DRAFT-FINAL

OPTIMIZATION PLAN
CERCLA AREAS OF CONCERN
LONG-TERM MONITORING PROGRAM

FORMER GRIFFISS AIR FORCE BASE SITE
ROME, NEW YORK

Prepared for:

Air Force Center for Engineering and the Environment
Building 770
428 Phoenix Drive
Rome, New York 13441

Contract Number XXXXXX-XX-X-XXXX/Delivery Order XXX

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LIST OF ACRONYMS AND ABBREVIATIONS

AFB	Air Force Base
AFCEE	Air Force Center for Engineering and the Environment
AFRL/RRS	Air Force Research Laboratory/Rome Research Site
AFRPA	Air Force Real Property Agency
ARARs	Applicable or Relevant and Appropriate Requirements
ATSDR	Agency for Toxic Substance and Disease Registry
AOC	Area of Concern
BCT	BRAC Cleanup Team
bgs	Below Ground Surface
BRAC	Base Realignment and Closure Act
COC	Contaminant of Concern
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CGI	Combustible Gas Indicator
Conti	Conti Environmental, Inc.
CY	Cubic Yards
DCE	dichloroethene
DDE	1,1-dichloro-2,2-bis(chlorophenyl)ethylene
DFAS	Defense Finance and Accounting Service
DOC	dissolved organic carbon
DOD	United States Department of Defense
DP	Drainage Pit
EA	EA Engineering
E&E	Ecology and Environment, Inc.
EE/CA	Engineering Evaluation/Cost Analysis
EEEPC	Ecology and Environment Engineering, P.C.
EPS	Electrical Power Substation
FFA	Federal Facility Agreement
XXXX	XXXX Remediations Inc.
FS	Feasibility Study
GLDC	Griffiss Local Development Corporation
IC	Institutional Control

IRA	Interim Remedial Action
IRP	Installation Restoration Program
JP-4	jet propulsion fuel grade 4
LAW	Law Engineering and Environmental Services, Inc.
LEL	lower explosive limit
LRA	Local Reuse Agency
LTM	Long-Term Monitoring
LUC	Land-Use Controls
LUR	Land-Use Restrictions
mg/L	milligrams per liter
MSL	Mean Sea Level
MS/MSD	Matrix Spike/Matrix Spike Duplicate
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
NEADS	Northeast Air Defense Sector
NFA	No Further Action
NPL	National Priorities List
NYANG	New York Air National Guard
NYCRR	New York Code of Rules and Regulations
NYS	New York State
NYSBC	New York State Barge Canal
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
O&M	Operations and Maintenance
OCIDA	Oneida County Industrial Development Agency
OP	Optimization Plan
OU	Operable Unit
OWS	Oil/Water Separator
PAH	Polynuclear Aromatic Hydrocarbon
PBR	Performance-Base Remediation
PCB	Polychlorinated Biphenyl
PCE	tetrachloroethene
PEER	PEER Consultants, P.C.

PISCES	Passive In-Situ Chemical Extraction Sampling
PM	Performance Monitoring
POC	point-of-compliance
POP	period of performance
ppm	parts per million
QA	Quality Assurance
QC	Quality Control
RA	Remedial Action
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
RL	reporting limit
ROD	Record of Decision
RRS	Rome Research Site
RSCOs	Recommended Soil Cleanup Objectives
SAC	Strategic Air Command
SAR	Small Arms Range
SCGs	Standards, Criteria, and Guidance Values
SD	Surface Drainage
SDG	Sample Delivery Group
SI	Supplemental Investigation
SMC	Six Mile Creek
SPDES	New York State Pollution Discharge Elimination System
SS	Spill Site
SVI	Soil Vapor Intrusion
SVOC	Semi-Volatile Organic Compound
TAL	Target Analyte List
TAGM	Technical and Administrative Guidance Memorandum
TBC	To Be Considered
TCA	1,1,1-trichloroethane
TCE	Trichloroethylene
TCLP	Toxicity Characteristic Leaching Procedure
TDS	Total Dissolved Solids
TKN	total Kjehldahl nitrogen

TMC	Three Mile Creek
TRPH	Total Recoverable Petroleum Hydrocarbons
UFP-QAPP	Uniform Federal Policy Quality Assurance Project Plan
U.S.	United States
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
VA	Veterans Affairs
VC	vinyl chloride
VOC	Volatile Organic Compound
WSA	Weapons Storage Area

1.0 INTRODUCTION

XXXX Inc. (XXX), in association with XXXX, Inc. (XXXX), has been contracted by the Air Force Center for Engineering and the Environment (AFCEE), to perform Long Term Monitoring (LTM) at Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) sites at the former Griffiss Air Force Base (AFB), New York. The work discussed in this Optimization Plan (OP) will be conducted through contract number FA8903-10-D-8595-0014. The LTM CERCLA sites addressed in this OP include:

- LF001 – Landfill 1 Area of Concern (AOC)
- LF002 – Landfill 2/3 AOC
- LF003 – Landfill 7 AOC
- LF007 – Landfill 5 AOC
- LF009 – Landfill 6 AOC
- SD031 – Three Mile Creek (TMC) AOC
- SD032 – Six Mile Creek (SMC) AOC
- SS060 – Building 35 AOC.

All work conducted at these sites will be performed in accordance with the former Griffiss AFB Uniform Federal Policy Quality Assurance Project Plan (UFP-QAPP) (XXXX, April 2011). Sections 2-9 provide a site description and the proposed LTM activities and outcome for each site.

Additional CERCLA sites at the former Griffiss AFB are assigned to this Performance-Based Remediation (PBR) contract; however, they are Land-use Control (LUC) / Institutional Control (IC) sites. The objectives for these sites include status quo, site closure, or optimization. The sites are listed below based on the appropriate objective.

Status Quo

- ST006 (Building 101)
- SS008 (Building 112)
- SS024 (Fire Demonstration Area)
- FT030 (Fire Protection Training Area)
- SS033 (Coal Storage Yard Area)
- SS044 (Electrical Power Substation)
- SD052 (On-base Groundwater AOCs)
- SS062 (AOC-9).

Site Closure

- DP011 (Building 3 Drywell)
- SS023 (Building 20 AOC)
- ST036 (Building 110)
- ST053 (Building 133).

Optimization (Removal of Groundwater LUC/ICs)

- DP012 (Building 301)

- DP013 (Building 255)
- DP015 (Building 219)
- DP022 (Building 22)
- SS017 (Lot 69)
- SS025 (Building T-9)
- SD050 (Building 214).

The work plans/optimization documents for these sites will be reported separately from this OP.

1.1 Griffiss AFB Operational History

The mission of the former Griffiss AFB varied over the years. The base was activated on February 1, 1942, as Rome Air Depot, with the mission of storage, maintenance, and shipment of material for the United States (U.S.) Army Air Corps. Upon creation of the Air Force in 1947, the depot was renamed Griffiss AFB. The base became an electronics center in 1950, with the transfer of Watson Laboratory Complex (later Rome Air Development Center (1951), Air Force Research Laboratory/Rome Research Site (AFRL/RRS), and then the Information Directorate at Rome Research Site was established with the mission of applied research, development, and testing of electronic air-ground systems). The headquarters of the Ground Electronics Engineering Installations Agency was established in June 1958, to engineer and install ground communication equipment throughout the world. The 49th Fighter Interceptor Squadron served at Griffiss AFB from 1959 until its inactivation in 1987. On July 1, 1970, the 416th Bombardment Wing of the Strategic Air Command (SAC) was activated with the mission of maintenance and implementation of both effective air refueling operations and long-range bombardment capability.

Griffiss AFB was designated for realignment under the Base Realignment and Closure Act (BRAC) in 1993 and 1995, resulting in deactivation of the 416th Bombardment Wing in September 1995. The AFRL/RRS and the Northeast Air Defense Sector (NEADS) have continued to operate at their current locations, and the New York Air National Guard (NYANG) operated the runway for the 10th Mountain Division deployments until October 1998, when they were relocated to Fort Drum, NY. The Defense Finance and Accounting Service (DFAS) have established an operating location at the former Griffiss AFB.

1.2 Environmental Background

As a result of the various national defense missions carried out at the former Griffiss AFB since 1942, hazardous and toxic substances were used, and hazardous wastes were generated, stored, or disposed of at various sites on the installation. The defense missions involved were, among others: the procurement, storage, maintenance, and shipment of war material; research and development; and aircraft operations and maintenance.

Numerous studies and investigations under the U.S. Department of Defense (DOD) Installation Restoration Program (IRP) have been carried out to locate, assess, and quantify the past toxic and hazardous waste storage, disposal, and spill sites. These

investigations included a records search in 1981, interviews with base personnel, a field inspection, compilation of an inventory of wastes, evaluation of disposal practices, and an assessment to determine the nature and extent of site contamination. Additionally, Problem Confirmation and Quantification studies (similar to what is now designated a Site Investigation) were conducted in 1982 and 1985; soil and groundwater analyses in 1986; a base-wide health assessment was conducted in 1988 by the U.S. Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR); base-specific hydrology investigations were also conducted in 1989 and 1990; a groundwater investigation in 1991; and site-specific studies and investigations were conducted between 1989 and 2005. The ATSDR issued a Public Health Assessment for Griffiss AFB dated October 23, 1995, and an addendum, dated September 9, 1996.

Pursuant to Section 105 of CERCLA, Griffiss AFB was included on the NPL on July 15, 1987. On August 21, 1990, the Air Force, the U.S. Environmental Protection Agency (USEPA), and New York State (NYS) Department of Environmental Conservation (NYSDEC) entered into an FFA under Section 120 of CERCLA. On March 20, 2009, 2,897.2 acres were deleted from the NPL.

1.3 Standards Criteria and Guidance and Remedial Action Objectives

SECTION 2.0
LF001 (LANDFILL 1 AOC)

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2.0 LF001 (LANDFILL 1 AOC)

2.1 Site Description

Approximately 22 acres in size, LF001 – Landfill 1 is located in the northern portion of the base. The wastes at Landfill 1 consisted of general refuse, hardfill, and boiler ash that was buried using trench and cover methods. An estimated 90,000-100,000 cubic yards (CY) of wastes were disposed of at the site from 1960-1973. The groundwater flow rate at LF001 is 2,000 feet per year. Groundwater flows to the southwest in the area of Landfill 1.

The Record of Decision (ROD) for LF001 was signed by the USEPA on June 5, 2000. In accordance with the ROD, the landfill was re-graded and capped in 2003. The cap components include a gas venting layer, a low-permeability layer, drainage layer, barrier protection layer, and a topsoil layer. LTM was initiated at LF001 in December 2003, and 5-Year Reviews were conducted in 2005 and 2010. Both 5-Year Reviews indicated that the selected remedy is protective of human health and the environment.

2.2 Current Conditions

Beginning in December 2003, LTM was performed at 11 monitoring wells (MWSAR03, LF1P-2, -3, -5, LF1MW-1R, -5, -6, -10, -11, -12 and -13) and 3 surface water locations (LF1SW-1, -2SMC, and -3). LF1MW-103 was added to the LTM network during the March 2004 sampling round. LF1MW-14 was added to the LTM network during the December 2004 sampling round. These sampling locations are illustrated in the Landfill 1 Sampling Location Figure (Attachment A). The LTM network was analyzed quarterly (routine) and annually (baseline) for NYSDEC Part 360 Parameters and Volatile Organic Compounds (VOCs). Currently, based on several rounds of sampling data, NYSDEC Part 360 Parameters and VOCs are sampled annually. All recommendations to alter the sampling network were provided in previous Landfill AOCs LTM Reports and reviewed by the USEPA and NYSDEC.

Boron, cyanide, mercury, PCBs, pesticides, and phenols were analyzed until 2006 and were then removed from the LTM sampling network due to their low or absent concentrations at the site. VOCs currently detected above the NYS Groundwater/Surface water Standards, Criteria, and Guidance Values (SCGs) include 1,2-dichlorobenzene, 1,3-dichlorobenzene, benzene, and chlorobenzene. These exceedances only occur at monitoring well LF1MW-11 and concentrations are stable and/or decreasing. Landfill leachate indicators previously detected above the NYS Groundwater / Surface water SCGs included ammonia, color, total dissolved solids (TDS), and total Kjehldahl nitrogen (TKN). The landfill leachate indicators detections continue to show stable trends. Metals analysis for this site continues to show levels above NYS SCGs. Metals in exceedance include manganese, iron, sodium, aluminum, chromium, and nickel. Several of the metals (e.g., manganese, iron, sodium) are indicative of base background conditions. All previous sampling data is provided in the Landfill 1 Sampling Results Table in Attachment B.

Landfill gas monitoring is performed at Landfill 1 to identify the presence and concentration of methane at or near the landfill. A total of 20 gas monitoring probes and 31 landfill gas vents were monitored on a quarterly basis from October 2005 until May

2010. Landfill gas sampling was optimized after the spring 2010 sampling round and is now sampled semiannually. Results from the gas sampling events at Landfill 1 continue to show elevated methane concentrations throughout the landfill. However, methane concentrations at point of compliance (POC) gas monitoring probes (LF1GMP-13 through -17) remained at non-detectable concentrations through the fall 2010 sampling round. The absence of methane at the POC gas monitoring probes demonstrates continued protection of potential receptors. In addition, the passive gas trench installed near the northwestern perimeter of Landfill 1 to prevent methane migration into neighboring properties appears to remain an effective treatment.

Since April 2005, landfill inspections and cover maintenance have been performed at Landfill 1. Inspections and maintenance are conducted on a quarterly basis with annual landfill cover mowing (fall). LUC/ICs have been implemented by the ROD and are verified annually as part of the landfill cover inspection program. The fall inspections are performed in conjunction with the Base-wide LUC/IC Site Inspections.

2.3 Regulatory Drivers

LF001 is regulated under the CERCLA of 1980, as amended, and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). Landfill recapping and LTM were/are conducted in accordance with New York State's Solid Waste Management Regulations, 6-NYCRR Part 360. Groundwater and surface water sample results are compared to NYSDEC Class GA Groundwater Standards and NYSDEC Class C Surface Water Standards (NYSDEC, June 1998). Additionally, the site activities are conducted under the supervision and recommendations of USEPA, Region II and NYSDEC.

2.4 Proposed Outcome

The proposed outcome for this site is LTM Optimization.

2.5 Pathways to Achieve Proposed Outcome

2.5.1 Pathway to Proposed Outcome

Groundwater monitoring, surface water monitoring, landfill gas monitoring, and landfill cover maintenance will continue to be performed at LF001. The decision to optimize the monitoring at the site will be guided by the sampling data. VOC exceedances at Landfill 1 are limited to one monitoring well, LF1MW-11. However, there has been a stable and/or decreasing VOC concentration trend at this monitoring well overtime. This monitoring well is located downgradient of the landfill boundary on the opposite side of SMC (Attachment A). No VOC exceedances have occurred at any of the surface water locations since LTM sampling was initiated in December 2003.

The landfill gas monitoring will be optimized from quarterly to semiannual. Previous landfill gas monitoring rounds show that elevated methane concentrations persist throughout the landfill. However, these levels are stable and data from the perimeter monitoring points show that methane is not migrating off the site's boundaries.

The landfill inspections will be optimized from quarterly to semiannually. Spring and fall inspections are proposed at the landfills. The inspections will be conducted in the spring and fall as cover visibility can be impacted by snow cover during the winter and by tall

grasses in the summer. Additional inspections and/or maintenance will be performed as needed; following the guidance established in the January 2005 Landfill 1 Operations and Maintenance (O&M) Manual. Additional inspections and/ or maintenance may be warranted as the result of significant rainfall over a 24-hour period (5-year storm event) or vector disturbance to the landfill cap.

2.5.2 Metric Development: Proposed End Point, Metrics, and Approach

Groundwater/Surface Water Monitoring:

The proposed end point is the optimization of groundwater and surface water monitoring. Groundwater and surface water are anticipated to be monitored annually from 2011-2014. Following this period of performance (POP), the XXXX team anticipates optimizing monitoring to biennial for 2016 and 2018 then every 5 years from 2020-2040. Subject to data confirmation and regulatory concurrence, the LTM schedule for LF001 is provided in Table 1. The LF001 LTM network is provided in Table 2 at the end of the LF001 section.

Period of Performance:

Groundwater and surface water monitoring will be conducted at 13 monitoring wells and three surface water locations for landfill leachate indicators from 2011-2014. Additionally, annual VOC analysis will be performed at seven groundwater monitoring wells and three surface water locations from 2011-2014. The seven monitoring wells proposed for VOC monitoring include LF1MW-5, -6, -10, -11, -12, LF1P-2, and MWSAR03. Alterations to the frequency and duration of the LTM network will be conducted through the analysis of sampling data trends. Proposal to reduce the sampling frequency and/or discontinue the monitoring of a sampling location may be prompted by the indication of a decreasing trend and/or at least two consecutive rounds with contaminant of concern (COC) levels below NYS Groundwater or Surface water SCGs. Proposal to increase the LTM network is detailed in the Contingencies section.

