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May 28, 2014

Ms. Lisa Taber
North Carolina Department of Environment and
Natural Resources
Division of Waste Management – Brownfields Program
217 W. Jones Street
Raleigh, North Carolina 27603

RE: 2014 Environmental Site Assessment Report
City of Monroe Brownfields Property Redevelopment
309 & 310 West Crowell Street
Monroe, North Carolina 28112
NCD 003 155 587

Dear Ms. Taber:

Enclosed please find a compact disc (CD) containing a PDF of the *2014 Environmental Site Assessment Report* for the Former Scott Aviation Facility located in Monroe, North Carolina. Because the file is so large (76 MB), a PDF of the report text, figures, and tables (no appendices) is also included. This report was prepared in support of Brownfields Development activities planned for this site and is being submitted on behalf of Tyco International, Inc. (Tyco).

If you have any questions regarding this report, please feel free to contact me at 864.234.2253 or at evelyn.rogers@aecom.com.

Sincerely,

AECOM Technical Services, Inc.

M. Evelyn Rogers, PE
Project Manager

Attachment - *Environmental Site Assessment Report CD*

C: Stuart Rixman, Tyco
Joseph Janeczek, Tyco
Mary Katherine Stukes, Parker Poe
Trent Sims, AECOM
Mark Hartford, AECOM

2014 ENVIRONMENTAL SITE ASSESSMENT REPORT

FORMER SCOTT AVIATION FACILITY
309 & 310 WEST CROWELL STREET
MONROE, NORTH CAROLINA 28112
NCD 003 155 587

Prepared for:

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May 2014

AECOM Project Number 60284473

CERTIFICATION PAGE

2014 Environmental Site Assessment Report
Former Scott Aviation Facility
Monroe, North Carolina

The undersigned certifies that he/she has reviewed the attached document and that the document is in material compliance with the requirements of the State of North Carolina. The data presentations contained herein are consistent with Consultant standards and generally accepted practices in the environmental profession.

Mark L Hartford, PG
North Carolina P.G. No. 1921

May 28, 2014
Date

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ACRONYMS AND ABBREVIATIONS

AST	aboveground storage tank
ASTM	American Society for Testing and Materials
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cis-1,2-DCE	cis-1,2-dichloroethene
COPC	chemical of potential concern
CSM	conceptual site model
1,2-DCA	1,2-dichloroethane
1,1-DCE	1,1-dichloroethene
DPT	direct push technology
EPA	United States Environmental Protection Agency
ESA	environmental site assessment
GPR	ground penetrating radar
IDW	investigation derived waste
mL	milliliters
msl	mean sea level
NCDENR	North Carolina Department of Environment and Natural Resources
NFRAP	No Further Remedial Action Planned
PCB	polychlorinated biphenyls
PCE	tetrachloroethene (perchloroethene)
PID	photoionization detector
PPL	Priority Pollutant List
Property	Former Scott Aviation Facility
PSRG	Preliminary Soil Remediation Goal
PVC	polyvinyl chloride
QC	quality control
REC	recognized environmental condition
Site	Former Scott Aviation Facility
SOP	standard operating procedure
SSI	Screening Site Inspection
SVOC	semivolatile organic compound
1,1,1-TCA	1,1,1-trichloroethane
TCE	trichloroethene
µg/kg	micrograms per kilogram
USI	Utility Specialists, Inc.
UST	underground storage tank
VC	vinyl chloride
VOC	volatile organic compound
Work Plan	*2014 Environmental Site Assessment Work Plan*

1.0 INTRODUCTION

This report describes the activities and results of a 2014 Environmental Site Assessment (ESA) conducted for the Former Scott Aviation Facility (the "Property" or Site) located in Monroe, North Carolina. The *2014 Environmental Site Assessment Work Plan* (Work Plan; AECOM, January 2014) was prepared in response to findings presented in the *Supplemental Soil Assessment Report* (Earth Tech, August 2004) that identified elevated concentrations of chlorinated solvents in soil, project scoping session meeting minutes (Appendix A.1), and response to North Carolina Department of Environment and Natural Resources (NCDENR) comments (Appendix A.2) on the ESA Work Plan (AECOM, January 2014). During the ESA, environmental samples were collected and analyzed to further characterize site media and investigate potential areas of environmental concern identified in the *Revised Phase I Environmental Site Assessment* (Earth Tech 2004a). Environmental sampling data, findings, and recommendations are provided within this ESA report.

1.1 Site Summary

The Property is located in downtown Monroe at the corner of Cromwell Street and Charlotte Avenue, across the street from City Hall (Figure 1-1). The Property occupies approximately 12 acres and includes two areas divided by Cromwell Street: Parcel I (Building I and the areas to the south and east); and Parcel II (Building II and the areas to the north and east). The Property was used as a metal fabricating plant from 1946 to 2002.

Environmental investigations have been conducted at the Property since 1990. As reported in the *Supplemental Environmental Site Assessment Report* (Earth Tech, December 2003) and the *Supplemental Soil Assessment Report* (Earth Tech, August 2004), soil samples were collected in the vicinity of the Former Building II Hazardous Waste Storage Area (Parcel II), and groundwater samples were collected from a saprolite/weathered rock monitoring well located on Parcel II and from bedrock monitoring wells located on Parcel I and Parcel II. As concluded in the reports, chlorinated solvents exceeded the screening criteria in both media, and data gaps were identified for soil and groundwater. In addition, potential areas of environmental concern identified in the *Revised Phase I Environmental Site Assessment* (Earth Tech, June 2004) were not investigated during the supplemental soil assessment (Earth Tech, August 2004). In response to these data gaps and non-investigated potential areas of environmental concern, the *2014 Environmental Site Assessment Work Plan* (AECOM, January 2014) was prepared. The Work Plan was implemented in the winter of 2014. Results of the investigations are presented in this report.

1.2 Investigation Objectives

The goal of the 2014 ESA is to acquire the necessary data to meet the environmental requirements for redeveloping the Property under the North Carolina Brownfields Property Reuse Act of 1997 (N.C. Gen.

Stat. § 130A-310.30 et seq.). In order to meet this goal, the following objectives were developed for the 2014 ESA:

1. Determine the absence or presence of chemicals in soil and groundwater at potential areas of environmental concern at Parcel I and at the former oil sump at Parcel II;
2. Further define the extent of soil and groundwater impacts associated with Parcel II;
3. Determine the potential presence of polychlorinated biphenyl (PCB) impacted soils in the vicinity of the former transformer pad at Parcel II;
4. Further characterize saprolite/weathered rock groundwater quality and gather current groundwater quality data from existing bedrock monitoring wells at Parcel I and Parcel II;
5. Acquire geotechnical soil parameters of the overburden residual soils for evaluating potential remedial alternatives and for use as input parameters for Site-specific risk assessment calculations;
6. Determine the absence/presence of volatile organic compounds (VOCs) in soil gas in the vicinity of the proposed fire station at Parcel I by conducting a limited soil gas survey; and
7. Further investigate Anomaly I on Parcel II (an area to the east of the Former Building II Hazardous Waste Storage Building that was identified based on the results of the 2005 geophysical survey) by conducting a records review and a limited geophysical survey.

The 2014 ESA was performed to provide the data intended to satisfy the objectives above.

2.0 SITE BACKGROUND

2.1 Site History

The facility operated as a metal fabricating plant from 1946 to 2002. In May of 1980, the company name, Tool Engineering Company, was changed to Scott Aviation of Monroe (Greenhorne and O'Mara, July 1991). In 2000, the company's name changed to Scott Health and Safety. In 2002, operations moved to a new facility in Monroe, North Carolina. The Property has been vacant since 2002, except for some minor assembly and related operations.

In 2013, Buildings I and II were demolished; however, the foundations were left in place. Presently, the paved area to the east of former Building II is used as a parking lot, a fire station is proposed for the eastern portion of Parcel I, and the remaining areas are unused but are proposed for redevelopment.

2.2 Summary of Historical Investigations

The following investigations have been conducted at the Property:

- *Phase I Screening Site Inspection* (SSI) (NUS Corporation, July 1990)
- *Phase II SSI* (Greenhorne and O'Mara, July 1991)
- *Phase I and Phase II Environmental Site Assessment Report* (Golder and Associates, May 1997)
- *Supplemental Environmental Site Assessment Report* (Earth Tech, December 2003)
- *Revised Phase I Environmental Site Assessment* (Earth Tech, June 2004)
- *Supplemental Soil Assessment Report* (Earth Tech, August 2004)
- *EM31 Survey 9-01-05* (Earth Tech, September 2005)

Summaries of these investigations are described in the following subsections.

2.2.1 1990 *Phase I SSI*

On February 13, 1990, NUS Corporation conducted an off-site reconnaissance and submitted a *Phase I Screening Site Inspection* to the United States Environmental Protection Agency (EPA) on July 17, 1990. The NUS report recommended a completion of a Phase II SSI on a medium priority basis.

2.2.2 1991 *Phase II SSI*

On May 16, 1991, Greenhorne and O'Mara, under contract with NCDENR, conducted a Phase II SSI and reported the results in the *Phase II SSI* report dated July 1991. NCDENR issued a letter to the EPA dated June 8, 1992, which summarized the *Phase II SSI* report and recommended that the Property be classified as "No Further Remedial Action Planned (NFRAP) under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) at this time".

2.2.3 1997 *Phase I and Phase II ESA*

In 1997, Golder and Associates conducted Phase I and Phase II assessments for the Enquirer- Journal facility located adjacent to the Scott Health and Safety Site and reported the results in a *Phase I and Phase II Environmental Site Assessment Report* dated May 21, 1997. The report concluded that the Enquirer-Journal was not believed to be responsible for the soil and groundwater contamination present at their facility and indicated that the cause of the contamination was the Scott Property. Based on a recommendation by Golder, a note was placed in Scott's files indicating that, based on the Golder information, the Scott Site's rating was high enough to place the Site on the Inactive Hazardous Waste Site Priority List for the State of North Carolina.

