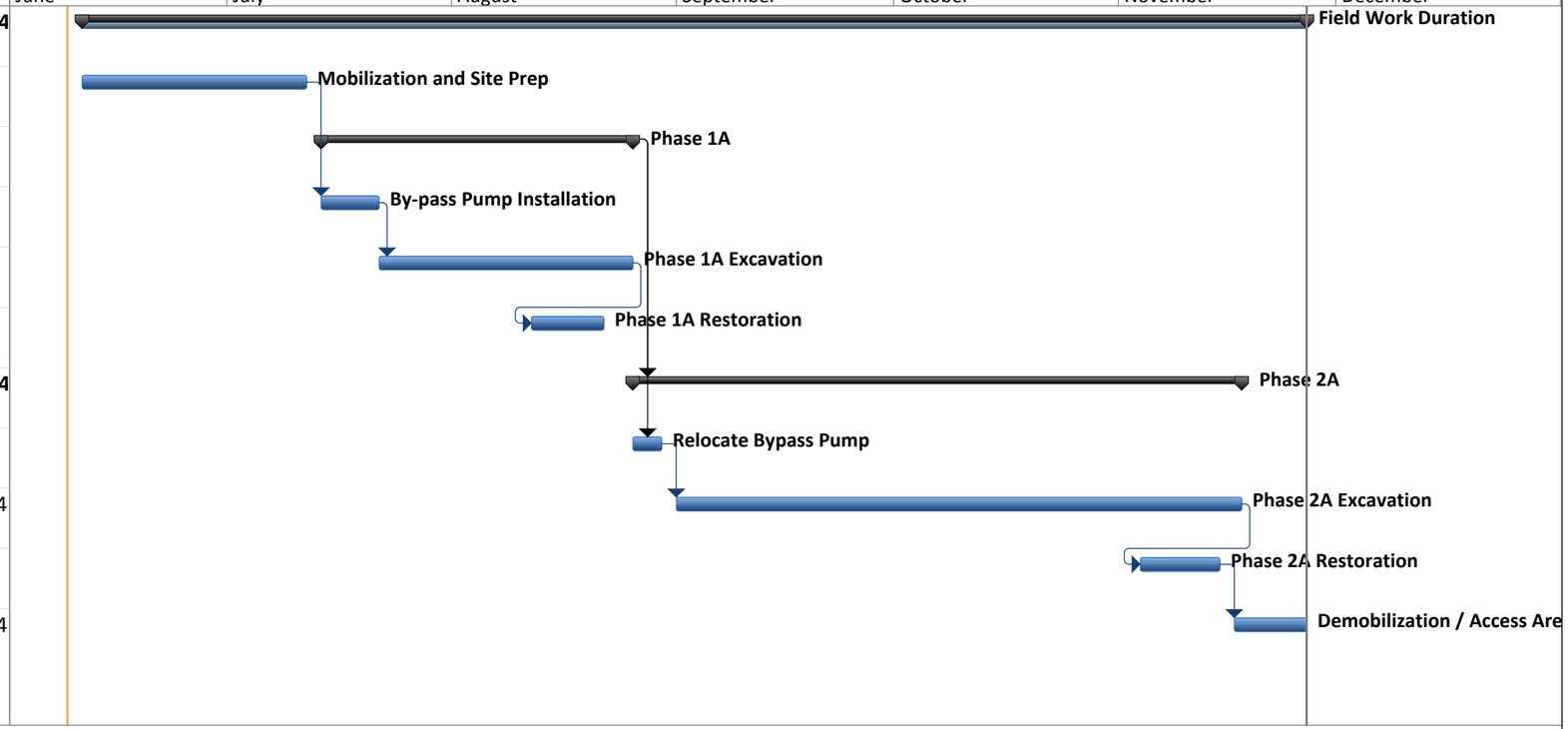
| | |
|---|---|
| Submit ACOE Permit to NYSDEC | February 7, 2014 |
| Initiate Waste Stabilization Bench Scale Test | May 7, 2014 |
| NYSDEC 2014 Construction Work Plan Approval | May 29, 2014 |
| Submit 2014 Restoration Work Plan to NSYDEC | May 30, 2014 |
| Mobilization and Site Preparation | June 11, 2014 |
| Submit Results of Waste Stabilization Bench Scale Test to NYSDEC | June 25, 2014 |
| NYSDEC 2014 Restoration Work Plan Approval | July 9, 2014 |
| Begin 2014 Construction Activities | July 14, 2014 |
| Complete 2014 Construction Activities | November 26, 2014 |
| Submit 2015 Construction Work Plan Addendum to NYSDEC | January 31, 2015 |
| NYSDEC 2015 Construction Work Plan Addendum Approval | March 1, 2015 |
| Begin 2015 Construction Activities | May 1, 2015 |
| Complete 2015 Construction Activities | November 15, 2015 |
| Submit 2016 Construction Work Plan Addendum to NYSDEC | January 31, 2016 |
| NYSDEC 2016 Construction Work Plan Addendum Approval | March 1, 2016 |
| Begin 2016 Construction Activities | May 1, 2016 |
| Complete 2016 Construction Activities | November 4, 2016 |

NOTE:

1) Dates are approximate and subject to change due to field conditions and unforeseen difficulties.
2) Monthly progress reports will be submitted to New York State Department of Environmental Conservation (NYSDEC) by the 10$^{th}$ of each calendar month.

**Exhibit C**
**2014 Remedial Action Construction Schedule**
**West Branch of Bloody Brook**
**Bloody Brook Voluntary Cleanup Program**
**Onondaga County, New York**

| ID | Task Name | Duration | Start | Finish |
|---|---|---|---|---|
| 1 | **Field Work Duration** | **121 days** | **Wed 6/11/14** | **Wed 11/26/14** |
| 2 | Mobilization and Site Prep | 23 days | Wed 6/11/14 | Fri 7/11/14 |
| 3 | **Phase 1A** | **31 days** | **Mon 7/14/14** | **Mon 8/25/14** |
| 4 | By-pass Pump Installation | 6 days | Mon 7/14/14 | Mon 7/21/14 |
| 5 | Phase 1A Excavation | 25 days | Tue 7/22/14 | Mon 8/25/14 |
| 6 | Phase 1A Restoration | 8 days | Tue 8/12/14 | Thu 8/21/14 |
| 7 | **Phase 2A** | **60 days** | **Tue 8/26/14** | **Mon 11/17/14** |
| 8 | Relocate Bypass Pump | 4 days | Tue 8/26/14 | Fri 8/29/14 |
| 9 | Phase 2A Excavation | 56 days | Mon 9/1/14 | Mon 11/17/14 |
| 10 | Phase 2A Restoration | 9 days | Tue 11/4/14 | Fri 11/14/14 |
| 11 | Demobilization / Access Area Restoration | 8 days | Mon 11/17/14 | Wed 11/26/14 |




Project: Bloody
Date: Mon 6/9/

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Task | Project Summary | Inactive Milestone | Manual Summary Rollup | Deadline | | | |
| Split | External Tasks | Inactive Summary | Manual Summary | Progress | | | |
| Milestone | External Milestone | Manual Task | Start-only | | | | |
| Summary | Inactive Task | Duration-only | Finish-only | | | | |

# APPENDIX F

# Field Sampling Plan

**BLOODY BROOK**

**ONONDAGA COUNTY**

**LIVERPOOL, NEW YORK**

---

# Site Management Field Sampling Plan

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March 2021

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Attachment 1 Standard Operating Procedure: Crayfish Sampling

# 1. Introduction

The purpose of this Field Sampling Plan (FSP) is to describe sample collection procedures for work conducted in association with the Site Management Plan (SMP) for the Lockheed Martin Corporation (Lockheed Martin) Bloody Brook site located in Onondaga County, New York ("site").

Limited field sampling is anticipated for management activities for the site beyond biological monitoring that includes sampling of crayfish from the brook for cadmium analysis two, four, and six years following the completion of excavation and restoration activities (2018, 2020, and 2022). Baseline biological monitoring was completed in 2014 prior to the initiation of remedial activities. The post-remediation monitoring was completed in August 2018 and 2020, and the final year is anticipated for summer 2022.

Limited soil samples may be required per the Institutional Control (IC) Plan provided in Section 3 of the SMP, and sampling for New York State Department of Environmental Conservation (NYSDEC) approval of imported soil may be required if additional clean fill needs to be transported to and used on site. Waste characterization sampling may be required if potentially contaminated material is to be transported for offsite disposal.

# 2. Sampling Methodologies

This section provides information specific to the actual field methods that will be employed in support of the biological monitoring and other potential soil sampling related to site management activities. Sample collection, equipment decontamination, ground surface restoration, sample packaging, analytical protocols, and quality control sample collection are discussed in this section.

## 2.1 Site Soil Sample Collection

If it is determined that soil samples are required per the IC Plan in the SMP (Section 3), sample collection will be performed between the hours of 8:00 am and 5:00 pm, and every effort will be made to minimize any inconvenience (e.g., noise) to residents of the area. Sampling documentation will consist of detailed notes made during sampling activities that include recording of sample locations, sample depth, soil lithology, and site conditions (e.g., weather). Depending on the depth of the soil sample required, either a stainless steel hand auger or a track-mounted Geoprobe® will be used to create the boring and to collect the soil sample. The diameter of the boring will be approximately 2-inches. The soil in each sample interval to be collected will be thoroughly mixed prior to placement in laboratory supplied sample containers. The samples will be collected and handled using new, disposable nitrile gloves. The hand auger or split spoons will be decontaminated, and each of the borings will be backfilled with the excess soil. When backfilling a boring, the excess soil will be placed in the borehole at approximately the depth it was removed.

### Ground Surface Restoration

All efforts will be made to limit the amount of surficial disturbance potentially caused by the sampling crew and equipment. At each sample location, an approximate 2-inch diameter patch of the vegetative cover will be removed down to the root and set aside to be replaced on the surface of the sample location after the boring has been backfilled. Any damage that may occur to the lawns where soil borings are advanced will be repaired with topsoil and grass seed following the completion of the field activities. If large areas require restoration, appropriate measures (e.g., hay bales) will be implemented to ensure that the work does not cause increased erosion.

### Analytical Protocols

All site soil samples collected pursuant to this FSP will be analyzed by a New York State Department of Health (NYSDOH) Environmental Laboratory Accreditation Program (ELAP) certified laboratory for

cadmium (Method SW 846 6010B). The laboratory will provide a NYSDEC Analytical Service Protocol (ASP) Category B deliverable data package to allow for data validation if determined to be required. Details related to analytical data quality are provided in the Quality Assurance Project Plan (QAPP) included as Appendix G of the SMP.

To support the potential future validation data needs, quality control samples (blind field duplicate, matrix spike, and matrix spike duplicate samples) will be collected in the field and will be analyzed by the laboratory.

### Quality Control Sample Collection

Quality control samples will be collected to provide necessary data for future validation of the laboratory data, if required. Blind field duplicate, matrix spike, and matrix spike duplicate samples will be collected at a frequency of one for each 20 samples collected.

Blind field duplicate samples will be created by collecting double volume for a sample location then splitting the sample volume between two sample containers to be used for the sample and the blind field duplicate sample. The matrix spike and matrix spike duplicate samples will be created by providing triple sample volume for a sample location then splitting the sample volume into three sample containers to be used for the sample, matrix spike sample, and matrix spike duplicate sample.

## 2.2 Sampling of Imported Fill

If Lockheed Martin is required to place additional clean imported fill after excavation activities, samples from the proposed clean source will be collected and analyzed in accordance with Section 5.4 of DER-10 in order to receive NYSDEC approval to use the source. Samples for volatile organic compounds (VOCs) in clean fill will be collected with the use of Encore® samplers or similar (See SMP QAPP).

## 2.3 Waste Characterization Sampling

If required, waste characterization samples will be collected in accordance with the methods and frequency described herein. For the collection of each sample, material will be collected from locations and at a frequency required by the waste receiving facility within the area to be sampled. Methods for VOC sample collection and homogenization of soil for analyses other than VOCs is described below.

### Collection of VOC samples

Soil to be sampled for VOC analysis will be collected using appropriate sampling tools (e.g., stainless steel hand auger) from a discrete sample location. Samples will be collected from a location chosen to be representative of the larger area. Samples will be collected using new, disposable nitrile gloves and placed directly into a sample jar provided by a New York State certified laboratory.

### Field Sample Homogenization

Samples collected for analysis other than VOCs and listed below will be field composited from composite sample locations within the lager area to be sampled. Collected grab samples from the composite sample locations will be transferred from the sampler to a large plastic bag and will be homogenized using new, disposable nitrile gloves. An appropriate mass of the homogenized material will be transferred to a laboratory-supplied sample container(s) for shipment to the laboratory. Samples will be stored and handled according to procedures outlined in this work plan.

### Spoils

Soil collected from borings that are not sent to a laboratory for analysis will be placed in the open boring from which it came. The remaining void space left from the boring will be filled with sand or similar. Equipment and tools that have come in contact with samples and non-contact sampling equipment will either be disposed of after each use or will be decontaminated and re-used according to the procedure described below.

### Ground Surface Restoration

All efforts will be made to limit the amount of surficial disturbance potentially caused by the sampling crew and equipment. At each soil sample location, a patch of the vegetative cover will be removed down to the root and set aside to be replaced on the surface of the sample location after the boring has been backfilled. Any damage that may occur to the vegetated areas where soil borings are advanced will be repaired and seeded following the completion of the field activities.

### Field Observation and Documentation of Samples

Field observations regarding each sample will be recorded on a field log. In addition, sampling documentation will consist of detailed notes made during sampling activities that include recording of sample locations, sample depth, and site conditions (e.g., weather). Sample locations will be identified using a small flag or similar article and surveyed prior to demobilization from the site.

### Sample Analysis

Analyses conducted under this Work Plan will be conducted by a laboratory certified under the NYSDOH ELAP for the constituents to be analyzed and to the extent that such certification is available. The samples for waste characterization will be submitted for laboratory analysis for the parameters presented in the table below.

| Analyte(s) | Analytical Method |
|---|---|
| Sulfide (Reactive) | SW-846-C7 |
| Reactivity | SW-846-C7 |
| Ignitability | SW-846-C7 |
| TCLP RCRA 8 Metals | SW-846-1311/SW846-7470 (Mercury); SW-846-1311/SW-846-6010 (other RCRA metals) |
| PCBs | SW-846-1311/SW-846-8082 |
| TCLP SVOCs | SW-846-1311/SW-846-8270 |
| TCLP VOCs | SW-846-1311/SW-846-8260 |
| TCLP Pest/Herb | SW-846-1311/SW-846-8081 |
| Percent Solids | SM-2540.B |

## 2.4 Biological Monitoring

The objective of the biological monitoring is to document cadmium concentrations in aquatic biota following the completion of the remedial activities at the site. Pre-remedial data was collected to serve as a baseline data set in 2014. Collectively, these data will be used in part to support the evaluation of the effectiveness of the site remedial program in mitigating potential cadmium impacts to Bloody Brook.

Crayfish are the target organism for this work because they are known to accumulate cadmium, and they are relatively less mobile than other resident aquatic organisms (e.g., fish). Crayfish have been observed in West Branch of Bloody Brook and Bloody Brook and have been sampled previously by both NYSDEC and Lockheed Martin.

Crayfish will be collected from three general locations or stations within the brook, including an upper, middle, and lower location (Figure 1), consistent with the locations sampled during the baseline sampling and the post-remediation sampling in 2018 and 2020. Each location will also be photographed by the field crew. Five samples of crayfish will be collected from each of the three sampling locations. In the event that sufficient number of crayfish cannot be collected, alternative or other species will be considered. The crayfish samples will be collected in accordance with the procedures described below, processed, and sent to a laboratory for cadmium analyses.

## Methodology

This section describes the general methods that will be used to collect, process, and analyze the biological tissue samples. Additional details on collection methods are presented in the standard operating procedure (SOP) (Attachment 1).

## Collection

Five crayfish samples will be collected from each of the specified three sampling locations, for a total of 15 samples. The crayfish that are retained for analyses will be of uniform size to the extent practicable. It is estimated that each crayfish sample will be a composite sample of 3 to 5 like-size individuals, although fewer (or more) organisms per sample may be collected depending on individual crayfish weights. In order to have sufficient tissue for analysis, each sample will have a minimum sample weight of approximately 20 grams.

Crayfish will be collected using a methodology appropriate for sample conditions and may include the use of a backpack electrofishing unit, hand netting, or seining. Details on these collection methods are included in the SOP in Attachment 1 of this appendix. Following sample collection, each crayfish will be weighed and measured (carapace length), and samples will be placed in an appropriately-labeled sample jar or clean sealable bag. Samples will be given a unique laboratory ID that specifies the location and sample number. For example, sample CR-18-1-001 would represent a crayfish sample (CR), collected in 2018 (-18), from location 1 (-1), and the first replicate (-001). After processing, samples will be placed in coolers with ice and shipped to the laboratory for analysis. The sample handling, packing, and shipping procedures are further described in sections below.

## Laboratory Analyses

Each of the biota samples will be analyzed by a laboratory recognized by the National Environmental Lab Accreditation (NELAC) for total cadmium using USEPA Method 6020 (ICP-MS). The contracted laboratory will follow the USEPA method, and the appropriate Quality Assurance/Quality Control (QA/QC) procedures detailed below. The laboratory will achieve a Method Detection Limit (MDL) of 0.006 milligrams per kilogram (mg/kg) and a Reporting Limit (RL) of 0.1 mg/kg.

## Quality Assurance/Quality Control

QA/QC procedures will be implemented to ensure data needs for completeness, accuracy, and precision. The laboratory will utilize QC samples to assess the validity of the analytical results of field samples. The laboratory QC samples will include a matrix spike/matrix spike duplicate collected once per event.

All laboratory cadmium analyses will follow USEPA Method 6020. The laboratory will ensure that the sample preparation and analyses are performed within the specified holding times for each analysis and perform an internal laboratory quality control report as well as note any QC deficiencies in the final laboratory report. Preservation will involve cooling the samples to 4 degrees Celsius (°C) during transportation, and storage at the laboratory at a temperature of -20 °C until analysis is performed. Holding time will be no more than 180 days to analysis.

Sample Frequency

In accordance with the 2014 Decision Document, post-remediation monitoring data was collected in 2018 and 2020 and reported to NYSDEC in letters dated October 31, 2018 and November 4, 2020, respectively. Per the NYSDEC comment letter regarding the 2020 biological monitoring dated December 11, 2020, an additional monitoring event will be conducted in 2022, consistent with previous sampling and as discussed herein. Sampling for each event will be completed during the same general time frame to avoid possible seasonal fluctuations in cadmium concentrations. Following the 2022 sampling event, the data will be evaluated and a determination will be made regarding the necessity for additional monitoring events.

## 3. Sample Packaging

Prior to the sampling activities, sample containers will be pre-cleaned by the laboratory and delivered to the field representative or a store bought new clean sealable bag will be used. The field representative will place a label on the sample containers. As samples are collected, the label will be used to record the sample identifier, date and time of sample collection, and the name of the person collecting the sample. After the samples have been collected, they will be kept in a cooler with ice and will be delivered to the laboratory under proper chain of custody.

## 4. Equipment Decontamination

Field decontamination will be minimized to the extent practical by using disposable equipment or pre-cleaned reusable equipment. However, as necessary, reusable sampling equipment will be decontaminated before use. The decontamination procedure will consist of a wash with a phosphate-fee detergent and potable water, a potable water rinse, a 10% nitric acid rinse, and a final distilled water rinse. The decontaminated equipment will then be placed in a plastic bag or wrapped in aluminum foil to keep the equipment clean.

## 5. Data Validation

The laboratory will provide a NYSDEC ASP Category B deliverable data package for all samples in order to allow for data validation as needed. Copies of the laboratory reports will be forwarded to a third party data validator. The data validator will review the project quality control samples, holding times, and laboratory precision. A validation report will be obtained for each laboratory analytical report.

## 6. Green and Sustainable Remediation

Per DER-10, green and sustainable practices have been considered in the development of this Field Sampling Plan and will be utilized during the field sampling activities. By using a hand auger when possible to collect soil samples, energy consumption will be minimized and no greenhouse gases or pollutants will be emitted. In addition, vehicle idling will be reduced with the requirement that all vehicles and equipment will be shut off when not in use for more than five minutes. Mobilization and demobilization to and from the site by field personnel will be minimized, and carpooling will be used when feasible. Material management and waste reduction practices will be implemented for the project. For example, paper usage and disposal/recycling will be minimized by requesting that all analytical data and analytical reports be delivered in an electronic format.




LEGEND:

- APPROXIMATE BIOTA MONITORING SAMPLE LOCATION
- BLOODY BROOK
- APPROXIMATE SITE BOUNDARY

NOTE:

1. BASE MAP SOURCE: ESRI ARCGIS STREET MAP.

0 800 1,600 Feet

GRAPHIC SCALE

AECOM

LOCKHEED MARTIN CORPORATION

BIOLOGICAL MONITORING LOCATIONS

WEST BRANCH OF BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

| FILE NAME: | DRN | PROJECT NO. | DATE | FIGURE NO. |
|---|---|---|---|---|
| Bio Mon Plan.dwg | --- | 60338140 | 8 / 2017 | 1 |

Plotted By: Bookasr
Layout-Sheet Name: 11X17
Plot File Date Created: Aug/31/2017 2:08 PM

Filename: N:\MARKETING\PROPOSALS\LOCKHEED MARTIN – BLOODY BROOK\CAD\BIO MON PLAN.DWG

# *Standard Operating Procedure: Crayfish Sampling*

## I. Introduction

The following procedures describe the general methodologies that will be used in the field to collect crayfish.

## II. Pre-Collection

Staff assigned the responsibility of collecting crayfish will be provided with the following information:

- Work documents (Biological Monitoring Plan, Health and Safety Plan);
- Water body name and site maps;
- Number and size of each species to be collected;
- Collecting and processing procedures;
- Special instructions (if any);
- Appropriate fisheries office contact; and
- Sampling permit.

## III. Equipment

The following collection equipment and materials will be available, as required, during crayfish sampling:

- Personal protective equipment (as required by the health and safety plan);
- Backpack electrofishing equipment;
- Dip nets with non-conductive handles;
- Chest or hip waders;
- Measuring board or ruler;
- Top-loading electronic and suspended-weight spring balances;
- Insulated coolers with ice;
- Plastic sealable bags and indelible ink markers;
- Camera;
- Global positioning system (GPS); and
- Field notebook.

## IV. Field Notes

Field notes will be recorded during sampling activities, and at a minimum, will include the following:

- Names of field crew and oversight personnel;
- General weather conditions;
- Date, time, and general capture location (including GPS location);

- Capture technique;
- Sample duration;
- General observations of crayfish habitat, abundance, and diversity; and
- Photograph number when pictures are taken.

## V. Collection Procedures

Crayfish will be collected using approved sampling techniques. State personnel (conservation officers) will be notified of the sampling activities prior to commencing field work. Only those target species identified in the monitoring plan and scientific collectors permit will be retained. Collection of other species may occur when target species are absent. Non-target species will be released back to the system.

The following procedures will be used, as necessary, to collect crayfish:

### A. Backpack Electrofishing

The following procedures describe the use of a backpack electrofishing unit to collect crayfish. Electrofishing activities will be temporarily halted when any persons, pets, or livestock are observed in the water or on the shore in close proximity to the electrofishing unit.

1. The field crew will don personal protective equipment (non-conductive waders and gloves, etc.), set up the electrofishing equipment, and test it upon arrival at the site.

2. The backpack operator will be responsible for control of the on-off switch on the anode handle, operation of the control equipment, and for capturing crayfish. The remaining field crew will work alongside the backpack operator and will capture crayfish.

3. Electricity will be applied to the water by actively maintaining the on-off switch in the closed position while the control equipment is operative.

4. The electrical current will be set to stun the crayfish, but should not cause mortality.

5. Target species of appropriate size will be collected using non-conductive dip-nets and will be placed in sealable plastic bags until they can be transferred to a cooler with ice.

6. Backpack electrofishing batteries will be recharged as needed.

### B. Hand-Netting

The following procedures describe the use of dip-nets and hand-capture techniques to collect crayfish:

1. The field crew will move along the water's edge to find crayfish. Crayfish will be captured by hand or by dip-net as they are spotted, and will be tracked and captured as they swim.

2. Target species of appropriate size will be placed into sealable plastic bags, and then into a cooler with ice. Non-target species will be noted in the field notebook.

### C. Seine-Netting

The following procedures describe the use of seines to collect crayfish:

1. The field crew will ready the appropriate sized seines (length, depth, and mesh size) for site conditions prior to field sampling.

2. One or two crew members will hold the seine in place, while an additional crew member lifts rocks upstream of the seine to dislodge crayfish. Crew members will then lift the net to collect crayfish.

3. Target species of appropriate size will be removed from the seines and will be placed into sealable plastic bags, and then into a cooler with ice. Non-target species will be counted and noted in the field notebook.

## VI. Sample Handling

The following identifies the temporary storage procedures that will be used to preserve crayfish in the field prior to sample processing, handling, and shipment to the laboratory:

1. Measure and weigh each crayfish after collection, as necessary. The carapace length (tip of rostrum to posterior edge of carapace) will be measured to the nearest 0.1 M with calipers to ensure that appropriate sized crayfish are taken. Weight will be taken to ensure that minimum sample mass requirements are satisfied.

2. Count the number of crayfish to ensure that the correct amount is taken.

3. Transfer crayfish to sealable plastic bags (if not done previously) and label with sampling date and capture location, and place in coolers with ice until field processing can occur.

# APPENDIX G

## Quality Assurance Project Plan

**BLOODY BROOK**

**ONONDAGA COUNTY**

**LIVERPOOL, NEW YORK**

---

# Site Management
# Quality Assurance Project Plan

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# 1. INTRODUCTION

The purpose of this Quality Assurance Project Plan (QAPP) is to document and establish criteria for conducting monitoring and sampling at a predetermined quality for work conducted in association with the Site Management Plan (SMP) for the Lockheed Martin Corporation (Lockheed Martin) Bloody Brook site located in Onondaga County, New York ("site").

Limited field sampling is anticipated for management activities for the site beyond biological monitoring that includes sampling of crayfish from the brook for cadmium analysis two years and four years following the completion of excavation and restoration activities (2018 and 2020). Baseline biological monitoring was completed in 2014 prior to the initiation of remedial activities. Limited soil samples may be required per the Institutional Control (IC) plan provided in Section 3 of the SMP, and sampling for New York State Department of Environmental Conservation (NYSDEC) approval of imported soil may be required if additional clean fill needs to be transported to and used on site.

# 2. FIELD SAMPLING

## 2.1 Field Sampling Procedures

Procedures for field sampling activities are included in Appendix F (Field Sampling Plan) of the SMP.

## 2.2 Equipment Decontamination

Field decontamination will be minimized to the extent practicable by using disposable equipment or pre-cleaned reusable equipment. However, as necessary, reusable sampling equipment will be decontaminated before use. The decontamination procedure will consist of a wash with a phosphate-free detergent and potable water, a potable water rinse, a 10 percent nitric acid rinse, and a final distilled water rinse. The decontaminated equipment will then be placed in a plastic bag or wrapped in aluminum foil to keep the equipment clean.

# 3. SAMPLE HANDLING

## 3.1 Sample Identification and Labeling

Collected samples will be assigned a unique identification using the sample location or other sample-specific identifier.

For soil samples, the sample identification will adhere to the following example format:

**SB-1-072819-0910 (Sample location-MMDDYY-Sample depth)**

For biological samples, the sample identification will adhere to the following example format:

**CR-19-1-01(Crayfish sample collected in 2019 from Location 1, and the first replicate)**

Affixed to each sampling container will be a non-removable label on which the following information will be recorded with permanent water-proof ink: client, project name, preservative, collection date and time, sample identification, requested analysis, and collected by.

## 3.2 Sample Bottles, Preservation, and Holding Time

Table 1 of this appendix identifies the sample preparation and analytical method, matrix, holding time, containers, and preservatives for the typical analyses to be performed at this site as needed.

The selection of sample containers used to collect samples is based on the criteria of sample matrix, analytical method, potential contaminants of concern, reactivity of container material with the sample, quality assurance/quality control (QA/QC) requirements, and any regulatory protocol requirements.

Sample bottles will be provided by the analytical laboratory and will conform to the requirements of the United States Environmental Protection Agency (USEPA) Specifications and Guidance for Contaminant-Free Sample Containers. Soil samples for volatile organic compound (VOC) analysis will be collected in EnCore sample kits. Crayfish may be collected and shipped in either laboratory provided containers or clean, sealed Ziploc® bags.

For the potential analyses anticipated during the site management activities, sample preservation is not needed. Should this change, chemical preservatives will be added to the sample bottles (prior to sample collection) by the analytical laboratory. Sample preservation is checked upon sample receipt by the laboratory.

Holding times (see Table 1) are calculated from the time of sample collection. Samples will be shipped from the field to arrive at the lab no later than 48 hours from the time of sample collection.

## 3.3 Chain of Custody and Shipping

A chain-of-custody (COC) form, typically provided by the analytical laboratory, will trace the path of sample containers from the project site to the laboratory.

Prior to a sampling event, AECOM personnel will notify the laboratory of upcoming field sampling events and the subsequent transfer of samples. This notification will include information concerning the number and type of samples and the anticipated date of arrival. Insulated sample shipping containers (typically coolers) will be provided by the laboratory for shipping samples. Sample bottles within each shipping container will be individually labeled with an adhesive identification label provided by the laboratory. Project personnel receiving the sample containers from the laboratory will check each cooler for the condition and integrity of the bottles prior to field work.

Once the sample containers are filled, they will be immediately placed in the cooler with ice (in Ziploc® plastic bags to prevent leaking) or synthetic ice packs to maintain the samples at 4$^{o}$C. The field sampler will indicate the sample designation/location number in the space provided on the COC form for each sample. The COC forms will be signed and placed in a sealed plastic Ziploc® bag in the cooler. The completed shipping container will be closed for transport with nylon strapping, or a similar shipping tape and two custody seals will be affixed to the lid. The seals must be broken to open the cooler and will indicate tampering if the seals are broken before receipt at the laboratory. When the laboratory receives the coolers, the custody seals will be checked, and lab personnel will sign the COC form.

# 4. DATA QUALITY REQUIREMENTS

## 4.1 Analytical Methods

Soil and crayfish sample analyses for this project will typically utilize USEPA SW-846 Methods 6010B and 6020A for cadmium, respectively.

Analytical methods used for this project are presented in the NYSDEC Analytical Services Protocol (ASP), 2005. It is the laboratory's responsibility to be familiar with this document and procedures and deliverables within it pertaining to NYS work. Category B deliverables will be required unless specified otherwise in specific work assignments or work plans.

The selected laboratory must be approved by the NYSDEC and certified by the New York State Department of Health (NYSDOH) Environmental Laboratory Approved Program (ELAP).

## 4.2 Quality Assurance Objectives

Data quality objectives (DQOs) for measurement data in terms of sensitivity and the PARCC parameters (precision, accuracy, representativeness, comparability, and completeness) are established so that the data collected are sufficient and of adequate quality for their intended uses. Data collected and analyzed in conformance with the DQO process described in this QAPP will be used in assessing the uncertainty associated with decisions related to this site.

### 4.2.1 Sensitivity

The sensitivity or detection limit desired for each analysis or compound is based on the DQOs established for the project. The method detection limit is determined in accordance with the procedure in ASP Exhibit A, section 4.9.2.12, which is consistent with the procedure in 40 CFR Part 136 Appendix B.

The Reporting Limit (RL) for non-detected analytes will be the lowest calibration standard associated with the analysis. Reporting limits will be equal to or lower than those presented in Exhibit C of ASP 2005 for the applicable method. Detected analytes at concentrations below the RL but above the MDL will be flagged "J" (estimated) by the laboratory. Typical RLs are summarized on Table 2 of this appendix.

The reporting limits and MDLs of the assigned laboratory will be reviewed by AECOM personnel to verify that the laboratory sensitivity is sufficient to meet the project objectives. These will typically include meeting the applicable standards, criteria, and guidance (SCGs) including soil cleanup objectives (6 NYCRR 375-6.8).

### 4.2.2 Precision

The laboratory objective for precision is to equal or exceed the precision demonstrated for the applied analytical methods on similar samples. Precision is evaluated by the analyses of laboratory and field duplicates.

Relative Percent Difference (RPD) criteria determined from laboratory performance data are used to evaluate precision between duplicates. A matrix spike duplicate will be performed once for every 20 samples for VOCs.

Precision measures the reproducibility of measurements under a given set of conditions. Specifically, it is a quantitative measure of the variability of a group of measurements compared to their average value. Precision is usually stated in terms of standard deviation, but other estimates such as the coefficient of variation, relative standard deviation, range (maximum value minus minimum value), and relative range are common and may be used pending review of the data.

The overall precision of measurement data is a mixture of sampling and analytical factors. Analytical precision is easier to control and quantify than sampling precision because there are more historical data related to individual method performance. In contrast, sampling precision is unique to each site or project.

Overall system (sampling plus analytical) precision will be determined by analysis of field duplicate samples for soil samples. Analytical results from laboratory duplicate samples will provide data on measurement (analytical) precision.

Precision will be determined from field duplicates, as well as, matrix spikes and matrix spike duplicates; it will be expressed as the RPD:

$$RPD = 100 \times 2(|X_1 - X_2|) / (X_1 + X_2)$$

where:

$X_1$ and $X_2$ are reported concentrations for each duplicate sample and subtracted differences represent absolute values.

Criteria for evaluation of laboratory duplicates are specified in the applicable methods. The objective for field duplicate precision is ≤ 50% RPD for all matrices for analytes detected at concentrations at least 2 times the reporting limit. Where one or both analytes are detected at less than 2 times the RL, the criterion is the absolute difference "D" ($X_1 – X_2$), and D should be less than the RL for the analyte.

### 4.2.3 Accuracy

The laboratory objective for accuracy is to equal or exceed the accuracy demonstrated for the applied analytical method on similar samples. Percent method recovery criteria and those determined from laboratory performance data are used to evaluate accuracy in matrix (sample) spike and blank spike quality control samples. A matrix spike and blank spike or laboratory control will be performed once for every analytical batch or as specified in the method or ASP. Other method-specific laboratory QC samples (such as continuing calibration standards) may also be used in the assessment of analytical accuracy. Sample (matrix) spike recovery is calculated as:

$$\% \text{ Recovery} = 100 \times (SSR-SR)/SA$$

Where:

SSR = Spiked Sample Result
SR = Sample Result, and
SA = Spike Added

Accuracy measures the bias in a measurement system. It is difficult to measure accuracy for the entire data collection activity; therefore, it will be assessed through use of known QC samples and presented as percent recovery.

Routine organic analytical protocol requires a surrogate spike in each sample. Surrogate recovery will be defined as:

$$\% \text{ Recovery} = (R/S) \times 100$$

Where:

S = surrogate spike concentration
R = reported surrogate compound concentration

Recovery criteria for laboratory spikes and other laboratory QC samples through which accuracy may be evaluated are established in the applicable analytical method.

### 4.2.4 Representativeness

The representativeness of data is only as good as the representativeness of the samples collected. Sampling and handling procedures and laboratory practices are designed to provide a standard set of performance-driven criteria to provide data of the same quality as other analyses of similar matrices using the same methods under similar conditions. Representativeness will be determined by a comparison of the quality controls for these samples against data from similar samples analyzed at the same time.

### 4.2.5 Comparability

Comparability of analytical data among laboratories becomes more accurate and reliable when all labs follow the same procedure and share information for program enhancement. Some of these procedures include:

- Instrument standards traceable to National Institute of Standards and Technology (NIST), the USEPA, or the NYSDOH/NYSDEC;
- Using standard methodologies;
- Reporting results for similar matrices in consistent units;
- Applying appropriate levels of quality control within the context of the laboratory quality assurance program; and
- Participation in inter-laboratory studies to document laboratory performance.

By using traceable standards and standard methods, the analytical results can be compared to other labs operating similarly. Periodic laboratory proficiency studies are instituted as a means of monitoring intra-laboratory performance.

Comparability within any specific project is also assessed by comparison of the project data to data generated previously and, if available, comparison of the data for multiple sampling events conducted for the project. Comparability (consistency) of sampling techniques is also assessed, to some extent, by analysis of field duplicates, although it should be noted that large differences between field duplicates may result from a wide variety of causes, not just inconsistent sampling.

### 4.2.6 Completeness

The goal of completeness is to generate the maximum amount possible of valid data for all planned samples. Completeness of 100 percent indicates that all planned samples were collected and the resultant data were fully valid and acceptable. As completeness is a function of both field activities and laboratory activities, separate completeness goals are established for each.

The default goal for sampling completeness is 95 percent, as is calculated as

$$\text{Sampling Completeness (\%)} = (S_c/S_p) \times 100$$

Where:

$S_c$ = Samples collected (submitted) for analysis (documented from field records or COC)
$S_p$ = Samples planned (as documented in the project-specific work plans)

The default goal for analytical completeness is also set at 95 percent. Analytical completeness may be less than 100 percent either due to systemic failures that result in the rejection or loss of data for an entire sample or compound-specific rejection within an otherwise valid analysis.

For typical work assignments, the default overall completeness goal is 90 percent useable data. The impact of rejected or unusable data will be made on a case-by-case basis. If the goals of the project can be achieved without the missing datum or data, or if data from a different sampling event can be used to fill the data gap, no further action would be necessary. However, loss of critical data may require resampling or reanalysis.

## 4.3 Field Quality Assurance

Table 2 in this appendix shows typical QA/QC samples and reporting limits. Field QA/QC samples are discussed below.

### 4.3.1 Blind Field Duplicate Samples

Blind field duplicate samples are used to assess the variability of a matrix at a specific sampling point and to assess the reproducibility of the sampling method. Soil blind duplicate samples are collected from a single location and device (e.g. a split spoon sampler). For the field sampling activities associated with site management activities, blind field duplicates are only anticipated to be collected if soil samples are required for cadmium per the ICs discussed in Section 3 of the SMP. Blind field duplicates will be collected at a frequency of one per 20 samples.

The default field duplicate precision (RPD) objective is ≤50% percent RPD for all matrices where the sample concentration is at least two times the reporting limit. Where the analyte is detected in both samples but the concentration is less than 2 times the reporting limit, precision is assessed by the absolute difference, which should be less than the reporting limit. The RPD is not calculable when the analyte is not detected in one or both analyses. A more detailed discussion of the calculation is provided in Section 4.2.2 (Precision), above.

### 4.3.2 Temperature Blanks

A temperature blank will be used to measure the temperature of liquid samples. If used, temperature blanks will be supplied by the analytical laboratory. If multiple coolers are necessary to store and transport samples, each cooler will contain an individual temperature blank.

## 4.4 Laboratory Quality Assurance

### 4.4.1 Method Blanks

A method blank is laboratory water on which every step of the method is performed and analyzed along with the samples. Method blanks are used to assess the background variability of the method and to assess the introduction of contamination to the samples by the method, technique, or instruments as the sample is prepared and analyzed in the laboratory. Method blanks will be analyzed at a frequency of one for every 20 samples analyzed or as otherwise specified in the analytical protocol.

### 4.4.2 Spiked Samples

Two types of spiked samples will be prepared and analyzed as quality controls for any soil samples collected for cadmium analysis per the ICs discussed in the SMP: matrix spikes and matrix spike duplicates (MS/MSD), which are analyzed to evaluate instrument and method performance and performance on samples of similar matrix. Additional sample volume will be provided to the laboratory by the project sampling team at a frequency of one for every 20 samples to allow for the MS/MSD analysis. In addition, matrix spike blanks (MSBs) will also be prepared and analyzed by the laboratory as required.

### 4.4.3 Laboratory Control Sample

A fortified clean matrix (laboratory control sample or LCS) is analyzed with each analysis. In some cases a “Laboratory-Fortified Blank” (LFB) may serve as the LCS. These samples generally consist of a standard aqueous or solid matrix fortified with the analytes of interest for single-analyte methods and selected analytes for multi-analyte methods according to the appropriate analytical method. The LCS may be analyzed in duplicate for some methods (LCSD). The analyte recovery from each analysis (LCS and LCSD) is used to monitor analytical accuracy. Analytical precision can be assessed from evaluation of the LCS/LCSD in the same manner as the MS/MSD.

# 5. EQUIPMENT CALIBRATION AND MAINTENANCE PROCEDURES

Quality assurance for instrumentation and equipment used for a project is controlled by a formal calibration program, which verifies that equipment is of the proper type, range, accuracy, and precision to provide data compatible with specified requirements. Instruments and equipment that measure a quantity or performance expected at a stated level are subject to calibration. Calibration is performed using reference standards or externally by calibration agencies or equipment manufacturers.

## 5.1 Laboratory Equipment Calibration

Laboratory equipment will be calibrated according to the method-specific requirements of the 2005 NYSDEC ASP, Exhibit E, Parts II and III and maintained following professional judgment and the manufacturer's specifications and additional requirements as specified in the ELAP certification manual.

### 5.1.1 Calibration Procedure

Written procedures are used for all instruments and equipment subject to calibration. For chemical analyses potentially performed for the site management activities, the calibration procedures are specified in the methods as compiled in the ASP. If established procedures are not available, a procedure is developed considering the type of equipment, stability characteristics of the equipment, required accuracy, and the effect of operational error on the quantities measured.

### 5.1.2 Calibration Frequency

Calibration frequency is based on the type of equipment, inherent stability, manufacturer's recommendations, values provided in recognized standards, intended data use, specified analytical methods, effect of error upon the measurement process, and prior experience.

### 5.1.3 Calibration Reference Standards

Two types of reference standards will be used by the laboratory for calibration, including:

- Physical standards, such as weights for calibrating balances and certified thermometers for calibrating working thermometers, refrigerators and ovens, are generally used for periodic calibration; and

- Chemical standards, such as Standard Reference Materials (SRMs) provided by the NIST or USEPA, may also include vendor-certified materials traceable to NIST or USEPA SRMs. These are primarily used for operational calibration.

### 5.1.4 Calibration Failure

Equipment that cannot be calibrated or becomes inoperable is removed from service. Such equipment must be repaired and satisfactorily recalibrated before re-use. For laboratory equipment that fails calibration, analysis cannot proceed until appropriate corrective action is taken and the analyst achieves an acceptable calibration.

Laboratory managers are responsible for development and implementation of a contingency plan for major equipment failure. The plan includes guidelines on waiting for repairs, use of other instrumentation, subcontracting analyses, and evaluating scheduled priorities.

### 5.1.5 Calibration Records

Records are prepared and maintained for each piece of equipment subject to calibration. Records demonstrating accuracy of preparation, stability, and proof of continuity of reference standards are also maintained. Copies of the raw calibration data are kept with the analytical sample data.

## 5.2 Operational Calibration

Operational calibration is generally performed as part of the analytical procedure and refers to those operations in which instrument response (in its broadest interpretation) is related to analyte concentration. Included are the preparation of a standard response (calibration) curve and often the analysis of blanks.

Preparation of a standard calibration curve is accomplished by the analysis of calibration standards, which are prepared by adding the analyte(s) of interest to the solvent that is introduced into the instrument. The concentrations of the calibration standards are chosen to cover the working range of the instrument or method. For most methods, five calibration standards are used, with the concentration of the lowest calibration standard being the reporting or quantitation limit for that analysis. Sample measurements are made and reported within this working range. Apparent concentrations which exceed the high end of the calibrated range ("E"-flagged data for organic analyses) are diluted (or a smaller sample is used) and re-analyzed. The calibration curve is prepared by plotting or performing a linear regression of the instrument responses against the analyte concentration.

# 6. DATA REDUCTION, VALIDATION, AND REPORTING

The guidance followed to perform quality data validation, and the methods and procedures outlined herein and elsewhere in the SMP and its attachments pertain to initiating and performing data validation, as well as reviewing data validation performed by others (if applicable). An outline of the data validation process is presented here, followed by a description of data validation review summaries.

## 6.1 Laboratory Data Reporting and Reduction

Data reduction is the process by which raw analytical data generated from laboratory instrument systems is converted into usable concentrations. The raw data, which may take the form of area counts, instrument responses, or observations, are processed by the laboratory and converted into concentrations expressed in the parts per million (mg/kg or mg/L) or parts per billion (µg/kg or µg/L) range. Raw data from these systems include compound identifications, concentrations, retention times, and data system print-outs. Raw data are usually reported in graphic form, bar graph form, or tabular form. The laboratory will follow standard operating procedures consistent with the data handling requirements of the applicable methods.

The laboratory will meet the applicable documentation, data reduction, and reporting protocols as specified in the 2005 revision of the NYSDEC ASP. ASP Deliverables are either Category B (full deliverables; similar to USEPA CLP requirements) or Category A (a reduced deliverable level). For the site management activities, Category B deliverables are the default and will be provided for all deliverables generated for the project unless explicitly indicated otherwise.

To meet NYSDEC electronic data deliverable (EDD) requirements, the contracted laboratory for this work will be required to submit electronic deliverables in an EQuIS 4-file format. AECOM personnel will be responsible for submitting a final EQuIS deliverable to NYSDEC that meets NYSDEC EDD requirements.

In addition to the hard copy of the data report, the laboratory will be asked to provide the sample data in spreadsheet form (submitted electronically or on computer diskette). The data spreadsheet will be generated to the extent possible directly from the laboratory's electronic files or information management system to minimize possible transcription errors resulting from the manual transcription of data.

## 6.2 Data Validation

Data generated for this site will be validated by a third-party subcontractor (not affiliated with the laboratory, AECOM, or Lockheed Martin). The validator will follow guidelines established in the USEPA Region 2 SOPs applicable to the analytical method(s) being reviewed. These SOPs are checklists which are designed to formally and rigorously assess the quality and completeness of SW-846 analysis data packages. The use of these USEPA SOPs will be adapted to conform to the specific requirements of the NYSDEC ASP (e.g., NYSDEC/ASP holding times; matrix spike blank requirements). Where necessary and appropriate, supplemental validation criteria may be derived from the EPA Functional Guidelines (USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, EPA-540-R-10-011, January 2010, and the National Functional Guidelines for Organic Data Review, EPA-540-R-08-01, June 2008).

Data Usability Summary Reports (DUSRs) will consist of text results of the review. Validation will consist of target and non-target compounds with corresponding method blank data, spike and surrogate recoveries, sample data, and a final note of validation decision or qualification, along with any pertinent footnote references. Qualifiers applied to the data will be documented in the report text. Where QC failures caused the laboratory to perform a re-analysis, the data validator will make a recommendation as to which of the two analyses should be used. Data review will also include an assessment of sensitivity (i.e., are reporting limits appropriate to determine if contaminants are present at or above action levels or other applicable threshold values).

There may be some analyses for which there is no established USEPA or NYSDEC data validation protocol. In such cases, validation will be based on the Region 2 SOPs and EPA Functional Guidelines as much as possible, as well as the laboratory's adherence to the technical requirements of the method, and the professional judgment of the validator. The degree of rigor in such validation will correspond to the nature of the data and the significance of the data and its intended use.

## 6.3 Field Data Verification

Verification of field data will be performed at two different levels. The first level of data verification will be performed at the time of collection by following standard procedures and QC checks. The second level of review consists of the Project Manager, or other competent personnel, reviewing the data to confirm that the correct values and units have been included. After data reduction into tables is complete, the Project Manager will review field reports for reasonableness and completeness and will validate subjective field and technical data.

# 7. PERFORMANCE AND SYSTEM AUDITS

Audits are systematic checks to determine the quality of operation of some activity or function in the field or laboratory. Two types of field audits may be conducted to verify adherence to proper field and sampling procedures:

- Performance audits are independent safety and health, procedure, and/or sample checks made by a supervisor or auditor to arrive at a quantitative measure of the quality of the data produced by one section or the entire measurement process; and

- System audits are onsite qualitative inspections and reviews of the QA system used by some part of or the entire measurement system. The audits are performed against the QAPP. A checklist is typically generated from the requirements and becomes the basis for the audit. The results of any deficiencies noted during the audit are summarized in an audit report.