Sampling data from Landfill 1 has shown continued site-wide stabilization of all VOCs and leachate indicators. Figure 1 shows the LF001 VOC concentration trends and Figure 2 shows the LF001 TDS concentration trends (a landfill leachate indicator). VOC analysis will be conducted at the seven monitoring wells and three surface water locations to ensure chemicals of concern are not migrating off-site or into the stream environment. Therefore, the recommended monitoring frequency will provide adequate warning to any potential release of COCs to the environment by the landfill.

The 13 monitoring wells include MWSAR03, LF1P-2, -3, -5, LF1MW-1R, -5, -6, -10, -11, -12, -13, -14, and -103 and the three surface water sampling locations include LF1SW-1, -2SMC, and -3. Low-flow sampling will be performed at all monitoring wells except bedrock monitoring well LF1MW-103 where bailer sampling will be performed. The surface water samples will be collected as grab samples. These sampling methods are described in detail in the Griffiss UFP-QAPP.

Table 1

LF001 LTM Schedule

Period of Performance		
Years	Activity	Performance
2011, 2012, 2013, and 2014	Monitoring	2nd Quarter (June)
	Landfill Inspections, Landfill Gas Monitoring	2nd and 4th Quarters (May and October)
	Reporting	4th Quarter (December)
2015	Landfill Inspections, Landfill Gas Monitoring	2nd and 4th Quarters (May and October)
	Reporting	4th Quarter (December)
	5-Year Review	2nd Quarter (April)
Post Period of Performance		
2020 through 2040	Landfill Inspections, Landfill Gas Monitoring	4th Quarter (October)
	Reporting	4th Quarter (December)
2016, 2018, 2020, 2025, 2030, 2035, and 2040	Monitoring	2nd Quarter (June)
2020, 2025, 2030, 2035, and 2040	5-Year Review	2nd Quarter (April)

Post-Period of Performance:

As a result of the stabilization/decline of contaminants at the site, we anticipate sampling will be optimized to biennial for 2016 and 2018 then every 5 years (2020, 2025, 2030, 2035, and 2040) at the 13 monitoring wells and three surface water sampling locations. Samples will be analyzed for landfill leachate indicators. This sampling will be conducted in conjunction with the 5-Year Review process. Based on stable/declining VOC results, the XXXX team anticipates recommending the discontinuation of VOC analysis from the LTM network.

Landfill Gas Monitoring:

The proposed end point is the optimization of landfill gas monitoring.

Period of Performance:

Twenty gas monitoring probes and 31 gas vents will be monitored semiannually for methane, LEL, oxygen, and carbon dioxide. Previous landfill gas monitoring rounds show that elevated methane concentrations persist throughout the landfill, but these levels are stable. Methane is not detected at any of the POC gas monitoring probes, therefore limiting potential risk of human exposure.

Post- Period of Performance:

As a result of the stable landfill gas results, we anticipate that monitoring will be optimized to annual.

Landfill Cover Inspections and Maintenance:

The proposed end point is the optimization of landfill cover inspections.

Period of Performance:

The current scope of quarterly landfill cover inspections and maintenance will be optimized to semiannual with annual landfill cover mowing. Vegetation growth on the landfill cap shows optimal coverage for erosion control and cover system stabilization. Spring and fall inspections are proposed as the landfills are covered by snow in the winter and by tall grasses in the summer. Additional inspections or maintenance will be performed as needed, as identified in the January 2005 Landfill 1 O&M Manual. An example of additional inspections includes the inspections of the landfill covers following a 5-Year Storm event (6 inches of rainfall within a 24-hour period).

Post- Period of Performance:

The recommended scope of semiannual landfill inspections will be recommended for optimization following the completion of this contract. If supported by the landfill conditions, the optimized frequency will be annual with annual reporting. It is necessary that inspections continue to ensure the integrity of landfill fencing, signage and the landfill cover.

Figure 1

LF001 VOC Concentration Trends

Figure 2

LF001 TDS Concentration Trends

Annual LUC/IC Inspections:

LUC/ICs, as required by the ROD, will be maintained in order to protect human health and the environment until the site is closed in 2040.

The Annual LUC/IC inspections will be conducted to confirm the implementation and performance of the LUC/ICs. All results will be reported annually in the base-wide LUC/IC Site Inspection Report.

5-Year Review:

LF001 will be included in the 2015 5-Year Review to evaluate the protectiveness of the remedy. The site will also be included in the 2020, 2025, 2030, 2035, and 2040 5-Year Reviews.

2.6 Contingencies

Groundwater/Surface Water Monitoring:

Groundwater and surface water monitoring is anticipated to ensure that the landfill is not releasing contamination to the environment. If it is found that the landfill is indeed releasing COCs to the environment, based on an increase in landfill leachate indicator detections and concentrations, a baseline analysis will be conducted. At this site, the baseline analysis will include VOCs, metals, PCBs, and landfill leachate indicators. Additional recommendations will be made using this data.

Landfill Gas Monitoring:

Landfill gas monitoring will be performed to ensure that methane gas does not travel outside the Landfill 1 boundary. If methane gas is detected at any of the perimeter POC wells and suspected of leaving the landfill boundary there will be an increase in frequency of gas sampling events to track upward trends and migration of methane.

Landfill Cover Inspections and Maintenance:

The landfill cover inspections and maintenance will be performed to ensure landfill cover materials, site drainage structures, and onsite monitoring wells are maintained and functioning within the design standards. In the event that the integrity of any of the above mentioned criteria is compromised, inspections and/ or maintenance will be performed immediately to address any damages or flaws at the site. The landfill maintenance requirements are specified in the January 2005 Landfill 1 O&M Manual.

Annual LUC/IC Site Inspections:

The LUC/IC site inspections will be maintained at an annual frequency.

5-Year Review:

The 5-Year Review will be maintained at a 5-year frequency.

Table 2

LF001 AOC LTM Network Summary

Sampling Locations	Screen Interval Depth (ft MSL)[1]	Sampling Rationale	Target Analytes/ EPA Method Numbers[2]	Matrix	# of Samples	Sampling Frequency	Evaluation Criteria
Groundwater		----------	Anions – SW9056 Nitrogen (TKN) – 351.2 Ammonia – 350.1 Chemical Oxygen Demand (COD) – 410.4 Biological Oxygen Demand (BOD) – 405.1 Total Organic Carbon (TOC) - SW9060 Total Dissolved Solids (TDS) – 160.1 Alkalinity – 310.2 Phenols – SW9066 Hardness – 130.2 Color – 110.2 Boron – SW6010B	Water	16[3]	Annually	If downgradient wells do not exhibit exceedances of NYS Groundwater Standards or Base background levels for two successive monitoring events, evaluate monitoring frequency and number of wells. Surface water analytes and frequency will be varied to follow groundwater program.
LF1P-3	494.13' – 489.13'	Downgradient					
LF1P-5	479.91' – 474.94'	Downgradient					
LF1MW-1R	534.46' – 524.46'	Upgradient					
LF1MW-13	495.82' – 485.82'	POC well					
LF1MW-103	32.8' – 22.8'[5]	Bedrock					
LF1MW-14	483.91' – 473.91'	Downgradient					

LF1P-2	495.07' – 490.07'	Downgradient	VOCs – SW8260 Anions – SW9056 Nitrogen (TKN) – 351.2 Ammonia – 350.1 Chemical Oxygen Demand (COD) – 410.4 Biological Oxygen Demand (BOD) – 405.1 Total Organic Carbon (TOC) - SW9060 Total Dissolved Solids (TDS) – 160.1 Alkalinity – 310.2 Phenols – SW9066 Hardness – 130.2 Color – 110.2 Boron – SW6010B				
LF1MW-5	485.26' – 475.26'	Downgradient					
LF1MW-6	492.36' – 482.36'	Downgradient					
LF1MW-10	511.08' – 501.08'	Downgradient					
LF1MW-11	494.25' – 484.25'	Downgradient					
LF1MW-12	483.91' – 473.91'	Downgradient					
MWSAR03	521.28' – 511.28'	Downgradient					
Surface Water (Six Mile Creek)	Depth to groundwater ranged from 0.0 to 27.1 ft bgs.						
LF1SW-1		Potential contaminant receptor					
LF1SW-2SMC		Potential contaminant receptor					
LF1SW-3		Potential contaminant receptor					
Methane All gas monitoring probes and vents	--	In accordance with 6 NYCRR 360-2.17(f)	CGI Methane or %LEL[4]	Gas	20 probes 31 vents	Semiannually	

1 Screen intervals provided for new wells requiring installation are estimated; screen interval depths will be finalized in the field. Assumes the 10-ft screen interval is between 3' above water table and 7' below water table.
2 Baseline parameters based on 6 NYCRR Part 360, Subpart 2, Appendix A.
3 Please refer to FSP for details concerning the number of quality assurance/quality control (QA/QC) samples and their locations. At least one matrix spike/matrix spike duplicate (MS/MSD) and two field duplicates will be collected per sample delivery group (SDG); one equipment blank per day and one ambient blank per day; one trip blank per cooler containing VOCs.
4 Combustible Gas Indicator (CGI); Lower Explosive Limit (LEL).
5 Monitoring well has not been surveyed. The reported value is in ft bgs.

SECTION 3.0
LF002 (LANDFILL 2/3 AOC)

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3.0 LF002 (LANDFILL 2/3 AOC)

3.1 Site Description

LF002, Landfill 2/3, is approximately 13 acres in size and is located in the northern portion of the base. The wastes at Landfill 2/3 consisted of hardfill in the southern portion of Landfill 2, on-board aircraft wastes in the northern portion of Landfill 2 and approximately 1 ton of wetted and double-bagged asbestos wastes in Landfill 3, located in the eastern portion of Landfill 2. The groundwater flow rate at LF002 is 222 feet per year. Groundwater flow is very gradual to the southwest in the area of Landfill 2/3.

The ROD for LF002 was signed by the USEPA on June 5, 2000. In accordance with the ROD, the landfill was re-graded and capped in summer 2003. The cap components include a gas venting layer, a low-permeability layer, drainage layer, barrier protection layer, and a topsoil layer. LTM was initiated at LF002 in December 2003, and 5-Year Reviews were conducted in 2005 and 2010. Both 5-Year Reviews indicated that the selected remedy is protective of human health and the environment.

3.2 Current Conditions

Beginning in December 2003, LTM was performed at six monitoring wells (LF2MW2-1, LF2MW-4, -12, -13, -14, and -100) and three surface water locations (LF2SW-1, -2, and -3). These sampling locations are illustrated in the Landfill 2/3 Sampling Location Figure (see Attachment A). The LTM network was analyzed quarterly (routine) and annually (baseline) for NYSDEC Part 360 Parameters and VOCs. Currently, based on several rounds of sampling data metals and landfill leachate indicators are sampled annually. All recommendations to alter the sampling network were provided in previous Landfill AOCs LTM Reports and reviewed by the USEPA and NYSDEC.

VOCs, cyanide, mercury and phenols were analyzed until 2006 and then removed from the LTM sampling network due to their low or absent concentrations at the site. Landfill leachate indicators previously detected above the NYS Groundwater/Surface water SCGs included ammonia, chloride, bromide, color, TDS, and TKN and nitrate. The landfill leachate indicators detections continue to show stable trends. TDS at LF002 is historically detected near or below the NYS Groundwater Standard of 500 milligram/liter (mg/L) at all monitoring wells with the exception of LF2MW-100 (bedrock well). The TDS has historically been detected above 2,000 mg/L (Figure 3 in section 3.5.2). The TDS is higher at this well due to the sampling method (bailing) producing a greater amount of suspended solids in the sample. All exceedances are within one order of magnitude of the TDS standard.

Metals analysis for this site continues to show levels above NYS Groundwater SCGs. Metals in exceedance include barium, chromium, manganese, iron, sodium, aluminum, chromium, and nickel. Several of the metals (e.g., manganese, iron, and sodium) are indicative of base background conditions. All previous sampling data is provided in the Landfill 2/3 Sampling Results Table in Attachment B.

Landfill gas monitoring has been performed at Landfill 2/3 to identify the presence and concentration of methane at or near the landfill. A total of nine gas monitoring probes and 14 landfill gas vents were monitored on a quarterly basis from October 2005 until May

2010. Landfill gas sampling was optimized after the spring 2010 sampling round and is now sampled semiannually. Results from the gas sampling events at Landfill 2/3 continue to show site-wide stabilization of methane concentrations.

Since April 2005, landfill inspections and cover maintenance have been performed at Landfill 2/3. Inspections and maintenance are conducted on a quarterly basis with annual landfill cover mowing (fall). LUC/ICs have been implemented by the ROD and are verified quarterly as part of the landfill cover inspection program. The fall inspections are performed in conjunction with the Base-wide LUC/IC Site Inspections.

3.3 Regulatory Drivers

LF002 is regulated under the CERCLA of 1980, as amended, and the NCP. Landfill recapping and LTM were/are conducted in accordance with New York State's Solid Waste Management Regulations, 6-NYCRR Part 360. Groundwater and surface water sample results are compared to NYSDEC Class GA Groundwater Standards and NYSDEC Class C Surface Water Standards (NYSDEC, June 1998). Additionally, the site activities are conducted under the supervision and recommendations of the USEPA, Region II and NYSDEC.

3.4 Proposed Outcome

The proposed outcome for this site is LTM Optimization.

3.5 Pathways to Achieve Proposed Outcome

3.5.1 Pathway to Proposed Outcome

Groundwater monitoring, surface water monitoring, landfill gas monitoring, and landfill cover maintenance will continue to be performed at LF002. The decision to optimize the monitoring at the site will be guided by the sampling data. Currently, no plumes or COCs are associated with the site as shown in the 8 years of LTM sampling data.

In addition, no VOC exceedances have occurred at any of the surface water locations since LTM sampling was initiated in December 2003.

The landfill inspections will be optimized from quarterly to semiannually. Spring and fall inspections are proposed at the landfills. The inspections will be conducted in the spring and fall as cover visibility is impacted by snow cover during the winter and by tall grasses in the summer. Additional inspections and/or maintenance will be performed as needed; following the guidance established in the January 2005 Landfill 2/3 O&M Manual. Additional inspections and/ or maintenance may be warranted as the result of significant rainfall over a 24-hour period or vector disturbance to the landfill cap.

3.5.2 Metric Development: Proposed End Point, Metrics, and Approach

Groundwater/Surface Water Monitoring:

The proposed end point at this site is the optimization of groundwater and surface water monitoring. Groundwater and surface water are anticipated to be monitored biennially in 2011, 2013, and 2015 and then every 5 years from 2020-2040. Subject to data

confirmation and regulatory concurrence, the projected LTM schedule for LF002 is provided in Table 3.

Table 3

LF002 LTM Schedule

Period of Performance		
Years	Activity	Performance
2011, 2013, and 2015	Groundwater and Surface Water Monitoring	2nd Quarter (June)
	Landfill Inspections, Landfill Gas Monitoring	2nd and 4th Quarters (May and October)
	Reporting	4th Quarter (December)
2012 and 2014	Landfill Inspections, Landfill Gas Monitoring	2nd and 4th Quarters (May and October)
	Reporting	4th Quarter (December)
2015	5-Year Review	2nd Quarter (April)
Post Period of Performance		
2020 through 2040	Landfill Inspections, Landfill Gas Monitoring	4th Quarter (October)
	Reporting	4th Quarter (December)
2020, 2025, 2030, 2035, and 2040	5-Year Review	2nd Quarter (April)
	Groundwater and Surface Water Monitoring	2nd Quarter (June)

Period of Performance:

Groundwater and surface water monitoring will be conducted at six monitoring wells and three surface water locations for landfill leachate indicators. Since the landfill does not have an associated COC plume, the analysis of landfill leachate indicators will provide any detection of potential contamination from the landfill entering the environment. Alterations to the frequency and duration of the LTM network will be conducted through the analysis of sampling data trends. Proposal to reduce the sampling frequency and/or discontinue the monitoring of a sampling location may be prompted by the indication of a decreasing trend and/or at least two consecutive rounds with COC levels below NYS Groundwater or Surface water SCGs. Proposal to increase the LTM network is detailed in the Contingencies section.

The sampling will be conducted biennially at all monitoring wells and surface water locations. Given the low groundwater velocity, the recommended monitoring frequency will provide adequate warning to any potential release of COCs to the environment by the landfill. As mentioned above, the groundwater flow velocity at this landfill is 222 feet per year. It will take groundwater approximately 4 years to migrate from upgradient of the landfill to the Landfill 2/3 toe. Additionally, sampling data from Landfill 2/3 has shown continued site-wide stabilization of all leachate indicators. Therefore, the recommended monitoring frequency will provide adequate warning to any potential release of COCs to

the environment by the landfill. Figure 3 shows the LF002 TDS concentrations trends (a landfill leachate indicator).

The six monitoring wells include LF2MW2-1, LF2MW-4, -12, -13, -14, and -100 and the three surface water sampling locations include LF2SW-1, -2, and -3. Low-flow sampling will be performed at all monitoring wells except bedrock monitoring well LF2MW-100 where bailer sampling will be performed. The surface water samples will be collected as grab samples. These sampling methods are described in detail in the Griffiss UFP QAPP. The LF002 LTM network is provided in Table 4 at the end of this plan.