2.2.4 2003 *Supplemental Environmental Site Assessment Report*

On October 29 and 30, 2001, four 2-inch diameter polyvinyl chloride (PVC) piezometer wells (P-1, P-2, P-3, and P-4) were installed in bedrock to define the groundwater flow direction. A North Carolina certified well drilling contractor working under the supervision of an Earth Tech hydrogeologist installed the piezometers. The August 2002 groundwater elevation data collected from these wells indicated that the source of groundwater contamination at the Site was located upgradient. Based on these results, Scott Health and Safety requested in a letter to NCDENR dated December 21, 2002 that the Site be removed from the North Carolina Inactive Hazardous Sites List.

In a response letter dated January 16, 2003, NCDENR requested the completion of an additional Site investigation prior to consideration of the removal request by Scott Health and Safety. Earth Tech conducted the investigation in February 2003 and issued the *Environmental Site Assessment Report and EDR Report* in June 2003 (Earth Tech, June 2003). Site activities included the installation of one saprolite/weathered rock monitoring well (designated MW-1) and the collection of soil and groundwater samples for VOC analysis using EPA Method 8260. The results indicated that VOCs were detected in soil and shallow saprolite/weathered rock groundwater in the vicinity of the former Building II Hazardous Waste Storage Building, and in the fractured bedrock aquifer beneath the Property.

In a letter dated July 3, 2003, NCDENR documented their review of the *Environmental Site Assessment Report and EDR Summary*. The NCDENR requested additional soil investigation in the vicinity of the

former Building II Hazardous Waste Storage Building. Also, in order to pursue a no further action determination, NCDENR stated that additional investigation would be necessary to demonstrate an off-site source for chemicals of potential concern (COPCs) detected in bedrock beneath the Property.

In response to the July 3, 2003 NCDENR correspondence, Earth Tech conducted a supplemental ESA. The results of the supplemental ESA were presented in the *Supplemental Environmental Site Assessment Report* (Earth Tech; December 2003). Supplemental ESA activities included continuous soil sampling at 11 soil boring locations (designated GP-1 through GP-11) in the immediate vicinity the former Building II Hazardous Waste Storage Building. The Supplemental ESA results indicated that soils at the Site appear to have been impacted by historic facility operations in the vicinity of the Former Building II Hazardous Waste Storage Building. The report concluded that the occurrence of VOCs in soils appears to be localized; however, the lateral extent was not sufficiently delineated.

2.2.5 2004 *Revised Phase I Environmental Site Assessment*

A revised Phase I ESA was performed to identify recognized environmental conditions (RECs) as defined in American Society for Testing and Materials (ASTM) Standard Practice E1527-00 in connection with the Property. Although no RECs were found during a site reconnaissance, ten potential areas of environmental concern were identified. These areas were:

- Parcel I (shown on Figure 2-1)
    1. Former Oil Tank Location
    2. Former Underground Storage Tank (UST) Area
    3. Former Water Pre-treatment Area
    4. Former Tar Drippings/Old Pitted Floor Area
    5. Former Metal Finishing/Vapor Degreasing Area
    6. Former Paint Room/Floor Drain Area
    7. Former Aboveground Storage Tank (AST) Area
    8. Former Building I Hazardous Waste Storage Area
- Parcel II (shown on Figure 2-2)
    1. Former Oil Sump Location
    2. Former Building II Hazardous Waste Storage Building

2.2.6 2004 *Supplemental Soil Assessment Report*

The supplemental soil assessment was conducted to further assess surface and subsurface overburden soil quality in the vicinity of the Former Building II Hazardous Waste Storage Building and in the heavily wooded area in the northern portion of the Site. This assessment was conducted to investigate the data gaps identified in the *Supplemental Environmental Site Assessment Report* (Earth Tech; December 2003).

Nineteen borings locations (GP-12 through GP-22 and HA-1 through HA-8) were advanced at the site. Generally, soil samples were collected from surface soil (0-1 foot below ground surface [bgs]); the midpoint between the ground surface and refusal or the highest photoionization detector (PID) headspace measurement within that depth interval; and immediately above the bedrock surface. Soil samples were analyzed for VOCs using EPA Method 8260. Tetrachloroethene (PCE), trichloroethene (TCE), cis-1,2-dichloroethene (cis-1,2-DCE), and vinyl chloride (VC) were the only analytes detected at concentrations that exceeded their respective screening criteria. These chlorinated solvents are present at, and downgradient/cross-gradient of, the Former Building II Hazardous Waste Storage Building. Spatial data gaps for chlorinated solvents in soil were identified in the conclusions in the *Supplemental Soil Assessment Report* (Earth Tech, August 2004).

2.2.7 2005 *EM31 Survey 9-01-05*

A geophysical survey was conducted on September 1, 2005 at the Property using a Geonics EM31 terrain conductivity (electromagnetic) meter to screen two areas for buried metallic objects associated with past site activities. Area 1 is located in the central portion of Parcel II, bounded to the west by the western Property fence and bounded to the north by the west-to-east oriented fence separating the developed portion of Parcel II from the undeveloped area north of the fence (Appendix A.3). Area 1 covers an area of 440 feet west to east and 120 feet north to south. Area 2 is located north of Area 1 within Parcel II. Area 2 covers an area of 80 feet west to east and 255 feet north to south. It is bounded to the west by the western Property fence, and bounded to the south by west-to-east oriented fence separating the developed portion of Parcel II from the undeveloped area north of the fence (Appendix A.3).

Two anomalies of interest were identified based on the results of the geophysical survey. Anomaly I is the larger of the two in area and is located in Area 1 to the east of the Former Building II Hazardous Waste Storage Building and beneath a concrete slab. During the survey, it was thought that the negative conductivity values seen on the instrument display were due to rebar in the concrete slab. The contoured data indicates another possibility. The horizontal dipole data, or the shallowest measurements, showed a much more subdued (all positive data) response than the vertical dipole data, or the deepest measurements, which was strongly negative in this area. The in-phase results show a similar trend, although the horizontal dipole values show some negative values in restricted areas. This is interpreted

to indicate buried metallic objects below the concrete slab. Anomaly II is also located in Area 1; it is just south of the Former Building II Hazardous Waste Storage Building. The anomaly appears to be a single station detection beneath the asphalt pavement.

3.0 SUMMARY OF FIELD INVESTIGATION ACTIVITIES

ESA activities were conducted to collect representative samples and to evaluate the data intended to satisfy the objectives identified in the Work Plan (also included in Section 1.2 of this report). This section describes the methods and procedures for the following activities:

- Pre-Investigation
- Field Investigation
- Post-Investigation
- Laboratory Analysis
- Data Reporting and Validation

Activities were conducted in general accordance with the Work Plan (AECOM, January 2014), EPA Region IV standard operating procedures (SOPs; EPA, May 2013), and well permits issued by NCDENR (Appendix A.4). Activities were recorded in field logbooks. Copies of the log book and field forms (boring logs, well construction logs, well development logs, groundwater sampling logs, well gauging data, and chains of custody) are included in Appendix B; photo documentation of field activities is included in Appendix C.

3.1 Pre-Investigation Activities

Pre-investigation activities include vegetation clearing, utility clearance, and a limited anomaly assessment. These activities are described in the following subsections.

3.1.1 Vegetation Clearing

Vegetation clearing activities were performed to provide access to proposed soil and groundwater sampling locations within the heavily wooded area on Parcel II. A pathway approximately 15 feet wide was cleared of vegetation by the City of Monroe's Engineering Division. Vegetation clearing activities were conducted in December 2013.

3.1.2 Utility Clearance and Limited Anomaly Assessment

A utility clearance was conducted to verify that proposed borehole and monitoring well locations were clear of underground utilities and subsurface anomalies. The utility clearance included initiating the North Carolina One-Call process and using a third party utility locating service.

The North Carolina One-Call process was initiated with the Utility Notification Center to notify utility companies that intrusive activities would be performed at the Property. The following utility companies and agencies were notified: City of Monroe (Electric & Gas and Water & Sewer), Sprint, Time Warner Cable, Broadplex LLC, USIC Locating Services, Inc., Frontier Communications, MCI, TW Telecom, and Synergy One Locating, LLC. Representatives of local utility companies identified and marked underground utilities, if present. In addition, a third party utility locating service, Utility Specialists, Inc., was used to clear each proposed borehole location using ground penetrating radar (GPR) and other locating equipment. When necessary, proposed borehole locations were relocated to ensure all boreholes are at least 5 feet away from marked potential utilities.

A limited anomaly assessment was conducted by Utility Specialists, Inc. in the region occupied by Anomaly I. In accordance with the Work Plan, a 3 foot by 10 foot area was surveyed using GPR (Figure 2-2). Based on readings from the geophysical instrumentation, Anomaly I is likely disturbed fill material and occurs from just under the paved surfaces to approximately 12 feet bgs. Evidence of fill materials including soil, brick fragments, minor quantities of glass, and wood debris were observed in soil cuttings from soil borings advanced within Anomaly I (Appendix B.2) and along the surface of the slope extending into the wooded, low lying area immediately north of Building II, based on site reconnaissance findings (Appendix A.5).

3.2 Field Investigation

The field investigation was conducted from January 2014 through February 2014. It included soil, groundwater, and soil gas investigations and a limited metals background study. Deviations from the Work Plan and the rationale for each are described in each investigation subsection. Soil, groundwater, and soil-gas sampling locations are depicted on Figures 2-1 and 2-2. Sampling and analysis matrices for each media are provided in Appendix D.

3.2.1 Soil Investigation

Soil samples were collected to determine the absence or presence of chemicals in soil, to refine the lateral and vertical extent of soil contamination, and to acquire geotechnical soil parameters of the overburden residual soils. Investigation areas included the ten areas of potential environmental concern, the wooded, low-lying area, and the former transformer pad. Fifty-nine boreholes were advanced using Rotosonic and Direct Push Technology (DPT) drill rigs; five shallow boreholes were advanced using a hand auger. Boring logs are provided in Appendix B.2.