Laboratory performance and system audits are performed by the laboratory's QA staff to assess the effectiveness of the quality system. These internal audits are performed on a routine basis. Audits are

also performed by certifying agencies. Audit reports and corrective actions are available to NYSDEC for review.

## 7.1 Laboratory Performance and System Audits

The laboratory selected for this project has been verified to be certified by the NYSDOH Environmental Laboratory Approval Program for the matrices and analytical protocols to be used. Therefore, no project-specific audit of the laboratory(s) will be performed unless warranted by a problem(s) that cannot be resolved by any other means, or at the discretion of AECOM.

## 7.2 Audit Procedures

Prior to an audit, the designated lead auditor will prepare an audit checklist. During an audit and upon its completion, the auditor(s) will discuss the findings with the individuals audited and discuss and agree on corrective actions to be initiated. The auditor will then prepare and submit an audit report to the manager of the audited group and the project manager.

The manager of the audited group will then prepare and submit, to the Project Manager, a plan for implementing the corrective action to be taken on non-conformances indicated in the audit report, the date by which such corrective action will be completed, and actions taken to prevent reoccurrence. If the corrective action has been completed, supporting documentation should be attached to the reply. The auditor will ascertain (by re-audit or other means) if appropriate and timely corrective action has been implemented.

Records of audits will be maintained in the project files.

## 7.3 Audit Documentation

A checklist will be completed during each audit so that the previously defined scope of the individual audits is accomplished and that the audits follow established procedures. The checklist will detail the activities to be executed as part of the auditing plan. Audit checklists will be prepared in advance and will be available for review. Following each system and performance audit, the auditor will prepare a report to document the findings of the specific audit.

# 8. CORRECTIVE ACTIONS

If instrument performance or data fall outside acceptable limits, corrective actions will be taken. These actions may include recalibration or standardization of instruments, acquiring new standards, replacing equipment, repairing equipment, and reanalyzing samples or redoing sections of work.

Situations related to the site management activities requiring corrective action will be documented and made part of the project file. For each measurement system identified requiring corrective action, the responsible individual for initiating the corrective action, and also the individual responsible for approving the corrective action, if necessary, will be identified.

As part of its quality management system (QMS) program, AECOM provides relevant excerpts and conclusions from data validation reports to the analytical laboratories. The laboratories are therefore made aware of non-critical items and areas where improvement may be made in subsequent project-related work.

The objectives of the corrective action procedures presented below are to ensure that recognized errors in performance of sample and data acquisition lead to effective remedial measures and that those steps are documented to provide assurance that any data quality deficiencies are recognized in later interpretation and are not recurrent.

## 8.1 Rationale

Many times corrective measures are undertaken in a timely and effective fashion but go undocumented. In other cases, corrective actions are of a complex nature and may require scheduled interactions between departmental groups. In either case, documentation in a formal or informal sense can reinforce the effectiveness and duration of the corrective measures taken.

## 8.2 Corrective Action Methods

### 8.2.1 Immediate Corrective Actions

Immediate corrective actions are of a minor or routine nature such as correcting malfunctioning equipment, correction of data transcription errors, and other such activities routinely made in the field, laboratory, or office by technicians, analysts, and other project staff.

### 8.2.2 Long-Term Corrective Actions

Long-term corrective action will be used to identify and eliminate causes of non-conformances which are of a complex nature and that are formally reported between management groups.

### 8.2.3 Corrective Action Steps

For long-term corrective actions, steps comprising closed-loop corrective action system are as follows:

- Define the problem;
- Assign responsibility for investigating the problem;
- Investigate and determine the cause of the problem;
- Determine a corrective action to eliminate the problem;
- Assign and accept responsibility for implementing the corrective action; and
- Verify that the corrective action has eliminated the problem.

Non-conformance events associated with analytical work are documented by the laboratories' Non-Conformance Records, which are reviewed and approved by the laboratory's Quality Assurance Manager.

### 8.2.4 Audit-Based Non-Conformances

Following audits, corrective actions are initiated if required by documenting the audit finding and recommended corrective action on an Audit Finding Report.

## 8.3 Corrective Action Report Review and Filing

Immediate and long-term corrective actions require review to assure that during the time of non-conformance, erroneous data were not generated or that, if possible, correct data were acquired instead. Such confirmation and review is the responsibility of the supervisor of the staff implementing the corrective action. Confirmation will be acknowledged by notation and dated signature on the affected data record or appropriate form or by memorandum to AECOM project management.

# 9. REFERENCES


NYSDEC, 2010a. *Technical Guidance for Site Investigation and Remediation. Draft. DER-10*. Division of Environmental Remediation. December.

NYSDEC, 2010b. CP-51 / *Soil Cleanup Guidance.* October.

New York State Department of Environmental Conservation (NYSDEC), 2005. *Analytical Services Protocol (ASP) Manual*. July.

NYSDOH ELAP Web site. http://www.wadsworth.orglabcert/elap

USEPA Region 2, Standard Operating Procedures for Data Review. Available at http://www.epa.gov/region02/qa/documents.htm#sop.

USEPA, 1986. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, Third edition. EPA SW-846. With revisions and updates through March, 2009. Accessed on line (at "SW-846 On-Line") at http://www.epa.gov/epaoswer/hazwaste/test/main.htm

USEPA, 1988. Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA. USEPA Office of Emergency and Remedial Response. OSWER Directive No. 355.3-01. October.

USEPA, 2010. Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, EPA 540/R-10-011. January.

USEPA, 2008. Contract Laboratory Program National Functional Guidelines for Organic Data Review, EPA/540/R-08-01. June.

## Table 1. Sample Bottle, Volume, Preservation, and Holding Time Summary

| MATRIX/ANALYSIS | Sample Prep Method [1] | Analytical Method [(2)] | Sample Bottles (3) | | | | Minimum | Preservation | Holding Time (4, 5) | | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Mat'l | Size | Qty | Source | Vol Rqd | (4) | Extraction | Analysis | |
| **Soil Samples** | | | | | | | | | | | |
| Volatile Organics | SW 846 5035 | SW 846 8260B | Encore | 5 or 25 g | 3 or 1 | Vendor [7] | 5 g | None | NA | 48 hours [8] | |
| Semivolatile Organics | SW 846 3540C/3541/3545C | SW 846 8270C | G | 8 oz [(6)] | 1 | Lab | 30 g | None | 14 days | 40 days | |
| Pesticides | SW 846 3540C/3541/3545C | SW 846 8081A | G | 8 oz [(6)] | 1 | Lab | 30 g | None | 14 days | 40 days | |
| PCBs | SW 846 3540C/3541/3545C | SW 846 8082 | G | 8 oz [(6)] | 1 | Lab | 30 g | None | 14 days | 40 days | |
| Metals (except mercury) | SW 846 3050B/3051/3052 | SW 846 6010B | G | 8 oz [(6)] | 1 | Lab | 10 g | None | NA | 180 days | 180 days for TAL metals except Hg. |
| Mercury | SW 846 7471A | SW 846 7471A | G | 8 oz [(6)] | 1 | Lab | 2 g | None | NA | 28 days | 28 days for Hg. |
| **Biological Samples** | | | | | | | | | | | |
| Cadmium | SW 846 3050B | SW 846 6020A | G or Ziploc® | NA | 1 | NA | 20 g | -20 ° C during lab storage | NA | 180 days | |

(1) Laboratory may propose alternate extraction/preparation methods, subject to AECOM approval.
(2) More recent versions of SW-846 methods may be used subject to AECOM approval.
(3) EnCore samplers for VOCs in soil will be provided by laboratory or AECOM on a case-by-case basis.
(4) All samples for chemical analysis should be held at 4 degrees C in addition to any chemical preservation required.
(5) Holding time calculated from day of collection, unless noted as being from time of extraction. Laboratory holding times (ASP 2005, Exhibit I) are two days shorter to allow for field handling and shipping.
(6) A single 8-oz sample is sufficient for SVOCs, pesticides, PCBs, and metals.
(7) Encore samplers are typically purchased from an outside supplier by AECOM but may also be requested (for a fee) from the analytical laboratory.
(8) Encore samplers must be prepared/preserved in the laboratory within 48 hours of collection. Soil samples in glass bottles and preserved Encores have a 14 day (total) holding time.

G = Glass
SW-846: Test Methods for Evaluating Solid Waste, Physical/Chemical Methods. USEPA SW-846. Complete through Update IV, March 2009.
EPA = Compendium of Methods for the Determination of Toxic Organics in Air, Second Edition (EPA/625/R-96/010b; 1999)

## Table 2. Reporting Limits and QA/QC Sample Quantity Summary

| MATRIX/ANALYSIS | Analytical Method | Laboratory | Reporting Limit -Typical (units as specified) [1] | Field Sample Quantity | Matrix Spike (MS) or LCS [2] | MS Duplicate or Matrix Duplicate [2] | Field Duplicate [2] | Equipment Blank | Trip Blank | Total Billable Analyses |
|---|---|---|---|---|---|---|---|---|---|---|
| **Soil Samples** | | | | | | | | | | |
| Volatile organics | SW 846 8260B | TBD | 5 µg/kg (typical) | TBD | TBD | TBD | TBD | NA | NA | TBD |
| Semivolatile organics | SW 846 8270C | TBD | 330 µg/kg (typical) | TBD | TBD | TBD | TBD | NA | NA | TBD |
| Pesticides | SW 846 8081A | TBD | 1.7-3.3 µg/kg (typical) | TBD | TBD | TBD | TBD | NA | NA | TBD |
| PCBs | SW 846 8082 | TBD | 57 - 70 µg/kg | TBD | TBD | TBD | TBD | NA | NA | TBD |
| Metals (TAL except Hg) | SW 846 6010B | TBD | Analyte-specific | TBD | TBD | TBD | TBD | NA | NA | TBD |
| Mercury | SW 846 7471A | TBD | 0.2 µg/kg | TBD | TBD | TBD | TBD | NA | NA | TBD |
| **Biological Samples** | | | | | | | | | | |
| Cadmium | SW 846 6020A | TBD | 0.1 mg/kg | 15 per event | NA | NA | NA | NA | NA | 15 per event |

TAL = Target Analyte List (23 Metals)
TBD = To be determined.
NA-Not anticipated to be required during site management activities.

Notes
1 Reporting limits for soils, when adjusted for dry weight, will be higher. Detections above the MDL but less than reporting limits will be reported and flagged estimated (J).
2 Matrix spike, matrix spike duplicates, and field duplicates will be collected at a frequency of 1 per 20 samples.

# APPENDIX H

## Health and Safety Plan

# Universal
# Health and Safety Plan

**For use on all high-risk, industrial and HAZWOPER projects**

Includes control measures for the Coronavirus Pandemic




# Lockheed Martin Corporation

Bloody Brook – Onondaga County
Liverpool, NY 13088
USA

**Project Number: 60624670**

Project Name: Bloody Brook

Prepared for

**Lockheed Martin**
497 Electronics Parkway, Bldg. EP-6, Rm, 100B
Liverpool, NY 13088
USA

Prepared by

AECOM

| | | |
|---|---|---|
| Prepared By:<br>Wendy Smith<br>SH&E Specialist II | Wendy Smith<br>Signature | 1/23/2021<br>Date Prepared |
| Reviewed By:<br>Scott Dietz<br>SH&E Manager | Scott J. Dietz<br>Signature | 2/25/2021<br>Date Reviewed |
| Approved By:<br>Kelly Lurie<br>Project Manager] | Kelly Lurie<br>Signature | 3/1/2021<br>Date Approved |

| | |
|---|---|
| Expiration: 25-January-2022 | Valid for one (1) year maximum or until the scope of work, subcontractor(s), methods and/or equipment change. |

# HASP SUMMARY

Note: This Summary is intended to provide key information only and cannot be substituted for reading, understanding, and complying with the full HASP, including the Emergency response section. This summary may be continually updated as tasks and personnel change. Use Continuation Sheets if necessary.

| | | | |
|---|---|---|---|
| **Project Name:** | Bloody Brook | **Project Number:** | 60624670 |
| **Client Name:** | Lockheed Martin Corporation | | |

| **SH&E INCIDENT REPORTING** |
|---|
| **DCS Americas Incident Hotline 1-800-348-5046**<br>TOLL-FREE \| 24 HOURS PER DAY \| 7 DAYS PER WEEK |
| Immediately report injuries, illnesses, property damage, security issues, regulatory inspections, environmental impacts/spills, and any potentially work-related injury, illness, discomfort/pain or damage. |

| **MEDICAL TREATMENT RESOURCES** |
|---|
| Identify the nearest Occupational Clinic and Hospital to the site that accepts AECOM Workers Compensation Insurance (see **Attachment A** for instructions). If the they are an unreasonable distance from the site, identify nearer hospitals or clinics. Attach maps and directions to the clinics and hospitals in **Attachment A**. |

| **AECOM Occupational Nurse** |
|---|
| **1-512-419-5016** *24 HOURS PER DAY \| 7 DAYS PER WEEK* |

| **Nearest Occupational Clinic** | | | |
|---|---|---|---|
| **Name:** | **North Medical Urgent Care** | **Phone Number:** | **315-452-2333** |
| **Address:** | 5100 West Taft Rd., North Syracuse, NY 13212 | | |
| **Hours of Operation:** | 8am-5pm | | |

| **Nearest Hospital** | | | |
|---|---|---|---|
| **Name:** | Upstate Medical Center ER | **Phone Number:** | **315-464-5611** |
| **Address:** | 750 E. Adams St., Syracuse, NY 13210 | | |

| **KEY PERSONNEL** | | | |
|---|---|---|---|
| **Project Manager (PM):** | Kelly Lurie | **Contact No.:** | 518-542-2944 |
| **Site Supervisor (SS):** | TBD per staffing | **Contact No.:** | |
| **Safety Officer (SSO):** | TBD per staffing and availability | **Contact No.:** | |
| **Regional SH&E Manager** | Lisa Rygiel (Environment) Contact No:720-621-2211 | | |
| **Area SH&E Manager:** | Pete Wray (EBL Northeast) Contact No:302-781-5872 | | |
| **Account SH&E Manager:** | Scott Dietz (Lockheed Martin Corporation) Contact No:240-344-5892 | | |
| **Client PM:** | Jill Fonte | **Contact No.:** | 315-944-8082 |
| NOTES: D – Direct Office Number O – General Office Number M – Mobile Device Number R – Radio Channel | | | |

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| **Short Service Employees (AECOM and Subcontractors)**<br>**< 6 months with Company in Current Job Description** | | ☐ **Yes, see table below for details**<br>☒ **None, not applicable** | |
|---|---|---|---|
| **Name** | **Company** | **Mentor** | **Mentor's Phone Number** |
| | | | |
| | | | |
| NOTES: D – Direct Office Number O – General Office Number M – Mobile Device Number R – Radio Channel | | | |

| **Subcontractors (List All)** | | ☐ **Yes, see table below for details**<br>☒ **None, not applicable** | |
|---|---|---|---|
| **Company Name** | **Task(s)** | **Site Safety Officer** | **SSO's Phone Number** |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| NOTES: D – Direct Office Number O – General Office Number M – Mobile Device Number R – Radio Channel | | | |

PM must positively verify subcontractors are approved in Subport (or by an equivalent evaluation process) for the work described. If there were any limitations/ conditions of approval, describe them below and how they are being met including the following (where applicable):

- ☐ Copy of their Corporate Safety Management Manual
- ☐ Copy of their Project/Site-specific health and safety plan
- ☐ Copy of task specific THAs/JHAs and daily inspection/tailgate forms
- ☐ Copy of their Pre-Qualification form
- ☐ Copy of their latest Workers Compensation Board (WCB) documents
- ☐ Copy of the signed contract
- ☐ Copy of their business license and training certificates (task specific)
- ☐ Other (Describe)

☐ I have verified that all subcontractors are approved in Subport (or equivalent), and that all conditions of approval are met.

| Project Manager Name | Project Manager Signature | Date |
|---|---|---|

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## Attachments

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Attachment B: THA Forms, and Tailgate Safety Meeting Form
Attachment C. AECOM SHE Procedures
Attachment D. Stretch/Flex Poster
Attachment E: Site Orientation
Attachment F Lockheed Martin Environmental, Safety, and Health Contractor Manual

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# REVISION LOG

| Template Revisions | | | |
|---|---|---|---|
| Version | Revised By | Date | Details of Revision |
| 1.0 | Alberto Munuera, Patrick Walz, & Gregg Ferris | 14 FEB 2020 | Initial Version, merging and replacing previous template documents (HAZWOPER HASP and Industrial/Project HASP) |
| 1.1 | Patrick Walz & Alberto Munuera | 26 MAR 2020 | Modified to add Coronavirus prevention and response guidelines |
| 1.2 | Tim Gilles, Kelly Dwyer, Scott Dietz, Lisa Rygiel, & Maria Hunt | 28 MAY 2020 | Formatting and grammar correction. Customized for universal use on high risk, Industrial and HAZWOPER projects |
| | | | |
| | | | |

| Project-Specific Revisions | | | |
|---|---|---|---|
| Version | Revised By | Date | Details of Revision |
| 0 | | | None – Original Site Health and Safety Plan |
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |

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# 1. INTRODUCTION

This written Health and Safety Plan (HASP) is designed to identify, evaluate, and control safety and health hazards, and to outline emergency response actions for AECOM-managed activities. This HASP is a component of the Site Management Plan (SMP) and must be kept on site during work activities and made available to all workers including subcontractors and other site occupants for informational purposes. AECOM subcontractors are expected to independently characterize, assess, and control site hazards created by their specific scope of work. At this time, the use of subcontractors for the current scope of work is not anticipated.

This section of the HASP summarizes important AECOM SH&E Procedures that apply to all Design and Consulting Services (DCS) Americas jobs. See **Attachment B** for the Project Task Hazard Assessment (THA) forms and **Attachment C** for complete copies of applicable field SH&E Procedures.

## 1.1 Applicable References

This HASP conforms to the regulatory requirements and guidelines established in the following documents:

- Federal Occupational Safety and Health Administration (OSHA) Code of Federal Regulation Title 29, Part 1910 (29 CFR Part 1910), Safety and Health Regulations for General Industry and 29 CFR 1926, Safety and Health Regulations for Construction.
- National Institute for Occupational Safety and Health/Occupational Safety and Hazards Administration/U.S. Coast Guard/U.S. Environmental Protection Agency, Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities, Publication No. 85-115, 1985.
- The requirements in this HASP also conform to AECOM's Safety for Life Program requirements as specified in the AECOM Safety, Health and Environment (SH&E) Manual.

## 1.2 Project Assumptions

- This is a Client-controlled site and AECOM is responsible for control of our immediate work area(s) only.
- No confined spaces will be entered on this project.
- No excavations will be entered.
- No work at heights (with fall protection) will be performed.
- Work will be performed during daylight hours.
- No subcontractors will be needed to complete current scope of work.

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# 2. SITE DESCRIPTION

The "site" is defined as West Branch of Bloody Brook (WBBB) and Bloody Brook and the surrounding area commencing on the southern boundary of the New York State Thruway and ending at 911 Old Liverpool Road. Access to the work areas for ingress and egress of personnel and equipment, if needed, will be from public roadways, public property, and private properties. Annual site inspections, as detailed in the SMP, will typically be completed from the Bloody Brook Drainage District. The public roadway access points include Brookview Lane, Sunflower Drive, Floradale Road, Pearl Street, and Old Liverpool Road. The Drainage District and individually owned private property may also be used to access the site. Access from private properties will be arranged with the appropriate parties prior to commencing work

## 2.1 Site Background/History

AECOM conducted environmental remediation construction services to remove elevated levels of cadmium detected in soil and sediment at the Bloody Brook site between 2014 and 2017. After completion of the remedial work, some contamination was left at the site, requiring that post-remedial site management activities be initiated to ensure the remedy continues to be protective as designed and constructed.

### 2.1.1 Scope of Work

See SMP for detailed discussion of anticipated scope of work to be completed as part of site maintenance.

### 2.1.2 Project Scope and Objective(s)

AECOM will be performing activities related to site management following remedial activities completed at the site. Planned and potential activities related to site management include:

- Site walks and inspections for erosion and vegetation;
- Potential installation of erosion controls;
- Collection of aquatic biological samples for cadmium analysis;
- Potential erosion repairs (e.g., removing and replacing riprap (light stone fill), topsoil replacement, etc.); and
- Work in wetland area (e.g., manual removal of *Phragmites* and other vegetative invasive species, inspecting, planting, and watering shrubs and trees).

### 2.1.3 Risk Register

The following tasks will be performed to achieve the project objective(s). A Task Hazard Assessment (THA) for each operation being performed by AECOM must be included in **Appendix B**, while those performed by managed subcontractors must be prepared by the subcontractor. Oversight of managed subcontractor activities is considered a discrete AECOM task and shall also be listed below. The use of subcontractors is not anticipated for the current scope of work.

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| Task Name | Permit(s) Required | | Task Performed By | | |
|---|---|---|---|---|---|
| | | | AECOM | SUB | Third-Party |
| Coronavirus Precautions THA | ☐ Yes | ☒ No | ☒ | ☐ | ☐ |
| Wetland Monitoring and Inspection THA | ☐ Yes | ☒ No | ☒ | ☐ | ☐ |
| Maintenance of Planting THA | ☐ Yes | ☒ No | ☒ | ☐ | ☐ |
| Collection of Biological Samples | ☒ Yes | ☐ No | ☒ | ☐ | ☐ |
| | ☐ Yes | ☐ No | ☐ | ☐ | ☐ |
| | ☐ Yes | ☐ No | ☐ | ☐ | ☐ |
| | ☐ Yes | ☐ No | ☐ | ☐ | ☐ |
| | ☐ Yes | ☐ No | ☐ | ☐ | ☐ |

## 2.1.4 Scope of Work Risk Assessment

| | | |
|---|---|---|
| ☒ | **Low Risk** | Examples: Non-intrusive work, occasional exposure and/or low risk hazards |
| ☐ | **Medium Risk** | Examples: Intrusive work, heavy equipment use, frequent exposure and/or moderate hazards |
| ☐ | **High Risk** | Examples: Complicated scope, large/multiple work crews, and/or constant exposure to hazards |

In general, the following tasks are considered High Potential (HiPo), as identified in S3AM-209-PR, Risk Assessment, based on the factors contributing to the severity and probability of credible outcomes resulting from ineffective mitigation of their hazards. Additional tasks or activities could be added to the list below based on a similar assessment of their hazards and associated control measures. No HiPo tasks will be required to complete the approved scope of work.

| | | | |
|---|---|---|---|
| ☐ | Working at heights > 4 ft (including aerial lifts, snooper trucks, scaffolds) | ☐ | Working in a controlled area |
| ☐ | Working in a confined space | ☐ | Extreme heat or cold stress environments |
| ☐ | Working in a trench or excavation | ☐ | Working with power tools/equipment (drill, chain saw, grinder, etc.) |
| ☐ | Performing tasks requiring lock out/tag out | ☐ | Working with/operating heavy equipment or machinery, including drill rigs |
| ☐ | Work on energized equipment | ☐ | Working in isolation from first aid services or immediate/emergency assistance |
| ☐ | Working with electricity | ☐ | Working around mobile equipment |
| ☐ | Working with hazardous substances or materials (including all HAZWOPER projects) | ☐ | Exposure to vehicular traffic (highways, roads, parking lots) |
| ☐ | Working with material under pressure | ☐ | All-Terrain Vehicle Work |
| ☐ | Working where there is a possible threat of violence, including civil unrest | ☐ | Working on Railroads or within 25 Feet of Tracks |
| ☐ | Working in avalanche areas | ☐ | Any activity/task involving non-voluntary use of respiratory protection, including for site access |
| ☐ | Working on or over water or ice | ☐ | Working with people diagnosed with coronavirus or other pandemic diseases |
| ☒ | Working in remote or wilderness isolation | ☐ | Other HiPo Task(s) [specify]: |

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The following AECOM procedures provide task specific permit requirements and shall be consulted if applicable to the scope of work *(S3AM-218-PR)*:

| | | | |
|---|---|---|---|
| ☐ | S3AM-120-PR, Radiation | ☐ | S3AM-304-PR, Fall Protection |
| ☐ | S3AM-209-PR, Risk Assessment & Management | ☐ | S3AM-310-PR, Cranes & Lifting Devices |
| ☐ | S3AM-301-PR, Confined Spaces | ☐ | S3AM-325-PR, Lockout Tagout |
| ☐ | S3AM-302-PR, Electrical Safety | ☐ | S3AM-330-PR, Underground Work |
| ☐ | S3AM-303-PR, Excavation | ☐ | S3AM-332-PR, Hot Work |

## 2.2 Cleaning/Disinfecting, Housekeeping and Personal Hygiene

During the Pandemic, AECOM has identified three basic levels of cleaning that are described in our AECOM Pandemic Procedure. AECOM also requires that each location develop a Touch Point Cleaning program. Each project site shall implement a touch point cleaning program to minimize the transmission of the virus through environmental sources, specifically hard surfaces or "touch points." It is recommended that each site develop a checklist to identify the touch points specific to the site. The checklist can be initialed, dated, and signed for each touch point item to document the cleaning process. This cleaning should be conducted daily or more often as needed/desired. Contract a service or designate a person(s) and/or develop a schedule for cleaning responsibilities. Common touch points are listed below:

- Light Switches
- Equipment controls
- Cabinet and file drawer knobs/handles.
- Vending machines
- Chair arms
- Copier/printer/fax control buttons
- Shared desks and keyboards
- Shared tools and equipment
- Garage access buttons
- Handrails
- Doorknobs/handles
- Elevator buttons
- Sinks and Faucets
- Counter tops
- Tabletops
- Coffee pots
- Refrigerator
- Microwave
- Water dispensers
- Windowsills
- Portable toilet commonly touched areas
- Personal protective equipment (PPE) items

Basic housekeeping requirements for offices and work sites, as well as personal hygiene and sanitation standards can be found in S3AM-013-PR Housekeeping. Inspections will be performed at the regular interval specified below. The housekeeping inspection form S3AM-013-FM1 is available for use. Complete the table below regarding site-specific Housekeeping and Personal Hygiene requirements:

| | | |
|---|---|---|
| **Cleaning/ Disinfecting** | ***Frequency:*** | Remote site – N/A |
| | ***Responsible Party:*** | |
| **Housekeeping:** | ***Inspection Frequency:*** | As applicable by whoever is at site |
| | ***Inspector:*** | |

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| | |
|---|---|
| **Eating, Drinking, Smoking:** | Permitted only in designated area(s) located **OFF SITE – No Smoking on LMC properties** |
| **Handwashing:** | Water, soap, and paper towels or equivalent supplies are located in employee(s) vehicle(s). Site staff will wash hands and face after completing work activities and prior to breaks or meals. |
| **Toilets:** | **Toilets** are located **at the gas station at the corner of Electronics Parkway and 7th North St.**<br>*NOTE: A minimum of one toilet must be provided for every 20 personnel on site. For mobile crews where work activities and locations permit transportation to nearby toilet facilities, on-site facilities are **NOT** required.* |
| **Water:** | **Water** is located in employee(s) vehicle(s).<br>A water supply meeting the following requirements will be used:<br>*Potable Water:* An adequate supply of potable water will be available for field personnel consumption. Potable water can be provided in the form of water bottles, canteens, water coolers, or drinking fountains. Disposable drinking cups for single use and a waste receptacle will be provided as needed. Water containers will be refilled daily and disinfected regularly. Potable water containers will be properly identified in order to distinguish them from non-potable water sources.<br>*Non-Potable Water:* Outlets for non-potable water shall be posted or otherwise marked in a manner that will indicate clearly that the water is unsafe and is **NOT** to be used for drinking, washing of the person, cooking, washing of food, washing of cooking or eating utensils, washing of food preparation or processing premises, or personal service rooms, or for washing clothes. **Non-potable water is water that does not meet OSHA's Sanitation standard for potable water.** All containers of non-potable water will be marked with a label stating ***"Non-Potable Water, Not Intended for Drinking Water Consumption"*** |
| **Illumination:** | **Artificial illumination** will not be provided. If natural light or installed lighting fixtures are not sufficient in the work area, toilet, and/or break area, then work activities will cease until adequate lighting is available. |

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# 3. AECOM SAFETY, HEALTH, AND ENVIRONMENT PROGRAM

## 3.1 AECOM Policy

AECOM's Safety, Health and Environment Policy, which establishes the framework to attain best-in-class Safety, Health and Environmental (SH&E) performance in the interest of benefitting AECOM's employees and stakeholder in the global marketplace, is available on AECOM's Ecosystem (intranet).

## 3.2 Safety for Life




"Safety for Life" is a comprehensive integrated AECOM Safety Management System that drives our nearly 100,000 employees toward AECOM's commitment to achieving zero work-related injuries and/or illnesses; preventing damage to property and the environment; and maintaining an environmentally friendly and sustainable workplace. Our Safety for Life program is supported by nine Life Preserving Principles that apply to all AECOM activities.

## 3.3 Life Preserving Principles

AECOM has adopted these "Life-Preserving Principles" to help demonstrate the commitment of our Safety for Life program. We firmly believe these "Life-Preserving Principles" will enable AECOM to achieve its goal of zero employee injuries, property damage and an environmentally friendly and sustainable workplace. The nine Life-Preserving Principles, along with their descriptions, can be found on AECOM's Ecosystem (intranet).

**Commitment:**
Managers will lead on safety, continuously demonstrating commitment to the highest standards.

**Participation:**
All employees are encouraged to engage in helping to control the risks we face.

**Budgeting and Staffing for Safety:**
The costs of managing SH&E are budgeted into every project. Our safety staff are fully trained to provide expert guidance.

**Pre-planning:**
We assess risks and produce detailed plans to control them during design, planning, and execution of work.

**Contractor Management:**
We carefully select and collaborate with all our partners to create a safe working environment.

**Recognition and Rewards:**
Employees are rewarded for safety excellence and we share best practices..

**Orientation and Training:**
Our employees will be provided with effective safety training in order to identify and mitigate hazards in the workplace to prevent injuries to themselves and others who may be affected by their actions.

**Incident Investigation:**
We investigate recordabe incidents and serious near misses to understand the causes and take action to prevent recurrence.

**Fit for Duty:**
All staff come to work each day fit and well, so they do not pose a hazard to themselves or others.

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## 3.4 Driving and Vehicle Safety

The proper operation of vehicles is critical to protecting the safety of AECOM employees and subcontractors. Drivers face numerous hazards while operating vehicles. Some of the hazards include collision with another vehicle, collision with a fixed object, vehicle break down or failure, or falling asleep or becoming otherwise incapacitated while driving. All employees will adhere to Driving procedure S3AM-005-PR, which includes the following key practices:

1. **Authorized Drivers**
   Managers must authorize drivers following evaluation of driver criteria to drive and maintain an AECOM-owned, leased or rented vehicle, a client or customer-owned vehicle, or a personal vehicle operated in the course of conducting AECOM business.

2. **Electronic Devices Prohibited**
   AECOM prohibits use of all portable electronic devices while operating a motor vehicle/ equipment, which includes being stopped at a traffic light or stop sign. Electronic devices include, but are not limited to, all mobile phones, two-way radios, pagers, iPods, MP3s, GPS, DVD players, tablets laptops, and other portable electronic devices that can cause driver distraction. Hands-free device use is **NOT** allowed.

   - GPS units and devices used for navigation may only be used if factory installed or secured to the vehicle with a bracket that allows the driver to view the image without having to take their eyes off the road. Electronic devices shall be setup for operation prior to commencing driving activities and shall **NOT** be changed by the driver while driving.

3. **Vehicle Inspections**
   The driver shall conduct pre-trip vehicle inspections prior to each trip. A vehicle inspection checklist, S3AM-005-FM2, can be used to guide and document the inspection process. Vehicle inspection is to include a 360-degree walk around and visual inspection under the vehicle for leaks and obstructions prior to moving the vehicle.

4. **Training**
   All drivers shall complete defensive driver training. Additional training (i.e., hands-on defensive driver training) may apply for medium and high-risk drivers; see Driving procedure S3AM-005-PR and SHE Training procedure S3AM-003-PR for more details.

5. **Journey Management Plan**
   Drivers who undertake trips in excess of 250 miles (400 kilometers) one way, drive in remote or hazardous areas, or when otherwise deemed necessary, shall develop and document a Journey Management Plan using S3AM-005-FM1 or equivalent.

6. **Secure Loads**
   Cargo is only to be carried within the passenger compartment of a vehicle when segregated and restrained to prevent objects from becoming distractions, obstructions, or projectiles to occupants should emergency vehicle maneuvers be required (e.g., harsh braking or crash). All goods transported on flatbed trucks or in pickup beds must be securely fastened to prevent them from becoming hazards. All applicable laws and regulations regarding securing of loads must be met. It is prudent to check the load after a few miles to ensure that load has not shifted or loosened prior to completing the remainder of the trip.

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**7. Backing Up**

Reversing the vehicle is to be avoided if at all possible. If backing up is necessary, use the following guidelines:

- ✓ Pre-plan all vehicle movements.
- ✓ If the pull-through method of parking is not possible, drivers will scan parking spot/area for hazards and back in; thereby, facilitating departure where the first move is forward.
- ✓ A light tap of the horn should be used to alert others of your intention to back up.
- ✓ Avoid tight spaces.

Vehicles rated over 10,001 pounds (4,536 kilograms) gross vehicular weight are required to have a competent spotter in place when backing. A competent spotter is one that has received spotter training. (For additional requirements pertaining to vehicles in this weight rating, see Commercial Motor Vehicles procedure S3AM-320-PR).

All vehicles shall have a competent spotter in place when backing in an active work zone. Parking and public access areas are recommended but not required to have a spotter.

## 3.5 Fitness for Duty

One of AECOM's nine Life-Preserving Principles is Fitness for Duty (see Fitness for Duty procedure S3AM-008-PR). Fitness for Duty means that individuals are in a state (physical, mental, and emotional) that enables them to perform assignments competently and in a manner that does not threaten the health and safety of themselves or others. On certain projects or for specific tasks, fit for duty certifications may be requested of medical providers by SH&E Managers or Human Resources (HR). Employees should ensure they are fit for duty prior to leaving home and unimpaired by substances or fatigue, and if necessary, contact your supervisor rather than attempting to report to work in unfit condition. Supervisors must observe their employees and work with the employee, SH&E staff, and HR to address deficiencies. AECOM will **NOT** tolerate retaliation against any employee for filing a complaint or concern regarding their fitness for duty or participating in any way in an investigation.

### 3.5.1 Proactive Health

AECOM is committed to promoting proactive health activities in addition to the planning for prevention of safety and environmental incidents. Proactive health activities will be completed on an on-going basis at AECOM on a corporate-wide basis (i.e., the wellness program associated with employee benefits), at offices, and at this project site. Management will be actively involved in providing and encouraging opportunities for health and wellness education and improvement. Health initiatives and education will be discussed periodically during office-based meetings as the safety moment or during the daily tailgate meeting as a toolbox talk. Topics may be related to, but are not limited to, the following:

- ✓ Heart health
- ✓ Smoking cessation
- ✓ Diet
- ✓ Stress management
- ✓ Diabetes prevention
- ✓ Exercise benefits

Topics and educational materials can be located on the AECOM Wellness page, National Institutes of Health website, Centers for Disease Control and Prevention website, and other reputable sources online.

In addition, the field team will be encouraged to participate in a daily stretch and flex routine (a standardized way to avoid soft tissue damage from work activities) to the best of their abilities, given their own personal limits. It is

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particularly beneficial to warm and loosen muscles before repetitive work, manual handling of loads, and when working in cold temperatures or with static postures. The Stretch and Flex manual and poster (**Attachment D**) serve as guidance for the leader to follow.

### 3.5.2 Fatigue

One aspect of fit for duty is fatigue management. AECOM has developed procedures that limit work periods or requires additional rest under certain circumstances, including during long-distance travel or when working at high altitudes. These procedures also set limits on extended work periods of 14 hours per day or 60 hours per week. A fatigue management plan is required if longer working hours are necessary (see Fatigue Management Procedure S3AM-009-PR).

### 3.5.3 Fatigue and Driving Safety

The effect of fatigue is both physiological and psychological and can severely impair a driver's judgement. Fatigue can cause lapses in concentration which could prove fatal. Fatigue is not just a problem for drivers on long trips, as drivers can also suffer from fatigue on short trips.

- ✓ After strenuous fieldwork, consider overnight accommodation or vehicle sharing for staff who are not acclimatized to the type of work.
- ✓ Microsleep can occur with a limited warning, and may be linked to several factors, for example:
    - Microsleep is most likely to occur during times when the circadian rhythm dictates the body should be asleep, such as at dawn, late at night, or in the mid-afternoon (e.g., 1 and 4 am and 1 and 4 pm.).
    - Potential to feel drowsy after a meal.
    - Driving long distances (considered potentially monotonous) even with sufficient sleep.
    - Prolonged sitting and warm ambient temperature may also increase the feeling of sleepiness.
- ✓ If safe to do so, consider undertaking actions to disrupt the microsleep event while identifying a safe place to stop, e.g., open a vehicle window, listen to upbeat music/change music source or ask the passenger (if present) to engage in conversation.
- ✓ Ensure field staff are familiar with the signs of fatigue and mitigation factors.

The most common visible signs of microsleep include the following:

- Eyelid drooping
- Eyelid closure
- Head nodding
- Brief periods of snoring
- Wandering thoughts

If any of the above become apparent, immediately pull over to a safe location and contact your PM or SH&E representative.

### 3.5.4 Substance Abuse

Drug and alcohol abuse pose a serious threat to the health and safety of employees, clients, and the general public as well as the security of our job sites, equipment and facilities. AECOM is committed to the elimination of illegal drug use and alcohol abuse in its workplace and regards any misuse of drugs or alcohol by employees to be

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unacceptable. AECOM Substance Abuse Prevention Procedure (S3AM-019-PR) prohibits the use, possession, presence in the body, manufacture, concealment, transportation, promotion or sale of the following items or substances on company premises. Company premises refer to all property, offices, facilities, land, buildings, structures, fixtures, installations, aircraft, automobiles, vessels, trucks and all other vehicles and equipment - whether owned, leased, or used.

- Illegal drugs (or their metabolites), designer and synthetic drugs, mood or mind altering substances, and drug use related paraphernalia unless authorized for administering currently prescribed medication;
- Controlled substances that are not used in accordance with physician instructions or non-prescribed controlled substances; and
- Alcoholic beverages while at work or while on any customer- or AECOM-controlled property.

This policy does not prohibit lawful use and possession of current medication prescribed in the employee's name or over-the-counter medications. Employees must consult with their health care provider about any prescribed medication's effect on their ability to perform work safely and disclose any restrictions to their supervisor.

Although some states may pass laws legalizing medical or recreational marijuana use, the use, sale, distribution and possession of marijuana are violations of federal law and AECOM policy, and will subject an employee to disciplinary action up to and including termination in accordance with controlling law. In Canada, where medical and recreational marijuana use is legal, employees must still follow Federal and Provincial laws, and AECOM policy with regards to use and possession. Employees found to be in contravention of legal requirements or AECOM policy will be subject to disciplinary action up to and including termination.

## 3.6 Rewards and Recognition

One of AECOM's Life Preserving Principles is Recognition and Rewards for proactive safety, health and environmentally focused behaviors. All projects are expected to participate in the rewards and recognition programs available on the Corporate and DCS Americas SH&E ecosystem pages. Large, long term projects are encouraged to establish a project specific rewards and recognition program which incorporates project specific goals and activities (template available S3AM-020-FM1). ***All rewards and recognition programs must emphasize the 9 Life Preserving Principles and proactive SH&E activities NOT solely the achievement of lagging metrics ("injury/incident-free" hours, etc.) as those may discourage incident reporting.***

There are several possible appropriate methods of rewarding and recognizing employees and contractors:

1. **Informal** – recognition via verbal acknowledgement, email, spot awards, luncheons, etc.
2. **Formal** – recognition via DCS Americas Programs:
   - AECOM Safety Star Recognition Program
   - AECOM Making a Difference (MAD) Award
   - Executive Challenge Coins






## 3.7 Hand Safety

The hands are exposed to hazards more than any body part. SH&E Hand Safety Procedure S3AM-317-PR describes requirements and best practices including these notable practices:

- **All personnel shall have gloves in their immediate possession 100%** of the time when in a shop or on a work site. Gloves that address the hazard shall be worn when employees work with or near any materials or equipment that present the potential for hand injury due to sharp edges, corrosives, flammable and irritating materials, extreme temperatures, splinters, etc. Use the Gloves Needs Assessment (S3AM-317-FM1) to help determine the appropriate glove for the hazard(s).

- **Fixed open-blade knives are prohibited** from use during the course of AECOM work. Examples of fixed open-blade knives include pocket-knives, multi-tools, hunting knives, and standard utility knives. For more information about cutting tools, see S3AM-317-ATT1 Safe Alternative Tools.

## 3.8 Safety Observations

Safety observations are observations made by employees or subcontractors of a condition or behavior which could contribute to an incident, prior to the incident occurring. Observations can also identify positive behaviors or interventions which contribute to the prevention of incidents. Large, long-term projects may benefit from the use of LifeGuard™ to track and trend observations on a site level. All other projects should log their observations using IndustrySafe™. Both reporting systems can be accessed on any safety page of Ecosystem or by using the QR codes below from a smartphone/device while off the AECOM network.

IndustrySafe Safety Management Software

LifeGuard

## 3.9 Newly Hired or Transferred Employees

All newly hired or transferred employees with fewer than 6 months experience working on field projects or an employee who has not completed the required training or received required certifications are considered “Short Service Employees”, or “SSEs” (see the Newly Hired or Transferred Employees procedure, S3AM-015-PR). The Project Manager will identify all SSEs working on the project, and each SSE will be assigned to an experienced team member so all activities may be monitored. All SSEs working or visiting a field environment are required to wear a green hard hat for safety and identification purposes. In the event a client has an existing SSEs program, AECOM will defer to the identification system required by the client. Any new employee shall wear the designated SSE identifier until the Project Manager determines the employee has the knowledge, skills, and ability related to the specific hazard on the project.

The project scope of work does **NOT** currently involve SSEs. If it becomes necessary to use one or more SSEs to complete the project scope of work, then they will be evaluated and approved in advance by the AECOM Project Manager prior to mobilizing to site and listed in this HASP.

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## 3.10 Stop Work Authority

AECOM empowers and expects all employees to exercise their Stop Work Authority (see Stop Work Authority Procedure S3AM-002-PR) if an incident appears imminent, or when hazardous behaviors or conditions are observed. A stop work request can be informal if the situation can be easily corrected or may require shutting down operations if revised procedures are necessary to mitigate the hazard. If an AECOM employee observes an imminently hazardous situation on a site controlled by others (i.e., a client-managed contractor), the employee can always stop work for themselves by removing themselves from the situation. Employees also may attempt to stop work to avoid allowing the contractor to come to harm by immediately notifying the contractor foreman or site engineer, or if necessary, the client or party managing the contractor.




No employee should object to the issuance of a stop-work request, nor can any disciplinary action be levied against the employee. All employees must agree that the situation has been mitigated before resuming work. No employee will be disciplined for refusing to work if they feel it is unsafe.

## 3.11 Lone Worker Management

AECOM discourages employees from working alone (i.e., where AECOM personnel are out of visual and audio range of others) when performing field tasks (see SH&E Procedure S3AM-314-PR, Working Alone). Note that under no circumstances should Newly Hired or Transferred Employees be permitted to work alone, and lone workers are **NOT** permitted to perform high risk tasks. If lone work is to be performed, a communications/check-in plan must be developed.

**Lone Worker Management Plan**

| | | | |
|---|---|---|---|
| **Lone Worker Justification:** | Low-risk tasks typically require one person. On occasion there will be additional personnel on site performing low-risk tasks per the scope of work. | | |
| **Lone Worker:** | *Role/Position:* | TBD | |
| | *Name:* | TBD | |
| | *Contact Number:* | TBD | |
| | *Task(s):* | ▪ See Scope of Work – Section 2.1.1 | |
| **Check-In Contact:** | | **PRIMARY** | **ALTERNATE** |
| | *Name:* | Kelly Lurie | |
| | *Contact Number:* | 518-542-2944 | |
| | *Title/Relationship:* | Project Manager | |
| **Check-In Requirements:** | *Method(s):* | ☒ Voice ☒ Text ☒ Email ☐ In-Person ☐ Lone Worker App ☐ Other | |
| | *Frequency/Time:* | Arrival and Departure and every two (2) hours between. | |
| **Response Plan:** | Check-In Missed: | • Reach out to lone worker via established method (text/voice/email) after the check-in is missed by 5 minutes. | |
| | 1st Contact Attempt Fails: | • A second attempt will be made within 5 minutes to call and/or text the worker's cell. | |

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| | | |
|---|---|---|
| | 2nd Contact Attempt Fails: | • A third attempt will be made via text and voice after an additional 3 minutes has passed with no check-in. If no local staff are available, a local representative from Lockheed Martin, Onondaga County, or the Town of Salina will be contacted to go to the site to locate the employee. |

# 4. ROLES AND RESPONSIBILITIES

Roles and responsibilities for the project team are defined below. The Project Manager (PM) is ultimately responsible for the development of this HASP and establishing a budget to implement the controls and training required. The PM is also responsible for ensuring that the plan is implemented, that appropriate documentation is generated, and that records are maintained. The SH&E Manager is responsible for reviewing and approving this HASP and assisting with other SH&E matters upon request. A Site Safety Officer may be appointed to oversee implementation of the HASP in the field. All project team members are responsible for reviewing and abiding by this HASP, performing daily (or more frequent) task hazard assessments, stopping work when necessary to correct unsafe behaviors or conditions, and reporting incidents promptly to the PM and AECOM Incident Reporting Hotline.

**DCS Americas Incident Hotline: 1-800-348-5046**

## 4.1 Project Manager

The Project Manager has overall management authority and responsibility for all site operations, including safety. The PM will provide the site supervisor, if appointed, with work plans, staff, and budgetary resources, which are appropriate to meet the safety needs of the project operations. Some of the PM's specific responsibilities include:

- Project start-up activities require appropriate SH&E planning prior to work commencing, including identification of hazards, associated risk, and appropriate controls for each task and operation found in the work scope.
- Completed project risk registers/task hazard assessments shall be incorporated into the Project's HASP.
- Verifying that personnel, to whom this HASP applies, including AECOM subcontractors, have received a copy of it, with ample opportunity to review the document and to ask questions.
- Providing the concurring SH&E Manager with updated information regarding conditions at the site and the scope of site work if changes occur that will affect the accuracy of this HASP.
- Providing adequate authority and resources to the Site Supervisor or Site Safety Officer to allow for the successful implementation of all necessary SH&E Procedures.
- Maintaining regular communications with the Site Supervisor or Site Safety Officer and, when necessary, the AECOM Client SH&E Program Manager.
- Coordinating the activities of AECOM subcontractors and ensuring that they are aware of the pertinent health and safety requirements for these projects, when applicable.
- Conducting Safety System Auditing by way of Management Site Visits and/or Project Manager Self-Assessments on a regular basis.

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- Approving amendments to the HASP (in conjunction with the Site Supervisor or Site Safety Officer).
- Coordinating activities with the client as needed to ensure the safe implementation of this HASP.

## 4.2 Site Supervisor

The Site Supervisor has the overall responsibility and authority to direct work operations at the job site according to the provided work plans and HASP. The Project Manager may act as the Site Supervisor while on site. The Site Supervisor's responsibilities include:

- Discussing deviations or drift from the work plan with the Site Safety Officer and Project Manager.
- Discussing safety issues with the Project Manager, Site Safety Officer, and field personnel.
- Assisting the Site Safety Officer with the development and implementation of corrective actions for site safety deficiencies.
- Assisting the Site Safety Officer with the implementation of this HASP and ensuring compliance.
- Assisting the Site Safety Officer with inspections of the site for compliance with this HASP and applicable SH&E Procedures.
- Reviewing Project Risk Register/ Task Hazard Assessments and Task Hazard Assessments (THAs) with the work crew.
- Reporting incidents and ensuring incidents and observations are logged into Lifeguard or IndustrySafe.
- Verifying that all operations follow the requirements of this HASP and halting any activity that poses a potential hazard to personnel, property, or the environment.
- Temporarily suspending individuals from field activities for infractions against the HASP pending consideration by the Site Safety Officer, the SH&E Manager, and the Project Manager.