Post-Period of Performance:

As a result of the absence of a contamination plume or COCs and the velocity of groundwater at the site, we anticipate sampling will be optimized to every 5 years (2020, 2025, 2030, 2035, and 2040) at the six monitoring wells and three surface water sampling locations. Samples will be analyzed for landfill leachate indicators. This sampling will be conducted in conjunction with the 5-Year Review process.

Landfill Gas Monitoring:

The proposed end point is the optimization of landfill gas monitoring.

Period of Performance:

Nine gas monitoring probes and 14 gas vents are monitored semiannually for methane, LEL, oxygen, and carbon dioxide. Previous landfill gas monitoring rounds show that elevated methane concentrations persist throughout the landfill, but these levels are stable. Methane is not detected at any of the POC gas monitoring probes, therefore limiting potential risk of human exposure.

Post-Period of Performance:

As a result of the stable landfill gas results, we anticipate that monitoring will be optimized to annual.

Figure 3

LF002 TDS Concentration Trends

Landfill Cover Inspections and Maintenance:

The proposed end point is the optimization of landfill cover inspections.

Period of Performance:

The current scope of quarterly landfill cover inspections and maintenance will be optimized to semiannual with annual landfill cover mowing. Previous quarterly inspections have not identified any major deficiencies that would jeopardize the integrity of the cover. The inspections indicated that vegetation growth on the landfill cap shows optimal coverage for erosion control and cover system stabilization. Spring and fall inspections are proposed as the landfills are covered by snow in the winter and by tall grasses in the summer. Additional inspections or maintenance will be performed as needed, as identified in the January 2005 Landfill 2/3 O&M Manual. An example of additional inspections includes the inspections of the landfill covers following a 5-Year Storm event (6 inches of rainfall within a 24-hour period).

Post-Period of Performance:

The scope of semiannual landfill inspections will be recommended for optimization following the completion of this contract. If supported by landfill conditions, the optimized frequency will be annual with annual reporting. It is necessary that inspections continue to ensure the integrity of landfill fencing, signage, and the landfill cover.

Annual LUC/IC Inspections:

LUC/ICs, as required by the ROD, will be maintained in order to protect human health and the environment.

The Annual LUC/IC inspections will be conducted to confirm the implementation and performance of the LUC/ICs. All results will be reported annually in the base-wide LUC/IC Site Inspection Report.

5-Year Review:

LF002 will be included in the 2015 5-Year Review to evaluate the protectiveness of the remedy. The site will also be included in 5-Year Review from 2020-2040.

3.6 Contingencies

Groundwater/Surface Water Monitoring:

Groundwater and surface water monitoring is anticipated to ensure that the landfill is not releasing contamination to the environment. If it is found that the landfill is indeed releasing COCs to the environment, based on an increase in landfill leachate indicator detections and concentrations, a baseline analysis will be conducted. At this site, the baseline analysis will include VOCs, metals, PCBs, and landfill leachate indicators. Additional recommendations will be made using this data.

Landfill Gas Monitoring:

Landfill gas monitoring will be performed to ensure that methane gas does not travel outside the Landfill 2/3 boundary. If methane gas is detected at any of the perimeter POC wells and suspected of leaving the landfill boundary there will be an increase in frequency of gas sampling events to track upward trends and migration of methane.

Landfill Cover Inspections and Maintenance:

The landfill cover inspections and maintenance will be performed to ensure landfill cover materials, site drainage structures, and onsite monitoring wells are maintained and functioning within the design standards. In the event that the integrity of any of the above mentioned criteria are compromised, inspections and/or maintenance will be performed immediately to address any damages or flaws at the site. The landfill maintenance requirements are specified in the January 2005 Landfill 2/3 O&M Manual.

Annual LUC/IC Site Inspections:

The LUC/IC site inspections will be maintained at an annual frequency.

5-Year Review:

The 5-Year Review will be maintained at a 5-Year frequency.

Table 4

LF002 AOC LTM Network Summary

Sampling Locations	Screen Interval Depth (ft MSL)	Sampling Rationale	Target Analytes/ Method Numbers[1]	Matrix	# of Samples[2]	Sampling Frequency	Evaluation Criteria
Groundwater LF2MW2-1 LF2MW-4 LF2MW-12 LF2MW-13 LF2MW-14 LF2MW-100 **Surface Water[3]** LF2SW-1 LF2SW-2 LF2SW-3	 516.28' – 506.28' 526.17' – 516.19' 521.5'– 511.5' 519.98' – 509.98' 531.35' – 521.35' 475.2'– 465.2' Depth to groundwater ranged from 3.12 to 29.79 ft bgs.	---------- Downgradient from potential source Downgradient from potential source Downgradient from potential source Downgradient from potential source Upgradient from potential source Downgradient from potential source Potential contaminant receptor Potential contaminant receptor Potential contaminant receptor	<u>Landfill Leachate Indicators:</u> Anions – SW9056 Nitrogen (TKN) – 351.2 Ammonia – 350.1 COD – 410.4 BOD – 405.1 TOC – SW9060 TDS – 160.1 Alkalinity – 310.2 Phenols – SW9066 Hardness – 130.2 Color – 110.2 Boron – SW6010B	Water	9	Annually	If downgradient wells do not exhibit exceedances of NYS Groundwater Standards or Base background levels for two successive monitoring events, evaluate monitoring frequency and number of wells.
Gas Sampling[4] Gas monitoring probes/vents		In accordance with 6 NYCRR 360-2.17(f)	Methane (FID/CGI)[5]	Gas	9 probes 14 vents	Semiannual	

[1] Baseline parameters based on 6 NYCRR Part 360, Subpart 2, Appendix A.
[2] Please refer to FSP for details concerning the number of QA/QC samples and their locations. At least one MS/MSD and two field duplicates will be collected per SDG; one equipment blank per day and one ambient blank per day; one trip blank per cooler containing VOCs.
[3] Subject to leachate seepage and/or surface water ponding.
[4] Gas monitoring probe sampling for VOCs and gas vent sampling for methane and VOCs are planned for the initial sampling round only. Additional sampling may be conducted pending an evaluation of the initial results.
[5] Flame ionization detector (FID).

SECTION 4.0
LF003 (LANDFILL 7 AOC)

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4.0 LF003 (LANDFILL 7 AOC)

4.1 Site Description

LF003, Landfill 7, is approximately 11 acres in size and is located northeast of Runway 15/33. The wastes at Landfill 7 consisted of domestic refuse, solid waste, liquid wastes, petroleum products, and miscellaneous Base operations waste (such as airplane parts), which were placed into four trenches in the landfill area and subsequently burned. Landfill 7 was active from 1950-1954. The groundwater flow rate at LF003 is 445 feet per year. Groundwater flow at Landfill 7 is in a general south-southwest direction.

The ROD for LF003 was signed by the USEPA on June 6, 2000. In accordance with the ROD, the landfill was re-graded and capped in 2002. The cap components include a low-permeability layer, drainage layer, barrier protection layer, and a topsoil layer. LTM was initiated in February 2003, and 5-Year Reviews were conducted in 2005 and 2010. Both 5-Year Reviews indicated that the selected remedy is protective of human health and the environment.

4.2 Current Conditions

Beginning in February 2003, LTM was performed at eight monitoring wells (LF7W-22, -23, -26, -27, -28, -29, -30, and -100) and two wetland surface water locations (LF7WL-3 and -4). These sampling locations are illustrated in the Landfill 7 Sampling Location Figure (see Attachment A). The LTM network was analyzed quarterly (routine) and annually (baseline) for NYSDEC Part 360 Parameters and VOCs. Currently, based on several rounds of sampling data, only metals are analyzed on an annual basis. All recommendations to alter the sampling network were provided in previous Landfill AOCs LTM Reports and reviewed by the USEPA and NYSDEC.

VOCs, mercury, PCBs and all leachate indicators were removed from the Landfill 7 LTM network analysis list in spring 2006, due to their low or absent concentrations at the site. Landfill leachate indicators previously detected above the NYS Groundwater / Surface water SCGs included color, TDS, and TKN. The landfill leachate indicators detections showed stable trends before the analysis was removed from the LTM network in 2006. Metals analysis for this site continues to show levels above NYS Groundwater SCGs. Metals in exceedance include magnesium, manganese, iron, sodium, aluminum, chromium, and nickel. Several of the metals, including manganese, iron, and sodium are indicative of base background conditions. All previous sampling data is provided in the Landfill 7 Sampling Results Table in Attachment B.

Since September 2003, landfill inspections and cover maintenance have been performed at Landfill 7. Inspections and maintenance are conducted on a quarterly basis with annual landfill cover mowing (fall). LUC/ICs have been implemented by the ROD and are verified quarterly as part of the landfill cover inspection program. The fall inspections are performed in conjunction with the Base-wide LUC/IC Site Inspections.

4.3 Regulatory Drivers

LF003 is regulated under the CERCLA of 1980, as amended, and the NCP. Landfill recapping and LTM were/are conducted in accordance with New York State's Solid

Waste Management Regulations, 6-NYCRR Part 360. Groundwater and surface water sample results are compared to NYSDEC Class GA Groundwater Standards and NYSDEC Class C Surface Water Standards (NYSDEC, June 1998). Additionally, the site activities are conducted under the supervision and recommendations of the USEPA, Region II and NYSDEC.

4.4 Proposed Outcome

The proposed outcome for this site is LTM Optimization.

4.5 Pathways to Achieve Proposed Outcome

4.5.1 Pathway to Proposed Outcome

Groundwater monitoring, surface water monitoring and landfill cover maintenance will continue to be performed at LF003. The decision to optimize the monitoring at the site will be guided by the sampling data. Currently, no plumes or COCs are associated with the site as shown in the 7 years of LTM sampling data.

The landfill inspections will be optimized from quarterly to semiannually. Spring and fall inspections are proposed at the landfills. The inspections will be conducted in the spring and fall as cover visibility is impacted by snow cover during the winter and by tall grasses in the summer. Additional inspections and/or maintenance will be performed as needed; following the guidance established in the September 2003 Landfill 7 O&M Manual. Additional inspections and/ or maintenance may be warranted as the result of significant rainfall over a 24-hour period or vector disturbance to the landfill cap.

4.5.2 Metric Development: Proposed End Point, Metrics, and Approach

Groundwater/Surface Water Monitoring:

The proposed end point at this site is the optimization of groundwater and surface water monitoring. Groundwater and surface water are anticipated to be monitored biennially for leachate indicators in 2011, 2013, and 2015. Following the 2015 event, the sampling frequency will be optimized to every 5 years from 2020 to 2040. The LTM schedule for LF003 is provided in Table 5. The LF003 LTM network is provided in Table 6 at the end of this plan.

Period of Performance:

Groundwater and surface water monitoring will be conducted at eight monitoring wells and two wetland surface water locations for landfill leachate indicators. Since the landfill does not have an associated COC plume, the analysis of landfill leachate indicators will provide any detection of potential contamination from the landfill entering the environment. Alterations to the frequency and duration of the LTM network will be conducted through the analysis of sampling data trends. Proposal to reduce the sampling frequency and/or discontinue the monitoring of a sampling location may be prompted by the indication of a decreasing trend and/or at least two consecutive rounds with COC levels below NYS Groundwater or Surface water SCGs. The proposal to increase the LTM network is detailed in the Contingencies section.

Table 5

LF003 LTM Schedule

Period of Performance		
Years	Activity	Performance
2011, 2013, and 2015	Groundwater and Surface Water Monitoring	2nd Quarter (June)
	Landfill Inspections	2nd and 4th Quarters (May and October)
	Reporting	4th Quarter (December)
2012 and 2014	Landfill Inspections	2nd and 4th Quarters (May and October)
	Reporting	4th Quarter (December)
2015	5-Year Review	2nd Quarter (April)
Post Period of Performance		
2020 through 2040	Landfill Inspections, Landfill Gas Monitoring	4th Quarter (October)
	Reporting	4th Quarter (December)
2020, 2025, 2030, 2035, and 2040	5-Year Review	2nd Quarter (April)
	Groundwater and Surface Water Monitoring	2nd Quarter (June)

The sampling will be conducted biennially, starting in the June 2011, at all monitoring wells and surface water locations. Given the absence of COCs, sampling will be conducted biennially for landfill leachate indicators. The recommended monitoring frequency will provide adequate warning to any potential release of COCs to the environment by the landfill.

The eight monitoring wells include LF7W-22, -23, -26, -27, -28, -29, -30, and -100 and the two wetland surface water sampling locations include LF7WL-3 and -4. Low-flow sampling will be performed at all monitoring wells except bedrock monitoring well LF7MW-100 where bailer sampling will be used. The surface water samples will be collected as grab samples. These sampling methods are described in detail in the Griffiss UFP-QAPP.

Post-Period of Performance:

As a result of the absence of a contamination plume or COCs and the velocity of groundwater at the site, we anticipate sampling will be optimized to every 5 years (2020, 2025, 2030, 2035, and 2040) at the eight monitoring wells and two wetland surface water sampling locations. Samples will be analyzed for metals and landfill leachate indicators. This sampling will be conducted in conjunction with the 5-Year Review process.

Landfill Cover Inspections and Maintenance:

The proposed end point at this site for landfill cover maintenance is semiannual.

Period of Performance:

The current scope of quarterly landfill cover inspections and maintenance will be reduced to semiannual with annual landfill cover mowing. Previous quarterly inspections have not identified any major deficiencies that would jeopardize the integrity of the cover. The inspections indicated that vegetation growth on the landfill cap shows optimal coverage for erosion control and cover system stabilization. Spring and fall inspections are proposed as the landfills are covered by snow in the winter and by tall grasses in the summer. Additional inspections or maintenance will be performed as needed, as identified in the September 2003 Landfill 7 O&M Manual. An example of additional inspections includes the inspections of the landfill covers following a 5-Year Storm event (6 inches of rainfall within a 24-hour period).

Post-Period of Performance:

The scope of semiannual landfill inspections will be recommended for optimization following the completion of this contract. If supported by the landfill conditions, the desired inspection frequency will be annual with annual reporting. It is necessary that inspections continue to ensure the integrity of landfill fencing, signage and the landfill cover.

Annual LUC/IC Inspections:

LUC/ICs, as required by the ROD, will be maintained in order to protect human health and the environment until the site is closed in 2040.

The Annual LUC/IC inspections will be conducted to confirm the implementation and performance of the LUC/ICs. All results will be reported annually in the base-wide LUC/IC Site Inspection Report.

5-Year Review:

LF003 will be included in the 2015 5-Year Review to evaluate the protectiveness of the remedy. The site will also be included in the 2020, 2025, 2030, 2035, and 2040 5-Year Reviews.

4.6 Contingencies

Groundwater/Surface Water Monitoring:

Groundwater and surface water monitoring is anticipated to ensure that the landfill is not releasing contamination to the environment. If it is found that the landfill is indeed releasing COCs to the environment, based on an increase in landfill leachate indicator detections and concentrations, a baseline analysis will be conducted. At this site, the baseline analysis will include VOCs, metals, PCBs, and landfill leachate indicators. Additional recommendations will be made using this data.

Landfill Cover Inspections and Maintenance:

The landfill cover inspections and maintenance will be performed to ensure landfill cover materials, site drainage structures, and on-site monitoring wells are maintained and functioning within the design standards. In the event that the integrity of any of the above mentioned criteria are compromised, inspections and/ or maintenance will be performed immediately to address any damages or flaws at the site. The landfill maintenance requirements are specified in the September 2003 Landfill 7 O&M Manual.

Annual LUC/IC Site Inspections:

The LUC/IC site inspections will be maintained at an annual frequency.

5-Year Review:

The 5-Year Review will be maintained at a 5-year frequency.

Table 6

LF003 AOC LTM Network Summary

Sampling Locations	Screen Interval Depth (ft MSL)	Sampling Rationale	Target Analytes/ Method Numbers[1]	Matrix	# of Samples[2]	Sampling Frequency	Evaluation Criteria
Groundwater		----------	Landfill Leachate Indicators:	Water	10	Annually	If downgradient wells do not exhibit exceedances of NYS Groundwater Standards or Base background levels for two successive monitoring events, evaluate monitoring frequency and number of wells.
LF7MW-22	479.12' – 474.19'	Downgradient from source, within plume	Anions – SW9056				
			Nitrogen (TKN) – 351.2				
LF7MW-23	482.03' – 472.01'	Downgradient from source, cross-gradient from plume	Ammonia – 350.2				
			COD – 410.4				
LF7MW-26	495.53' – 485.53'	Downgradient from source, within plume	BOD – 405.1				
			TOC – SW9060				
LF7MW-27	500.91' – 490.91'	Downgradient from source	TDS – 160.1				
LF7MW-28	484.31' – 474.31'	POC well	Alkalinity – 310.1				
LF7MW-29	514.56' – 504.56'	Upgradient from source	Phenols – SW9066				
LF7MW-30	494.67' – 484.67'	Downgradient from source	Hardness – 130.2				
LF7MW-100	470.57' – 460.57'	Downgradient from source, within plume, Bedrock well	Color – 110.2				
			Boron – SW6010B				
	----------	----------					
Surface Water	Depth to groundwater ranged from less than 1 ft to 17.71 ft bgs.						
LF7WL-3		Potential contaminant receptor					
LF7WL-4		Potential contaminant receptor					

1 Baseline parameters based on 6 NYCRR Part 360, Subpart 2, Appendix A.
2 Please refer to FSP for details concerning the number of QA/QC samples and their locations. At least one MS/MSD and two field duplicates will be collected per SDG; one equipment blank per day and one ambient blank per day; one trip blank per cooler containing VOCs.