Nine of the ten areas of potential environmental concern identified in the *Revised Phase I Environmental Site Assessment* (Earth Tech, June 2004) were investigated by advancing one borehole at the center of each area using a Rotosonic drill rig and advancing up to four boreholes using a DPT drill rig generally located at the corners of a 25-foot by 25-foot grid that circumscribes the central borehole in each area of

potential environmental concern. (This soil boring pattern was not used at the Former Building II Hazardous Waste Storage Building.) Soil samples were collected using Macrocore samplers with acetate liners and/or Rotosonic methods from up to three depth intervals: shallow (0-2 feet bgs), intermediate (2-10 feet bgs), and deep (greater than 10 feet bgs), unless refusal was encountered prior to collection of samples from these depths. Soil boring SB09 was not advanced because of its close proximity to city infrastructure (sidewalk, road, utilities) and other boreholes. In accordance with the Work Plan, deep samples collected from the perimeter boreholes were placed on "extract and hold" status at the analytical laboratory pending review of the analytical results associated with the shallow and intermediate samples at each location to determine whether or not analysis of the associated deep soil sample was necessary to further assess soil quality. Deeper soil samples were analyzed only for analytes detected at a concentration that exceeding their respective screening criteria in the intermediate depth interval.

The tenth area of potential environmental concern (Former Building II Hazardous Waste Storage Building) was investigated by collecting soil samples from 17 boreholes advanced at the general location of nodes of a 50-foot by 50-foot sampling grid that spanned the area from the Former Building II Hazardous Waste Storage Building to the area immediately north of Building II. Soil samples were collected using Macrocore samplers with acetate liners and/or Rotosonic methods from up to three depth intervals: shallow (0-2 bgs), intermediate (2-10 feet bgs), and deep (greater than 10 feet bgs), unless refusal was encountered prior to collection of samples from these depths.

The wooded, low-lying area was investigated by advancing six boreholes. Three of the boreholes were located downgradient of observed debris on the slope (potential source area) which lies immediately north of Building II; the remaining three boreholes were located approximately 100 feet south of the railroad track along the northern edge of the Property. The objective was to delineate soil and saprolite/weathered rock groundwater contamination, if present. Soil samples were collected using Rotosonic methods from up to three depth intervals: shallow (0-2 feet bgs), intermediate (2-9 feet bgs), and deep (greater than 9 feet bgs), unless refusal was encountered prior to collection of samples from these depths.

Soil samples were collected in accordance with the sampling and analysis tables in Appendix D and analyzed for:

- VOCs by EPA Method 8260B
- Semi-volatile organic compounds (SVOCs) by EPA Method 8270D
- Priority Pollutant List (PPL) Metals by EPA Method 6010B/7471A
- Cyanide by EPA Method 9012A
- Hexavalent Chromium By EPA Method 7196A

In addition, five shallow soil borings were advanced using a hand auger in the vicinity of a former transformer pad. Soil borings were advanced to 3 feet bgs and samples were collected from 0-1 foot bgs and 2-3 feet bgs for analysis of PCBs by EPA Method 8082A. Samples collected from SS03 and SS05 at 2-3 feet bgs were also analyzed for VOCs and SVOCs.

Soil samples for geotechnical analysis were acquired from the main lithologic layer (overburden soil) encountered at the Property. Two bulk and two undisturbed geotechnical soil samples were collected from overburden soils at SB05 and SB10 from approximately 9-12 feet bgs and 10-12 feet bgs, respectively, using acetate liners and stainless steel cores. These samples were analyzed for:

- Bulk Soil Density by ASTM D7263
- Specific Gravity by ASTM D854
- Moisture Content by ASTM D2216
- Atterberg Limits by ASTM D4318
- Fraction of Organic Carbon by Walkley-Black Method
- Particle Size Analysis by ASTM D422
- Hydraulic conductivity by ASTM D5084

3.2.2 Limited Metals Background Study

A limited metals background study was conducted to establish metals concentrations in soil that represent background conditions (non-anthropogenic) at the Property. Although the background study was not proposed in the Work Plan, the study was deemed necessary based on review of initial analytical results which indicated that metals concentrations (particularly arsenic) in soil exceeded the soil screening criteria (Section 5.2). Six soil samples were collected at approximately 2 feet bgs from locations not expected to have been impacted by historical facility operations. The background study samples were collected from locations across the Property in which soils are predominately alluvial sediments (see Section 4.2). These metals background sampling locations are shown on Figures 2-1 and 2-2. The background soil samples were collected using a hand auger and were analyzed for PPL Metals.

3.2.3 Groundwater Investigation

The groundwater investigation included the installation of saprolite/weathered rock groundwater monitoring wells, well development, groundwater sampling, and well gauging.

3.2.3.1 Well Installation

Permanent groundwater monitoring wells were installed to provide a network of monitoring wells for the acquisition of groundwater samples. Monitoring wells MW-2 through MW-11 were constructed during the field investigation. Monitoring wells were constructed in accordance with the Monitoring Well Construction Permit #WM0300741 and its modification (Appendix A.4) based on the NCDENR State-Wide Well Construction Variance (NCDENR, April 2013). Well completion records for the newly installed wells are included in Appendix B.3.

At Parcel I, newly installed monitoring wells MW-2 and MW-3 were constructed using Schedule 40 PVC casing and 10 foot pre-packed 0.010-inch slotted screens. Monitoring wells MW-4 and MW-5 were constructed using 5 foot pre-packed 0.010-inch slotted screens. The annular space around the wells was filled with #2 filter sand from the bottom of the borehole to 2 feet above the top of the well screen, hydrated bentonite from the top of the sand pack to 2 feet above the sand pack, and bentonite-portland cement slurry from the top of the bentonite seal to the ground surface.

Newly installed monitoring wells MW-6, MW-7, MW-8, and MW-11, located in the heavily wooded area at Parcel II, were constructed using Schedule 40 PVC casing and combination of 5 foot pre-packed 0.010-inch slotted and various lengths of standard 0.0010-inch slotted PVC screens; the various lengths were used to increase the screen height to an elevation above the groundwater table. Monitoring wells MW-9 and MW-10 were constructed using 5 foot pre-packed 0.010-inch slotted screens. The annular space around these wells was filled with #2 filter sand from the bottom of the borehole to 0.5 feet above the top of the well screen, hydrated bentonite from the top of the sand pack to 0.5 feet above the sand pack, and bentonite-portland cement slurry from the top of the bentonite seal to the ground surface. Monitoring well construction details are summarized in Table 3-1.

The surface completion of the newly installed groundwater monitoring wells outside of the heavily wooded area was constructed as a flush mount with a 2-foot by 2-foot concrete pad. The surface completion of each of the newly installed groundwater monitoring wells within the heavily wooded area was constructed as a riser with a 2-foot by 2-foot concrete pad. Well casings were marked on the north side to designate the well reference location.

3.2.3.2 Well Development

Each newly installed monitoring well was developed by over-pumping to remove fine-grained particulates, improve hydraulic communication with the residual soil horizon, and stabilize groundwater quality parameters. Groundwater quality parameters including pH, specific conductivity, turbidity, and temperature were monitored during development activities. In the event that stabilization criteria could not be met (individual parameters change by less than 10% for three consecutive readings) due to poor

recharge, the monitoring wells (MW-2 through MW-6) were pumped dry a minimum of two times over the course of 24 hours. Well development logs are presented in Appendix B.4.

3.2.3.3 Groundwater Sampling

Groundwater samples were collected from the monitoring well network to determine the absence or presence of chemicals in groundwater, to characterize the saprolite/weathered rock and bedrock groundwater aquifers, and to refine the extent of groundwater contamination. The monitoring well network is composed of eight existing bedrock monitoring wells (P-1 through P-6, W-2A, and W-3A), one existing saprolite/weathered rock monitoring well (MW-1), and 10 newly installed saprolite/weathered rock monitoring wells (MW-2 through MW-11)[1]. Groundwater sampling activities were conducted in accordance with low-flow sampling procedures (EPA, April 1996). The presence of a dense or light non-aqueous phase liquid was not detected in the monitoring wells. Groundwater sampling logs are provided in Appendix B.5.

Groundwater within each well was purged with a peristaltic pump prior to sampling using low-flow techniques. The pump tubing was placed at approximately mid-screen in each well, and the groundwater was purged at approximately 100 milliliters (mL) per minute. Water level measurements were acquired using a Geotech oil–water interface probe. Water quality parameters (Table 3-2) of well purge water were measured in a flow through cell at approximately 5-minute intervals using a calibrated YSI-556 water quality meter and DRT-15 turbidity meter.

Purging activities were considered complete when groundwater quality parameters had stabilized to within 10 percent of three consecutive readings or the well was purged dry. Upon completion of groundwater purging activities, groundwater sampling activities were initiated. Groundwater samples were collected for analysis of:

- VOCs by EPA Method 8260B
- SVOCs by EPA Method 8270D
- PPL Metals by EPA Method 6010B/7470A
- Cyanide by EPA Method 9012A
- Hexavalent Chromium By EPA Method 7196A

[1] Monitoring wells MW-4 and MW-5 were installed based on the presence of water in overburden soil during drilling; however, 24-hours after development, these wells contained less than 6-inches of water within the well screened column. Because such a small quantity of water was present within the wells, the water was not considered to be representative of saprolite/weathered rock groundwater; therefore, groundwater samples were not collected from these wells.

3.2.3.4 Well Gauging

Well gauging data were acquired to determine the inferred flow direction and the estimated hydraulic gradient of the saprolite/weathered rock and bedrock groundwater aquifers beneath the Property. One round of well gauging was conducted on February 10, 2014 (Appendix B.6). The groundwater surface within each monitoring well was gauged using a water level probe. Measurements were recorded at the marked/notched well casing to the nearest hundredth of a foot (Table 3-3).

3.2.4 Limited Soil Gas Investigation

A limited active soil gas survey was performed to determine the absence/presence of VOCs in soil gas in the vicinity of the proposed fire station at Parcel I. Active soil gas points were constructed with sand from 2-3 feet bgs and with hydrated bentonite from the ground surface to 2 feet bgs. A dedicated soil gas probe was installed at the center of the sand column at each soil gas sampling location. A helium leak test was performed at each sample location to assess if ambient air was entering the soil gas point or sample tubing connections; the assessment indicated that insignificant quantities of helium were detected in the sample tubing at each setup.