## 4.3 Site Safety Officer

The Site Safety Officer supports the Site Supervisor in providing a safe work environment. Not all sites will have a designated Site Safety Officer; the decision should be made by the Project Manager and SH&E Manager taking into consideration the complexity and risks of the scope of work. The Site Supervisor may act as the Site Safety Officer on sites without one. The Site Safety Officer's responsibilities include:

- Updating the site-specific HASP to reflect changes in site conditions or the scope of work. HASP updates must be reviewed and approved by the SH&E Manager.
- Inspecting the site for compliance with this HASP and the SH&E Procedures using the appropriate field audit inspection checklist found in IndustrySafe.
- Coordinating with Site Supervisor to review THAs with the work crew.
- Assisting as needed to report incidents and verify that incidents and observations are logged into Lifeguard or IndustrySafe.

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- Working with the Site Supervisor and Project Manager to develop and implement corrective action plans to correct deficiencies discovered during site inspections. Deficiencies will be discussed with project management to determine appropriate corrective action(s).
- Contacting the SH&E Manager for technical advice regarding safety issues.
- Determining emergency evacuation routes, establishing and posting local emergency telephone numbers, and arranging emergency transportation.
- Checking that all site personnel and visitors have received the proper training, orientation and medical clearance prior to entering the site.
- Establishing controlled work areas (as designated in this HASP or other safety documentation).
- Facilitating or co-leading daily tailgate meetings and maintaining attendance logs and records.
- Discussing potential SH&E hazards with the Site Supervisor, the SH&E Manager and the Project Manager.
- Selecting an alternate Site Safety Officer by name and informing him/her of their duties, in the event that the Site Safety Officer must leave or is absent from the site.
- Verifying that all operations follow the requirements of this HASP.
- Issuing a "Stop Work Order" under the conditions set forth in this HASP.
- Temporarily suspending individuals from field activities for infractions against the HASP pending consideration by the SH&E Manager and the Project Manager.

## 4.4 Employees

Responsibilities of employees associated with this project include, but are not limited to:

- Understanding and abiding by the SH&E Procedures specified in the HASP and other applicable safety policies, and clarifying those areas where understanding is incomplete.
- Providing feedback to SH&E management for continuous improvement relating to omissions and modifications in the HASP or other safety policies and procedures.
- Notifying the Site Supervisor or Site Safety Officer of unsafe conditions and acts.
- Stopping work if there is doubt about how to safely perform a task or if unsafe acts or conditions are observed (including subcontractors or team contractors).
- Speaking up and refusing to work on any site or operation where the SH&E procedures specified in this HASP or other safety policies are not being followed.
- Contacting the Site Supervisor or Site Safety Officer or the SH&E Manager at any time to discuss potential concerns and update the THA in the field to reflect the modifications. Provide THA feedback to the supervisor for continuous improvement
- Calling the AECOM Hotline if an SH&E incident happens (+1-800-348-5046)
- Provide THA feedback to the supervisor for continuous improvement.

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## 4.5 Subcontractors

Performance of the project scope of work does **NOT** involve the use of subcontractors. If it becomes necessary to use one or more subcontractors to complete the project scope of work, they will be evaluated in advance by the AECOM Project Manager and approved by the AECOM Project Manager and Regional SH&E Manager, as appropriate, prior to mobilizing to site, and listed in the Subcontractor section of this HASP Summary.

## 4.6 Visitors

Authorized visitors (e.g., client representatives, regulators, AECOM management staff, etc.) requiring entry to any work location on the site will be briefed by the Project Manager, Site Supervisor, or Site Safety Officer on the hazards present at that location. Visitors will be escorted at all times at the work location and will be responsible for compliance with their employer's health and safety policies. In addition, this HASP specifies the minimum acceptable qualifications, training and PPE that are required for entry to any controlled work area; visitors must comply with these requirements at all times.

If the site visitor requires entry to any exclusion zone (EZ), but does not comply with the above requirements, the visitor will be denied access to the EZ. If the visitor disregards instructions to remain outside the EZ, work activities will be immediately suspended, and the situation reported and documented.

Unauthorized visitors, and visitors not meeting the specified qualifications, will **NOT** be permitted within established controlled work areas. If unauthorized visitors and/or visitors not meeting the specified qualifications enter a controlled work area and/or EZ, work activities will be immediately suspended, and the situation reported and documented.

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# 5. TRAINING AND DOCUMENTATION

The following sections describe the standard practices or programs that AECOM will establish to prepare employees to perform work safely and consistent with AECOM policy and Procedures.

## 5.1 HASP/Site Orientation

The Project Manager shall conduct a project/site-specific HASP orientation prior to the start of field operations, with support as needed by the SH&E Manager, Site Safety Officer, or Site Supervisor. This meeting will involve representatives from all organizations with a direct contractual relationship with AECOM on the job site. Minimum items to be covered are listed in **Attachment E**. Participants will then sign the HASP Personnel Acknowledgement register at the end of the HASP.

## 5.2 Daily Tailgate Meetings and THA Reviews

The Site Supervisor, Site Safety Officer or designee shall facilitate a tailgate meeting to discuss the specific requirements of this HASP and review the applicable THAs prior to the commencement of daily project activities. Attendance at the daily tailgate meeting is mandatory for all employees and subcontractors at the site contracted to AECOM. Simultaneous operations are encouraged to attend each other's tailgate meetings or at the very least the supervisors shall discuss the coordination of activities and associated hazards of each other's tasks. The supervisor will then convey the information to the work crew. The Tailgate Meeting must be documented by the Site Supervisor or Site Safety Officer on a Daily Tailgate Meeting form, a blank copy of which is included in **Attachment B**.

As part of the daily tailgate meeting, employees and subcontractors will be encouraged to voluntarily warm up and stretch select muscle groups to the best of their ability and within each person's individual limitations. Stretching is particularly beneficial to warm and loosen muscles before repetitive work, manual handling of loads, and when working in cold temperatures or with static postures. The exercises included in Attachment D may be used to facilitate these efforts.

## 5.3 Worker Training and Qualifications

All personnel at this site must be qualified and experienced in the tasks they are assigned. SH&E Training Procedure S3AM-003-PR establishes the general training requirements for AECOM employees.

Check all required training on the table below. Verify training records of employees and subcontractors.

**Site Specific Training Requirements**

| Training | | Applies to |
|---|---|---|
| ☒ | ERP/HASP and Site Orientation | All Employees and Subcontractors |
| ☒ | Vehicle/Driver Safety & Defensive Driving | All Employees who drive on behalf of AECOM |
| ☒ | Field Safety | Employees visiting the field that does not require HAZWOPER |
| ☒ | Speak Up/Listen Up (SULU) | All AECOM field employees and supervisors |
| ☐ | First Aid / CPR | Designated employees or employees performing high risk activities and medical attention is more than 4 minutes away |

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**Site Specific Training Requirements**

| Training | | Applies to |
|---|---|---|
| ☐ | Respiratory Protection & Fit Test | Employees needing to wear respirators |
| ☒ | OSHA 10-Hr. Construction Safety (or CSTS 2020 in Canada) | Refer to Section 5.3.1 for guidance |
| ☐ | OSHA 30-Hr. Construction Safety | Refer to Section 5.3.1 for guidance |
| ☒ | HAZWOPER 40-Hour and 8-Hr. Annual Refresher | On HAZWOPER sites, in EZ, exposed to hazardous contamination |
| ☐ | HAZWOPER Supervisor | Employees managing others in HAZWOPER activities or at HAZWOPER Sites |
| ☐ | Hazardous Materials Shipping (U.S.) | Employee responsible for shipping HZM/HZW/DG and/or signing manifests |
| ☐ | Transportation of Dangerous Goods (CAN) | Employees responsible for shipping/transporting regulated hazardous materials that exceed regulatory requirements |
| ☐ | Annual Medical Surveillance / Clearance | Employees working in an exclusion zone and the regulatory required exposure limit **is** exceeded for 30 or more days a year |
| ☐ | Biennial Medical Surveillance / Clearance | Working in an exclusion zone more than 30 days a year and the regulatory required exposure limit is **NOT** exceeded |
| ☐ | Under Bridge Inspection Unit (UBIU) AECOM University module | Employees working in a UBIU |
| ☒ | All-Hands Coronavirus Training: | All Employees performing work during the COVID-19 Pandemic |
| ☐ | Local and/or Client Requirements: | [If applicable, specify] |

## 5.3.1 OSHA 10-Hr. (or CSTS 2020)/OSHA 30-Hr. Training

OSHA 10 (or CSTS 2020 in Canada) and OSHA 30 training are required for projects with construction, demolition, or construction/industrial-like hazards. "Construction/industrial-like hazards" occur on sites where the focus is **not** construction/industrial activities, but where our scope includes work activities involving work at heights, confined space, hot work, and/or lifting/hoisting loads or work around heavy construction equipment or "yellow iron." Examples of heavy construction equipment include excavators, bull dozers, graders, articulated dump trucks, pile drivers, and large air or mud rotary drill rigs. Smaller equipment like bobcats, road worthy commercial trucks, and hollow-stem auger drill rigs would not be considered heavy construction equipment.

This training is needed if this type of work is being performed within our work area or if it may impact our work area. It is not applicable if our work area is separated from the construction/demolition/industrial area with enough distance or physical barriers that fully prevent exposure of our team to those hazards. This includes projects where we serve as Inspectors, or any work where our employees are exposed to construction/industrial site hazards.

OSHA 30 hr. training is required for supervisors in the United States. The term "supervisor" has many different meanings. The requirement to complete the OSHA 30 hr. course will be based on field supervisory roles and responsibilities, not administrative supervision roles. Field supervisors required to take the OSHA 30 course are defined as those individuals who provide work direction and leadership directly to AECOM field personnel and/or our subcontractors for construction/demolition activities or tasks that have construction/industrial-like hazards. These supervisors must be knowledgeable of construction hazards and controls because they are responsible for:

- Field implementation of a construction/demolition scope of work;
- Controlling performance on the job site;

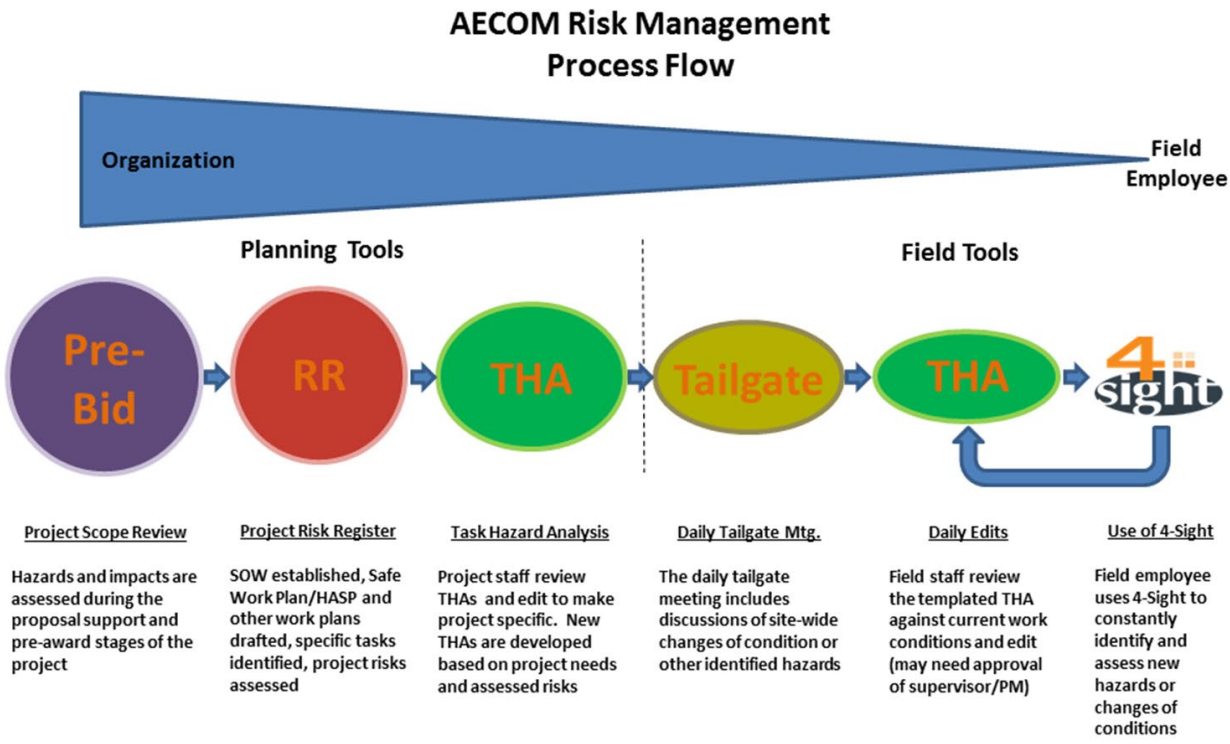
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- Evaluating and controlling hazards & preventing site safety risks; and
- Intervening to prevent unsafe actions or conditions of employees, clients, and subcontractors related to construction/demolition hazards.

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# 6. HAZARD ASSESSMENT AND CONTROL

AECOM has adopted an approach to hazard assessment and control that incorporates both qualitative and quantitative methods to identify hazards and the degree to which they may impact employees and AECOM operations. See S3AM-209-PR, Risk Assessment and Management, for details regarding AECOM's process. This approach is illustrated below and described in the following section.




## 6.1 SH&E Procedures

All AECOM SH&E procedures, in their controlled copy version, are available on the internal SH&E Policy and Procedures ecosystem page. Programmatic procedures referenced in this document (for example SH&E Training) do not need to be printed for inclusion in this HASP. The applicable field procedures checklist is in the Physical Hazards section below and procedures are included in **Attachment C**.

## 6.2 Task Hazard Assessments (THAs) and Daily Tailgate Meeting Form

THA forms (a blank version is located in S3AM-209-PR) shall be prepared for each task to be performed as part of the scope of work. This includes driving to the site, parking, and walking as well as the hazards, associated risk, and appropriate controls for all other work activities. The DCS Americas Templated THA Library may also be used to find previously approved THAs, though these should be modified to be project and site-specific. The preparer shall have

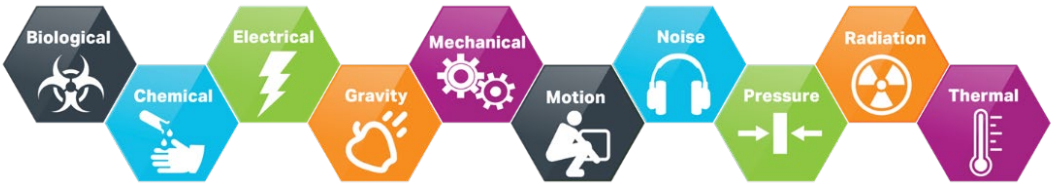
one THA form for each task in the Scope of Work found in this work plan (**Attachment B)** and shall also include blank copies.

In the field, all employees and visitors shall review the daily the THAs and complete and sign the Daily Tailgate Meeting Form S3AM-209-FM5. Many times, when employees arrive in the field, situations are different than originally planned for or additional job steps are required. The THA asks workers update or 'dirty up' the THA in the 'On-Site Edits' rows to assess the risks presented by the changed condition and requires the worker to describe steps to reduce the risk. If the hazard(s) cannot be successfully mitigated, the work is **NOT** allowed to proceed.

### 6.2.1 Hazard Categories

THAs should include consideration of the following hazard categories when identifying hazards and task specific controls:

- Biological
- Chemical
- Electrical
- Gravity
- Mechanical
- Motion
- Pressure
- Noise
- Radiation
- Thermal




## 6.3 4 Sight

When preparing hazard assessments and throughout the day workers should use 4-Sight. This is a mental process through which workers ask themselves (and each other) four questions designed to effectively assess hazards. Using these questions during each task, especially those without established THAs, will help workers identify hazards and condition changes so that they can control them or stop work to seek assistance.




- **What am I about to do?**
- **What could go wrong?**
- **What could be done to make it safer?**
- **What have I done to communicate the hazard?**

## 6.4 Speak Up/Listen Up

All AECOM employees have a responsibility to help create the environment where the expectation is Safety for Life. Speak Up/Listen Up (SULU) is a technique to steward jobsite safety by utilizing 4-Sight as a basis for safety feedback conversations. SULU has two main parts:

- **Speak Up** where employees use three simple steps when providing feedback to others about unsafe acts:
    - Ask to discuss their hazard assessment or 4-Sight for the task;

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  - Get a commitment from the employee to apply the hazard controls and perform the task according to the accepted procedures; and
  - Follow up to ensure the employee is working safely

- **Listen Up** where employees use two simple steps when responding to safety feedback:
  - Listen – Focus on the message, not the messenger; and
  - Commit to performing the task the safer way

SULU conversations should happen consistently throughout the workday to create clear expectations of how work should be performed. All employees should recognize safe work behaviors in order to reinforce them and keep them going. An occasional correction is much more effective when employees are frequently encouraged and positively recognized for their safe actions. Managers and supervisors should be having SULU conversations during site visits and ensure peer to peer and site supervisor to crew SULU conversations are being held.

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# 7. PHYSICAL AND BIOLOGICAL HAZARD ASSESSMENT

A physical hazard is a hazard that threatens the physical safety of an individual; contact with the hazard typically results in an injury. The following table summarizes the physical hazards or activities containing physical hazards present at the site and the associated procedures that address protection and prevention of harm.

All checked procedures MUST be included in **Attachment C** for implementation and reference. The following hazards and their site specific description are anticipated based on the scope of work and project site:

| **Hazard/ Activity**<br>**(Note: Text in this column links to procedure)** | **Site Specific Description**<br>**(Where, What Phase of Work, Frequency, Etc.)** | **Applicable Procedure** |
|---|---|---|
| ☐ Abrasive Blasting | | S3AM-335-PR |
| ☐ Aerial Work Platforms | | S3AM-323-PR |
| ☐ All-Terrain Vehicles | | S3AM-319-PR |
| ☐ Blasting and Explosives | | S3AM-336-PR |
| ☐ Bloodborne Pathogens | | S3AM-111-PR |
| ☐ Cofferdams | | S3AM-344-PR |
| ☒ Cold Stress | Continuous exposure when ambient air temperature is below 32 °F (0 °C) **or** when ambient air temperature is below 50 °F (10 °C) with wet/damp conditions. | S3AM-112-PR |
| ☐ Compressed Air Systems and Testing | | S3AM-337-PR |
| ☐ Compressed Gases | | S3AM-114-PR |
| ☐ Concrete Work | | S3AM-338-PR |
| ☐ Confined Spaces | | S3AM-301-PR |
| ☐ Corrosive Reactive Materials | | S3AM-125-PR |
| ☐ Cranes and Lifting Devices | | S3AM-310-PR |
| ☐ Demolition | | S3AM-339-PR |
| ☐ Diving (scientific and commercial) | | S3AM-334-PR |
| ☐ Drilling, Boring & Direct Push Probing | | S3AM-321-PR |
| ☐ Electrical Safety | | S3AM-302-PR |
| ☐ Excavation & Trenches | | S3AM-303-PR |
| ☐ Fall Protection | | S3AM-304-PR |
| ☐ Flammable and Combustible Liquids | | S3AM-126-PR |
| ☐ Gauge Source Radiation | | S3AM-122-PR |
| ☐ Hand and Power Tools | | S3AM-305-PR |
| ☐ Hazardous Waste Operations | | S3AM-117-PR |
| ☒ Heat Stress | Continuous exposure when ambient air temperature is above 80 °F (26.6 °C) and a standard | S3AM-113-PR |

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| Hazard/ Activity<br>(Note: Text in this column links to procedure) | Site Specific Description<br>(Where, What Phase of Work, Frequency, Etc.) | Applicable Procedure |
|---|---|---|
| | work uniform is worn **or** when ambient air temperature is above 70 °F (21.1 °C) and impermeable chemical protective clothing is worn. | |
| ☐ Heavy Equipment | | S3AM-309-PR |
| ☐ High Altitude | | S3AM-124-PR |
| ☐ Highway and Road Work | | S3AM-306-PR |
| ☐ Hoists Elevators and Conveyors | | S3AM-343-PR |
| ☐ Hot Work | | S3AM-332-PR |
| ☐ Ladders | | S3AM-312-PR |
| ☐ Lockout Tagout | | S3AM-325-PR |
| ☐ Machine Guarding Safe Work Practice | | S3AM-326-PR |
| ☐ Marine Safety and Vessel Operations | | S3AM-333-PR |
| ☐ Material Storage | | S3AM-316-PR |
| ☐ Mine Site Activities | | S3AM-341-PR |
| ☐ Mining Operations | | S3AM-345-PR |
| ☐ Noise | | S3AM-118-PR |
| ☐ Non-Ionizing Radiation | Frequent exposure to sunlight during daylight hours | S3AM-121-PR |
| ☐ Overhead Lines | | S3AM-322-PR |
| ☒ Pandemic Virus | Potential exposure during travel and field task(s) | SR1-003-PR2 |
| ☐ Powder-Actuated Tools | | S3AM-327-PR |
| ☐ Powered Industrial Trucks | | S3AM-324-PR |
| ☐ Radiation | | S3AM-120-PR |
| ☐ Railroad Safety | | S3AM-329-PR |
| ☐ Respiratory Protection | | S3AM-123-PR |
| ☐ Scaffolding | | S3AM-311-PR |
| ☐ Steel Erection | | S3AM-340-PR |
| ☐ Temp. Floors, Stairs, Railings, Toe-boards | | S3AM-342-PR |
| ☐ Underground Utilities | | S3AM-331-PR |
| ☐ Underground Work | | S3AM-330-PR |
| ☒ Wildlife, Plants and Insects | Whenever/wherever work is occurring at the project | S3AM-313-PR |
| ☒ Working Alone | If a specific task requires one person only | S3AM-314-PR |
| ☒ Working on and Near Water | When performing work near the wetlands and Bloody Brook, work will not be performed under high flow conditions (i.e., depth will be near or below 18 inches with low flow). | S3AM-315-PR |

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## 7.1 Pandemic Virus

COVID-19 is a disease that results from infection of the virus identified as SARS-CoV-2. SARS-CoV-2 is a Coronavirus, one of a large family of viruses found in both animals and humans. Some infect people and are known to cause illness ranging from the common cold to more severe diseases such as Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS) with symptoms such as fever, cough, and shortness of breath. There are currently three human vaccines approved for emergency use for this virus. Availability and distribution of the vaccines remain widely varied and are being rolled out in a phased approach based on risk groups.

Key AECOM resources can be found at the AECOM Ecosystem Coronavirus Information Center on the Ecosystem homepage or at this link, the Coronavirus Smart Card, and the AECOM Pandemic Procedure: SR1-003-PR2. Additional resources can be found at the following non-AECOM websites:

- Center for Disease Control and Prevention (CDC).
- World Health Organization (WHO).

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# 8. CHEMICAL HAZARD ASSESSMENT

A chemical hazard is a type of occupational hazard caused by exposure to chemicals in the workplace. Exposure to chemicals in the workplace can cause acute or long-term detrimental health effects. Potential exposure to chemical hazards on AECOM projects can come from several sources including materials brought on site to perform work, constituents of concern found in environmental media under investigation, and simultaneous operations being performed at the site by the property owner/third parties.

## 8.1 Potential Exposure Pathways

Occupational exposure to chemical hazards associated with work activities could potentially occur by two primary routes (inhalation and skin contact) and one indirect route (incidental ingestion). These exposure pathways are discussed below. Exposure to chemical hazards are anticipated to be minimal for the current scope of work. Remediation has been completed on the site, and residual soil contamination is present at depths not to be encountered during site management activities. Samples will be collected for biological monitoring, which could potentially result in absorption or ingestion, as discussed below. If additional tasks should be needed that would require potential contact with residual site contamination, a THA will be developed and approved prior to the initiation of the work.

### 8.1.1 Inhalation

Under the current scope of work, there is not a concern for inhalation exposure. Residual soil contamination is at a depth below that which may be encountered during site maintenance activities. If additional site maintenance is needed that would require intrusive work, a THA will be developed, and this HASP will be updated as appropriate prior to initiation of the intrusive work. If determined to be necessary, air monitoring may be performed in the work area and within the employee's breathing zone to assess the need to implement appropriate control measures or stop work.

### 8.1.2 Skin Contact (Absorption)

Personnel handling residual product or waste and associated equipment may be exposed to chemical hazards by skin contact or adsorption. However, exposure is expected to be limited since workers will be required to wear appropriate PPE (i.e., appropriate work gloves, body clothing, and/or face shield).

### 8.1.3 Ingestion

Personnel handling residual product or waste and associated equipment, including project hazardous materials, may be exposed by incidental ingestion. Typically, this exposure occurs if proper PPE was not used or personal hygiene was not practiced. Personal protection against exposure via ingestion can be accomplished by performance of proper decontamination procedures when exiting contaminated work areas as well as using the correct PPE.

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### 8.1.4 Sources of Potential Chemical Exposures

Depending on the source of potential chemical hazard and the likelihood of exposure, certain measures will be taken to protect AECOM employees as specified below.

| | |
|---|---|
| ☒ | Exposure to chemical hazards is **NOT** anticipated |
| ☐ | Hazardous chemicals will be used to perform the work (see Section 8.2) |
| ☐ | Exposure to constituents of concern found in environmental media is likely (See Section 8.3) |
| ☐ | Exposure to chemical hazards is possible due to activities of the site owner or other parties (see Section 8.4) |

## 8.2 Hazardous Materials Communication

The approved scope of work does not involve the use of hazardous materials, such as sample preservatives, grout, paints, adhesives, decontamination solutions, etc. If the use of hazardous materials becomes necessary, Safety Data Sheets (SDSs) will be obtained and made available to field personnel.

## 8.3 Constituents of Concern

Based on information obtained from historical investigations and other sources, the chemicals in the table below are known or suspected to be present at the site.

**Summary of Hazardous Properties of Contaminant Exposure Hazards**

**Notes:** **PEL.....Permissible Exposure Limit** **IP.....Ionization Potential**
**TLV.....Threshold Limit Value** **eV.....Electron Volt**

| Chemical Name | Media | Primary Routes of Exposure | PEL | TLV | IP (eV) |
|---|---|---|---|---|---|
| **Metals** | | | | | |
| Cadmium | Soil, groundwater, biological | Dermal | 0.005 mg/m$^3$ | 0.01 mg/m$^3$ | n/a |

### 8.3.1 Decontamination

The project scope of work outline in Section 2.1.2 does **not** require or involve decontamination and/or waste stream handling/management

**Decontamination Procedures & Equipment**

| Procedure | Equipment Needed |
|---|---|
| | |
| | |
| | |

**Equipment Decontamination Procedures**

| Type Equipment | Decontamination Solution | Procedure |
|---|---|---|
| | | |
| | | |
| | | |

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| Waste Handling for Decontamination | |
|---|---|
| **Waste Streams/Products** | **Disposal Procedures** |
| | |
| | |
| | |
| | |

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# 9. AIR MONITORING

Depending on the contaminants of concern, the products used to perform the work, or third-party operations, sampling or monitoring may be required within the work area on site to detect the presence and relative levels of chemical or particulate hazards. The data collected throughout monitoring shall be used to determine the appropriate levels of PPE. Monitoring shall be in accordance with Exposure Monitoring Procedure S3AM-127-PR and specified in the work permit and/or THA for the tasks. With the current scope of work, it is not anticipated that air monitoring will be required. If additional work is needed that may require air monitoring, a THA will be developed and approved, and this HASP will be updated prior to the initiation of the work.

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# 10. PERSONAL PROTECTIVE EQUIPMENT

PPE is considered the last line of defense in hazard control. PPE is meant to protect workers when all other methods (elimination, substitution, engineering, and administrative) have been exhausted. All employees must be trained in the proper use and maintenance of PPE. See Procedure S3AM-208-PR, Personal Protective Equipment.

A PPE assessment (see S3AM-208-FM1) can be performed to help determine PPE requirements. PPE upgrades for individual tasks or steps of a task are to be identified in the appropriate THA(s).

## 10.1 Site Minimum Personal Protective Equipment

Unless otherwise excluded by an approved Management of Change (MoC), the following personal protective equipment is required by AECOM and/or client procedures and requirements and shall be worn on site outside of designated "Safe Zones", such as offices and parking lots. Do **NOT** downgrade the PPE specified in the THA and/or this HASP without review and approval from SH&E Manager.

**Site Minimum PPE** [1]

| | |
|---|---|
| ✓ Hard hat | ✓ Safety-toe work boots |
| ✓ Safety glasses with side shields (may be clear or shaded) | ✓ Long pants |
| ✓ Reflective Vest | ✓ Shirt with sleeves (short or long – cover shoulders) |

## 10.2 Additional Personal Protective Equipment Needed on Site

The following PPE is required by the host facility, task hazard assessment (THA), or prescribed upgrades in response to air monitoring response (action) levels.

**Head / Ears** ***(select all that apply)***

| | |
|---|---|
| ☐ Climbing helmet | ☐ Earplugs |
| ☐ Hard hat with chin strap | ☐ Over-ear hearing protection (i.e., muffs) |
| ☐ Wide brimmed hard hat | ☐ Dual hearing protection (earplugs **and** muffs) |
| ☐ Insect net | ☐ Other: [specify] |

**Face / Eyes** ***(select all that apply)***

| | |
|---|---|
| ☐ Spoggles (Safety glasses with foam liner for dust protection) | ☐ Face shield (impact) |
| ☐ Chemical goggles | ☐ Face shield (splash) |
| ☐ Welding mask/goggles | ☐ Other: [specify] |

**Hands** ***(select all that apply)***

| | |
|---|---|
| ☒ Abrasion, cut and/or puncture resistant | ☐ Chemical resistant: |
| ☐ Impact resistant | ☒ Nitrile |

[1] All PPE must meet applicable ANSI, ASTM, or MSHA standards as applicable.

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**Hands** ***(select all that apply)***

| | |
|---|---|
| ☒ Leather | ☐ PVC |
| ☐ Mechanics | ☐ Rubber/Latex |
| ☐ Other: [specify] | ☐ Other: [specify] |

**Legs / Feet** ***(select all that apply)***

| | |
|---|---|
| ☐ High ankle boots | ☐ Rubber boots |
| ☐ Metatarsal guards | ☐ Waders |
| ☐ Electrically resistant boots | ☐ Snake gaiters **or** chaps |
| ☐ Puncture-resistant boots or insoles | ☐ Disposable boot covers **or** booties |
| ☒ Other: Muck ( or equivalent) boots | |

**Body** ***(select all that apply)***

| | |
|---|---|
| ☒ Sunscreen | ☐ Personal flotation device (PFD): |
| ☒ Insect repellent with DEET | ☐ Type I ☐ Type II ☐ Type III |
| ☒ Permethrin applied to clothing | ☐ Type V – Auto-inflate with Type II performance |
| ☐ Disposable coveralls | ☐ Type V – Mustang Suit |
| ☐ Flame Retardant Clothing (FRC): | ☐ Fall Protection: |
| ☐ Rating: [specify] | ☐ Full body harness |
| ☐ Weight: [specify] | ☐ Single lanyard with self-locking D-ring |
| ☐ Rating and weight not specified by client or facility | ☐ Double lanyard with self-locking D-rings |
| ☐ High-visibility clothing: | ☐ Self-retracting lifeline with self-locking D-ring |
| ☒ ANSI Class II | ☐ Shock absorber |
| ☐ ANSI Class III | ☐ Lad-safe or similar device |
| ☐ Not specified by client or facility | ☐ Suspension trauma straps |
| ☐ Other: [specify] | ☐ Self-rescue kit |
| ☐ Other: [specify] | ☐ Other: [specify] |

**Respiratory Protection** ***(select all that apply)***

| | | | |
|---|---|---|---|
| ☐ Air-Purifying Respirator (APR): | ☐ Filtering Facepiece Respirator (FFR) - **Required Use** | | |
| ☐ Full-Face | ☐ N95 | ☐ N99 | ☐ N100 |
| ☐ Half-Face | ☐ R95 | ☐ R99 | ☐ R100 |
| ☐ Cartridge: [Specify] | ☐ P95 | ☐ P99 | ☐ P100 |
| ☐ Supplied Air Respirator: | ☐ Other: [Specify] | | |
| ☐ Self-Contained Breathing Apparatus (SCBA) | ☒ **FFR / Face Covering / Face Mask** – **Voluntary Use** | | |
| ☐ Air-Line Respirator | | | |

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**Equipment** ***(select all that apply)***

| | |
|---|---|
| ☐ Air and Noise Monitoring | ☐ Weather, Heat and Cold Stress Monitoring: |
| ☐ Dosimeter | ☐ Portable weather station **or** meter |
| ☐ See Section 9.1 above | ☐ Smart phone with weather app |
| ☐ Other: [specify] | ☐ Wet Bulb Globe Thermometer (WBGT) |
| ☐ Communication Beyond Cell Phones | ☐ Other: [specify] |
| ☐ Portable, hand-held radio | ☐ Wildlife / Wilderness Survival: |
| ☐ Satellite phone | ☐ Air horn |
| ☐ Other: [specify] | ☐ Bear spray |
| ☐ Traffic / Work Area Controls: | ☐ Emergency Rations |
| ☐ See Section 11.1 below | ☐ Emergency Shelter(s) |
| ☐ Other: [specify] | ☐ Other: [specify] |
| ☐ Fire Control / Protection: | ☐ Other: |
| ☐ [specify type], Qty = [#] | ☐ [specify] |
| ☐ [specify type], Qty = [#] | ☐ [specify] |
| ☐ [specify] | ☐ [specify] |
| ☐ First Aid Kit(s): | ☐ [specify] |
| ☐ Type [?], Class [?], Qty= [#] | ☐ [specify] |
| ☐ Type [?], Class [?], Qty= [#] | ☐ [specify] |

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# 11. SITE CONTROL

The purpose of site control is to protect the public from inadvertently coming into contact with site hazards and to protect AECOM employees being impacted by hazards. This section details the equipment and actions needed to promote optimal site control. Under the current scope of work, the need for site work zones is unlikely. The work will be completed within town and county easements that are accessible to the public; however, it is unlikely that the area will be accessed during work hours. Additionally, the work being completed would not be expected to pose a risk to the public.

## 11.1 Site Work Zones

Site layout and site control need to be coordinated to achieve a productive work environment and efficient work process while minimizing exposure of employees and the public to hazards associated with the work. Consider the following items when planning the site layout and controls:

- "Line of Fire" hazards- overhead utilities, falling/ tipping equipment, release of energy/ pressure, flying debris
- Noise, dust, odor suppression
- Contamination containment and decontamination area layout
- Traffic control for site vehicles/ equipment (public traffic control requires Traffic Control Plan)
- Restricted access for areas requiring special training, skills, or certifications
- Restriction of work near railroads
- Presence or creation of excavations
- Loading/unloading areas
- Portable restrooms
- Dumpsters and bins
- Equipment lay down
- Heavy equipment parking
- Overnight safety and security needs

Check the description of the site controls **already** in place:

| |
|---|
| ☐ Work area is within a facility/property with secure and restricted access provided by client or third party |
| ☐ Work area is enclosed within a facility/property, but access is not restricted via locks, guards, or gates |
| ☒ Work area is on a property that is open, but access by the public is unlikely |
| ☐ Work area is on a property that is open and access by the public is likely |
| ☐ Work area is in a roadway or right of way of a roadway (Traffic Control Plan required S3AM-306-PR) |
| ☐ Work area is on or near railroad, including right of way, active lines and crossings |

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☐ Other: [Insert description]

Check and describe the site controls that need to be added to protect the public and the AECOM work team.

| Control Item | | Description of Type and Application |
|---|---|---|
| ☐ | Fence | |
| ☐ | Locks | |
| ☐ | Barricades | |
| ☐ | Cones | |
| ☐ | Tape | |
| ☐ | Hole Covers | |
| ☐ | Other: | |

## 11.2 Simultaneous and Neighboring Operations

Simultaneous and neighboring operations often present a need for added coordination and communication to address hazards that are presented by multiple operations. Complete the tables below. Mark "N/A" only if there is no feasible hazard presented by simultaneous or neighboring operations.

**Simultaneous Operations – Within the Site**

**☐ Yes, see table below for details**
**☒ None, not applicable**

| Activity | Company | Contact Person (Activity Lead) | Contact's Phone Number | Addressed in THA(s) |
|---|---|---|---|---|
| | | | | ☐ Yes ☐ No |
| | | | | ☐ Yes ☐ No |
| | | | | ☐ Yes ☐ No |

**Simultaneous Operations – Neighboring Sites**

**☐ Yes, see table below for details**
**☒ None, not applicable**

| Activity | Company | Contact Person (Activity Lead) | Contact's Phone Number | Addressed in THA(s) |
|---|---|---|---|---|
| | | | | ☐ Yes ☐ No |
| | | | | ☐ Yes ☐ No |
| | | | | ☐ Yes ☐ No |

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## 11.3 NY State Guidelines and Lockheed Martin Facility-Specific COVID-19 Safety Requirements

### Face Masks

Based on the Centers for Disease Control and Prevention's (CDC) and NY State's latest recommendations, the use of masks or face coverings for employees and onsite contractors are required while performing their work and where social distancing is a challenge. This includes areas where the work situation is not conducive to maintaining physical separation of at least six feet.

Where possible, employees who come into Lockheed facilities to work should bring in their own masks that conform to CDC guidelines. The masks cannot have exhalation valves or inhibit the use of other personal protective equipment (PPE) in the workplace.

PPE such as masks must be used properly. It is an employee's personal responsibility to inspect and maintain the integrity of the equipment and to use PPE properly as stated below:

- Masks must be fitted over the nose and mouth. The closer a mask sits on the face against the skin the more effective it will be.
- For the most effective fit, it is recommended (but do not require) that employees have a clean-shaven face. Facial hair decreases the effectiveness of the mask by creating a looser fit on the face.
- Hands/gloves must be cleaned prior to and after touching the mask when putting on, adjusting or taking off the mask. Employees must avoid touching the inside of the mask.
- Employees should inspect the mask to ensure that it is not visibly dirty, worn, torn or ripped prior to and after use. If the mask has any of these defects, employees should not use it and request a new mask through their supervisor, immediate manager or designated site lead.
- Masks that are not dirty, torn, or ripped after use should be reused whenever possible. Employees should follow this guidance for cleaning and storing used masks when not in use:
    - Let the mask dry in air and then secure it in a clean, dry place.
    - Employees must store their mask with the employee's belongings and not leave it in the open where it can be touched by other employees.
- Employees must dispose of masks that cannot be reused in a trash receptacle following site procedures.
- Any employee using a higher level of respiratory protection for a workplace chemical or aerosol hazard shall not downgrade the level of respiratory protection to a cloth or company-issued mask and shall continue to use their existing PPE.

### Other Preventions

In an abundance of caution, all employees should:

- Complete the self-attestation daily prior to visiting a Lockheed Martin site.
- Frequently and thoroughly wash hands.

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- Stay home when sick. Self-monitor for signs and symptoms of COVID-19 at home prior to coming to work. If an employee has signs or symptoms of an illness, they should notify their leader, follow LM Health and Wellness guidance, and stay at home.
- Follow respiratory etiquette, including covering coughs and sneezes and disposing of used tissues in trash receptacles.
- Maintain a social distance of six feet from other employees whenever possible and do not shake hands or otherwise touch other people.
- Avoid using other workers' phones, desks, offices, or other work tools and equipment, when possible; clean your own equipment and tools prior to sharing with other workers.
- Maintain regular housekeeping practices in work areas, including the routine cleaning and disinfecting of work surfaces and equipment.

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# 12. EMERGENCY RESPONSE

Any situation that has resulted or poses an imminent threat to persons, property and/or the environment constitute an emergency and require immediate action by the individual discovering and/or involved in the situation. Immediate actions start with the signaling of an emergency that is accompanied by a ceasing of site activities (i.e., Stop Work). When safe to do so, immediate actions will be taken to prevent an imminent risk from resulting in an incident and/or minimize the potential for an escalation in the severity of the incident. Immediate actions for reasonably credible emergency situations or scenarios are described within the following sections.

## 12.1 Communication – Method(s) of Signaling an Emergency

In addition to verbal communication amongst the field team, the following methods of communicating or signaling an emergency will be used:

| | | | |
|---|---|---|---|
| ☒ **Cell Phone** | ☐ **Hand Signal** | ☐ **Radio (Channel No)** | ☐ **Satellite Phone** |

## 12.2 Muster and Shelter-in-Place Locations

In the event of an emergency situation or imminent threat persons, property and/or environment, workers will report to the appropriate muster and/or shelter-in-place location. Workers will remain at the muster or shelter-in-place location until a headcount is completed and any "all clear" is issued by the proper authority for the site, unless it is unsafe to remain at that location.

| | |
|---|---|
| **Primary Muster Location:** | Brookview Lane, or depending on where work is occurring, nearest public residential street |
| **Shelter-in-Place Location:** | Personal vehicle |

## 12.3 Location of Emergency Equipment

Site personnel will be made aware of the location of emergency equipment that can aid in the response to an emergency situation or imminent threat to persons, property and/or the environment during the site orientation, daily toolbox safety meetings, and/or crew reviews.

Personnel will have a small first aid kit in their personal vehicle.

## 12.4 Emergency Responders and Resources

In the event of a **life-threatening or critical emergency**, AECOM employees should immediately engage emergency responders and/or resources, as appropriate, to the type of emergency. Steps should be taken to meet and escort emergency responders and/or resources to location of the emergency whenever possible.

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| Emergency Coordinators / Key Personnel | | | |
|---|---|---|---|
| **Name** | **Title/Workstation** | **Telephone Number** | **Mobile Phone** |
| Jill Fonte | Lockheed Martin Client Contact | 315.456.1993 | 315-944-8082 |
| Kelly Lurie | AECOM Project Manager | - | 518.542.2944 |
| Scott Dietz | AECOM Regional SH&E Manager | - | 240.344.5892 |
| Pete Wray | AECOM Area SH&E Manager | - | 302.781.5872 |
| Candice Johnson | AECOM EBL SH&E Director | | 416-407-9661 |
| **Organization / Agency** | | | |
| **Name** | | **Telephone Number** | |
| Electronics Park Facility Patrol | | | 315.456.2917 |
| Electronics Park Emergency | | | 315.456.2111 |
| Police Department (local) | | | 911 |
| Fire Department (local) | | | 911 |
| Ambulance Service ***(EMT will determine appropriate hospital for treatment)*** | | | 911 |
| Emergency Hospital ( Upstate Medical Center) | | | 315-464-8668 |
| Emergency Hospital Route: See Figure 9-1 | | | |
| **Organization / Agency** | | | |
| **Name** | | | **Telephone Number** |
| AECOM Nurse Hotline: 24-hr On-Call Occupational Nurse **(*Non-Emergency assistance only – Employees must notify SH&E prior to calling*)** | | | (877) 878-9525 |
| AECOM Incident Reporting Hotline | | | (800) 348-5046 |
| New York State Spill Hotline | | | (800) 457-7362 |
| National Response Center | | | (800) 424-8802 |
| **Public Utilities** | | | |
| **Name** | | **Telephone Number** | |
| Dig Safely NY | | | 811 |

Utility and Pipeline Owners (For utility and pipeline related emergencies only)

| Utility/Pipeline Name | Provider/Facility Owner | Contact No. |
|---|---|---|
| Cable | Service is NOT Provided to Site | Not Applicable |
| Electric | Service is NOT Provided to Site | Not Applicable |
| Natural Gas | Service is NOT Provided to Site | Not Applicable |
| Phone | Service is NOT Provided to Site | Not Applicable |
| Water | Service is NOT Provided to Site | Not Applicable |

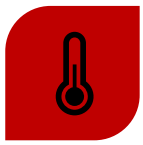
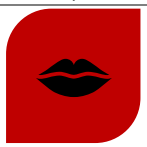
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**Utility and Pipeline Owners (For utility and pipeline related emergencies only)**

| Utility/Pipeline Name | Provider/Facility Owner | Contact No. |
|---|---|---|
| Sewer | Service is NOT Provided to Site | Not Applicable |
| Call Before You Dig | (Utility One-Call Locating) | 811 |
| Call Before You Dig | (Utility One-Call Locating) | 1-800-962-7962 |

## 12.5 Fitness for Duty and Illness Reporting During the Pandemic

AECOM employees should always live our life-preserving principle of "Fitness for Duty", which requires employees to stay home from work when they are sick, as they are not "Fit for Duty" when ill. During times of pandemic, the importance of this step is increased. If you experience signs/symptoms of illness (see images below) or find out that you have come into contact with a person who has been confirmed positive with the Coronavirus, notify the site supervisor and the project manager, your Area, Regional, or Business Line SH&E Manager, and go home and/or stay home. Notify the AECOM Incident Reporting Hotline (**1-800-348-5046)** and/or the AECOM Nurse Line (**1-512-419-5016).** Managers will work with the local SH&E and/or Resiliency teams to respond according to the AECOM Pandemic Procedure: SR1-003-PR2.

| | | | |
|---|---|---|---|
|  FEVER |  TIREDNESS, CONFUSION |  DRY COUGH |  SHORTNESS OF BREATH |
|  NASAL CONGESTION, SORE THROAT OR RUNNY NOSE |  BLUE LIPS OR FACE |  PERSISENT PAIN OR PRESSURE IN THE CHEST |  IF ANY OF THESE SYMPTOMS ARE IDENTIFIED, SEEK MEDICAL ATTENTION! |

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# 13. NOTIFICATIONS AND REPORTING

**NOTE! In the event of a life threatening emergency, call 911 FIRST. A life threatening emergency can include:**

- Loss of consciousness
- Seizures
- Uncontrolled loss of blood
- Heat Stroke
- Head or spinal cord injury
- Severe allergic reaction
- Abdominal trauma
- Difficulty breathing
- Cardiac arrest
- Broken bones

**Once immediate actions have been taken, if safe to do so, notifications (verbal) and reporting (written) must be immediately completed. Notifications serve to engage additional resources in the management of the emergency and initiate additional processes such as medical case management, spill response, incident investigation, etc. Reporting initiates the formal documentation process and supports the development of key learnings to prevent a reoccurrence.**

## 13.1 Initial Notifications

The person observing and/or involved with the emergency or incident is required to make the following initial notifications as soon as reasonably possible:

**Call #1 – AECOM Site Supervisor or Site Safety Officer**

| Role | Person Assigned to Role | Contact No. Primary | Contact No. Alt. |
|---|---|---|---|
| **Primary Site Supervisor:** | Kelly Lurie | 518-542-2944 | |
| **If unavailable, Alternate Site Supervisor:** | Nickcole Evans | 315-243-1624 | |
| **If unavailable, Site Safety Officer:** | Scott Dietz | 240-344-5892 | |
| Note: D = Direct Office Phone; M = Mobile Phone, O = Office Phone, R = Radio, and S = Satellite Phone | | | |

**Call #2 – DCS Americas Incident Reporting Hotline**

**1-800-348-5046**

| | |
|---|---|
| DIRECT TOLL-FREE | Hours of Operation: 24 Hours/Day; 7 Days/Week |

*For injuries and illnesses, you should be transferred by the hotline to the AECOM Occupational Nurse:*

**AECOM Occupational Nurse**

**1-512-419-5016**

| | |
|---|---|
| DIRECT | Hours of Operation: 24 Hours/Day; 7 Days/Week |

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**Call #3 – Affected Employee's Direct Supervisor**

**Employees are encouraged to program their direct supervisor's phone numbers into their cell phone.**

**Call #4 – Vehicle Management or Insurance Provider** ***(Vehicle Motor Vehicle Accidents Only)***

**Employees involved in motor vehicle accidents or who have discovered property damage caused to motor vehicles should call the appropriate party:**

**ARI Fleet Management** ***(Fleet vehicles only)***

**1-800-422-7647**

| | |
|---|---|
| DIRECT TOLL-FREE | Hours of Operation: 24 Hours/Day; 7 Days/Week |

**Rental Company** *(Rental vehicles only)*

**Refer to your rental agreement for contact numbers and hours of operation**

**Personal Insurance Provider** *(Personal vehicles used for business travel only)*

**Refer to your personal insurance policy for contact numbers and hours of operation**

## 13.2 Client-Specific Notifications

AECOM must notify Lockheed Martin Project Lead in the event of a fatality, injury, environmental release (spill), near-miss incident, or any ESH incident that is likely to generate significant publicity. A written report of the incident/injury/spill and corrective action(s) taken shall be submitted to the Lockheed Martin Project Lead within one (1) day of the incident.