SECTION 5.0
LF007 (LANDFILL 5 AOC)

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5.0 LF007 (LANDFILL 5 AOC)

5.1 Site Description

LF007, Landfill 5, is approximately 4 acres in size and is located in the south-central portion of the base. The waste at Landfill 5 consisted of domestic wastes, reportedly having been burned and then buried. Approximately 18,000 CY of wastes were disposed of at the site from 1950-1960. During the Remedial Investigation (RI), groundwater flow rates were found to be 114 feet per year. Principal groundwater flow directions at Landfill 5 are to the west in the area bordering the northern part of the landfill and to the southwest in the central and southern parts of the landfill.

The ROD for LF007 was signed by the USEPA on June 5, 2000. In accordance with the ROD, the landfill was re-graded and capped in 2002. The cap components include a low-permeability layer, drainage layer, barrier protection layer, and a topsoil layer. LTM was initiated in February 2003, and 5-Year Reviews were conducted in 2005 and 2010. Both 5-Year Reviews indicated that the selected remedy is protective of human health and the environment.

5.2 Current Conditions

Beginning in February 2003, LTM was performed at five monitoring wells (LF5MW-1A, -3, -5, -100R, and MW49D07) and three surface water locations (LF5SW-1, -2, and -3). These sampling locations are illustrated in the Landfill 5 Sampling Location Figure (see Attachment A). The LTM network was analyzed quarterly (routine) and annually (baseline) for NYSDEC Part 360 Parameters and VOCs. Currently, based on several rounds of sampling data, only metals are analyzed on an annual basis. All recommendations to alter the sampling network were provided in previous Landfill AOCs LTM Reports and reviewed by the USEPA and NYSDEC.

VOCs were analyzed until 2006, no exceedances were reported. PCBs were analyzed until 2006 at all sampling locations and until 2008 at LF5MW-100R (bedrock well). PCBs were only detected in LF5MW-100R. In 2005 and 2006, the PCB detections were above the NYS Groundwater Standards, Criteria, or Guidance values (SCGs). No PCBs were detected at this location in 2007 and 2008. Landfill leachate indicators previously detected above the NYS Groundwater / Surface water SCGs included ammonia, bromide, chloride, color, nitrate, sulfate, TDS, and TKN. The landfill leachate indicators detections showed stable trends before the analysis was removed from the LTM network in 2006. Metals analysis for this site continues to show levels above NYS Groundwater SCGs. Metals in exceedance include manganese, iron, sodium, aluminum, chromium, and nickel. Several of the metals (e.g., manganese, iron, and sodium) are indicative of base background conditions. All previous sampling data is provided in the Landfill 5 Sampling Results Table in Attachment B.

Since September 2003, landfill inspections and cover maintenance have been performed at Landfill 5. Inspections and maintenance are conducted on a quarterly basis with annual landfill cover mowing (fall). LUC/ICs have been implemented by the ROD and are verified quarterly as part of the landfill cover inspection program. The fall inspections are performed in conjunction with the Base-wide LUC/IC Site Inspections.

5.3 Regulatory Drivers

LF007 is regulated under the CERCLA of 1980, as amended, and the NCP. Landfill recapping and LTM were/are conducted in accordance with New York State's Solid Waste Management Regulations, 6-NYCRR Part 360. Groundwater and surface water sample results are compared to NYSDEC Class GA Groundwater Standards and NYSDEC Class C Surface Water Standards (NYSDEC, June 1998). Additionally, the site activities are conducted under the supervision and recommendations of the USEPA, Region II and NYSDEC. Additionally, the site activities are conducted under the supervision and recommendations of the USEPA, Region II and NYSDEC.

5.4 Proposed Outcome

The proposed outcome for this site is Optimized Exit Strategy.

5.5 Pathways to Achieve Proposed Outcome

5.5.1 Pathway to Proposed Outcome

Groundwater monitoring, surface water monitoring and landfill cover maintenance will continue to be performed at LF007. The decision to optimize the monitoring at the site will be guided by the sampling data. Currently, no plumes or COCs are associated with the site as shown in the seven years of LTM sampling data.

The landfill inspections will be optimized from quarterly to semiannually. Spring and fall inspections are proposed at the landfills. The inspections will be conducted in the spring and fall as cover visibility is impacted by snow cover during the winter and by tall grasses in the summer. Additional inspections and/or maintenance will be performed as needed; following the guidance established in the September 2003 Landfill 5 O&M Manual. Additional inspections and/ or maintenance may be warranted as the result of significant rainfall over a 24-hour period or vector disturbance to the landfill cap.

5.5.2 Metric Development: Proposed End Point, Metrics, and Approach

Groundwater/Surface Water Monitoring:

The proposed end point at this site is the optimization of groundwater and surface water monitoring. Groundwater and surface water are anticipated to be monitored biennially in 2011, 2013, and 2015, and every 5 years from 2019 to 2039. The LTM schedule for LF007 is provided in Table 7 and the LF003 LTM network is provided in Table 8.

Period of Performance:

Groundwater and surface water monitoring will be conducted at five monitoring wells and three surface water locations for landfill leachate indicators. Since the landfill does not have an associated COC plume, the analysis of landfill leachate indicators will provide any detection of potential contamination from the landfill entering the environment. Alterations to the frequency and duration of the LTM network will be conducted through the analysis of sampling data trends. Proposal to reduce the sampling frequency and/or discontinue the monitoring of a sampling location may be prompted by the indication of a decreasing trend and/or at least two consecutive rounds with COC

levels below NYS Groundwater or Surface water SCGs. Proposal to increase the LTM network is detailed in the Contingencies section.

Table 7

LF007 LTM Schedule

Period of Performance		
Years	Activity	Performance
2011, 2013, 2015	Groundwater and Surface water Monitoring	2nd Quarter (June)
	Landfill Inspections	2nd and 4th Quarters (May and October)
	Reporting	4th Quarter (December)
2012 and 2014	Landfill Inspections	2nd and 4th Quarters (May and October)
	Reporting	4th Quarter (December)
2015	5-Year Review	2nd Quarter (April)
Post Period of Performance		
2016, 2017, and 2018	Landfill Inspections	4th Quarter (October)
	Reporting	4th Quarter (December)
2019, 2024, 2029, 2034, and 2039	Groundwater and Surface water Monitoring	2nd Quarter (June)
	Landfill Inspections	4th Quarter (October)
	Reporting	4th Quarter (December)
2020, 2025, 2030, 2035, and 2040	5-Year Review	2nd Quarter (April)

The sampling will be conducted biennially, starting in the June 2011, at all monitoring wells and surface water locations. Given the low velocity of the groundwater flow at the site and absence of COCs, sampling will be conducted biennially for landfill leachate indicators. As mentioned above, the groundwater flow velocity at this landfill is 114 feet per year. It will take groundwater 2.5 years to migrate from upgradient of the landfill to the wetland area located at the Landfill 5 southern toe. Therefore, the recommended monitoring frequency will provide adequate warning to any potential release of COCs to the environment by the landfill.

The five monitoring wells include LF5MW-1A, -3, -5, -100R, and MW49D07 and the three surface water sampling locations include LF5SW-1, -2, and -3. Low-flow sampling will be performed at LF5MW-3, and -5, while bailer sampling will be performed at LF5MW-1A, -100R, and MW49D07. The surface water samples will be collected as grab samples. These sampling methods are described in detail in the Griffiss UFP QAPP.

Post-Period of Performance:

As a result of the absence of a contamination plume or COCs and the velocity of groundwater at the site, we anticipate sampling will be optimized to every 5 years (2019,

2024, 2029, 2034, and 2039) at the five monitoring wells and three surface water sampling locations. Samples will be analyzed for landfill leachate indicators. This sampling will be conducted in conjunction with the 5-Year Review process.

Landfill Cover Inspections and Maintenance:

The proposed end point at this site for landfill cover maintenance is semiannual.

Period of Performance:

The current scope of quarterly landfill cover inspections and maintenance will be optimized to semiannual with annual landfill cover mowing. Previous quarterly inspections have not identified any major deficiencies that would jeopardize the integrity of the cover. The inspections indicated that vegetation growth on the landfill cap shows optimal coverage for erosion control and cover system stabilization. Spring and fall inspections are proposed as the landfills are covered by snow in the winter and by tall grasses in the summer. Additional inspections or maintenance will be performed as needed, as identified in the September 2003 Landfill 5 O&M Manual. An example of additional inspections includes the inspections of the landfill covers following a 5-Year Storm event (6 inches of rainfall within a 24-hour period).

Post-Period of Performance:

The scope of semiannual landfill inspections will be recommended for optimization following the completion of this contract. It is necessary that inspections continue to ensure the integrity of landfill fencing, signage and the landfill cover.

Annual LUC/IC Inspections:

LUC/ICs, as required by the ROD, will be maintained in order to protect human health and the environment until the site is closed in 2040.

The Annual LUC/IC inspections will be conducted to confirm the implementation and performance of the LUC/ICs. All results will be reported annually in the base-wide LUC/IC Site Inspection Report.

5-Year Review:

LF007 will be included in the 2015 5-Year Review to evaluate the protectiveness of the remedy. The site will also be included in the 2020, 2025, 2030, 2035, and 2040 5-Year Reviews.

5.6 Contingencies

Groundwater/Surface Water Monitoring:

Groundwater and surface water monitoring is anticipated to ensure that the landfill is not releasing contamination to the environment. If it is found that the landfill is indeed releasing COCs to the environment, based on an increase in landfill leachate indicator detections and concentrations, a baseline analysis will be conducted. At this site, the

baseline analysis will include VOCs, metals, PCBs, and landfill leachate indicators. Additional recommendations will be made using this data.

Landfill Cover Inspections and Maintenance:

The landfill cover inspections and maintenance will be performed to ensure landfill cover materials, site drainage structures, and onsite monitoring wells are maintained and functioning within the design standards. In the event that the integrity of any of the above mentioned criteria are compromised, inspections and/or maintenance will be performed immediately to address any damages or flaws at the site. The landfill maintenance requirements are specified in the September 2003 Landfill 5 O&M Manual.

Annual LUC/IC Site Inspections:

The LUC/IC site inspections will not be optimized.

5-Year Review:

The 5-Year Review will not be optimized.

Table 8

LF003 AOC LTM Network Summary

Sampling Locations	Screen Interval Depth (ft MSL)	Sampling Rationale	Target Analytes/ Method Numbers[1]	Matrix	# of Samples[2]	Sampling Frequency	Evaluation Criteria
Groundwater		----------	Landfill Leachate Indicators:	Water	8	Annually	If downgradient wells do not exhibit exceedances of NYS Groundwater Standards or Base background levels for two successive monitoring events, evaluate monitoring frequency and number of wells.
LF5MW-3	459.25' – 449.25'	Downgradient of potential source and between landfill and hardfill	Anions – SW9056 Nitrogen (TKN) – 351.2 Ammonia – 350.2 COD – 410.4 BOD – 405.1 TOC – SW9060 TDS – 160.1 Alkalinity – 310.1 Phenols – SW9066 Hardness – 130.2 Color – 110.2 Boron – SW6010B				
MW49D07	455.51' – 445.51'	Downgradient from potential source					
LF5MW-5	459.49' – 449.49'	Downgradient from potential source					
LF5MW-100	405.92' – 395.92'	Bedrock, downgradient					
LF5MW-1A	465.6' – 455.6'	Upgradient from potential					
Leachate Samples		None encountered					
	----------	----------					
Surface Water	Depth to groundwater ranged from 4.90 to 21.80 ft bgs.						
LF5SW-1		Potential contaminant receptor					
LF5SW-2		Potential contaminant receptor					
LF5SW-3		Potential contaminant receptor					

SECTION 6.0
LF009 (LANDFILL 6 AOC)

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6.0 LF009 (LANDFILL 6 AOC)

6.1 Site Description

LF009, Landfill 6, is approximately 15.7 acres in size and is located near the southern boundary of the base. The wastes at Landfill 6 consisted of general refuse and hardfill that was buried and some of which was burned at the site. An estimated 38,000-62,000 CY of wastes were disposed at the site from 1955-1959. During the 1980s, although the landfill was no longer active, an unknown quantity of fuel-contaminated soil from the tank excavations at Tank Farms 1 and 3 was disposed of in the southern portion of Landfill 6. In 1986, a clay cap was constructed over the fuel-contaminated soils area. The groundwater flow rate at LF009 is 37 feet per year. Groundwater flows south-southwest toward TMC at Landfill 6.

The ROD for LF009 was signed by the USEPA on June 7, 2001. In accordance with the ROD, the landfill was re-graded and capped in 2004. The cap components include a gas venting layer, a low-permeability layer, drainage layer, barrier protection layer, and a topsoil layer. A portion of the fill material used at Landfill 6 consisted of soil/debris from various on-base projects, including: approximately 52,600 cubic yards (CY) of material from the TMC restoration project, approximately 3,000 CY of cobbles from the Apron 1 biopile remediation project and approximately 2 CY of soil from the Rainbow Creek remediation project. LTM was initiated in June 2006 and Five-Year Reviews were conducted in 2005 and 2010. Both 5-Year Reviews indicated that the selected remedy is protective of human health and the environment.

6.2 Current Conditions

Beginning in June 2006, LTM was performed at 19 monitoring wells (775VMW-10, -18R, -20R, LF6MW-1, -12, LF6VMW-10R2, -17D, -17S, -18, -19, -20, -21, -22, -23, -24, -25, -26, TMCMW-9 and TMC-USGS-2), three surface water locations (LF6SW-1, -2, -3), and one wetland sampling location (LF6W-1). As recommended by the NYSDEC, landfill leachate sampling locations LF6LH-1 and -2 were added to the LF6 LTM network in December 2006. These sampling locations are illustrated in the Landfill 6 Sampling Location Figure (see Attachment A). The LTM network was analyzed quarterly (routine) and annually (baseline) for NYSDEC Part 360 Parameters and VOCs. Currently, based on several rounds of sampling data NYSDEC Part 360 Parameters and VOCs are sampled semiannually. All recommendations to alter the sampling network were provided in previous Landfill AOCs LTM Reports and reviewed by the USEPA and NYSDEC.

VOCs currently detected above the NYS Groundwater/ Surface water SCGs include TCE and cis-1,2 dichloroethene. Exceedances occur at monitoring wells 775VMW-10, LF6MW-12, and LF6VMW-26. Landfill leachate indicators previously detected above the NYS Groundwater / Surface water SCGs included chloride, color, TDS, and TKN. The landfill leachate indicators detections continue to show stable trends. Metals analysis for this site continues to show levels above NYS Groundwater SCGs. Metals in exceedance include manganese, magnesium, iron, sodium, aluminum, chromium, and nickel. Several of the metals (e.g., manganese, iron, sodium) are indicative of base

background conditions. All previous sampling data is provided in the Landfill 6 Sampling Results Table in Attachment B.

Landfill gas monitoring has been performed at Landfill 6 to identify the presence and concentration of methane at or near the landfill. A total of 13 gas monitoring probes and 16 landfill gas vents were monitored on a quarterly basis from October 2005 until October 2009. Landfill gas sampling was optimized after the October 2009 sampling round and is now sampled semiannually. Results from the gas sampling events at Landfill 6 showed elevated methane concentrations throughout the landfill, but these levels have declined. Methane has not been detected on Landfill 6 since the fall 2009 gas monitoring round.

Since July 2006, landfill inspections and cover maintenance have been performed at Landfill 6. Inspections and maintenance are conducted on a quarterly basis with annual landfill cover mowing (fall). Land-use Controls/Institutional Controls (LUC/ICs) have been implemented by the ROD and are verified quarterly as part of the landfill cover inspection program. The fall inspections are performed in conjunction with the Base-wide LUC/IC Site Inspections.

6.3 Regulatory Drivers

LF009 is regulated under the CERCLA of 1980, as amended, and the NCP. Landfill recapping and LTM were/are conducted in accordance with New York State's Solid Waste Management Regulations, 6-NYCRR Part 360. Groundwater and surface water sample results are compared to NYSDEC Class GA Groundwater Standards and NYSDEC Class C Surface Water Standards (NYSDEC, June 1998). Additionally, the site activities are conducted under the supervision and recommendations of the USEPA, Region II and NYSDEC. Additionally, the site activities are conducted under the supervision and recommendations of the USEPA, Region II and NYSDEC.

6.4 Proposed Outcome

The proposed outcome for this site is LTM Optimization.

6.5 Pathways to Achieve Proposed Outcome

6.5.1 Pathway to Proposed Outcome

Groundwater monitoring, surface water monitoring and landfill cover maintenance will continue to be performed at LF009. The decision to optimize the monitoring at the site will be guided by the sampling data. VOC exceedances at Landfill 6 are limited to three monitoring wells 775VMW-10, LF6MW-12, and LF6VMW-26. These wells have showed sustained exceedances. There has been a stable and/or decreasing VOC concentration trend at monitoring wells 775VMW-10, LF6MW-12, and LF6VMW-26. In addition, no VOC exceedances have occurred at any of the three surface water locations since LTM sampling was initiated in June 2006.