Two active soil gas samples were collected over a period of 24 hours, using Suma canisters. The vacuum pressure of each Suma canister was recorded in the log book before and after sample collection. Samples were collected for analysis of VOCs using EPA Method TO-15.

3.3 Post-Investigation Activities

3.3.1 Land Surveying

Land surveying activities were performed to locate, mark, and acquire coordinates and elevations of sampling locations and pertinent site features. Land surveying activities were conducted in February 2014 by a licensed land surveyor employed by Benchmark Surveying. Coordinates were acquired using a Sokkia SET2B total station and a Husky data collector with an Ashtech Promark 2 Global Positioning System. Coordinates are provided in the North Carolina State Plane Coordinate System (North American Datum 1983 and North American Vertical Datum 1988) and are included in Appendix E.

3.3.2 Site Restoration

Surface restoration activities were conducted to restore the ground surface to grade following drilling activities. Boreholes not slated for well construction were abandoned using a neat grout mixture of bentonite and Portland cement. In addition, the ground surface of boreholes within paved areas was restored with a cement-bentonite grout until flush with the surrounding pavement.

3.3.3 IDW Management and Disposal

Investigation derived waste (IDW) management and sampling activities were conducted to properly stage IDW and characterize IDW for disposal. Sources of IDW included soil cuttings from boreholes, well development water, well purge water, and decontamination fluids. Disposable personal protection equipment was decontaminated as needed and disposed as municipal solid waste. Fifteen drums of IDW were generated during the field investigation.

IDW was appropriately managed from the time of collection to relinquishment. IDW staging areas were erected on or adjacent to the former foundations of Building I and Building II for drum storage and as a decontamination area. IDW was segregated by source location and matrix, and deposited into U.S. Department of Transportation-approved 55-gallon steel drums. Each drum was identified with a written label on the top and side of the drum. A drum inventory that included pertinent IDW information was maintained on an IDW management form. At Parcel I, eight IDW drums were staged inside the temporary fenced area of the Building I foundation. At Parcel II, seven IDW drums were staged on asphalt pavement adjacent to the Building II foundation.

IDW was characterized for disposal by collecting and analyzing waste characterization samples to characterize soil, groundwater, and decontamination fluids. Waste characterization data including total analyte and leachate concentrations were compared to screening criteria presented in *"Contained-in" Policy for Soil Contaminated with Listed Hazardous Waste* (North Carolina Hazardous Waste Section, May 2005) to determine the appropriate disposal option for each container of IDW. Drum removal and disposal activities were performed by GARCO Inc. of Asheboro, North Carolina in May 2014. Copies of the waste manifests are presented in Appendix F.

Samples were analyzed to quantify chemical concentrations in soil and groundwater and to measure/describe geotechnical parameters of site soil. Chains of Custody are provided in Appendix B.7. Chemical analyses were performed by PACE Analytical located in Huntersville, North Carolina in accordance with laboratory SOPs. Geotechnical analyses were performed by S&ME Inc. located in Greenville, South Carolina in accordance with ASTM standard test methods. Sampling and analysis matrices are provided in Appendix D for each media.

3.4 Data Reporting and Validation

The analytical laboratory verified, reduced, and reported data electronically to AECOM. Verification and validation checks of the project analytical data were performed by AECOM to identify data entries that exceed the specified quality control (QC) criteria. Analytical data packages and a full discussion of the process are provided in the Analytical Data Quality Report (Appendix G). Geotechnical data packages are presented in Appendix H.

4.0 SITE CHARACTERISTICS

Site characteristics include surface topography, geology, hydrology, and hydrogeology as described below.

4.1 Surface Topography

A topographic map showing surface elevation contours is provided as Figure 4-1.

Surface topography of the Parcel I generally slopes from the southwest to northeast, with elevations ranging from approximately 564 feet above mean sea level (msl) to 605 feet above msl. The vast majority of Parcel I is covered by a concrete building foundation (former Building I) and asphalt-pavement parking areas located to the south and east of the Building I foundation.

Surface topography of Parcel II varies from 597 feet in elevation near the intersection of Crowell Street and Crawford Avenue to 560 feet in elevation in the wooded, low-lying area at the drainage ditch. Most of this topography change occurs between the southern portion of Parcel II (the Building II foundation and the area immediately surrounding the Former Building II Hazardous Waste Storage Building which is relatively flat at approximately 578 feet msl) and the wooded, low-lying area, which is at approximately 565 feet msl. The wooded, low-lying area extends north approximately 250 feet from the toe of the slope to a railroad right-of-way, and contains mostly large trees.

The areas around the Former Building II Hazardous Waste Storage Building consist of grass to the north and west and pavement to the south and east. Both the grassed and paved areas are bounded to the north by a chained link fence. The chain link fence separates these areas from the wooded, low-lying area in the northern portion of the Parcel II, and bounds the top of a steep (greater than 45 degrees) man-made slope that extends approximately 13 feet downward. Fill dirt, construction debris, empty 55-gallon drums, and 5-gallon pails were observed on the slope (Appendices A.5 and B.1).

An additional lobe of fill materials extends from the gate located in the western portion of the chain link fence and runs along the western side of the wooded, low-lying area to a small run of chain link fence at the northern edge of the Property. This lobe of fill materials is approximately 100 feet wide and 300 feet long. The top of this fill feature is relatively flat at 573 feet msl.

4.2 Geology

Regional and site geology has been interpreted based on soil, lithology, and rock descriptions and geotechnical lab data (Appendix H) from this and previous investigations, and through a study of literature (Hibbard, Stoddard, Secor, and Dennis, 2002; Milton, 1984; and Stromquist, and Sundelius, 1969).

4.2.1 Regional Geology

The Former Scott Aviation Facility is located within the Carolina terrane of North Carolina, which extends up from eastern Georgia to central Virginia. The outcrop width is greatest in the central part of North Carolina and consists of low-grade metaigneous and metasedimentary rocks. Four metavolanic-dominated sequences make up the Carolina terrane: Virgilinia, Albermale, South Carolina, and Cary, which together represent a suprasubduction zone magmatic arc system which has been folded and faulted in a series of northeast trending synclines and anticlines. The closest structural feature is the Troy anticlinorium, which extends from central Randolph County through Union County into South Carolina.

A large part of Union county is within the Albermale sequence of this terrane, which is thought to range from Neoproterozic to Cambrian age. The Uwharrie formation is placed at the base of the Ablermale sequence, which is characterized as mostly felsic volcanic rocks. Albermale group overlies the Uwharrie and is mostly made up of submarine epiclastic sedimentary rocks, which are broken up into four lithologies: interbedded siltstone and claystone of the Tillery Formation, tuffaceous mudstones and overlying shales consisting of the Mudstone and Flat Swamp Members of the Cid Formation, Siltstone and mudstone of the Floyd Church Formation, and volcanic sandstone and volcanic siltstone of the Yadkin Formation.

4.2.2 Site Geology

The geology underlying the site or portions of the site can be divided into the following units:

- Fill
- Alluvial sediments – Thinly bedded Silts
- Saprolite/Weathered rock
- Bedrock

Three geologic/hydrogeologic cross-sections (A-A' as Figure 4-2, B-B' as Figure 4-3, and C-C' as Figure 4-4) were prepared to illustrate stratigraphy across the site.

4.2.2.1 Fill

Fill materials were encountered at some boring locations on Parcel I and Parcel II, primarily within and immediately adjacent to the building foundations. Fill ranged in thickness from 1 to 12 feet, but typically averaged approximately 5 feet thick. The exception to this was at borings SB05 through SB08 on the upper slab area at Parcel I, where a thin fill layer was observed just above the native saprolitic/weathered

bedrock. Fill materials were classified as silt or silt with clays with occasional mudstone cobbles, and ranged in color from red to brown to dark brown to pale olive.

Fill materials were also encountered in boreholes within and around Anomaly I (Figure 2-2). The fill materials in this area extend from the ground surface to a maximum depth of 12 feet bgs as noted on soil boring logs for SB11 through SB14 and SB17 through SB19. These fill materials were classified as slits and clays (predominantly silt with gravels 3 millimeters in diameter, with trace clays, olive brown in color) with occasional brick fragments and wood debris.

4.2.2.2 Alluvial Sedimentology

At several boring locations (SB14 and SB28 through SB32), silts were encountered just below the topsoil/ fill material and above weathered rock. These silts were generally very pale brown in color, thinly bedded horizontally, and contained a small percentage (~5-10%) of fine grained sands and trace (< 5%) gravel consisting of quartz and feldspars fragments. Thickness of the alluvial sediments encountered ranged from 2.5 feet at SB14 to 7.5 feet thick at SB29.

Geotechnical data was used to further define soils within this geologic unit. Soil samples collected from SB05 and SB10 at approximately 9-12 feet bgs and 10-12 feet bgs, respectively, were described as a sandy lean clay to lean clay based on the Unified Soil Classification System (Appendix H). The samples had low total organic carbon contents of 0.81 percent and 0.87 percent, respectively, and hydraulic conductivities of 6.78×10^{-6} and 2.75×10^{-5} centimeters per second, respectively.

4.2.2.3 Saprolite/Weathered Rock

Below the fill layer(s) and/or alluvium in the wooded, low-lying area, a zone of saprolite and weathered rock is present at all boring locations. The saprolite is composed primarily of very pale olive to olive fine to very fine saprolitic mudstone. The saprolite transitions with depth to weathered bedrock that is composed of both competent and near-friable rock.

4.2.2.4 Bedrock

Bedrock beneath the former Scott Aviation Facility site consists of dense, hard, fine-grained tuffaceous mudstones of the Cid Formation Mudstone Member, and is composed primarily of olive and bluish gray mudstones, siltstones, and volcanic tuffs, which have been metamorphosed. Bedrock was differentiated from overlying materials based on the degree of weathering. Cuttings from auger and air-hammer drilling at well locations P-1 through P-6 (beginning at depth of 15 to 39.5 feet bgs) consisted of relatively hard pieces of rock, which were considered to be competent bedrock. Although some of the overlying materials were hard, drilling above these depths was successfully performed and samples of this material

could be broken with moderate force; therefore these materials were classified as saprolite or partially weathered rock.