Additional client specific requirements are provided in the Lockheed Martin Environmental, Safety, and Health Contractor Manual provided in Attachment F.

## 13.3 Additional Internal AECOM Notifications

The AECOM Site Supervisor will make the following additional internal notifications. If the AECOM Site Supervisor cannot be reached or is not capable of making the notifications, the notifications will be made by an alternate AECOM Site Supervisor or AECOM Site Safety Officer.

### 13.3.1 AECOM Project Management

| Role | Person Assigned to Role | Contact No. Primary | Contact No. Alt. |
|---|---|---|---|
| **AECOM Project Manager:** | Kelly Lurie | 518-542-2944 | |
| **If unavailable, AECOM Project Mgr. Alternate:** | Nickcole Evans | 315-243-1624 | |
| Note: D = Direct Office Phone; M = Mobile Phone, O = Office Phone, R = Radio, and S = Satellite Phone | | | |

The Project Manager will perform any additional internal notification requirements based on the requirements of their region, business line, or client account.

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### 13.3.2 AECOM Safety, Health and Environment (SH&E) Management

| Role | Person Assigned to Role | Contact No. Primary | Contact No. Alt. |
|---|---|---|---|
| **Client Acct. SH&E Mgr.:** | Scott Dietz | 240-344-5892 | |
| **If unavailable, Area SH&E Manager:** | Pete Wray | 302-660-9 | |
| **If unavailable, Regional SH&E Manager:** | Candice Johnson | 416-407-9661 | |
| Note: D = Direct Office Phone; M = Mobile Phone, O = Office Phone, R = Radio, and S = Satellite Phone | | | |

## 13.4 Internal Reporting

### 13.4.1 Incident and Near Miss Reporting

All incidents and near misses (i.e., incidents without consequences), regardless of type and perceived severity, must be reported within **IndustrySafe** (AECOM's SH&E Database) within the timeframes listed below:

| Incident Type | IndustrySafe Reporting Timeframe |
|---|---|
| **Significant Incident, including any injury to an AECOM employee or Subcontractor** | Within **4 hours** |
| **All Other Incidents** | Within **24 Hours** |
| **Note: Only the basic facts, who, what, when, where and how, are needed to complete the initial IndustrySafe report. SH&E Managers will assist you in updating the report as additional information becomes available.** | |

Significant incidents include:

- Fatality;
- Amputation;
- Hospitalization for treatment for more than 24 hours (admission);
- Any single event resulting in more than one employee requiring medical treatment or more than one employee being away from work for more than 3 days;
- Any SH&E-related Consent Agreement/Order/Lawsuit or enforcement action seeking more than $10,000 or alleging criminal activity;
- Any spill or release of a hazardous material that is reportable to a regulatory agency;
- Any Notices of Violation resulting from not operating within a regulatory agency permit/license or consent;
- Any incident resulting in property damage expected to exceed $10,000 United States dollars (USD);
- Any security-related incident that could have caused significant harm to an AECOM employee; and/or
- Any near miss event that may have resulted in any of the above consequences, but because of "luck" did not result in harm to persons, property or the environment.

Other incidents include:

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- Any injury or illness to an AECOM employee or subcontractor, even if it does not require medical attention, including non-work-related injuries/illnesses that have become significantly aggravated by the work environment;
- An injury to a member of the public or client representative occurring on an AECOM-controlled work site;
- Re-occurring conditions such as back pain or cumulative trauma disorders (e.g., carpal tunnel syndrome);
- Fire, explosion or flash that is not an intended result of a planned event (e.g., remediation process, laboratory procedure);
- Any incident involving company-owned, rented or leased vehicles (including personal vehicles used for company business); and/or
- Any failure to comply with requirements of a regulatory permit issued to AECOM.

### 13.4.2 Safety Observation Reporting

All safety observations must be reported within **IndustrySafe™ or Lifeguard™** (AECOM's SH&E Databases), as dictated by the AECOM Project Manager, in a timely manner. It is recommended that safety observations are reported within 7 to 14 days of the observation.

### 13.4.3 SH&E Database Access

Incidents, near misses, and audits/inspections must be entered into **IndustrySafe™**, which is one of AECOM's SH&E Databases. Safety observations may also be entered into **IndustrySafe™** at the AECOM Project Manager's discretion. **IndustrySafe™** can be accessed via the SH&E Page on Ecosystem when you are in the office or connected to the AECOM network via VPN. IndustrySafe may also be accessed from your smartphone/device, if equipped with a QR Code Reader App, using the QR Code to the right.

Incidents, Near Misses, Audits/Inspections and Safety Observations

Safety observations may also be entered into **Lifeguard™**, which is one of AECOM's SH&E Databases, at the AECOM Project Manager's discretion. **Lifeguard™** can be accessed via the SH&E Page on Ecosystem when you are in the office or connected to the AECOM network via VPN. **Lifeguard™** may also be accessed from your smartphone/device, if equipped with a QR Code Reader App, using the QR Code to the right.

Safety Observations

### 13.4.4 Reporting Assistance

If your field schedule, access to internet, and/or limited cellular phone coverage have the potential to impact timely incident, near miss, and/or safety observation reporting, please contact your AECOM Project Manager and/or SH&E Manager for assistance.

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# 14. RESPONSE PLANS: REASONABLE CREDIBLE EMERGENCY SCENARIOS

Based on site history, operations, and setting along with the approved scope of work, the following emergency scenarios have been determined to be reasonably credible to occur. Immediate actions and post-emergency follow-up actions, when applicable, are discussed below for each reasonably credible emergency scenario.

## 14.1 Injuries and Illnesses

### 14.1.1 Immediate Actions

#### 14.1.1.1 Engage Medical Resources

In the event of a **life-threatening or critical emergency**, AECOM employees should **dial 911 or the site-specific number** for the emergency responder and follow the recommended instructions. After dialing 911 or the site-specific number and in **less serious situations**, an injured employee or a co-worker should contact the **Incident Hotline at 1-800-348-5046** to ensure that the employee receives the best care at the best time (i.e., within the first hour following an injury or potential injury). By contacting the Incident Hotline, the worker can be connected with AECOM's nurses for first aid advice. If recommended by the nurse, the supervisor or a co-worker should drive the injured employee to the project-designated clinic or hospital.

#### 14.1.1.2 Care for the Injured or Ill Person(s)

Employees trained in first aid, CPR and/or Automated External Defibrillators (AED) should render initial care in a manner consistent with their training. This care should be provided until the injury or illness is resolved (i.e., first aid cases) or transportation to the appropriate medical facility is arranged and present on the site (i.e., treatment beyond first aid incidents).

**First Aid, CPR and AED Trained Personnel**

| Name | Company | Contact No. | 1st Aid | CPR | AED |
|---|---|---|---|---|---|
| Robert Montione | AECOM | 518-231-3450 | ☒ | ☒ | ☒ |
| | | | ☐ | ☐ | ☐ |
| | | | ☐ | ☐ | ☐ |

#### 14.1.1.3 Transport to Nearest Medical Facility for Treatment

For injuries and illnesses that require treatment beyond first aid, the injured/ill person(s) shall be transported to the nearest medical facility for treatment. For life-threatening or critical emergencies, Emergency Medical Services (EMS) should handle the transport. EMS will determine the hospital to which the injured/ill person(s) will be transported. The AECOM Field Supervisor and/or Site Safety Officer shall confirm with EMS the final destination of the injured/ill persons. The nearest hospital equipped for emergency medical care, driving directions and map are provided in **Attachment A**.

For less serious situations, the AECOM Site Supervisor, AECOM Site Safety Officer (SSO) and/or their designee shall transport and accompany the injured/ill person(s) to the nearest Occupational Clinic (preferred) or hospital, if an

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occupational clinic is not available, not within a reasonable driving distance, or cannot be reached during their hours of operation. The nearest occupational clinic, driving directions and map are provided in **Attachment A**.

#### 14.1.1.4 Engage AECOM Occupational Nurse with Medical Treatment Provider

The AECOM Site Supervisor, AECOM SSO or their designee who is accompanying the injured/ill person(s) to the medical treatment facility shall notify the AECOM Occupational Nurse of the situation, communicate the destination of the injured/ill person(s) and assist the nurse in connecting with the medical treatment provider to facilitate medical case management.

### 14.1.2 Follow-Up Actions

Outside of notifications and reporting, the AECOM Site Supervisor, AECOM SSO or their designee shall coordinate the post-treatment transportation of injured/ill person(s).

## 14.2 Motor Vehicle Breakdowns and Flat Tires

If safe to do so, remove the car from the traveled way. To the extent possible, AECOM personnel should **NOT** change flat tires or perform similar repairs.

- For rental vehicles, contact the rental company
- For fleet vehicles, contact **ARI Fleet Management: 1-800-422-7647**
    - **Prompt 1 – Roadside Assistance**
    - **Prompt 3 – Maintenance Management**
- For personal vehicles used on AECOM business, contact an emergency provider.

## 14.3 Motor Vehicle Collisions

All vehicles should be rented through Carson Wagonlit Travel (accessible via Ecosystem) to ensure that AECOM insurance is included in the rental rate. All other insurances should be declined. AECOM's rental vehicle insurance policy for National/Enterprise or Avis can be found on the DCS Americas United States or Canada travel pages. **Drivers MUST print and carry the applicable insurance policy for the rental. For company owned vehicles, drivers MUST also print and carry proof of insurance.**

### 14.3.1 Immediate Actions (Recommended Responses)

- Assess the situation and move all occupants (except the injured) out of further harm's way.
- If safe to do so, remove the car from the traveled way.
- Call 911, if necessary
    - If appropriate, wait for police to arrive before moving vehicles.
- Provide insurance information to other drivers if necessary or requested and collect the same:
    - Driver's Information:
        - Name and contact number

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        - Driver's license number, expiration date and issuing state/province
        - Insurance policy number, carrier/provider and provider's contact number
    - Vehicle Information:
        - Make, model and year
        - License plate/tag number and issuing state/province
        - Owner's name, address and contact number
    - Passenger's Information:
        - Name and contact number
    - Witness Information:
        - Name and contact number
- If possible, obtain names and phone numbers of witnesses.
- Sketch the accident scene and/or take photographs of the scene, if possible and **safe to do so**.
- Take photographs of the damage to vehicles and property, if possible and **safe to do so**.
- If police are **NOT** on scene, file an accident report at the local police station.

**NOTE: DO NOT ADMIT LIABILITY, AGREE TO PAY FOR DAMAGE, OR SIGN A DOCUMENT RELATED TO AN INCIDENT EXCEPT AS REQUIRED BY LAW.**

### 14.3.2 Follow-Up Actions

#### 14.3.2.1 Police Report

- If the police were **NOT** on scene, file an accident report at the local police station.
- Include a copy of the police report with the IndustrySafe report (upload report to IndustrySafe).

#### 14.3.2.2 Drug and Alcohol (D&A) Testing

Driver's that may have caused or contributed to motor vehicle collisions resulting in $2,500 U.S. Dollars (USD) or more in damage to individuals, vehicles and/or property shall undergo drug and alcohol testing. The AECOM Site Supervisor, AECOM SSO or designee shall:

- Contact Lindsay Scammell at **1-804-515-8552** to coordinate the drug and alcohol testing;
- Accompany and transport the driver to and from the D&A testing facility; and
- Coordinate transportation for the driver pending the results of the D&A testing.

## 14.4 Environmental Spills/Releases

AECOM employees are not expected to take action or to participate in rescues or responses to chemical releases (including of petroleum products) beyond the initial discovery of the release and immediate mitigation actions such as closing a valve, placing absorbents, and notifying the client and or public emergency response system (911), unless there is a contractual provision for this response and specially trained employees.

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### 14.4.1 Immediate Actions – Reportable Quantity Regulatory Agency Notifications

All environmental spills or releases of hazardous materials (e.g., fuels, solvents, etc.), whether in excess of the Reportable Quantity or not, will be reported according to the incident reporting procedure. In determining whether a spill or release must be reported to a regulatory agency, the Site Supervisor or qualified worker will assess the quantity of the spill or release and evaluate the reporting criteria against the state-specific reporting requirements, applicable regulatory permit, and/or client-specific reporting procedures. **If reporting to a US state or Federal regulatory agency is required, AECOM has 15 minutes from the time of the spill/release to officially report it. In Canada, spills notification varies by Province. Employees should review the local regulatory requirement, document it in this plan and communicate it to all personnel.**

Chemical-specific United States (U.S.) Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Reportable Quantities for the known chemicals onsite are shown in the table below.

| Hazardous Substance | Regulatory Synonyms | Final RQ (lbs.) |
|---|---|---|
| 1,1,1-Trichloroethane | TCA | 1,000 |
| Arsenic | N/A | 1 |
| Benzene | N/A | 10 |
| Cadmium | N/A | 10 |
| Carbon Tetrachloride | N/A | 10 |
| Chromium | N/A | 5,000 |
| Ethyl Benzene | N/A | 1,000 |
| Lead | N/A | 10 |
| Mercury | N/A | 1 |
| Methyl Ethyl Ketone | MEK | 5,000 |
| Nickel | N/A | 100 |
| Pentachlorophenol | PCP | 10 |
| Selenium | N/A | 100 |
| Tetrachloroethylene | Perchloroethylene, PCE | 100 |
| Toluene | N/A | 1,000 |
| Trichloroethylene | Trichloroethene, TCE | 100 |
| Xylene | N/A | 100 |

CERCLA RQ's can be found at: http://www.epa.gov/oem/docs/er/302table01.pdf

The spill containment program addresses the following site-specific information:

- Potential hazardous substance spills and available controls;
- Initial notification and response;
- Spill evaluation and response; and
- Post-spill evaluation.

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### 14.4.2 Immediate Actions – Spill Evaluation and Response

The Field Lead/Site Supervisor and/or SSO are responsible for evaluating spills and determining the appropriate response. When this evaluation is being made, the spill area is isolated and demarcated to the extent possible. When an incidental release occurs, clean-up personnel receive instructions in a pre-clean-up meeting as to spill conditions, PPE, response activities, decontamination, and waste handling.

The procedures of the Emergency Response section of this HASP are immediately implemented when the spill is determined to require emergency precautions and action, if necessary, to protect those outside the clean-up area, notification of the appropriate authorities is made. The table in Section 14.4.1 lists the spill conditions that trigger notification of Federal, state, and local agencies.

The following are general measures that response/clean-up personnel take when responding to a spill:

- To minimize the potential for a hazardous spill, hazardous substances, control/absorbent media, drums and containers, and other contaminated materials are properly stored and labeled.
- When a spill occurs, only those persons involved in overseeing or performing spill containment operations will be allowed within the designated hazard areas. If necessary, the area will be roped or otherwise blocked off. Unauthorized personnel are kept clear of the spill area.
- Appropriate PPE is donned before entering the spill area.
- Appropriate spill control measures are applied during spill response.
- Whenever possible without endangerment of personnel, the spill is stopped at the source or as close to the source as possible.
- Ignition points are removed if fire or explosion hazards exist.
- Surrounding reactive materials are removed.
- Drains or drainage in the spill area are blocked or surrounded by berms to exclude the spilled waste and any materials applied to it.
- Provisions are made to contain and recover a neutralizing solution, if used.
- Small spills or leaks from a drum, tank or pipe will be evacuate an appropriate distance in all directions to allow clean-up and to prevent employee exposure.
- For small spills, sorbent materials such as sand, sawdust, or commercial sorbents are placed directly on the spill to prevent further spreading and aid in recovery.
- Spill area sprayed with appropriate foam where the possibility of volatile emissions exists.
- If the spill results in the formation of a toxic vapor cloud, from vaporization, reaction with surrounding materials, or the outbreak of fire, further evacuation may be required.
- To dispose of spill waste, all contaminated sorbents, liquid waste, or other spill clean-up will be placed in small quantities in approved drums for proper storage or disposal as hazardous waste. The weight of the drums shall not exceed the chemical-specific weight listed in the table above.

### 14.4.3 Post Spill Evaluation

As part of the incident investigation and reporting documentation, a written spill response report shall be prepared at the conclusion of clean-up operations. The report will include, at a minimum, the following information:

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- Date of spill incident;
- Cause of incident;
- Spill response actions;
- Any outside agencies involved, including their incident reports; and
- Lessons learned or suggested improvements.

The spill area is inspected to ensure the area has been satisfactorily cleaned. The use of surface and air sampling is utilized in this determination as necessary. The root cause of the spill shall be examined, and corrective steps taken to ensure the engineering and control measures in place have performed, as required. If alternative precautions or measures are needed, they are made available and implemented.

All durable equipment placed into use during clean-up activities is decontaminated for future utilization. All spill response equipment and supplies are re-stocked as required.

## 14.5 Fire

AECOM employees are not expected to attempt to put out fires. Stop work; notify all AECOM personnel, move upwind and contact 911 and/or emergency response at the site. If employees have been properly trained in the operation of a fire extinguisher, they may attempt to put out a small fire, provided that the following conditions are met:

- The fire must be small (i.e., smaller than a trash can) and in its early stages;
- The employee must have an escape route;
- The employee must be trained and know they have the right type of extinguisher;
- The employee must be safe from toxic gases; and
- There must be no hazardous conditions that could quickly accelerate the fire (i.e., presence of chemicals, especially dry grass, etc.).

Above all, if in doubt, the employee must **NOT** attempt to fight the fire.

## 14.6 Environmental Impacts

AECOM strives to avoid or control environmental impacts from our operations through planning and implementation of best practices as well as preparing responses to react to environmental incidents. Environmental Compliance procedure S3AM-204-PR provides details on permitting and planning requirements.

**Potential Environmental Impacts**

| Type | Description of Hazard and Permit or Control Being Implemented |
|---|---|
| ☐ **Air Emissions** | Any operations where air emissions may negatively impact the surrounding environment, air emission permits, etc. and discuss associated control |
| ☐ **Hazardous Waste Management** | Storage, treatment, or disposal of hazardous waste at the project site, RCRA Part B permits or equivalent, 90-day storage procedures, etc. |

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**Potential Environmental Impacts**

| Type | Description of Hazard and Permit or Control Being Implemented |
|---|---|
| ☐ **Storm Water Pollution** | Operations that may generate/discharge storm water from the project site, NPDES/general construction storm water discharge permits, etc. |
| ☒ **Wetlands** | Use the FWS online wetlands mapper (http://www.fws.gov/wetlands/Data/mapper.html) to determine if any wetlands exist on your project site, are adjacent to your project, or may be negatively impacted by your project, any regulatory permits and control measures |
| ☐ **Critical Habitat(s)** | Use the FWS online critical habitat mapper tool (http://criticalhabitat.fws.gov/) to determine if any plant or animal critical habitats exists on, adjacent to, or may be otherwise impacted by your project, any regulatory permits and control measures |
| ☐ **Other:** | [Describe] |

AECOM will take the appropriate steps to mitigate environmental impacts by implementing the controls listed above and addressing any spills or fires as outlined in Sections 14.4 and 14.5, respectively.

## 14.7 Inclement Weather

Inclement weather includes but is not limited to heavy rain or storms and associated floods, heavy winds, lightning, snowstorms and blizzards, and sandstorms and haboobs. Weather conditions which are normal or expected can cause hazards, such as cold weather in winter or excessive heat in the summer. The best approach to preventing exposure to these hazards is project planning. Where possible, plan to perform work at seasonably appropriate times of the year. Starting several days to a week prior to field work, begin reviewing projected weather forecasts to determine if work should be delayed, or accelerated, to avoid days with higher chances of inclement weather. Weather conditions can change rapidly. Therefore, field personnel and the project managers should be prepared to utilize Stop Work Authority if uncontrolled hazardous situations develop. Additional precautionary measures for reasonably foreseeable weather conditions are provided below.

### 14.7.1 Ambient Temperature (Heat and Cold)

Heat and cold stress may vary based upon work activities, PPE/clothing selection, geographical locations, and weather conditions. Where possible, plan work to avoid the hottest (or coldest) part of the day. To reduce the potential of developing heat/cold stress, be aware of the signs and symptoms of heat/cold stress and watch fellow employees for signs of heat/cold stress. Use vehicles or covered area for shelter and take breaks as needed.

#### 14.7.1.1 Hot Weather

In hot weather and/or work area conditions, keep hydrated, prevent over exposure to the sun with clothing or use of sun cream and take frequent breaks out of the sun. Use the “buddy system” to monitor effects of heat stress as it can be difficult to identify the impacts of heat in yourself. Create shaded work areas if appropriate. Use a strong sunscreen and wear a full-brimmed hat when in the sun to protect the back of the neck and shoulders. Refer to SH&E Procedure S3AM-113-PR1, Heat Stress, for more information.

#### 14.7.1.2 Cold Weather

In cold/wet weather and/or work area conditions, be aware of potentially slippery surfaces (wet or icy). Wear boots with good tread and carefully select your walking path to eliminate or reduce the need to traverse wet or icy surfaces.

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Wear warm / waterproof clothing and take breaks in a warm location. If heavy snows or icy weather are anticipated, consider your driving route prior to leaving for the site or returning at the end of the day. It may be necessary to stop work earlier in the day to allow time to return to lodging if road conditions are at risk of deteriorating. Refer to SH&E Procedure S3AM-112-PR1, Cold Stress, for more information.

## 14.7.2 Storms

Heavy or unexpected storms, whether they be rain, snow, or wind, represent a changed condition in which multiple hazards could be present. Stormy weather increases hazards at the job site by making travel more treacherous, both on foot and in vehicles. Visibility can be reduced. Manual tasks become more difficult as conditions worsen, increasing the chances of injury. Mental states may deteriorate increasing the risks of hazards attributable to frustration or exhaustion. Other hazards may exist; for example, winds could cause objects to blow away or strike workers or equipment or blow dust or debris into eyes. For these reasons, be aware of changing weather conditions and be prepared to stop-work to secure the project site and depart prior to storms whenever possible. If storms suddenly develop, remember that the loss of equipment or materials is far preferable to taking risks of injury by attempting to demobilize when storms are active.

## 14.7.3 Lightning

One of the most serious weather threats is lightning. A two-tier notification system consisting of alerts and stand downs shall be used to allow ample time for field teams to cease their activities, secure the work area, and seek shelter.

### 14.7.3.1 Immediate Actions – Alerts and Stand Downs

Alerts are issued by AECOM Site Supervisor and/or AECOM Site Safety Office when inclement weather, including lightning is detected within 50 miles (80 km) of the site. Alerts indicate that work crews should be prepared to cease all field activities and secure the work area. Stand Downs are issued by AECOM Site Supervisor and/or AECOM Site Safety Officer when inclement weather is detected within 30 miles (50 km) of the work area. Stand downs indicate that all work crews shall immediately cease all field activities and seek shelter. Stand downs remain in effect until the inclement weather has passed. For thunderstorms, the stand down will remain in effect for a minimum of 30 minutes following the last detection of lightning.

### 14.7.3.2 Immediate Actions - Guidance for Lightning

**Go Indoors:** Remember the phrase, "**When thunder roars, go indoors**." If you see lightning and cannot count to 30 before hearing thunder, the lightning is too close for comfort. Find a safe, enclosed shelter when you hear thunder. Safe shelters include homes, offices, shopping centers, and hard-top vehicles with the windows rolled up.

**Crouch Close to the Ground and Separate:** If you are caught in an open area, crouch down in a ball-like position (**feet and knees together**) with your head tucked and hands over your ears so that you are down low with minimal contact with the ground. **Do NOT lie down**. Lightning causes electric currents along the top of the ground that can be deadly over 100 feet away. Crouching down is the best combination of being low and touching the ground as little as possible.

**Separate:** If you are in a group during a thunderstorm, separate from each other. This separation will reduce the number of injuries if lightning strikes the ground.

If a person is struck by lightning:

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- Call 911 or other Emergency Services Contact.
- Assess the scene to ensure that continuing risk to rescuers does not exist if lightning strikes. For other electrical-related emergencies (non-lightning), ensure the source of electricity has been deenergized.
- Check to see if the victim is breathing and proceed with CPR if victim is not breathing.

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# 15. PERSONAL ACKNOWLEDGEMENT AND DISCLAIMER

By signing below, the undersigned acknowledges that he/she has reviewed the AECOM Health and Safety Plan for the **Lockheed Martin, Bloody Brook** site. The undersigned also acknowledges that he/she has been instructed in the contents of this document and understands the information pertaining to the specified work and will comply with the provisions contained therein. The employee understands that they are **NOT** to perform any work that they have not been adequately trained for and that they are to stop work if it is unsafe to proceed. Finally, the employee understands to notify the Site Supervisor and the **Incident Hotline at 800-348-5046** for any incident, ***including ANY injury even if no first aid or medical treatment is required.***

| Print Name | Signature | Organization | Date |
|---|---|---|---|
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## 15.1 Disclaimer

This HASP, and each of its provisions, is applicable only to, and for use only by, AECOM, its affiliates, and its subcontractors. Any use of this Plan by other parties, including, without limitation, third-party contractors on industrial sites or projects where AECOM is providing engineering, construction management, or similar services, without the express written permission of AECOM, will be at that party's sole risk, and AECOM Corporation shall have no responsibility. The existence and use of this Plan by AECOM shall not be deemed an admission or evidence of any acceptance of any safety responsibility by AECOM for other parties unless such responsibility is expressly assumed in writing by AECOM in a specific project contract.

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# ATTACHMENT A

## Hospital and Clinic Directions/Maps

## Incident Reporting and Response Flow Chart

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# A-1: NEAREST HOSPITAL

**Upstate Medical Center ER..... 1-315-464-5611**

| | | | |
|---|---|---|---|
| **Address:** | 750 E Adams Street | | |
| **City:** | Syracuse | | |
| **State/Province:** | NY | **Postal/Zip Code:** | 13210 |
| **Estimated Travel Time:** | 11 minutes | **Distance:** | 5.6 miles |

**DRIVING DIRECTIONS**

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- From Site, head southeast to Electronics Parkway
- Turn right onto Electronics Parkway
- Turn left onto Old Liverpool Road
- Merge onto I-81 South to Syracuse
- Take exit 18 towards Adams Street
- Turn right onto Almond Street
- Turn left onto E Adams Street
- Turn right at Elizabeth Blackwell St – destination will be on the right

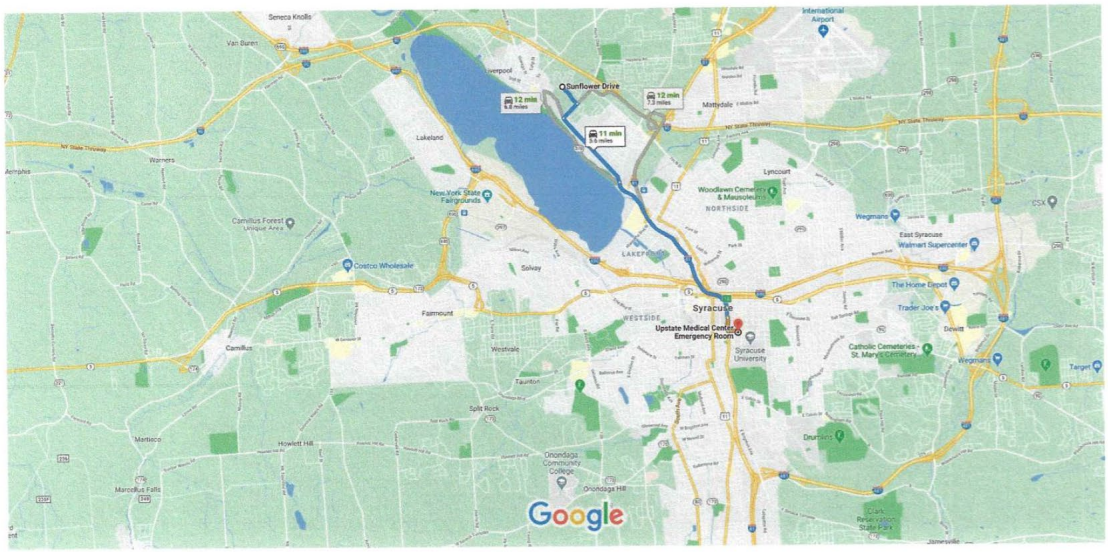
**MAP TO HOSPITAL**

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Google Maps

# Sunflower Dr, Liverpool, NY 13088 to upstate medical center emergency room

Drive 5.6 miles, 11 min




Map data ©2021 Google 1 mi

## Sunflower Dr
Salina, NY 13088

1. Head southeast on Sunflower Dr toward Grandy Dr
1 min (0.4 mi)

**Take Old Liverpool Rd and I-81 S to Almond St in Syracuse. Take exit 18 from I-81 S**
7 min (4.8 mi)

2. Turn right onto Electronics Pkwy
0.3 mi

3. Turn left onto Old Liverpool Rd
Pass by Valvoline Instant Oil Change (on the right)
1.4 mi

4. Use any lane to merge onto I-81 S via the ramp to Syracuse
2.9 mi

5. Take exit 18 toward Adams St
0.2 mi

**Follow Almond St and E Adams St to your destination**
2 min (0.4 mi)

6. Turn right onto Almond St
0.2 mi



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# A-2: NEAREST OCCUPATIONAL CLINIC

**North Medical Urgent Care (a.k.a: St. Joseph's Physicians Urgent Care).....315-452-2333**

| | | | |
|---|---|---|---|
| **Address:** | 5100 W Taft Road | | |
| **City:** | Liverpool | | |
| **State/Province:** | NY | **Postal/Zip Code:** | 13088 |
| **Estimated Travel Time:** | 10 minutes | **Distance:** | 3.5 miles |
| **Business Hours:** | 7am-10pm | | |

## DRIVING DIRECTIONS

- From site, head to Electronics Parkway
- Turn left onto Electronics Parkway
- Follow to W Taft Rd, turn right onto W. Taft Rd
- Turn right onto Janus Park Drive
- Destination is on your left within the North Medical Center complex

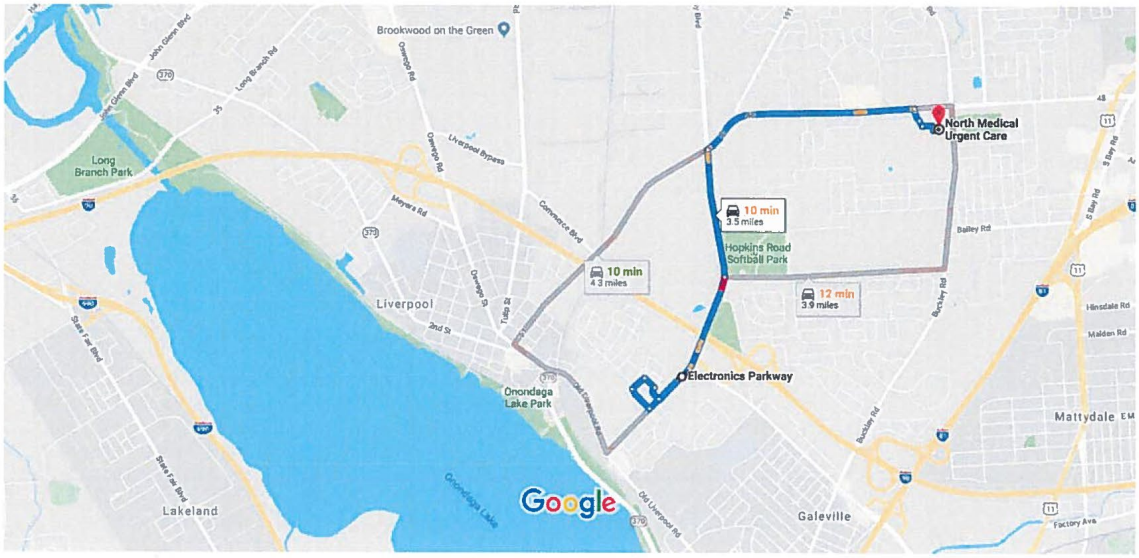
## MAP TO OCCUPATIONAL CLINIC

© AECOM Restricted

Google Maps

## Electronics Pkwy, Salina, NY 13088 to North Medical Urgent Care

Drive 3.5 miles, 10 min




Map data ©2019 2000 ft

### Electronics Pkwy
Salina, NY 13088

1. Head southwest on Electronics Pkwy
   31 s (0.2 mi)

**Continue on Sunflower Dr to Electronics Pkwy**
1 min (0.4 mi)

2. Turn right onto Sunflower Dr
   0.1 mi
3. Turn right onto Viking Pl
   472 ft
4. Turn right onto Joel Ave
   397 ft
5. Turn right onto Daniel Dr
   423 ft

**Take W Taft Rd to Janus Park Dr in Clay**
6 min (2.6 mi)

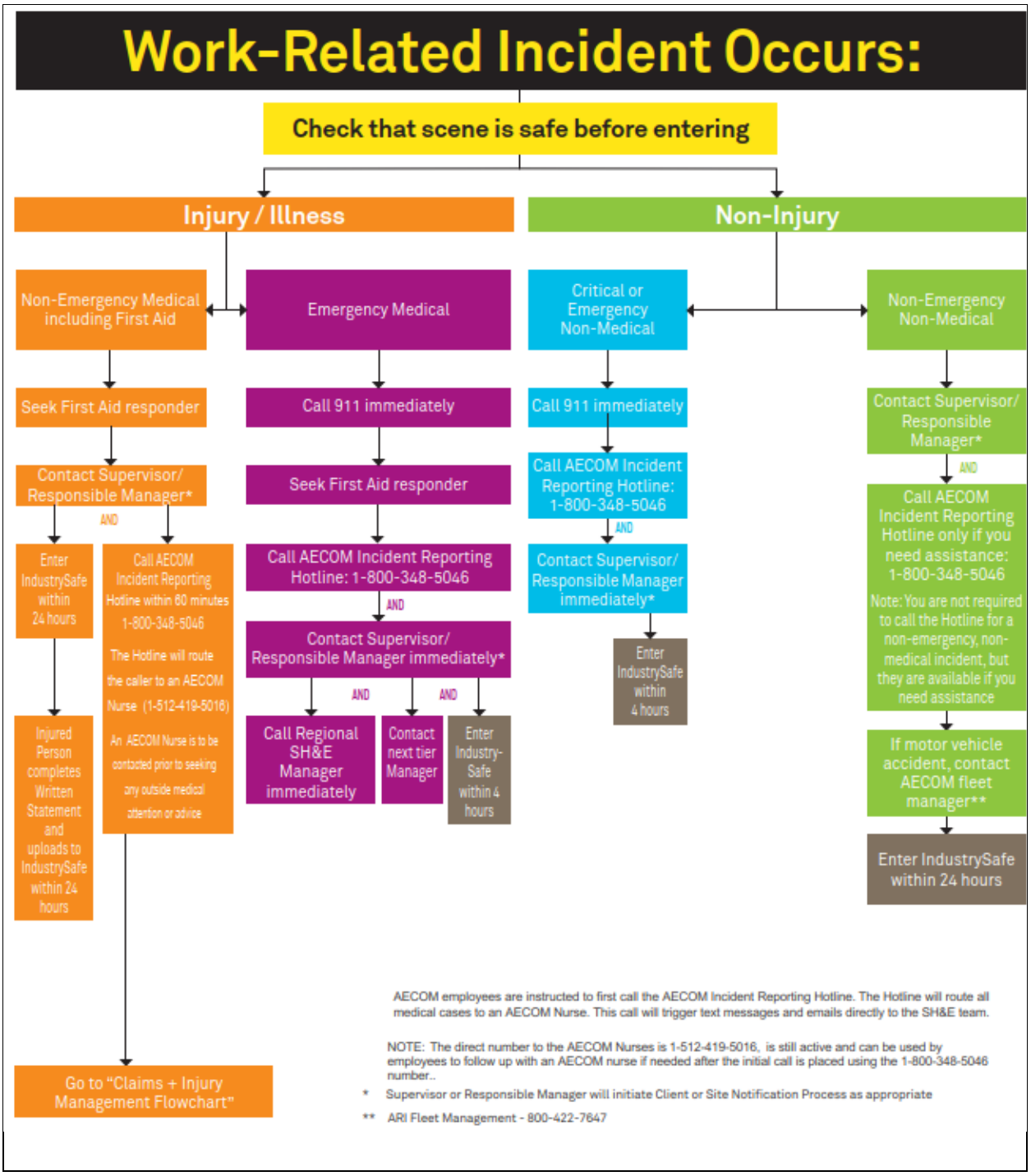
6. Turn left at the 1st cross street onto Electronics Pkwy
   0.8 mi



[Insert Map to Clinic Here]

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## A-3: INCIDENT REPORTING AND RESPONSE FLOW CHART



# ATTACHMENT B

## Task Hazard Assessment (THA) and Tailgate Meeting Forms

Each discrete task being performed during the project (i.e., Driving, Inspection, Sample Collection, etc.) requires a Task Hazard Assessment (THA; form S4[DCS]AM-209-FM6-A). If you don't have a THA for a task, obtain or develop one. The DCS Americas Templated THA Library may also be used to find previously approved THAs.

The THAs MUST be reviewed at the start of each shift and signed by all staff involved in the operation. The THAs should be consulted and updated throughout the day if conditions change using the 'On-Site Edits' lines.

Insert Task Hazard Analyses here. Include these documents after this cover sheet in the final HASP.

The preparer shall download a sufficient number of blank copies of the Tailgate Meeting Form (S3AM-209-FM5) to use each day of fieldwork, and blank THA forms so that new task can be performed, if not covered by previously-prepared THAs. A THA must be in hand prior to starting to perform work on any task.

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# B-1: TASK HAZARD ASSESSMENT INSTRUCTIONS

Each unique task or work group should have their own THAs. If workers have a THA for their task(s) in hand, they should simply review it and document the site-specific edits in red pen in the appropriate section. If workers do ***NOT*** have a THA for all tasks to be performed, a THA must be obtained or drafted *prior to starting work* on that task. Use additional pages as needed.

- Identify the basic steps of the task that must be performed in order and their associated hazards. Identify controls or barriers to mitigate each identified hazard.
- Clearly identify any **STOP WORK** triggers
- Document stop work and change management if conditions/ scope changes.
- Use 4-Sight to identify and mitigate site-specific hazards throughout the day. Modify the THA as needed. Contact site supervisors or the PM for any significant scope changes or changes of expected conditions.
- All THAs shall be 3 pages (maximum) or less (preferred). If they are longer, the task is too broad.
- All hazards will use standardized nomenclature (Hazard Wheel), should be specific, detail how someone could be hurt, and what the outcome could be.
- All actions to mitigate hazards must be specific, clearly aligned with its respective hazard and not generic. Avoid words such as "*proper", "correct*", or "*appropriate*"). Use specifics and numerical values (i.e., wear disposable nitrile gloves, stand back 6 feet/1.8 meters, take a 10 minute break every hour).
- PPE cannot be the only line of defense - PPE is always the last line of defense, so think through what other controls (engineering, administrative, etc.) could mitigate hazards.

**Discuss as Applicable and Modify THA as Needed**

| Note: Check ☐ if reviewed or mark N/A | | | |
|---|---|---|---|
| 1 | Biological, Chemical, Electrical, and Physical Hazards | ☐ Reviewed | ☐ N/A |
| 2 | Decontamination Procedures | ☐ Reviewed | ☐ N/A |
| 3 | Ergonomics- Lifting, Body Position | ☐ Reviewed | ☐ N/A |
| 4 | Lock Out/ Tag Out | ☐ Reviewed | ☐ N/A |
| 5 | Short Service Employees- visual identifier and mentor/ oversight assignment | ☐ Reviewed | ☐ N/A |
| 6 | Simultaneous/ Neighboring Operations | ☐ Reviewed | ☐ N/A |
| 7 | Slip/ Trip/ Fall Hazards | ☐ Reviewed | ☐ N/A |
| 8 | Specialized PPE Needs | ☐ Reviewed | ☐ N/A |
| 9 | Traffic Control | ☐ Reviewed | ☐ N/A |
| 10 | Waste Management/ Decontamination | ☐ Reviewed | ☐ N/A |
| 11 | Weather Hazards/ Heat Stress/ Cold Stress | ☐ Reviewed | ☐ N/A |
| 12 | Changes in Personnel, Equipment/Machinery, Methods and Materials | ☐ Reviewed | ☐ N/A |
| 13 | Work Permit requirements (identify): | ☐ Reviewed | ☐ N/A |
| 14 | Other (describe): | ☐ Reviewed | ☐ N/A |

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## B-1: TASK HAZARD ASSESSMENT INSTRUCTIONS (Continued)

**Using the Matrix:**

1. Identify basic steps of the task and associated hazards.
2. Calculate the initial risk rating.
3. Identify control measure to eliminate or reduce the hazard's risk and calculate the residual risk rating.
4. If the risk rating (after controls are implemented) cannot be reduced to 4 or lower, additional approvals are needed before the activity can begin.

| Severity – Potential Consequences | | | | |
|---|---|---|---|---|
| | **People** | **Property Damage** | **Environmental Impact** | **Public Image/Reputation** |
| Catastrophic | Fatality, Multiple Major Incidents | >$1M USD, Structural collapse | Offsite impact requiring remediation | Government intervention |
| Critical | Permanent impairment, Long term injury/illness | >$250K to $1M USD | Onsite impact requiring remediation | Media intervention |
| Major | Lost/Restricted Work | > $10K to $250K USD | Release at/above reportable limit | Owner intervention |
| Moderate | Medical Treatment | > $1K to $10K USD | Release below reportable limit | Community or local attention |
| Minor | First Aid | </=$1K USD | Small chemical release contained onsite | Individual complaint |

| Probability | | |
|---|---|---|
| Frequent | Expected to occur during task/activity | 9/10 |
| Probable | Likely to occur during task/activity | 1/10 |
| Occasional | May occur during the task/activity | 1/100 |
| Remote | Unlikely to occur during task/activity | 1/1,000 |
| Improbable | Highly unlikely to occur, but possible during task/activity | 1/10,000 |

| **Probability** | **Severity** | | | | |
|---|---|---|---|---|---|
| | 5 - Catastrophic | 4 – Critical | 3 – Major | 2 – Moderate | 1 - Minor |
| 5 – Frequent | 25 | 20 | 15 | 10 | 5 |
| 4 – Probable | 20 | 16 | 12 | 8 | 4 |
| 3 – Occasional | 15 | 12 | 9 | 6 | 3 |
| 2 – Remote | 10 | 8 | 6 | 4 | 2 |
| 1 - Improbable | 5 | 4 | 3 | 2 | 1 |

| Risk Rating (Probability x Severity) | Risk Acceptance Authority |
|---|---|
| 1 to 4 (Low) | Risk is tolerable, manage at local level |
| 5 to 9 (Medium) | Risk requires approval by Operations Lead/Supervisor & Safety Manager |
| 10 to 25 (High) | Risk requires the approval of the Operations Manager & Safety Director |

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# B-2: PROJECT TASK HAZARD ASSESSMENTS (THAs)

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# Task Hazard Assessment

AECOM Imagine it. Delivered.

| **Task Name:** | **Field and Field Office – Precautions for Coronavirus** |
|---|---|

| | | | | | |
|---|---|---|---|---|---|
| **Project Name:** | Bloody Brook 2021 Monitoring and Maintenance | Client: | Lockheed Martin | **Date:** | 2/25/2021 |
| **Permits Required? (list):** | Essential Services Letter required for travel if required by ocal ordinance | **Work Location:** | Bloody Brook site – all outdoors | | |

**THIS THA MUST BE FULLY REVIEWED AND ACKNOWLEDGED DAILY BY ALL AECOM STAFF and AECOM SUBS ON-SITE**

**All job steps, hazards, work practices & PPE are to be clearly understood and implemented. All necessary revisions have been written on the THA.**

| | |
|---|---|
| **Required PPE:** | ☒ Hard Hat ☒ Safety Glasses ☒ HiVis Vest ☒ Safety Toe Boots ☐ Gloves: ☐ Hearing Protection ☐ Other: _____ |
| | For certain tasks (see THA below) the following are required:<br>Potable water and soap (preferable) or hand sanitizer w/ 60% alcohol<br>Disinfectant wipes<br>Tissues<br>Nitrile gloves<br>Safety goggles<br>Coveralls<br>Disinfectant spray List of Cleaning Products to Kill Coronavirus<br><br>Face covering when you are not able to maintain 6' social distance or where required by client or government order. Face coverings can be made from household materials by using needles, thread, cloth, tee-shirts, bandanas, etc. KN95, N95, dust/face masks are also acceptable. Local requirements may vary. https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/diy-cloth-face-coverings.html<br><br>PPE Note: Consider checking sources such as gas stations and specialty markets, as these may have equipment or materials not available at general grocery stores. |
| **Tools & Equipment:** | |

**REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!**

| **Job Steps**<br>*List all steps required to perform a task in the sequence they are performed* | **Potential Hazards**<br>*How could you be hurt? What would the injury be?* | **Risk**<br>*(initial)* | **Critical Actions to Mitigate Hazards**<br>*List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact.* ***Identify any 'Stop Work' triggers.*** | **Risk**<br>*(final)* |
|---|---|---|---|---|
| 1. Fitness for Duty check (performed at home prior to work) | 1a. Being unfit for duty – impacted by illness including coronavirus | 12 | 1a. Ensure you are fit for duty<br>Are you or have you been in any of these situations?<br>➢ I have had close contact with a confirmed case or a symptomatic person under investigation for coronavirus in the last 14 days.<br>➢ A doctor requested me to be tested for coronavirus or instructed me to self-quarantine?<br>➢ A member of my household or someone I was in close contact within the last 14 days experienced some of the following symptoms: fever, cough, shortness of breath, fatigue, sore throat, chills, gastro-intestinal disease or diarrhea, loss of taste/smell.<br>➢ I have or previously had some of the following symptoms in the last 7 days: fever or chills, cough, shortness of breath or difficulty breathing, fatigue, muscle or body ache, headache, new loss of taste/smell, sore throat, congestion or runny nose, nausea or vomiting, or diarrhea.. | 4 |

# Task Hazard Assessment

AECOM Imagine it. Delivered.