The landfill gas monitoring will be optimized from quarterly to semiannual. Previous landfill gas monitoring rounds show that elevated methane concentrations were detected throughout the landfill but these levels have declined.

The landfill inspections will be optimized from quarterly to semiannually. Spring and fall inspections are proposed at the landfills. The inspections will be conducted in the spring and fall as cover visibility is impacted by snow cover during the winter and by tall grasses in the summer. Additional inspections and/or maintenance will be performed as needed; following the guidance established in the December 2006 Landfill 6 O&M Manual. Additional inspections and/ or maintenance may be warranted as the result of significant rainfall over a 24-hour period or vector disturbance to the landfill cap.

6.5.2 Metric Development: Proposed End Point, Metrics, and Approach

The proposed end point at this site is the optimization of groundwater and surface water monitoring. Groundwater and surface water are anticipated to be monitored annually in 2011, 2012, and 2013, every two years from 2014-2018 and every 5 years from 2020-2040. Subject to data confirmation and regulatory concurrence, the projected LTM schedule for LF009 is provided in Table 9. The LF009 LTM network is provided in Table 10 at the end of the LF009 section.

Table 9

LF009 LTM Schedule

Period of Performance		
Years	Activity	Performance
2011, 2012, 2013, and 2014	Groundwater and Surface water Monitoring	2nd Quarter (June)
	Landfill Inspections, Landfill Gas Monitoring	2nd and 4th Quarters (May and October)
	Reporting	4th Quarter (December)
2015	Landfill Inspections	2nd and 4th Quarters (May and October)
	Reporting	4th Quarter (December)
	5-Year Review	2nd Quarter (April)
Post Period of Performance		
2016 through 2040	Landfill Inspections, Landfill Gas Monitoring	4th Quarter (October)
	Reporting	4th Quarter (December)
2016, 2018, 2020, 2025, 2030, 2035, and 2040	Groundwater and Surface water Monitoring	2nd Quarter (June)
2020, 2025, 2030, 2035, and 2040	5-Year Review	2nd Quarter (April)

Period of Performance:

Groundwater and surface water monitoring will be conducted annually at 19 monitoring wells and three surface water locations, one wetland location and two leachate locations for landfill leachate indicators. Additionally, annual VOC analysis will be performed at monitoring wells 775VMW-10, LF6VMW-12, -23, -24, -25, -26, and TMCMW-9, surface water locations LF6SW-1, -2, -3, wetland sample LF6W-1. Alterations to the

frequency and duration of the LTM network will be conducted through the analysis of sampling data trends. Proposal to reduce the sampling frequency and/or discontinue the monitoring of a sampling location may be prompted by the indication of a decreasing trend and/or at least two consecutive rounds with COC levels below NYS Groundwater or Surface water SCGs. Proposal to increase the LTM network is detailed in the Contingencies section.

Starting in 2014, sampling will be conducted biennially at all monitoring wells and surface water locations for landfill leachate indicators. Given the low groundwater velocity, the recommended monitoring frequency will provide adequate warning to any potential release of COCs to the environment by the landfill. As mentioned above, the groundwater flow velocity at this landfill is 37 feet per year. It will take groundwater approximately 10 years to migrate from upgradient of the landfill to the Landfill 6 toe. Additionally, sampling data from Landfill 6 has shown continued site-wide stabilization of all leachate indicators. Figure 4 shows the LF009 (TDS) concentrations trends (a landfill leachate indicator) for downgradient monitoring wells. Therefore, the recommended monitoring frequency will provide adequate warning to any potential release of COCs to the environment by the landfill.

Additionally, the XXXX team anticipates removing VOC analysis from the LF009 LTM following the 2014 sampling event. All exceedances reported during the LF009 LTM sampling are associated with Landfill 6 Chlorinated plume (SD052). The Landfill 6 Chlorinated Plume is part of the SD052 On-Base Groundwater Contamination program and is sampled semiannually.The 19 monitoring wells include 775VMW-10, -18R, -20R, LF6MW-1, -12, LF6VMW-10R2, -17D, -17S, -18, -19, -20, -21, -22, -23, -24, -25, -26, TMCMW-9 and TMC-USGS-2, the three surface water sampling locations include LF6SW-1, -2, and -3, two leachate sampling locations LF6LH-1 and -2, and wetland sample LF6W-1. Low-flow sampling will be performed at all monitoring wells except bedrock monitoring well LF1MW-103 where bailer sampling will be performed. The surface water samples and wetland sample will be collected as grab samples. These sampling methods are described in detail in the Griffiss UFP-QAPP.

Post-Period of Performance:

As a result of the stabilization/decline of contaminants at the site, we anticipate sampling will be optimized to biennial for 2016 and 2018 then every 5 years (2020, 2025, 2030, 2035, and 2040) at the 19 monitoring wells, three surface water sampling locations, and one wetland location. Samples will be analyzed for landfill leachate indicators. This sampling will be conducted in conjunction with the 5-Year Review process.

Landfill Gas Monitoring:

The proposed end point is the optimization of landfill gas monitoring.

Figure 4

LF009 TDS Concentration Trends

Period of Performance:

Thirteen gas monitoring probes and 16 gas vents are monitored semiannually for methane, LEL, oxygen, and carbon dioxide. Previous landfill gas monitoring rounds show that elevated methane concentrations persist throughout the landfill, but these levels are stable. Methane is not detected at any of the POC gas monitoring probes, therefore limiting potential risk of human exposure.

Post-Period of Performance:

As a result of the stable landfill gas results, it is anticipated that monitoring will be optimized to annual.

Landfill Cover Inspections and Maintenance:

The proposed end point at this site for landfill cover maintenance is semiannual.

Period of Performance:

The current scope of quarterly landfill cover inspections and maintenance will be reduced to semiannual with annual landfill cover mowing. Previous quarterly inspections have not identified any major deficiencies that would jeopardize the integrity of the cover. The inspections indicated that vegetation growth on the landfill cap shows optimal coverage for erosion control and cover system stabilization. Spring and fall inspections are proposed as the landfills are covered by snow in the winter and by tall grasses in the summer. Additional inspections or maintenance will be performed as needed, as identified in the December 2006 Landfill 6 O&M Manual. An example of additional inspections includes the inspections of the landfill covers following a 5-Year Storm event (6 inches of rainfall within a 24-hour period).

Post-Period of Performance:

The scope of semiannual landfill inspections will be recommended for optimization following the completion of this contract. If supported by landfill conditions, the desired inspection frequency will be annual with annual reporting. It is necessary that inspections continue to ensure the integrity of landfill fencing, signage and the landfill cover.

Annual LUC/IC Inspections:

LUC/ICs, as required by the ROD, will be maintained in order to protect human health and the environment until the site is closed in 2040.

The Annual LUC/IC inspections will be conducted to confirm the implementation and performance of the LUC/ICs. All results will be reported annually in the base-wide LUC/IC Site Inspection Report.

5-Year Review:

LF009 will be included in the 2015 5-Year Review to evaluate the protectiveness of the remedy. The site will also be included in the 2020, 2025, 2030, 2035, and 2040 5-Year Reviews.

6.6 Contingencies

Groundwater/Surface Water Monitoring:

Groundwater and surface water monitoring is anticipated to ensure that the landfill is not releasing contamination to the environment. If it is found that the landfill is indeed releasing COCs to the environment, based on an increase in landfill leachate indicator detections and concentrations, a baseline analysis will be conducted. At this site, the baseline analysis will include VOCs, metals, PCBs, and landfill leachate indicators. Additional recommendations will be made using these data.

Landfill Gas Monitoring:

Landfill gas monitoring will be performed to ensure that methane gas does not travel outside the Landfill 6 boundary. If methane gas is detected at any of the perimeter POC wells and suspected of leaving the landfill boundary there will be an increase in frequency of gas sampling events to track upward trends and migration of methane.

Landfill Cover Inspections and Maintenance:

The landfill cover inspections and maintenance will be performed to ensure landfill cover materials, site drainage structures, and on-site monitoring wells are maintained and functioning within the design standards. In the event that the integrity of any of the above mentioned criteria are compromised, inspections and/ or maintenance will be performed immediately to address any damages or flaws at the site. The landfill maintenance requirements are specified in the December 2006 Landfill 6 O&M Manual.

Annual LUC/IC Site Inspections:

The LUC/IC site inspections will be maintained at an annual frequency.

5-Year Review:

The 5-Year Review will be maintained at a 5-Year frequency.

Table 10

LF009 AOC LTM Network Summary

Sampling Locations	Screen Interval Depth (ft MSL)	Sampling Rationale	Target Analytes/ Method Numbers[1]	Matrix	# of Samples	Sampling Frequency	Evaluation Criteria
Groundwater		----------	Landfill Leachate Indicators:	Water	23[4]	Annually	If downgradient wells do not exhibit exceedances of NYS Groundwater Standards or Base background levels for two successive monitoring events, evaluate monitoring frequency and number of wells.
LF6MW-1	460.8' – 450.8'	Upgradient well	Anions – SW9056				
TMC-USGS-2	428.6' – 426.1'	Downgradient from landfill	Nitrogen (TKN) – 351.2				
775VMW-18R	423.7' – 413.7'	Upgradient well	Ammonia – 350.2				
775VMW-20R	413.9' – 403.9'	Upgradient well	COD – 410.4				
LF6VMW-10R2	439.2' – 429.2'	Downgradient from landfill	BOD – 405.1				
LF6VMW-17S[2]	457.18' – 447.18'	Downgradient, vertical profile	TOC – SW9060				
LF6VMW-17D[2]	422.1' – 412.1'	Downgradient, vertical profile	TDS – 160.1				
LF6VMW-18[3]	411.88' – 421.88'	Downgradient, vertical profile	Alkalinity – 310.1				
LF6VMW-19[3]	438.95' – 428.95'	Downgradient, vertical profile	Phenols – SW9066				
LF6VMW-20[3]	398.26' – 388.26'	Downgradient, vertical profile	Hardness – 130.2				
LF6VMW-21[3]	434.93' – 424.93'	Upgradient well	Color – 110.2				
LF6VMW-22[3]	435.76' – 425.76'	Downgradient, vertical profile	Boron – SW6010B				
Leachate Locations							
LF6LH-1		Leachate locations					
LF6LH-2							

Table 10 (cont'd):

LF009 AOC LTM Network Summary

Sampling Locations	Screen Interval Depth (ft MSL)	Sampling Rationale	Target Analytes/ Method Numbers[1]	Matrix	# of Samples	Sampling Frequency	Evaluation Criteria
Groundwater 775VMW-10 LF6MW-12 LF6VMW-23[2] LF6VMW-24[2] LF6VMW-25[2] LF6VMW-26[3] TMCMW-9 **Surface Water (TMC)** LF6/TMCSW-1 LF6/TMCSW-2 LF6/TMCSW-3 **Wetlands** LF6W-1	427.1' – 412.1' 416.59' – 406.59' 424.57' – 414.57' 419.25' – 409.25' 416.6' – 406.6' 412.9' – 402.9' 439.16' – 429.16'	Upgradient well Downgradient from landfill Downgradient, vertical profile Downgradient, vertical profile Downgradient, vertical profile Downgradient from landfill Downgradient from landfill ---------- Potential contaminant receptor Potential contaminant receptor Potential contaminant receptor Potential contaminant receptor	VOCs – SW8260 Landfill Leachate Indicators: Anions – SW9056 Nitrogen (TKN) – 351.2 Ammonia – 350.2 COD – 410.4 BOD – 405.1 TOC – SW9060 TDS – 160.1 Alkalinity – 310.1 Phenols – SW9066 Hardness – 130.2 Color – 110.2 Boron – SW6010B	Water	23[4]	Annually	If downgradient wells do not exhibit exceedances of NYS Groundwater Standards or Base background levels for two successive monitoring events, evaluate monitoring frequency and number of wells. Surface water analytes and frequency will be varied to follow groundwater program.
Gas Sampling[4] Gas monitoring probes/vents		In accordance with 6 NYCRR 360-2.17(f)	Methane (FID/CGI)[5]	Gas	13 probes 16 vents	Semiannual	

1 Baseline parameters based on 6 NYCRR Part 360, Subpart 2, Appendix A.
2 New monitoring well requiring installation to establish a more appropriate screen interval.
3 Indicates new monitoring well requiring installation.
4 Please refer to FSP for details concerning the number of QA/QC samples and their locations. At least one MS/MSD and two field duplicates will be collected per SDG; one equipment blank per day and one ambient blank per day; one trip blank per cooler containing VOCs.

SECTION 7.0
SD031 (THREE MILE CREEK AOC)

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7.0 SD031 (THREE MILE CREEK AOC)

7.1 Site Description

The TMC AOC is located in a forested area in the southern part of the former Griffiss AFB. It is bordered by the Electrical Power Substation (EPS) to the northwest, Landfills 4, 5, and 6 to the northeast, and the former Skyline Housing development to the southwest. The TMC AOC is a creek with an approximate length of 10,000 feet, a width of 10 feet and a depth ranging from 2 inches at its origination to 2 feet at the furthest downstream area near the New York State Barge Canal. The creek originates at two storm water culvert outlets located at Ellsworth Road and Wright Drive (near the EPS). Two additional smaller culverts that drain the area surrounding the EPS enter the creek slightly downstream from the two larger culverts. The creek receives both surface water runoff and groundwater from the surrounding watershed. Drainage is received from Landfills 4, 5, and 6, the Electric Power Substation and the south central part of the Base. TMC flows in a southeasterly direction and eventually flows into the NYS Barge Canal (about one mile south of the Base).

The ROD for the TMC AOC was issued by the Air Force in December 2003 and signed by the USEPA in March 2004. In addition, 5-Year Reviews were conducted in 2005 and 2010. Both 5-Year Reviews indicated that the selected remedy is protective of human health and the environment.

7.2 Three Mile Creek AOC Conditions

7.2.1 Previous Investigations

Preliminary studies of TMC were performed in 1981, 1987, and 1988. Soil, sediment, surface water, groundwater, and fish tissue samples were collected. Numerous metals, PAHs, PCBs, and pesticides were detected in the streambed sediments and the fish tissue was contaminated with PCBs, some PAHs, and metals. The results of these studies led to the performance of an RI from 1993-1995.

The RI was performed to characterize the nature and extent of environmental contamination at the TMC AOC to determine whether remedial action was necessary to eliminate potential threats to human health and the environment from exposures that might arise under existing or expected future site conditions. The RI included an aquatic survey, surface water sampling, sediment sampling, and fish tissue sampling. The aquatic survey was used to evaluate creek habitat, water quality, benthic and drift macroinvertebrate communities, and fish populations within four 100-meter segments of the on-base part of the creek (one near the EPS, one near Landfill 5, one near the Thor Street residential area, and one further downstream just inside the base boundary). At approximately the same locations, sediment samples were collected for toxicity testing and fish samples were collected for pesticides, PCBs, and metals analyses. Results from the sediment toxicity tests performed as part of the aquatic survey indicated that chemicals were not present at levels acutely toxic to aquatic life. A slight impairment of benthic macroinvertebrate populations was noted at the locations near Landfill 5 and near the base boundary. The fish population assessment indicated that fish communities were in poor to fair condition which could be due to site contaminants and, in part, to the lack of quality habitat. The results of the fish tissue analysis indicated the presence of PCBs,

pesticides, and mercury at levels exceeding NYSDEC ecological risk guidelines for protection of piscivorous wildlife.

Surface water samples were collected from 12 locations along TMC and analyzed for VOCs, SVOCs, PCBs, pesticides, metals, glycols, radionuclides and water quality parameters. One VOC, 15 Semi-VOCs (SVOCs), four pesticides, and seven metals were detected at concentrations above the most stringent criteria for surface water. Sediment samples were collected at two depths below the surface water/sediment interface (0.5 feet and 1.0 foot) from 15 locations, including the 12 locations along TMC and three locations along the drainage ditch near Landfill 5. The samples were analyzed for VOCs, SVOCs, pesticides, herbicides, PCBs, dioxins, metals, and radionuclides. Three VOCs, 22 SVOCs, 18 pesticides, dioxin, and ten metals were detected at concentrations above the most stringent criteria for sediment.

In 1995, NYSDEC performed passive in situ concentration/extraction sampling (PISCES) at one location in TMC to test for PCBs and other organochlorines. PCBs and 1,1-dichloro-2,2-bis(chlorophenyl)ethylene (DDE) were detected. Naturally occurring conditions such as below average rainfall and low flow in the stream may have affected the ability of PISCES to detect contaminants.

In 1997, for a separate investigation of PCB contamination associated with Landfill 5, sediment samples were collected at two depth intervals (0-0.5 feet and 1-1.5 feet) from seven locations in the Landfill 5 tributary to TMC. PCBs were detected at concentrations above the most stringent criteria.

In June 1997, as part of a basewide SI, three PISCES samples and two surface water samples were collected from TMC for pesticide and PCB analysis. Pesticides were detected in two of the PISCES samples. No contaminants were detected in the surface water.