The presence of low yielding fractures in bedrock at 28 to 61 feet bgs were observed at bedrock monitoring wells P-1 through P-6. The orientation of the fractures could not be determined with the drilling and sampling techniques used during the previous investigations.

4.3 Hydrology

Pertinent hydrology features and surface water migration pathways are shown on Figure 4-1. The only feature at the Property that contains moving surface water is a drainage ditch along the northern boundary of the Property and oriented parallel to the railroad track. Surface water flows from the east to the west before entering a stone culvert that runs beneath the railroad track embankment to the north. It is presumed that surface water routed by this culvert discharges to Bearskin Creek.

In the event of rainfall, the majority of surface water runoff is collected in French drains or routed by concrete curbs to stormwater culverts or drains. Generally, surface water flows to the northeast unless intercepted by such water routing/collection features. In Parcel I, surface water collected in French drains presumably discharges to the City of Monroe's stormwater system. In Parcel II, surface water runoff on non-paved and paved surfaces is eventually discharged to the wooded, low-lying area as sheet flow.

A stormwater wash-out is located at the northwestern corner of the concrete pad in the central portion of Parcel II. Generally, paved areas north of Building II gently slope to this corner. Evidence of surface water runoff is based on eroded soil and fill observed in the wash out where a PVC utility is completely exposed. After surface water reaches the wooded, low-lying area it either percolates into the ground or eventually discharges to the drainage ditch.

4.4 Hydrogeology

Groundwater within the Property occurs within two distinct aquifers: saprolite/weathered rock aquifer; and bedrock aquifer. Groundwater beneath the Property is considered a potential source of drinking water based on *Classification and Water Quality Standards Applicable to the Groundwater of North Carolina* (North Carolina Administrative Code, 2013).

4.4.1 Saprolite/Weathered Rock Groundwater Aquifer

Shallow groundwater occurs within saprolite and weathered rock that overlays competent bedrock at two locations within the Property. One location is at Parcel I and the other location is within the wooded, low-lying area on Parcel II. These two locations were identified based on the presence/absence of

saprolite/weathered rock groundwater encountered during drilling activities as noted in historical and 2014 ESA boring logs.

The presence of saprolite/weathered rock groundwater was observed during drilling activities at saprolite/weathered rock monitoring wells MW-1 through MW-11; however, saprolite/weathered rock groundwater was not encountered during drilling at bedrock well locations (P-1 through P-6, W-2A, and W-3A; installed prior to the 2014 ESA investigation), proposed saprolite monitoring well locations SB04, SB05, SB07, SB08, SB10, and SB18, and many ESA boreholes advanced to competent bedrock, which suggests that the saprolite/weathered rock aquifer is localized and may exist as perched groundwater. Decreases in the groundwater surface elevation within the wells using low-flow methods (EPA, April 1996) suggests that there is a finite supply of water (i.e., perched groundwater) and/or the aquifer lies within a low yielding formation due to the tight saprolite soils.

The saprolite/weathered rock groundwater surface elevations at the Property were measured between approximately 560 and 590 feet msl. Depths to groundwater at the Property range from approximately 0.1 feet bgs to 3.76 feet bgs within the wooded, low-lying area to 5.90 feet bgs to 12.66 feet bgs across the remainder of the Property. The estimated thickness of the perched saprolite/weathered rock groundwater was determined based on the difference between the groundwater table elevation and top of competent rock elevation at saprolite/weathered rock wells. Bedrock monitoring well locations and soil borings advanced within the overburden to competent bedrock that were dry were designated as zero thickness. Contours of the saprolite/weathered rock groundwater thickness were generated using Kriging geostatistical interpolation method to depict saturated areas and are provided on Figure 4-5.

The saprolite/weathered rock aquifer is presumably recharged by rain that infiltrates through soils. The detection frequency of saprolite/weathered rock groundwater was much higher in the wooded, low-lying area than in other portions of the Property, which is likely attributable to surface water runoff collection and infiltration within this lower elevation area. In addition, the wooded, low-lying area may be recharged by upgradient saprolite/weather rock groundwater.

The inferred groundwater direction and hydraulic gradient of the two perched groundwater zones were determined using the Kriging geostatistical interpolation method. Input parameters of well gauging data and well casing elevations and coordinates were incorporated into the GIS and processed. The inferred groundwater flow direction is oriented toward the northeast in the Parcel I perched groundwater zone and toward the northwest in the wooded, low-lying area in Parcel II (Figure 4-6). The hydraulic gradient was calculated to be approximately 0.016 foot/foot and 0.008 foot/foot for Parcel I and Parcel II, respectively.

4.4.2 Bedrock Groundwater Aquifer

Bedrock groundwater is present within fractures in the bedrock that lies beneath the saprolite. As reported in the *Supplemental Soil Assessment Report* (Earth Tech, August 2004), groundwater was first

encountered during drilling activities in discrete water-bearing fractures in bedrock at depths ranging from 28 to 61 feet bgs. Groundwater was not detected in the saprolite at these locations. After bedrock wells were installed, the potentiometric pressure head of the bedrock groundwater resulted in a significant increase to static groundwater surface elevations within the bedrock wells. The static water levels within most of the bedrock monitoring wells are at an elevation many feet above the saprolite and bedrock interface. Based on the bedrock fracture locations and stratigraphy shown on Figures 4 and 5 of the *Supplemental Environmental Site Assessment Report* (Earth Tech, December 2003 and Appendix A.6) and the 2014 well gauging data, the difference in elevation of the first encountered bedrock fracture and the static water level is approximately 30 feet at P-1, 38 feet at P-2, 31 feet at P-3, 13 feet at P-4, 21 feet at P-5, 16 feet at P-6, 15 feet at W-2A, and 3 feet at W-3A. The generally large pressure head differentials indicate that the bedrock groundwater aquifer is confined and experiences artesian-like conditions.

The bedrock groundwater aquifer is presumably recharged by saprolite/weathered rock groundwater that enters through bedrock fractures. Saprolite/weathered rock groundwater must meet two criteria before being considered a potential source for bedrock groundwater: 1) a fracture must be present, and 2) the pressure head (static water level) of the saprolite/weathered rock groundwater must be greater than the pressure head of the bedrock groundwater within a facture. A higher pressure head would exist where saprolite/weathered rock groundwater is pooling at a fracture or enters a fracture at a location higher than the pressure head of the bedrock groundwater. Because the static water level in bedrock wells P-1, P-2, P-4 through P-6, and W-2A is above the saprolite-bedrock interface (Figures 4 and 5; Earth Tech, December 2003 and Appendix A.6) and groundwater was not detected at these locations in the saprolite, bedrock groundwater in these wells is likely supplied by saprolite/weathered rock groundwater from bedrock fracture(s) that are topographically higher than the potentiometric surface within these bedrock wells. In bedrock wells P-3 and W-3A (Figure 4 and Figure 5; Earth Tech, December 2003; Appendix A.6), the potentiometric surface is below the interface between saprolite/weathered rock and bedrock; therefore, saprolite/weathered rock groundwater located upgradient and downgradient of these wells may be sources of bedrock groundwater for these two wells. Upwelling of bedrock groundwater to saprolite/weathered rock may occur, but the likelihood of this occurrence is presumably low within the Property. These conclusions are based on general hydraulic principles and cannot be verified because mapping of bedrock fractures is not feasible.

Depths to static water levels of bedrock groundwater range from 12.8 feet bgs to 31.5 feet bgs. Bedrock groundwater potentiometric surface elevations occur between approximately 561 and 590 feet msl. The inferred bedrock groundwater flow direction is oriented toward the north-northeast at Parcel I and toward the north-northwest on Parcel II (Figure 4-6), and the hydraulic gradient was calculated to be approximately 0.082 foot/foot; these values are based under the assumption that bedrock groundwater across the Property is hydraulically connected.

5.0 NATURE AND EXTENT OF CONTAMINATION

The nature and extent of contamination was evaluated through the collection and analysis of soil, groundwater, and soil gas samples. Analytical data were compared to screening criteria to identify areas impacted by historical site activities/releases, assess the extent of soil and groundwater contamination, identify source areas, and identify analytes to be further evaluated in Section 6. The project screening criteria and the nature and extent of contamination associated with the Property are described in the following subsections.

5.1 Screening Criteria

Analytical data collected were evaluated using the following environmental screening criteria.

- **Soil Screening Criteria**. Project screening criteria for soil were identified as the most conservative value of the NCDENR Preliminary Soil Remediation Goals (PSRGs; Residential, Industrial, and Protection of Groundwater; NCDENR, January 2014). Metal concentrations were further screened using established background values derived based on the 95th percentile for each metal analyte (Appendix I).
- **Groundwater Screening Criteria**. Project screening criteria for groundwater was identified as NCDENR Groundwater Standards (NCDENR, April 2013).
- **Soil Gas Screening Criteria**. Project screening criteria for soil gas was identified as Sub Slab and Exterior Soil Gas Screening Levels (NCDENR, January 2014).

Metal concentrations were evaluated using the project screening criteria and background concentrations (Appendix I) to assess whether elevated concentrations may represent anthropogenic or natural background conditions. Background concentrations for metals were defined as the upper 95th percentile concentration based on analytical results from six representative background soil samples. Only metals which were detected at concentrations exceeding the project screening criteria and background were further evaluated in Section 6.

Areas impacted by historical site activities/releases were identified based on analytical results from sampling locations in which chemical concentrations exceeding the project screening criteria and background were detected. Only chemicals detected at concentration(s) exceeding the project screening criteria and, for metals, background concentrations are further evaluated in Section 6.

5.2 Soil

Analytical data results for soil samples sequenced by analyte group [VOCs, SVOCs, PCBs, and PPL metals (plus cyanide and hexavalent chromium)] are presented in Tables 5-1 through 5-4. Statistical summary tables of surface soil and subsurface soil analytical results are presented in Tables 5-5 and 5-6,

respectively. The spatial distributions of selected chemicals (PCE, TCE, cis-1,2-DCE, and vinyl chloride [VC]) which were frequently detected in soil at concentrations exceeding screening criteria are depicted on Figure 5-1 and Figure 5-2 for Parcel I and Parcel II, respectively.