**Task Name:** Field and Field Office – Precautions for Coronavirus

| | | | | |
|---|---|---|---|---|
| | | | ➢ Where required, my temperature check today shows a fever, without the use of fever reducing medications in the last 24 hours? (100.4 F [37.8C] or above or exceeding criteria required by local order or client requirements).<br><br>**If response is a YES, then do not access the workplace**. If AECOM employee, contact your Supervisor and the AECOM Nurse at **512-419-5016** for advice.<br><br>**If response is a NO or Yes, but released by AECOM nurse, you can proceed to work**. You may be asked to check your temperature again when you arrive to your workplace. | |
| ***On-Site Edits:*** | | | | |
| 2. Travel by vehicle or air required | 2a. Being in an enclosed space with poor air circulation in close contact with other people. | 12 | 2a. For Vehicle travel, review the "Preparations for Travel when Driving (fleet, rental and personal vehicles) to Minimize Coronavirus Exposure" THA for driving and the "Preparations for Travel when flying to Minimize Coronavirus Exposure" for flying. | 4 |
| ***On-Site Edits:*** | | | | |
| 3. General Field Work | 3a. Working Around Others | 12 | 3a. **Personnel must maintain at least 6-foot distance from each other** (see note below if this seems to be unachievable)**.** Practice social distancing at tailgate meetings, in break rooms and job trailers. Completely avoid (if possible) or limit the number of people in job trailers and other confined areas at any one time so that this distance can be maintained. If possible, hold meetings outside. If indoors, open window(s) for circulation. Wipe down window handles prior to opening. Even when practicing social distancing, we must limit the amount of people in any one group to less than 10 people.<br><br>Clean all surfaces of your hands often with soap and water for at least 20 seconds. If soap and water are not readily available, use a hand sanitizer that contains at least 60% alcohol. Cover all surfaces of your hands, including around and under fingernails and rub them together until they feel dry. When using hand sanitizer, be sure your hands are completely dry prior to touching any objects or surfaces.<br><br>Wear safety glasses or goggles and avoid contact/touching of face, eyes, nose, and mouth. Cover your mouth and nose with a tissue when you cough or sneeze or use the inside of your elbow. Throw used tissues in the trash. Immediately wash or sanitize your hands.<br><br>**NOTE**: . Face coverings will also be worn at all times when a minimum of 6 feet separation cannot be maintained or when there will be a shared workspace. If you feel your task cannot be performed by maintaining social distancing, face coverings will be worn in combination with additional behavioral or PPE controls. If additional guidance is required, contact your SH&E manager to discuss the use of additional controls. Please keep in mind, face coverings alone will not protect you from Coronavirus, so additional controls must be added.<br><br>If the need arises to enter a personal residence, **prepare a separate task specific THA** for this task. | 4 |
| | 3b. Handling Shared Equipment and Tools | 12 | | |

**Task Name:** **Field and Field Office – Precautions for Coronavirus**

| | | | | |
|---|---|---|---|---|
| | 3c. Exposure during Lunch and Bathroom Breaks | 12 | 3b. Wipe down and disinfect equipment before use with soap/water or disinfectant wipes. Wear disposable gloves when wiping surfaces down with disinfectant. Regularly wash hands when handling tools or equipment. Wash hands before eating or drinking.<br><br>3c. Be sure to wash hands with soap/water whenever a bathroom is nearby. At minimum, do so during bathroom and lunch breaks. Use a paper towel to open door handle when exiting bathroom. If using outside toilet facilities (i.e. Porta Johns), wash hands with soap and water or hand sanitizer both before and after opening/closing the door.<br><br>Where possible, employees are encouraged to pack meals and snacks as needed for the project duration and avoid visiting stores and restaurants. If necessary, modify your schedule to avoid restaurants and public restrooms during peak, i.e., crowded, periods to minimize contact with the public. Use drive-through service for food pick-up if available. | 4 |
| | 3d. Lack of food/water/supplies | 4 | Avoid eating lunch as a group, if you must, do so outside or in a space with windows open (wipe down windows prior to opening). Maintain 6 feet or more and do not share dishes (e.g., bag of chips, communal salad bowl, etc.) Refrain from sharing a field office coffee pot.<br><br>Many locations may have shortages of food, water, or supplies or closed restaurants. Bring food, water, and supplies to allow you to work a full shift without additional provisions. | 1 |
| ***On-Site Edits:*** | | | | |
| 4. Office Work | 4a. Working around others | 12 | 4a. Work from home when possible.<br><br>Clean hands often with soap and water for at least 20 seconds after using the restroom, after you have been in a public place, before and after eating or after blowing your nose, coughing, or sneezing. If soap and water are not readily available, use a hand sanitizer that contains at least 60% alcohol. Cover all surfaces of your hands, including around and under fingernails, and rub them together until they feel dry. Cover your mouth and nose with a tissue when you cough or sneeze or use the inside of your elbow. Throw used tissues in the trash. Immediately wash or sanitize your hands.<br><br>Sit at least six feet apart from others. Change workstations and meeting room setup to accommodate this social distancing. Even if you are practicing social distancing, we must still limit groups of people to less that 10. Do not eat or hang out in common areas.<br><br>Maintain social distancing during tailgate meetings and/or THA reviews, supervisor should seek verbal agreement from all and note this rather than passing pen and clipboard around for signature. Avoid passing round other items such as sign-in sheets as well.<br><br>Make hand-sanitizers, sanitizing wipes, and other hygienic supplies readily available. | 4 |
| | 4b. Encountering frequent "touch points" and handling shared equipment | 12 | 4b. Wipe down keyboards, mouse, phone, headset/headphones, any other "touch points". Limit contact of shared items. Wipe down surfaces before contacting them. Wash hands after handling or wear disposable gloves.<br><br>In reception areas, use your own pen to sign in and out of offices. Remove unnecessary items such as business card holders, communal candy jars, etc. | 4 |

# Task Hazard Assessment

AECOM Imagine it. Delivered.

**Task Name:** **Field and Field Office – Precautions for Coronavirus**

| | | | | | |
|---|---|---|---|---|---|
| | | | | Work with facilities to assign someone to clean AND disinfect frequently touched surfaces daily. Follow the manufacturer's instructions for all cleaning and disinfection products (e.g., concentration, application method and contact time. | |
| ***On-Site Edits:*** | | | | | |

## Additional Notes:

**Where required, supplies (i.e., disinfectant spray/wipes, soap/hand sanitizer, nitrile gloves) should be made available prior to starting work. Request re-supply if stock runs low.**

Use disinfectant products that contain at least 70% alcohol. Use alcohol-based hand sanitizer that contains at least 60% alcohol. Wash hands with soap and water whenever available. Remember that soap (including bar soap) is generally available and is considered superior to hand sanitizer or disinfectant wipes/spray.

Common touch points and surfaces include but are not limited to:

- Arms on chairs
- Tabletops
- Doorknobs and handles
- Countertops
- Elevator Buttons
- Coffee Pots
- Refrigerator / microwave / dishwasher / toaster handles
- Water Dispensers
- Cabinet and file drawer knobs / handles
- Shared office supplies such as staplers, paper cutters, scissors, packaging tape dispensers, writing utensils
- Phone receivers, keypads
- Copier / printer / fax control buttons
- Sink faucets
- Light switches

If any staff are showing any possible symptoms of or have been in recent direct contact with others showing symptoms of CORONAVIRUS, **STOP WORK**. Notify the site supervisor and the project manager and go home and/or stay home. Contact the AECOM Incident Reporting Hotline (1-800-348-5046) and/or the AECOM Nurse Line (1-512-419-5016), and notify the Area SH&E Manager. A list of common symptoms to look out for can be found here: AECOM Guidance for Coronaviruses

Visit the CDC webpage on cleaning and disinfecting procedures: CDC Guidance for Community and Residential Cleaning-Disinfection for Coronavirus.

# Task Hazard Assessment

AECOM Imagine it. Delivered.

**Task Name:** **Field and Field Office – Precautions for Coronavirus**

A list of approved disinfectants for use against SARS-CoV-2, the cause of CORONAVIRUS, is available here: US EPA List of Disinfectants Effective Against Coronaviruses

## Revision Log

| Version | Issued / Revised By | Date | Revision Summary |
|---|---|---|---|
| THA Revisions | | | |
| 0 | Amanda Lanning & Kelly Dwyer | March 23, 2020 | Original version |
| 1 | Patrick Walz | March 26, 2020 | Added new Step 1, Fitness for Duty Check. Modified language related to stopping work when PPE supplies are unavailable. Added instructions for making diluted bleach solution. Modified vehicle use instructions to allow long-term rental and fleet vehicle use. |
| 2 | Scott Dietz | April 2, 2020 | Added new Step 5, Traveling/Out of Town Work |
| 3 | Patrick Walz & Joan Root | April 13, 2020 | Modified language related to hotel stays. Moved instructions for making diluted bleach solution from PPE section to Step 6 and added hazards and mitigations. Added note regarding requirements for face coverings to PPE section, and added tips for obtaining sources of PPE. |
| 4 | Scott Dietz, Kelly Dwyer, Patrick Walz, & Devon Molitor | May 1, 2020 | Added revision log. Modified language related to office cleaning to clarify that facilities should be contacted to arrange office cleaning. Modified Step 3 to clarify social distancing requirements and added “note” with steps to take when not possible. |
| 5 | Walz, Dietz, Dwyer, Indorato, Gregory, Molitor, Cooter | May 5, 2020 | Modified the Fit for Duty language, removed requirement to wear nitrile gloves when driving and opening/closing doors and windows, modified language if AECOM personnel must enter a personal residence. |
| 6 | Walz, Dietz, & Shelley Brown | June 17, 2020 | Modified the symptoms of coronavirus, removed language regarding travel and hotel stays and provided link to new travel THAs which cover those topics in greater detail. Various additional minor modifications to text and formatting. Modified initial risk ratings. |
| Project-Specific Revisions | | | |
| | | | |
| | | | |
| | | | |

# Task Hazard Assessment

AECOM Imagine it. Delivered.

**Task Name:** Field and Field Office – Precautions for Coronavirus

## All Employees:

**STOP WORK** if uncertain about safety or if a hazard or additional precaution is not recorded on the THA.

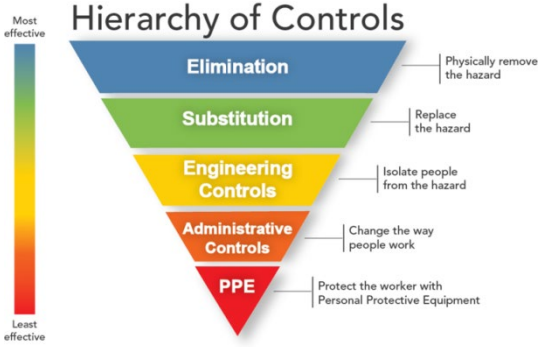
Be alert, recognize and communicate any changes in scope, personnel or conditions at the worksite to the supervisor.

Use **4-Sight**, AECOM's last-minute risk assessment process continuously throughout the day by asking yourself and your co-workers to assess your task, hazards, and mitigations. Amend the THA when needed.

- ***What am I about to do?***
- ***What can go wrong?***
- ***What can be done to make it safer?***
- ***What have I done to communicate the hazards?***

**For a more thorough identification of hazards, ask "What else could go wrong?" using the Hazard Categories**




- ***Most hazards need more than one control***
- ***What should you do? Stack your controls***
- ***PPE can NEVER be your only means of protection***

| Worker Sign On | |
|---|---|
| *I participated in the on-site review and fully understand the content of this Task Hazard Assessment.* | |
| **Printed Name** | **Signature** |
| **1. Supervisor:** | |
| **2.** | |
| **3.** | |
| **4.** | |
| **5.** | |
| **6.** | |
| **7.** | |
| **8.** | |
| **9.** | |
| **10.** | |

| Visitor Acknowledgement |
|---|
| *Visitors review task hazards and acknowledge understanding* |
| 1. |
| 2. |
| 3. |
| 4. |
| 5. |
| 6. |
| 7. |
| 8. |
| 9. |
| 10. |

**Submit a new THA for addition to the DCSA THA Library or send THA improvement suggestions to DCSA.THA.Library@AECOM.com**
**Include a copy of the new THA or a photo of the THA modifications as appropriate.**

# Task Hazard Assessment

AECOM Imagine it. Delivered.

**Task Name:** Site Maintenance and Planting

| | | | | | |
|---|---|---|---|---|---|
| **Project Name:** | **Bloody Brook Monitoring and Maintenance** | **Client:** | Lockheed Martin | **Date:** | February 23, 2021 |
| **Permits Required? (list):** | No | **Work Location:** | Liverpool, NY | | |

**This THA must be fully reviewed with all staff members. All job steps, hazards, work practices, and PPE are clearly understood and have been implemented. All necessary revisions have been written on the THA.**

| | |
|---|---|
| **Required PPE:** | ☒ Hard Hat ☒ Safety Glasses ☒ HiVis Vest ☒ Safety Toe Boots ☒ Gloves: Leather as needed ☐ Hearing Protection ☐ Other: |
| **Tools & Equipment:** | Emergency kit Communication device (cell phone) Navigation system |

**REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!**

| **Job Steps** *List all steps required to perform a task in the sequence they are performed* | **Potential Hazards** *How could you be hurt? What would the injury be?* | **Risk** *(initial)* | **Critical Actions To Mitigate Hazards** *List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact.* ***Identify any 'Stop Work' triggers.*** | **Risk** *(final)* |
|---|---|---|---|---|
| 1. Trip Planning | 1a. Unauthorized driving | 9 | 1a. You must be an AECOM authorized driver to drive for AECOM business purposes. Consult the requirements of S3AM-005-PR1. Authorized Drivers shall maintain a current driver's license with full privileges applicable to the vehicle to be operated. Develop a Journey Management Plan if applicable. | 4 |
| | 1b. Inclement weather | 6 | 1b. Evaluate weather conditions prior to beginning the travel to determine if travel should proceed. Verify your vehicle is equipped to travel in poor weather. Have supplies on hand in the event that you become stranded, including a communication device to call for help. | 4 |
| | 1c. Getting Lost | 6 | 1c. Review route in advance and program GPS prior to leaving | 3 |
| | 1d. Inadequate vehicle for the site/trip | 7 | 1d. Understand what type of vehicle is necessary to transport tools & equipment to the site. Know site conditions before departure and obtain proper vehicle, 4-Wheel drive if necessary | 4 |
| | 1e. Vehicle malfunction | 8 | 1e. Inspect vehicle prior to leaving. Verify that maintenance records are current. | 4 |
| ***On-Site Edits:*** | | | | |
| 2. Driving | 2a. Fatigue | **15** | 2a. Start trip well rested & take breaks when needed. Share driving responsibilities where possible. **STOP DRIVING AND PULL OVER** in a safe place if you begin | 4 |

# Task Hazard Assessment

AECOM Imagine it. Delivered.

**Task Name:** Site Maintenance and Planting

| REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on! | | | | |
|---|---|---|---|---|
| **Job Steps**<br>*List all steps required to perform a task in the sequence they are performed* | **Potential Hazards**<br>*How could you be hurt? What would the injury be?* | **Risk**<br>*(initial)* | **Critical Actions To Mitigate Hazards**<br>*List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact.* ***Identify any 'Stop Work' triggers.*** | **Risk**<br>*(final)* |
| | | | nodding off or showing other signs of fatigue. if you are traveling with a passenger the passenger must remain awake and alert. | |
| | 2b. Risky driving practices | **15** | 2b. Practice defensive driving techniques and avoid bad driving habits<br>• Allow for adequate time to make the trip<br>• Do not speed or attempt to multi-task<br>• Do not use cell phone or text or attempt to program GPS while driving | 4 |
| ***On-Site Edits:*** | | | | |
| 3. Stops/breaks during transit | 3a. Theft of equipment/materials | 6 | 3a. Place items out of sight and lock vehicle when leaving it. Do not leave vehicle unattended for longer than necessary. If at all possible, avoid leaving packed vehicles in public parking areas overnight, unload if possible. Park in well lighted areas. | 4 |
| | 3b. Personal security risk | **10** | 3b. Be alert and aware of surroundings when making stops. Stop at areas which are well lit and have security if possible. | 3 |
| ***On-Site Edits:*** | | | | |
| 4. Planting shrubs and vegetation:<br>- Use shovel to dig shallow hole.<br>- Place planting in hole and cover roots with soil.<br>- Place mulch around base of planting.<br>Arrangement of rip-rap:<br>Watering of plantings:<br>- using 5-gallon bucket, bring water from Bloody Brook to fill watering bags on plantings. | 4a. Biological hazards | 4 | 4a. There are many different types of biological hazards that can be encountered on a work site. These include ticks, spiders, mosquitoes, chiggers, poisonous or other noxious plants, alligators, bears, small mammals, bird droppings, small mammals, snakes, etc. Consult S3AM-313-PR1 and the multiple attachments to determine the biological hazards that may be present and the mitigation measures for each. | 2 |
| | 4b. Feral & wild animals | 4 | 4b. Do not attempt to pick up, handle, or otherwise handle stray or wild animals such as dogs, cats, raccoons, squirrels, etc., no matter how tame they may appear. | 2 |
| | 4c. Heat stress | 6 | 4c. Know the signs and symptoms of heat stress (refer to the procedure S3AM-113-PR1 for information. Have adequate drinking water available and drink frequently. Arrive at the site well hydrated and physically fit. | 3 |

# Task Hazard Assessment

AECOM Imagine it. Delivered.

**Task Name:** Site Maintenance and Planting

**REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!**

| Job Steps<br>*List all steps required to perform a task in the sequence they are performed* | Potential Hazards<br>*How could you be hurt? What would the injury be?* | Risk<br>*(initial)* | Critical Actions To Mitigate Hazards<br>*List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact.* ***Identify any 'Stop Work' triggers.*** | Risk<br>*(final)* |
|---|---|---|---|---|
| | 4d. Cold stress | 6 | 4d. Know the health concerns associated with working in cold weather including hypothermia, frost bite, etc. (see S3AM-112-PR1). Dress in layers and take warming breaks. | 4 |
| | 4e. Sunburn | 6 | 4e. Have sunblock available and apply and reapply as per directions. Avoid direct solar exposure when possible. Seek breaks in shaded areas. | 3 |
| | 4f. Slips/trips/falls | 6 | 4f. Be aware of walking surfaces at all times, wear footwear with good tread and ankle support, use handrails where available, avoid walking in muddy or wet areas when possible, identify and mark or have removed any obstructions that may be present in predicted walking paths. | 4 |
| | 4g. Pinch points | 6 | 4g. Take care when moving stone, do not attempt to move large rip-rap; wear protective gloves (e.g., leather). Lift and place rip-rap carefully, never throw the rip-rap. | 4 |
| | 4h. Back/muscle strain | 6 | 4h. During planting and other maintenance activities, use safe lifting practices, loads greater than 49 pounds should be lifted by two people. Implement stretch and flex prior to performing strenuous tasks. | 4 |
| | 4i. Work near water | 8 | 4i. Work near the Bloody Brook channel or ponded areas within the wetlands will not be completed at times of high flow, when the water is deeper than about 18 inches. At normal flow, water is 18 inches or less. Always work in a buddy system when working in the water and/or marshy areas. Keep a pathway from the trees being watered to Bloody Brook clear and free from tripping hazards. | 0 |

**Additional Notes:**

# Task Hazard Assessment

AECOM Imagine it. Delivered.

## All Employees:

**STOP WORK** if uncertain about safety or if a hazard or additional precaution is not recorded on the THA.

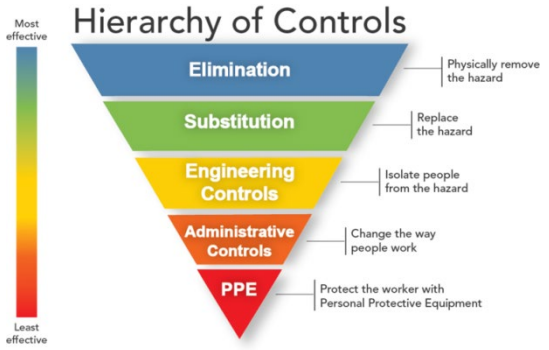
Be alert, recognize and communicate any changes in scope, personnel or conditions at the worksite to the supervisor.

Use **4-Sight**, AECOM's last minute risk assessment process continuously throughout the day by asking yourself and your co-workers to assess your task, hazards, and mitigations. Amend the THA when needed.

- ***What am I about to do?***
- ***What can go wrong?***
- ***What can be done to make it safer?***
- ***What have I done to communicate the hazards?***

**For a more thorough identification of hazards, ask "What else could go wrong?" using the Hazard Categories**




- ***Most hazards need more than one control***
- ***What should you do? Stack your controls***
- ***PPE can NEVER be your only means of protection***

| Worker Sign On | |
|---|---|
| *I participated in the on-site review and fully understand the content of this Task Hazard Assessment.* | |
| **Printed Name** | **Signature** |
| **1. Supervisor:** | |
| **2.** | |
| **3.** | |
| **4.** | |
| **5.** | |
| **6.** | |
| **7.** | |
| **8.** | |
| **9.** | |
| **10.** | |

| Visitor Acknowledgement |
|---|
| *Visitors review task hazards and acknowledge understanding* |
| 1. |
| 2. |
| 3. |
| 4. |
| 5. |
| 6. |
| 7. |
| 8. |
| 9. |
| 10. |

**Submit a new THA for addition to the DCSA THA Library or send THA improvement suggestions to DCSA.THA.Library@AECOM.com**
**Include a copy of the new THA or a photo of the THA modifications as appropriate.**

# Task Hazard Assessment

AECOM Imagine it. Delivered.

| **Task Name:** | **Wetland Monitoring and Site Inspection** |
|---|---|

| | | | | | |
|---|---|---|---|---|---|
| **Project Name:** | **Bloody Brook Monitoring and Maintenance** | **Client:** | Lockheed Martin | **Date:** | February 23, 2021 |
| **Permits Required? (list):** | No | **Work Location:** | Liverpool, NY | | |

**This THA must be fully reviewed with all staff members. All job steps, hazards, work practices, and PPE are clearly understood and have been implemented. All necessary revisions have been written on the THA.**

| | |
|---|---|
| **Required PPE:** | ☒ Hard Hat ☒ Safety Glasses ☒ HiVis Vest ☒ Safety Toe Boots ☒ Gloves: Leather / Nitrile as needed ☐ Hearing Protection ☐ Other: |
| **Tools & Equipment:** | Emergency kit Communication device (cell phone) Navigation system |

**REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!**

| **Job Steps** *List all steps required to perform a task in the sequence they are performed* | **Potential Hazards** *How could you be hurt? What would the injury be?* | **Risk** *(initial)* | **Critical Actions To Mitigate Hazards** *List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact.* ***Identify any 'Stop Work' triggers.*** | **Risk** *(final)* |
|---|---|---|---|---|
| 1. Trip Planning | 1a. Unauthorized driving | 9 | 1a. You must be an AECOM authorized driver to drive for AECOM business purposes. Consult the requirements of S3AM-005-PR1. Authorized Drivers shall maintain a current driver's license with full privileges applicable to the vehicle to be operated. Develop a Journey Management Plan if applicable. | 4 |
| | 1b. Inclement weather | 6 | 1b. Evaluate weather conditions prior to beginning the travel to determine if travel should proceed. Verify your vehicle is equipped to travel in poor weather. Have supplies on hand in the event that you become stranded, including a communication device to call for help. | 4 |
| | 1c. Getting Lost | 6 | 1c. Review route in advance and program GPS prior to leaving | 3 |
| | 1d. Inadequate vehicle for the site/trip | 7 | 1d. Understand what type of vehicle is necessary to transport tools & equipment to the site. Know site conditions before departure and obtain proper vehicle, 4-Wheel drive if necessary | 4 |
| | 1e. Vehicle malfunction | 8 | 1e. Inspect vehicle prior to leaving. Verify that maintenance records are current. | 4 |
| ***On-Site Edits:*** | | | | |
| 2. Driving | 2a. Fatigue | **15** | 2a. Start trip well rested & take breaks when needed. Share driving responsibilities where possible. **STOP DRIVING AND PULL OVER** in a safe place if you begin | 4 |

# Task Hazard Assessment

AECOM Imagine it. Delivered.

**Task Name:** Wetland Monitoring and Site Inspection

**REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!**

| Job Steps<br>*List all steps required to perform a task in the sequence they are performed* | Potential Hazards<br>*How could you be hurt? What would the injury be?* | Risk<br>*(initial)* | Critical Actions To Mitigate Hazards<br>*List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact.* ***Identify any 'Stop Work' triggers.*** | Risk<br>*(final)* |
|---|---|---|---|---|
| | | | nodding off or showing other signs of fatigue. if you are traveling with a passenger the passenger must remain awake and alert. | |
| | 2b. Risky driving practices | 15 | 2b. Practice defensive driving techniques and avoid bad driving habits<br>• Allow for adequate time to make the trip<br>• Do not speed or attempt to multi-task<br>• Do not use cell phone or text or attempt to program GPS while driving | 4 |
| ***On-Site Edits:*** | | | | |
| 3. Stops/breaks during transit | 3a. Theft of equipment/materials | 6 | 3a. Place items out of sight and lock vehicle when leaving it. Do not leave vehicle unattended for longer than necessary. If at all possible, avoid leaving packed vehicles in public parking areas overnight, unload if possible. Park in well lighted areas. | 4 |
| | 3b. Personal security risk | 10 | 3b. Be alert and aware of surroundings when making stops. Stop at areas which are well lit and have security if possible. | 3 |
| ***On-Site Edits:*** | | | | |
| 4. Walking Site/Completing Vegetation Monitoring | 4a. Biological hazards | 4 | 4a. There are many different types of biological hazards that can be encountered on a work site. These include ticks, spiders, mosquitoes, chiggers, poisonous or other noxious plants, alligators, bears, small mammals, bird droppings, small mammals, snakes, etc. Consult S3AM-313-PR1 and the multiple attachments to determine the biological hazards that may be present and the mitigation measures for each. | 2 |
| | 4b. Feral & wild animals | 4 | 4b. Do not attempt to pick up, handle, or otherwise handle stray or wild animals such as dogs, cats, raccoons, squirrels, etc., no matter how tame they may appear. | 2 |
| | 4c. Heat stress | 6 | 4c. Know the signs and symptoms of heat stress (refer to the procedure S3AM-113-PR1 for information. Have adequate drinking water available and drink frequently. Arrive at the site well hydrated and physically fit. | 3 |

# Task Hazard Assessment

AECOM Imagine it. Delivered.

**Task Name:** Wetland Monitoring and Site Inspection

**REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!**

| **Job Steps** *List all steps required to perform a task in the sequence they are performed* | **Potential Hazards** *How could you be hurt? What would the injury be?* | **Risk** *(initial)* | **Critical Actions To Mitigate Hazards** *List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact.* ***Identify any 'Stop Work' triggers.*** | **Risk** *(final)* |
|---|---|---|---|---|
| | 4d. Cold stress | 6 | 4d. Know the health concerns associated with working in cold weather including hypothermia, frost bite, etc. (see S3AM-112-PR1). Dress in layers and take warming breaks. | 4 |
| | 4e. Sunburn | 6 | 4e. Have sunblock available and apply and reapply as per directions. Avoid direct solar exposure when possible. Seek breaks in shaded areas. | 3 |
| | 4f. Slips/trips/falls | 6 | 4f. Be aware of walking surfaces at all times, wear footwear with good tread and ankle support, use handrails where available, avoid walking in muddy or wet areas when possible, identify and mark or have removed any obstructions that may be present in predicted walking paths. Use the buddy system if near the side banks or in marshy areas. | 4 |

**Additional Notes:**

# Task Hazard Assessment

AECOM Imagine it. Delivered.

## All Employees:

**STOP WORK** if uncertain about safety or if a hazard or additional precaution is not recorded on the THA.

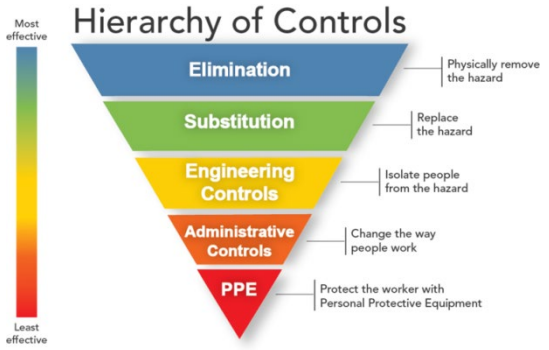
Be alert, recognize and communicate any changes in scope, personnel or conditions at the worksite to the supervisor.

Use **4-Sight**, AECOM's last minute risk assessment process continuously throughout the day by asking yourself and your co-workers to assess your task, hazards, and mitigations. Amend the THA when needed.

- ***What am I about to do?***
- ***What can go wrong?***
- ***What can be done to make it safer?***
- ***What have I done to communicate the hazards?***

**For a more thorough identification of hazards, ask "What else could go wrong?" using the Hazard Categories**




- ***Most hazards need more than one control***
- ***What should you do? Stack your controls***
- ***PPE can NEVER be your only means of protection***

| Worker Sign On | |
|---|---|
| *I participated in the on-site review and fully understand the content of this Task Hazard Assessment.* | |
| **Printed Name** | **Signature** |
| **1. Supervisor:** | |
| **2.** | |
| **3.** | |
| **4.** | |
| **5.** | |
| **6.** | |
| **7.** | |
| **8.** | |
| **9.** | |
| **10.** | |

| Visitor Acknowledgement |
|---|
| *Visitors review task hazards and acknowledge understanding* |
| 1. |
| 2. |
| 3. |
| 4. |
| 5. |
| 6. |
| 7. |
| 8. |
| 9. |
| 10. |

**Submit a new THA for addition to the DCSA THA Library or send THA improvement suggestions to DCSA.THA.Library@AECOM.com**
**Include a copy of the new THA or a photo of the THA modifications as appropriate.**

# Task Hazard Assessment

AECOM Imagine it. Delivered.

| **Task Name:** | **Biological Monitoring** |
|---|---|

| | | | | | |
|---|---|---|---|---|---|
| **Project Name:** | **Bloody Brook Monitoring and Maintenance** | **Client:** | Lockheed Martin | **Date:** | February 23, 2021 |
| **Permits Required? (list):** | License renewal from NYSDEC required – no charge for this. | **Work Location:** | Liverpool, NY | | |

**This THA must be fully reviewed with all staff members. All job steps, hazards, work practices, and PPE are clearly understood and have been implemented. All necessary revisions have been written on the THA.**

| | |
|---|---|
| **Required PPE:** | ☒ Hard Hat ☒ Safety Glasses ☒ HiVis Vest ☒ Safety Toe Boots ☒ Gloves: Leather as needed ☐ Hearing Protection ☐ Other: |
| **Tools & Equipment:** | Emergency kit Communication device (cell phone) Navigation system |

**REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!**

| **Job Steps** *List all steps required to perform a task in the sequence they are performed* | **Potential Hazards** *How could you be hurt? What would the injury be?* | **Risk** *(initial)* | **Critical Actions To Mitigate Hazards** *List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact.* ***Identify any 'Stop Work' triggers.*** | **Risk** *(final)* |
|---|---|---|---|---|
| 1. Trip Planning | 1a. Unauthorized driving | 9 | 1a. You must be an AECOM authorized driver to drive for AECOM business purposes. Consult the requirements of S3AM-005-PR1. Authorized Drivers shall maintain a current driver's license with full privileges applicable to the vehicle to be operated. Develop a Journey Management Plan if applicable. | 4 |
| | 1b. Inclement weather | 6 | 1b. Evaluate weather conditions prior to beginning the travel to determine if travel should proceed. Verify your vehicle is equipped to travel in poor weather. Have supplies on hand in the event that you become stranded, including a communication device to call for help. | 4 |
| | 1c. Getting Lost | 6 | 1c. Review route in advance and program GPS prior to leaving | 3 |
| | 1d. Inadequate vehicle for the site/trip | 7 | 1d. Understand what type of vehicle is necessary to transport tools & equipment to the site. Know site conditions before departure and obtain proper vehicle, 4-Wheel drive if necessary | 4 |
| | 1e. Vehicle malfunction | 8 | 1e. Inspect vehicle prior to leaving. Verify that maintenance records are current. | 4 |
| ***On-Site Edits:*** | | | | |
| 2. Driving | 2a. Fatigue | **15** | 2a. Start trip well rested & take breaks when needed. Share driving responsibilities where possible. **STOP DRIVING AND PULL OVER** in a safe place if you begin | 4 |

# Task Hazard Assessment

AECOM Imagine it. Delivered.

**Task Name:** Biological Monitoring

**REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!**

| Job Steps<br>*List all steps required to perform a task in the sequence they are performed* | Potential Hazards<br>*How could you be hurt? What would the injury be?* | Risk<br>*(initial)* | Critical Actions To Mitigate Hazards<br>*List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact.* ***Identify any 'Stop Work' triggers.*** | Risk<br>*(final)* |
|---|---|---|---|---|
| | | | nodding off or showing other signs of fatigue. if you are traveling with a passenger the passenger must remain awake and alert. | |
| | 2b. Risky driving practices | **15** | 2b. Practice defensive driving techniques and avoid bad driving habits<br>• Allow for adequate time to make the trip<br>• Do not speed or attempt to multi-task<br>• Do not use cell phone or text or attempt to program GPS while driving | 4 |
| ***On-Site Edits:*** | | | | |
| 3. Stops/breaks during transit | 3a. Theft of equipment/materials | 6 | 3a. Place items out of sight and lock vehicle when leaving it. Do not leave vehicle unattended for longer than necessary. If at all possible, avoid leaving packed vehicles in public parking areas overnight, unload if possible. Park in well lighted areas. | 4 |
| | 3b. Personal security risk | **10** | 3b. Be alert and aware of surroundings when making stops. Stop at areas which are well lit and have security if possible. | 3 |
| ***On-Site Edits:*** | | | | |
| 4. Manual collection of crayfish from Bloody Brook stream channel | 4a. Biological hazards | 4 | 4a. There are many different types of biological hazards that can be encountered on a work site. These include ticks, spiders, mosquitoes, chiggers, poisonous or other noxious plants, alligators, bears, small mammals, bird droppings, small mammals, snakes, etc. Consult S3AM-313-PR1 and the multiple attachments to determine the biological hazards that may be present and the mitigation measures for each. | 2 |
| | 4b. Feral & wild animals | 4 | 4b. Do not attempt to pick up, handle, or otherwise handle stray or wild animals such as dogs, cats, raccoons, squirrels, etc., no matter how tame they may appear. | 2 |
| | 4c. Heat stress | 6 | 4c. Know the signs and symptoms of heat stress (refer to the procedure S3AM-113-PR1 for information. Have adequate drinking water available and drink frequently. Arrive at the site well hydrated and physically fit. | 3 |

# Task Hazard Assessment

AECOM Imagine it. Delivered.

**Task Name:** **Biological Monitoring**

**REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!**

| **Job Steps** *List all steps required to perform a task in the sequence they are performed* | **Potential Hazards** *How could you be hurt? What would the injury be?* | **Risk** *(initial)* | **Critical Actions To Mitigate Hazards** *List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact.* ***Identify any 'Stop Work' triggers.*** | **Risk** *(final)* |
|---|---|---|---|---|
| | 4d. Cold stress | 6 | 4d. Know the health concerns associated with working in cold weather including hypothermia, frost bite, etc. (see S3AM-112-PR1). Dress in layers and take warming breaks. | 4 |
| | 4e. Sunburn | 6 | 4e. Have sunblock available and apply and reapply as per directions. Avoid direct solar exposure when possible. Seek breaks in shaded areas. | 3 |
| | 4f. Slips/trips/falls | 6 | 4f. Be aware of walking surfaces at all times, wear footwear with good tread and ankle support, use handrails where available, avoid walking in muddy or wet areas when possible, identify and mark or have removed any obstructions that may be present in predicted walking paths. | 4 |
| | 4g. Work near water | 8 | 4g. Work near the Bloody Brook channel or ponded areas within the wetlands will not be completed at times of high flow, when the water is deeper than about 18 inches. At normal flow, water is 18 inches or less. | 0 |

**Additional Notes:**

# Task Hazard Assessment

AECOM Imagine it. Delivered.

## All Employees:

**STOP WORK** if uncertain about safety or if a hazard or additional precaution is not recorded on the THA.

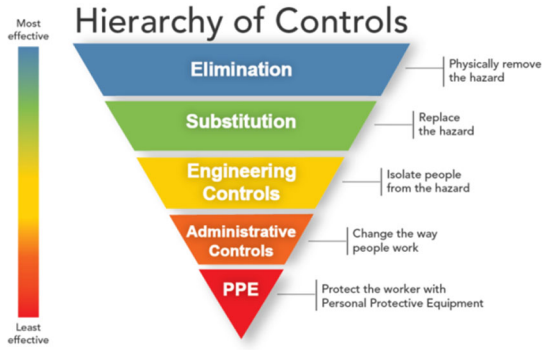
Be alert, recognize and communicate any changes in scope, personnel or conditions at the worksite to the supervisor.

Use **4-Sight**, AECOM's last minute risk assessment process continuously throughout the day by asking yourself and your co-workers to assess your task, hazards, and mitigations. Amend the THA when needed.

- ***What am I about to do?***
- ***What can go wrong?***
- ***What can be done to make it safer?***
- ***What have I done to communicate the hazards?***

**For a more thorough identification of hazards, ask "What else could go wrong?" using the Hazard Categories**




- ***Most hazards need more than one control***
- ***What should you do? Stack your controls***
- ***PPE can NEVER be your only means of protection***

| Worker Sign On | |
|---|---|
| *I participated in the on-site review and fully understand the content of this Task Hazard Assessment.* | |
| **Printed Name** | **Signature** |
| **1. Supervisor:** | |
| **2.** | |
| **3.** | |
| **4.** | |
| **5.** | |
| **6.** | |
| **7.** | |
| **8.** | |
| **9.** | |
| **10.** | |

| Visitor Acknowledgement |
|---|
| *Visitors review task hazards and acknowledge understanding* |
| 1. |
| 2. |
| 3. |
| 4. |
| 5. |
| 6. |
| 7. |
| 8. |
| 9. |
| 10. |

**Submit a new THA for addition to the DCSA THA Library or send THA improvement suggestions to DCSA.THA.Library@AECOM.com**
**Include a copy of the new THA or a photo of the THA modifications as appropriate.**

# B-3: BLANK THA AND DAILY TAILGATE MEETING FORMS

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# ATTACHMENT C

## AECOM SH&E Procedures

All AECOM SH&E Procedures, in their controlled copy version, are available on the internal SH&E Policy and Procedures ecosystem page.

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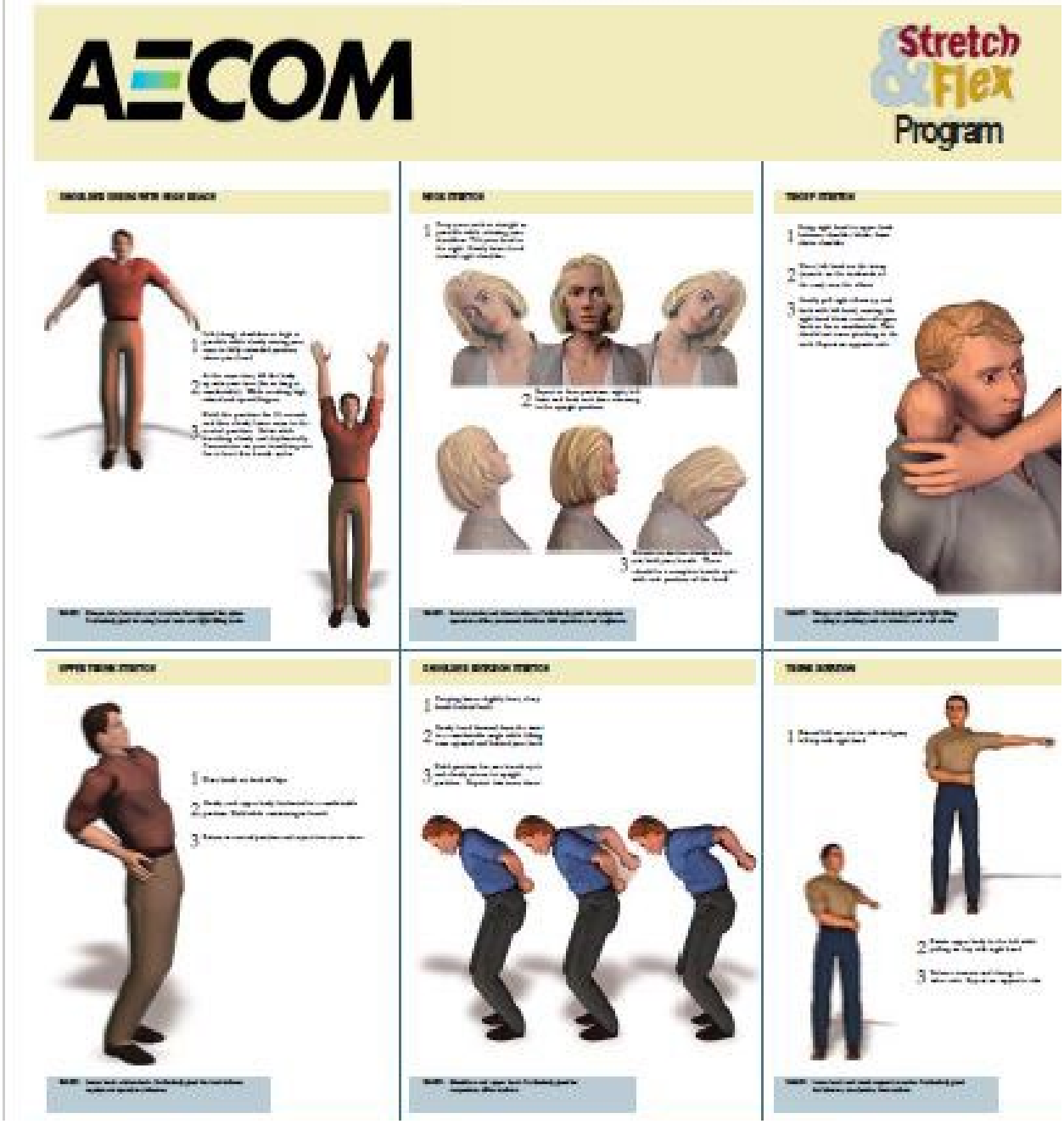
**Standard Operating Procedures (SOPs) will be maintained in a separate binder at the project site.**

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# ATTACHMENT D

## Stretch and Flex Poster

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# ATTACHMENT E

## Site Orientation

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# E-1: SITE ORIENTATION INSTRUCTIONS AND CHECKLIST

AECOM will conduct a site safety briefing for a person's initial visit to the site. The briefing will be conducted:

- Prior to the start of work;
- For any new AECOM or subconsultant personnel; and
- At each mobilization, or whenever there is a change in task or significant change in task location.

All personnel working on the project who have received the site briefing (including the HASP review) will sign the Personal Acknowledgement located at the end of the HASP. Visitors may receive a shortened version to address the hazards specific to their visit.

The following items, at minimum, will be discussed during the site safety briefing:

- Contents of this HASP;
- The Emergency Response Plan;
- Contractor SH&E Management expectations;
- Injury management, including notification and hospital and occupational clinic locations;
- The AECOM 4-Sight program;
- Stop Work authority;
- The THAs (**Attachment B**) for the tasks that will be performed on a given project;
- Types of hazards at the site and means for minimizing exposure to them;
- Instructions for new operations to be conducted, and safe work practices;
- PPE that must be used;
- Lone worker check-in procedures;
- Emergency evacuation routes, muster points, and tornado/storm shelters; and
- Location and use of emergency equipment.

These meetings must be documented and maintained in the project files.

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# ATTACHMENT F

## Lockheed Martin Environmental, Safety, and Health Contractor Manual

© AECOM Restricted
Universal Health and Safety Plan Template (S4[DCS]AM-209-FM2-C)
Revision 11 June 16, 2020
PRINTED COPIES ARE UNCONTROLLED. CONTROLLED COPY IS AVAILABLE ON COMPANY INTRANET.

LOCKHEED MARTIN



Rotary and Mission Systems -
Syracuse, NY

# Environmental, Safety and Health Contractor Manual

TARGET ZERO

gogreen 2020

## Emergencies Contact Information

- **ALL Emergencies: (315) 456-2111**
- Patrol Non-Emergency: (315) 456-2917
- ESH Contact:

| Name | Ext. | Cell # (315) |
|---|---|---|
| Ned Moore, Mgr | | (517)388-8169 |
| Deb Ackerman | 1517 | 516-9053 |
| Nick Caparco | 2606 | 413-9130 |
| Anna Guinta | 3351 | 396-6518 |
| Phil Talucci | 1456 | 409-9688 |
| Bob Travis | 2249 | 481-1997 |

- Facilities Contacts:

| Name | Ext. | Cell # (315) |
|---|---|---|
| Avery Denny, Mgr. | 1720 | 314-0955 |
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Note: A copy of this Contractor Safety Manual must be available on site for reference and review during the course of the project.

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## Emergencies and Facilities Protections

### General Evacuation

LM RMS has developed emergency response plans for all facilities. When the fire alarm sounds, or you are notified by your LM RMS contact you and your employees should:

- Stop all work;
- Shut off electrical equipment and machines and secure classified material, if possible;
- Walk to the nearest exit, including emergency exits with panic bar assemblies. Exit the building.
- Report to the Security Officer located in the center of the primary assembly area. Account for all of your employees and move to the evacuation assembly area. Do not attempt to leave the site.
- Do not re-enter the facility until instructed to do so by LM RMS Security or the ESH office.

If your employees are not working in their normal work areas, or they are in hallways, rest rooms, etc., they should use the nearest exit. Once outside the building, your employees should stay at least 200 feet away from the building while proceeding to the assembly area (if you are unaware of the assembly areas, ask your LM RMS contact in advance of an emergency).

Your employees should become familiar with the evacuation routes in their work areas.


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## Medical Emergencies

In the event that your employees are injured while on LM RMS property they should:

- Call or have someone else call the site emergency number 315-456-2111 and request emergency medical response. Your employees should be prepared to provide the location of the emergency, building number or name, floor and column number and details on the nature of the emergency.
- Report the injury no matter how minor to your on-site supervisor and your Lockheed Martin RMS contact as soon as possible.

Copies of reports of all injuries must be given to the ESH office and documentation relative to incident investigation(s). ESH may request further information depending on the incident.

All contractors are encouraged to report Near Miss/Close Call incidents to ESH or their LM RMS contact. Near Misses and Close Calls will be investigated to determine cause and mitigation of exposure.




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## General Information

### ESH Policy Statement

Lockheed Martin Rotary and Mission Systems (RMS) are committed to mission success with a proactive, predictive and preventive strategy to enable program performance excellence. This commitment delivers superior products and services to our customers in a manner that protects employees, customers and the community while preserving the environment and conserving natural resources. To meet this commitment, we work as an integrated team, sharing responsibility for the following objectives:

- Understanding and fulfilling Customer requirements and expectations to enhance satisfaction
- Delivering sustainable, quality solutions
- Maintaining compliance with all customer, regulatory and statutory requirements, internal procedures, and the voluntary programs to which we subscribe
- Continually measuring and improving the effectiveness of our Management Systems to drive organizational performance and understanding of this policy
- Setting responsibility for establishing and reviewing objectives and commitments
- Communicating quality and environment, safety and health awareness to all employees to promote its application to daily activities
- Maintaining an ethical relationship with customers, employees, suppliers and the community


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- Preventing pollution by minimizing waste, maximizing material reuse through recycling and the efficient use of resources
- Preventing injuries, accidents and ill health by providing a safe and healthy workplace for our employees and the communities in which we operate.

**Facility Access**

Each contractor company must submit an access authorization list with the names and citizenship status of the contractor personnel to their LM point of contact. Any contractor employee whose name does not appear on the access list will not be allowed to enter RMS facilities. The contractor must provide an approved form of identification and citizenship upon their arrival. The contractor foreman or supervisor must notify the LM POC of any additions or deletions to their company's access authorization list as soon as possible. LM POC will enter authorized contractor employees into the visitor information system (VisitLM) data base for a period not to exceed one year. Access to classified areas will be coordinated by the local Security Rep and will require clearance verification. Identification badges must be worn and in view at all times. All badges remain the property of LM and must be returned when access is no longer needed or upon request.


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## ESH Contractor Program

Lockheed Martin RMS is dedicated to ensuring that a safe and healthful work environment exists for our employees, contractors and visitors. As part of our company wide initiative, we have implemented a Contractor ESH Program to reflect the importance of environment, safety and health in our business.

Our program consists of five parts:

1. A review of the project's Environmental, Safety and Health (ESH) requirements;
2. A review of contractor project safety plans;
3. Annual orientation of all contractor employees in our ESH site requirements, emergency procedures, chemical usage and accident reporting;
4. Certification of required training as required;
5. Periodic work-site inspections to ensure compliance.