In July 1998, additional SI samples were taken from the off-base portion of TMC to fill data gaps that had been identified in the RI sampling. These included two surface water samples and eight sediment samples. Four metals were detected in surface water samples above the most stringent criteria. Concentrations of 18 SVOCs, DDD, PCB (Aroclor 1260), and five metals detected in sediment were above the most stringent criteria.

A visual inspection of the habitat quality of TMC was conducted in 1999, by the Air Force, United States Army Corps of Engineers (USACE), NYSDEC, USEPA, and US Fish and Wildlife Service to gain a better understanding of creek conditions and the impact of potential remedial actions. In the same year, for the TMC Feasibility Study (FS), sediment samples were collected from six locations in TMC pond (located off-base between NYS Routes 365 and 49) and analyzed for PCBs, cadmium, and lead. In 2001, the same six locations in the pond were vertically profiled to depths of 3.5 feet below creek bottom to determine the vertical extent of sediment contamination and the appropriate depth for sediment remediation. Twelve additional samples were collected, two samples per location. PCBs, cadmium, and lead were all detected at concentrations exceeding the most stringent criteria.

The 2001 FS investigation also included sampling along the on-base portion of the TMC channel and the Landfill 5 tributary in order to define the vertical and lateral extent of contamination to better determine the potential breadth and depth of sediment remediation in those areas. Samples of sediment and native soil (beneath sediment) were collected at selected locations from depth intervals of up to 3.5 feet. Five VOCs, 24 SVOCs, 15 pesticides, two PCBs, dioxins, and 10 metals were detected at concentrations exceeding the most stringent criteria. While many of the same chemicals were also detected in the native soil samples, the concentrations were not as great, and fewer exceeded the most stringent criteria.

7.2.1 Record of Decision

The ROD for the TMC AOC was issued by the Air Force in December 2003 and signed by the USEPA in March 2004. Based on the previous investigations and environmental conditions at the site the selected remedy for the creek is selected excavation of contaminated sediments and LTM. The excavation included the entire length of the on-base portion of the creek, discrete and localized off-base portions of the creek, and the TMC pond. The contamination was identified to be considerably lower in the off-base portion of the creek. Therefore, excavation of the entire off-base portion was not required. For LTM, the ROD states surface water, sediment, and fish tissue samples will be analyzed in accordance with the TMC AOC LTM program following creek bed remediation and restoration.

7.2.2 Three Mile Creek AOC Remedial Action

XXXX performed a Remedial Action (RA) at TMC from summer 2004 to summer 2005. For the remedial action, excavation of contaminated sediments was conducted in the on-base and off-base portions of TMC. The TMC pond along with sixteen soil deposits was excavated to a depth of 3.5 feet below ground surface (bgs) in the off-base portion of TMC. Approximately 5,940 CY of sediment was excavated from the off-base portion of TMC. The main channel, the north channel, and the Landfill 5 tributary were excavated in the on-base portion of TMC. The design depths for the excavation ranged from 2.5 feet bgs to 4 feet bgs and approximately 29,427 CY were excavated. XXXX collected two soil samples on June 29, 2005, from the TMC pond backfill, which were analyzed for VOCs, SVOCs, PCBs, pesticides, and metals. The results indicated VOCs and metals detections, none of which exceeded the Most Stringent Ecological Screening Values.

The excavated area of the creek was restored and consisted of sediment backfill, the construction of several meanders throughout the length of the creek, and the distribution of logs across the banks of the main channel to provide wildlife habitat areas and create five vernal pools and a mitigation wetland (5 acres) within the TMC floodplain.

7.2.3 Three Mile Creek AOC Long Term Monitoring

LTM at the TMC AOC consists of annual surface water and sediment sampling at sampling locations TMC-1 through -8 and fish tissue sampling and a benthic qualitative assessment performed every three years at sampling locations TMC-1 through -5. The sampling locations are illustrated in the SD031 sampling locations figure in Attachment A. Fish tissue sampling and benthic qualitative assessment is not performed at TMC-6 through -8 as these sites are upgradient potential source locations. LTM at the AOC was

initiated in fall 2006. Surface water sampling, sediment sampling, fish tissue sampling and a benthic qualitative assessment was performed in accordance with the Final LTM work plan requirements (XXXX, October 2004). Annual LTM sampling was also performed in fall 2007, fall 2008, fall 2009, and fall 2010. Only surface water and sediment samples were collected in the fall 2007, fall 2008, and fall 2010 sampling rounds. Fish tissue sampling and a benthic qualitative assessment were also performed in fall 2009 in addition to surface water and sediment sampling.

Surface water and sediment samples were analyzed for VOCs, SVOCs, metals, pesticides, and PCBs. Fish tissue samples were analyzed for cadmium, mercury, pesticides, and PCBs.

The following sections summarize the LTM sampling data.

7.2.3.1 Surface Water

VOC detections were reported in surface water samples during the 2006, 2007, 2008, and 2009 sampling events (not analyzed during the 2010 sampling event). None of these detections exceeded NYS Surface Water Standards. SVOC and metals concentrations exceeding NYS Surface Water Standards were reported during all sampling events. During data analysis, the SVOC and metals detections were determined to be indicative of basewide background conditions (identified during the RI) (reported at several sites throughout the base) or were detected within one order of magnitude of the surface water standard. Only one sampling location showed PCB or pesticide exceedances during the TMC AOC LTM sampling events. Location TMC-7 reported one PCB (Aroclor 1260) and one pesticide (dieldrin) exceedance during the fall 2007 and fall 2008 sampling events. The exceedances may be attributed to suspended solids in the sample.

All latest LTM surface water sampling results from 2010 were compared to the previous LTM surface water results and the 1993/94 RI (if applicable). Surface water results for SVOCs and pesticides are lower in concentration and in number of detected COCs than the four previous LTM rounds. Two SVOCs that were detected above NYSDEC Surface water Standards are associated with the B data qualifier. This qualifier indicates that the analyst was also detected in the associated blank. TMC-7 which showed the most SVOC exceedances during the Fall 2009 sampling round could not be sampled in 2010 due to a lack of water. TMC-6 showed the highest number of SVOC exceedances during this round which is an increase from the Fall 2009 round. This may be attributed to suspended solids or spatial variability. One pesticide, gamma-chlordane, exceedance was also detected in one surface water sampling location (TMC-6) and may be attributed to the sample containing suspended solids. No pesticides have ever been detected at this location. Additionally, it should be noted that pesticides containing these COCs are no longer used at the former Griffiss AFB.

7.2.3.2 Sediment

VOCs have not been detected at any location in all three LTM sampling rounds above the most stringent ecological screening value. SVOC and metals concentrations were detected above the most stringent ecological screening value. The SVOC and metals exceedances reported in the sampling round are indicative of basewide background conditions (identified during the RI) or were detected within one order of magnitude of

the most stringent ecological screening value. Pesticide exceedances were reported at all sampling locations. Total pesticide concentrations show a decreasing trend when the 1994 RI and LTM sampling results are compared. PCB (Aroclor 1260) has been detected at concentrations above the most stringent ecological screening value of 5 µg/kg during all sampling rounds. Exceedances show a decreasing trend at applicable sampling locations (TMC-1, -2, -3, -6, -7, and -8) when the 1994 RI sampling round and LTM sampling rounds were compared. The PCB detections reported at the site during the LTM sediment sampling are provided in Table 1. The sediment sampling results are provided in Attachment B.

In 2010, PCB (Aroclor 1260) exceedances were reported for sampling locations TMC-1 (144 µg/kg), -2 (71.7 µg/kg), -3 (234 µg/kg), -4 (339 µg/kg), -5 (604 J µg/kg), and -7 (28.3 µg/kg). The most stringent ecological screening value for Aroclor 1260 is 5 µg/kg. The highest PCB (Aroclor 1260) concentration during the fall 2010 sampling round was reported at TMC-5 (604 J µg/kg). Sampling location TMC-5 is located downgradient of the creek that does not require remediation. Therefore, the higher concentrations may be attributed to contamination migration from the upgradient locations not part of the RA. Figure 1 shows the PCB concentrations detected in all of the sampling rounds at each sampling location. PCB concentration trend charts are also provided in Figure 5 for each sampling location with PCB detections.

Arochlor 1260 was detected at a maximum concentration of 7,500 µg/kg (TMC-7) in the 1993/4 RI and declined to a maximum concentration of 603 J µg/kg (TMC-5) in the fall 2010 sampling round. The maximum detection was 304 µg/kg (TMC-4) in the fall 2009 sampling round, 433 µg/kg (TMC-4) in the fall 2008 round, 116 µg/kg (TMC-5) in the fall 2007 round, and 570 µg/kg (TMC-4) in the fall 2006 round. The COC variations are likely due to spatial variability. However, the general trend is declining from the 1993/4 RI to the fall 2010 results by an order of magnitude. The PCB concentrations are provided in Table 11.

Given the data trends from the RI and LTM data, the RA was effective in removing a majority of the PCB contamination in the TMC sediments.

7.2.3.3 Fish Tissue

Pesticide, PCB, and metals detections were reported in fish tissue samples at all of the sampling locations (TMC-1, -2, -3, -4, and -5). All locations had at least one fish sample with a PCB or pesticide concentration above the NYSDEC piscivorous wildlife criteria. At sampling locations 1, 4, and 5, PCB concentrations were detected above the NYSDOH Fish Advisory Guidelines (locations 1, 4, and 5 also showed elevated PCB exceedances in the sediment samples). The TMC AOC 2004/2005 RA was not required along the entire length of the creek. It is likely that the fish sampled lived in the stretch of the creek that does not require remediation because TMC is dammed near the Barge Canal making it impossible for new fish to migrate into the creek.

In the on-base portion of the creek that required remediation, LTM fish tissue sampling data has shown a decrease in PCB levels compared to the RI results at locations TMC-1, -2, and -3. These three locations are similar to sampling locations sampled during the RI (TMCFS-1, -2, and -3). Detected PCBs concentrations ranged from 0.028-32.5 ppm

during the RI. In the 2006 sampling event, total detected PCB concentrations ranged from 0.25-2.89 ppm and from 0.58-4.3 ppm in the 2009 sampling event.

It should also be noted that the number and size of fish collected during the 2006 and 2009 sampling events show an increasing trend compared to the RI results. During the RI, a total of 456 fish were collected from these three locations ranging in length from 33-179 millimeters (mm). In the 2006 sampling event, 319 fish were collected from these locations ranging from 45-225 mm and 759 fish were collected at these three locations ranging from 47-251 mm in the 2009 sampling event. The small decrease in number of fish collected from the RI to the 2006 sampling event may be a result of the 2004/2005 RA displacing fish in this section of the creek.

Additional fish tissue samples will be required to identify any trends. The PCB detections reported at the site during the LTM fish tissue sampling are provided in Table 12.Table 11

PCB (Aroclor 1260) Detections (µg/kg) in Sediment Samples

Sampling Location	Sampling Round					
	RI Results (1994)	2006	2007	2008	2009	2010
TMC-1	NA	66.5	U	51.2	146	144
TMC-2	6,600	28.5 F	16.7	13.2 F	84	71.7
TMC-3	3,400	U	38.1	3.76 F	47.5	234
TMC-4	NA	570	67.1	433	304	339
TMC-5	NA	111	116	74.6	211	604 J
TMC-6	U	U	8.75 F	U	U	U
TMC-7	7,500	115	101	7.97 F	54.7	28.3
TMC-8	U	U	U	U	NS	NS

Notes:
U = not detected.
F = The analyte was detected above the MDL but below the RL.
J = The analyte was an estimation.
NA = not available.
NS = not sampled

Figure 5

Sediment PCB Concentration Trends at TMC

Table 12

Fall 2006 Fish Sampling PCB (sum of congeners) Results at TMC

Sampling Location	TMC-1	TMC-2	TMC-3	TMC-4	TMC-5
Range of PCB Detections (µg/kg)	902 – 2,890	250 – 1,370	998.7 – 1,858.13	1,628.91 – 5,192.56	1,700 – 2,576.91
Exceedances above NYSDEC Piscivorous Wildlife Criteria	7	10	5	5	6
Exceedances above NYSDOH Fish Advisory Guidelines	1	0	0	3	4

The fish tissue sampling result trends for PCBs are illustrated in Figure 6.

7.2.3.4 Benthic Qualitative Assessment

The results of the benthic qualitative assessments conducted in 2006 and 2009 showed that the creek was slightly-to-moderately impacted according to the NYSDEC Biomonitoring Unit protocol for slow and sandy streams. Since there is sandy substrate and slow water flow in portions of the creek, TMC is considered a poor habitat for benthic macroinvertebrates. Therefore, the slightly-to-moderately impacted classification may be due to the poor habitat and not chemical conditions in surface water or sediment.

7.3 Regulatory Drivers

SD031 is regulated under the CERCLA of 1980, as amended, and NCP. NYSDEC piscivorous wildlife criteria and NYSDOH Fish Advisory Guidelines are used for fish tissue sampling results and NYSDEC most stringent ecological screening values are used for sediment sampling results. NYSDEC Class C Surface Water Standards.The site activities are conducted under the supervision and recommendations of the USEPA, Region II and NYSDEC.

7.4 Proposed Outcome

The proposed outcome for this site is Site Closure.

7.5 Pathways to Achieve Proposed Outcome

7.5.1 Pathway to Proposed Outcome

The pathway to the proposed outcome is to demonstrate the stabilization/decline of site contamination, the effectiveness of the remedial action, and the absence of source site impact. Monitoring will continue at SD031 through annual sediment sampling at seven sampling locations and fish tissue at five sampling locations. Fish tissue sampling will be conducted in 2012 and 2015. The LTM schedule is provided in Table 13 and the LTM sampling summary is provided in Table 14.

Additionally, continued source control will be conducted through the monitoring of potential source sites which include LF007 (Landfill 5), LF009 (Landfill 6), and SD052 (Landfill 6 TCE Plume). The remedies have been implemented at all of these sites.

Table 13

SD031 LTM Schedule

Period of Performance		
Years	Activity	Performance
2011	Sediment Sampling	4th Quarter (October 2011)
2012	Benthic Qualitative assessment	3rd Quarter (August 2012)
	Sediment Sampling and Fish Tissue Sampling	4th Quarter (October 2012)
2013	Sediment Sampling	4th Quarter (October 2013)
2014	Sediment Sampling	4th Quarter (October 2014)
2015	Benthic Qualitative assessment	2nd Quarter (June 2015)
	Sediment Sampling and Fish Tissue Sampling	3rd Quarter (July 2015)
	Closure Report	3rd Quarter (August 2015)

7.5.2 Metric Development: Proposed End Point, Metrics, and Approach

The following details the approach and rationale of sediment sampling, fish tissue sampling and benthic qualitative assessment. The rationale for discontinuing surface water is also provided below.

Sediment Monitoring:

Annual sediment sampling for PCBs, SVOCs, and pesticides analysis will be conducted at seven sampling locations (TMC-1, -2, -3, -4, -5, -6, and -7). PCBs, SVOCs, and pesticides have been reported in the sediment above the most stringent ecological screening criteria. However, previous LTM data shows that the RA has significantly reduced the chemical of concern concentrations by over two orders of magnitude. Additionally, data shows that the RA goal of reducing PCB concentrations to 1 ppm or less throughout the creek has been achieved. The continued sediment sampling will be conducted to demonstrate the reduction and stabilization of sediment contaminants.

Fish Tissue Sampling:

Fish tissue sampling is proposed at five sampling locations in 2012 and 2015. Fish samples will be analyzed for pesticides, PCBs, mercury, cadmium, and % lipids. The 2006 and 2009 fish tissue sampling results showed pesticide, PCBs, and metals above NYSDEC piscivorous wildlife criteria. Additionally, tissue samples from three sampling locations (TMC-1, -4, and -5) showed PCB levels above NYSDOH fish advisory guidelines.

Figure 6

Fish Tissue PCBPCB Concentrations at TMC

The COC concentrations in fish tissue are stable and it is anticipated that the PCB concentrations in the fish tissue will decline over time in lockstep with the PCB concentrations decline in the creek sediments. However, since PCBs are persistent chemicals, the PCB concentrations in the sediment are expected to decline over a prolonged period of time (decades). Additionally, TMC is a closed system with no entry or exit way for fish to migrate in and out of the creek. Therefore, since levels are expected to be stable for decades, with no change in fish population due to a lack of fish migration opportunities, the PCB levels in the fish tissue are expected to decline slowly over a decade long period. Since all remediation actions have been successfully completed, closure of the site will be recommended following the 2015 sampling round after COC stability has been shown.

Benthic Qualitative Assessment:

Benthic Qualitative assessments will be conducted in 2012 and 2015. The assessments of fall 2006 and fall 2009 showed an impaired habitat, possibly due to the sandy substrates and low flow at the creek and not chemical conditions in the surface water and sediment. The additional benthic qualitative assessments will be used to track trends in the ecological community and water quality at the creek.

Surface Water Monitoring:

Surface water sampling is proposed to be discontinued since the source of any surface water contamination has been confirmed to be a result of the contaminated suspended solids from sediments. Additionally, TMC surface water is proposed for sampling in the LF007 (Landfill 5) and LF009 (Landfill 6) LTM networks. It is anticipated that any potential contamination in the creek will be identified through these source area LTM networks.