The nature and extent of soil contamination in the vicinity of the ten areas of potential environmental concern, the transformer pad, and the wooded, low-lying area are described below.

5.2.1 Former Oil Tank Location, Parcel I

Soil data associated with Former Oil Tank Location was characterized by soil samples collected from five soil borings (SB01 and SB01a through SB01d; Figure 5-1). VOCs and SVOCs were not detected in soil at concentrations exceeding the screening criteria. However, two metals were detected at concentrations above the screening criteria and background as follows:

- Arsenic and thallium concentrations slightly exceeded the screening criteria and background in one sample each.

Although arsenic and thallium were detected at concentrations slightly above background in one sample each, these metals are likely not related to the Former Oil Tank. Samples from other depths in the same boring did not contain arsenic or thallium at concentrations exceeding background. In addition, VOCs and SVOCs were not detected at concentrations exceeding screening criteria in soil samples from this area. Therefore, the limited presence of arsenic and thallium at elevated concentrations in this area is likely attributable to background, not to a release in this area. It does not appear that there were any releases from the Former Oil Tank.

5.2.2 Former UST Area, Parcel I

The Former UST Area was characterized by data associated with soil samples collected from four soil borings (SB08 and SB08a through SB08c; Figure 5-1). VOCs and SVOCs were not detected in soil at concentrations exceeding the screening criteria; however, one metal was detected above the screening criteria and background as follows:

- Arsenic exceeded the screening criterion and background in one sample.

Although arsenic exceeded background in one sample, no VOCs or SVOCs were detected in soil samples from this area at concentrations above screening criteria. In addition, arsenic concentrations did not exceed background in samples collected from other depths in the same boring. Therefore, the isolated detection of arsenic at an elevated concentration in this area is likely attributable to background, not to a release from the Former UST. It does not appear that there were any releases from the Former UST.

5.2.3 Former Water Pre-Treatment Area, Parcel I

The Former Water Pre-Treatment Area was characterized by data associated with soil samples collected from four soil borings (SB07 and SB07a through SB07c; Figure 5-1). SVOCs and metals were not detected in soil at concentrations exceeding the screening criteria and background; however one VOC was detected above the screening criteria as follows:

- PCE exceeded its screening criterion in four of six samples collected in this area. PCE was detected in shallow and intermediate depth intervals. Deep samples were not collected in this area due to refusal.

Based on the presence of PCE in shallow soil in this area, historical operations conducted at the Former Water Pre-Treatment Area likely resulted in releases to soil.

5.2.4 Former Tar Drippings/Old Pitted Floor Area, Parcel I

The Former Tar Dripping/Old Pitted Floor Area was characterized by data associated with soil samples collected from five soil borings (SB02 and SB02a through SB02d; Figure 5-1). SVOCs were not detected in soil at concentrations exceeding the screening criteria; however, three VOCs and one metal were detected above the screening criteria and background as follows:

- PCE was detected at concentrations above the screening criterion in all eleven samples collected from this area. The sample with the highest detected concentration (753 micrograms per kilogram [µg/kg]) was a shallow soil sample (0-2 ft bgs).
- TCE was detected at concentrations exceeding the screening criterion in six of the eleven samples collected from this area.
- Cis-1,2-DCE exceeded the screening criterion in one sample.
- Thallium slightly exceeded background and screening criterion in one sample.

Based on the elevated concentrations of PCE and TCE detected in soil samples from this area, historical operations conducted at the Former Tar Dripping/Old Pitted Floor Area likely resulted in releases to soil. Although thallium was detected at a concentration slightly above its background in one sample, this isolated elevated concentration is likely attributable to background.

5.2.5 Former Paint Room/Floor Drain Area, Parcel I

The Former Paint Room/Floor Drain Area was characterized by data associated with soil samples collected from five soil borings (SB04 and SB04a through SB04d; Figure 5-1). Deep interval samples

were not collected in this area due to refusal. SVOCs were not detected in soil at concentrations exceeding the screening criteria; however, one VOC and three metals were detected above the screening criteria and background as follows:

- PCE was detected at concentrations exceeding the screening criterion in five of the nine samples collected in this area.
- Arsenic slightly exceeded background and screening criterion in one sample.
- Nickel slightly exceeded background and screening criterion in one sample.
- Thallium slightly exceeded background and screening criterion in one sample.

Based on the detections of PCE at concentrations above the screening criteria, historical operations conducted at the Former Paint Room/Floor Drain Area likely resulted in releases to soil. Three metals were detected slightly above screening criteria and background in one soil sample each; therefore, these isolated elevated concentrations of metals are likely attributable to background and not to the Former Paint Room/Floor Drain.

5.2.6 Former Metal Finishing/Vapor Degreasing Area, Parcel I

The Former Metal Finishing/Vapor Degreasing Area was characterized by data associated with soil samples collected from two soil borings (SB05 and SB05a: Figure 5-1). SVOCs were not detected in soil at concentrations exceeding the screening criteria; however, three VOCs and two metals were detected above the screening criteria and background as follows:

- PCE was detected at concentrations that exceeded the screening criterion in all four samples.
- TCE was detected at concentrations that exceeded the screening criterion in two of the four samples.
- 1,1-Dichloroethene (1,1-DCE) was detected at concentrations that exceeded the screening criterion in two of the four samples.
- Cadmium was detected at a concentration that slightly exceeded background and screening criterion in two of the four samples.
- Thallium was detected at a concentration that slightly exceeded background and screening criterion in one sample.

Based on the concentrations of PCE, TCE, and 1,1-DCE detected in soil above screening criteria, historical operations conducted at the Former Metal Finishing/Vapor Degreasing Area likely resulted in releases to soil. In addition, cadmium and thallium were detected at concentrations slightly above background in two and one samples, respectively; therefore, these isolated elevated concentrations of

metals are likely attributable to background and not to the Former Metal Finishing/Vapor Degreasing Area.

5.2.7 Former AST Area, Parcel I

The Former AST Area was characterized by data associated with soil samples collected from four soil borings (SB06 and SB06a through SB06c; Figure 5-1). SVOCs were not detected in soil at concentrations exceeding the screening criteria; however, six VOCs and four metals were detected above the screening criteria and background as follows:

- PCE was detected at concentrations that exceeded the screening criterion in all samples. The highest PCE concentration (243,000 µg/kg) was detected in the sample from SB06c at 2 feet bgs.
- TCE was detected at concentrations that exceeded the screening criterion in seven of the eleven samples. The highest TCE concentration (1,420 µg/kg) was detected in the sample from SB06 at 10 feet bgs.
- 1,1,2-Trichloroethane was detected at a concentration that slightly exceeded the screening criterion in one sample. The sample was collected from SB06 at 10 feet bgs.
- 1,1-DCE was detected at concentrations that exceeded the screening criterion in three of the eleven samples. The sample with the highest concentration (1,680 µg/kg) was collected from SB06 at 10 feet bgs.
- 1,2-Dichloroethane (1,2-DCA) was detected at a concentration that exceeded the screening criterion in two of the eleven samples. The sample with the higher concentration was collected from SB06 at 10 feet bgs.
- Methylene chloride exceeded the screening criterion in one sample.
- Antimony was detected at a concentration that exceeded the screening criterion and background in one sample.
- Arsenic was detected at a concentration that exceeded screening criteria and background in four of the nine samples.
- Nickel was detected at a concentration that slightly exceeded the screening criterion and background in one sample.
- Thallium was detected at a concentration that slightly exceeded screening criteria and background in one sample.

Based on the concentrations of PCE and TCE detected in soil samples in this area, historical operations conducted at the Former AST Area likely resulted in releases to soil. Although four metals were detected at slightly elevated concentrations, the presence of these metals is likely attributable to background.

A sump was identified in the vicinity of the Former AST Area. This sump is currently filled with sediment/soil and standing water. Because of the fill, the presence or absence of pipes or drains within the sump could not be confirmed.

5.2.8 Former Building I Hazardous Waste Storage Area, Parcel I

The Former Building I Hazardous Waste Storage Area was characterized by data associated with soil samples collected from five soil borings (SB03 and SB03a through SB03d; Figure 5-1). SVOCs were not detected in soil at concentrations exceeding the screening criteria; however, six VOCs and two metals were detected above the screening criteria and background as follows:

- PCE was detected at concentrations that exceeded the screening criterion in all fourteen samples. The sample with the highest concentration was collected in intermediate soil at a concentration of 1,200,000 µg/kg.
- TCE was detected at concentrations that exceeded the screening criterion in eleven of the fourteen samples. The highest concentration was detected in deep soil at 1,200 µg/kg.
- 1,1,2-Trichloroethane was detected at a concentration that slightly exceeded the screening criterion in one sample.
- 1,1-DCE was detected at concentrations that exceeded the screening criterion in five of the fourteen samples.
- 1,2-DCA was detected at a concentration that exceeded the screening criterion in one sample.
- Methylene chloride was detected at a concentration that exceeded the screening criterion in one sample.
- Arsenic was detected at a concentration that slightly exceeded background and screening criterion in one sample.
- Cadmium was detected at concentrations that slightly exceeded the screening criterion in two samples.

Based on the concentrations of PCE, TCE, and other chlorinated solvents detected in soil, historical operations conducted at the Former Building I Hazardous Waste Storage Area likely resulted in releases to soil. Although arsenic and cadmium were detected at concentrations slightly above background and the screening criteria, the presence of these metals are likely attributable to background and not to the Former Building I Hazardous Waste Storage Area.

5.2.9 Former Oil Sump Location, Parcel II

The Former Oil Sump Location was characterized by data associated with soil samples collected from five soil borings (SB10 and SB10a through SB10d; Figure 5-2). VOCs were not detected in soil at concentrations exceeding the screening criteria; however one SVOC and one metal were detected above the screening criteria and background as follows:

- Benzo[a]pyrene was detected at a concentration that exceeded the screening criterion in one sample.
- Thallium was detected at a concentration that slightly exceeded screening criteria and background in one sample.