We expect all contractors or subcontractors working at our facilities are:

- Fully qualified and trained to OSHA requirements found in 29 CFR 1910 and 29 CFR 1926 as applicable; the contractor shall maintain readily accessible records documenting training has been completed.
- Responsible for the safety of their employees, subcontractors as well as protection of Lockheed Martin Corporation employees and property at their project site;
- In compliance with all local, state and federal regulations, statutes or laws.


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## Your Rights and Responsibilities

This manual provides you with standards that must become part of your everyday work at our facilities. It does not supersede any standards set by any regulatory agency, nor does it eliminate the need for sound ESH practices beyond those given in this manual. The general information given here may be superseded or supplemented by more detailed or more current requirements.

**LM RMS requires that you read this manual before you start work.** On the job, you are expected to follow these and other ESH practices. Failure to do so may result in warnings and other appropriate actions to protect you and your employees. Repeat minor or a single serious infraction will result in restricted access or removal from the premises for contractor employees and possible contract termination.

Maintaining a safe and healthy work environment that is environmentally sound is a continuous effort that requires everyone's cooperation. The contractor is responsible for maintaining safe working conditions and reasonable and prudent Environmental, Safety and Health practices while on LM RMS property.

It is the LM RMS policy to comply with all applicable local, state and federal laws and regulations affecting the health, safety and environmental liability and the enforcement of those requirements on its contractors.

It is your responsibility (the contractor or contract employee) to:

- Learn about all applicable hazards in the workplace;
- Use proper practices and procedures;
- Properly use personal protective equipment;


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- Use all personal and equipment safeguards;
- Observe the Tobacco-Free policy when on premises. Premises includes property that Lockheed Martin owns, leases as a tenant, or operates for a customer-owner, including all buildings, spaces, grounds, parking lots, vehicles, and aircraft.
- Promptly report any on-the-job accidents or unsafe conditions to your onsite Supervisor or foreman;
- Stop the job in the event of any accident involving personnel, production hardware or equipment and notify your onsite Supervisor or foreman;
- Maintain good housekeeping practices;
- Report any spills of chemicals or other hazardous materials immediately by calling the emergency number provided;
- Make certain you have the required training for the work you are performing;
- Wear the badge(s) provided to you visibly on the upper front part of your body at all times;
- Comply with site's minimum requirements for working apparel. Ensure that all have medical certifications in accordance with their job function and legal requirements;
- Prohibit the use of cell phones and other electronic devices while operating a motor vehicle unless using a hands free device;


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- Prohibit the use of LM RMS equipment (i.e. ladders, forklifts, tools etc.) unless Third Party User Loaned Tool/Equipment Indemnity Agreement is allowed at the LM RMS facility and proper signatures are obtained.
- Protect your work site with appropriate signage and barricades.

### Enforcement Policy

Our goal is to prevent injuries and losses attributed to unsafe work practices or conditions. To ensure our expectations for compliance are being met, Lockheed Martin RMS has developed the following enforcement policy:

Enforcement actions are based on severity and frequency of infractions. LM reserves the right to restrict access of contractor employees and/or to terminate the contract if, in the Company's discretion, contractor infractions are sufficiently serious to warrant such action.

**Minor Infractions** – Non-life threatening and does not pose a significant threat to Lockheed Martin employees, subcontractors or property (ex. Failure to wear protective equipment in a construction area, etc.)

**Major Infractions** – Potentially life threatening to their own employees or Lockheed Marin employees or put the LM property at risk; creates a fire hazard; or is a serious violation (ex.. Failure to report an accident; Violations of permit conditions or failure to obtain a permit, etc.)

**No Tolerance Infractions** – Willful violations of requirements that could result in life threatening or extensive property damage or


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violations of security requirements. Some examples of "No Tolerance Infractions" are:

- Illegal drug or alcohol use
- Stealing property
- Willful violations
- Unlawful removal of identified asbestos containing material
- Illegal dumping of hazardous waste
- Provoking or engaging in an act of violence against another person on company property
- Weapon possession

LM-Syracuse's Contractor Disciplinary Process is posted at the Patrol window. Contract employees and/or the contract company can be removed from the site after receiving:

- 3 strikes of Minor Infractions (ex. not wearing safety glasses with side shields) or,
- 1 strike in Major (ex. not using fall protection) or No Tolerance Infractions.


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## Environmental Safety & Health

### Asbestos

ASBESTOS (29 CFR 1926.1101)

If any work involves any potentially Asbestos Containing Material, stop job and contact your LM POC or ESH Department.

DO NOT disturb or dispose of materials containing asbestos without ESH approval.

Materials that may contain asbestos at our site are:

- Pipe elbows, tee's, valves – hard packed cement
- Hi Pressure steam lines – some straight runs
- Most valve and stem packing – rope type braid
- Gaskets – valve flanges
- Floor tile – all floor tile and mastic is suspect
- Fire doors – lining inside of older doors
- Under our wooden floors – felt and mastic
- HVAC insulation wrap –in our fan rooms
- Corrugated Building Siding
- Roof flashing
- Windows – glaze and caulking


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## Compressed Gas Cylinders




Chain or secure cylinders in an upright position at all times whether in storage or use.

Move cylinders only when they are chained to a handcart; never drop, roll or slide them across the ground or floor.

Keep the protective cap in place at all times when the cylinder is not in actual use. Cylinder must be properly labeled with contents and hazard warnings.

Always use the proper regulator for each cylinder. Do not use an adapter or other connections to attach a regulator to a gas cylinder.

Store and properly secure cylinders in a well-ventilated location. The use and storage of flammable/combustible gases is restricted in the facility. Advance approval by the LM RMS ESH office is required.

Any cylinder that does not meet DOT inspection requirements must be tagged “Do Not Use” and removed from LM RMS property.

Keep oxidizing gases separate from fuel gases by distances required by the National Fire Protection Association (NFPA)/OSHA.


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## Confined Space Entry



When the operations or work activities involve confined space entry, Contractors will issue their own entry permits and provide a copy to the LM RMS site contact and/or ESH prior to entering the confined space for approval, if requested.

All permit required confined spaces at the Syracuse facility are marked with danger signs except manholes. If any space requires the removal of a manhole cover to enter then consider the space a permit required confined space.

Contractor and subcontractor personnel shall notify the LM contact prior to performing any work in confined spaces. Contractor shall coordinate all work activities involving confined space entry with LM RMS ESH. All personnel associated with such activities shall be trained by their employer to perform those responsibilities defined in 29 CFR 1910.146. Any such work may be performed only after issuance of a "Confined Space Entry Permit". Inform LM contact or LM RMS ESH of hazards confronted or created in permit spaces during entry operations.

Contractor must receive permission from the Patrol office (x2917) prior to entering the confined space to verify rescue services are available. In the event of an emergency call (315) 456-2111.


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## Cranes and Hoisting Operations

All proposed crane operations involving movement over the roof of any LMC building shall be coordinated through your LM site contact.



- At the Syracuse facility, mobile cranes will not be used until HPOC or ESH completes an internal Cranes & Hoist checklist.
- All personnel working below the swing radius of the crane must be evacuated before work may be performed and the area around the crane base must be barricaded to prevent unauthorized personnel from entering the hazard zone.
- Mobile cranes shall not be operated or moved within 10 feet of any open trench or overhead power lines.
- Hoist and rigging equipment and associated attachments must have the required manufacturer's label that includes its rated working load capacity.
- A qualified person trained and experienced in safe rigging practices is required, per OSHA 1926.251.
- Maintain required training, hoist and rigging equipment inspection records and provide these upon request.
- Do not operate under adverse weather conditions.


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## Electrical Safety




Any contractor that will be installing or repairing electrical equipment or electrical distribution systems shall be qualified and have the appropriate training by their employer before commencing work at our facilities. The minimum requirements for training are contained in the OSHA Electrical Construction standards, 29 CFR 1926.400. Proof of training must be available upon request by LM RMS.

Contractors shall comply with the safe work practices as well as the Personal Protective Equipment of NFPA 70E. Do not work on any LM electrical equipment until the equipment has been de-energized and locked out. Electrical circuits cannot be shut down without the authorization of the Facilities Maintenance office.

Electrical work that cannot be de-energized requires the contractor to obtain an Energized Electrical Work Permit from LM. Work that requires electrical equipment to be energized for proper installation, test or service must be reviewed and cleared by the ESH office prior to actual installation, test or service. All such hot work will require the contractor to have safety related procedures, appropriate personal protective equipment, specialized training and adequate working clearance in the work area. Contractors shall comply with posted warning labels on the electrical panels or refer to NFPA 70E tables for prescribed personal protective equipment and safe working boundaries.


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Electrical extension cords used on LM RMS projects must be free from splices or other damage. The extension cords must be manufactured from UL listed components and must be one continuous assembly. Daisy chained cords are not permitted. Multiple outlet extension cords are allowed if properly sized for the load. Extension cord sets used with portable electric tools and appliances shall be of the three wire type and designed for hard or extra hard service. Flexible cords used with temporary and portable lights shall be designed for hard or extra hard service.

Flexible power cords and extension cords shall be protected from mechanical damage. Sharp corners and projections shall be avoided. Flexible cords and extension cords may pass through doorways or other pinch points, if protection is provided to avoid damage and do not create a hazard.

Contractors shall use either ground fault circuit interrupters or an assured equipment grounding program as specified in 29 CFR 1926.404 to protect employees on construction sites. The program shall cover all cord sets, receptacles that are not a part of the building and equipment connected by cord and plug that are available for use or used by employees on the construction site.

All electrical work sites in aisles or other areas accessible to LM RMS residents shall be barricaded such that anyone outside the barricade will be at least three (3) feet from any electrical hazard. No work site with exposed, energized parts shall be left open at the end of the work day. Protective covers or enclosures or Lockout/Tag out shall be used to protect against accidental contact.


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## Energy Controlled Procedures (LOTO)

1. Contractors are required to provide Lockout/Tag out programs and training to their employees as required by OSHA standards.
2. Contractors are to provide all locks, warning tags, and lockout/tag out devices necessary to safely perform the job.




3. Notify Facilities/ESH prior to performing lockout/tag out and to coordinate/communicate the Energy Control Program to achieve compliance with the on-site Lockout/Tag out program.
4. All servicing and repair of equipment shall require the use of Lockout Tagout to isolate the energy sources (disconnects, circuit breakers, valves, etc.) and ensure "zero" energy. Contractors shall be aware that Lockheed Martin utilizes Red locks and "Danger Do Not Operate" tags for Lockout Tagout. Locks and tags applied to equipment shall not be removed or attempted to be defeated.

## Explosives

Use of explosives will not be permitted for any activity unless LM RMS ESH has granted specific advance written approval. This will not be granted until LM RMS ESH, Facilities, and Facilities Protection have reviewed a detailed Safety Plan.


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## Fall Protection

1. Contractors must ensure their workers are protected from falls when work is performed at heights greater than 4 feet. OSHA regulations state that workers must be protected by a guardrail system, safety net system or personal fall arrest and/or restraint system (full body harness, single or double leg shock absorbing lanyards, self-retracting lanyards, anchorage connector, etc.).




2. Only personal fall arrest equipment (harness systems and lifelines) appropriately rated by the manufacturer for the type or work under consideration will be used.
3. All shoe sole materials must provide adequate sole-to-surface friction to prevent slip and/or fall injuries.
4. Head protection; such as hard hats, are to be worn in all areas in which there exists the possibility of falling objects from above.
5. Employees are to be protected from falling objects by toe-boards; screens or guardrail systems erected to prevent objects from falling from higher levels, or be protected by a canopy structure erected to deflect falling objects. The area to which objects could fall may be marked with signs or barricaded so those employees are prohibited from entering the area.


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### Fire Sprinkler Impairment

1. Construction materials or other equipment shall not be placed upon or suspended from any fire sprinkler pipes, valves, or supports, either temporarily or permanently.
2. No work shall be performed, or any valve opened or closed, on any fire sprinkler system without the prior approval of Facilities and/or ESH.
3. Coordinate any planned sprinkler system impairments with Facilities or ESH. Facilities and/or ESH is responsible for conducting the impairment/restoration and ensuring that all notifications are made and all precautions are taken before work is performed on the fire sprinkler system.



4. Impairment notifications shall be provided 24 hours prior to the work.
5. Hot work permits will not be issued during sprinkler system impairments.

### Contractor Chemicals

All ESH pre-approved chemicals brought onto LM RMS property must be stored in properly labeled, approved containers and in areas approved by LM ESH. Notify your LM RMS contact in advance of any use of chemicals within LM RMS grounds and buildings.

- Every effort will be made to use the safest product. This includes alternate methods of construction or design.
- The contractor will also provide a safe storage area outside of the building(s). This area will be in


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compliance with all applicable codes and shall have adequate secondary containment.

- Flammable and combustible liquids must be dispensed from metal safety cans bearing a Factory Mutual (FM) or Underwriters' Laboratory (UL) listing.
- When using chemicals, additional ventilation may be required. Ventilation equipment used to exhaust flammable vapors must be hazardous location rated.


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## Hazard Communication/SDS




Under the Hazard Communication Standard, each contractor is required to have a Safety Data Sheet (SDS) for each material with which its employees work. Contractors/Vendors must submit SDSs to the ESH office for review prior to bringing the chemical on site.

Hazardous materials include, but are not limited to, adhesives, solvents, acids, caustics, paints, floor covering, coating, cleaners, detergents, flammable and combustible liquids, and insulation materials.

If the materials have not been previously reviewed by the ESH office, the contractor will be denied access until the Lockheed Martin ESH office has been contacted and clearance is arranged. Clearance is never automatic, many substances that are highly toxic or damaging to the environment are never allowed on LM RMS property. It is always best to request clearance prior to any required use date.

SDSs must be kept where they are readily accessible to all employees who might come into contact with the hazardous material.

Contractors are responsible for ensuring that all of their employees, agents or subcontractors who work with hazardous materials have received Hazard Communication (Right To Know) training by their employer.

The spill or release of any substance must be immediately reported to LM RMS through established LM RMS emergency procedures. Contractors may request SDS's for any Lockheed


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Martin chemicals to which their employees may potentially be exposed. Lockheed Martin will make every attempt to remove chemicals from construction areas but production requirements dictate that there will be times when contractors will have to work in proximity to Lockheed Martin chemical processes.

### Environmental Safety & Health Work Plan

A job ESH Work Plan may be required. An ESH Work Plan shall provide the following:

a) an outline of the requirements of each project;
b) a description of how the project will be completed;
c) ESH controls and hazard mitigation
d) Appropriate personal protective equipment
e) specific training requirements for the project and a listing of personnel required to be so trained;
f) method of waste disposal, if applicable
g) emergency response plans and telephone numbers; and
h) the methods for assuring contractor and subcontractor compliance with regulatory requirements.

Copies of ESH Work Plans shall be retained on site and available to LM RMS ESH or the LM Contact.


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## Hot Work



If your work requires welding, cutting, gas heaters, flame cutting, or any spark producing activity, you must obtain a "Hot Work Permit" from the appropriate Facilities Protection or ESH office and/or its designated representative (for further information LM site contact), and strictly follow site procedures. All welding and cutting operations must be conducted in accordance with NFPA 51B.

## Housekeeping and Material Storage




Maintain good housekeeping at all times. Clean work areas and store items neatly at the end of each work shift. Remove combustible material (e.g., trash, wood, rags, cardboard, paper) at the end of each day.

Keep dust down at all times, including during on-working periods. Sprinkle or treat, with dust suppressants, the soil at the site, haul roads, and other areas disturbed by operations. Dry power brooming will not be permitted. Instead, use vacuuming, wet mopping, wet sweeping, or wet power brooming.

Electrical panels, emergency equipment, means of egress, aisles and passageways may not be blocked. Materials may not be stored on scaffolds, runways, loading docks, or roofs in excess of materials needed for immediate use. Storage within stairwells is not permitted.


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### Indoor Air Quality

Gasoline, diesel, liquefied petroleum (LP) gas powered internal combustion engines shall not be used inside LM RMS buildings unless prior written approval is obtained from LM RMS ESH. Such equipment includes, but is not limited to Powered Industrial Vehicles, pressure washers, concrete saws, generators and the like.

### Laser/Radiation Usage

Lasers and/or radiation sources are not to be used on LM RMS property without prior written approval from the LM RMS ESH department.

NOTE: For ceiling leveling lasers, trained personnel and warning signs are required. LM RMS ESH permission is not required for these types of lasers.

### Noise

1. Operations involving high noise producing equipment are not to be conducted in populated areas.
2. Noise levels must be within safe limits and/or employees must be provided proper hearing protection.
3. Hearing protection equipment must be used in the event safe noise levels are exceeded.



Make the maximum use of low-noise emission products, as certified by the EPA.


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### Personal Protective Equipment (PPE)

If your work exposes your employees to potential hazards, they should be furnished with the appropriate personal protective equipment. If you do not have the appropriate personal protective equipment, you may not work on LM RMS property. Personal protective equipment includes, but is not limited to, such items as safety glasses, goggles, face shields, respirators, hearing protection, gloves, plastic aprons, arm guards, hard hats and foot protection.

If your ESH Work Plan requires the use of personal protective equipment within the work area, appropriate warning signs shall be in place to notify any person entering the area the PPE is required. Any person, LM RMS employee, visitor or contractor, inside a work area that has PPE requirements, shall wear the appropriate equipment.


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**Portable Ladders/Ladders**

1. Ladders shall be maintained in good condition at all times, the joint between the steps and side rails shall be tight, all hardware and fittings securely attached, and the movable parts shall operate feely without binding or undue play.
2. Frayed or badly worn rope shall be replaced.
3. Safety feet and other auxiliary equipment shall be kept in good condition to ensure proper performance.
4. Ladders shall be inspected frequently and those which have developed defects shall not be used on Lockheed Martin property.
5. Ladders shall not be placed in front of doors opening toward the ladder unless the door is blocked open, locked or guarded. Ladders shall not be placed in passageways, driveways, or any location where they may be displaced by activities being conducted on any other work, unless protected by barricades or guards.
6. Portable metal ladders shall NOT be used.
7. Straight or extension ladders shall be tied off or otherwise secured to prevent lateral movement and should extend a minimum of 3 feet above the next level (point of support at the eave, gutter, or platform line). Extension ladders shall be set up with the base away from the wall at a 1 to 4 ratio.
8. Sitting or standing on the top two steps of a ladder is prohibited.


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## Powder Actuated Tools



- You must be trained and qualified by the tool manufacturer before using powder-actuated tools. You must carry a valid operator's card issued by the tool manufacturer and present it to your LM RMS contact and ESH upon request.
- You must not leave these tools unattended or available to unauthorized persons.
- Powder-actuated tools must meet the design requirements in "American National Safety Requirements for Explosive Actuated Fastening Tools" (ANSI A 10.3 – 1977). Only tools which meet these design standards may be used.
- Use of powder-actuated tools in explosive or flammable atmospheres is strictly prohibited.

## Roofing Operations

- Any roofing work must be in complete compliance with OSHA construction standard, 29 CFR 1926.500, which requires fall protection and a fall protection plan.
- The use of open flames on roofing will require you to post a fire watch. It is your responsibility to make all arrangements with your LM POC.
- The area below the roof activity will be cordoned off 6 foot beyond the foot print of the work being performed


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above. A spotter will be used during operations where there is potential for debris and or tar to fall below.

### Scaffolds

The contractor shall ensure all scaffold safety rules are followed as required by 29 CFR 1910.28, 29 CFR 1910.29, 29 CFR 1926.451 and other applicable regulations and standards.



- All scaffolds will be built and inspected by a competent person per OSHA requirements.
- Rolling scaffold wheels will be locked.
- Daily inspections of scaffolds shall be made available to the ESH department upon request.
- Hardhats are required when employees are exposed to a possible bump hazard or when falling objects could cause a possible hazard.

### Scissor Lifts, Aerial Lifts and Other Personnel Lift Devices

Contractors must follow the Manufacturer's operator manual when operating manually or self-propelled aerial lifts, i.e. Genie Personnel Lifts, Scissors Lifts, Boom Lifts, etc.

- Inspect the equipment and test the controls prior to use each day. If defective, tag out of service and do not use.
- Only trained, authorized personnel are allowed to use.


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- Do not exceed maximum weight limit listed on the equipment.
- Be sure base is level at all times. Never adjust leveling jacks when a person is elevated in the platform.
- Do not climb, sit, stand or hang on the guardrails or midrails.
- On boom lifts and vehicle mounted elevating platforms; each worker must wear a full body harness with their lanyards attached to the anchor points provided by the manufacturer on the platform.
- Do not move Personnel Lifts when elevated, tip over may result.
- Stay clear of overhead electrical wires and obstructions. Maintain the minimum safe approach distances to power lines in accordance with OSHA requirements, the manufacturer's safety warnings and equipment labels.



## Trenching

Before performing excavation work on the property, an excavation permit is required. Approval and permits must be obtained from ESH prior to starting work.


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### Utility Shutdown

LM RMS ESH, Facilities and Security need to be informed 48 hours prior to any utility shutdown.

### Vehicle Operations and Powered Industrial Trucks

All equipment brought on site must comply with applicable OSHA standards. Only electric- powered equipment is allowed inside the building without prior approval of the ESH office. Motor vehicles, forklifts and other equipment powered by flammable/combustible liquids are not allowed inside building(s).



Safe and proper practices must be followed at all times or vehicle operating privileges will be suspended or revoked at the discretion of Security, ESH or site contact.

Personal or contractor vehicles shall not be serviced (e.g., oil changes, tune-ups, washing/detailing, brake changes, etc.) while on company property except in emergency situations (e.g., towing for repairs, flat tire repair, jump start, windshield replacement, etc.)


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### Warning Signs and Barricades

The Contractor must barricade the construction sites to prevent all unauthorized personnel from walking through the construction area. Barricades can be, “A” frame barricades, stanchions, etc. Barriers shall be substantial. Overhead work conducted in aisles where objects could fall and possibly strike passersby must have sufficient safeguards in place, i.e., overhead protective barrier (netting, hard barrier), detour routes, consider working off-shifts.




Signs must also be posted to indicate to unauthorized personnel that entry through the construction area is strictly prohibited. In addition, a detour route must be pre-selected and marked appropriately.

Floor and wall openings must be guarded by substantial barriers, railings, netting, fences, guardrails, steel plates and covering material to prevent slip, trips and falls.

Covers for holes in floors, roofs or other walking/working surfaces shall be secured, capable of supporting without failure at least twice the weight of employees, equipment, and materials imposed on the cover at any one time.


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### Hazardous Waste




Any generation of hazardous wastes must be coordinated with the ESH office prior to generating the waste. Storage, labeling and handling of hazardous waste must meet state and federal requirements.

- Store hazardous waste in approved containers (49 CFR 178) properly labeled to identify the type of waste.
- For oil and hazardous material spills, notify Patrol at 315-456-2111 immediately.
- The Contractor will make arrangements with LM RMS ESH department for the characterization, handling, storage and disposal of all hazardous waste generated by the project. The contractor shall dispose of hazardous waste in accordance with site procedures. Contact LM Contact and LM RMS ESH to coordinate disposal.

### Solid and Sanitary Waste

Pick up solid wastes, and place in containers that are regularly emptied. Follow all site recycling practices, including but not limited to the recycling of paper, glass, plastic, metals, woods, cardboard, and concrete.

- Do not prepare or cook food on the project site.
- Do not pour any fats, oils or greases down any sink or drain.


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- Prevent contamination of the site and other areas when handling and disposing wastes. On completion, leave the areas clean. Control and properly dispose of waste.
- Dispose of rubbish and debris in accordance with the requirements specified.
- Remove and dispose rubbish and debris from LMC.
- Place garbage in approved containers and move to a pickup point or disposal area, where directed.
- For any soils brought to the facility from off-site, the contractor must supply a "clean fill certification" to LM RMS ESH for approval prior to land application.




**Storm Water Pollution Prevention**

- All contractors and/or subcontractors conducting construction activities from which runoff goes into or adjacent to any surface water in the state must submit the appropriate Notice of Intent and obtain permit approval depending on the area of land to be disturbed and their role as primary or secondary operator.




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## Revision History

Revised 12/23/2013 Initial MST Release (37 pages)

Revised 2/27/2014 Minor changes: Page 6 added (Insert your site's emergency numbers); page 10 - Item 1 deleted "complete" and item 2 deleted "all"; Page 25 changed will to "may" be required

Site Level Revision 6/26/15: pg. 1 Cell Phone # updated; pg. 14 added LM-Syracuse 3 strikes, 1 strikes rule; pg. 21 fall protection required at 4 ft or greater

Site Level Revision 6/28/16: pg. 1 Contact list updated

Site Level Revision 9/13/16: Change cover to replace RMS reference; Replace MST reference to RMS throughout document; pg. 1 Contact List updated

Site Level Revision 5/22/2017: update contacts list

Site Level Revision 11/22/2017: update ESH Policy Statement

Site Level Revision 09/19/2018: Contact list updated; minor edits throughout; remove OSHA VPP; update table of contents; add LOTO wording regarding Syracuse use of Red locks and Danger Do Not Operate tags.

Site Level Revision 4/15/19: update contacts list


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# APPENDIX I

## Site-Wide Inspection Form

**Bloody Brook**
**Liverpool, NY**
**Site-Wide Inspection Form**

Engineering Control: Soil Cover  Inspection Date:_____

| Item | Yes | No | N/A | Comments |
|---|---|---|---|---|
| Was ponding observed in any areas of the soil cover? If so, identify the stream mile marker in the comment section of this form. | | | | |
| Were areas of erosion observed in the soil cover or along the streambed? If so, identify the stream mile marker in the comment section of this form. | | | | |
| Based on the above items, does the engineering control continue to perform as designed? | | | | |
| Were the weirs and piezometers within the wetland areas inspected and appear to be in good condition, functioning as designed? | | | | |
| Were the permanent plot, transect, and photo locations within the wetlands clearly marked? | | | | |
| Has there been any apparent intrusive activity, excavation, or construction at the site? If so, were the activities performed in accordance with the SMP? | | | | |
| Were vegetation and wetland monitoring completed during this site inspection? If so, were the vegetation inspection logs completed? | | | | |

Note: Upon completion of the form, any non-conforming items warranting corrective action should be identified here within.

Name of Inspector: _____  Signature of Inspector: _____
Inspector's Company: _____  Date: _____

**IMMEDIATELY REPORT ANY FAILURE OR DEFECT TO THE PROJECT MANAGER SO A COUNTERMEASURE PLAN CAN BE IMPLEMENTED.**

# APPENDIX J

## Restoration Monitoring Plan

**BLOODY BROOK**
**ONONDAGA COUNTY**
**LIVERPOOL, NEW YORK**

# Site Management Restoration Monitoring Plan

**Prepared for:**
Lockheed Martin Corporation
497 Electronics Parkway
Building EP-6, Room 100B
Liverpool, New York 13088

**Prepared by:**
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**March 2021**

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# 1.0 Introduction

This *Restoration Monitoring Plan* (RMP) has been prepared to summarize the monitoring activities to evaluate the success of restoration at the Bloody Brook site. The required activities discussed herein pertain specifically to vegetative survival, erosion of brook bottom and side banks, and wetland habitat development. Other aspects related to the site remediation that require post-remediation monitoring, including biological monitoring, are detailed in other sections of the SMP.

The first four annual restoration monitoring events were completed between May and July of 2017, 2018, 2019, and 2020. Following an adaptive management approach to the development of the wetlands, and in accordance with the NYSDEC-approved August 2018 *Restoration Monitoring Summary Report* and the related NYSDEC letter dated November 5, 2018, a dense stand of trees were planted in the spring and fall 2019 between the wetlands and the offsite invasive species to act as a barrier and to provide a canopy for shade. Due to nursery availability in 2019, some of the proposed trees were planted in fall 2020. Additional details are provided in the sections below. The current designations for habitat areas and plantings in the wooded area are presented on Figure 1 and summarized in Table 1 in this RMP.

## 1.1 Site Description

The Bloody Brook site was broken into four distinct areas based on land use and characteristics as described below**.**

- Wooded Area – This portion of the site extends from the Thruway south (downstream) approximately 1,050 feet. This undeveloped area is irregularly shaped and relatively wide (i.e., greater than 150 feet) and includes three wetlands. The wooded area is entirely within the Onondaga County Bloody Brook Drainage District (Drainage District) easement and is owned by the Town of Salina. The Drainage District easement provides Onondaga County personnel permanent access to Bloody Brook for various projects to improve and maintain drainage. Storm water drainage from the surrounding development enters the WBBB from the west via a drainage channel at the southern end of the wooded area.

- Residential Area – The residential area surrounds the wooded area commencing at the Thruway and extending downstream of the wooded area with residential properties abutting the Drainage District easement along the WBBB to the downstream side of Floradale Road.

- Apartment Complex Area – The apartment complex area is located on Pearl Street and Town Gardens Drive between the residential properties along Floradale Road and the commercial properties along Old Liverpool Road.

- Commercial Area – The commercial area extends from commercial properties located along Old Liverpool Road to Onondaga Lake Parkway.

# 2.0 Summary of Completed Vegetation Restoration Activities

Sections 2.1 through 2.5 below summarize the construction and restoration activities related to vegetation disturbance (including tree removal) and vegetation replacement (including seed, emergent plant, tree, and shrub planting) completed at the site. The tree removal and vegetation replacement activities were completed in accordance with the NYSDEC approved work plans listed below.

- *2014 Wooded Area Tree Removal Work Plan* (January 2014)
- *2014 Construction Work Plan* (March 2014)
- *2014 Revised Restoration Work Plan* (August 2014)
- *2014 Tree Removal Work Plan for 2015 Construction Season* (November 2014)
- *Tree Removal Work Plan and Waste Characterization Soil Sampling Plan for the 2016 Construction Season* (October 2015)
- *2015 Construction and Restoration Work Plan* (February 2015)
- *2016 Construction and Restoration Work Plan* (March 2016)

Section 2.4 discusses deviations from the proposed work based on field changes made during construction activities. All field changes were approved by NYSDEC prior to implementation.

Section 2.5 addresses restoration and maintenance completed as part of the adaptive management approach and following recommendations based on the annual monitoring events completed to date, per the following NYSDEC approved work plans and maintenance summary reports:

- 2017 *Restoration Maintenance Work Plan* (October 2017) and *Restoration Maintenance Summary Report* (July 2018)
- 2018 *Restoration Maintenance Work Plan* (October 2018) and *Restoration Maintenance Summary Report* (February 2019)
- 2019 *Restoration Maintenance Summary Report and Work Plan* (August 2019) and *Restoration Maintenance Summary Report* (December 2019)
- 2020 *Restoration Maintenance Summary Report and Work Plan* (September 2020) and *Restoration Maintenance Summary Report* (December 2020)

## 2.1 Pre-Construction Tree Removal

Tree surveys and subsequent tree removals were completed prior to starting the site excavation activities. While tree removal was minimized where possible, trees were removed from all areas of the site, and new trees were planted as described below. The tree removals and replacements were completed in accordance with the NYSDEC approved work plans listed above.

## 2.2 Wooded Area

The disturbed land located in the wooded area is within the Drainage District easement which is owned by the Town of Salina and managed by Onondaga County. The remedial activities within the wooded area included disturbance of wetlands, upland areas outside of the wetlands, and removal of trees. Restoration of the wooded area included seeding and planting of wetlands and upland areas and replacement of forest and shrub habitat. Emergent wetlands were seeded with a wetland seed mix, and emergent plants were planted. Forested and shrub/scrub wetlands were also seeded with a wetland seed mix to provide an emergent wetland cover as the trees and shrubs grow. To provide a natural look to the wetland forested and shrub/scrub plantings, trees and shrubs were placed in

random with no identical tree or shrub species placed directly next to its equal. The upland areas were seeded with riparian and meadow seed mixes. Upland forested areas were planted with a woodland seed mix, and trees were planted with a shrub understory. Upland and wetland seed mixes are provided in Attachment A.

## 2.3 Residential, Apartment Complex, and Commercial Areas

Condition of lawns, vegetation cover, trees, and landscaping features within residential properties, the apartment complex, and commercial properties were documented as part of a precondition survey. As part of the remedial activities, the vegetation cover was disturbed and trees were removed. Residential properties, the apartment complex, and commercial properties were restored as close as practical to pre-existing conditions with consideration for input from the property owner and typically included the placement of sod and/or grass seed, trees, shrubs, and other plantings similar to what was removed from the property.

In the Drainage District easement within the residential, apartment complex, and commercial areas (i.e., outside of the wooded area), it was proposed to restore and seed the area with a Northeastern U.S. Roadside Native Mix (ERNMX-105) (Attachment A). However, based on a request from Onondaga County Department of Water Environment Protection (OCDWEP), a field change was implemented in September 2015 that included planting low maintenance ground cover along the top of the banks in portions of this area. Details of this field change are provided in Section 2.4.

To accommodate the property owner, the remediation was not completed for the apartment complex area outside of the brook until 2017. Annual restoration monitoring for this area began in 2018.

## 2.4 Field Changes to Vegetation Restoration Activities

Final restoration and planting was completed in accordance with the NYSDEC approved *2014 Revised RWP* and other work plans listed above in Section 2.0 with the following field changes.

1. The size of trees to be planted in the wooded area was changed from 2.5 to 3 inches to a mix of 1.5 to 2.5 and 2.5 to 3 inches. Portions of the site have limited access and finished grades that make planting the larger 2.5 to 3 inch trees difficult, due to the larger root balls. This field change was approved by NYSDEC on November 12, 2014.

2. Approved by NYSDEC on November 12, 2014, the number of trees to be planted in the wooded area including habitat area UPF-2 was changed from 1,066 to 270 due to the following reasons:

    - Trees previously existing on the site and preserved were not taken into consideration in the number of trees proposed in the *2014 Revised RWP*;

    - The estimate for the quantity of trees in the *2014 Revised RWP* was based on a standard tree per acre density for planting a new forest plantation of seedlings in large open areas. Such plantations are managed by thinning every 10 to 15 years. In addition, large planting stocks, with a mix of 1.5 to 2.5 inch and 2.5 to 3 inch trees, are being used instead of seedlings, which were proposed to be used in the *2014 Revised RWP*. Therefore, the trees are being planted on 14 to 16 foot centers more closely resembling an older forest; and

    - The revised quantity of trees was also reduced to reflect the elongated shape of the habitat plots.

3. On May 20, 2015, a field change was approved by NYSDEC regarding a proposed method of controlling Phragmites. Activities related to this field change are discussed in Section 3.1.1.6 of this RMP.

4. On July 24, 2015, a field change was approved by NYSDEC regarding the approved plantings for habitats RIP and UPF-1. At that time, 23 Black Cherry trees had been planted in these two habitats (15 in RIP and 8 in UPF-1). While little to no mortality had been observed in the other plantings, the Black Cherry trees experienced an approximately 50 percent mortality rate. The nursery supplying the stock had been consulted, and they recommended not replacing these with new Black Cherry trees as they seem to not be well suited to these two habitats.

   In an effort to maintain the biodiversity of the plantings in RIP and UPF-1, it was proposed that the Black Cherry trees that were failing be replaced with other approved species which were already thriving at the site. The numbers reported below allow for replacement of all Black Cherry trees should that be needed.

   - RIP: Fifteen planted Black Cherry to be replaced with: four Red Maple; four Sugar Maple; four Pin Oak; and three Eastern Hemlock, and

   - UPF-1: Eight planted Black Cherry to be replaced with: two Sugar Maple, two American Beach, two White Pine, and two Eastern Hemlock.

5. On September 22, 2015, a field change was approved by NYSDEC that allowed the planting of low maintenance ground cover vegetation along the Bloody Brook Drainage District easement downstream of the wooded area between the top of the stone lined brook side bank and private properties that measure 4 feet or less in width. This field change was implemented at the request of OCDWEP in order to keep these areas easily accessible to Onondaga County personnel for brook maintenance. The field change specified that areas between the top of stone and the private property that measure 4 feet or greater in width be seeded with the previously approved grass seed mix and areas between the top of stone and the private property that measure 4 feet or less in width be seeded with annual rye (for temporary cover and soil stabilization) and selected low maintenance ground cover plants. Following the one year lifespan of the rye grass, the selected low maintenance ground cover vegetation, listed below, should be established.

   - Lowbush Blueberry (*Vaccinium angustifolium*)
   - Barren Strawberry (*Waldsteinia fragarioides*)
   - Three-Toothed Cinquefoil (*Sibbaldiopsis tridentata*)
   - Moss Phlox (*Phlox subulata*)
   - Horizontal Juniper (*Juniperus horizontalis*)

6. On September 22, 2015, NYSDEC approved a field change allowing the adaptive management in the palustrine shrub/scrub area adjacent to the NYS Thruway (PSS-1). The *2014 Revised RWP* called for a specific planting plan for PSS-1 to include: *Cornus amomum, Cephalanthus occidentalis, Sambucus canadensis, Alnus incana, and Aronia arbutifolia*. PSS-1 was completed and planted during fall 2014 and has since become established. In the interim, it was noted that the groundwater inflow to this area is more persistent than originally anticipated. To accommodate these conditions, a field change was implemented to allow for the introduction of several native obligate wetland species that will better tolerate the regular inundation of PSS-1. In support of the above management scope, the following plants:

- Silky Dogwood *(Cornus amomum)*
- Elderberry *(Sambucus Canadensis)*
- Speckled Alder *(Alnus incana)*
- Red Chokeberry *(Aronia arbutifolia)*

if deceased, were to be replaced with:

- Leatherleaf *(Chamaedaphne, calyculta)*
- Button Bush *(Cephalanthus occidentalis)*
- Smooth Alder *(Alnus serrulata)*
- Fetterbush *(Leucothoe racemose)*
- Silky Willow *(Salix Sericea)*
- Mountain Holly *(Nemopanthus mucronata)*

No more than 20 percent of any one of the above were to be used as replacement species to maintain biodiversity within PSS-1, and the plants were to be planted at the same density described in the *2014 Revised RWP*.

## 2.5 Vegetation Restoration Activities Following Annual Site Inspections

The first two annual restoration monitoring events were completed in late May 2017 and early June 2018 and resulted in additional plantings and adjusted boundaries for some of the habitat areas. The specific recommendations from each of the monitoring events are discussed in the corresponding *Restoration Monitoring Summary Report* (July 2017 and August 2018), and the resulting boundaries and locations of different planted trees and shrubs are shown in Figures 1 through 10 and summarized in Table 2 of this RMP. As indicated, following the third and fourth annual monitoring events completed in June and July 2019 and 2020, several of the habitat areas are developing as designed and required no new plantings. Per the 2019 *Restoration Maintenance Summary Report and Work Plan*, invasive species removal is to continue as needed in these areas, and they will continue to be monitored during the 2021 monitoring events. Additionally, although target numbers were not met for some of the trees and shrubs in PSS-2 or PFO-1, in accordance with the 2019 work plan, volunteer trees or the recently planted rooted cuttings were not included in the counts. These will be evaluated and incorporated as appropriate during the 2021 monitoring activities. The bare root trees and shrubs planted in fall 2019 were formally captured during the 2020 monitoring activities discussed herein, and those planted in fall 2020 will be captured during the 2021 monitoring. Approximate locations of the bare root trees and shrubs planted in 2019 and 2020 are provided in Figure 10.

# 3.0 Restoration Monitoring

## 3.1 Vegetation Monitoring

Vegetation monitoring for each area (i.e., wooded, residential, apartment complex, and commercial areas) will be completed as described below on an annual basis and will include an on-site inspection to be completed by a qualified person (e.g., biologist). Monitoring will continue for between one and five years, pursuant to approved work plans and property-specific access/restoration agreements between Lockheed Martin and the property owner. Section 5 below provides an anticipated schedule for this monitoring.

### 3.1.1 Wooded Area

The wooded area is comprised of three wetlands that are further divided into ten wetland habitat areas, two riparian areas, and six upland areas (Table 1 and Figure 1). Vegetation monitoring in the wooded area will be completed in accordance with the 2014 Revised RWP and the June 6, 2014 United States Army Corps of Engineers (USACE) Nationwide Permit (NWP) 38 to perform remediation activities in the WBBB and adjacent wetlands (USACE NWP 38). Monitoring in this area will be completed on an annual basis for five years. The information collected during the on-site inspection will be used to calculate the number of targeted plant species and the percent vegetation cover in the different habitat areas in order to assess the progression of development and natural sustainability of the wetlands and habitat areas. Target plant species include all planted shrubs and trees.

The site vegetation inspections will include inspections of the vegetative cover, trees, and shrubs for each of the wetland and upland habitat types. Figures 1 through 9 show the plantings for all of the habitat areas in the wooded area. The vegetative cover in these areas will be inspected to ensure that germination is occurring in all areas and that no large bare spots exist. The plot and transect procedures that will be used, in accordance with the 2014 Revised RWP and the January 1987 *Corps of Engineers Wetland Delineation Manual*, are described below.

Planted trees and shrubs will be counted and inspected to ensure they are developing, and dead trees and shrubs will be flagged. If the number of trees and shrubs is determined to be less than the target numbers as reported in Table 2 of this RMP, corrective measures may be proposed including tree and shrub replacements. Field forms for each of the habitat areas with planted trees and shrubs are provided in Attachment B. If determined necessary, tree and shrub species may be substituted for similar native species based on availability. Additionally, control measures will be implemented as discussed below in Section 3.1.1.6 if invasive species are present in any habitat area at a density greater than 5 percent.

Following each inspection, a summary report will be prepared and submitted to NYSDEC for approval detailing the extent of vegetation cover, target plant species survival, discussion of any issues, and proposed corrective actions, as needed. Section 5 of this RMP provides additional details on the summary reports.

#### 3.1.1.1 Plot Procedure

The plot procedure will be conducted at eight locations within the emergent habitat areas. See Figure 1 for the plot locations. At each location, a 10-foot by 10-foot permanent plot was marked at the corners with 1-inch PVC pipes extending at least 2 feet above the ground surface. Depending on the plant

density in the plot, it may be divided into multiple subplots during counting to ease the counting process. The species within the plot will be identified to the extent practical. The estimated percent cover of foliage of each species of herbaceous or woody vegetation in the square will be recorded. The average percent cover for the entire plot will be calculated with bare ground included as a cover type. Photographs will be taken of each plot.

#### 3.1.1.2 Transect Procedure

Permanent transects have been established across PSS-1, PSS-2, and PFO-1 as shown in the Figure 1. A spacing to provide 20 to 30 measuring points within each transect at the time of the inspection will be chosen (e.g., every four feet provided 26 points in the 100 foot PFO-1 transect). At each measuring point, the area of coverage for each species, with bare ground included as a cover type, will be determined and expressed as a percent coverage of the total transect area. Moving from the habitat edge, each tree and shrub that has a canopy extending into the 2-foot wide transect will be recorded. In addition, the approximate area of canopy (as projected on the ground) will be recorded. The data set will include a species frequency count, a coverage area for each individual, a total coverage (square feet) for each species, and a relative coverage as a percent cover. In PFO-1, trees and understory shrubs will be presented separately. Photos will also be taken of each transect.

#### 3.1.1.3 Habitat Area Monitoring

PEM-1, PEM-2, PEM-3, PEM-4, PEM-5, W-10, and W-11 (Palustrine Emergent) – For these seven wetland areas containing primarily emergent plants, the plot procedure as described in the 2014 Revised RWP and above will be used to estimate percent cover. If vegetative cover does not appear to be approaching 80 percent during the annual monitoring events, corrective actions will be proposed.

PSS-1, PSS-2 (Palustrine Shrub/Scrub), and PFO-1 (Palustrine Forested) – For these three wetland areas, containing both trees and shrubs as well as wetland habitat seed mix, the transect procedure, as described in the 2014 Revised RWP and above will be used to estimate percent cover. Additionally, the habitat area will be walked, and any dead trees or shrubs will be flagged. A count of the live trees and shrubs in the areas will be compiled to calculate the number for the targeted species. Corrective measures will be proposed when the number of trees and shrubs is less than the target number, when invasive species are present at a density greater than 5 percent, or when vegetative cover does not appear to be approaching 80 percent in the particular habitat area.

UPF-1 and UPF-2 (Forested Upland) – For these two upland areas, containing both trees and shrubs as well as forested floor seed mix, the habitat area will be evaluated, and any dead trees or shrubs will be flagged for potential replacement. A count of the live trees and shrubs in the areas will be compiled for the targeted species. Corrective measures will be proposed if the number of trees and shrubs are determined to be below the target number as reported in Table 2 of this RMP, or when invasive species are present at a density greater than 5 percent.

To monitor the success of the seed mix, vegetation cover will be monitored in each habitat area by performing a walkthrough including a visual inspection. If the vegetative cover does not appear to be approaching 80 percent in a particular habitat area, corrective measures will be proposed to and approved by NYSDEC prior to being implemented.

RIP-1 and RIP-2 (Riparian) – For the riparian habitats, containing trees, shrubs, and a riparian habitat seed mix, the habitat area will be evaluated, and any dead trees or shrubs will be flagged for potential later replacement. A count of the live trees and shrubs in the areas will be compiled for the targeted

species. Corrective measures will be proposed if the number of trees and shrubs are determined to be below the target number as reported in Table 2 of this RMP, or when invasive species are present at a density greater than 5 percent. Shrubs in these habitat areas were planted and surveyed in groups of three with each plant counted as an individual shrub.

To monitor the success of the seed mix, vegetation cover will be monitored by a walkthrough including a visual inspection. If the vegetative cover does not appear to be approaching 80 percent in a particular habitat area, corrective measures will be proposed to and approved by NYSDEC prior to being implemented.

RIP-2 comprises the land immediately adjacent to WBBB. Ideally, the edge of the stream should have sufficient cover to provide shade for the stream to maintain cooler temperatures, improving conditions for aquatic habitat. This has been accomplished within RIP-2 primarily through the planting of willow and dogwood live stakes. Existing large trees also provide shade to some parts of the stream banks in this area. Starting at the northern edge of the site at the Thruway fence line, the channel will be walked down to Weir 3. The vegetation and percentage cover will be monitored, and photos (facing downstream) will be taken approximately every 50 feet to document the vegetation cover and shade during the annual monitoring activities.

USS-1 (Shrub/Scrub Upland) - For the upland shrub/scrub habitat, containing shrubs and a forest floor habitat seed mix, the habitat area will be walked, and any dead shrubs will be flagged for later replacement. A count of the live shrubs in the areas will be compiled for the targeted species. Corrective measures will be proposed if the number of trees and shrubs are determined to be below the target number, or when invasive species are present at a density greater than 5 percent.

To monitor the success of the seed mix, vegetation cover will be evaluated by completing a walkthrough including a visual inspection. If the vegetative cover does not appear to be approaching 80 percent in a particular habitat area, corrective measures will be proposed to and approved by NYSDEC prior to being implemented.

MOW-1, MOW-2, and LAWN (Upland Meadow and Lawn) - For these areas, either an upland meadow or cool season lawn seed mix were used. Visual inspections will entail a walkthrough of the areas to confirm the seed mix was successful, and there are no large bare spots. If bare spots larger than 1 square foot are observed during monitoring, conditions in the area will be evaluated (e.g., multiple bare spots, soil compaction, etc.) to determine if corrective measures should be proposed.

#### 3.1.1.4 Wetlands Groundwater and Surface Water Level Monitoring

During restoration activities in the wetland areas, three weirs were installed to allow for adjustment of the height of water retained in the wetlands (Figure 1). With NYSDEC approval, adjustments would be made, as needed, to improve the hydrology to support the different habitat types. During a 2015 high flow event, Weir 2 was damaged and required reconstruction. Following repairs, it was observed that conditions in the wetland behind the repaired weir were drier than anticipated. In May 2017, a field change was submitted to and approved by NYSDEC to permanently raise the height of Weir 2. These adjustments, completed in August 2017, raised the height of Weir 2 by 8 inches to lengthen the retention time of water and increase the water level in this wetland area and have effectively increased hydration of the wetland.

Shallow piezometers, installed in four locations at the edge of inundation in the constructed wetlands, will be used to monitor groundwater levels in the wetlands. Surface water will be monitored using four

staff gauges installed in each of the three constructed wetlands. The approximate locations of the piezometers and staff gauges are shown on Figure 1.