5-Year Review:

SD031 will be included in the 2015 5-Year Review to evaluate the protectiveness of the remedy and assess the proposed closure of the site.

7.6 Contingencies

Following this POP, if it is found that COCs at the creek increase or the ecological community does not continue to improve or if site closure is not approved, additional monitoring will be performed to evaluate the protectiveness of the selected remedy. The XXXX team will recommend monitoring every 5 years in conjunction with the 5-Year Review during the post POP years.

Table 14

SD031 AOC LTM Network Summary

Sampling Locations	Sampling Rationale	Sample Medium/ Target Analytes/ Method Numbers	Sampling Frequency	Evaluation Criteria/ Modification Justification
TMC-1 TMC-2 TMC-3 TMC-4 TMC-5	Upstream, northern fork Downstream of Landfill 5 tributary Downstream of Landfill 5, cross gradient of Landfill 6 Downstream of Base Boundary In TMC Pond	**Sediment** SVOCs/SW8270, Pesticides/SW8081, PCBs/SW8082, Mercury/SW7471 **Fish** Cadmium/SW6010, Mercury/SW7471, Pesticides/SW8081, PCBs/SW8082, % lipid.	Annually for sediment. Every Three Years for fish tissue sampling and benthic qualitative assessments	Sediment and fish will be sampled annually to track COC concentrations. Benthic qualitative assessments will be conducted to track trends in water quality and the ecological community.
TMC-6 TMC-7	Upstream, southern fork Landfill 5 tributary	**Sediment** SVOCs/SW8270, Pesticides/SW8081, PCBs/SW8082, Mercury/SW7471	Annually for sediment.	Sediment is sampled annually to track COC concentrations.

SECTION 8.0

SD032 (SIX MILE CREEK AOC)

A Physical Tab Divider Will Be Included Here in the Hardcopy Optimization Plan

8.0 SD032 (SIX MILE CREEK AOC)

8.1 Site Description

SMC is a natural stream bordered by wetlands and enters the base from the north. The creek is approximately 8 feet wide and 1.5 feet deep prior to entering the base and approximately 20 feet wide and 4 feet deep after leaving the former base. The on-base portion of the creek is approximately 8,400 feet long, split in an upper and lower section, plus an additional 7,200 feet within the runway culvert separating both sections. The creek continues off base for approximately 2 miles, ultimately flowing into the NYS Barge Canal.

Surface water runoff from Landfills 1, 2/3, and 7, the Weapon Storage Area (WSA), WSA Landfill, runway, on-base shops, and Rainbow Creek flows to the creek. Leachate from the same landfills also seeps into the creek. However, recent and historical data show that concentrations are below or within one order of magnitude of the NYS Surface water Standards. Portions of the base storm water system discharge to the on-base lower portion of the creek. During operation, the base storm water system also received rinse water and washdown, which may have contained oils, solvents, and fuels from various base facilities.

SMC has been classified as a NYSDEC Class C stream. According to the New York Code of Rules and Regulations (NYCRR) 701, the best usage for Class C stream waters is fishing, where waters shall be suitable for fish propagation and survival. Based on an Aquatic Habitat Assessment, at least 12 species of fish are found in SMC.

The ROD for SMC AOC was signed by the USEPA on March 26, 2004 and LTM was initiated in October 2004. In addition, 5-Year Reviews were conducted in 2005 and 2010. Both 5-Year Reviews indicated that the selected remedy is protective of human health and the environment.

8.2 Six Mile Creek AOC Conditions

8.2.1 Previous Investigations

Preliminary studies of SMC were performed in 1981 and 1988. Soil, sediment, and fish tissue samples were collected. Numerous metals and polynuclear aromatic hydrocarbons (PAHs) were detected in the sediments. Several metals and polychlorinated biphenyls (PCBs) were detected in the fish tissue samples at levels below the Food and Drug Administration (FDA) action level of 2.0 ppm but above the 0.1 ppm level representing risk to piscivorous wildlife. The results of these studies led to the performance of an RI in 1994 and 1995.

The RI was performed to evaluate the nature and extent of environmental contamination at the site and to determine whether RA was necessary to eliminate potential threats to human health and the environment from exposures that might arise under existing or expected future site conditions. The RI included an aquatic survey that evaluated creek habitat, water quality, benthic and drift macroinvertebrate communities, and fish populations at three stations along the northern section of the creek (SMC-FS1, SMC-FS2, and SMC-FS3, similar in location to location SMC-1 and -2). At approximately the same three locations, sediment samples were collected for toxicity testing and fish

samples were collected for pesticides, PCBs, and metals analyses. Results from the sediment toxicity tests performed as part of the aquatic survey indicated that chemicals were not present at levels acutely toxic to aquatic life; however, the benthic macroinvertebrate community at one station was classified as slightly impaired.

During the RI, surface water samples were collected over several rounds of sampling from 21 locations: 14 from SMC, one at the AFFF lagoon, three in the Mohawk River, and three in the Barge Canal. Two VOCs, 14 SVOCs, four pesticides, six metals, cyanide, and sulfide were detected at concentrations above the most stringent criteria for surface water. Sediment samples were collected at two depths below the surface water/sediment interface from the same 21 locations. Three VOCs, 18 SVOCs, 20 pesticides, one PCB and six metals were detected at concentrations above the most stringent criteria for sediment.

In 1995, the NYSDEC conducted a benthic macroinvertebrate community analysis for SMC just downstream of the former AFB's boundary at the Route 365 bridge. Due to a significantly impacted benthic macroinvertebrate community, the water quality was assessed as being moderately impacted. Fish population data indicated that fish communities were generally in fair condition and whole-body fish tissue concentrations indicated that PCBs, pesticides and mercury were present at levels exceeding NYSDEC ecological risk guidelines. The PCB concentrations in fish tissue also exceeded the previously mentioned FDA action level.

Also in 1995, NYSDEC performed passive in situ concentration/extraction sampling (PISCES) on the lower portion of SMC to test for PCBs and other organochlorines. No contaminants were detected. However, naturally occurring conditions, such as below average rainfall and low flow in the stream, may have affected the ability of PISCES samplers to detect contaminants.

As part of a basewide SI performed in June 1997, one water sample was collected from a storm sewer manhole located within the SMC culverted section, and two surface water samples were collected from the storm sewer outfalls at the headwaters of Rainbow Creek. No contaminants were detected in these water samples. In addition, ten PISCES samples were collected for pesticides and PCBs analyses from SMC, two from unnamed tributaries to the creek, and one from the Rainbow Creek Tributary. No PCBs were detected. The levels of pesticides found in Rainbow Creek and downstream in SMC were higher than in the upper portion of SMC and the other tributaries. There are no screening criteria for PISCES samples.

In July 1998, additional SI samples were collected, primarily from off-Base locations, to fill data gaps that had been identified in the RI sampling. These included two surface water samples and 12 sediment samples. Three metals were detected above the most stringent criteria for surface water. Ten SVOCs, PCBs, dioxins/furans, and two metals were above the most stringent criteria for sediment.

In July 1999, the habitat quality of the creek was visually inspected by AFRPA, USACE, NYSDEC, USEPA, and U.S. Fish and Wildlife Service (USFWS). A brief walkover of the on-Base portion revealed the presence of orange floc (iron oxide) at a few locations above and below the culvert. This was attributed to the presence of leachate seeps with

extensive orange floc upstream at Landfill 1. A more extensive walkover of the off-Base portion of the creek revealed an aquatic habitat of relatively high quality. The surrounding habitat is also of high quality for plants and wildlife, including extensive areas of forest, shrub, and emergent wetlands. The presence of cloudiness and some orange floc in the water column was observed. The floc is probably due to leachate seepage from Landfill 1. However, it should be noted that high concentrations of iron were observed in background conditions (E&E, July 2003).

8.2.2 Record of Decision

The ROD for the SMC AOC was issued by the Air Force in December 2003 and signed by the USEPA in March 26, 2004. Based on the previous investigations and environmental conditions at the site, the selected remedy is Source Control at sites potentially discharging to SMC and LTM of the SMC AOC, stated in the ROD.

8.2.3 Six Mile Creek AOC Long Term Monitoring

LTM at the SMC AOC was initiated in October 2004 and consisted of annual surface water and sediment sampling at twelve sampling locations (SMC-1 through -12) and fish tissue sampling and a benthic qualitative assessment is conducted every three years at 5 sampling locations (SMC-1 through -5). These locations are illustrated in the SMC AOC sampling location figure in Attachment A. Surface water sampling, sediment sampling, fish tissue sampling and a benthic qualitative assessment was performed in fall 2004 and fall 2007. Surface water and sediment sampling was also conducted in fall 2005 and fall 2006.

As recommended in the fall 2007 LTM Report, only SMC-1, -2, -4, -5, and -11 were sampled in 2008 and 2009. Seven locations were removed as a result of little to no contamination reported at the sites over four consecutive sampling rounds. During these events, surface water and sediment sampling was conducted.

In fall 2010, surface water samples, sediment samples, fish tissue samples, and benthic qualitative assessments were conducted at sampling locations SMC-1, -4, and -5. A benthic qualitative assessment was also conducted at SMC-2. No sediment samples were collected here due to the absence of contamination and surface water sampling is conducted under the Landfill 1 LTM network. Sampling location SMC-11 was removed from the LTM network following the installation of the Rainbow Creek culvert.

8.2.3.1 Surface Water:

Results from annual surface water sampling conducted between 2004 and 2010 showed VOC, SVOC, and metals concentrations above NYS Surface water Standards. One VOC (benzene) exceedance was present at two sampling locations, SMC-4 and -5. However, benzene concentrations have not been detected above the NYS Surface water Standards at these locations since 2008. The historical exceedances were attributed to the Apron 2 Petroleum Spill Site, which is upgradient of the creek and currently undergoing active remediation through horizontal biosparging. The benzene detections reported at the site during the LTM surface water sampling are provided in Table 15. The NYS Surface Water Standard for benzene is 1 µg/L.

Table 15:

Benzene Detections (µg/L) in Surface Water Samples at SMC

Sampling Round	SMC-4	SMC-5
2004	5.8	3.8
2005	2.1	3
2006	5.98	3.61
2007	3.38	2.01
2008	2.53	1.21
2009	0.78	0.67
2010	U	U

Notes:
U = not detected
F = the analyte was reported above the MDL but below the RL.
NS = not sampled.
X = exceedance of NYS Surface Water Standard.

Samples from several locations have reported SVOC and metals concentrations above NYS Surface Water Standards. However, concentrations were within one order of magnitude of the NYS Surface Water Standards or attributed to background conditions. There were no PCB or pesticide exceedances reported in any of the sampling events.

8.2.3.2 Sediment

Results from annual sediment sampling conducted between 2004 and 2010 showed SVOC, metals, pesticides, and PCBs concentrations above the NYSDEC's most stringent ecological screening values. Sediment sampling results are provided in Attachment B. The following summarizes the latest LTM sampling results (fall 2010).

- Up to eight SVOC detections were reported at all three sampling locations, but concentrations did not exceed the most stringent ecological screening values. Additionally, two of the SVOCs detected at each location were also detected in the associated blank.

- No pesticides were detected in any of the three locations.

- One PCB detection was reported: Aroclor 1254 exceeded the most stringent ecological screening value (15.96 µg/kg) at sampling location SMC-5 (50.2 µg/kg). No PCBs detections were reported from sampling locations SMCs -1 and - 4. The most stringent ecological screening value for Aroclor 1248 and 1254 is 15.96 µg/kg. The most stringent ecological screening value for Aroclor 1260 is 5 µg/kg.

PCB exceedances observed during LTM sampling show a decreasing trend compared to the 1994 RI sampling round, at applicable sampling locations (SMCs -1, -4, and -5). However, there is no discernable trend among the seven LTM rounds. The PCB detections reported at SMC-4 and -5 during the LTM sediment sampling are provided in Table 16. The PCB results trends for SMCs -4 and -5 are illustrated in Figure 7.

Table 16

PCB Detections (µg/kg) in Sediment Samples at SMC

Sampling Locations	PCB (Aroclor)	SamplingRound						
		2004	2005	2006	2007	2008	2009	2010
SMC-4	1248	54	9.9 F	U	U	U	U	U
	1254	61	52	67.1	120 J	14.5 F	72.7	U
	1260	19 F	U	U	U	U	U	U
SMC-5	1248	U	U	U	U	U	U	U
	1254	24 F	U	U	92.6	U	U	50.2
	1260	U	U	19.4 F	U	U	U	U

Notes:
U = not detected
F = the analyte was reported above the MDL but below the RL.
J = the analyte was detected, the quantitation is an estimate.
X = exceedance of screening value.

8.2.3.3 Fish Tissue

During the 2004 LTM event, fish tissue sampling was conducted at sampling locations SMC-1, -2, -3, -4, and -5. Results showed PCB detections at all sampling locations, including SMC-1 which is the upgradient location. PCB exceedances of the NYSDEC piscivorous wildlife criteria were reported at sampling locations SMC-4 and -5. However, the concentrations were not above the NYS Department of Health Fish Advisory Guidelines.

Sampling locations SMC-3, -4, and -5 were sampled in 2007. Results showed PCB detections at all sampling locations. PCB exceedances of the NYSDEC piscivorous wildlife criteria were reported at sampling locations SMC-4 and -5. However, the concentrations were not above the NYS Department of Health Fish Advisory Guidelines.

Fish sampling was again conducted at SMC-1, -4, and -5 in 2010. No fish samples could be collected at SMC-2 due to the beaver pond. The samples from SMC-1, -4 and -5 were analyzed whole for ecological evaluation. No exceedances were reported in fish tissue samples at SMC-1, but one PCB (aroclor 1254) was detected. This location is upstream of all former Griffiss AFB source sites. PCB exceedances of the NYSDEC piscivorous wildlife criteria were reported at sampling locations SMC-4 and -5. However, the concentrations were not above the NYS Department of Health Fish Advisory Guidelines.

Fish Tissue Sampling Summary

The range of total PCB concentrations from the 2010 sampling round was lower than the total PCB concentration ranges from both the 2004 and 2007 sampling rounds. The sediment sample at this location did not show any PCB detections during the 2010 sampling round. The fish tissue sampling result trends for PCBs are illustrated in Figure 8.

Figure 7

Sediment PCB Concentration Trends at SMC

8.2.3.4 Benthic Qualitative Assessment

Benthic Qualitative Assessments were conducted at locations SMC-1, -2, -3, -4, and -5 in 2004, at SMC-2, -3, -4, and -5 in 2007, and at SMC-1, -2, -4, and -5 in 2010. Results from 2010 showed an improvement in water quality impacts in the creek at sampling locations SMC-1, -4, and -5. The water quality at SMC-1 and -5 was non-impacted in the 2010 sampling round. SMC-1 was slightly impacted in 2004 (not sampled in 2007) and SMC-5 was slightly impacted in 2004 and 2007. Both locations have ideal macro invertebrate habitat including a rocky substrate with faster water flow rates.

The water quality at SMC-4 was slightly impacted during the 2010 sampling round. This location was moderately impacted during the 2004 and 2007. Only 36 specimens could be collected using the kick sampling method at this location. However, the number of specimens collected has increased from the 2007 sampling round when only 26 specimens were collected. Additionally, only 84 specimens were collected at SMC-4 in 2004. Therefore, given the substrate and overall habitat of the sampling location, the low yield is not believed to be attributed to water quality but poor habitat.The water quality at SMC-2 remained similar when compared to previous sampling events (moderate). This location had sandy substrate and is downgradient of Landfill 1. At this location, a beaver dam has been constructed generating slow water flow rates. The sample was collected upstream of the pond in a narrower and shallower portion of the creek. The slow water flow rates can contribute to lower oxygen rates in the water and a less favorable benthic habitat.

8.3 Regulatory Drivers

SD032 is regulated under the CERCLA of 1980, as amended, and the NCP. The site activities are conducted under the supervision and recommendations of the USEPA, Region II and NYSDEC.

8.4 Proposed Outcome

The proposed outcome for this site is Site Closure.

8.5 Pathways to Achieve Proposed Outcome

8.5.1 Pathway to Proposed Outcome

The pathway to the proposed outcome at SD032 is additional annual sediment monitoring to show that the site COCs have stabilized or have declined. In addition, benthic qualitative assessments will be conducted in 2012 and 2014.

Monitoring will continue at SD032 through annual sediment sampling at two sampling locations. Benthic qualitative assessment will be conducted at one location The LTM schedule is provided in Table 17 and the LTM sampling summary is provided in Table 18.

Additionally, continued source control will be conducted through the monitoring of potential source sites which include LF001 (Landfill 1), LF002 (Landfill 2/3), LF003 (Landfill 7), Apron 2, SD052 (Landfill 6 TCE Plume) and AOC-9. The remedies have been implemented at all of these sites.