Although benzo[a]pyrene and thallium exceeded the screening criteria in one sample each, the extent of elevated concentrations is very limited and it is not likely that these exceedances are related to the Former Oil Sump. It does not appear that there were any releases from the Former Oil Sump.

5.2.10 Former Building II Hazardous Waste Storage Building, Parcel II

The Former Building II Hazardous Waste Storage Building was characterized by data associated with soil samples collected from soil borings (SB11 through SB27; Figure 5-2). Six VOCs and three metals were detected above the screening criteria and background as follows:

- PCE was detected at concentrations that exceeded the screening criterion in 26 of 46 samples. Samples collected from soil borings SB11, SB16, SB17, SB18, and SB27 contained concentrations above 1,000 µg/kg. The highest PCE concentration detected was collected in intermediate soil (approximately 8 feet bgs) from SB17 at a concentration of 781,000 µg/kg.
- TCE was detected at concentrations that exceeded the screening criterion in seven samples. Samples collected from soil borings SB11, SB18, and SB27 had concentrations above 1,000 µg/kg. The highest concentration detected was in the deep soil (approximately 12 feet bgs) sample from SB11 at a concentration of 8,890 µg/kg.
- Cis-1,2-DCE was detected at concentrations that exceeded the screening criterion in seven samples. Samples collected from soil borings SB11, SB18, SB23, and SB27 had concentrations above 1,000 µg/kg. The highest cis-1,2-DCE concentration detected was in intermediate soil (6 feet bgs) from SB27 at a concentration of 50,200 µg/kg.
- VC was detected at concentrations that exceeded the screening criterion in six samples. The sample with the highest concentration was collected in deep soil (12 feet bgs) from SB11 at a concentration of 186 µg/kg.

- Methylene chloride was detected at a concentration that exceeded the screening criterion in one sample at SB23. The sample was collected from 4 feet bgs; a deeper sample was not collected due to refusal.
- p-Isopropyltoluene was detected at a concentration that exceeded the screening criterion in one sample at SB23. The sample was collected from 4 feet bgs; a deeper sample was not collected due to refusal.
- Antimony was detected at concentrations that slightly exceeded the screening criterion and background in four samples.
- Arsenic was detected at concentrations that slightly exceeded background and screening criteria in seven samples.
- Cadmium was detected at a concentration that slightly exceeded the screening criterion in one sample.

Soils within and near the Former Building II Hazardous Waste Storage Building on Parcel II have been impacted by historical releases or disposal practices performed at the Former Building II Hazardous Waste Storage Building. VOCs are present at concentrations that exceed the screening criteria in all soil borings except SB24 and SB25. Two of these boreholes, SB17 and SB18, lie within Anomaly I which, due to its composition, may act as a preferential pathway for contamination to travel from the Former Building II Hazardous Waste Storage Building or may be a separate source of contamination.

The extent of VOC-contaminated soil was not fully delineated laterally; spatial data gaps in shallow, intermediate, and deep soil are present to the south, west, and/or north to northwest of the Former Building II Hazardous Waste Storage Building. Although elevated concentrations of VOCs were detected along the top of slope to the wooded, low-lying area, the extent of contamination at and beyond this slope is addressed in Section 5.2.12.

Because of the absence of elevated concentrations of VOCs at SB23 and SB24, the PCE detected at SB26 does not appear to be related to releases from the Former Building II Hazardous Waste Storage Building.

Although antimony, arsenic, and cadmium were sporadically detected at slightly elevated concentrations across this area, these metals are likely attributable to background and not related to the Former Building II Hazardous Waste Storage Building.

5.2.11 Transformer Pad, Parcel II

The Transformer Pad was characterized by data associated with soil samples collected from five soil borings (SS01 through SS05; Figure 5-2). VOCs and PCBs were not detected in soil at concentrations

exceeding the screening criteria; however two SVOCs were detected above the screening criteria as follows:

- Benzo[a]pyrene was detected at a concentration that exceeded the screening criterion in one sample.
- Benzo[b]fluoranthene was detected at a concentration that exceeded the screening criterion in one sample.

Because PCBs, which are the primary contaminants associated with transformers, were not detected in samples from this area, VOCs were not detected in this area, and only two SVOCs were detected at slightly elevated concentrations in one sample from this area, it is does not appear that there were any releases from the Transformer Pad.

5.2.12 Wooded, Low-Lying Area, Parcel II

The wooded, low-lying area was characterized by data associated with soil samples collected from six soil borings (SB28 through SB33; Figure 5-2). Metals were not detected in soil at concentrations exceeding the screening criteria and background; however, three VOCs and one SVOC were detected above the screening criteria as follows:

- PCE was detected at concentrations that exceeded the screening criteria in nine of the 16 samples. PCE concentrations detected in soil samples collected from boreholes located near the slope immediately north of Building II were higher than PCE concentrations from samples collected from boreholes near the drainage ditch. The highest PCE concentrations were in samples collected from SB28, which is downgradient of the Former Building II Hazardous Waste Storage Building.
- TCE was detected at concentrations that exceeded the screening criterion in two samples.
- Cis-1,2-DCE was detected at concentrations that exceeded the screening criterion in one sample.
- Benzo[a]pyrene was detected at concentrations that exceeded the screening criterion in one sample.

PCE, TCE, and cis-1,2-DCE were detected in soils in the wooded, low-lying area and are likely due to historical activities performed at the Former Building II Hazardous Waste Storage Building and/or potential source materials in the disturbed media within Anomaly I.

Due to the remoteness of the sample location of the single elevated concentration of benzo[a]pyrene detected (SB33), benzo[a]pyrene is likely not associated with historical activities performed at the Property.

5.3 Groundwater

Analytical results for groundwater samples sequenced by analyte group are presented in Tables 5-7 through 5-9. Statistical summary tables of saprolite/weathered rock and bedrock groundwater analytical results are presented in Table 5-10 and Table 5-11, respectively. The spatial distributions of pertinent chemicals detected at concentrations above screening criteria in saprolite/weathered rock and bedrock groundwater are depicted on Figure 5-3 and Figure 5-4, respectively.

5.3.1 Saprolite/Weathered Rock Groundwater

Saprolite/weathered rock groundwater samples were collected from wells screened above competent rock. This monitoring well network includes MW-1 through MW-3 and MW-6 through MW-11 (Figure 5-3). As described in Section 3.2.3.3, groundwater samples were not collected from saprolite/weathered rock wells MW-4 and MW-5. SVOCs were not detected in saprolite/weathered rock groundwater at concentrations exceeding the screening criteria; however, nine VOCs and three metals were detected above the screening criteria as follows:

- PCE was detected at concentrations that exceeded the screening criterion in samples from eight of the nine saprolite/weathered rock groundwater wells. The highest concentrations of PCE were detected in samples collected from Parcel I (MW-2 and MW-3).
- TCE was detected at concentrations that exceeded the screening criterion in samples from six of nine wells. The highest concentrations of TCE were detected in samples collected from Parcel I (MW-2 and MW-3). TCE concentrations did not exceed screening criterion in MW-9 through MW-11, located at the northern end of the Property just south of the drainage ditch.
- Cis-1,2-DCE was detected at concentrations that exceeded the screening criterion in samples from four of the nine wells.
- 1,1,1-Trichloroethane (1,1,1-TCA) was detected at concentrations that exceeded the screening criterion in samples collected from two wells in Parcel I (MW-2 and MW-3).
- 1,1-DCE was detected at concentrations that exceeded the screening criterion in samples collected from two wells in Parcel I (MW-2 and MW-3).
- 1,2-DCA was detected at concentrations that exceeded the screening criterion in samples collected from two wells in Parcel I (MW-2 and MW-3).

- Bromodichloromethane was detected at concentrations that exceeded the screening criterion in samples collected from MW-7, MW-9, and MW-11. These wells are located in the wooded, low-lying area.
- Chloroform was detected at concentrations that exceeded the screening criterion in samples collected from Parcel I (MW-2 and MW-3).
- Dibromochloromethane was detected at concentrations that slightly exceeded the screening criterion in samples collected from MW-7, MW-9, and MW-11.
- Arsenic, chromium, and lead were detected at concentrations above the screening criteria in samples collected from one well, MW-7. This well is located downgradient of Anomaly I.

Saprolite/weathered rock groundwater contamination is present beneath Building I, northwest of Building II just north of the Former Building II Hazardous Waste Storage Building, and in the wooded, low-lying area. Conclusions on groundwater quality for other portions of the Property cannot be made because saprolite/weathered rock groundwater appears to be present within localized perched zones and not hydraulically connected.

Bromodichloromethane, chloroform, and dibromochloromethane are not considered to be site-related contaminants because these chemicals are likely by-products from drinking water disinfection, and are common laboratory contaminants. Further supporting lines of evidence include: 1) bromodichloromethane and dibromochloromethane were not detected in site soil, 2) chloroform was detected in a few soil samples, but concentrations detected were well below the screening criterion, and 3) long-term leaks from City water lines or the use of drilling fluids (e.g., potable water acquired from a City of Monroe fire hydrant) may have resulted in the exceedances of these three chemicals in groundwater.

5.3.2 Bedrock Groundwater

Bedrock groundwater samples were acquired from wells screened within the bedrock. This monitoring well network includes P-1 through P-6, W-2A, and W-3A (Figure 5-4). Five VOCs were detected above the screening criteria as follows:

- PCE was detected at concentrations that exceeded the screening criterion in samples collected from all eight bedrock monitoring wells. The highest concentration of PCE detected was 14,900 µg/L in the sample collected from P-3, which is near the Former Building II Hazardous Waste Storage Building.
- TCE was detected at concentrations that exceeded the screening criterion in samples from seven of the eight wells. The highest concentration of TCE detected was 453 µg/L in the sample from P-3.

- Cis-1,2-DCE was detected at concentrations that exceeded the screening criterion in well P-4.
- VC was detected at concentrations that exceeded the screening criterion in wells P-4 and P-5.
- Benzene was detected at a concentration that exceeded the screening criterion in well W-2A.