#### 3.1.1.5 Wetlands Photographic Monitoring

Progress in germination and growth of vegetation will be monitored using panoramic photographs from five permanent photo points established in uplands surrounding the constructed wetlands. The locations of the permanent photo points are shown in Figure 1.

#### 3.1.1.6 Invasive Species Control

During construction activities, a Bloody Brook Phragmites Control Procedure was developed and approved by the NYSDEC to control the growth and spread of Phragmites adjacent to the restored wooded area of the site. In accordance with the procedure, *Phragmites* were removed in June 2015 and light-proof tarps were placed over the area. In spring 2017 (after about two years of the tarps remaining in place), the tarps were removed, and the previously covered areas were seeded with a PA New England Province riparian seed mix (i.e., ERNMX-253) (Attachment A) at a rate of 20 pounds per acre. Following application of the seed mix, the area has been monitored along with the adjacent restored portion of the wooded area as discussed in the previous sections. This procedure was also used in a portion of PSS-1 between spring 2019 and fall 2020. Since shrubs and rooted cuttings were planted in holes throughout the tarp, the area was not seeded at the time the tarp was removed in October 2020. This will be completed in spring 2021 if determined to be needed.

Following implementation of the initial *Phragmites* control procedure, a standard operating procedure (SOP) for removal of invasive species was developed to further address control of *Phragmites* and to address the presence of other identified invasive species on the site, including purple loosestrife, Japanese knotweed, multiflora rose, honeysuckle, and buckthorn. This SOP is provided in Attachment C of this RMP.

### 3.1.2 Residential, Apartment Complex, and Commercial Areas

All residential, apartment complex, and commercial plantings will be visually inspected until they are successfully established for a period of between one and five years, in accordance with the property-specific access/restoration agreements between Lockheed Martin and the property owner. Plantings will be replaced as needed, with consideration for input from the property owner.

## 3.2 Erosion Monitoring

In accordance with the March 2014 Decision Document and the August 2014 Revised RWP, the site will be inspected for ponding on the side banks and for erosion of the brook bottom and side banks. Results from this inspection will be summarized in the Restoration Summary Report.

In addition to the brook bottom and side banks, a swale constructed in November 2019 to direct standing water from behind adjacent residences toward the wetlands will be inspected as part of the erosion monitoring to ensure erosion or sedimentation is not occurring. The location of the swale is shown on Figure 1.

# 4.0 Vegetation Replacement

After each habitat area is inspected as described above, the habitat areas and dead trees and shrubs will be evaluated to determine replacement activities. The replacement activities will be summarized in the summary report, to be submitted to NYSDEC within 60 days of completing the monitoring. Replacements will be planted by the fall planting season, assuming stock availability and favorable site/weather conditions. If necessary, replacements will be made during the following spring planting season. Per the 2014 Revised RWP, some dead vegetation (including plant shrubs and trees) will be left as standing wood habitat, with the replacement tree being planted nearby.

An assessment of the species that had the highest success will be completed during each inspection, and replacement shrubs or trees, as needed, will be selected from those determined to be the most successful. If a tree or shrub species does not survive at acceptable rates, the cause of the high mortality rate will be evaluated. For example if a tree or shrub species has a low survival rate due to altered habitat conditions, replacement shrubs and trees will be selected based on the existing habitat conditions from the list of species already being planted at the site. If a native species not already being planted at the site is determined to be a better alternative, that alternative native species may be proposed to be planted at the site. Any replacement plantings needed at the site will be proposed to and approved by the NYSDEC prior to the corrective action being implemented. For example, if a species of tree or shrub has died due to inappropriate habitat conditions (e.g., too wet or too dry), the proposed replacement species will be based on a tree or shrub that is better adapted for survival in the existing habitat conditions. If the tree or shrub appears to have died for no particular reason, that tree or shrub will be replaced by the same species. This practice of replacement species was implemented with Field Changes approved on July 24, 2015 and September 22, 2015 as summarized in Section 2.4 of this RMP (numbers 4 and 6).

# 5.0 Restoration Monitoring Summary Reports and Proposed Schedule

Within 60 days after the monitoring event, a Restoration Monitoring Summary Report and Work Plan will be submitted to the NYSDEC that provides an assessment of the development of the wetlands and habitat area as well as tree and shrub survival. That document will include completed field forms; photographic documentation of observed vegetative and hydrological conditions; recommendations for replacement of planting as needed; and any activities proposed or completed to correct any restoration failures or issues discovered during the monitoring activities.

Pursuant to approved work plans, this monitoring will be completed for five years, with 2021 anticipated to be the final year for the wetland habitats and the residential properties. As discussed in Section 4.2 of the SMP, restoration was still in progress at the areas listed below and were therefore excluded from the 2017 monitoring event. Accordingly, the final monitoring for these three areas is anticipated to be completed in 2022:

- Apartment complex area including the stream side banks and bottom
- Portion of the commercial property outside of the stream side banks and located between the Old Liverpool Road culvert and the railroad tracks
- Construction access area at Onondaga Lake Parkway

The 2021 schedule for these field activities and associated reports are as follows:

- May/June – annual erosion and residential vegetation monitoring event, weather permitting. The erosion portion of this inspection will continue beyond 2021.
- June/July – annual wetland vegetation monitoring event, weather permitting.
- August/September – Summary report and work plan submitted to NYSDEC for review.
- By October/November – implement proposed corrective actions including re-plantings, as determined in the summary report and work plan.

NYSDEC will be notified one week prior to these field activities.

# Tables

**Table 1. Restored Wooded and Wetland Habitat Types**

| Habitat Type | Habitat ID* | Quantitative measure* |
|---|---|---|
| Emergent | PEM-1 North | Plot 1 |
| | PEM-1 South | Plot 2 |
| | PEM-2 | Plot 3 |
| | PEM-3 | Plot 4 |
| | PEM-4 | Plot 5 |
| | PEM-5 | Plot 6 |
| | W-10 | Plot 7 |
| | W-11 | Plot 8 |
| Scrub shrub | PSS-1 | PSS Transect 1 |
| | PSS-2 | PSS Transect 2 |
| | | Target number of trees and shrubs |
| Palustrine Forested | PFO-1 | PFO Transect 1 |
| | | Target number of trees and shrubs |
| Riparian | RIP-1 | Target number of trees and shrubs |
| | RIP-2 | Assessment of tree cover |
| Upland Shrub | USS-1 | Target number of trees and shrubs |
| Upland Forest | UPF-1 | Target number of trees and shrubs |
| | UPF-2 | Target number of trees and shrubs |
| Upland Meadow | MOW-1 | Only qualitative measure used – visual inspection of ground cover |
| | MOW-2 | |
| | LAWN | |

* See Figure 1 for habitat, plot, and transect locations.

**Table 2. Target Tree and Shrub Counts from 2020 Monitoring Event**

| Wetland Habitat Area | Area (square feet) | Total Number of Target Trees/Shrubs[1] | Species | Total Number of Trees and Shrubs Counted during Monitoring in June 2020 |
|---|---|---|---|---|
| PSS-1 Trees | 1,726 | 4 | | 3 |
| | | | Pin Oak | 3 |
| PSS-1 Shrubs | 1,726 | 17 | | 19 |
| | | | Grey Dogwood | 2 |
| | | | Northern Arrowwood | 7 |
| | | | Sweet Gale | 1 |
| | | | Chokeberry[2] | 4 |
| | | | Elderberry[2] | 5 |
| PSS-2 Shrubs | 6,940 | 69 | | 80 |
| | | | Sandbar Willow | 46 |
| | | | Elderberry | 8 |
| | | | Red Chokeberry | 3 |
| | | | Buttonbush | 6 |
| | | | Sweet Gale | 4 |
| | | | Northern Arrowwood | 13 |
| PFO-1 Trees | 10,817 | 37 | | 19 |
| | | | Red Maple | 1 |
| | | | Black Willow | 11 |
| | | | River Birch | 3 |
| | | | Swamp White Oak | 4 |
| PFO-1 Shrubs | 10,817 | 4 | | 4 |
| | | | Elderberry | 4 |
| RIP-1 Trees | 31,515 | 97 | | 106 |
| | | | Red Maple | 27 |
| | | | Sugar Maple | 20 |
| | | | Pin Oak | 19 |
| | | | Eastern Hemlock | 11 |
| | | | White Pine | 6 |
| | | | Swamp White Oak | 4 |
| | | | Tulip Tree | 5 |
| | | | Basswood | 3 |
| | | | Riverbirch | 1 |
| | | | Black Willow | 1 |
| | | | Silver Maple | 9 |
| RIP-1 Shrubs | 31,515 | 314 | | 293 |
| | | | Northern Arrowwood | 117 |
| | | | Elderberry[2] | 2 |
| | | | Chokeberry[2] | 3 |
| | | | Nannyberry | 51 |
| | | | Grey Dogwood | 90 |
| | | | Highbush Cranberry | 11 |
| | | | Steeplebush | 2 |
| | | | Sweet Gale | 6 |
| | | | Buttonbush | 9 |
| | | | Speckled Alder | 2 |
| USS-1 Shrubs | 3,291 | 39 | | 39 |
| | | | Grey Dogwood | 19 |
| | | | Northern Arrowwood | 20 |
| UPF-1 Trees | 8,675 | 26 | | 32 |
| | | | Sugar Maple | 9 |
| | | | American Beech | 9 |
| | | | Red Maple | 3 |
| | | | Silver Maple | 1 |
| | | | Basswood | 5 |
| | | | Swamp White Oak | 3 |
| | | | Eastern Hemlock | 2 |
| UPF-1 Shrubs | 8,675 | 86 | | 84 |
| | | | Northern Arrowwood | 27 |
| | | | Nannyberry | 14 |
| | | | Grey Dogwood | 35 |
| | | | Highbush Cranberry | 8 |
| UPF-2 (Woodland) Trees | 11,300 | 21 | | 21 |
| | | | Sugar Maple | 5 |
| | | | White Pine | 3 |
| | | | River Birch | 3 |
| | | | Red Maple | 5 |
| | | | Eastern Hemlock | 5 |
| UPF-2 (Woodland) Shrubs | 11,300 | 83 | | 61 |
| | | | Northern Arrowwood | 30 |
| | | | Grey Dogwood | 28 |
| | | | Elderberry | 3 |

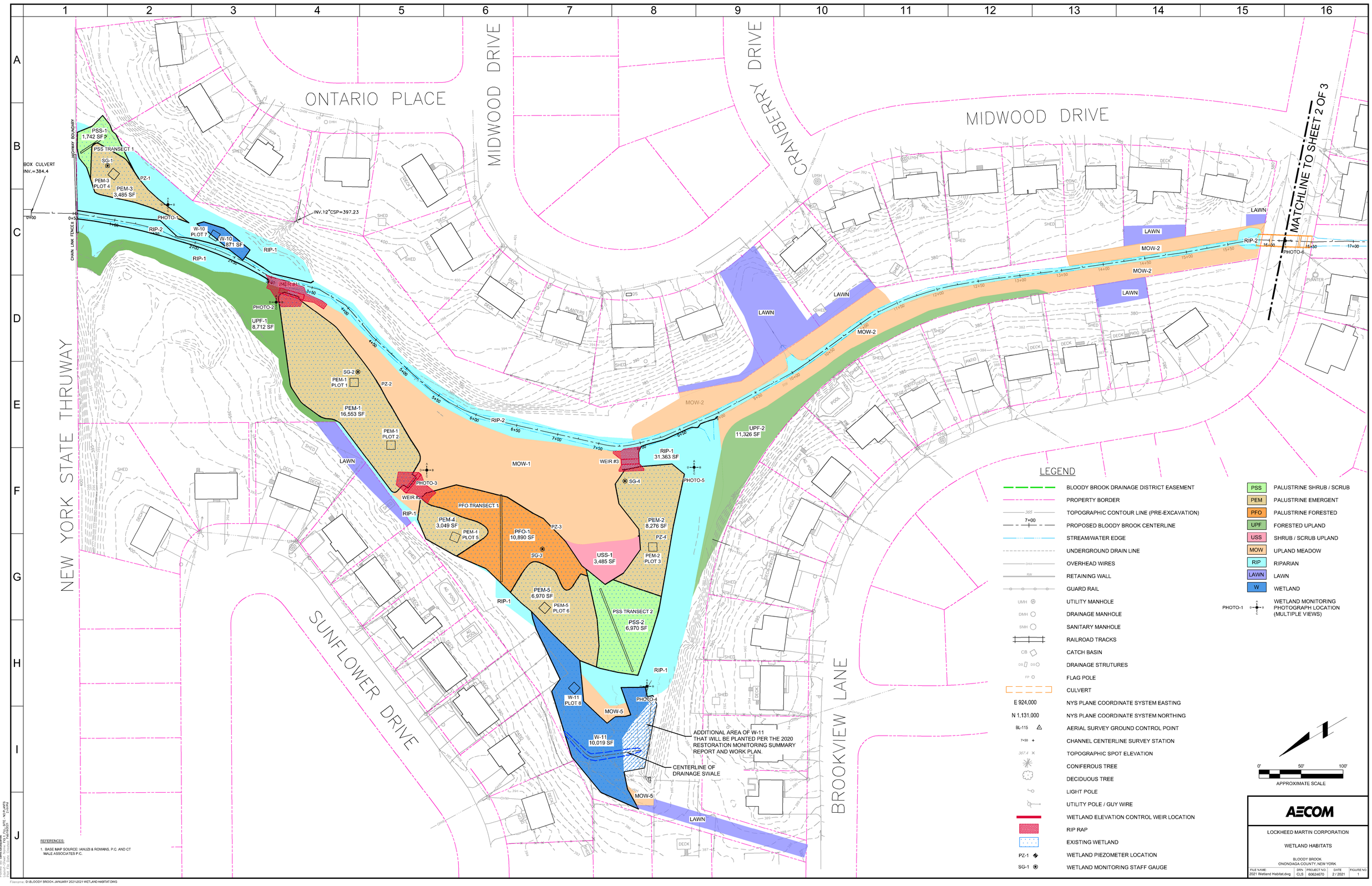
Notes:

1) Target trees and shrubs refer to the trees and shrubs planted in accordance with NYSDEC approved restoration activities.

2) The total numbers include two chokeberry and three elderberry shrubs planted in November 2020 per the NYSDEC approved September 2020 Restoration Monitoring Summary Report and Maintenance Work Plan.

3) This table includes only the habitat areas where target trees and shrubs are counted as part of the monitoring process. The habitat areas not included are inspected using other quantitative techniques as discussed in Section 3 of this Restoration Monitoring Plan.

# Figures




## LEGEND

- BLOODY BROOK DRAINAGE DISTRICT EASEMENT
- PROPERTY BORDER
- TOPOGRAPHIC CONTOUR LINE (PRE-EXCAVATION)
- PROPOSED BLOODY BROOK CENTERLINE
- STREAM/WATER EDGE
- UNDERGROUND DRAIN LINE
- OVERHEAD WIRES
- RETAINING WALL
- GUARD RAIL
- UTILITY MANHOLE
- DRAINAGE MANHOLE
- SANITARY MANHOLE
- RAILROAD TRACKS
- CATCH BASIN
- DRAINAGE STRUTURES
- FLAG POLE
- CULVERT
- E 924,000 — NYS PLANE COORDINATE SYSTEM EASTING
- N 1,131,000 — NYS PLANE COORDINATE SYSTEM NORTHING
- BL-115 — AERIAL SURVEY GROUND CONTROL POINT
- 7+50 — CHANNEL CENTERLINE SURVEY STATION
- 367.4 — TOPOGRAPHIC SPOT ELEVATION
- CONIFEROUS TREE
- DECIDUOUS TREE
- LIGHT POLE
- UTILITY POLE / GUY WIRE
- WETLAND ELEVATION CONTROL WEIR LOCATION
- RIP RAP
- EXISTING WETLAND
- PZ-1 — WETLAND PIEZOMETER LOCATION
- SG-1 — WETLAND MONITORING STAFF GAUGE

- PSS — PALUSTRINE SHRUB / SCRUB
- PEM — PALUSTRINE EMERGENT
- PFO — PALUSTRINE FORESTED
- UPF — FORESTED UPLAND
- USS — SHRUB / SCRUB UPLAND
- MOW — UPLAND MEADOW
- RIP — RIPARIAN
- LAWN — LAWN
- W — WETLAND
- PHOTO-1 — WETLAND MONITORING PHOTOGRAPH LOCATION (MULTIPLE VIEWS)

0' 50' 100'
APPROXIMATE SCALE

REFERENCES:

1. BASE MAP SOURCE: IANUZI & ROMANS, P.C. AND CT MALE ASSOCIATES P.C.

AECOM

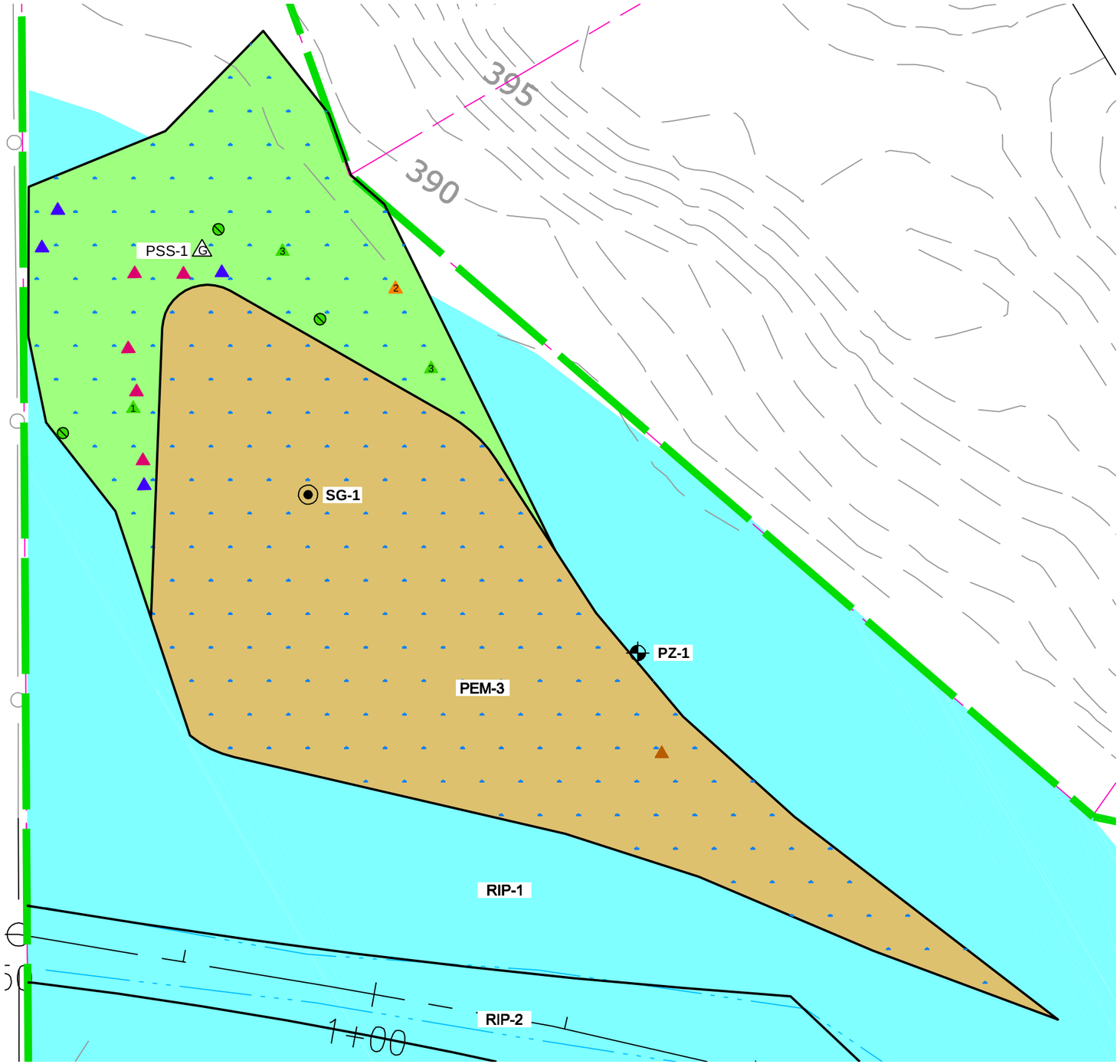
LOCKHEED MARTIN CORPORATION

WETLAND HABITATS

BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

| FILE NAME | DRN | PROJECT NO. | DATE | FIGURE NO. |
|---|---|---|---|---|
| 2021 Wetland Habitat.dwg | CLS | 60624670 | 2 / 2021 | 1 |

Plotted By: chris.sizemore@aecom.com
Layout Name: Model
Last Plot: 2/4/2021 11:47:08 AM
Login Name: sizemorc
Filename: D:\BLOODY BROOK JANUARY 2021\2021 WETLAND HABITAT.DWG




## LEGEND

- PZ-1 — WETLAND PIEZOMETER LOCATION
- SG-1 — WETLAND MONITORING STAFF GAUGE
- PSS — PALUSTRINE SHRUB / SCRUB
- PEM — PALUSTRINE EMERGENT
- RIP — RIPARIAN
- EXISTING WETLAND

### EXISTING TREES

- PIN OAK

### EXISTING SHRUBS

- GREY DOGWOOD
- BUTTONBUSH
- ELDERBERRY
- RED CHOKEBERRY
- NORTHERN ARROWWOOD
- G — SWEET GALE

### PLANT STATUS BASED ON JULY 2020 INSPECTION

- LIVING TREE
- STRESSED TREE
- 3 — NUMBER OF LIVING SHRUBS

## NOTES

1. THE TRIANGLES REPRESENTING PLANTED SHRUBS INDICATE ONE LIVE SHRUB OF THAT SPECIES COUNTED AT THAT LOCATION DURING THE 2020 MONITORING EVENT, UNLESS OTHERWISE NOTED.

2. THE SHRUB WITHIN PEM-3 WAS PLANTED PRIOR TO THIS AREA BEING DESIGNATED AS AN EMERGENT WETLAND DUE TO WETTER CONDITIONS AND THE ADAPTIVE MANAGEMENT APPROACH.

0' 15' 30'

AECOM

LOCKHEED MARTIN CORPORATION

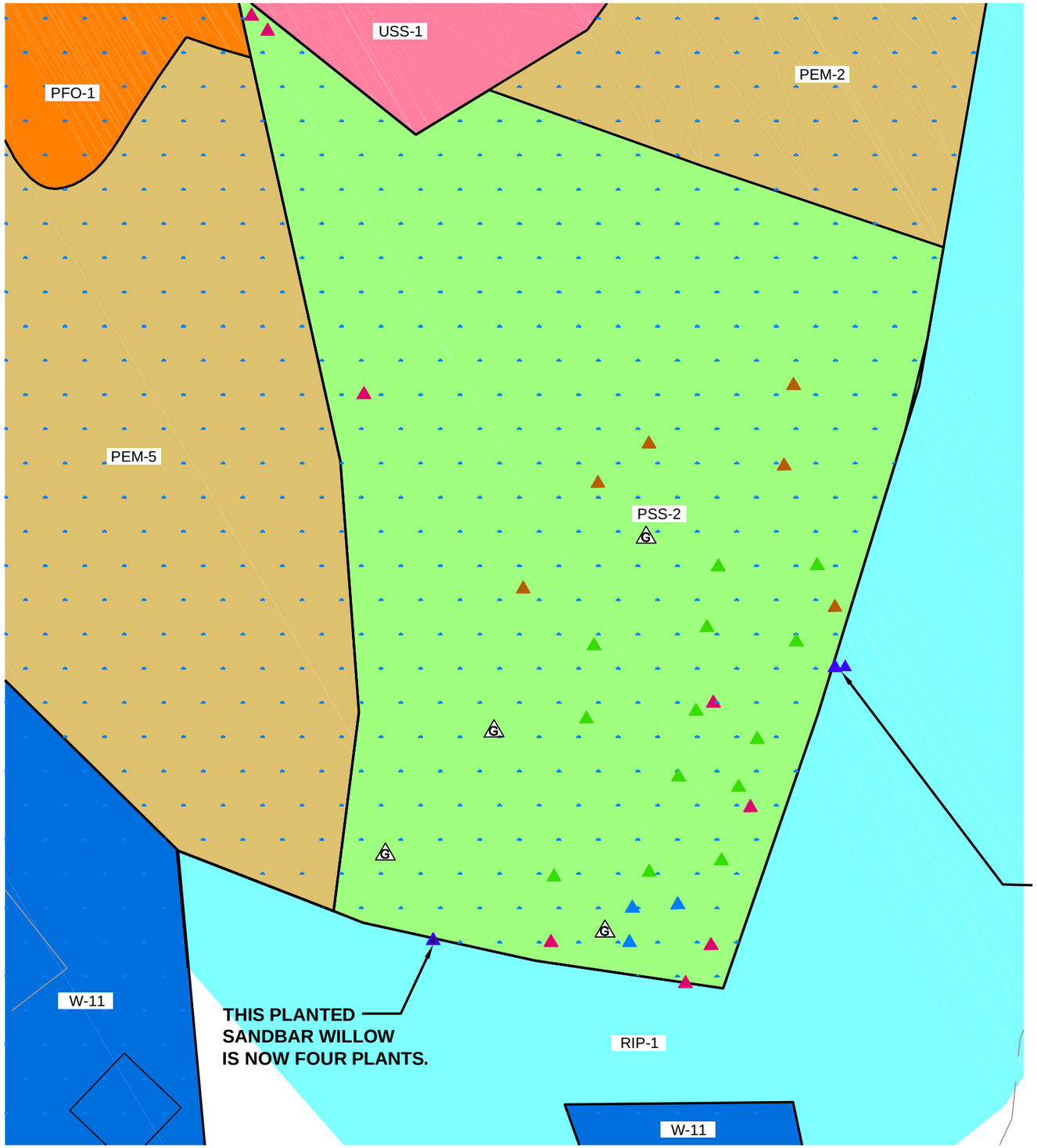
PLANTING LOCATIONS FOR PSS-1

BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

| FILE NAME: | DRN | PROJECT NO. | DATE | FIGURE |
|---|---|---|---|---|
| 2021 Plant Plan.dwg | CLS | 60624670 | 2 / 2021 | 2 |

Plotted By: carrie.szczepanski
Layout-Sheet Name: FIG 2_PLANTING PLAN PSS-1
Plot File Date Created: Feb/19/2021 3:58 PM

Filename: D:\BLOODY BROOK JANUARY 2021\2021 PLANT PLAN.DWG




## LEGEND

- PSS — PALUSTRINE SHRUB / SCRUB
- PEM — PALUSTRINE EMERGENT
- PFO — PALUSTRINE FORESTED
- USS — SHRUB / SCRUB UPLAND
- RIP — RIPARIAN
- W — WETLAND
- EXISTING WETLAND

## EXISTING SHRUBS

- ELDERBERRY
- BUTTONBUSH
- RED CHOKEBERRY
- SANDBAR WILLOW
- NORTHERN ARROWWOOD
- SWEET GALE (G)

## NOTES

1. THE TRIANGLES REPRESENTING PLANTED SHRUBS INDICATE ONE LIVE SHRUB OF THAT SPECIES COUNTED AT THAT LOCATION DURING THE 2020 MONITORING EVENT, UNLESS OTHERWISE NOTED.

0' 15' 30'

AECOM

LOCKHEED MARTIN CORPORATION

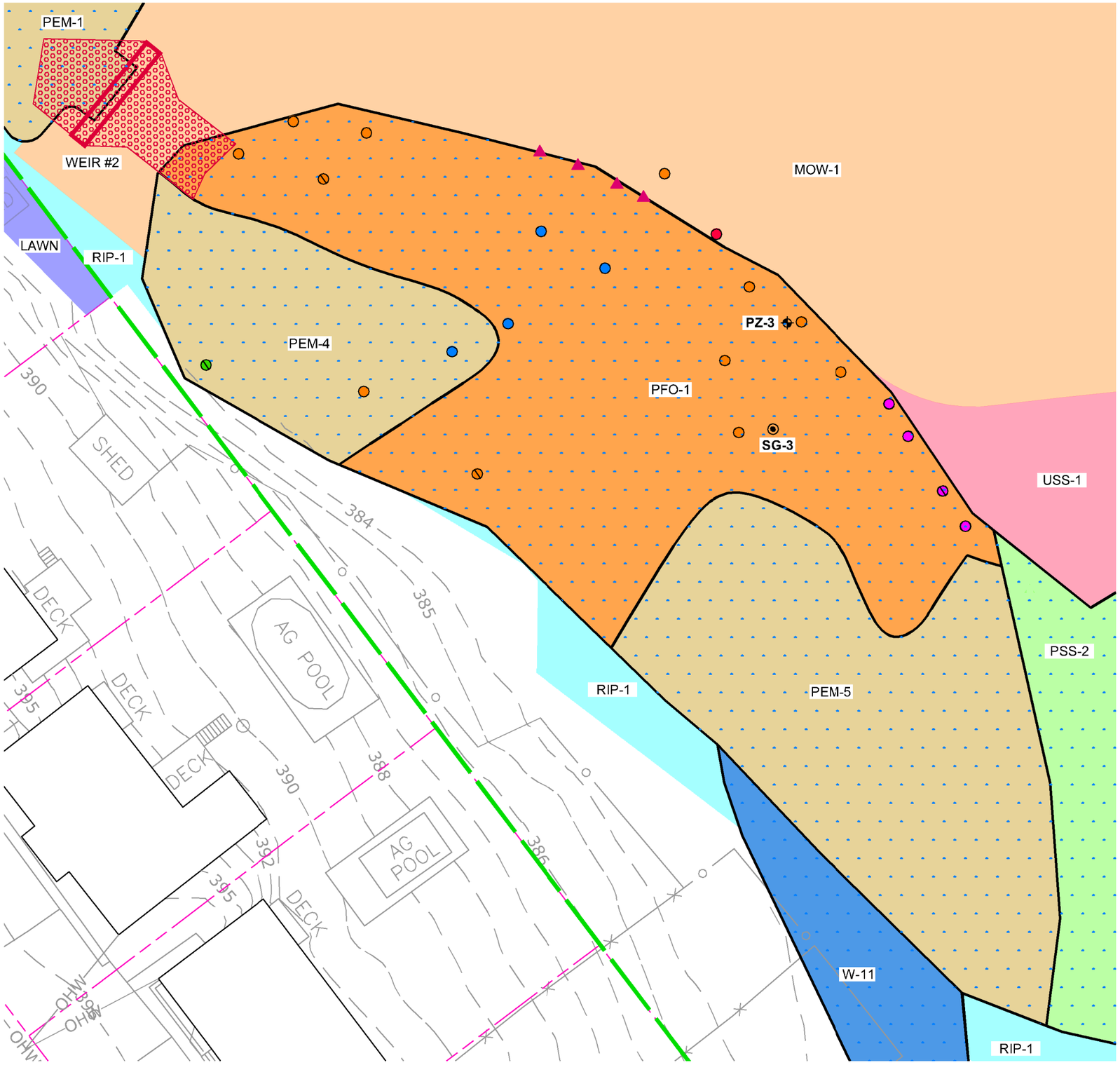
PLANTING LOCATIONS FOR PSS-2

BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

| FILE NAME: | DRN | PROJECT NO. | DATE | FIGURE |
|---|---|---|---|---|
| 2021 Plant Plan.dwg | CLS | 60624670 | 2 / 2021 | 3 |

Plotted By: carrie.szczepanski
Layout–Sheet Name: FIG 3_PLANTING PLAN PSS-2
Plot File Date Created: Feb/19/2021 3:05 PM

Filename: D:\BLOODY BROOK JANUARY 2021\2021 PLANT PLAN.DWG




## LEGEND

- PZ-3 — WETLAND PIEZOMETER LOCATION
- SG-3 — WETLAND MONITORING STAFF GAUGE
- PSS — PALUSTRINE SHRUB / SCRUB
- PEM — PALUSTRINE EMERGENT
- PFO — PALUSTRINE FORESTED
- USS — SHRUB / SCRUB UPLAND
- MOW — UPLAND MEADOW
- RIP — RIPARIAN
- LAWN — LAWN
- W — WETLAND
- EXISTING WETLAND

### EXISTING TREES

- BLACK WILLOW
- PIN OAK
- RED MAPLE
- RIVER BIRCH
- SWAMP WHITE OAK

### SHRUBS

- ELDERBERRY

### PLANT STATUS BASED ON JULY 2020 INSPECTION

- LIVING TREE
- STRESSED TREE

## NOTES

1. THE TRIANGLES REPRESENTING PLANTED SHRUBS INDICATE ONE LIVE SHRUB OF THAT SPECIES COUNTED AT THAT LOCATION DURING THE 2020 MONITORING EVENT, UNLESS OTHERWISE NOTED.
2. THE TREES WITHIN PEM-4 WERE PLANTED PRIOR TO THESE AREAS BEING DESIGNATED AS EMERGENT WETLANDS DUE TO WETTER CONDITIONS AND THE ADAPTIVE MANAGEMENT APPROACH.

0’ 25’ 50’

AECOM

LOCKHEED MARTIN CORPORATION

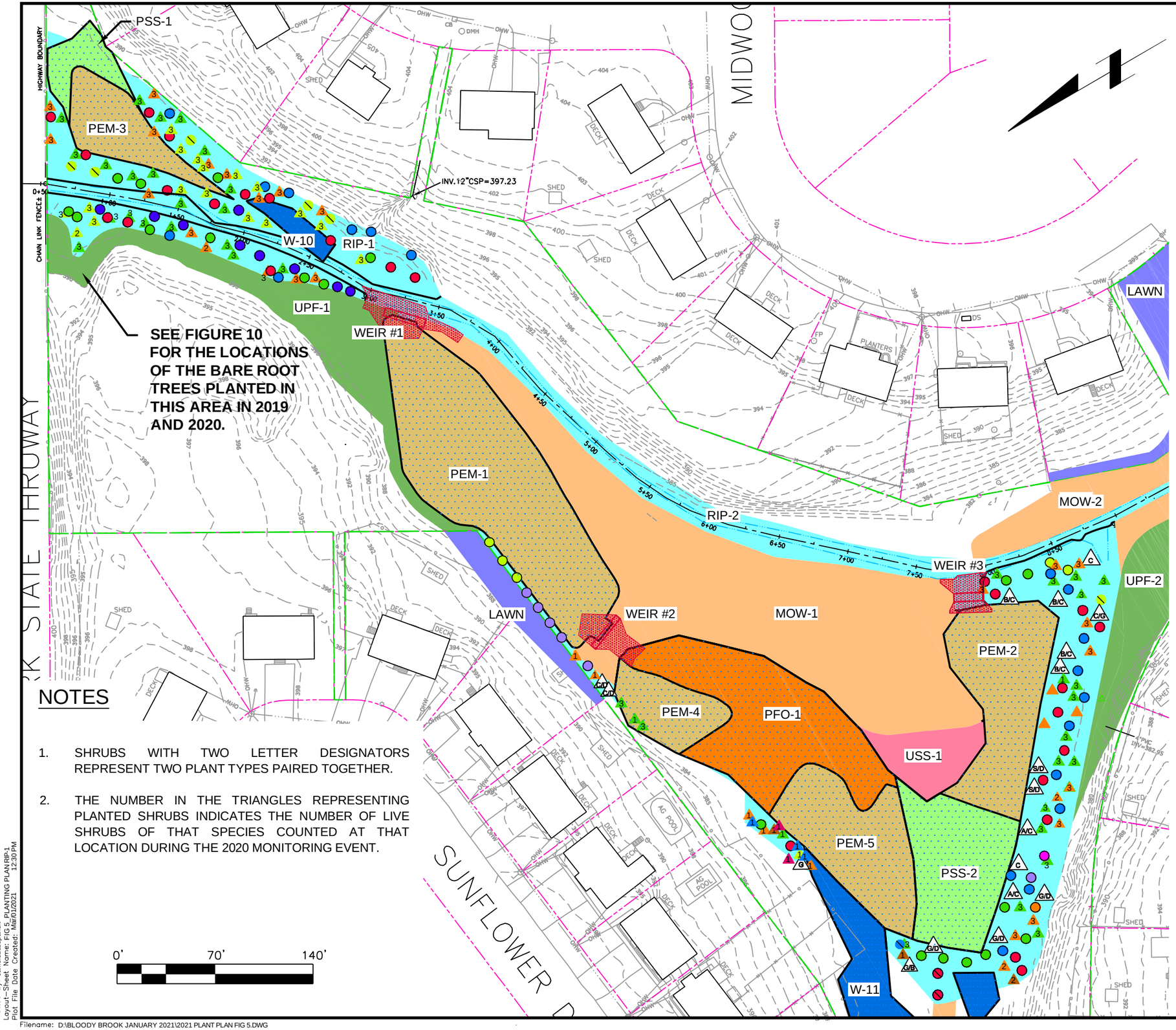
PLANTING LOCATIONS FOR PFO-1

BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

| FILE NAME: | DRN | PROJECT NO. | DATE | FIGURE |
|---|---|---|---|---|
| 2021 Plant Plan Fig 4.dwg | CLS | 60624670 | 2 / 2021 | 4 |

Plotted By: carrie.szczepanski
Layout-Sheet Name: FIG 4_PLANTING PLAN PFO-1
Plot File Date Created: 2/19/2021 1:46 PM

Filename: D:\BLOODY BROOK JANUARY 2021\2021 PLANT PLAN FIG 4.DWG




## LEGEND

| | | | |
|---|---|---|---|
| PSS | PALUSTRINE SHRUB / SCRUB | | |
| PEM | PALUSTRINE EMERGENT | | |
| PFO | PALUSTRINE FORESTED | | |
| UPF | FORESTED UPLAND | | |
| USS | SHRUB / SCRUB UPLAND | RIP | RIPARIAN |
| MOW | UPLAND MEADOW | LAWN | LAWN |
| | EXISTING WETLAND | W | WETLAND |

### EXISTING TREES

| | | | |
|---|---|---|---|
| | BLACK WILLOW | | SILVER MAPLE |
| | EASTERN HEMLOCK | | SUGAR MAPLE |
| | PIN OAK | | SWAMP WHITE OAK |
| | RED MAPLE | | WHITE PINE |

### EXISTING SHRUBS

- BUTTON BUSH
- GREY DOGWOOD
- NANNYBERRY
- NORTHERN ARROWWOOD
- ELDERBERRY
- RED CHOKEBERRY
- C — HIGH BUSH CRANBERRY
- G — SWEET GALE
- B/C — BUTTON BUSH/HIGH BUSH CRANBERRY
- D/A — GREY DOGWOOD/SPECKLED ALDER
- C/D — HIGH BUSH CRANBERRY/GREY DOGWOOD
- C/G — HIGH BUSH CRANBERRY/SWEET GALE
- A/C — SPECKLED ALDER/HIGH BUSH CRANBERRY
- G/D — SWEET GALE/GREY DOGWOOD
- S/D — STEEPLE BUSH/GREY DOGWOOD
- G/B — SWEET GALE/BUTTON BUSH

### PLANT STATUS BASED ON JULY 2020 INSPECTION

- ○ LIVING TREE
- \ STRESSED TREE
- 3 NUMBER O F LIVING SHRUBS

## NOTES

1. SHRUBS WITH TWO LETTER DESIGNATORS REPRESENT TWO PLANT TYPES PAIRED TOGETHER.
2. THE NUMBER IN THE TRIANGLES REPRESENTING PLANTED SHRUBS INDICATES THE NUMBER OF LIVE SHRUBS OF THAT SPECIES COUNTED AT THAT LOCATION DURING THE 2020 MONITORING EVENT.

0’ 70’ 140’

AECOM

LOCKHEED MARTIN CORPORATION

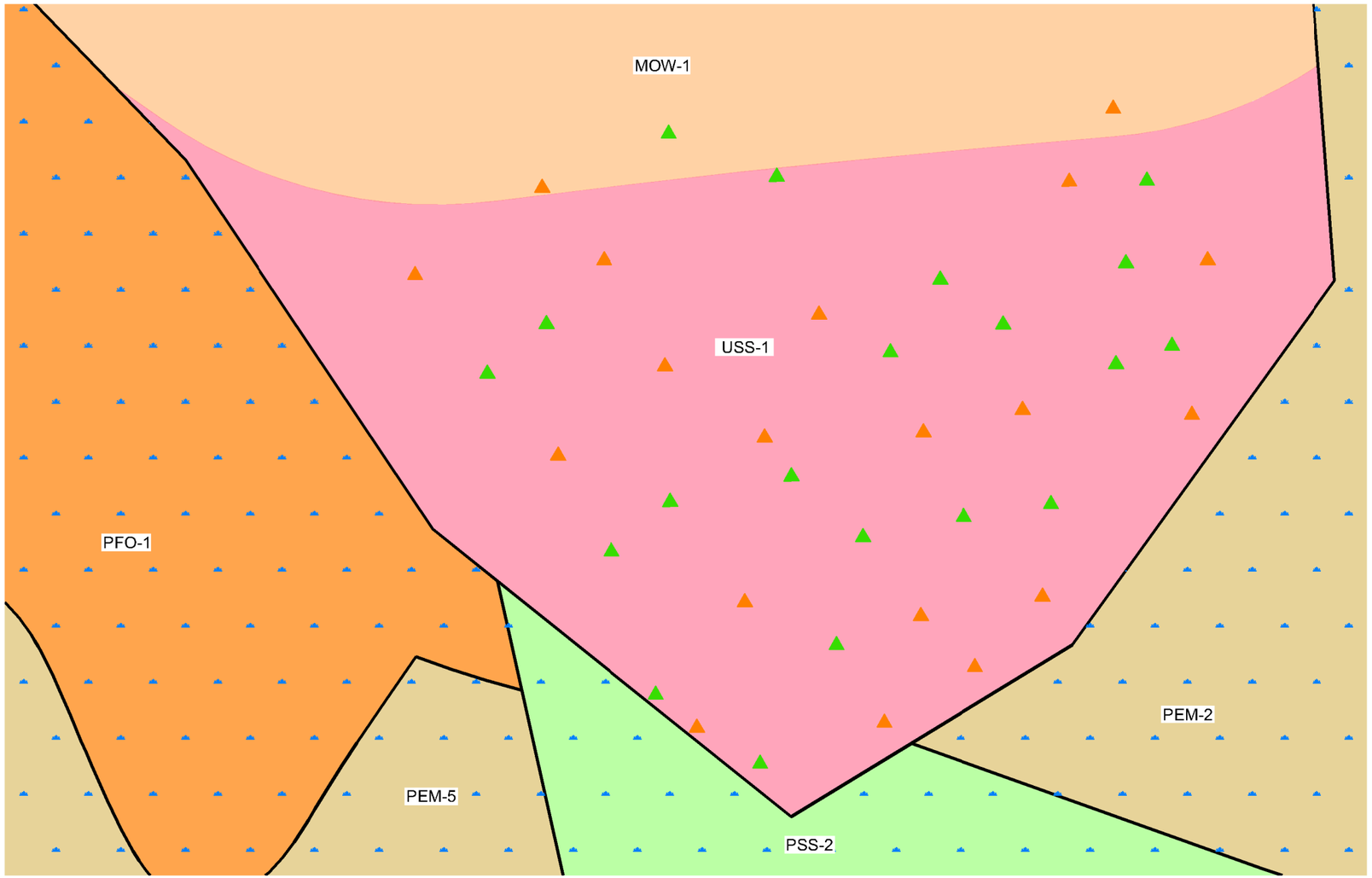
PLANTING LOCATIONS FOR RIP-1

BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

| FILE NAME: | DRN | PROJECT NO. | DATE | FIGURE |
|---|---|---|---|---|
| 2021 Plant Plan Fig 5.dwg | CLS | 60624670 | 2 / 2021 | 5 |

Plotted By: carrie.szczepanski
Layout–Sheet Name: FIG 5_PLANTING PLAN RIP-1
Plot File Date Created: Mar/02/2021 12:30 PM

Filename: D:\BLOODY BROOK JANUARY 2021\2021 PLANT PLAN FIG 5.DWG




## LEGEND

| | |
|---|---|
| PSS | PALUSTRINE SHRUB / SCRUB |
| PEM | PALUSTRINE EMERGENT |
| PFO | PALUSTRINE FORESTED |
| USS | SHRUB / SCRUB UPLAND |
| MOW | UPLAND MEADOW |
| | EXISTING WETLAND |

### EXISTING SHRUBS

- GREY DOGWOOD
- NORTHERN ARROWWOOD

## NOTES

1. THE TRIANGLES REPRESENTING PLANTED SHRUBS INDICATE ONE LIVE SHRUB OF THAT SPECIES COUNTED AT THAT LOCATION DURING THE 2020 MONITORING EVENT, UNLESS OTHERWISE NOTED.

0' 10' 20'

AECOM

LOCKHEED MARTIN CORPORATION

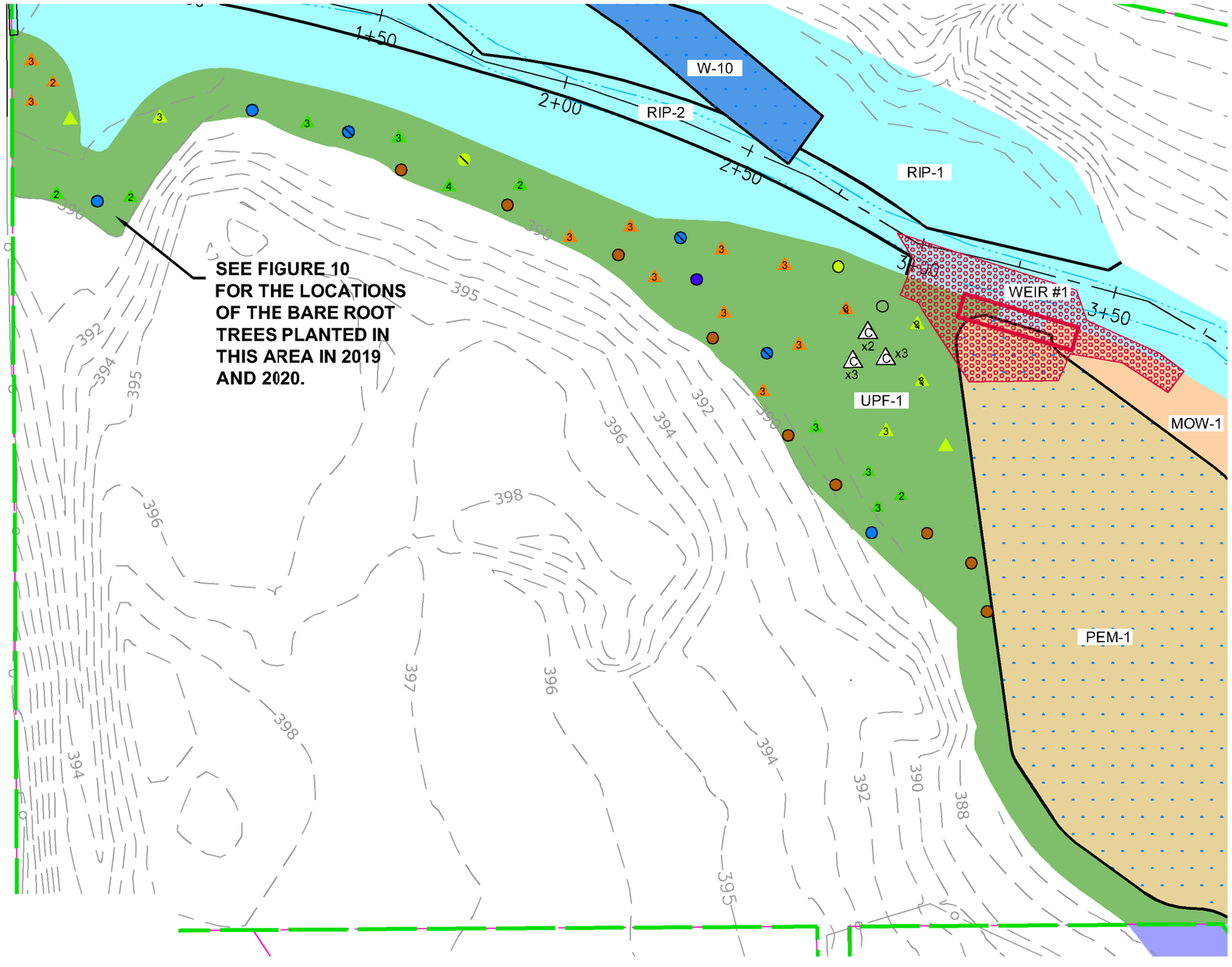
PLANTING LOCATIONS FOR USS-1

BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

| FILE NAME: | DRN | PROJECT NO. | DATE | FIGURE |
|---|---|---|---|---|
| 2021 Plant Plan.dwg | CLS | 60624670 | 2 / 2021 | 6 |

Plotted By: carrie.szczepanski
Layout--Sheet Name: FIG 6_PLANTING PLAN USS-1
Plot File Date Created: Feb/19/2021 2:05 PM

Filename: D:\BLOODY BROOK JANUARY 2021\2021 PLANT PLAN.DWG




## LEGEND

- PEM — PALUSTRINE EMERGENT
- UPF — FORESTED UPLAND
- MOW — UPLAND MEADOW
- RIP — RIPARIAN
- W — WETLAND
- EXISTING WETLAND

### EXISTING TREES

- AMERICAN BEECH
- EASTERN HEMLOCK
- SILVER MAPLE
- SUGAR MAPLE

### EXISTING SHRUBS

- GREY DOGWOOD
- NANNYBERRY
- NORTHERN ARROWWOOD
- HIGHBUSH CRANBERRY

### PLANT STATUS BASED ON JULY 2020 INSPECTION

- LIVING TREE
- STRESSED TREE
- 3 — NUMBER OF LIVING SHRUBS

## NOTES

1. THE TRIANGLES REPRESENTING PLANTED SHRUBS INDICATE ONE LIVE SHRUB OF THAT SPECIES COUNTED AT THAT LOCATION DURING THE 2020 MONITORING EVENT, UNLESS OTHERWISE NOTED.