Table 17

SD032 LTM Schedule

Period of Performance		
Years	Activity	Performance
2011	Sediment Sampling	4th Quarter (October 2011)
2012	Benthic Qualitative assessment	2nd Quarter (June 2012)
	Sediment Sampling	4th Quarter (October 2012)
2013	Sediment Sampling	4th Quarter (October 2013)
2014	Benthic Qualitative assessment	2nd Quarter (June 2014)
	Sediment Sampling	4th Quarter (October 2014)
2015	Sediment Sampling	3rd Quarter (July 2015)
	Closure Report	3rd Quarter (August 2015)

8.5.1 Metric Development: Proposed End Point, Metrics, and Approach

Sediment Monitoring:

Sediment sampling will be conducted in SMC at two sampling locations for PCBs (SMC-4 and -5). SMC-4 and -5 are located downgradient of the Rainbow creek culvert.

Previous sampling results shows that sediment contamination is limited to sampling locations down-gradient of Rainbow Creek (SMC-4 and -5). Due to the completion of the culvert in Rainbow Creek in 2009, we expect to see a decreasing trend in PCB detections as the potential for contaminated sediment migration has been eliminated.

SVOC and pesticide will be discontinued from the LTM network as previous exceedances are declining and within one order of magnitude of the most stringent ecological values or indicative of background conditions. Additionally, it should be noted that pesticides containing these COCs are no longer used at the former Griffiss AFB.

Fish Tissue Sampling:

The XXXX team proposes to discontinue fish tissue sampling at SD032. LTM data from 2004, 2007, and 2010 has shown that contaminant concentrations are below NYSDOH Fish Advisory Guidelines and less than one order of magnitude of the NYSDEC piscivorous wildlife criteria. Additionally, the sampling data shows a declining trend throughout the site.

In evaluating the necessity of fish tissue sampling at SD032, additional fish sampling data from waterways in Rome, New York were reviewed using the NYSDEC's fish contamination database. Fish tissue sampling from the Mohawk River (above Rome) and

Figure 8:

Fish Tissue PCB Concentration Trends at SMC

Barge Canal (below Rome) showed PCB detections in the fish. The average PCB concentrations at both sampling locations ranged from 30-70 µg/kg. PCBs were also detected in SMC-1, the upgradient location in the SD032 LTM network. The fish tissue results showed PCBs up to 40 µg/kg at this location. This location is isolated from the lower section of SMC and former Griffiss AFB source locations by the SMC culvert. The fish tissue sampling results from the upgradient location at SMC and the two independent locations shows that PCBs are present in previously thought un-impacted waterways. It has been demonstrated that fish in the lower section of SMC have been impacted as a result of the PCB contamination at Rainbow Creek; these results are still within an order of magnitude of regional results.

With fish tissue sampling, a large number of fish are removed. During the 2010, several mature brown trout were used for samples, thus potentially impacting the reproduction success of trout in this portion of the creek. Therefore, removal of the fish tissue sampling is also recommended to promote the continued recovery and fish diversity of the creek.

Benthic Qualitative Assessment:

Benthic qualitative assessment will be conducted at SMC-5 to provide a continued habitat assessment as contamination declines. Assessments will be conducted in 2012 and 2013. Previous assessments at this location have shown non-impacted water quality. The assessment at SMC-5 will serve as an indicator of water quality at the lower section of the creek.

5-Year Review:

SD032 will be included in the 2015 5-Year Review to evaluate the protectiveness of the remedy and assess the proposed closure of the site.

8.6 Contingencies

Additional LTM at SD032 will be conducted to ensure that the selected remedy is protective of human health and the environment. If it is found that COCs at the creek increase or the ecological community does not continue to improve, additional monitoring will be performed to evaluate the protectiveness of the selected remedy. Monitoring will continue on an annual basis.

If the COCs do show stable/decreasing trends; however, site closure is not approved. The XXXX team will recommend monitoring every 5 years in conjunction with the 5-Year Review.

Table 18

SD032 AOC LTM Network Summary

Sampling Locations	Sampling Rationale	Target Analytes/ Method Numbers	Sampling Frequency	Evaluation Criteria/ Modification Justification
SMC-4	Downgradient of former PCB source	**Sediments** PCBs/SW8082	Annually for sediment.	Sediment samples at SMC-4 to monitor potential downgradient contamination trends.
SMC-5	Downgradient of former PCB source		Annually for sediment Benthic Qualitative Assessment in 2012 and 2014	Sediment samples at SMC-5 will be sampled to monitor potential downgradient contamination trends. Additional benthic qualitative assessments will be conducted to ensure that the creek environment is not declining

SECTION 9.0

SS060 (BUILDING 35 AOC)

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9.0 SS060 (BUILDING 35 AOC)

9.1 Site Description

Building 35 was located in the southeast-central section of the base (Figure 1-2), near an area that was used for outside storage of drums and scrap material during the 1940s. An unknown quantity of drums and transformers were also stored in this area during the late 1960s and 1970s. Site closure was a requirement under the Building 35 Resource Conservation and Recovery Act (RCRA) Hazardous Waste Storage permit and the closure activities were performed in the late 1990s (OHM Remediation Services Corporation [OHM], July 1997).

The former Hazardous Waste Storage Area (HWSA) was located in the southwest corner of Building 35 and was approximately 30-by-50 feet in area. Although a hazardous waste inventory is not available for the area, the area was assumed to contain waste associated with aircraft maintenance activities such as corrosion control painting, degreasing, and routine engine, wheel and tire services. There is no record of any spills at the HWSA.

The former PCB storage area was located in the northwest corner of Building 35 and occupied an approximate area of 37 by 46 feet. Inspection reports indicate that PCB items were stored in the area since at least 1985. Also, a spill in the PCB area was recorded on October 25, 1991, when approximately one quart of transformer oil leaked from a damaged terminal onto part of a wooden pallet and a 2-inch-diameter spot on the concrete floor. The oil was tested and was reported below 5 ppm PCBs. Base records also report a small PCB spill on March 16, 1995, which reportedly happened when a PCB-containing transformer was moved from the containment area within Building 35. The spill area, approximately 20 square feet, was properly remediated.

9.2 Current Conditions

Closure activities for the HWSA and PCB areas in association with RCRA NYSDEC Permit #6-3-13-00063/00020-0 were conducted by OHM in 1996 in accordance with Closure Plans approved by the NYSDEC in 1995. The Closure Plans were designed to ensure that the Building 35 storage areas would require no further maintenance after clean closure, and threats to human health and the environment would be minimized or eliminated. The closure activities included the collection of pre-closure wipe samples from each storage area and surface soil samples (0-1 feet bgs) from the outside perimeter of the building. Twelve surface soil samples were analyzed for PCBs, and all twelve samples indicated elevated concentrations of PCBs above the recommended action level of 1 ppm (OHM, July 1997).

A remedial action was conducted in 1997 to demolish Building 35, excavate, transport, and dispose of PCB-contaminated soil and debris, and backfill the area with clean soil after analysis of confirmation samples. After initial soil excavation, 82 confirmatory samples were collected, where 27 out of 68 grids had exceedances. Three additional rounds of soil excavation occurred; where in total 130 confirmatory samples were collected. Confirmatory samples were compared to state recommended cleanup levels, where values were taken from the NYSDEC Technical and Administrative Guidance Memorandum 4046. All values are reported in Table 3.1-2 Building 35 Area Confirmatory Sample Results Summary of Positive Hits and Validation Qualifiers, Appendix E of the Closeout Report Interim Remedial Action Building 35 Area (IT, May

1999). Approximately 24,414 tons of PCB-contaminated soil/concrete was removed during the excavation. An estimated 20,078 tons were disposed of offsite as non-hazardous soil/concrete, and 4,336 tons as hazardous soil.

Two groundwater monitoring rounds were conducted in May and July 1998, when samples were submitted for PCBs, VOCs, SVOCs, pesticides, and metals analyses. Results indicated two VOCs – vinyl chloride and total 1,2-DCE (including both the cis and trans isomers) – at levels above NYS Class GA Groundwater Standards in B035MW-4; total 1,2-DCE only was reported above the NYS Groundwater Standard in B035MW-3 (8 µg/L). Concentrations were reported up to 6 µg/L and 42 µg/L for vinyl chloride and 1,2-DCE, respectively, both in B035MW-4. No PCBs were reported above the detection limit during either sampling round (1 µg/L [2 µg/L for arochlor-1221 only] for May 1998 and 0.06 µg/L for July 1998) (OHM, April 2000).

In accordance with the closure requirements under the RCRA Permit for Building 35, threats to human health and the environment have been minimized or eliminated (i.e., source areas have been removed). The Air Force plans to monitor, under the On-Base Groundwater Contamination AOC, residual groundwater contamination for the COCs on an annual basis with a joint review by NYSDEC, USEPA, and the Air Force Real Property Agency (AFRPA) after 5 years; this intention was approved by NYSDEC in a letter dated December 8, 1999 (OHM, April 2000). The site was included in the 5-Year Review which was issued in 2010 (XXXX, September 2010).

Groundwater Remediation:

Based on LTM sampling results, direct injection was performed at the site in efforts to remediate COCs. The purpose of the direct injection activities is to degrade and remediate the chlorinated hydrocarbon plume at the site. Hydrogen Release Compound (HRC®) releases lactic acid for fermentation by microorganisms producing hydrogen as an electron donor. Hydrogen then degrades chlorinated hydrocarbons. HRC® was injected in December 2005 at the Building 35 AOC in a 50-foot wall with 5 injection points. HRC® was injected from 10-20 ft bgs at a rate of 8 pounds of product per foot. HRC® was injected in August 2006 at the Building 35 AOC in two 50-foot walls with 5 injection points. HRC® was injected from 10-20 feet bgs at a rate of 8 pounds of product per foot. Newman Zone® was injected in December 2008 in monitoring well B035MW-4 at the Building 35 AOC site. Newman Zone® releases emulsified vegetable oil for fermentation by microorganisms producing hydrogen as an electron donor. Hydrogen then degrades chlorinated hydrocarbons. One thousand pounds of product were injected. The injections were recommended as part of the LTM reports, including August 2005 Groundwater Monitoring Report (XXXX, August 2005) for the December 2005 injection, August 2006 Groundwater Monitoring Report (XXXX, August 2006) for the August 2006 injection, and May 2008 Groundwater Monitoring Report (XXXX, May 2008) for the December 2008 injection. The injection activities were summarized in the previous On-base Groundwater AOCs Monitoring Report (August 2006, August 2007, and August 2009, respectively).

Groundwater Monitoring:

Monitoring well B035MW-4 was the only well sampled in the April 2010 sampling round. Analyses were performed for chlorinated ethenes only for VOCs, and alkalinity, chloride, nitrate, sulfate, and TOC for groundwater chemistry.

The VOC results indicated two exceedances as oppose to past sampling rounds which indicated one exceedance. The two exceedances included cis-1,2-DCE at 13.1 µg/L and vinyl chloride (VC) at 3.03 µg/L. The VOC results indicated detections similar to past sampling rounds of perchloroethene (PCE) , trichloroethene (TCE), and trans-1,2-DCE which were all below their respective NYSDEC Class GA Groundwater Standards (Attachment B). Groundwater chemistry results indicated an increase in chloride concentration from 73 mg/L in March 2009 to 96 mg/L in April 2010, sulfate also increased from 2.7 mg/L in March 2009 to 11 mg/L in April 2010, and TOC decreased from 8.2 mg/L in March 2009 to 1.9 mg/L in April 2010. The TOC, VC, and cis-1,2-DCE concentrations are trended in Figure 9.

Land Use Controls/Institutional Controls:

The Griffiss Land Use Controls/Institutional Control (LUC/IC) Site inspection program, which included SS060 was implemented in 2006. This site is inspected annually with annual reporting. No violations have been reported at this site.

9.3 Regulatory Drivers

SS060 is regulated under the Griffiss CERCLA On-Base Groundwater Program. The site activities are conducted under the supervision and recommendations of the NYSDEC and USEPA.

9.4 Proposed Outcome

The proposed outcome for this site is site closure with restrictions following the 2012 sampling event.

9.5 Pathways to Achieve Proposed Outcome

9.5.1 Pathway to Proposed Outcome

The pathway to the proposed outcome at SS060 is additional vegetable oil emulsion injection and annual groundwater monitoring to support site closure with restricted use.

A vegetable oil emulsion injection will be performed around contaminated well B035MW-1. Monitoring will continue at B035MW-1 for two annual sampling rounds. The remediation/ LTM schedule is provided in Table 19 and the LTM sampling summary is provided in Table 20.

Figure 9

SS060 cis-1,2-DCE, Vinyl Chloride, and TOC Concentration Trends

Table 19

SS060 Remediation and LTM Schedule

Period of Performance		
Years	Activity	Performance
2011	Monitoring	2nd Quarter (June 2011)
	Remediation	3rd Quarter (July 2011)
2012	Monitoring	2nd Quarter (June 2012)
	Closure Report	1st Quarter (January 2013)
	Well Abandonment	2nd Quarter (April 2013)

9.5.2 Metric Development: Proposed End Point, Metrics, and Approach

Groundwater Injection:

A vegetable oil emulsion injection (Newman Zone® injection) will be conducted at B035MW-4 following the next groundwater sampling event. Approximately 1,800 pounds of vegetable oil will be sheared into an emulsion with a shear pump and heated groundwater and then injected into a 25 ft grid surrounding monitoring well B035MW-4. The sampling data following the injection is anticipated to confirm that VOC concentrations are declining and that the vegetable oil emulsion injection is effectively boosting site contamination remediation.

Groundwater monitoring following the 2009 Newman Zone® injection has shown that the injection has had an effect on the chlorinated ethene concentrations at the Building 35 AOC site. This is demonstrated by the decrease in cis-1,2-DCE concentration ultimately leading to the increase in the daughter compound VC. Currently, the TOC dissolved in the groundwater is limiting the degradation of cis-1,2-DCE. However, the TOC levels are declining.

The additional vegetable oil emulsion injection will further decrease TOC levels and enhance the degradation of chlorinated solvents in the aquifer.

Groundwater Monitoring:

Groundwater monitoring will be conducted at one monitoring well (B035MW-4) for two additional annual groundwater monitoring events. Samples will be analyzed for chlorinated VOCs (AFCEE QAPP 4.0 List) using EPA Method SW8260 and groundwater characteristics. The LTM sampling summary is provided in Table 2.

Site Closure:

As mentioned in Section 2, this site was closed under RCRA in 1999. In the 1999 Completion Report recommended the following LUC/ICs to be incorporated in the deed for this site.

- The deed will state that within the site boundary, the owner or operator will restrict the relocation of the contaminated soils below 1 foot of the surface from being placed outside the site boundaries. If the contaminated soil below 1 foot of

the surface is to be excavated, it must remain on site, stay covered if stockpiled, and covered by a minimum of 1 foot of clean fill once it is returned to the ground.

- The deed will prohibit the development and use of the property for residential housing, elementary and secondary schools, childcare facilities and playgrounds unless prior approval is received from the Air Force, USEPA, and NYSDEC.

- The deed will prohibit the extraction, utilization, or consumption of any water from the aquifer below the surface of the ground unless the water has been tested and found to meet all applicable standards and such owner obtains the prior written approval from the NYSDOH.

- The deed will include a covenant that the aquifer will not be used in any way that could spread or exacerbate environmental contamination or open exposure pathways to humans or the environment.

Therefore, SS060 cannot be closed with unrestricted use. Following one addition injection and two groundwater monitoring events, site closure with restricted use will be proposed. Given the current site conditions and proposed actions, site closure will be protective of human health and the environment with continued LUC/IC maintenance.

Monitoring Well Abandonment:

Following the approved closure of the site, all four remaining monitoring wells (B035MW-1, -2, -3, and -4) will be decommissioned. The wells will be decommissioned using NYSDEC approved decommissioning techniques.

Land Use Control/ Institutional Controls:

LUC/ICs have been inspected at this site since 2006. These inspections will continue during this POP.

9.6 Contingencies

Potential risks at the site include the increase in chlorinated VOC concentrations. However, it has been determined that all contaminants sources have been removed from the site so an increase appears unlikely. Additional monitoring and vegetable oil emulsion injection will be conducted if declining trends are not confirmed after the 2012 sampling event.

Table 20

SS060 AOC LTM Network Summary

Sampling Locations	Sampling Rationale	Target Analytes / Method Numbers	Sampling Frequency	Evaluation Criteria / Modification Justification
B035MW-4	Downgradient of potential source	VOCs – (Specified COC Short List) / SW8260 COCs - PCE, TCE, cis-1,2-DCE, trans-1,2-DCE, and VC.	Annual	Continue to verify the cis-1,2- DCE attenuation. Analysis for VOCs (chlorinated ethenes short list only) will occur annually, after which the results will be evaluated to assess future monitoring frequency.

SECTION 10.0
SUSTAINABLE PRACTICES

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10.0 SUSTAINABLE PRACTICES

The majority of personnel are on site (XXXX) thus reducing mobilization and demobilization time for system O&M, monitoring, and annual LUC/IC inspections which decreases fuel consumption and thus carbon emissions. Optimization of the LTM networks will also reduce fuel consumption as field requirements will be decreased. In addition, XXXX's team will produce the annual LTM Reports, LUC/IC Site Inspection Reports, the 2015 5-Year Review, and Site Closure Reports while minimizing paper usage by including all appendices on compact discs.

SECTION 11.0
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11.0 REFERENCES

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Attachment A

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Attachment B

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