Because monitoring well W-2A does not lie within the Property[2], and benzene was not detected in Property soil, the benzene exceedance at well W-2A is not attributable to historical operations conducted at the Former Scott Aviation Facility.

Chlorinated solvents are present in bedrock groundwater beneath the Monroe Inquirer Journal, beneath Parcel I, and beneath Parcel II (southwest, west, and northeast of Building II). Conclusions on groundwater quality for other portions of the Property cannot be made because bedrock groundwater is confined within fractures and these fractures have not been mapped; therefore, the connectivity of groundwater within bedrock monitoring wells cannot be determined with any certainty.

5.4 Soil Gas

The validated analytical results for VOCs are presented in Table 5-12. VOCs were not detected in soil gas at concentrations above the screening criteria at the eastern portion of Parcel I.

[2] The Enquirer Journal granted written permission to enter its property to check water levels, sample, and survey monitoring wells W-2A and W-3A.

6.0 SUMMARY AND CONCLUSIONS

The investigation objectives presented in Section 1.2 were satisfied through the collection and evaluation of the soil, groundwater, and soil-gas analytical data and evaluation of results from a limited geophysical survey. The investigation focused on soil in ten potential areas of environmental concern, Anomaly I, the Transformer Pad, and the wooded, low-lying area; saprolite/weathered rock groundwater and bedrock groundwater; and soil-gas on the eastern portion of Parcel I.

COPCs for the Former Scott Aviation Facility are presented in Section 6.5, the conceptual site model (CSM) is presented in Section 6.6, and recommendations for the Property are provided in Section 6.7.

6.1 Geophysical Anomaly I

Based on readings from the geophysical instrumentation, Anomaly I is disturbed fill material and occurs from beneath the paved surface to approximately 12 feet bgs. Evidence of fill materials including soil, brick fragments, minor quantities of glass, and wood debris were observed in soil cuttings from soil borings advanced within Anomaly I (Appendix B) and along the surface of the slope extending into the wooded, low lying area immediately north of Building II. Empty 55-gallon drums were also observed along the slope (Appendix A.5), which suggests that the contents of the fill are not homogeneous.

6.2 Soil Contamination

Based on the absence/presence of chemicals in soil exceeding the screening criteria and background described in Section 5.2, releases have likely occurred from the following source locations:

- Parcel I
    - Former Water Pre-treatment Area
    - Former Tar Drippings/Old Pitted Floor Area
    - Former Metal Finishing/Vapor Degreasing Area
    - Former Paint Room/Floor Drain Area
    - Former AST Area
    - Former Building I Hazardous Waste Storage Area
- Parcel II
    - Former Building II Hazardous Waste Storage Building

Soils in the former low-lying, wooded area also appear to have been impacted by former activities at the facility.

Based on to the absence of site-related contaminants above the screening criteria and background, it does not appear that releases occurred at the Former Oil Tank Location, Former UST Area, Former Oil Sump, or the Transformer Pad.

6.3 Groundwater Contamination

6.3.1 Saprolite/Weathered Rock Groundwater

Saprolite/weathered rock groundwater contamination is present beneath Parcel I (Building I) and Parcel II (north of the Former Building II Hazardous Waste Storage Building, and in the wooded, low-lying area). PCE, TCE, cis-1,2-DCE, 1,1,1-TCA, 1,1-DCE, 1,2-DCA, bromodichloromethane, chloroform, dibromochloromethane, arsenic, chromium, and lead were detected in saprolite/weathered rock groundwater at concentrations exceeding the screening criteria.

The highest concentrations of VOCs in soil and groundwater on Parcel I are present at the Former AST Area and the Former Building I Hazardous Waste Storage Area. Migration of VOCs from these two source areas may have resulted in impacts to saprolite/weathered rock groundwater beneath other potential areas of environmental concern at Parcel I.

Activities performed at the Former Building II Hazardous Waste Storage Building appear to have impacted groundwater (MW-1, MW-6, MW-7, MW-8, MW-10, and MW-11). The fill within Anomaly I may also be a source of groundwater contamination.

6.3.2 Bedrock Groundwater

Bedrock groundwater contamination is present beneath the Monroe Inquirer Journal property, beneath Parcel I, and beneath Parcel II (southwest, west, and northeast of Building II). PCE, TCE, cis-1,2-DCE, and VC were detected in bedrock groundwater beneath the Property at concentrations that exceed the screening criteria. Sources of bedrock contamination likely resulted from migration of contaminated saprolite/weathered rock groundwater into the bedrock via fractures. Because monitoring wells W-2A, P-5, and P-6 are immediately adjacent to the Monroe Inquirer Journal property, bedrock groundwater contamination at these wells may be attributable to releases from that building.

6.4 Soil-Gas Contamination

Based on soil-gas analytical data, VOCs were not detected in soil gas at concentrations above the screening criteria at the eastern portion of Parcel I.

6.5 Identification of COPCs

Analytes that exceed NCDENR screening criteria and background (metals only) and appear to be site-related were retained as COPCs. A chemical retained as a COPC does not necessarily mean that the chemical poses an unacceptable human health risk, but that a further evaluation is warranted. The following analytical groups and associated COPCs were retained for further evaluation:

- **VOCs:** 1,1,1-TCA, 1,1-DCE, 1,2-DCA, PCE, TCE, cis-1,2-DCE, and VC were retained as COPCs. 1,1,2-trichloroethane and p-isopropyltoluene were not retained as COPCs because concentrations detected are below residential and industrial PSRGs; protection of groundwater is the only PSRG that was exceeded, and there are no groundwater standards for 1,1,2-trichloroethane and p-isopropyltoluene. Methylene chloride was not retained as a COPC because concentrations detected are below residential and industrial PSRGs; protection of groundwater is the only PSRG that was exceeded, and methylene chloride was not detected in groundwater. Bromodichloromethane, chloroform, and dibromochloromethane were not retained as COPCs because these chemicals were detected below residential and industrial PSRGs and these chemicals are likely by-products from drinking water disinfection which are present in saprolite/weathered rock groundwater potentially from long-term leaks from City water lines or the use of drilling fluids that used City water.
- **SVOCs:** SVOC analytes were not retained as COPCs. Although benzo[a]pyrene was detected slightly above the screening criteria in three samples and benzo[b]fluoranthene was detected slightly above the screening criteria in one sample, the diverse locations of these exceedances (only one sample in surface soil each of the following areas: the Transformer Pad Area, the wooded, low-lying area, and the Former Oil Sump) across the site and the lack of detections in numerous other samples collected across the site (including samples between these locations) suggest that these chemicals are not site-related. They are also common constituents in asphalt, which was used for the large parking lots.
- **PCBs:** PCB analytes were not retained as COPCs because PCBs were not detected in soil in the transformer area.
- **Metals:** Metals analytes, cyanide, and hexavalent chromium were not retained as COPCs. Although antimony, arsenic, cadmium, chromium, lead, nickel, and thallium were detected in soil at concentrations that slightly exceeded the screening criteria and/or background, no significantly elevated concentrations of these metals were detected, and the locations of the samples in which exceedances were detected are spatially sporadic and not concentrated in any specific area; therefore, the presence of these metals in soils does not appear to be site-related. Arsenic, chromium, and lead concentrations detected in groundwater slightly exceeded the screening criteria in one well (MW-7), which was considered to be anomalous and not site-related. Cyanide was not detected in soil or groundwater above the screening criteria. Hexavalent chromium was not detected in soil or groundwater.

Because all suspected source locations have been investigated at the Former Scott Aviation Facility Property, these COPCs represent the refined list of chemicals that are present at the Property in soil or groundwater at concentrations exceeding the screening criteria or background. Other chemicals may be present at concentrations less than the screening criteria or background and would not be included in analyte lists for future sampling events. If a "new" source area were to be found, expansion of this COPC list may be necessary to properly characterize potentially contaminated media.

6.6 Conceptual Site Model

The primary purpose of the CSM is to identify sources and exposure pathways that may pose a potential risk to human health risks as well as ruling out other pathways. Presently, receptors are not risk because the paved area to the east of former Building II is used as a parking lot, and the remaining areas are unused but are designated for potential redevelopment.

Relationships between affected media, exposure routes, and potential receptors under residential and industrial land use scenarios were evaluated based on the current understanding of the CSM. Because the future land use of the Property is currently unknown, both scenarios were retained for further evaluation. The rationale for identifying exposure pathways as potentially complete, insignificant, or incomplete for the retained receptors is provided in Figure 6-1. Potentially complete exposure pathways are summarized for retained receptors as follows:

- **Hypothetical Future Residents:** Incidental ingestion, dermal contact, and inhalation of soil from the 0–10 foot bgs interval, bio-uptake of produce grown in a garden, inhalation of vapors emanating from soil or saprolite/weathered rock groundwater, and ingestion and dermal contact of groundwater used as drinking water are potentially complete exposure pathways.
- **Future Industrial/Occupational Workers:** Incidental ingestion, dermal contact, and inhalation of soil from the 0–2 foot bgs interval, inhalation of vapors emanating from soil or saprolite/weathered rock groundwater, and ingestion and dermal contact of groundwater are potentially complete exposure pathways.
- **Future Excavation/Construction Workers:** Incidental ingestion, dermal contact, and inhalation of soil from the 0–10 foot bgs interval, inhalation of vapors emanating from soil or saprolite/weathered rock groundwater, and ingestion and dermal contact of groundwater are potentially complete exposure pathways.

6.7 Recommendations

The objectives for additional sampling and analysis, if required, will be determined based on discussions among the City of Monroe, NCDENR, and Tyco on findings documented within this 2014 ESA Report. As part of the discussion, an assessment of the NCENDR PSRGs is recommended to identify the most

appropriate screening criteria for redeveloping the Property under the North Carolina Brownfields Property Reuse Act of 1997 (N.C. Gen. Stat. § 130A-310.30 et seq.). Refinement of the screening criteria based on the projected land use (residential and/or commercial/industrial) of the Property is recommended.

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