0' 15' 30' 60'

AECOM

LOCKHEED MARTIN CORPORATION

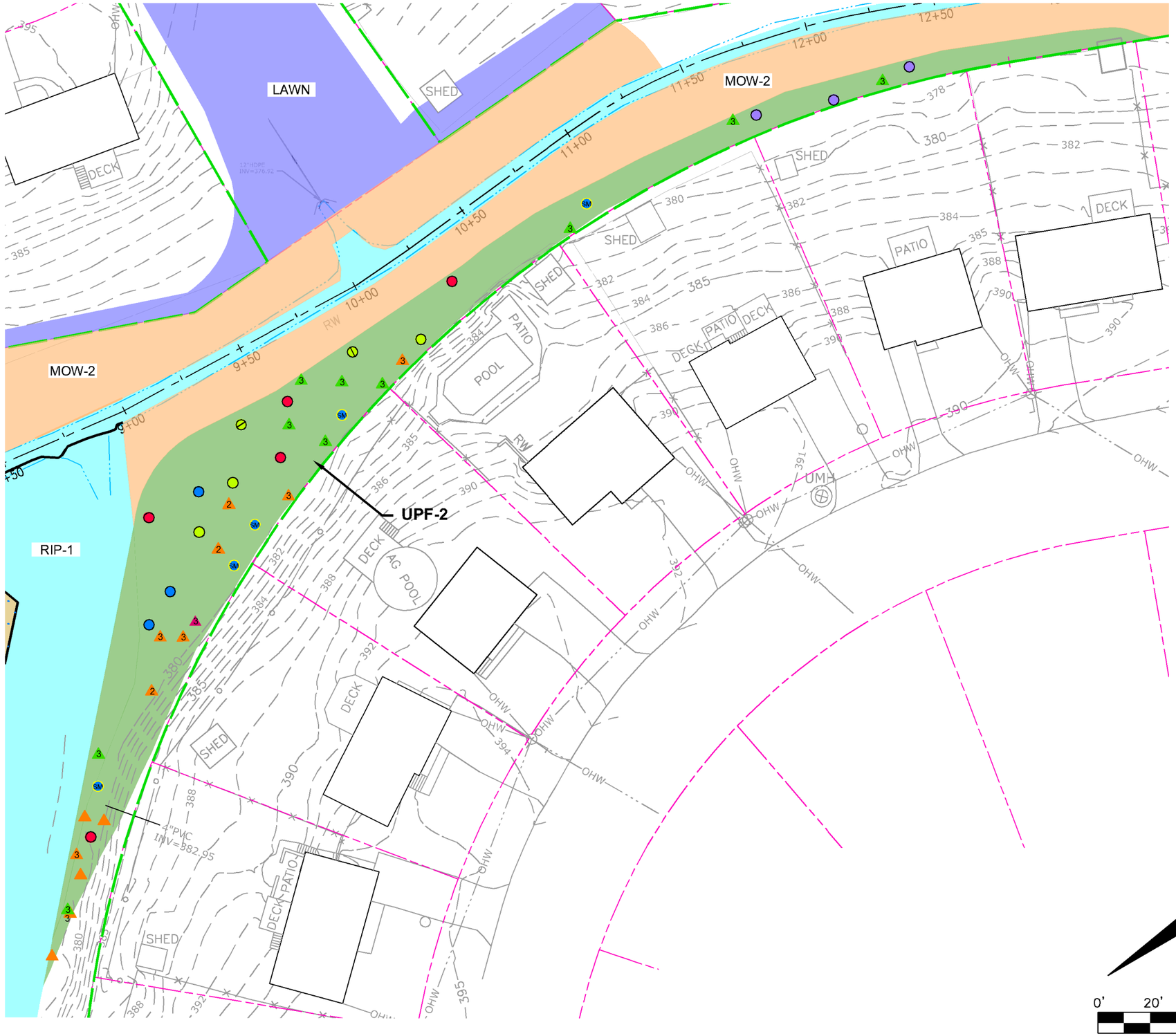
PLANTING LOCATIONS FOR UPF-1

BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

| FILE NAME: | DRN | PROJECT NO. | DATE | FIGURE |
|---|---|---|---|---|
| 2021 Plant Plan.dwg | CLS | 60624670 | 2 / 2020 | 7 |

Plotted By: carrie.szczepanski
Layout-Sheet Name: FIG 7_PLANTING PLAN UPF-1
Plot File Date Created: Feb/19/2021 2:07 PM

Filename: D:\BLOODY BROOK JANUARY 2021\2021 PLANT PLAN.DWG




## LEGEND

- UPF — FORESTED UPLAND
- MOW — UPLAND MEADOW
- RIP — RIPARIAN
- LAWN — LAWN
- EXISTING WETLAND

### EXISTING TREES

- EASTERN HEMLOCK
- RED MAPLE
- SUGAR MAPLE
- WHITE PINE
- RIVER BIRCH

### EXISTING SHRUBS

- ELDERBERRY
- GREY DOGWOOD
- NORTHERN ARROWWOOD

### PLANT STATUS BASED ON JULY 2020 INSPECTION

- LIVING TREE
- STRESSED TREE
- 3 — NUMBER OF LIVING SHRUBS

## NOTES

1. THE TRIANGLES REPRESENTING PLANTED SHRUBS INDICATE ONE LIVE SHRUB OF THAT SPECIES COUNTED AT THAT LOCATION DURING THE 2020 MONITORING EVENT, UNLESS OTHERWISE NOTED.

0' 20' 40' 80'

AECOM

LOCKHEED MARTIN CORPORATION

PLANTING LOCATIONS FOR UPF-2

BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

| FILE NAME: | DRN | PROJECT NO. | DATE | FIGURE |
|---|---|---|---|---|
| 2021 Plant Plan UPF-2.dwg | CLS | 60624670 | 2 / 2021 | 8 |

Plotted By: carrie.szczepanski
Layout–Sheet Name: FIG 8_PLANTING PLAN UPF-2
Plot File Date Created: Feb/26/2021 9:02 AM

Filename: D:\BLOODY BROOK JANUARY 2021\2021 PLANT PLAN UPF-2.DWG

RIP-1

MOW-5

W-11

MOW-5

LAWN

ADDITIONAL AREA OF W-11 THAT WILL BE PLANTED PER THE 2020 RESTORATION MONITORING SUMMARY REPORT AND WORK PLAN.

CENTERLINE OF DRAINAGE SWALE

30"CMP
INV=377.90

DECK

DECK

SHED

BUSH

SH

386 385 380 385 388 382 384 385 386 390 388 387 392

## LEGEND

| | |
|---|---|
| MOW | UPLAND MEADOW |
| RIP | RIPARIAN |
| LAWN | LAWN |
| W | WETLAND |
| | EXISTING WETLAND |

## EXISTING SHRUBS

- ELDERBERRY
- RED CHOKEBERRY
- G SWEET GALE

## NOTES

1. THE TRIANGLES REPRESENTING PLANTED SHRUBS INDICATE ONE LIVE SHRUB OF THAT SPECIES COUNTED AT THAT LOCATION DURING THE 2020 MONITORING EVENT, UNLESS OTHERWISE NOTED.
2. W-11 WAS NOT ONE OF THE HABITAT AREAS RESULTING FROM THE DESIGN FOR WETLAND RESTORATION. HOWEVER, IT APPEARS TO BE AN ADDITIONAL WETLAND AREA AND HAS BEEN INCORPORATED INTO THE ANNUAL VEGETATION MONITORING AND MAINTENANCE ACCORDINGLY.

0’ 10’ 20’ 40’

AECOM

LOCKHEED MARTIN CORPORATION

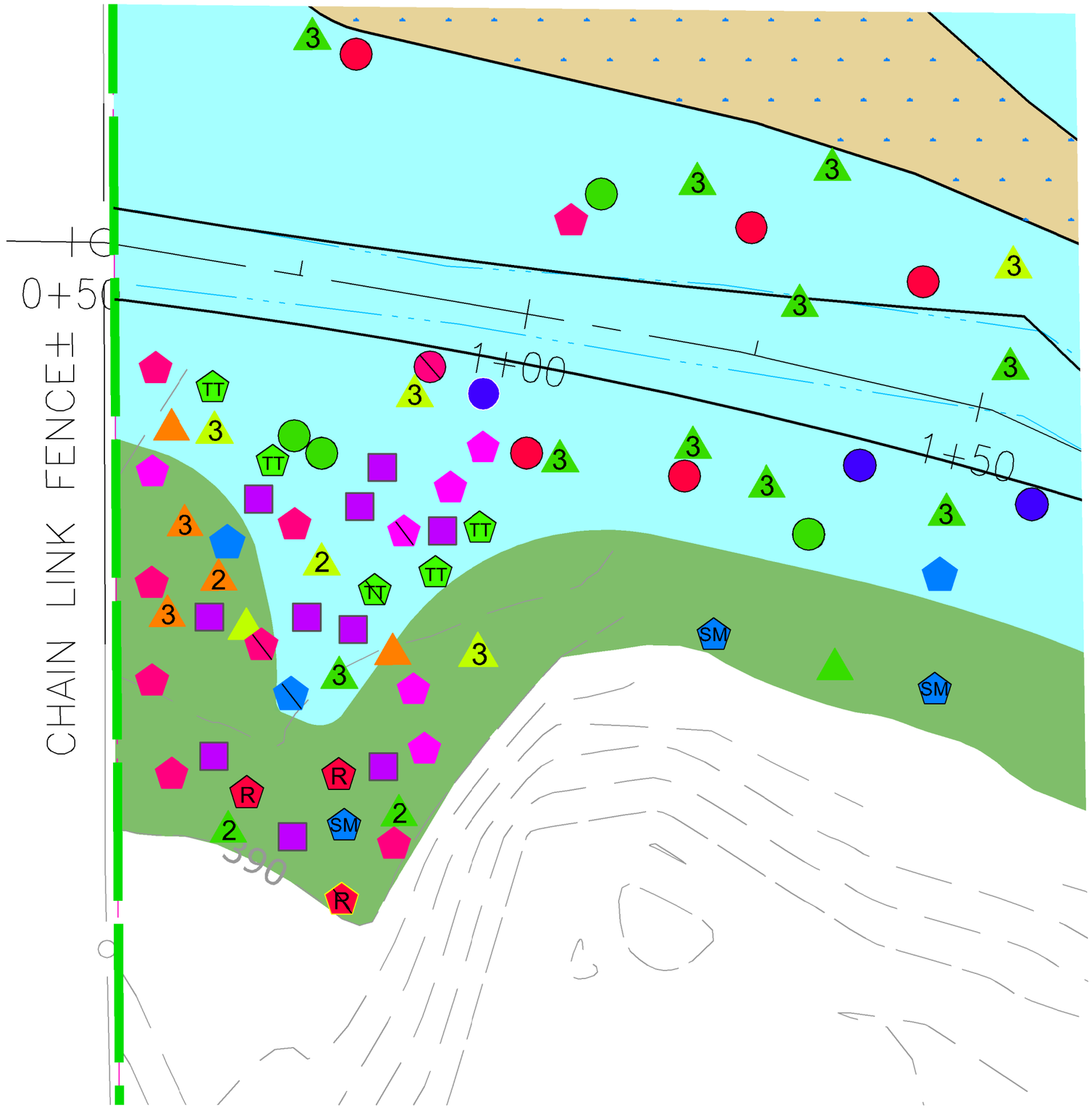
PLANTING LOCATIONS FOR W-11

BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

| FILE NAME: | DRN | PROJECT NO. | DATE | FIGURE |
|---|---|---|---|---|
| 2021 W-11 Fig 9.dwg | CLS | 60598046 | 2 / 2021 | 9 |

Plotted By: carrie.szczepanski
Layout=Sheet Name: FIG 9_PLANTING PLAN W-11
Plot File Date Created: Feb/19/2021 4:12 PM

Filename: D:\BLOODY BROOK JANUARY 2021\2021 W-11 FIG 9.DWG




## LEGEND

PEM — PALUSTRINE EMERGENT
UPF — FORESTED UPLAND
RIP — RIPARIAN

### TREES

- AMERICAN BEECH
- BLACK CHERRY
- EASTERN HEMLOCK
- PIN OAK
- SILVER MAPLE
- RED MAPLE

### SHRUBS

- GREY DOGWOOD
- NANNYBERRY
- NORTHERN ARROWWOOD

### 2019 BARE ROOT TREES

- RED MAPLE
- SUGAR MAPLE
- TULIP TREE
- SWAMP WHITE OAK
- BASSWOOD
- RIVER BIRCH

### 2020 BARE ROOT TREES

- SERVICE BERRY

### PLANT STATUS BASED ON JULY 2020 INSPECTION

- LIVING TREE
- STRESSED TREE
- 3 — NUMBER OF LIVING SHRUBS
- 2019 LIVING BARE ROOT TREE
- 2020 LIVING BARE ROOT TREE

AECOM

LOCKHEED MARTIN CORPORATION
RESTORATION MAINTENANCE SUMMARY REPORT
LOCATIONS of 2019 AND 2020 BARE ROOT TREES in RELATION TO SURROUNDING PLANTINGS
BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

| FILE NAME: | DRN | PROJECT NO. | DATE | FIGURE |
|---|---|---|---|---|
| 2021 Bare Rcot Trees.dwg | CLS | 60624670 | 2 / 2021 | 10 |

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# Attachment A

# Seed Mixtures

## PA New England Province Riparian Mix

**ERNMX #** ERNMX-253
**Seeding Rate** Approximately 20 lb per acre
**Mix Type** Wet Meadow & Wetland Sites

- 14% Little Bluestem, Fort Indiantown Gap-PA Ecotype (Schizachyrium scoparium, Fort Indiantown Gap-PA Ecotype)
- 14% Indiangrass, PA Ecotype (Sorghastrum nutans, PA Ecotype)
- 10% Riverbank Wildrye, PA Ecotype (Elymus riparius, PA Ecotype)
- 10% Virginia Wildrye, PA Ecotype (Elymus virginicus, PA Ecotype)
- 9% Deertongue, 'Tioga' (Panicum clandestinum (Dichanthelium c.), 'Tioga')
- 8% Big Bluestem, 'Niagara' (Andropogon gerardii, 'Niagara')
- 7% Fox Sedge, PA Ecotype (Carex vulpinoidea, PA Ecotype)
- 2% Switchgrass, 'Shelter' (Panicum virgatum, 'Shelter')
- 2% Boneset, PA Ecotype (Eupatorium perfoliatum, PA Ecotype)
- 2% Soft Rush (Juncus effusus)
- 2% Swamp Milkweed, PA Ecotype (Asclepias incarnata, PA Ecotype)
- 2% Autumn Bentgrass, PA Ecotype (Agrostis perennans, PA Ecotype)
- 2% Wild Senna, VA & WV Ecotype (Senna hebecarpa (Cassia h.), VA & WV Ecotype)
- 2% Oxeye Sunflower, PA Ecotype (Heliopsis helianthoides, PA Ecotype)
- 2% Blue Vervain, PA Ecotype (Verbena hastata, PA Ecotype)
- 2% Partridge Pea, PA Ecotype (Chamaecrista fasciculata (Cassia f.), PA Ecotype)
- 1% Wild Bergamot, PA Ecotype (Monarda fistulosa, PA Ecotype)
- 1% Redtop Panicgrass, PA Ecotype (Panicum rigidulum (P. stipitatum), PA Ecotype)
- 1% Joe Pye Weed, PA Ecotype (Eupatorium fistulosum, PA Ecotype)
- 1% Flat Topped White Aster, PA Ecotype (Aster umbellatus (Doellingeria umbellata), PA Ecotype)
- 1% Purplestem Aster, PA Ecotype (Aster puniceus (Symphyotrichum puniceum), PA Ecotype)
- 1% Zigzag Aster, PA Ecotype (Aster prenanthoides (Symphyotrichum p.), PA Ecotype)
- 1% New England Aster (Aster novae-angliae (Symphyotrichum n.))
- 1% New York Ironweed, PA Ecotype (Vernonia noveboracensis, PA Ecotype)
- 1% Many Leaved Bulrush, PA Ecotype (Scirpus polyphyllus, PA Ecotype)
- 1% Spotted Joe Pye Weed, PA Ecotype (Eupatorium maculatum (Eupatoriadelphus maculatus), PA Ecotype)

Total: 100%

## Northeastern U.S. Roadside Native Mix

**ERNMX #** ERNMX-105
**Seeding Rate** Approximately 20 lb per acre, or 1/2 lb per 1,000 sq ft
**Mix Type** Upland & Meadow Sites

- 24% Big Bluestem, 'Prairie View'-IN Ecotype (Andropogon gerardii, 'Prairie View'-IN Ecotype)
- 20% Sideoats Grama, 'Butte' (Bouteloua curtipendula, 'Butte')
- 19% Virginia Wildrye, PA Ecotype (Elymus virginicus, PA Ecotype)
- 5% Broomsedge, MO Ecotype (Andropogon virginicus, MO Ecotype)
- 5% Blackeyed Susan, Coastal Plain NC Ecotype (Rudbeckia hirta, Coastal Plain NC Ecotype)
- 4% Partridge Pea, PA Ecotype (Chamaecrista fasciculata (Cassia f.), PA Ecotype)
- 4% Purple Coneflower (Echinacea purpurea)
- 3% Ohio Spiderwort, PA Ecotype (Tradescantia ohiensis, PA Ecotype)
- 2% Swamp Milkweed, PA Ecotype (Asclepias incarnata, PA Ecotype)
- 2% Wild Senna, VA & WV Ecotype (Senna hebecarpa (Cassia h.), VA & WV Ecotype)
- 2% Oxeye Sunflower, PA Ecotype (Heliopsis helianthoides, PA Ecotype)
- 2% Zigzag Aster, PA Ecotype (Aster prenanthoides (Symphyotrichum p.), PA Ecotype)
- 2% Blue False Indigo, Southern WV Ecotype (Baptisia australis, Southern WV Ecotype)
- 2% Flat Topped White Aster, PA Ecotype (Aster umbellatus (Doellingeria umbellata), PA Ecotype)
- 1% Wild Bergamot, PA Ecotype (Monarda fistulosa, PA Ecotype)
- 1% Early Goldenrod, PA Ecotype (Solidago juncea, PA Ecotype)
- 1% New England Aster, PA Ecotype (Aster novae-angliae (Symphyotrichum n.), PA Ecotype)
- 1% Marsh (Dense) Blazing Star (Spiked Gayfeather), PA Ecotype (Liatris spicata, PA Ecotype)

Total: 100%

## PA New England Province FACW Mix

**ERNMX #** ERNMX-251

**Seeding Rate** Approximately 20 lb per acre

**Mix Type** Wet Meadow & Wetland Sites

- 24% Fox Sedge, PA Ecotype (Carex vulpinoidea, PA Ecotype)
- 20% Virginia Wildrye, PA Ecotype (Elymus virginicus, PA Ecotype)
- 10% Lurid (Shallow) Sedge, PA Ecotype (Carex lurida, PA Ecotype)
- 5% Hop Sedge, PA Ecotype (Carex lupulina, PA Ecotype)
- 4% Blue Vervain, PA Ecotype (Verbena hastata, PA Ecotype)
- 3% Green Bulrush, PA Ecotype (Scirpus atrovirens, PA Ecotype)
- 3% Soft Rush (Juncus effusus)
- 2% Swamp Milkweed, PA Ecotype (Asclepias incarnata, PA Ecotype)
- 2% Wood Reedgrass, PA Ecotype (Cinna arundinacea, PA Ecotype)
- 2% Boneset, PA Ecotype (Eupatorium perfoliatum, PA Ecotype)
- 2% Cosmos (Bristly) Sedge, PA Ecotype (Carex comosa, PA Ecotype)
- 2% Oxeye Sunflower, PA Ecotype (Heliopsis helianthoides, PA Ecotype)
- 2% Redtop Panicgrass, PA Ecotype (Panicum rigidulum (P. stipitatum), PA Ecotype)
- 2% Sensitive Fern (Onoclea sensibilis)
- 1% Joe Pye Weed, PA Ecotype (Eupatorium fistulosum, PA Ecotype)
- 1% Pennsylvania Smartweed, PA Ecotype (Polygonum pensylvanicum, PA Ecotype)
- 1% Spotted Joe Pye Weed, PA Ecotype (Eupatorium maculatum (Eupatoriadelphus maculatus), PA Ecotype)
- 1% Northern Long Sedge, PA Ecotype (Carex folliculata, PA Ecotype)
- 1% Slender Mountainmint (Pycnanthemum tenuifolium)
- 1% Flat Topped White Aster, PA Ecotype (Aster umbellatus (Doellingeria umbellata), PA Ecotype)
- 1% Bladder (Star) Sedge, PA Ecotype (Carex intumescens, PA Ecotype)
- 1% Rattlesnake Grass, PA Ecotype (Glyceria canadensis, PA Ecotype)
- 1% Many Leaved Bulrush, PA Ecotype (Scirpus polyphyllus, PA Ecotype)
- 1% Great Blue Lobelia, PA Ecotype (Lobelia siphilitica, PA Ecotype)
- 1% New York Ironweed, PA Ecotype (Vernonia noveboracensis, PA Ecotype)
- 1% Narrowleaf Blue Eyed Grass (Sisyrinchium angustifolium)
- 1% Brown Bulrush, PA Ecotype (Scirpus pendulus, PA Ecotype)
- 1% New England Aster (Aster novae-angliae (Symphyotrichum n.))
- 1% Zigzag Aster, PA Ecotype (Aster prenanthoides (Symphyotrichum p.), PA Ecotype)
- 1% Purplestem Aster, PA Ecotype (Aster puniceus (Symphyotrichum puniceum), PA Ecotype)
- 1% Square Stemmed Monkeyflower, PA Ecotype (Mimulus ringens, PA Ecotype)

Total: 100%

## Partially Shaded Area Roadside Mix

**ERNMX #** ERNMX-140

**Seeding Rate** Approximately 20 lb per acre, or 1/2 lb per 1,000 sq ft

**Mix Type** Woodland Openings, Partially Shaded Sites & Shrubby Sites Associated with Bioengineering

- 20% Virginia Wildrye, PA Ecotype (Elymus virginicus, PA Ecotype)
- 17% Creeping Red Fescue (Festuca rubra)
- 17% Deertongue, 'Tioga' (Panicum clandestinum (Dichanthelium c.), 'Tioga')
- 10% Autumn Bentgrass, Albany Pine Bush-NY Ecotype (Agrostis perennans, Albany Pine Bush-NY Ecotype)
- 6% Tall White Beardtongue (Penstemon digitalis)
- 5% Partridge Pea, PA Ecotype (Chamaecrista fasciculata (Cassia f.), PA Ecotype)
- 4% Purple Coneflower (Echinacea purpurea)
- 4% Zigzag Aster, PA Ecotype (Aster prenanthoides (Symphyotrichum p.), PA Ecotype)
- 4% Blackeyed Susan, Coastal Plain NC Ecotype (Rudbeckia hirta, Coastal Plain NC Ecotype)
- 3% Marsh (Dense) Blazing Star (Spiked Gayfeather), PA Ecotype (Liatris spicata, PA Ecotype)
- 3% Ohio Spiderwort, PA Ecotype (Tradescantia ohiensis, PA Ecotype)
- 2% Thimbleweed, PA Ecotype (Anemone virginiana, PA Ecotype)
- 2% Oxeye Sunflower, PA Ecotype (Heliopsis helianthoides, PA Ecotype)
- 1% Blue False Indigo, Southern WV Ecotype (Baptisia australis, Southern WV Ecotype)
- 1% Wild Bergamot, PA Ecotype (Monarda fistulosa, PA Ecotype)
- 1% Slender Bushclover, VA Ecotype (Lespedeza virginica, VA Ecotype)

Total: 100%

# Attachment B

# Vegetation Field Monitoring Forms for Habitat Areas

**Post-Remediation Vegetation Monitoring**
**West Branch of Bloody Brook - (WBBB)**
**Onondaga, New York**

**Habitat Area:** RIP-1

**Date:** _____

**Weather:** _____ **Inspector(s):** _____

| Planting Type | Species | Common Name | Number Proposed | Number Planted | Number Survived | Comments/Notes |
|---|---|---|---|---|---|---|
| Tree | *Acer rubrum* | Red maple | | | | |
| Tree | *Acer saccharum* | Sugar maple | | | | |
| Tree | *Fagus grandifolia* | American beech | | | | |
| Tree | *Quercus palustris* | Pin oak | | | | |
| Tree | *Tsuga canadensis* | Eastern hemlock | | | | |
| Tree | *Prunus serotina* | Black cherry | | | | |
| Tree | *Pinus strobus* | White pine | | | | |
| **Total # Trees** | | | | | | |
| Shrub | *Viburnum dentatum* | Northern arrowwood | | | | |
| Shrub | *Viburnum lentago* | Nannyberry | | | | |
| Shrub | *Cornus racemosa* | Grey dogwood | | | | |
| **Total # Shrubs** | | | | | | |

**Post-Remediation Vegetation Monitoring**
**West Branch of Bloody Brook - (WBBB)**
**Onondaga, New York**

**Habitat Area:** PSS-1

**Date:**

**Weather:** **Inspector(s):**

| Planting Type | Species | Common Name | Number Proposed | Number Planted | Number Survived | Comments/Notes |
|---|---|---|---|---|---|---|
| Shrub | *Cornus amomum* | Silky dogwood | | | | |
| Shrub | *Cephalanthus occidentalis* | Buttonbush | | | | |
| Shrub | *Sambucus canadensis* | Elderberry | | | | |
| Shrub | *Alnus incana* | Speckled alder | | | | |
| Shrub | *Aronia arbutifolia* | Red chokeberry | | | | |
| **Total # Shrubs** | | | | | | |

**Post-Remediation Vegetation Monitoring**
**West Branch of Bloody Brook - (WBBB)**
**Onondaga, New York**

**Habitat Area:** UPF-1

**Date:** _____

**Weather:** _____ **Inspector(s):** _____

| Planting Type | Species | Common Name | Number Proposed | Number Planted | Number Survived | Comments/Notes |
|---|---|---|---|---|---|---|
| Tree | *Acer saccharum* | Sugar maple | | | | |
| Tree | *Fagus grandifolia* | American beech | | | | |
| Tree | *Prunus serotina* | Black cherry | | | | |
| Tree | *Pinus strobus* | White pine | | | | |
| Tree | *Quercus palustris* | Pin oak | | | | |
| Tree | *Tsuga canadensis* | Eastern hemlock | | | | |
| **Total # Trees** | | | | | | |
| Shrub | *Viburnum dentatum* | Northern arrowwood | | | | |
| Shrub | *Viburnum lentago* | Nannyberry | | | | |
| Shrub | *Cornus racemosa* | Grey dogwood | | | | |
| **Total # Shrubs** | | | | | | |

**Post-Remediation Vegetation Monitoring**
**West Branch of Bloody Brook - (WBBB)**
**Onondaga, New York**

**Habitat Area:** PFO-1

**Date:** _____

**Weather:** _____ **Inspector(s):** _____

| Planting Type | Species | Common Name | Number Proposed | Number Planted | Number Survived | Comments/Notes |
|---|---|---|---|---|---|---|
| Tree | *Acer rubrum* | Red maple | | | | |
| Tree | *Quercus palustris* | Pin oak | | | | |
| Tree | *Salix niger* | Black willow | | | | |
| Tree | *Betula nigra* | River birch | | | | |
| Tree | *Quercus bicolor* | Swamp white oak | | | | |
| **Total # Trees** | | | | | | |
| Shrub | *Cornus amomum* | Silky dogwood | | | | |
| Shrub | *Alnus incana* | Speckled alder | | | | |
| Shrub | *Sambucus canadensis* | Elderberry | | | | |
| Shrub | *Cephalanthus occidentalis* | Buttonbush | | | | |
| **Total # Shrubs** | | | | | | |

**Post-Remediation Vegetation Monitoring**
**West Branch of Bloody Brook - (WBBB)**
**Onondaga, New York**

**Habitat Area:** USS-1

**Date:** _____

**Weather:** _____ **Inspector(s):** _____

| Planting Type | Species | Common Name | Number Proposed | Number Planted | Number Survived | Comments/Notes |
|---|---|---|---|---|---|---|
| Shrub | *Cornus racemosa* | Grey dogwood | | | | |
| Shrub | *Viburnum lentago* | Nannyberry | | | | |
| **Total # Shrubs** | | | | | | |

**Post-Remediation Vegetation Monitoring**
**West Branch of Bloody Brook - (WBBB)**
**Onondaga, New York**

**Habitat Area:** PSS-2

**Date:** _____

**Weather:** _____ **Inspector(s):** _____

| Planting Type | Species | Common Name | Number Proposed | Number Planted | Number Survived | Comments/Notes |
|---|---|---|---|---|---|---|
| Shrub | *Cornus amomum* | Silky dogwood | | | | |
| Shrub | *Salix exigua* | Sandbar willow | | | | |
| Shrub | *Salix discolor* | Pussy willow | | | | |
| Shrub | *Sambucus canadensis* | Elderberry | | | | |
| Shrub | *Lindera benzoin* | Spice bush | | | | |
| Shrub | *Aronia arbutifolia* | Red chokeberry | | | | |
| **Total # Shrubs** | | | | | | |

**Post-Remediation Vegetation Monitoring**
**West Branch of Bloody Brook - (WBBB)**
**Onondaga, New York**

**Habitat Area:** UPF-2

**Date:** _____

**Weather:** _____ **Inspector(s):** _____

| Planting Type | Species | Common Name | Number Proposed | Number Planted | Number Survived | Comments/Notes |
|---|---|---|---|---|---|---|
| Tree | *Acer saccharum* | Sugar maple | | | | |
| Tree | *Fagus grandifolia* | American beech | | | | |
| Tree | *Prunus serotina* | Black cherry | | | | |
| Tree | *Pinus strobus* | White pine | | | | |
| Tree | *Tsuga canadensis* | Eastern hemlock | | | | |
| **Total # Trees** | | | | | | |
| Shrub | *Viburnum dentatum* | Northern arrowwood | | | | |
| Shrub | *Cornus racemosa* | Grey dogwood | | | | |
| Shrub | *Viburnum lentago* | Nannyberry | | | | |
| **Total # Shrubs** | | | | | | |

# Attachment C

# Standard Operating Procedures for Removal of Invasive Species

# Standard Operating Procedures for Removal of Invasive Species

Updated March 2019

The dominant invasive species at the Bloody Brook site, *Phragmites* (*Phragmites australis*) and purple loosestrife (*Lythrum salicaria*) are species not native to New York that spread rapidly, displacing other species and causing environmental damage. To the extent practical, we want to eliminate *Phragmites* and purple loosestrife from the Bloody Brook site. These species can reproduce from either seeds or from pieces of root or stems. In addition to these species, Japanese knotweed (*Polygonum cuspidatum)* has been observed at lesser densities on the site and should be handled in a similar manner, to be discussed below.

Three other invasive species including multiflora rose, honeysuckle, and buckthorn, have been identified on the site at lesser densities and differ from *Phragmites*, purple loosestrife, and Japanese knotweed in that they are woody and do not reproduce from pieces of cut stem. These invasive species reproduces from fruit and roots. Therefore, the cut stems (excluding fruit and roots) do not have to be disposed of off-site.

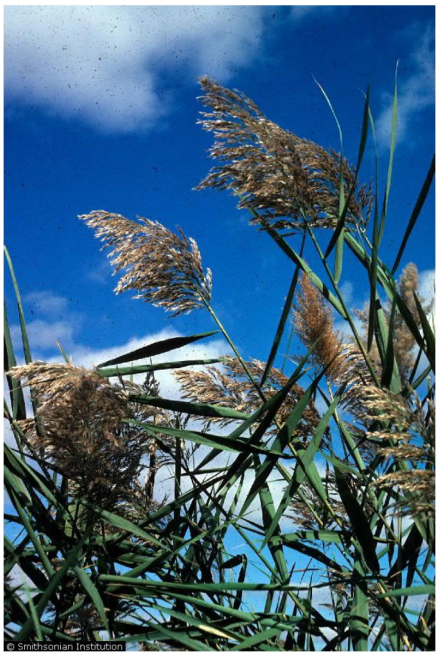
A Standard Operating Procedure (SOP) was developed and is provided below for non-woody and woody invasive species. Descriptions and photos of the each of the species are provided, as well as required procedures for effective removal for the non-woody and woody plants to ensure no transfer or regrowth.

## ***Phragmites*, Purple Loosestrife, and Japanese Knotweed**

**Descriptions** (http://nyis.info/)

*Phragmites*

Stems of the non-native *Phragmites* are hollow, usually green with yellow nodes during the growing season, and yellow when dry in the winter. *Phragmites* leaves are blue-green to yellow-green, up to 20 inches long and 1 to 1.5 inches wide at their widest point. They are arranged all along one side of a stem. In late July and August, *Phragmites* is in bloom with purple to gold highly branched panicles of flowers. The seeds are grayish and appear fluffy due to the silky hairs that cover each seed.



Purple Loosestrife

Purple loosestrife is a perennial with a dense, woody rootstock that can produce dozens of stems. Shoot emergence and seed germination occurs as early as late-April, and flowering begins by mid-June. The stalkless stem leaves are 5 to 14 centimeters long, lance-shaped, and opposite. Leaf pairs often grow at 90 degree angles from one another, and leaves near the flowers are sometimes alternate. Stems are upright, angular, and densely hairy. Mature plants can reach up to 4 meters in height, and older plants often appear bush-like, with sometimes dozens of woody stems growing from a single rootstock. The showy purple flowers have 5 to 7 petals and grow in pairs or clusters on 10 to 40 centimeters tall spikes.



Japanese Knotweed

Japanese knotweed (*Polygonum cuspidatum*) is an upright, shrubby, herbaceous, woody-appearing perennial reaching heights of 10 to 15 feet (3 to 4.5 m). The stems are smooth, stout, and hollow. Where the leaves attach to the stem, the stem is swollen with a membranous sheath surrounding the joints. The leaves are broadly ovate (road and rounded at the base and tapering toward the end), 3 to 6 inches (8 to 15 cm) long by 2 to 4 inches (5 to 10 cm) wide, alternating on stem, broadly oval to somewhat triangular or heart-shaped, pointed at the tip. The plant's shoots come up from a network of spreading rhizomes. These horizontal roots can reach lengths of 65 feet (20 m) or more. Japanese knotweed has branched sprays of small greenish-white flowers from August to September. The plant develops small winged fruits Seeds are triangular, shiny, very small, and about 1/10 inch (2.5 mm) long. Japanese knotweed spreads primarily by seed (transported by wind, water, animals, humans, or as a soil contaminant), stem fragments, and by shoots sprouting from its system of rhizomes



## Removal Procedures for *Phragmites*, Purple Loosestrife, and Japanese Knotweed

1. If there is a seed head on the plant, this should be cut off and placed in a garbage bag for disposal, taking care not to drop seeds onto the ground.

2. The entire plant should then be dug up by:

    a. Loosening up the ground with a spading fork,

    b. Grasping the base of plant by hand and pulling the plant out by the roots, or use Uprooter to remove the stem and roots. *Phragmites* and Japanese knotweed produce long horizontal root systems, and purple loosestrife produces a large taproot. If possible, try to gently but firmly pull at the roots to remove as long a piece of root as possible. This will minimize the number of small pieces of root left in the ground (each of which can produce a new plant next year).

3. All of the plant is then placed in a garbage bag for disposal.

4. Take care not to step on, dig up, or otherwise damage desirable plants, especially any shrubs or trees.

This procedure is based on guidance from the NYSDEC on invasive species (www.dec.ny.gov/docs/lands_forests_pdf/sfinvasivecontrol.pdf ) in the Strategic Plan for State Forest Management (www.dec.ny.gov/docs/lands_forests_pdf/spsfmfinal.pdf) and Cornell University's New York Invasives Species Information site (http://nyis.info/).

## Multiflora Rose, Honeysuckle, and Buckthorn

**Descriptions** (http://nyis.info/)

Multiflora Rose

Multiflora rose, (*Rosa multiflora*), is a vigorous perennial shrub. Canes (stems) root at the tips and may reach heights of up to 10 feet. The red-to-green twigs may have numerous recurved thorns. Its pinnately compound leaves grow alternately with 5, 7, 9, or 11 oval, saw-toothed leaflets. The leaflets are nearly smooth on the upper surface and paler with short hairs on the underside. The base of each leaf stalk bears a pair of fringed bracts or stipules. The fringed stipules are the best characteristic to use to distinguish multiflora rose from other species. Multiflora rose shrubs can grow to a height of 10-15 feet and to a width of 9-13 feet. Clusters of showy, fragrant, white to white-pink, half-inch to one-inch diameter flowers, bloom in panicles, inflorescences with side stems, in late May or June. Roots are wide-ranging and capable of resprouting. In addition, growing stem tips that contact the soil surface are capable of rooting, through a process known as layering, to form new plants. Extensive thickets are formed this way.



Buckthorn

Common buckthorn (*Rhamnus cathartica*) is a small deciduous tree or large shrub that can grow to six meters in height. It has dull green oval or egg shaped leaves and is easily identified by the small thorns at the tip of its branches. Common buckthorn is a perennial shrub or small tree. It is found in lightly shaded areas and is tolerant of many soil types from well-drained sand to clay. Branches are tipped with a short thorn; a thorn may also be found in the fork between two branches. The leaves may be opposite or in an alternating pattern (both may be found on the same branch). The leaves are oval or egg shaped with small, serrated teeth. The leaf may be a dull green or a dark green with a lighter green on the under-side. Flowers are small with four sepals (a modified leaf that encloses the petals and other parts of the flower) and four petals and they form small clusters from the axils (the space between a leaf or branch and the stem/stalk of the plant) of leaves or on short twigs along the stem. The flowers are a yellowish to green color. Each flower is unisexual with either four stamens or one pistil with a plant being either male or female (dioecious). The fruit or berries are small (5-6 mm in diameter) and are a dark purplish or black color. Each berry will contain four hard seeds. The common buckthorn flowers during late spring (May-June) while leaves are emerging. The berries ripen during August and September and can be found still attached to the plant throughout the winter.



Honeysuckle Spp.

Several species of honeysuckle found in NY are characterized as invasive, including: *Morrow's honeysuckle (Lonicera morrowii), Tatarian honeysuckle (Lonicera tatarica), Amur honeysuckle (Lonicera maackii), and Japanese honeysuckle (Lonicera japonica)*. To the non-botanist, native and invasive non-native honeysuckles appear very similar. One way to distinguish between native and invasive honeysuckles is by looking at the stems. Native honeysuckles have solid stems while invasive honeysuckles have hollow stems. *L. morrowii, L. tatarica, and L. maackii* are perennial shrubs; *L. japonica* is a perennial woody vine (although its leaves can remain green throughout mild winters). The shrub forms range from 6 to 15 feet in height, while vines can reach 30 feet in length. The egg-shaped leaves range from 1 to 3 inches in length and are arranged oppositely along stems. Invasive honeysuckles begin flowering from May to June and bear small (less than 1 inch long), very fragrant tubular flowers ranging from creamy white through various shades of pink to crimson. *L. morrowii and L. tatarica* produce ¼ inch red berries from mid-summer through early-fall; *L. maackii's* dark-red berries don't ripen until late-fall*; L. japonica* produces dark-purple or black berries in the fall.





## Management and Removal Procedures for Multiflora Rose, Buckthorn, and Honeysuckle

Seedlings can be pulled by hand. Small plants can be dug, but care needs to be taken to remove all roots. Frequent, repeated cutting or mowing at the rate of three to six times per growing season, for two to four years, has been shown to be effective in achieving high mortality of multiflora rose. In natural communities, cutting of individual plants is preferred to site mowing to minimize habitat disturbance. The cut stems, if bare of fruit, can be piled to provide habitat/cover for small wildlife on site.

1. Ideally, removal should be done when there are no berries/seeds on the plant. If not feasible, if there are berries/seeds on the plant, these should be cut off and placed in a garbage bag for disposal, taking care not to drop seeds onto the ground.

2. The upper portions of the plant (e.g., trunk, branches) should be cut off using pruners or loppers. These can be placed in a pile and left on site.

3. The roots should then be dug up unless repeated cutting is determined to be more appropriate for the plant (e.g., large root area which could result in disturbance of surrounding native plants) by:

    a. Loosening up the ground with a spading fork,

    b. Grasping the base of plant by hand and pulling the plant out by the roots, or use Uprooter to remove the roots.

4. The roots are then placed in a garbage bag for disposal.

5. Take care not to step on, dig up, or otherwise damage desirable plants, especially any shrubs or trees.

## Equipment

Spading forks
Uprooter
Clippers/pruners/loppers
Boots
Gloves
Plastic disposal bags
Reusable plastic bins for transferring plant waste with thorns

# Appendix K

## Responsibilities of
## Property Owners, Onondaga County, Town of Salina, Village of Liverpool, and Remedial Party

## Responsibilities

The responsibilities for implementing the Site Management Plan ("SMP") for the Bloody Brook site (the "site"), are divided between private property owners, Onondaga County, Town of Salina, Village of Liverpool, and the Remedial Party. The portion of the brook subject to the remedial activities and covered by this SMP include an approximately 5,000 foot long section of the brook and side banks between the New York State Thruway and Onondaga Lake Parkway, in the Town of Salina and Village of Liverpool, Onondaga County, New York. The brook provides drainage capacity and flood protection to area properties and is maintained by Onondaga County as part of the Bloody Brook Drainage District. Onondaga County has obtained easements from area property owners for access to maintain the brook.

**Solely for the purposes of this document and based upon the facts related to a particular site and the remedial program being carried out,** the term Remedial Party ("RP") refers to any of the following: certificate of completion holder, volunteer, applicant, responsible party, and, in the event the New York State Department of Environmental Conservation ("NYSDEC") is carrying out remediation or site management, the NYSDEC and/or an agent acting on its behalf. The RP is:

Lockheed Martin Corporation
497 Electronics Parkway
Liverpool, New York 13088

## Responsibilities of Private Property Owners, Onondaga County, Town of Salina, and Village of Liverpool:

1) The parties listed above shall follow the provisions of the SMP as they relate to future construction and excavation at the site.

2) The parties listed above shall grant access to the site to the RP and the NYSDEC and its agents for the purposes of performing activities required under the SMP and assuring compliance with the SMP.

3) The parties listed above are responsible for assuring the security of the remedial components located on its property to the best of its ability. In the event that damage to the remedial components or vandalism is evident, the site's RP should be notified in accordance with the timeframes indicated in Section 3 of the SMP (Institutional and Engineering Control Plan).

4) In the event some action or inaction by the parties listed above adversely impacts the site, the party must (i) notify the site's RP in accordance with the time frame indicated in Section 3 of the SMP (Institutional and Engineering Control Plan) and (ii) coordinate the performance of necessary corrective actions with the RP.

5) The parties listed above must notify the RP of any change in ownership of the site property within the easement (identifying the tax map numbers in any correspondence) and provide contact information for the new owner of the site property/ies.

## Remedial Party Responsibilities

1) The RP must follow the SMP provisions regarding any construction and/or excavation it undertakes at the site.

2) In accordance with a periodic time frame determined by the NYSDEC, the RP shall periodically certify, in writing, that all ICs set forth in this SMP remain in place and continue to be complied with. The RP shall complete a written certification in order to allow for inclusion of the certification in the site's Periodic Review Report (PRR) to the NYSDEC.

3) The RP shall report to the NYSDEC all activities required for remediation, operation, maintenance, monitoring, and reporting. Such reporting includes, but is not limited to, periodic review reports and certifications, electronic data deliverables, corrective action work plans and reports, and updated SMPs.

4) Before accessing the site property to undertake a specific activity, the RP shall provide the owner advance notification that shall include an explanation of the work expected to be completed. The RP shall provide to (i) the owner, upon the owner's request, (ii) the NYSDEC, and (iii) other entities, if required by the SMP, a copy of any data generated during the site visit and/or any final report produced.

5) If the NYSDEC determines that an update of the SMP is necessary, the RP shall update the SMP and obtain final approval from the NYSDEC. Within 5 business days after NYSDEC approval, the RP shall submit a copy of the approved SMP to the full distribution list.

6) The RP shall notify the NYSDEC of any changes in RP ownership and/or control and of any changes in the party/entity responsible for the operation, maintenance, and monitoring of and reporting with respect to any remedial system (Engineering Controls). The RP shall provide contact information for the new party/entity. 6 NYCRR Part contains notification requirements applicable to any construction or activity changes and changes in ownership. Among the notification requirements is the following: Sixty days prior written notification must be made to the NYSDEC. Notification is to be submitted to the NYSDEC Division of Environmental Remediation's Site Control Section. Notification requirements for a change in use are detailed in Section 2.4 of the SMP. A 60-Day Advance Notification Form and Instructions are found at http://www.dec.ny.gov/chemical/76250.html. Such activity constitutes a Change of Use pursuant to 375-1.11(d) and requires 60-days prior notice to the NYSDEC. A 60-Day Advance Notification Form and Instructions are found at http://www.dec.ny.gov/chemical/76250.html.

7) The RP shall notify the NYSDEC of any damage to or modification of the systems as required under Section 1.3 (Regulator Notifications) of the SMP.

8) Prior to a change in use that impacts the remedial system or requirements and/or responsibilities for implementing the SMP, the RP shall submit to the NYSDEC for approval an amended SMP.

9) Any change in use, change in ownership, change in site classification (*e.g.*, delisting), reduction or expansion of remediation, and other significant changes related to the site may result in a change in responsibilities and, therefore, necessitate an update to the SMP and/or updated legal documents. The RP shall contact the Department to discuss the need to update such documents.

Change in RP ownership and/or control and/or site ownership does not affect the RP's obligations with respect to the site unless a legally binding document executed by the NYSDEC releases the RP of its obligations.

Future site owners and RPs and their successors and assigns are required to carry out the activities set forth above.